Message

From: Cirian, Mike [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=98D0FD2CBB3F4F25B819C6929E18D08D-CIRIAN, MIKE]
Sent: 4/30/2018 2:58:45 PM
To: John.Stroiazzo@glencore.ca; Michael Ritorto [mritorto@rouxinc.com]; Andrew Baris [abaris@rouxinc.com]; Steve Wright - CFAC [swright@cfaluminum.com]
CC: Gunnar Emilsson [EmilssonGR@cdmsmith.com]
Subject: FW: CFAC 2018 Phase 1 Document Comments

Hello John,

I am sharing this email from Nino in order to see if you and your staff would draft a response for me in order to help address his concerns. This is a rather lengthy email in which I think we have addressed these issues. But I could use the help with the details.

Thanks,
Mike

Mike Cirian, PE
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From: Sue Berube [mailto:subarube@hotmail.com]
Sent: Sunday, April 29, 2018 2:11 PM
To: Cirian, Mike <Cirian.Mike@epa.gov>; Sue Berube <subarube@hotmail.com>
Subject: CFAC 2018 Phase 1 Document Comments

Hi Mike,
Here are my comments on the work done so far. Please call if you have any questions.

March 31, 2018

Mike Cirian
U S Environmental Protection Agency
108 East 9th St. Suite 1
Libby, Montana 59923

Mike,

You have asked for comments on the Phase I RI -FS Site Characterization Document that CFAC prepared for the Aluminum Plant and you released to the public in early 2018.

My initial thoughts after reading this multi- thousand page document is that it was nice to have the additional information about the plant; but it really didn't improve the knowledge base much because Glencore with your, and MDEQ's permission, allowed them to not include findings from earlier studies in 1993 and 2013. This included the long track history of the drinking water wells,
the existence of other know plumes under the plant, and the extremely difficult answers CFAC is seeking to avoid where production wells 3, 5 and 7 are concerned. This data from these 3 wells makes the assertions made by John Stroiazzo in 2017 and conclusions in this document highly suspect or outright false. In addition CFAC has claimed multiple times that this document would be out in the fall of 2017 and would include all four sets of sampling data. I only found the first two. What happened to the last two sets. Mr. Stroiazzo in April of 2017 released data on the first two sets of data to the local news outlets that claimed the data showed the pollution problem at the site was small, known, and in one specific location far away from anything else. In a CFAC liaison meeting in October of 2017 he verbally contradicted this and said a second waste dump is now also believed to be leaking. Why didn't you make sure these last two sets of samples were included in this document so that a review of all the data could be done at one time. Your schedule states that this Phase I data is the basis for a BRAWP, Phase 2 sampling plan and Human Health Risk Analysis. These are critical and you haven't provided all the data to the public to review so they can accurately participate in setting up these important studies. You need to delay all of these document productions until all of the data is clearly presented to the public so they can question you, your technical contractor and MDEQ experts about their understanding of the plants historical operation and its pollution footprint. A TAG from the EPA for this plant would go a long way in getting competent technical analysis of this plant completed. If you looked at Mr. Stroiazzo's rebuttal of my June letter to the Hungry Horse News you will see where CFAC is avoiding responsibility for the waste they put in the ground and siting either EPA or MDEQ at least 8 times for approving, by regulation, permit or verbal discussion of Roux's plans pollution causing or sampling methods that hide important data from the public. This phase I document has data gaps because of questionable decisions by regulators with questionable understanding of this plants historical operations.
From this opening statement I believe it is safe to say I don't think Phase 1 sampling plans do a credible job of defining the size and location of the problem.

I will try and address several of the shortfalls of this document and effort expended so far.
Historically, I approached CFAC and EPA in April of 2015 offering to personally escort the two parties on a tour of the plants known historical problem areas. It took me until October of 2015 to get this tour opportunity. In that tour I showed all of you 11 separate sites with known problems. CFAC voice recorded this tour and produced a document that purported to restate everything I said. It was presented to me for my signature and I refused to sign it for two reasons. One there were multiple mistakes on sizes, dimensions, locations and historical conditions and operations at selected sites and the second and most critical was the CFAC lawyers statement at the bottom of every page that this data was CFAC's and was protected by attorney client privilege. I'll discuss how CFAC put my data to use later; but first I'll restate the items I presented in their conference room as the basis of my picking the tour sites.
I told them their studies needed to analyse the following key decisions made by company owners that allowed the pollution to claim this site.
Key Decisions:
1.Diverting main stem of Flathead River and placing Sewer Lagoons and Water Wells on river island.
2.Allowing fluoride and cyanide to flow unregulated into Flathead River for 35 to 55 years.

3.Allowing Spent Potliner to be stored underground or sit on surface where water can leach.
4.Allowing Fluoride to be stored underground or sit on surface where water can leach.
5.Allowing process cooling water that contains heavy metals or organic carcinogens to be forced back into the underground water acquifer.
6.Unsupervised in-holdings causing environmental damage.
7.Rectifier transformer oil,used vehicle lubricants used for dust suppression on roads and dumps.
8.Minimal segregation of wastes and no maifest records or knowledge of what is buried in dumps.
9.Non-transparent process to regulators that was used to prepare plant for sale in 1990's. Building removals, compromised waste dump caps.
10.Potential contamination from unknown single wall tanks used for fuels and waste oils.- rectifier,garage, oil incinerator.
11.Conscious decision to exclude ex-CFAC employees from RI-FS preparation and technical review by EPA and Glencore.

With the exception of items one and seven these pollution causing problems were caused by one underlying premis that has caused plant owners great hardships with their decision making.

OUT OF SIGHT -- OUT OF MIND

Plant management starting in the early 1950's and continuing until the 1980's intentionally fought all efforts to move plant wastes to pubic facilities and concentrated on building and utilizing 7 to 9 dump sites for all plant waste without creating any system to segregate or carefully catalogue what was buried and where. There is only one of these sites that has a clay base under the waste. All other sites are directly exposed to water sources.

These 11 owner decisions are the true basis of the pollution problems at the plant.

Back to my tour and how CFAC used the information I provided that morning.

First stop was the seep and I explained that this was just a small part of the problem. I told them that it extended both upstream and downstream from this area for considerable distance. They didn't tell me that in 2014 they got a new MPDES water permit from the State and that they added a 1.5 mile stretch of river as part of the seep. They were aware of this extended seep in previous permit renewals but chose not to add it to their permit until 5 years after they shutdown. We also stopped and talked about production wells 3 thru 7 with great emphasis on 5, 6, and 7. Five and seven fluoride and cyanide historically prove that their is a flow of contamination or a plume that flows south and east of the dump sites. The 1993 and 2013 sampling programs proved this existence. CFAC chose to drop all production well samples from phase 1 program and they claim EPA approved. An equally serious problem with a proven second plume of unknown origin in well 7. It is 61 feet deep and has historically been contaminated with both fluoride and cyanide. Well 6 is in the same building- six feet away and 72 feet deep and has never tested positive for high fluoride or cyanide. This presents two intractable problems for CFAC. They are at the magic alluvial layer boundary that has all the water flow and into the glacial till depth where it is claimed no significant water flows and there appears to be very strong evidence that rather than blanket flow of water under the site there are mini-streams that concentrate flows from a contamination source and deliver them to very specific underground locations where neighboring wells less than 6 feet away and screened 11 feet lower can pull 1500 gallons per minute yet remain pollution free. This well alone discredits much of the analysis and verbage in the phase 1 document about how and where water comes from and flows under the CFAC plant property. When you investigate production wells 3 and 5 you will encounter similar problem scenerios, especially if you read the results of the

drawdown tests that were done in 1993 with wells 3 and 5 and a contingent of upstream test wells that were drilled for the Hydrometrics study. This is a serious data gap in phase one data because you have no new wells or data that found this second plume and certainly the depths and location of the pollution appear to discredit your proposed theory on where pollution starts and how it gets to these locations.

Next stop was the cathode soaking area 1/3 of a mile north of the plant. We poured millions of gallons of water on freshly failed cathodes from the early 1970's into the late 1980's. The cathodes were dumped on the ground here and 2 or 3 one inch water lines sprayed this two acre area day and nite for most of 20 years. I told you that in preparation for the plants sale the owners at the time-early 1990's, ordered the service crew to push the gravel hill behind this site on top of it to make it go away. You proposed in your SAP and Remedial Phase 1 investigation to break this into 43 one acrea plots and do one bore sample per plot. I commented at the time your plan to do a surface and 2 foot deep samples was to shallow to catch this waste source. In your final phase 1 document you took 3 samples per bore hole-- surface, shallow(less than 2 feet), and intermediate(10 to 12 feet) ; but you intentionally labeled this deeper sample as- sample ns-- not sampled. Why? This is the only sample that was even capable of reaching the buried problem and you all intentionally remove this sample from the laboratory work. A further note concerning this site. I personally performed over 50 complete cathode autopsies on this exact site. The off gases from these watered cathodes was horrendous. It required wearing a charcoal filtered respirator to protect from the intense ammonia and gaseous hydrogen fluoride that was coming off and even with this protection your eyes watered and stung intensly after each visit. This has import because once the water softened the cathodes enough for the excavator hammer to break, the pieces were trucked to the west, center and east landfills. I told you that in 1997 the east landfill PVC cap slumped and sheared wide open. This large tear was never repaired and was recovered with gravel per managements orders. It was blamed on the wet spring; but my opinion at the time was disregarded. I believe that offgases from wet cathode waste lifted the cap as it was one piece with no ventiallation stacks. This inflation of the liner caused the slump and tear. Problem I explained to you was that all the water that drained from this dump was captured in the north collection pond by under the pile piping. It is still doing it today but as I explained the liner for this pond was intentionallly destroyed by driving a tracked caterpillar thru it multiple times in the spring of 1994. Everything that drains to this pond is going directly into the ground about 20 feet upstream from the Cedar Creek Overflow ditch at this location. I realize you used GPR on the pile but you were barely able to find the PVC liner let alone the torn area and the north pond is still running everything that runs to it into the ground. Your Phase 1 study did nothing to address this problem area. Pollution is still going into the ground at this location because rainwater is probably still running into the tear. Because of my autopsy experiences I also have trouble believing your findings with the PID and gas sampling equipment. Cathode wastes when wet generate copious volumes of ammonia, hydrogen flouride gas and based on a series of self igniting fires in the west dump that were blamed on acetylene production when water was sprayed on spent potliner and potline off-gas scrubber catch there is a VOC issue that was not found in your Phase 1 study. Read the design document Hydrometrics generated when they designed the gas collection system in the current west landfill. Based on their PID readings and knowledge of dump design they believed the system would be needed to last 30 years to handle organic off-gases.

Finally I had you stop at the north and north-east percolation ponds. I told you of the amount and location of the pond diggings from the north pond. They are buried next to this pond and contain pure petroleum coke and coal tar pitch fines along with untold chemicals from the water scrubber system used by the paste plant. Your Phase 1 document claims it is a very shallow pond; yet I told you the holes with deep water in them were at least 15 to 20 feet deep as the large excavator the plant owned was used to dig them. The NW

pond was a bigger concern because this pond was designed to redirect all the water back into the underground aquifer. There were 66,000 gallons per day of fume scrubber water put into this pond and the fumes were from coal tar pitch that was heated to 250 centigrage. At these temperature all the chemicals that we call creosote are liberated from coal tar pitch and this scrubber collects them and flushes them out into this pond. Because of the carcinogenic nature of many coal tar pitch constituents I stressed the importance of finding where this water goes. I felt that putting tracers into this water source were warranted if the test wells didn't find these chemicals. Someone has been getting these ugly chemical actors and that should be carefully investigated and quantified. I didn't find in any of your phase 1 verbage where any attempt has been made to trace flows of dangerous chemicals, just talk of your 44 wells are better than the long established plant wells at finding the pollution. Why then did you place roughly ⅓ of your 44 new wells directly next to the existing plant wells and when asked to put in place additional early warning wells for any pollution that might be headed toward Aluminun City water wells(over 25 wells) you added only one in the farthest southwest corner of your property and drilled and screened it in the glacial till material that your claiming carries no water. Your protection of our water source shows a clear lack of concern for early detection of a problem that would impact your closest next door neighbor.
For the time and effort I've put into getting you early information about specific problems and sites you jointly showed a lack of concern for finding the extent of pollution at the plant, its sources and seriouness and making good on your founding charter to protect people and the environment from chemicals generated by industrial operations.

'Before discussing the actual Phase 1 data summary I would like to present some information on gaps in data that EPA needs to do the legwork on to understand the pollution issues historically. You will not be able to use CFAC to accurately provide this data. Here are the topics and areas:

1.
2. Findings
3. of 1990 pm-10 study that included CFAC.-Important issues in this document include the size and shape of the pollution cloud that hung over the plant daily and the areas north, south and east of the plant. Air dispersion model for the plant and location of
4. CFAC's chosen monitoring station directly south east of the rod mill. Air pollution from the plant is responsible for the high metals, fluoride, cyanide, and PAH concentrations in the area of the plants soil, water, and groundwater.
5.
6.
7.
8. Operating
9. procedures from 1955 to 1978- Old Anaconda cells and wet anode technology were responsible for huge flouride emmissions that led to two legal actions. Company settled both by not pleading guilty. First one they bought 3000 acres of their neighbors property
10. and let them live on the land tax free the remainder of their lives. Suit started by Kalispell vetrenarian based on fluoride caused teeth problems of livestock that belonged to plant neighbors. Second lawsuit settled out of court as well. Jim McGarvey represented
11. group that had problems with plant emissions in the late 60's. They prevailed and plant changed its operating procedures and the chemical supplies it used. Tree farms were established to look at build up of fluoride in vegetation, restrictions on start-up

12. event during the growing season. Sulfate studies in Glacier National Park. Large room 8 test of wet scrubbers on the plants roof to lower fluoride emmissions. Pressure by State of Montana to set a lower standard for fluoride emmissions of face permanent
13. facility shutdown. In 2009 the plant had a permitted standard of 1.64 pounds of fluoride per ton of Aluminum produced out our roofs. This compares with actual reported emmissions by the plant of numbers between 9.39#'s/ton and 26.18 #'s /ton produced for
14. the years from 1955 to 1968. At 26.18 #'s/ton and 180,000 tons of annual production the plant was dumping 4,702,000 pounds of pure fluoride into the plants airshed. This material chemically reacted with every chemical element in nature and poisoned the soil
15. and water in the plants vicinity.
16.

There wasn't any regulation of PAH and the plant dumped millions of pounds of these organic carcinogens into the environment. Wet anodes were totally soupy on the surface and the pitch percentage was above 30% so 180,000 pounds of coal tar pitch were being boiled daily at temperature above 400 degrees farenheit on the anodes surface. At this temperature all the organics that make up creosote were going airborne out the roofs and we know they reached 600 degrees farenheit because that is the temperature that is required to boil off benzo(a)pyrene that was found in most of the soil, water, and groundwater samples in the phase 1 data.

3. Production and Consumption data is available every month from 1955 to 2009 and it provides the statistics on plant chemical useage and contained impurities that allows you to know what was used and reported as emmissions.

4. Get the aerial pictures of the plant. CFAC claims only 6 useable pictures are in their possession. Get Mel Ruder's picture files from the Hungry Horse News or get them from the Mansfield Library in Missoula. They will let you see what was there.

5. Contact the regulators at the State of Montana for Air, Water, and Soil pollution permits. Find all correspondence where CFAC used the Grand Fathered In argument or claimed changes to a permit were needed or couldn't be met by the plants technology. Theseare the documents that contain the information on where the plant was impacting the environment and was unwilling to cure a known pollution problem. While you are getting these data as CFAC for all files and documents written by Steve Wright, Don Ryan Shari Halloran, Brian Hohn, Tim Furlong and Nancy Guilliland. These were the environmental employees that measured and responded to the regulators requests.

These 5 areas contain the starting points that allow you to see what gaps the companies involved were unwilling to spend funds on to correct known serious pollution problems at the plant over the years. Knowing what scared them will allow you to figure why and ask questions about what impacts were likely on the environment based on their resistance to comply.

Section 3 and 4 of the Phase 1 Data Summary Report are the results of what was done and found thru 2 rounds of sampling. Lets discuss each section:

Section 3.2- Soil Gas Sampling-As stated earlier my experience with wet cathode autopsies and the engineering design of the west landfill lead me to the conclusion that the minimal amount of volatile material in these dumps seem wrong. Dumps historically off-gas for decades as their contents degrade and water and

chemicals in cathodes react to off-gas as well. Calcium carbide and water react to produce explosive gas mixtures of hydrogen or acetylene. Self starting fires in the carbon area of the west dump in the early 1980's were speculated to be caused in this manner. You should have found more gases. In 1994 with the completion of the cap on this dump you could physically feel warm gases exiting the 10 ventillator stacks with your hand.

Section 3.2.3- Geophysical Survey- The GPR data and discussion are not that meaningful because data on the location of the PVC liner on the east and west landfill are readily available on the as built engineering drawings for those two dumps. The data presented was intermittant locations for the liner with reference to the drawings to give it some credibility. What is missing is the fact that you didn't have Shari use the equipment to try and locate the tear in the center back of the east landfill and repair it to stop any future flows into the destroyed north pond associated with that dump.

Induced Polarization data is more interesting. The data from IP really didn't match up well with the drillers logs for water table so it was discussed as if they did. Bedrock at 148 to 200 feet was seeable in the data as described in the drillers log. The idea in the drillers log that wells along the mountain front weren't solid rock contacts but weathered seems a stretch. One look up at Teakettle Mountain above those drilling sites confirms that the glaciers scratched that mountain down to solid rock and there isn't a good technical reason why rock under the land surface would be any differently attacked by the last glacial age. The drillers logs were very poorly completed. Look at the drillers logs from the wells drilled for Hydrometrics 1993 study and the professionalism and detail will jump out at you. The wet scrubber pond being 15 to 43 feet deep seems odd as the barrier around the peripherey was created at the same time to hold liquid in. Why wouldn't it be all one depth. Find the aerials you have and see if it really is shallow at the north end. The center landfill is probably 50 feet deep as that dump was created at the crest of a hill by backing loaded dump trucks up and dumping them. A cat was used to push the cathode pieces over and create a road the next truck could back out onto and dump. This created an upsloping ramp at the crest of a natural hill and material was at least 50 feet tall in that cone before they covered it in pit run gravel. Because of the piles extreme steepness on the south side I doubt any of the clay cap material that is claimed to be on that pile is anywhere near the top of the pile. As I shared with you on the 2015 tour I doubted the clay cap existed at the top of the pile because our freeze/thaw climate and the extreme steepness of the pile. The 106 foot depth for the west landfill is unrealistic as is water table argument. The large bright red masses in the area of the west landfill, wet scrubber pond and center landfill are more concerning in that they exist in solid masses only in areas very close to these dumps. If water caused these masses they surely would be under areas south and west of the dumps because your wells have found the water table at the same elevation as water under the dumps. Because induced polarization is so enhanced over such large vertical and horizontally connected areas, and not in any other transects, I believe it is more realistic to assume something leaking from the dumps has permanently changed the ionization potential at depth for these areas. The huge volumes of sodium fluoride exiting the dumps or any other element combined with fluoride is a more likely explaination for the massive induced polarization spike. In addition a personal conversation I had with the Anaconda engineer who signed off on the original as built drawings for the plant occurred in 1994. I asked him if he believed the then held company position that this landfill was 35 feet deep was correct. He said no- he believed it was 50 to 60 feet deep which agrees with the IP data presented. Another possiblilty is from the area of the sanitary landfill. In the early 1990's our service crew dug a huge pit next to this landfill and created a new entity different from what is labeled as the sanitary landfill, that was filled with material in the 1950's, 60's and early 70's. This new pit was dug with an excavator roughly 40 feet deep and filled with screened basement material. It contained 1.4 million pounds of highly

fluorided alumina and minus ¼ inch pure cryolite bath chunks. All of this material is in the underground glacial aluvium where the underground water is currently flowing and is a high probabilty source for the sanitary landfill area to be partly to blame for high induced polarization values in this underground area and the fluoride that keeps flowing to the Flathead River.

Section 3.3.1 Site stratigraphy is your interpretation of the layers under the site. You have classed the underground structure as one composed of 3 separate areas as a general rule. The top 75 feet is generally glacial outwash alluvium where all the water is said to travel underground. This area is underlain with a 200 feet or thicker glacial till layer that is composed of the same materials as the glacial outwash above it with a higher concentration of silt and clay mixed in which you believe stops the water and pollution from the plant from going below this layer. Finally there is the bottom or bedrock layer underlaying both of the upper layers. You further assert that all water flows in the top most layer and moves south to southwest to the Flathead River seeps.

I believe it is a fact that the glaciers that carved the Flathead valley moved from North to South in the location of the plantsite. Personal observations of rock imbedded in ice, scrape marks on the rocks above the plant on Teakettle mountain and the west shore of Flathead Lake, that I have personnally observed, show this scenerio today. With the massive amount of ice coming out of the North and Middle Fork drainages they would have blocked ice trying to move out of the South Fork. They over topped the Mission Mountain range between Teakettle and Whitefish Mountain and destroyed the continuity of the Missons in this one 3 mille wide gap. Teakettle exists as the funny shapped anomoly to the mountains on either side of it because of massive ice damage from the North. Glaciers tend to release a lot of water from their edges because that area heats up more as the land is exposed. This process creates a natural stream channel where water flows off the glacier to its sides and dumps both massive amounts of embedded materials and water to form the morraines that exist today against the side of Teakettle mountain.

Using geologic cross-sections A-A thru D-D I believe you have proven that there is a flat area out away from Teakettle that is roughly 75 feet thick and is loose packed glacial alluvium with heavy underground water flow. After all Production wells 3 thru 7 all produced 1500 gallons per minute of water in all 12 months of the year for decades faithfully. Your assertion that glacial till under this area stops water flow from going below this layer becomes quite suspect though as it doesn't exist as a level flat floor under the alluvium. If you look at the 3 parallel cross-sections of A, D and B you see something odd about this pollution stopping till layer. Those 3 sections show the alluvium layer to be between 150 and 200 feet thick next to Teakettle Mountain and if you look at A and D there is another pocket buried under a shallow section of till that contains another large enclosed pocket of alluvium trapped in this same corridor close to the mountain. This makes sense that water would flow in this deep layer of alluvium east of the plant all the way to the river. Hence they explain the plume found in 1993 and 2013 that was delivering pollution to production wells 3 and 5. B doesn't have this buried pocket of alluvium; but it doesn't need one as it is over 200 feet thick by the mountain and is sitting on a huge bed of silt at the mouth of Bad Rock canyon.

Water will flow down this natural channel because it is a natural gathering channel for water coming off of Teakettle, the Cedar Creek overflow or possibly the Cedar Creek drainage.

Production wells 3, 4 and 5 gather water in this alluvium and do not reach the silt under them. Silt probably may not be a highly conductive water layer because of its fine grain size and compaction under pressure of the overburden. Section C-C runs perpendicular to A,B, and D but shows some of the same underground properties. There is 175 feet of alluvium on the river bank. There is a buried pocket of alluvium north of the river under the dump areas, and the silt pocket at the south end of section B is shown to exist at the east end

of C where they intersect. What is important is that production wells 6 and 7 are shown on the island in the river. The alluvium under well 7 is about 60 feet deep. The depth of this well is 61 feet and it has been polluted with fluoride and cyanide for decades at fairly high levels. Well 6 is only 6 feet from this well and is 71 feet deep so it appears to extend into the silt layer. It has never tested positive for pollutants to my knowledge. Either the pollution from well 7 is getting there in the alluvium layer or is coming directly to this well thru one of the underground rat holes found buried under the till layer north of this site. It alone disproves the CFAC assertion that all of the pollution is flowing on top of the till layer and is moving to the south or southwest from the west landfill. This area has a plume that is moving southeast or straight east. CFAC plugged all of the deep wells that were to go 300 feet bls. The reason they gave was that the well encountered another water flow below the till layer surface. To my knowledge none of these deeper water sources were sampled before the decision was made to cap them at some shallower depth. These deeper sources should have been sampled to prove that there weren't deeper water flows in another alluvium layer of possibly another water carrying medium that is moving pollution away from the site.

Why is there several hundred feet of water deposited silt at the mouth of Bad Rock Canyon in a river that is running so fast CFAC couldn't find any silt in the river to sample as part of their study. There was no silt found under the CFAC property north of the river, to speak of, and it is relatively flat where silt would be thought to gather.

Some discussion of other individual wells is needed in the ground water arena.

Water fluctuation underground was acknowledged; but not singled out as a cause for pollution to flow from dumps for over 50 years. In 1993 Hydrometrics all but avoided this discussion and concentrated on how a PVC cap on the west landfill would stop rain and snow infiltration and within 5 years of installation they told the State water board that cfmw-12 (most polluted well on plantsite in 1993) would fall to background level if cap was ok'd. Permit was issued to CFAC based on this discussion yet cfmw-12 is still the most polluted well on the site today. There was no follow-up from State and Hydrometrics had some data from CFAC that water level moved immensely in wells over the 12 month year. You saw cfmw- 7 on the west edge of the west landfill move over 40 vertical feet in the summer and fall of 2016. Cfmw- 20 on the southwest edge of the center landfill moved over 30 feet in the same time frame. With these two pieces of data and the depth of the west landfill why haven't you come out and plainly stated that groundwater has for decades(probably entered Flathead River in 1956) been moving up into the waste dumps from below every spring?

Cfmw-17 was drilled in the top center of the center waste dump in the early 1990's and has never shown signs of pollution from then until 2003 and probably 2009 when CFAC quit sampling its wells. This brings up a serious question or two. Did CFAC always sample this well in the late summer or fall when it was dry for roughly 20 consecutive years? Based on John's verbal comments in the CFAC Liaison Panel meeting of October 2017 they had identified this dump as also leaking. Did it go 27 years without leaking a drop of pollution or is there an unkown time frame when these dumps will start leaking because of their age or a sample being taken when the water level is up 30 or more feet and starts the leaching process over every spring. There are at least 7 buried dump sites where water will rise this spring to leach the dumps contents not counting the polluted percolation ponds that experience this same phenomena annually. This is a third easily identifiable gap in you data.

Your problem with the industrial landfill is probably related to underground water rising; but there may be more to it. Your surface sample of cyanide in Cedar Creek twice last fall could be from buried cathode in this landfill as there was never any monitoring of what ended up in this dump. Our service crew hauled garbage from the production and maintenance areas daily to this dump and any dumpster could have contained failed cathode

parts. The other likely possibility is the in-holding directly upstream from the cyanide finds. This property was used for farming, logging, sawmill etc. and the in holder had back door access to plant dumps for supplies to run these various business pursuits for over 30 years. There were hazardous wastes on this property when CFAC took possession, after the death of the owner, that may be causing environmental problems with the creek.

Your other data gap is a serious ommission. Myself, as the president of Gadow Mutual Pump, and the other users of well water in the Aluminum City area have virtually begged you to do something to protect our water supplies since 2014. I personally asked that you put wells accross your southwest border to help give an early identification of pollution flowing toward this residential area. The fact that you put in only one well in the farthest southwest corner and screened it below the alluvium layer we take our water from is testimony to your minimal concern for the people who live in this area and our health concerns.

There is another surface water feature within your self selected boundary of concern that may need some sampling in the future. In the far southeast corner by your gravel borrow pit the Cedar Creek Overflow is not in a man made ditch per se. It is a natural creek bottom in the bottom of a steep canyon. Last fall it had an active small flow of water in it with the ditch above it dry. There is also a small grass and cattail seep located up hill from this creek where it exits the canyon. It was also iced over but still flowing last fall. Roux recon missed this feature in 2016- may be worth sampling and testing the water in both of them as they are inside your designated test area.

There has never been any cathode waste on the ground in the vicinity of the drum storage area. To get the 7000 milligram sample from the well in this area would mean the flow from the dumps with know cyanide contents would have to be straight west or slightly southwest. The head pressure of water coming off a mountain would certainly push these dump contents west as you found and if you had included the spring samples with this document possibly quite a bit farther west.

One final gap in your data is the presence of mercury in the sites dumps. Out of site - Out of mind was the management creed in the 1950's, 60's, 70's, and most of the 80's. In the first 15 years of operation the recifier was a mercury switch system. It converted AC power to DC power for the potlines using a technology that relied of metallic mercury that cycled between open and closed switches to manufacture the DC power the plant used. This switching many thousands of time each hour vaporized the liquid mercury and forced it into the rectifier building air. Calbag was forced in 2016 to decontaminate the west rectifier station before they could decommission the facility. It was still contaminated above standards that were safe to work in even after 50 years of no mercury being used in the facility. The actual rectifier switches would have been contaminated at much higher levels and would have been disposed of on the site unless CFAC can generate a document from 1965 that shows where management of the Anaconda Company signed off on burying this equipment at some other site. Highly doubtful.

As far as telling you where to look Mike that is your job to find it and protect the environment as I don't know where they would have made it disappear too. A side note that may or may not be related to this chemical. In the early 1980's just after I started working for ARCO Metals at the site there was a lot of mercury news in the Kalispell paper. It was related to the State of Montana or possibly the EPA going after the Kalispell waste treatment facilities as there was a discovery of Mercury in the Flathead Lake or its fish. They were blaming Kalispells' waste treatment facility for allowing the material to pass into the Lake. It is quite possible this mercury could have leached from a CFAC dump and found its way to the lake. This one chemical is dangerous enough that your expert on health risk should postpone her work until you have CFAC help you find the level of mercury pollution on this site caused by this electrical rectifier equipment. Other gaps in your data

that are important to know before proceeding include: where are all the chemicals the plant laboratory used over the years, and dumped down their in house drains to go out to dry wells until the late 1990's? They went to a dry well under the current parking lot northeast of the current guard gate. You didn't sample this dry well or the soil around it because it was buried and additional lines were laid out of this area to the north in the late 70's. Chemicals were mostly inorganics but several like benzene, toluene, quinoline, and xylene were used in our anode development program tests and these went to the dry wells. The plant stopped using these three carcinogens in the late 80's when lab personnel threatened to walk out of the plant because 3 then current employees of the lab facility were being treated for various cancers and the staff felt the use of these chemicals were probably to blame. You might want to look at the paste plant operators and helpers health problems over the years. I know of 6 of those men that died of cancer or are in remission today. Every area of the paste plant except the control room were mandatory respirator required areas because of the chemicals that left airborne from coal tar pitch when it was heated. The signs on the entry doors to the paste plant specifically stated that respirators were required protection to protect from known carcinogens eminating from heated coal tar pitch. Your health study should include a look at lab and paste plant personnel as these were the folks that suffered the greatest health problems because of their exposure to carcinogenic chemicals.
You found no PCB chemicals in the soil. There should be a lot of them on the roads north of the plant as that is how the plant disposed of most of the PCB contaminated rectifier air cleaning oils and transformer oils. It wasn't until the 50 ppm hazardous waste rule came into being in the 1980's that the plant started to watch and manage these levels. Before then any value of PCB contaminant was acceptable to be put on plant roads for dust control or on the west landfill for the same reason. You didn't sample under the PVC cap on the west landfill. If you had you would have encounter a 4 inch well defined black layer about 18 inches under the current PVC cap. It is the PCB oil your looking for and it is still there if you choose to look for it in the west landfill soil. Concentrate your sampling on the road to the sanitary landfill and PCB or automotive used vehicle oil should be encountered on this road. It was liberally oiled multiple times every year because of the heavy vehicle traffic that used this route and caused dust problems for the potlines at times.
When you decide to directly sample the 9 dumps, and not just in their general vicinity, you wil find hundreds of barrels of chemical waste-paint solvents, metal cleaners,laboratory liquid wastes, used vehicle and hydraulic oils, rectifier air scrubber oils, and transformer oils that are buried and never manifested. These chemicals are waiting to enter the ground water supply in our future too!
Another gap in your data is why you deleted the intermediate 10 to 12 foot deep sample in the operating grids. Especially when I told you in 2015 we put millions of gallons of water on freshly failed cathodes in grids CFISS 007,008, 013 and 014. These 4 grid cells should be grossly contaminated with every leachable chemical found in a failed alumium cell cathode.

In section 3.4.1 to 3.4.1.5 the discussion centers on the chemicals found in soils. It was safe to say that all soils north, south and east of the plant were contaminated at the surface and most had some contamination down to the 10 to 12 foot level below the surface. Values were not real high for the most part, but the fact that they were there is concerning as metals, cyanide, fluoride and PAH type organics were not placed on the ground or handled in most of these areas. Cyanides in all this soil is most surprising becasuse the only source(only source of this material if you believe the companies propoganda) of this material is a solid form produced in the hot carbon of the cathode shell when the hot carbon is warm enough to interact with the air we breath and chemically attach the carbon atoms of the cathode (C) to the nitrogen atoms (N) in the air. This chemical reaction produces cyanide (CN) which is a gas that can react with any available cation. CFAC thinks

iron(Fe) is the prefered cation to react and produce ferrous or ferric cyanide (Fe CN). This is claimed to be a stable non-reactive form of cyanide but is not the most probable chemical reaction in a CFAC cathode. CFAC cathodes increased in weight by 60 tons over their lifespan and most of this weight was from sodium metal intercalation into the cathode carbon with age. Sodium(Na) has many multiples of reactivity higher than iron as a cation, so sodium would be the natural chemical companion for cyanide in the cell lining. This produces sodium cyanide(NaCN) which is more reactive with its surroundings thus making the cyanide more mobile in the environment. Sodium cyanide heap leaching of gold in Montana is illegal today because of the problems these facilities have caused for the soil and especially the water surrounding these mining operations over the years. Why cyanide is so prevalent in soil samples around the plant is somewhat puzzling in that solid ferric or sodium cyanide would require dissolution in water to have the mobility to reach all areas of the plant. I believe if you indepentantly verify the cyanide source of the plant it is not possible to bring it back to the cathodes. It is from the airshed pollution. The anodes ran at 960 degrees centigrade and they were directly exposed to the ambient air in the vicinity of the gas collection skirts and burners. Cyanide would have been produced here as well and would have left the plant as air pollution. It was not measured so it would have polluted everything under the air shed cloud that was found in the 1990 pm-10 testing. This is why it is found in all soils of the plant even down to 12 feet under the surface. It is not the result of poor waste cathode handling practices or is a naturally occuring element in the soil as this document expouses. Fluoride is easier to understand as the plant pumped hundreds of thousands to millions of pounds of pure fluoride ions out the open roof of the potlines and the unscrubbed furnace stacks of the casting facility. Because of fluorides extreme electo-negative status as an anion it reacts with every positively charged chemical species found in nature. This extreme reactivity is what makes it such a dangerous environmental pollutant. It reacts with hydroden in the air or in water molecules to form hydrogen fluoride which is extremely acidic. This is what kills forage or trees or accumulates in their leaves, needles and blades. Thus the lawsuits over the years because of damage to domestic animals teeth or the accumulation of fluoride in the forage near and far from the plant. This material came from the pollution cloud in the air over the plant and Mission mountain front. It was found in all the soil, water and ground water samples around the plant. Contrary to CFAC comments that it is a natural element in all the soils around the plant I believe this is spin. The fluoride is in everything because the plant put millions of pound of fluoride into the airshed around the plant every year for decades. This huge influx of the chemical gradually changed the chemistry of all the soils around the north Flathead Valley. Using the Kalispell weather data for the plant conditions is wrong. Along the Mission mountain front there are some very local conditions with stagnant air in a large pocket that is not measured at the airport. On a related note when you look at all the soil samples in this document CFAC intentionally called sodium, calcium, potassium, and magnesium essential elements and as such didn't sample and analyze them. They were listed and coded as NM-not meaningful. They are all in the thousands to hundreds of thousands of micrograms per liter in the samples while all of the other metals rarely exceed 100 micrograms per liter. When one considers they are all positively charged cations what is the chance a large percentage of these essential elements are chemically combined with the most powerful negatively charged anion known to man? That anion is fluoride so yes the soil absolutly would have significant concentrations of fluoride at all depths that water born hydrogen fluoride(HF) could reach. Not only soil but all the way down to the groundwater is contaminated with fluoride in the vicinity of the plant.

PAH- poly-aromatic hydrocarbons are typically ringed hydrocarbons like benzene, toluene, xylene, anthracene and pyrenes. They are found everywhere on the plants soils because like fluoride they exited the paste plant as gases when coal tar pitch and petroleum coke were combined in large mixers. The mixtures commonly

came in contact with temperatures that approached 300 centigrade(600degrees farenheit). These temperatures boiled off the the dust portion of the petroleum coke with all its impurities included(sulfur, chromium, nickel, iron, arsenic etc.) and all of the organic compounds in coal tar pitch that turn from liquid to gaseous form at temperatures under 600 degree farenheit. We use these same chemicals in other industrial or commercially available products. All of the chemicals that we know as creosote boil off in this temperature range and if they are cooled, condense to the black/brown liquid we are familiar with. The pollution at the Somers tie plant is creosote that has moved down thru the soil and is floating on the water table at the head of Flathead Lake. We have the potential for this same problem at CFAC as we water scrubbed the mixer off gas with one pass well water that condensed these same gases to liquids and we sent them to the north percolation pond system to be reinjected into the underground water acquifer. We routinely mixed 120,000 to 180,000 pounds of coal tar pitch daily. The paste plant is not how most of these chemicals reached the soil around the plant. For that one has to look at the use of the paste produced in the paste plant. It was sent to the potlines and put on the surface of the anodes. Here we know the temperatures reached the 600 degree centigrade range because of the presence of benzo(a)pyrene and many other similar ringed compounds that are found in the soil samples even down to 12 feet below the grounds surface. These are some of the more serious cancer causing chemicals in coal tar pitch. They were liberated in the air that left the open roofs of the potlines and condensed and fell back to the ground in the surrounding airshed. The State never placed any regulations on the quantity of these chemicals, only fluoride, but they have some equally bad environmental problems once they are separated from their coal tar pitch starting point. I believe benzo(a) pyrene is even classed as a teratagen- it interacts with our DNA to cause deformities and diseases such as cancer.
Another serious data gap is the background data values for all pollutants. They come from an area that is north and west of the main plant. It was directly under the air shed plume every day of the year and as such is polluted with all manner of chemicals. It is not as claimed by CFAC to be contaminated with the normal elements found in the Flathead Valley soils. It is contaminated with CFAC released air pollutants that fell to the ground in this area. To get around pollution problems the plant on several occaisions petitioned the State of Montana to let it subtract what it claimed were background concentrations from permit samples and report the difference so they could comply easily with all of their soil samples and water samples.
Another important gap is the lack of data from the area under the potlines. This is a impacted area that has never been studied. In particular the north half of casting was the original maintenance facility for the plant for 12 years and there should be buried waste and fuel tanks under this area. Chances they were properly cleaned up in 1967 when new maintenance facility was built is highly suspect. In addition in 2001 an oil leak was found in the electrical tunnel under the potline basement floor just south of this new manintenance facility. There were no soil borings ever made in this area to identify what oil it was or where it came from.
Mike there are many individual inconsistencies in the sample data that should be checked out,but they are not as important as the data gaps I've discussed above. Since you saw fit to publish this document with only the summer and fall 2016 samples and not the spring of 2017 samples when more interesting and meaningful data would have shown up I'm not going to waste my time on these individual data.

In conclusion, if you believe CFAC that only 2 insignificant data gaps exist, as they published in this document, you and your technical staff should be removed from this project as you are in over your head and do not posses or have access to a technical understanding of what exists at this facility.
Butte and Anaconda were owned by the old Anaconda Company and mining and ore preparations done in Butte and the smelting in Anaconda have kept EPA in those two communities for over 30 years now trying to

clean up the tag along elements that came with copper. It is these smelter tag alongs that are the big problems in those two areas. In Great Falls it was a refinery for copper and a smelter for the other tag along metals such as zinc, silver, gold and antimony. CFAC is a smelter too. It produced aluminum but the real pollution that is dangerous and hard to control came along as tag along elements with the alumina ore, cryolite, and the supplies of coal tar pitch, petroleum coke, and coal. These are the pollutants that are spread all over the CFAC site and surrounding airshed.

This phase 1 document is very incomplete in finding these elements and does nothing to address all of the chemical garbage that is siting in the waste dumps. Youintentionally prevented the direct sampling of these piles and they need careful scrutiny before any health risk assessment or phase 2 discussion should ever be started.

Flathead Valley residents should not have to continue to live with environmental problems caused by CFAC owners that intentionally employed the out of site- out of mind mentality to turn an island in the Flathead River into a sewer lagoon, build 7 to 9 dumps with no accountablity for what they chemically contain and what they are or will someday leak. Finally we shouldn't have to live with the pollution that regulators allowed the owners to pump into the atmosphere to fall over a much wider area than just the plants property.

Nino Berube