4 August 2018

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Subject: Questions about the draft Remedial Investigation/Feasibility Study for the Former Satralloy Site – Ferrochromium Arc Furnace/Baghouse Dust

Reference: Remedial Investigation/Feasibility Study for the Former Satralloy Site dated December 2016

Dear Ms. Galanti,

We are hoping to see soon responses to our first three letters to you related to the Remedial Investigation/Feasibility Study for the Former Satralloy Site dated December 2016(RI/FSforFSS).

With our growing team, we would like to focus most of this letter on the authors of the (RI/FSforFSS) lack of relevant attention to the Ferrochromium Arc Furnace Dust that has been produced, buried and/or stored at the Satralloy Site.

The RI/FSforFSS mentions about the electric arc furnaces making ferroalloy products and by products. It seems the authors intentionally down play what took place at the Satralloy site. This is a former ferrochromium process facility. For over 30 years this facility processed hundreds of thousands of pounds of chromite. It generated over 2 million tons of ferrochromium waste byproducts. These byproducts can leach a tremendous amount of trivalent and hexavalent chromium. It is curious that the metallurgical process and its byproducts' negative impacts are so lightly addressed. A clear example of this is the use of the word ferrochromium. A word used only once in over 1,700 pages between all the volumes that make up the RI/FSforFSS. Satralloy was a ferrochromium facility that had open atmospheric ferrochromium electric arc furnaces running almost continuously for 24 years. To earn some credibility in presenting the RI/FSforFSS as a semi-neutral report, Freeport and Golder Associates need to acknowledge the true scope (i.e. locations where buried & stored, volume, tonnage), and potential risk of the ferrochromium furnace dust (since it appears every sample tested using TCLP methods had hexavalent chromium levels above USEPA hazardous limits) at the Satralloy Site.

We have shown excerpts from the FI/FSforFSS below in bold section introduction, italics and underlined and following those excerpts the Friends of Kolmont have provided comments and questions. We are requesting the Ohio EPA to answer our questions.

Page ES-2 and page 2 excerpt from the RI/FSforFSS

The Site consists of approximately 333.5 acres of land and includes an abandoned ferrochromium alloy processing plant. The Site is located on County Road 74 in Cross Creek Township, Jefferson County, Ohio, approximately four miles southwest of Steubenville (Figure 1.1-1). Portions of the Site are bordered on the west, south, and east by Cross Creek (Figure 1.1-2), a perennial stream which discharges into the Ohio River.

Former processing facilities consisted primarily of two production buildings ("mill buildings"), baghouses adjacent to the two mill buildings (for air pollution control during operation), concrete bins used for unloading rail cars, an electrical building, an administration (office) building, a laboratory, a water supply plant, cooling towers (now demolished), and a wastewater treatment plant (now demolished). Alloys were produced in the mill buildings from chromium ores by smelting and refining in electric arc furnaces. Four furnaces and two converters were housed in the mill buildings. In addition to these structures in the "Plant Area", residual piping used for transporting byproducts from the processing operations to the upland areas is present between the mill buildings and the upland areas north of them. Byproducts were either pumped as slurry through this piping or were hauled in trucks to either the "Ridge Top Area" or Former Mine Area.

Byproducts of the ferroalloy plant operations included slag and baghouse dust from the electric arc furnaces. Baghouse dust from the electric arc furnaces is present beneath the baghouses and may be present in and around the mill buildings.

RESPONSE to Pages ES-2 and 2 excerpt FROM THE FRIENDS OF KOLMONT

1. This is the one and only time ferrochromium is mentioned the RI/FSforFSS as shown highlighted above. This paragraph was included in page 2 of the Executive Summary and duplicated in Page 2 of the main report. So technically you could maybe count it as twice. We find it curious if not a bit puzzling that in producing a document that is supposed to represent the status of a former Ferrochromium facility that operated over 24 years producing prodigious amounts of ferrochromium products and by products, this word is only mentioned in a historical reference and never addressed in any technical way. Especially since the ferrochromium slag and ferrochromium dust are the two principal generators of hexavalent chromium at the Satralloy Site. The RI/FSforFSS has also clearly stated the chromium and hexavalent chromium are the two highest ranked Constituents of Potential Concern (COPC). It seems like the authors are trying to downplay what is the 800 pound gorilla in the room

1.1.3 Regulatory Background from the RI/FSforFSS

The Site has been the focus of several investigations by the United States Environmental Protection Agency (USEPA) and the Ohio Environmental Protection Agency (OEPA), starting in the early 1990s. In 1992, the USEPA performed a screening-level site investigation, including sampling and analysis of soil and solids, surface and groundwater, and sediment from Cross Creek (PRC 1992). OEPA sampled Site surface water in 1997 and again in 2003 and analyzed it for hexavalent chromium (Cr[VI]). In 2003, OEPA

performed Toxicity Characteristic Leaching Procedure (TCLP) testing on soil, slag, and baghouse dust samples (OEPA 2003). A summary of prior USEPA and OEPA investigations is provided in Section 2.1. The quality assurance/quality control (QA/QC) information on the USEPA and OEPA data has not been independently evaluated. Based on these limited data, OEPA concluded that: Cr(VI) was the principal chemical of potential concern (COPC); that the Site posed a substantial threat to public health; and that contamination at the Site had impacted soil, surface water, and potentially groundwater.

RESPONSE to 1.1.3 Regulatory Background excerpt FROM THE FRIENDS OF KOLMONT:

1. Why was this Ohio EPA and USEPA data mentioned above not shown and summarized in the RI/FSforFSS? Was it because it has elevated numbers of chromium and hexavalent chromium that the authors did not want to address?

Section 2.1.1 from the RI/FSforFSS

Background soil samples were collected west of the Site and east of the Site near Kolmont. Cadmium, chromium, copper, magnesium, nickel, and zinc were measured in Site soils at concentrations "three-times above background levels". The baghouse dust sample showed chromium at a concentration of 12,400 milligrams per kilogram (mg/kg), and chromium was measured at 1,110 mg/kg in the Chromite Ore Storage Area sample.

RESPONSE to Section 2.1.1 excerpt FROM THE FRIENDS OF KOLMONT:

Please see our response below to section 2.1.1 under 4.2 Building Dust

2.1.6 Cross Creek Fish Tissue from the RI/FSforFSS

A limited number of fish tissue samples were collected by OEPA in 1996, 2000, and 2002 (OEPA 2006). Fillet samples were analyzed for inorganics, polychlorinated biphenyls (PCBs), and pesticides (Table 2.1-1). In 2010, OEPA collected and analyzed fish tissue from various locations in Cross Creek following the OEPA guidance (OEPA 2005). The 2010 results have not yet been published by OEPA (and thus are not included in Table 2.1-2).

RESPONSE to Section 2.1.6 excerpt FROM THE FRIENDS OF KOLMONT:

This last sentence above makes us wonder as to the effort both Freeport and Golder Associates put into including any outside research that may be counter to their biased conclusions. How could both Freeport and Golder Associates personnel not be aware of the Ohio EPA doing sampling and study work in Cross Creek in 2010 and that there would be a report produced from that work? That work was published in April 2013 in a report called "Biological and Water Quality Study of the Cross Creek Basin and Selected Ohio River Watersheds". How can Freeport and Golder Associates let more than 3½ plus years go by and not know this Biological and Water Quality report had been issued Did they not have numerous meetings with the Ohio EPA between April 2013 and December 2016? This report is only about a 1 minute simple internet search from being found? Over 3½ years seems like more than enough time to get it included in the RI/FSforFSS? Since Golder Associates listed at the end of the RI/FSforFSS a number of internet references that support their conclusions: why is it when there are many published reports about the toxicity and hazardous nature of ferrochrome arc furnace dust did Freeport and Golder Associates not include these?

The technical reports that Freeport and Golder Associates reference in the RI/FSforFSS on baghouse dust are written outside the USA but they stay silent on key factors like both Canada and other European and African nations' environmental regulatory

agencies categorize ferrochrome arc furnace dust as a hazardous material (Environment Canada 2010a waste K091). Why is it, so many nations use valid scientific documentation to justify ferrochromium arc furnace dust to be classified a hazardous material but there is no mention of this by Freeport or Golder Associates? It really seems to us that once again the authors are intentionally leaving out valid, published technical research that does not support their biased conclusions.

3.4 Building Dust (Bulk and Roof) from the RI/FSforFSS

Baghouse dust and other chromium-containing dust associated with the mill buildings was investigated to provide the data necessary to determine appropriate remedial action for the dust in the Feasibility Study (FS). This dust associated with the mill buildings was sampled and analyzed in accordance with the workplan in Addendum No. 2 of the RI/FS Workplan (Golder 2014).

The mill buildings and their respective baghouses were being cleaned to remove dust as part of Phase 1 Interim Action. The dust was collected in bags, and representative dust samples were collected using a process described in the workplan. Each mill building was divided into three major regions representing the sources of dust (ground floor, upper floors and baghouses). Composite samples were prepared in a tiered manner by grabbing increments from the dust samples and combining them into composite samples that represent the specified regions.

The sampling plan allowed for tiered compositing, meaning that additional composites samples would be analyzed in the event that "Tier 1" analytical results showed significant variation, in order to determine the differences between areas. However, after reviewing the results it was decided only Tier 1 composites were necessary.

Grab samples were collected from the dust in bags and composited into Tier 1 samples representing the following areas (Table 3.4-2A):

- *South Mill Building Ground Floor*
- *South Mill Building Other Floors*
- *South Mill Building Baghouse Area*
- *North Mill Building Baghouse Area*
- *North Mill Building Other Floors*
- *North Mill Building Baghouse Area*

Accumulated dust has been identified on four roofs at the Site. These are the flat portions of the roofs on the North and South Mill buildings, the wastewater treatment plant (since demolished), and the cooling water pump house (Figure 3.4-1). A fifth flat roof, on the electrical building, was not sampled because it contains only a thin layer of dust, and there is no reason to believe that the dust on this roof differs from the other roof dust. Sample collection for roof dust is summarized in Table 3.4-2B.

RESPONSE to Section 3.4 excerpt FROM THE FRIENDS OF KOLMONT:

Fortunately we have some members now in our group that worked as laborers on the 2014 cleanup of the Mill Buildings, Silos and Baghouses. We our wondering why Freeport and Golder Associates are grouping roof dust in with the "dust" that is around the baghouses and inside the Mill Buildings. They definitely give the impression all these dust sources are the same? Did they do any metallurgy tests to confirm this? We did not see any in the RI/FSforFSS. A simple generalization about the Satralloy Site is that there does not seem to be any trees or large plants growing in the slag areas. A simple question is how can flat roofs which are subject to heavy winds, rains, snow fall, seasonal changes of

leaves dropping, etc. have dust on them identical to ferrochromium arc furnace dust that is inside the Mill Buildings? There are small trees growing on the flat roof of the North Mill Building. Common sense would lead one to question if there was not a significant amount of dirt on that flat roof to support the growth of vegetation. We hope the Ohio EPA does not accept any conclusions by Freeport and Golder Associates that presents roof dust to be the same as ferrochromium arc furnace dust without proving it by metallurgical comparison. We are happy that it was tested but this hazardous dust on the flat roofs is just that. It may have ferrochromium arc furnace dust mixed in with it as most lab results of the samples showed it to be hazardous with the high hexavalent chromium numbers but please do not accept it as 100% pure ferrochromium arc furnace dust. That would be a complete misrepresentation.

4.2 Building Dust (Bulk & Roof) from the RI/FSforFSS

Baghouse dust and other chromium-containing dust associated with the mill buildings was investigated to provide the data necessary to determine appropriate remedial action for the dust in the FS. As part of interim action in 2015 and 2016, this dust was collected and placed in a staging area until appropriate disposition can be determined. Analytical results for building dust samples (see Section 3.4) are provided in Table 4.2-1. Dust collected from the two mill building interiors exhibited different COPC concentrations:

North Mill Building dust:
• Total chromium concentrations ranged from 4,700 to 32,000 mg/kg with a median of 17,600 mg/kg
• Cr(VI) ranged from 389 to 1,010 mg/kg with a median of 861 mg/kg
• SPLP leachate concentrations of total chromium ranged from 13 to 31 mg/L with a median of 24 mg/L
• Manganese concentrations ranged from 555 to 1,500 mg/kg with a median of 620 mg/kg
• pH ranged from 10.2 to 12.3 SU with a median of 11. 6

South Mill Building dust:
Total chromium concentrations ranged from 1,100 to 2,000 mg/kg with a median of 1,350 mg/kg
• Cr(VI) ranged from 0.39 to 54.8 mg/kg with a median of 21.6 mg/kg
• SPLP leachate concentrations of total chromium ranged from 0.08 to 1.0 mg/L with a median of 0.76mg/L
• Manganese concentrations ranged from 2,600 to 9,300 mg/kg with a median of 5,850 mg/kg.
• pH ranged from 8.65 to 9.06 SU with a median of 8.80

Dust from flat roofs:
• Total chromium concentrations ranged from 730 to 2,800 mg/kg with a median of 1,400 mg/kg
• Cr(VI) ranged from 0.41 to 60.5 mg/kg with a median of 5.02 mg/kg, and leachate concentrations of total chromium ranged from 0.48 to 0.42 mg/L with a median of 0.27 mg/L
• Manganese concentrations ranged from 3,500 to 65,000 mg/kg with a median of 8,500 mg/kg
• pH ranged from 7.85 to 8.57 SU with a median of 8.51

Of significance, the North Mill Building, the South Mill Building, and the flat roofs differed significantly from each other for concentrations of total chromium, Cr(VI), Cr in SPLP leachate, and manganese. In addition, the pH of the dust from the North Mill Building was much higher than the dust from the South Mill Building or flat roofs.

RESPONSE to Section 4.2 excerpt FROM THE FRIENDS OF KOLMONT:

As mentioned we are fortunate to have some members now in our group that worked as laborers on the cleanup of the Mill Buildings and Baghouses. We our wondering why Freeport and Golder Associates did not give more information as

to why lab results for the "dust" were so different in each Mill Building and under the Baghouses. We can give you some questions to ask them on this subject.

1. Why was it not addressed by the authors as to how the bulk collection of "dust" in and under the baghouses, silos and mill buildings was performed by the Contractor cleaning these areas? Since samples were taken from the collection bags all the cleanup materials were placed in for laboratory processing by Golder Associates, we feel Golder Associates should clearly explain what was in these bags. There was much more than just pure 100% "dust" in those 1 and 10 cubic yard collection bags.
2. In the areas of clean up around the three Baghouses any debris, rotten wood, broken plastic, rust, junk and debris collected by the Contractor was thrown into the same collection bags the dust was. Under the Baghouses was dust spread all around on top of the ground. To collect it skid steers and excavators. This was not surgical precision "dust" collection. The Golder Field Personnel told us to make sure we get all the dust even that intermixed layer with the soil. So there was many times close to a foot of dirt scraped and placed in the bags with the dust that was laying on top of the ground. Some of the collection bags had more dirt in them than "dust". How could Golder Associates draw pure 100% "dust" samples from these collection bags?
3. Inside the South Mill Building there was 4-8 inches of dirt covering most of the concrete first floor. Apparently the soil had flooded in from the west side of the building (which was at ground level with the first floor) over the years. Again, sometimes there was more dirt placed in the collection bags than "dust" when the first level concrete floor was being scraped, shoveled, swept and vacuumed. On the ground floor of the South Mill building half the floor was dirt. skid steers and front end loaders were used to scoop up the dust lying on top of the ground. When this was scraped up there was also about 6"-12" of the dirt floor portions that came with it (and in some places even thicker layers of dirt) before loading it into the collection bags. A number of the collection bags had more dirt than "dust" in them. How could Golder Associates draw pure "dust" samples from these collection bags?
4. The South Mill Building was much cleaner than the North Mill Building. We had heard that Satralloy employees had decommissioned this building in a more methodical manner before they walked away from it in late 1982 and had taken better care of it from a house keeping perspective before the plant was closed. The dust/dirt ratio in the collection bags (i.e. more dirt) was much different in the South Mill Building compared to the North Mill Building.

5. From both the Mill Buildings: desks and office furniture, broken tiles, toilets and other bathroom fixtures, bricks, glass, junk, small pipes, small machine parts and other debris and was often thrown into the hundreds of collection bags with the "dust". Especially if it was small stuff.
6. The Contractor while collecting "dust" off the top of the bare ground also scraped off a lot of dirt and debris around and underneath the Silos at the North and South Mill Buildings and put them in the same collection bags as the other "dust" that was stored in the North Mill Building. These almost always had more dirt than dust in them.
7. Inside the North Mill Building again on the ground floor (over half of it was a dirt floor) the Contractor scraped 6"-18" of dirt with the dust and dumped them into the collection bags. The upper floors of the North Mill Building had more than twice the dust in them compared to the South Mill Building. The bags from the upper floors had a lot more "dust" than dirt and junk in them compared to the South Mill Building.

All of this information can be verified by the Golder Associates Field Personnel that were watching the Contractor do this. So our questions to the Ohio EPA are:

A. Did Golder Associates take any duplicate "dust" samples from each of the Bag Houses, South & North Mill Building ground floors and other floors and do metallurgic tests to confirm what was actually in the "dust" they were testing? Maybe those South Mill Buildings samples had a higher dirt concentration than the "dust" samples from the North Mill Building and thus the lower chromium and hexavalent chromium numbers.

B. How can the lab sample results of the "dust" from the roofs and each Mill Building, Baghouses and around the Silos be classified by the authors as the same if Golder Associates did not do sound due diligence of what it was they were testing? Does Golder Associates have personnel that can visually tell the difference between pure ferrochromium arc furnace dust and material that is 70% ferrochromium arc furnace dust, 20% fine dirt and 10% ash? Or any other combination?

C. Why is it that the authors did not give the quantities and volume of the "dust" stored inside the hundreds of 1 and 10 cubic yards collection bags that have been left in the North Mill Building? How much is in there?

D. Since all those stored collection bags in the North Mill Building are now very hard to segregate and clearly the vast, vast majority of them have very elevated numbers of chromium and hexavalent chromium; what is going to be done with them? Will they be disposed offsite in a timely manner as hazardous waste?

E. Based on the test data provided in the RI/FSforFSS, would not any licensed waste facility that was asked to receive this North Mill Building "stored dust" classify it as hazardous waste?

F Could Ohio EPA take some independent, random samples of the material in the collection bags stored in the North Mill Building and send them out for TCLP laboratory analysis? Once this is done, then could Ohio EPA send this information to a qualified landfill and see if they would profile the material as hazardous or non-hazardous? This seems like it would be a good way to accurately classify what is being stored by Freeport

WHY IS FREEPORT AND GOLDER ASSOCIATES IGNORING ALL THE OTHER FERROCHROIUM FURNACE DUST BURIED AT THE SATRALLOY SITE?

We are most concerned that the entire RI/FSforFSS has completely ignored the 24 years of ferrochromium furnace dust that was produced and buried at the Satralloy Site. How can Ohio EPA accept such a huge missing component of a hazardous waste material and not take this into account in the risk assessments? There is not any consideration given by the authors of what happened to this hazardous ferrochromium arc furnace dust material. This is a true lack of due diligence in accurately defining and representing true risks for the current Satralloy Site.

We have a few former Satralloy employees also in our group and they have told us in the early years the ferrochromium arc furnace dust was just taken by truck, randomly dumped and mixed in with the slag in the area south of the South Mill Building and also up on the plateau. In later years there was three more distinct areas they would haul it to and dump it. Those areas are:

1) Follow the former haul road at the south end of the upper rail spur to the very south end of the slag piles' almost to the property line. There is a huge dump site there; over a three acres in size. Dirt was spread around it so vegetation would grow and act as a wind shield. You will have to walk through some vegetation to find it.
2) Just to the west of the former government chromite ore stockpile near the west side of the plateau, at least a 2 acre area
3) Just south of the former government chromite ore stockpile on the plateau about another acre

These ferrochromium arc furnace dust dump areas should be shown on documents that both the Ohio EPA and Freeport must have.

If you take an average depth of 20 feet for these three areas (5 acres) it equates to over 160,000cy and there must have been 2 times this much layered in with the slag before designated dumping of the ferrochromium arc furnace dust started.

We did not see any testing of soil samples by Golder Associates near these areas. Why is that? Would it have hurt their conclusions? We hope the Ohio EPA considers this a gross oversight by Freeport and Golder Associates and request additional sampling be done in these areas. We feel it is the only proper way to include a comprehensive

representation of the ferrochromium arc furnace dust at the Satralloy Site it in the next draft of the RI/FSforFSS. We are sure it would affect the Human Health Risk Assessment and the Ecological Risk Assessment as currently stated.

We look forward to your soonest response. Like our last request could you please post your replies to us on your Ohio EPA website?

Sincerely,

Friends of Kolmont

1 August 2018

Maria Galanti,
Site Coordinator, Ohio EPA
Division of Environmental Response and Revitalization
2195 E Front Street
Logan, OH 44138

Subject: Questions about the draft Remedial Investigation/Feasibility Study for the Former Satralloy Site

Reference: Remedial Investigation/Feasibility Study for the Former Satralloy Site dated December 2016

Dear Ms. Galanti,

I have not seen a response yet to my first two letters sent over the last 2 weeks and I am hoping I will see it posted soon on the Ohio EPA website. I have been able to get assistance from additional friends and our numbers are growing of people who all have concerns about the potential human and environmental health issues related to the Satralloy Facilities and want to see some tangible action take place. We have continued reading in detail the Remedial Investigation/Feasibility Study for the Former Satralloy Site dated December 2016 (RI/FSforFSS) and many other documents found on the Ohio EPA website and other publications.

We do not agree with most of the biased conclusions found in the Golder Associates posted documents. We have found in the website's documents; letters when Ohio EPA asking questions to Freeport McMoRan and seen that the responses coming back from Golder Associates usually ignore the questions, do not address the question(s) or answer in a way that seems to only partially address the subject or they give an answer that is not related to the question. We would like to see Ohio EPA request Freeport to be accountable for Golder Associates to answer in detail the questions you have asked and not "get away" with evasive, non-responsive, partial or dismissive answers. We are confident you are aware of all of these unanswered or incorrectly answered questions. Your letters to Freeport request that the RI/FSforFSS and HHRA be revised but is that happening to your satisfaction? There is nothing on the OhioEPA website that indicates this.

In the RI/FSforFSS, it gives the conclusion that there is no health concerns from the ferrochromium slag at the Satralloy Site. Golder Associates summarizes that any hexavalent chromium that is generated will be quickly converted to trivalent chromium by natural attenuation in the soil. The report cites as a reference to support this claim: *Palmer, C.D. and R. W. Puls 1994. Natural attenuation of hexavalent chromium in groundwater and soils. Environmental Research Brief. Environmental Protection Agency.*

We looked up this publication and here is what the summary of the Palmer/Puls research states.

"Summary

Under certain conditions, toxic Cr(VI) can be reduced to the less toxic Cr(III) in soils and precipitated as an insoluble hydroxide phase. The possibility of relying on such "natural attenuation" of Cr(VI) is attractive because of the great expense of remediating chromium contaminated sites. Before such an option is adopted, however, it should be demonstrated that natural attenuation is likely to occur under the specific conditions at the site being investigated.

If natural attenuation is to be considered a viable option for chromium contaminated sites, then ideally, it must be demonstrated that:

1) *there are natural reductants present within the aquifer,*
2) *the amount of Cr(VI) and other reactive constituents do not exceed the capacity of the aquifer to reduce them,*
3) *the time scale required to achieve the reduction of Cr(VI) to the target concentration is less than the time scale for the transport of the aqueous Cr(VI) from source area to the point of compliance,*
4) *the Cr(III) will remain immobile, and*
5) *there is no net oxidation of Cr(III) to Cr(VI).*

The most difficult information to obtain is the time scales for the reduction and oxidation of chromium in the soil. Demonstrating Cr(VI) reduction in aquifer by mass balances that rely primarily on the aqueous concentrations from monitoring well networks are valid only if it is demonstrated that Cr(VI) precipitates are not forming in the aquifer. The monitoring network must be sufficiently dense that estimates of Cr(VI) are accurate."

Our question to the Ohio EPA is did you ask Freeport to demonstrate that the above 5 bullets of Palmer/Puls' criteria were addressed and proven to be the case for the soils at Satralloy? If not; how can you accept the conclusions by Freeport and Golder Associates that there is no risk at the Satralloy Site from the ferrochromium slag? If there is no risk than why are there elevated readings of hexavalent chromium in the monitor wells as reported by Golder Associates in the RI/FSforFSS?

Freeport and Golder Associates seem to completely ignore that there are elevated levels of hexavalent chromium in the surface waters discharging into Cross Creek from the Satralloy Site. The lab data shown in the RI/FSforFSS shows this to be the case. Surely the Ohio EPA has seen this. Again, how can Freeport and Golder Associates claim there is no risk to humans or the environment when their own test data shows there is a hexavalent chromium being discharged into Cross Creek on a regular basis?

While the RI/FSforFSS states that no samples of Cross Creek surface water had concentrations above the applicable criteria for hexavalent chromium of 11 µg/L, this is not the case. Here is another example of the authors of this report ignoring relevant data. Data presented in the mixing-zone study (Appendix D of the RI/FSforFSS) show three hexavalent chromium exceedances in samples taken at discharge locations from the "mixed" area of Cross Creek (15 , 22, and 12 µg/L) and three hexavalent chromium exceedances in samples taken from the "mixing" area (31, 38, and 17 µg/L). Because the study concluded that there is almost no mixing zone for discharges to Cross Creek, there is uncertainty in the distinction between discharge-water samples (ranging from 30 to 2,300 µg/L), mixing-area samples, and Cross Creek surface-water samples.

There are uncertainties related to the interpretation of Cross Creek sediment and sediment porewater data presented in the RI/FSforFSS. Hexavalent chromium was detected in sediment background (upstream) samples from Cross Creek (0.2 to 0.7 mg/kg) and McIntyre Creek (0.2 to 1.3 mg/kg). If there is no risk why is there a presence of hexavalent chromium in background samples? Freeport or Golder Associates has not explained the possible source. Would you please ask them to? These levels are in the same range as those detected in Cross Creek sediment samples taken adjacent to outfalls at Satralloy (median 0.6 mg/kg). In addition, sediment porewater samples taken in Cross Creek at the Satralloy Site contain hexavalent chromium at concentrations in the range of 24 to 540 µg/L, well above the surface-water criterion of 11 µg/L. The RI/FSforFSS conceptual model for the Satralloy Site behavior does not explain these background sediment and Satralloy-related sediment porewater findings. The findings for sediment porewater are inconsistent with the RI/FSforFSS model of immediate reduction to trivalent chromium on discharge into the creek. A possible explanation is that acid-volatile sulfide (AVS) capacity has been exceeded in sediment to a point where further reduction of hexavalent chromium to trivalent chromium cannot occur. AVS levels measured during the RI/FSforFSS were below detection limits in sediment. These uncertainties about hexavalent chromium in sediment background, and the future potential for increasing hexavalent chromium in porewater, need to be resolved to confidently predict future impacts of the Satralloy Site on Cross Creek sediment and address those impacts. Have you asked Freeport and Golder Associates these questions?

We reviewed the Conceptual Site Model (CSM) and have a number of observations and questions. We see the following problems with this CSM, which we feel may result in not evaluating all risk contributors that need to be addressed. Two transport mechanisms are important to evaluate at the Site, but are missing from the CSM. In addition to not being addressed by the baseline Human Health Risk Assessment (HHRA), we are concerned that

they will not be considered when you select the final remediation risk assessment. These mechanisms are:

1) The CSM does not include the groundwater-to-seep pathway. The CSM includes leaching to groundwater, but then only includes drinking of Valley Fill groundwater as an exposure pathway, not the secondary (and potentially more important) mechanism of groundwater becoming seep water. This gap in the CSM may result in not assessing specific source areas at the Satralloy Site as potentially important contributors to risk that may warrant remedial action. An example is the Interflow Zone of groundwater. This zone is eliminated from consideration in the draft HHRA, because it is not a viable source of drinking water. However, the Interflow Zone sits over a clay layer in the Plant area and discharges groundwater with hexavalent chromium concentrations in the range of 1,400 µg/L directly into Cross Creek. By not including this secondary pathway in the CSM, the potential importance of the Interflow Zone as a significant source of exposure to Cross Creek recreational users, is not directly examined. There is recreational use (swimming, wading and fishing) in Cross Creek across from the Satralloy Plant area. As stated, Cross Creek surrounds the Satralloy Site on three sides. The extent to which this creek based recreational use may extend next to and downstream of Satralloy is not addressed. In fact, exposures and risks from recreational use of Cross Creek are not quantified in the draft HHRA. We see this as a major omission and needs to be addressed.

2) The CSM also does not include ferrochromium slag disturbance that results in increased leaching to groundwater and seeps. The RI/FSforFSS talks about capping the slag which would mean consolidating it which means a great deal of ferrochromium slag disturbance. The CSM includes "soil disturbance" during future construction as a pathway for direct contact with "soil." Large areas of the Site are covered with ferrochromium slag. As seen with practice in Europe and Africa disturbing the ferrochromium slag will increase leaching from these slag-area sources, including releasing metals such as arsenic and chromium. This release mechanism may be a significant contributor to increased risks associated with groundwater and surface water. Excluding it from the CSM, and consequently from consideration in the risk assessment, results in its significance not being evaluated. Again it gives the impression the authors are misleading the reader of this report. This release mechanism and related risks will be especially important to evaluate for future Site development scenarios and Site remediation alternatives that may include ferrochromium slag disturbance.

The CSM shows pathways associated with recreational use of Cross Creek as "potentially complete but contributes little to risk." These pathways receive only qualitative treatment in the HHRA. Based on our review, we are not convinced that these pathways contribute little to the risk. We recommend that the exposure pathways associated with recreational use of Cross Creek be given quantitative treatment in the HHRA. Measured concentrations are available for Constituents of Potential Concern (COPCs) in sediment, bank soil, surface water, and fish tissue at the Site, near areas where recreational use has been observed. These data should be used to perform a quantitative risk assessment of the recreational use of Cross Creek. The

results of this risk assessment may indicate a need to consider remediation alternatives that include managing recreational use risks, in general or in certain locations. In your on Ohio EPA report on Biological and Water Quality Study of the Cross Creek Basin, Ohio EPA people mention multiple times personal witnessing people swimming and using Cross Creek for recreational purposes. For those of us that live on or near Cross Creek we are wondering why Freeport did not insist on this being addressed. Freeport personnel came to the Hilndale Fire Station a few times and gave slide show presentations about the Satralloy Site and said how they were going to study the Site in great detail and evaluate its impacts to the local area. The way this RI/FSforFSS has been written is inconsistent with what the Freeport Project Manager has been telling us for the last 8 years.

The CSM identifies four exposure areas for the HHRA: upland, lowland, site-wide, and Cross Creek. Using the large exposure areas adopted in the draft HHRA results in aggregation and averaging of concentration data from smaller exposure areas where human activities and exposure may reasonably occur, where concentrations may be higher, and/or where available data are insufficient to quantify exposure. We agree with the letter comments to Freeport by the Ohio EPA that the HHRA should divide the Site into smaller exposure areas based on source areas, past use, and Site geography.

The draft ecological risk assessment (ERA) also includes a CSM. Unlike the HHRA CSM, the CSM for ecological pathways does include the groundwater-to-seep-to-surface water pathway. It also shows (more correctly) the ferrochromium slag material as the primary source, unlike the HHRA model, which indicates soil as the primary source. However, it does not include a release mechanism involving soil or ferrochromium slag disturbance that would increase releases to surface water. If it is reasonable to anticipate that such disturbance may occur, the baseline risk assessments need to include related pathways. In addition, not including it in the baseline risk assessment makes it likely to not be considered in the Feasibility Study residual risk assessment of alternative remedies. It seems the authors of the RI/FSforFSS are being misleading and disingenuous.

Based on the letters we have seen the Ohio EPA has sent to Freeport and our experts' review we would like to see Ohio EPA ask for the following refinements to the conceptual models of the Satralloy Site. We feel these refinements are important to ensure that the when the Feasibility Study is done it will include remediation alternatives that address all factors that may be important contributors to future risks from the Satralloy Site, and risks associated with implementing the remedy itself.

a. All components of the ferrochromium slag matrix should be addressed, including ferrochrome waste materials and dust, as the primary sources. Differences in transport mechanisms and exposure pathways relevant to each of these components should be addressed by the Site conceptual models.

b. The variability of geochemistry across the Site (e.g., pH) and its effect on predicting releases to exposure pathways should be addressed. Conceptual site models should recognize uncertainties about future leaching and continued rapid and complete hexavalent chromium reduction.

c. The SPLP results should not be represented as indicating low leaching of hexavalent chromium from the Site, nor as an explanation for "low concentrations of chromium in surface water across the Site." Concentrations in SPLP results and on-site surface water samples are orders of magnitude above the applicable surface-water criterion for hexavalent chromium. Conceptual models of the Site should recognize that there are significant releases of hexavalent chromium to on-site surface water and Cross Creek surface water and sediment. In addition, claims that measured Cross Creek surface-water concentrations of hexavalent chromium are all below the applicable surface-water criterion are tenuous, considering the inexact distinctions among samples taken at discharge points, "mixing" locations, and "mixed" locations. This uncertainty needs to be recognized.

d. Disruption of the areas containing ferrochromium slag should be included in conceptual models of the Site as an important mechanism that can enhance leaching and transport of hexavalent chromium (and other COPCs) from ferrochromium slag material, through secondary media (e.g., shallow groundwater and seep water) to Cross Creek. This is important because future remediation or construction activities at the Site will need to account for this enhanced release mechanism.

e. The presence of hexavalent chromium in background sediment samples and elevated levels of hexavalent chromium in Cross Creek sediment porewater need to be understood and explained, including potential implications for future impacts.

f. The HHRA conceptual model should include transport from shallow groundwater to seep water to Cross Creek sediment and surface water as a pathway, and not limit groundwater to just the drinking-water pathway. The potential for groundwater from the Interflow Zone to be a source to Cross Creek sediment and surface water, and related recreational and ecological exposures in that vicinity, should be included.

g. The HHRA should include a quantitative assessment of exposures and risk associated with recreational use of Cross Creek.

We look forward to your soonest response. Like our last request could you please post your replies to us on your Ohio EPA website?

Sincerely,

Friends of Kolmont

23 July 2018

Maria Galanti,
Site Coordinator, Ohio EPA
Division of Environmental Response and Revitalization
2195 E Front Street
Logan, OH 44138

Subject: Questions about the draft Remedial Investigation/Feasibility Study for the Former Satralloy Site

Reference: Remedial Investigation/Feasibility Study for the Former Satralloy Site dated December 2016

Dear Ms. Galanti,

I have not seen a response yet to my first letter sent last week and I am hoping I will see it posted soon on the Ohio EPA website. I have downloaded all the reports on the Ohio EPA website related to Satra Concentrates. I am writing you to ask some questions about the Remedial Investigation/Feasibility Study for the Former Satralloy Site dated December 2016.

The Hellbender Salamander seems to be essentially ignored in the study work by Freeport McMoRan. The Ohio Division of Wildlife lists the Hellbender as ENDANGERED. There is a tremendous amount of literature available on the Hellbender in Ohio Rivers. One of them is "*A Conservation Plan for Eastern Hellbender in Ohio*" by Gregory J. Lipps. There are websites that are focused on the Hellbender. In reading thru this literature there is information on Cross Creek and that Hellbenders have been seen upstream of the Satralloy facility but not downstream. Could it be because of the uncontrolled hexavalent chromium releases from the Satralloy facility? There is no mention of the Hellbender in the 470 pages in Volume 1 and in the 965 pagers of Volume II that seems to cover risk assessments to human and aquatic life. I only found the word Hellbender used once in a table on page 61. There was no discussion in either of the volumes about the Hellbender. In fact it seems the report inadvertently or intentionally ignored the Hellbender. An example of this very limited inclusion of the Hellbender can be seen in Volume II; an excerpt from Table 5-1 it shows the following:

Table 5-1 (excerpt)
Assessment Endpoints, Measures of Effect, and Representative Receptors
Level III Baseline Ecological Risk Assessment
Former Satralloy Site
Jefferson County, Ohio

Functional Group	Assessment Endpoint	Representative Endpoint Species	Measure of Exposure	Measure of Effect
Amphibians and Reptiles	Survival, reproduction, and growth of amphibians and COPCs in soil sediment and preys	Eastern Hellbender	Due to limited toxicity data and difficulty in determining exposure, this is addressed qualitatively in Section 6 of the Level III BERA.	

Notes:
COPC = constituent of potential concern
LOAEL = lowest observed adverse effect level
NOAEL = no observed adverse effect level
T&E = threatened and endangered

Why is it for the entire Table 5-1 every one of the other 14 Functional Groups there is individual attention and notes given to both "Measure of Exposure" and "Measure of Effect" but with the Eastern Hellbender these two blocks are merged into one and it seems not to give any real information to the exposure or effect level. I would have expected to see something like how levels of hexavalent chromium exposure effect the Hellbender. Plus there was no qualitative or quantitative follow up in Section 6 in the Level III BERA as stated there would be in Table 5-1. I hope Ohio EPA has criticized Freeport McMoRan for not only ignoring the Hellbender but also frequently referencing the reader from one part of the documents to another part but in the second or third reference there is nothing there of substance.

I also have a number of questions about what is addressed in the Remedial Investigation/Feasibility Study for the Former Satralloy Site (RI/FSforFSS); they are provided below.

1) The RI/FSforFSS talks about hexavalent chromium being a constituent of potential concern but the issues and concerns about hexavalent chromium seems to be almost ignored in the report. The term FeCr is only used once in over thirteen hundred pages of the report. Nor is there any mention on the estimated amount of FeCr on the site. Is it 20 to 40 pounds or 20 million to 40 million pounds? Freeport McMoRan should know how to do thorough assays of slag. They seem to do talk about their ability to assay all kinds of ores, slags and tailings in their own published literature, surely they can do a reasonable estimate of how much FeCr is on the Site. Why does the risk assessment not calculate the potential hexavalent chromium that can be generated from a pound

of FeCr or other forms of chromium? Since hexavalent chromium seems to be one of the top Constituent of Potential Concern why is so little quantitative data provided in the report?

2) In the RI/FSforFSS that has Golder Associates name on the cover, it states on pages ES-2 and 2 that the estimated volume of slag deposited on Site is 800,000cy. There seems to be more than twice that volume of slag at the Satralloy Site. Since FeCr and other forms of chromium are in the slag and these are the sources of hexavalent chromium leaching off the Site; is it not very important to make sure there is an accurate estimate of how much slag is on the Satralloy Site? Has the Ohio EPA independently checked or challenged Golder on providing a realistic volume and not one that has been low-balled?

3) In Volume I, page 12 shows that the baghouse dust has chromium concentrations over 10 times the background levels. Page 25 it states the sample results are in Table 4.2-1. In looking at the chromium and hexavalent chromium numbers in table 4.2-1 there seems to be a lot of high numbers. Do these numbers exceed any health limits? If they do which EPA limits do they exceed? How much baghouse dust is on the Satralloy Site?

I look forward to your soonest response. Like my last request could you please post your replies to me on your Ohio EPA website?

Sincerely,

Mingo Junction Anonymous

19 July 2018

Maria Galanti,
Site Coordinator, Ohio EPA
Division of Environmental Response and Revitalization
2195 E Front Street
Logan, OH 44138

Subject: Public Health Concerns about the Former Satralloy Site and Releases to Cross Creek

Reference: Biological and Water Quality Study of the Cross Creek Basin and Selected Ohio River Watersheds by Ohio EPA

Dear Ms. Galanti,

I am writing to you about health concerns living near Satralloy. I heard Mr. Gentile's interview on TV and a friend of mine passed on a report done by the Ohio EPA that I felt alarming reading through it. I have a few questions about the Former Satralloy Site with regards to public health and safety.

In the above referenced Ohio EPA Technical Report dated April 1, 2013; page 11 it states ..."*Significant amounts of hexavalent chromium and total chromium are being discharged to Cross Creek from the Satralloy facility (Table 8). Ohio EPA field staff often observed citizens swimming in Cross Creek during the 2010 survey just downstream from Satralloy at the Mingo Junction – Goulds bridge (TR-74). This is a well-known swimming location and could be a potential area of human health exposure to hexavalent chromium and total chromium. Signs should be posted at this location to warn citizens about the potential exposure.*" I have never seen any potential exposure warning signs posted at this location by Ohio EPA or any other agency. Why is this? If there is such a concern why has there been no follow up?

On page 27 of the referenced Ohio EPA Technical Report it states..."*Satralloy did have an NPDES permit with Ohio EPA but the permit was revoked in 1996 after the facility was closed and the new owner and operator refused to continue the required monitoring. Several areas discharge from the property directly to Cross Creek from RMs 7.72 to 4.71 (Figure 8). Hexavalent chromium and chromium samples were collected from Satralloy by Ohio EPA on*

April 1, 2011 and showed exceedances of the WQS criterion for hexavalent chromium (see Figure 8 and Table 8 for sampling locations and Table 8 for sampling results). Elevated levels of total chromium, total dissolved solids (TDS) and pH were above WQS criterion for the Outside Mixing Zone Average (OMZA) (Table 8). Additional samples, collected by the Cyprus Amax Minerals Company on June 7, 2011 and May 8, 2012 also exceeded the WQS criterion for hexavalent chromium." An excerpt of Table 8 is shown below:

Satralloy discharges to Cross Creek sampled by Ohio EPA

Parameter	Units	Location SC1 RM 7.82	Location GC-3 RM 4.68	Location GC-5 RM 4.75	Location GC-4 RM 4.71
Chromium	ug/L	54.3	752	281	634
Hexavalent Chromium	ug/L	59	752	271	620
Total Dissolved Solids	mg/L	168	1710	984	1300
pH	S.U.	11.19	12.6	9.3	11.38

This Table shows three of the four locations exceeding the EPA WQS for Chromium at 100 ug/L. I understand there is not an EPA WQS for hexavalent chromium in drinking water but I would like to know how these hexavalent chromium levels compare to Cross Creek Stormwater discharge samples taken well upstream of the Satralloy Site on McIntyre and Cross Creeks as well as storm water discharge samples taken from other ferrochromium facilities in the United States.

On page 35 of the referenced Ohio EPA Technical Report under the Fish Tissue discussion it states … "*Among the 28 fish analyzed in 10 tissue samples in the vicinity of Satralloy, chromium was detected in a composite evaluation of three white suckers. This finding is consistent with similar observations of higher concentrations in lower trophic levels (Eisler 1986). Otherwise, beyond the fundamental point that chromium should not be present, further inferences about this detection and amount are speculative. The uncertainty regarding chromium and environmental exposure should be cause for concern and further investigation. The 2010 fish detection near the former Satralloy facility indicates that hazardous substances are migrating from the location. More active containment and remediation are recommended.*"

I talked to people that have recently done work at Satralloy and they said the owners of the property, Freeport McMoRan has done a big report called a Remedial Investigation. Did Freeport McMoRan address these issues brought up in this Ohio EPA Technical Report?

I am very concerned about the amounts of hexavalent chromium being released into Cross Creek via surface water discharges. People living and working in the area of the Satralloy Site have seen, after rainfalls, light green water pouring from the Satralloy Site drainages and under the fence into multiple Cross Creek locations. You own Ohio EPA Technical Report states that for many years hexavalent chromium has been discharging from the Satralloy Site into Cross Creek. It appears to me that there is clearly an issue with hexavalent chromium being discharged into Cross Creek from the Satralloy Site. I have heard there has been additional study work done beyond the referenced Ohio EPA Technical Report. Can you tell me if there

has been additional sampling done by Ohio EPA, Freeport McMoRan and any other third parties that confirms hexavalent chromium is entering Cross Creek from the Satralloy Site?

I want to stay anonymous, as I have personal concerns if a big company like Freeport McMoRan finds out who I am. I am asking if you could please post your response to me on your Ohio EPA website and I can read it from there. I hope you will answer my letter soon and not dismiss it as just some backwoods neighbor that doesn't count.

Sincerely,

Mingo Junction Anonymous