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AZR AMERICAN ZINC RECYCLING
Delivering a Sustainable Future

April 25, 2019

Julia Morita, M.D.
Department of Public Health
Pollution Prevention Unit
333 South State Street, Room 200
Chicago, Illinois, 60604

Re: AZR Variance Request
Rules and Regulations for Control of Emissions from the Handling and Storage of Bulk Solid Materials - Part D.

Dear Commissioner Morita,

In accordance with Section 10.0 of the Rules and Regulations for Control of Emissions from the Handling and Storage of Bulk Solid Materials (the "BSM Rules"), effective January 25, 2019, American Zinc Recycling Corp. ("AZR") submits the following variance requests related to operations at its facility in the Calumet area of Chicago (the "Chicago Facility" or the "Facility").

Variance Requests (Section 10.0(2)(a))

A variance is requested from Part D Enclosure Requirements for the storage, handling, and transfer points for the Facility's manganese-bearing material known as Iron Rich Material ("IRM"). Although the Facility processes a second, manganese-bearing, bulk solid—electric arc furnace dust ("EAF dust")—AZR does not require regulatory relief for that material because the material already is handled in compliance with the BSM Rules.

A second variance is requested from the Interim Fugitive Dust Plan in Section 5.0(1)(b). Because this requirement does not have a direct effect on public health, and the appropriateness of this variance depends on CDPH's treatment of the first variance request, this variance request is discussed at the end of this filing.

Pertinent Data on Location, Size, Population, and Geographic Area in Vicinity of the Chicago Facility (Section 10.0(2)(b))

AZR's Facility is located at 2701 E. 114th St., in the Calumet area of Chicago, on the Calumet River. It was built in 1940. Horsehead Resource Development Company, Inc. ("Horsehead R&D") purchased the plant in 1986. In 2003, Horsehead Corporation purchased the assets of Horsehead R&D in a then-pending bankruptcy proceeding. Horsehead Corporation

subsequently changed its name to "American Zinc Recycling Corp." in May 2017. In all material respects, AZR has continued the plant manufacturing operations unchanged since the 2003 acquisition. The Facility currently employs 65 employees.

An aerial photograph of the Chicago Facility is attached as Exhibit A. The Facility property encompasses approximately 33.5 acres and is located in the South Deering neighborhood of Chicago. South Deering covers an area of approximately 11 square miles, bounded on the east by the Calumet River and on the west by Lake Calumet. The area has a long industrial history because of its ready access to transportation, including river, railcar, and nearby interstate highway connections. For an urban area, the neighborhood is sparsely populated: Despite easily being the largest of Chicago's 77 official community areas, South Deering only has ~14,600 residents.[1] By contrast, Chicago's second largest community area, Austin, is only 7.15 square miles, but has ~98,000 residents.[2] There are no residential properties in the immediate vicinity of the Facility—it is located within a district that is zoned for manufacturing use under the City of Chicago Zoning Ordinance. The closest residential property is ¼-mile southwest, across Torrence Avenue. AZR

The AZR Facility is bordered on the north by an equipment yard for Walsh Construction, and on the south by a grain facility (COFCO International). To the west, there are railroad tracks between the Facility and Torrence Avenue. The Calumet River is immediately east of the property, with industrial facilities located along it in the vicinity of the AZR Facility that are used for scrap metal processing, storing bulk materials, and transferring bulk materials (including coke) to and from barges and trucks. Within a mile of the plant are a number of other facilities, that handle various bulk solid materials, as well as a port vessel loading operation.

The area is heavily industrialized, and AZR personnel have observed visible dust emissions coming from the properties of its neighbors. On various occasions AZR personnel have smelled rotting grain coming from the adjacent facility immediately to the south and have observed particulate emissions originating from the scrap recycling facility across the river.

A map with nearby industrial facilities is attached as Exhibit B.

To be clear: AZR does not believe that its manufacturing operations affect the surrounding population beyond the normal effect of any ongoing manufacturing operation within a community, such as the presence of truck traffic entering and exiting the facility. (And even that effect is limited to a fraction of the South Deering area.) Accordingly, a formal response to the BSM Section 10.0(2)(b)'s request for information on "the population and geographic area affected by, or potentially affected by, the process or activity" would describe only the AZR Facility. Nonetheless, this variance request describes a broader geographical area so that the Department appreciates the industrial character of the region, and the potential for AZR's neighbors to cause dust emissions to be carried to the AZR Facility.

[1] https://www.cmap.illinois.gov/documents/10180/126764/South+Deering.pdf.

[2] https://www.cmap.illinois.gov/documents/10180/126764/Austin.pdf.

AZR strives to be a good member of the local community. Despite significant community and governmental interest in problems caused by airborne bulk solids (including airborne manganese), AZR has not received complaints from its neighbors, other local citizens, local police or elected officials regarding particulate materials leaving the AZR property.[3] Other than the use of the local roads leading to and from its facility by employees and contractors, AZR believes that the area affected by its manufacturing activity is generally limited to the Facility premises.

Description of Process & The Quantity and Types of Materials Used (Sections 10.0(2)(b) & 10.0(2)(c))

AZR's Facility is a recycling operation for electric arc furnace dust ("EAF dust") material generated by the steel mini-mill industry. AZR's recycling operation prevents EAF dust from winding up in landfills and instead turns it into valuable commercial products, namely "Waelz Oxide" ("WOX") and "Iron Rich Material" ("IRM").[4] The Facility is not a bulk-solids terminal, and does not handle, store, or transfer bulk material on behalf of others.

The manganese concentration (by weighted average) of EAF dust is approximately 2%-3%. But the Facility's receipt and use of EAF dust as a feed material to its manufacturing process is conducted in a fully enclosed process. The EAF dust and other zinc-bearing feedstock materials (collectively, the "feedstock material") arrive at the Facility via enclosed railcar or truck. The railcar or truck enters a Facility building, known as the "C&B Building" which provides full enclosure for the receipt and handling of the feedstock material. EAF dust is placed directly into the process from trucks and railcars which are offloaded indoors. All handling of this material is done indoors or within enclosed structures, which are equipped with particulate matter (PM) pollution control equipment. This air pollution control equipment is identified and regulated in the Facility's Clean Air Act Permit Program (CAAPP) permit issued by the Illinois EPA.[5] (Attached as Exhibit C) Through the use of the air pollution control equipment (Bag Collectors 11A, 11B, and 12), the C&B building is maintained under negative pressure to prevent the escape of fugitive emissions. Furthermore, the CAAPP Permit requires periodic testing of this air pollution control equipment.[6] This testing, most recently completed on November 15-16, 2017, confirmed that the air pollution control equipment was effectively

[3] On August 13, 2018, a CDPH inspector noted one of the kilns at the Facility producing emissions with "~10-15%" opacity. (A copy of the CDPH inspector's report is attached as Exhibit C.) AZR addressed this observation by adjusting the operations of the kiln to abate the emissions. The CDPH inspector's report documents AZR's compliance with the requirements of the BSM Rules.

[4] AZR manages its WOX materials in compliance with all applicable sections of the BSM Rules, and these materials are not the subject of this variance request.

[5] In CAAPP Permit No. 96030189, Condition 4.1.1, the C&B Building is identified as "Curing and Blending Building" and is controlled by Bag Collectors 11A, 11B, and 12.

[6] CAAPP Permit No. 96030189, Condition 4.1.2.b.ii.D.I.

operating, and compliance with PM_{10} emission limits identified in the CAAPP permit was demonstrated.[7]

The curing and blending process pelletizes the EAF dust. Pelletized EAF is no longer a "dust" and its potential to become airborne while being transported to the kilns is minimal. In any event, the pelletized EAF is not exposed to the outdoor environment—it travels through enclosed conveyor belts to the Feed Building, and proceeds either to Kiln 1 or Kiln 2, again through completely enclosed conveyor belts.

Thus, the AZR Facility's use of EAF dust does not present a threat of unacceptable off-site emissions either during transport to or after arrival at the Facility. Because EAF dust is not stored or otherwise handled outdoors, the use and handling of EAF dust does not trigger any additional enclosure or monitoring requirements under the Amendments.

The IRM produced by the processing of EAF dust has approximately 1%-2% manganese concentration. Manganese in the IRM is present in two compound forms: a very small amount of a silicate compound which includes manganese, and a smaller, trace presence of manganese in the metallic iron (as a ferromanganese compound).[8]

But although it has a lower manganese concentration than the EAF dust, the IRM cannot feasibly be handled in a totally enclosed manner like EAF dust. AZR produces approximately 76,000 cubic-yards of IRM annually, and at any given time, there are several piles of IRM stored outside at the Facility in compliance with the 30-ft. height restriction in Section 7.0(2) of the BSM Rules. Among other uses, IRM is used as an iron source in cement production, as an aggregate in asphalt production, and as a passive water treatment medium for the removal of metal (under the trade name "Ecotite").

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[7] *Report on a Particulate Emissions Test Program*, prepared by Clean Air Engineering for American Zinc Recycling Corporation, January 4, 2018. This Report is included in Exhibit E. The appendices to this report have been omitted due to size, but are available on request. See also CAAPP Permit No. 96030189, Conditions 4.1.2.b.i.B, and 4.1.2.b.i.D.

[8] *See* Pittsburgh Mineral & Environmental Technology, Inc. (PMET) results of semi-quantitative mineral phase analysis of AZR's IRM, dated October 24, 2018 (Exhibit F). PMET is a certified lab that performed an X-ray powder diffraction (XRD) analysis to determine the mineralogical composition of IRM, and an analysis of the metal flake in the IRM (largely iron based) using a scanning electron microscope with energy-dispersive x-ray detector (SEM-EDX) technology. Per the SEM-EDX analysis, a very small fraction of the metal in IRM as a ferromanganese compound (at a total manganese concentration of approximately 0.1% of the IRM), and, per the XRD analysis, another small percentage of manganese in the IRM (possibly in the form of manganese oxide, at approximately 1.5%) as braunite, a silicate material. AZR acknowledges that materials containing ferrous manganese compounds and manganese silicates fall within the BSM Rule's definition of "Manganese-Bearing Bulk Material," but manganese is not extracted from the IRM and AZR questions whether IRM generates manganese-containing emissions as handled at the AZR Facility, both of which are also requirements of the definition.

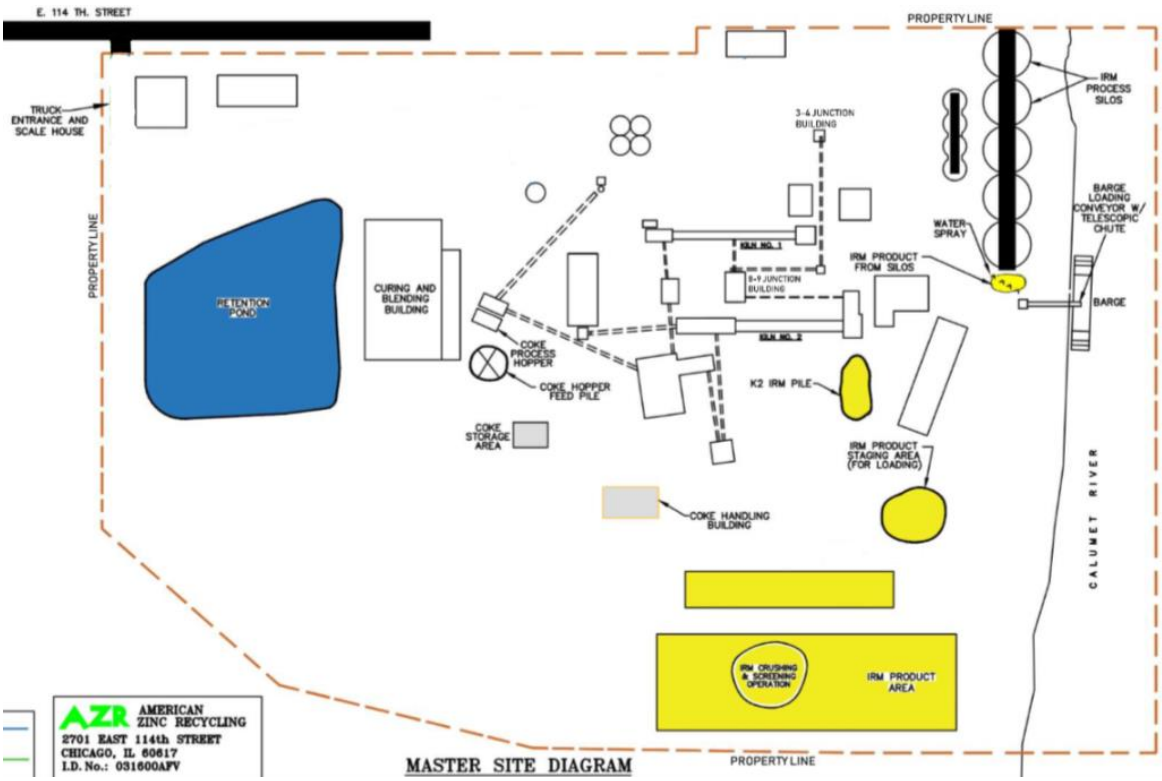

Figure 1 - Site Diagram (Large version attached as Exhibit G)

IRM is formed in the Chicago Plant's two Waelz kilns.[9] Each kiln produces IRM that can be in two forms: "fine" IRM and oversized IRM. The "oversized" IRM is about the size of a basketball and has no potential to become airborne. It exits each kiln into an "Oversize Pit" and is periodically collected by front-end loaders and taken to a dedicated bunker at the IRM Product Area. There it undergoes quality-control testing, and if it is of appropriate quality, it is run through crushing and screening equipment so that it is of a similar size to the other IRM material. This crushing and screening equipment is regulated by the Facility's CAAPP permit, and a water truck spray is used for dust suppression during crushing/screening operations (even during freezing conditions). The permit requires additional precautions required by 35 Ill. Admin. Code 212.301, 212.306, 212.308, and 212.316.

Fine IRM exits each kiln from a different port than the oversize IRM.[10] Each kiln is attached to a "cooler" which collects the Fine IRM and rapidly cools it with sprayed water so

[9] Pursuant to the Facility's CAAPP permit, the kilns use two product collectors for limiting emissions.

[10] In April 2019, the Kiln 2 Cooler was shut down for repairs, and Kiln 2 has temporarily been directing both "fine" IRM and oversize IRM into a "water quench pit." From the quench pit, a backhoe scoops up the material, and places it on the neighboring "K2 IRM Pile." After quality-control testing, material is wetted again, and transported by front-end loader to the IRM Product Area. Because the material is completely immersed in water while in the quenching pit, and remains soaking wet while it is placed in the "K2 IRM Pile," this temporary process has no

that it can be safely handled.[11] Fine IRM exiting Kiln 1 passes through the Kiln 1 Cooler, then travels along a series of three conveyor belts, each of which is enclosed. (In the map in Exhibit G, this can be seen as three dashed lines forming a "J" shape, beginning at the mid-point of Kiln 1.)

The conveyor belts from Kiln 1 terminate at the "3-4" Junction, which is a small building that encloses the deposited material on all but one side. The building does not have a northern wall, and this is how front-end loaders access the deposited material before transporting it to the IRM Process Silos. Three permanent water sprays soak all Fine IRM entering the 3-4 Junction. The 3-4 Junction is not a storage area—fine IRM is typically removed from the Junction by a front-end loader within two-to-four hours. Because the material is kept wet, is enclosed on all but one side, and is at this location only for a short period of time, this transfer point has no meaningful potential to generate fugitive IRM dust.

Figure 2 - "3-4 Junction" Building (showing water from overhead sprays)

Under normal operations, the Fine IRM exiting Kiln 2 passes through the Kiln 2 cooler, then travels on an enclosed conveyor belt to the "8-9 Junction" Building, a small building located in between Kiln 1 and Kiln 2. This building encloses the Fine IRM deposited there on five sides and an attached baghouse prevents fugitive dust from leaving the building.[12]

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potential to generate fugitive dust. The K2 IRM Pile will be eliminated once the Kiln 2 Cooler is repaired.

[11] Construction Permit No 18050025 from the Illinois EPA, identifies these water spray systems and associated water spray operating log.

[12] In order to minimize the number of conveyor belts and transfer points, AZR has committed project capital to redesigning the Kiln 1 Fine IRM system so that it terminates in the same place as the Kiln 2 Fine IRM, namely, the 8-9 Junction Building. This upgrade—projected to cost $250,000—will result in all Fine IRM being deposited in the 8-9 Junction Building. A water

Front-end loaders are used to transport Fine IRM from the 3-4 Junction Building and the 8-9 Junction Building to the IRM Process Silos. The Silos are not used for long-term storage of the IRM.[13] Rather, this is a "QA" area, where batches of IRM can undergo quality-control testing before being comingled with other batches of IRM at the IRM Product Area. The Silos do not provide complete enclosure of the IRM—each has an opening at the base large enough for the front-end loaders to enter the structure. Nonetheless, the IRM at this point has no meaningful potential to become airborne. The IRM is shielded from the wind on almost all sides and remains wet from the Kiln 1 and Kiln 2 coolers. Accordingly, there is no meaningful potential for this material to become airborne while being transferred or stored in the IRM Process Silos.

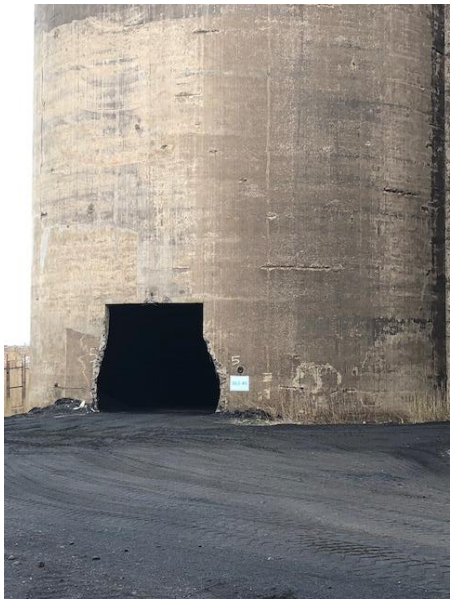

Figure 3 - IRM Process Silo

Figure 4 - "8-9 Junction" Building with Baghouse

After analytical testing, the IRM is moved by a front-end loader from the Silos to one of three areas. If barge shipments are scheduled in the near future, the IRM is moved to a temporary staging area located approximately 150 feet south of the barge-loading conveyor system (the "IRM Product Staging Area (for Loading)" on the site diagram.) IRM inventory for later customer shipments is stored in the IRM storage pile area located on the southern portion of the Facility (the "IRM Storage Bunkers" and "IRM Product Area" on the site diagram). The barge-loading conveyor system is enclosed, and a chute extends down from the end of the conveyor into the hull of the barge, so that descending material is protected and shielded from the wind.

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spray system (similar to the one at the 3-4 Junction Building) will be added to the 8-9 Junction Building. The 8-9 Junction Building's baghouse will be removed as part of this project. Once the project is complete (projected June 30, 2019), the 3-4 Junction Building will no longer be a transfer point for Fine IRM.

[13] The Process Silos are not large enough to be used for the long-term storage of IRM. The Silos were constructed before the Facility was repurposed as an EAF-recycling operation.

Figure 5 - Photo of Enclosed Conveyor with Chute Depositing Material in Barge

The AZR Facility has been permitted by both the City of Chicago and the Illinois EPA, including regular inspections by both authorities. As noted previously, the Facility currently operates under a Title V Clean Air Act Permit Program (CAAPP) permit (I.D. No. 031600AAF), issued by the Illinois EPA.[14] With one exception, the Facility has consistently complied with the requirements of this permit regarding the control of fugitive dust emissions.[15]

The Facility also operates as a solid waste management site (ILD040891368; Permit No. 1986-08-OP, Supplemental Permit No. 2004-07-SP), which contains provisions for the on-site accumulation and storage of product material on the property, namely IRM. In accordance with the requirements of the City of Chicago Rules and Section 11-4-660 of the Municipal Code of Chicago, the Facility maintains a Certificate of Operation from the City of Chicago.

Demonstration of Impact (Section 10.2.d.)

1. **IRM is unlikely to produce fugitive dust, even when stored outdoors.**

In the case of the IRM, the nature of that material is itself a limiting factor on emissions. It is very dense (weight upwards of 100 lbs/ft^3), when compared to bulk solids like coal or coke. When the IRM is exposed to the atmosphere, compounds which comprise IRM, similar in nature to lime, form a four-to-five-inch thick crust which is as hard as concrete (lime is a key component of most types of cement.) The crust is so hard that the IRM surface cannot be broken through with a shovel. This crust (which becomes one-inch thick within a few weeks regardless

[14] Per the Facility's CAAPP permit, fugitive emissions from IRM handling and storage piles are identified and permitted at Condition 4.4. Fugitive emissions from IRM screener, crusher, and storage piles and associated roadways are identified and permitted at Condition 4.6.

[15] On July 5, 2018, a lightning strike caused an operational failure at the Facility that caused the induction fans that draw emissions from the Facility's Kilns into AZR's pollution control equipment to lose power. After 23 minutes, AZR personnel identified and corrected the problem. However, during this period of time, the Permit's 30% opacity limit was exceeded. Within hours of the event, AZR submitted notices to the Illinois Environmental Protection Agency, the Illinois Emergency Management Agency, and the National Response Center.

of the season) prevents IRM from generating meaningful fugitive dust emissions when it is stored outside.

Figure 6 - Photo of IRM Showing Crust

2. AZR takes affirmative efforts to suppress fugitive dust.

Whenever the IRM is transferred at the Facility (*e.g.*, when exiting the kiln, or from storage silos to the IRM Product Area, or from the IRM Product Staging Area onto trucks), AZR uses its water-based dust-suppression system to apply water to the IRM.[16] The Facility has permanent water sprays installed at the 3-4 Junction Building, the Kiln 1 Cooler, and the Kiln 2 Cooler. The Facility has, for several years, used a water truck, equipped with a spray hose, for dust suppression at other IRM loading or transfer locations. And in February 2019, the Facility began renting a second water truck to ensure that dust suppression can be performed consistently or at those times when the other water truck is unavailable.[17] Facility personnel have no discretion to forego dust suppression efforts if a water truck is unavailable. The task must be delayed until a water truck becomes available. Even during freezing conditions, when water application is impractical or unsafe, a Liquidow™ technical-grade calcium chloride solution is used as a chemical stabilizer during any outdoor loading, unloading, transfer, or pile disturbance.

[16] When freezing conditions are present, quality-control and safety issues prevent AZR from applying water during transfer operations. In these circumstances, AZR (1) monitors weather forecasts and ensures that its on-call contractor applies chemical stabilizers to any outdoor loading, unloading, transfer, or pile disturbance during freezing conditions; (2) monitors for visible dust and shuts down if the dust emissions cannot be effectively suppressed without the use of water spray; and (3) as of February 2019, maintains and operates PM_{10} monitors and evaluates the results to ensure that there is no marked increase in fugitive dust during freezing conditions. CDPH has concluded that these measures are sufficient to prevent the creation of a public nuisance and protect the surrounding community. CDPH Response to Variance Request, at p. 3 (Sept. 14, 2018).

[17] The water truck costs about $2,000 dollars per week.

Figure 7 - Water Truck Applying Water to Bulk Solids

The application of water accelerates the formation of the crust on the surface of the IRM and also ensures that fugitive dust emissions are controlled during IRM loading or transfer activities. Indeed, the watering is so routine that Google Earth Pro's satellite photo of the IRM Product Area (taken at an essentially random point in time in October 2018) shows a water truck applying water to the IRM Storage Pile.

Figure 8 - Google Satellite Photography Dated 10/15/18 (Water Truck Shown on Right Side of Image)

Water is also applied to the IRM immediately prior to being screened at the IRM Product Area.

AZR's additional dust suppression efforts have been comprehensively documented in its Fugitive Dust Plan, which has been repeatedly updated since it was first submitted to the Department in 2014, most recently in January 2019. The Plan includes provisions to prevent truck activity from generating significant amounts of fugitive dust. AZR uses a uses a street sweeper equipped with a vacuum system to clean paved roads used to transport material inside

the facility and within one-quarter mile of the perimeter of the Facility. The sweeper also employs a water spray during non-freezing conditions.

Additionally, before IRM trucks exit the Facility, AZR personnel inspect their wheels for loose material. If loose material is found, it is hosed off with water (weather permitting) before the IRM truck is allowed to leave the Facility. This precaution was initially adopted when some portions of the Facility were unpaved, increasing the potential for material to adhere to truck tires. Now, all internal roads at the Facility are paved, and so significantly less material ends up on the tires of IRM trucks.[18] Nonetheless, AZR has left this inspection in place, out of an abundance of caution.

AZR has also devoted increasing resources towards preventative maintenance at the Facility. In November 2018, AZR implemented a computerized preventative maintenance system that tracks the maintenance needs of every piece of equipment at the Facility. The system, requires a significant commitment of man-hours to implement but greatly reduces the chance of any equipment breakdowns, including pollution-control equipment, because required maintenance and repairs are flagged and addressed on a consistent, regular basis.

The increased reliability of the pollution-control systems and other Facility equipment provided by the new preventative maintenance system is beneficial to the surrounding area. In May 2015, EAF dust escaped the C&B Building after a seal on a dust collector broke. With the new preventative maintenance system, this seal, and hundreds of other equipment components, are serviced or replaced on a set schedule incorporated into the maintenance system, significantly reducing how often unexpected failure events like this occur.[19]

3. Objective evidence from other AZR facilities confirms that IRM does not produce significant amounts of fugitive dust.

The effectiveness of the AZR Facility's suppression efforts has been corroborated by direct testing. AZR's quarterly opacity testing—using EPA Methods 9 and 22—in the areas of the Facility where IRM is handled or stored show no opacity or minimal levels well below 10% even when IRM is being removed from or added to the piles. This tracks with long-term PM_{10} monitoring that AZR has conducted at its facility in Rockwood, Tennessee (the "Rockwood Facility"). The Rockwood Facility is comparable to the AZR Chicago Facility both in terms of processing rate of IRM and overall operations. Both facilities operate two kilns, with similar reserves of IRM stockpiles on site. The Rockwood Facility's PM_{10} monitoring results are consistently well below the PM_{10} 150 $\mu g/m^3$ National Ambient Air Quality Standard. AZR previously submitted a detailed review of the Rockwood Facility's PM_{10} monitoring results

[18] The 2019 version of the Fugitive Dust Plan describes existing unpaved roads at the Facility. The next update will be corrected to note that there are no longer any unpaved roads at the Facility.

[19] Also in 2015, a breakdown in the Facility's bucket elevator (which was part of the system that transferred petcoke from storage areas to the kilns) caused material to spill on the ground. The Facility no longer uses petcoke, and it replaced the bucket elevator with an enclosed conveyor several years ago. Nonetheless, occurrences of this nature will be much less frequent now that the computerized preventative maintenance system is in use.

to the Department in support of its prior variance request related to the BSM Rules' requirements for continuous PM_{10} monitoring and that submission is incorporated by reference here.[20] Thus, the empirical data provided by the Rockwood Facility's PM_{10} monitors shows that IRM production, storage and handling at the Facility should not present a risk of off-site fugitive dust emissions that warrant the additional regulation in the Amendments.

4. Preliminary PM_{10} Monitoring corroborate the findings from the Rockwood Facility.

CDPH has previously recognized that the data from the Rockwood Facility is "promising," though it was not convinced that the similarities between the Chicago and Rockwood Facilities were sufficient to reliably predict the level of fugitive dust that would be found at the Chicago Facility. CDPH Response to Variance Request, at p. 13 (Sept. 14, 2018). But AZR has now installed four, permanent, continuous, Federal Equivalent Method real-time PM_{10} monitors at the Chicago Facility.[21]

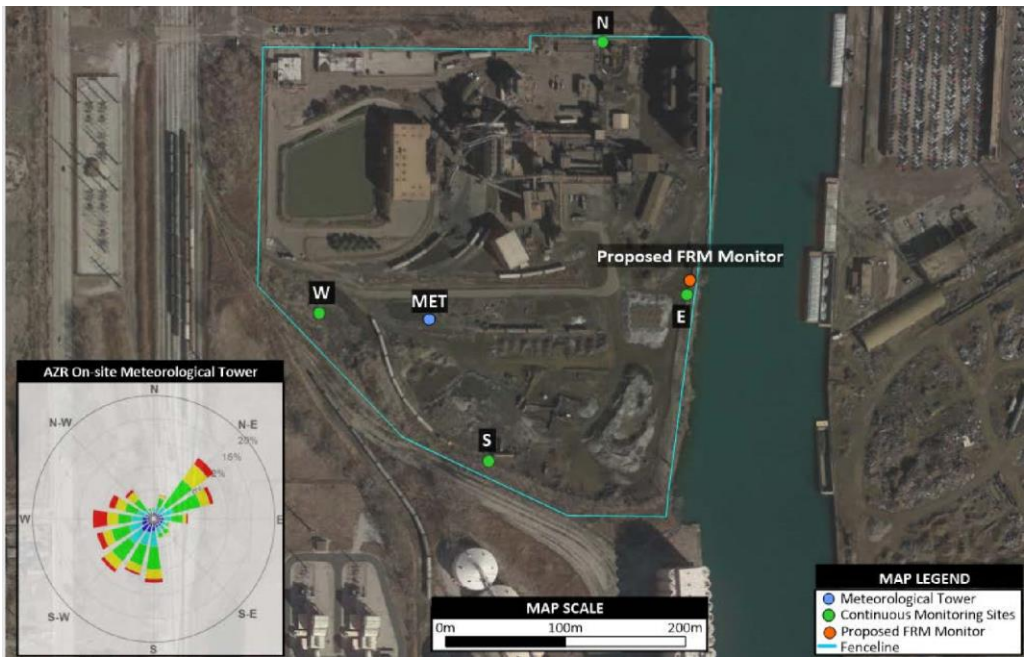

Figure 9 – Site Map Depicting Monitoring Locations

Per a review of the limited validated PM_{10} monitor data collected to date (February 22 through March 31, 2019, over 38 days), monitoring data for the North and the East monitors was evaluated to determine if elevated PM_{10} concentrations occur when the wind is blowing from a direction that would include either IRM handling or IRM storage operations. In the case of the East PM_{10} Monitor, during hours when the average hourly wind blew from a wind direction of south southwest to west (compass directions 190 to 270 degrees), which would include IRM storage and IRM crushing and screening activities immediately upwind of the East Monitor, the

[20] The prior submission, dated June 12, 2018, is available at: https://www.chicago.gov/content/dam/city/depts/cdph/InspectionsandPermitting/SuppSubSupport_AZR_VarReq_6132018.pdf

[21] Photographs of the PM_{10} monitors are attached as Exhibit H.

average PM_{10} concentration of these hours was 25.2 µg/m^3, as compared to a PM_{10} concentration at the East Monitor from all hours across the monitoring period of record 38 days, of 24.9 µg/m^3. Thus, there does not appear to be any impact of PM_{10} concentrations when wind blows from a direction with upstream IRM storage and handling operations. In the case of the North PM_{10} Monitor, during hours when the average wind blew from a wind direction of south to southwest (compass directions 180 to 220 degrees), which would include IRM discharge from the kilns and related handling activities immediately upwind of the North Monitor, the average PM_{10} concentration of these hours was 93.3 µg/m^3, as compared to a PM_{10} concentration at the North monitor from all hours across the monitoring period of record 38 days of 40.9 µg/m^3. Although these levels are still well below the PM_{10} ambient standard, as a precautionary measure, AZR has initiated additional actions which should help reduce PM_{10} concentrations at the North Monitor.[22] By comparison, across all hours of all 38 PM_{10} monitoring days, the average PM_{10} concentration at the South PM_{10} monitor was 22.4 µg/m^3, and the average PM_{10} concentration at the West PM_{10} monitor was 20.0 µg/m^3.

Given the limited data record, and AZR's actions since the PM_{10} monitoring was initiated, there is little evidence of elevated PM_{10} concentrations (fugitive dust) at monitors located immediately downwind of IRM storage and handling operations. So while further monitoring is needed to be more definitive, the fact that the Chicago Facility's air monitoring results resemble the Rockford Facility's results over an initial set of testing creates a strong presumption that extended testing will *also* resemble the PM_{10} monitoring results from Rockford.

If CDPH grants the requested variance, AZR is confident that long-term PM_{10} monitoring data (and metals monitoring to be conducted once CDPH approves the Facility's Metals Management Plan) will show that to be the correct decision. However, AZR is concerned that off-site sources may affect its manganese air monitoring results once that monitor is installed after the CDPH approves AZR's pending metals-monitoring location. As discussed on page 14, *infra*, the new PM_{10} monitoring is already providing strong evidence that PM_{10} levels in this area are the product of other facilities, particularly the South Shore Recycling site to the east where AZR personnel have observed fugitive dust emissions migrating across the river to its facility. AZR submits that more needs to be done to investigate potential sources of fugitive dust emissions, which may contain metals like manganese, so that the risk of off-site sources of manganese being recorded by the future AZR monitor are appropriately addressed.

[22] These measures include additional water spray application where IRM is handled, particularly during nonroutine operations (as discussed on page 15, below), and redesign/reconfiguration of IRM conveyor transfers to reduce the handling of IRM (as described in Footnote 12, *supra*). These activities will be reflected in a subsequent submittal of the Fugitive Dust Plan to the CDPH.

Figure 10 - Photo from AZR Facility of Visible Emissions Originating from South Shore Recycling Facility to the East

During an August 2018 inspection by CDPH inspector Kenneth Scott, AZR pointed out the visible emissions from the recycling facility across the river and suggested that CDPH conduct an investigation into their nature and origin. AZR is unaware whether CDPH has conducted that investigation. In any event, AZR has not noticed any reduction in the frequency or intensity of these emissions since August 2018. Indeed, recently collected monitoring data from the East Monitor suggests that most of the highest PM_{10} readings at this monitor location occur when the wind is blowing from the East.

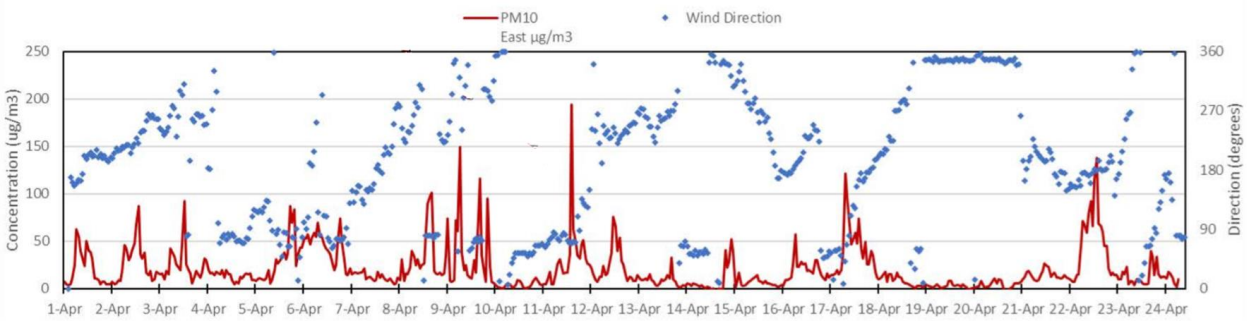

Figure 11 - PM_{10} and Wind Direction Data (East Monitor, April 2019)

On this graph, wind from the East is indicated on the right y-axis as centering around the 90° line. (Winds from the South are at 180°; West winds are at 270°; North winds are at 0°/360°) The elevated readings obtained on April 8th, 9th, 17th, and especially April 11th correlate with Eastern winds, and could not have been generated by the AZR Facility, as any fugitive dust would be blown away from the East Monitor.

5. PM_{10} monitoring shows the effectiveness of new dust suppression procedures relating to "kiln cleanout" events.

On March 19th, 2019, one monitor did find airborne PM_{10} material at levels that met or exceeded the Reportable Action Level. AZR initially notified CDPH of this event on March 22nd, and followed-up with additional information on April 9th, 2019. Based on an investigation by AZR's environmental consultant, Trinity Consultants, the available information shows that this event was not caused by the pile at the IRM Product Area. Rather, the elevated PM_{10} readings occurred while AZR was conducting a "kiln cleanout" of one of the two kilns it uses to process IRM. These cleanouts are part of periodic maintenance—the Waelz oxide process causes IRM residue build up along the interior walls of each kiln. Approximately every 3 months, the kilns are deactivated in turn, and a remote-controlled robot is used to dislodge the IRM residue (called "kiln rubble"). The kiln is rotated to move the kiln rubble towards an opening—the same opening where oversize IRM exits—so that it can be removed from the kiln.[23]

Although AZR personnel do not recall past kiln cleanouts producing significant amounts of dust, the elevated monitoring results on March 19 correspond with the cleanout of Kiln 2 in close proximity to the North Monitor. Once AZR noted the possible connection, it implemented new dust suppression procedures to be carried out as part of the kiln cleanout maintenance process. Specifically, a water truck is brought to the kiln during cleanout and uses its hose to spray water on kiln rubble as it is removed.

AZR first conducted these dust-suppression procedures during the cleanout of Kiln 1 on April 7, 2019. The PM_{10} monitors seem to have confirmed the success of these additional safeguards—none of the PM_{10} monitors recorded elevated levels during this cleanout. Accordingly, AZR has committed to a further capital project to design and install more permanent spray equipment at the site exit point. These upgrades, estimated to cost $150,000 dollars, will include water control valves that will enable adjustments to be made to the amount of water applied for dust suppression at the kiln exit point.

6. IRM storage piles have been studied and showed little to no risk to human health or the environment.

Most important, given the Department's concerns about human health risks posed by manganese-containing bulk solid materials, is the fact that the United States Environmental Protection Agency (U.S. EPA) has already studied the potential health risks posed by outdoor storage and transport of materials like IRM, and even based on what U.S. EPA described as a "very conservative risk assessment," the EPA found that they do not pose any significant health risks.

As AZR advised the Department in its prior variance submission under the BSM Rules, the IRM produced by AZR falls into a category of materials which the U.S. EPA refers to generally as "high temperature metals recovery" slag residue or "HTMR." In the 1990s, the

[23] Kiln rubble is unsuitable for reuse. Once removed, it is placed in an enclosed hopper and is eventually disposed of off-site.

U.S. EPA conducted a risk assessment on HTMR materials to determine the potential human and ecological health impacts from placing HTMR materials on land.[24] The risk assessment specifically included an evaluation of AZR's IRM, because AZR (then "Horsehead Corporation") was and is one of the major producers of this material. The U.S. EPA's risk assessment evaluated a number of potential release and exposure scenarios associated with the generation and management of storage piles of HTMR, including the potential for particulate matter emissions, releases to groundwater, releases that are deposited onto a neighboring residential area, and releases deposited into neighboring surface waters from: (1) outdoor pile storage directly on the ground; (2) the process of adding HTMR slag residuals to the outdoor storage pile; and (3) loading/unloading operations associated with transport of the HTMR slag.

The U.S. EPA reported on the results of this assessment as follows:

> The results from EPA's very conservative risk assessment for the relevant management practices and uses of HTMR slags indicate that constituents of concern in HTMR slags pose little or no risk to human health or the environment. Based on this assessment, no significant risks were found for storage, transport, disposal, and encapsulated uses of HTMR slags (use as subbase, as an ingredient in cement or concrete/asphalt) that meet the [proposed "generic exclusion levels" in the U.S. EPA rules].

59 Fed. Reg. 67256, 67261 (Dec. 29, 1994).

AZR's predecessor, Horsehead Resource Development Co., also commissioned a complete evaluation of the U.S. EPA's HTMR risk assessment by an independent company, Gradient Corporation ("Gradient"), with results similar to those of the U.S. EPA study.[25] Gradient evaluated the U.S. EPA's methodology, assumptions and conclusions, in addition to assessing HTMR product applications not assessed by the U.S. EPA. It concluded that the U.S. EPA was correct in its determination that the HTMR slag products poses "little or no risk to human health or the environment," even though U.S. EPA had employed generally conservative assumptions to predict media concentrations and for deriving health-based reference

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[24] See Proposed Rules, *Standards for the Management and Use of Slag Residues Derived from HTMR Treatment of K061, K062, and F006 Wastes*, 59 Fed. Reg. 67256 (December 29, 1994) ("1994 Proposed HTMR Rules"), https://archive.epa.gov/epawaste/hazard/web/pdf/59fr6725612291994.pdf; see also U.S. EPA, *Draft Report: Assessment of Potential Risks to Human Health and the Environment from Management and Uses of HTMR Slag*, (Nov. 30, 1994) ("1994 HTMR USEPA Report").

[25] Gradient Corporation, *Critical Evaluation of EPA's Risk Assessment in the Proposed HTMR Slag Product Rulemaking*, (Revised April 26, 1995) ("Gradient Corp. HTMR Assessment Report"). Because the Gradient Corp. HTMR Assessment Report is over 200 pages in length, only a copy of the Executive Summary is attached here as Exhibit I.

concentrations.[26] The results of Gradient's analysis similarly concluded that the storage and loading of IRM piles "pose an insignificant threat to human health and the environment."[27]

Statement of Hardship (10.0(2)(e)(i).

The question of whether Section 10.0(1)'s requirements impose an unreasonable hardship on AZR looks to more than the mere cost to comply. The review of the hardship issue is a balancing process which must balance the hardship of compliance against any adverse impact on the environment. *Marathon Oil Co. v. E.P.A.*, 242 Ill.App.3d 200, 206 (1993) (interpreting "arbitrary or unreasonable hardship" language as used in Section 35 of the Illinois Environmental Protection Act, 415 ILCS 5/35(a)). So, because the evidence shows that AZR's outdoor storage of IRM has no meaningful potential to produce airborne manganese, even if the enclosure requirement imposed only modest costs on AZR, those costs would be unreasonable. PM_{10} monitoring for the last month, which included high-wind days, lends support to the conclusion that the outdoor IRM piles do not appear to generate PM_{10} in significant amounts. The outdoor IRM piles and transfers have not produced any Reportable Action Level incidents.

The sole Reportable Action Level PM_{10} incident relates to a periodic maintenance process that only occurs eight times per year (quarterly cleanouts of the two kilns) and that AZR has already modified its procedures to correct. The effectiveness of these new procedures has been confirmed by subsequent testing. AZR has spent significant capital on installing and operating the PM_{10} monitors, and the information they generate has already been put to use identifying the Facility procedures most likely to generate fugitive dust and implementing appropriate corrective action. If this variance is granted, CDPH will have the ability to confirm the ongoing appropriateness of the variance as new monitoring data comes in.

The costs to comply with new BSM Enclosure Rules would be exorbitant. At any given time, there are several piles of IRM stored outdoors at the Facility, some reaching 30 feet high. The cost to enclose these piles would be prohibitively expensive. The IRM Product Area covers approximately five-and-a-half acres. It has cost AZR over $2.5 million just to build an enclosure for the relatively small amount of metcoke it stores for use in its production process. AZR typically stores fifteen times as much IRM as metcoke (by weight). AZR conservatively estimates that the cost to enclose the IRM Product Area in compliance with the Amendments will exceed $10 million. What's more, without a variance, AZR would also be required to install enclosures at *all* transfer points, including the Kiln 1 Oversize Bunker, the Kiln 2 Oversize Bunker/Water Quench Pit, the K2 IRM Pile, the IRM Product Staging Area, and the Barge Loading Area. Additionally, all five IRM Process Silos would need to be retrofitted to add doors. These upgrades would cost at least $3.5 million dollars.

Requiring these costs, when IRM has a minimal manganese content, is already mostly enclosed (except at the IRM Product Staging area and Barge Loading Area), and is subject to aggressive and effective dust-suppression measures, would be unreasonable and arbitrary. AZR has demonstrated in this variance request that it has in place equivalent measures that are

[26] Gradient Corp. HTMR Assessment Report at p. ES-1 to ES-2.

[27] Gradient Corp. HTMR Assessment Report at p. 178.

reasonably expected to adequately control manganese emissions. Therefore, prior to requiring enclosure at a cost that threatens the continued viability of the Chicago Facility, AZR should be given the opportunity that a variance provides to show through actual operations that its outdoor handling and storage of IRM does not cause any nuisance or adverse effect upon the public health or environment.

Section 10.0(2)(f), Regarding the Proposing of a Compliance Timetable, Is Not Applicable Here

Because AZR is not citing Section 10.0(2)(e)(ii) of the BSM Rules as a basis for the variance, Section 10.0(2)(f)—which is explicitly not a universal requirement for variances from the BSM Rules—is not applicable. CDPH has already recognized that a variance can be appropriate if (1) a facility's manganese-bearing materials contain "a level of manganese that is so low as to be negligible" and (2) the facility "persuasively demonstrates why . . . the exemption will not create a public nuisance or adversely impact the surrounding area, environment, or property uses." See CDPH, *Official Response to Public Comments on Proposed Amendments to Rules for the Handling and Storage of Bulk Material Piles*, at p. 4 (Jan. 25, 2019).[28] Thus, if the CDPH finds that the minimal amounts of manganese found in the Facility's IRM, stored in accordance with existing procedures and dust-control procedures, do not create a public nuisance then there is no need for an arbitrary timetable. AZR will continue to execute existing fugitive-dust control measures indefinitely.

Alternative Methods of Compliance (Section 10.0(2)(g))

AZR takes the issue of manganese emissions seriously. Even though the previous opacity testing and the nature of IRM establish a *prima facie* case that the IRM does not pose a public nuisance, the CDPH can engage in ongoing vetting of that case using additional PM_{10} data generated by the Facility. AZR has installed four, permanent, continuous, Federal Equivalent Method (FEM) real-time PM_{10} monitors to measure potential fugitive dust emissions from the storage, on-site handling, loading, unloading, stockpiling, and processing of bulk solids at the Facility. One of these monitors is located directly adjacent to the IRM Product Area. As the data collection record of these monitors increases, they will measure, among other things, the quantity of PM_{10} in the air at the boundaries of the Facility property and show that the Facility is not a significant contributor to fugitive dust, including fugitive dust that may contain manganese.

Providing CDPH with objective evidence that IRM poses no threat to the South Deering community regardless whether it is transferred or stored indoors or outdoors is an "alternative method of compliance" within the purpose of Part D of the BSM Rules. To date, these monitors are confirming that the Facility's outdoor handling and storage of PM_{10} is not presenting a threat of unacceptable fugitive dust emissions. The isolated March 19 incident associated with a periodic kiln cleanout activity has been addressed by improving the cleanout procedure with the addition of a water spray step, and subsequent data has confirmed the effectiveness of that response.

[28] Available at https://www.chicago.gov/content/dam/city/depts/cdph/InspectionsandPermitting/CDPH_Resp_Com_BulkMaterialAmendments_January2019.pdf

Further, AZR has timely submitted to CDPH its metals monitoring plan (MMP) with a monitoring plan for a proposed Federal Reference Method Sampler (FRM) for PM_{10} filter-based monitoring efforts, as required per Section 6.0(a) of the Amendments. AZR intends to install and commence air monitoring for manganese after its MMP is approved by the Department.[29] The proposed location of the FRM monitor is in close proximity to the larger IRM storage piles on the southern portion of the facility. The manganese air monitoring results will provide an additional alternative method of compliance within the purpose of Part D of the BSM Rules. AZR should be allowed the opportunity to demonstrate through this on-site monitoring that the enclosure of its IRM piles and transfer points is not required to protect public health and the environment.

AZR has considered alternative methods of "enclosing" the IRM piles, but none are feasible. It is impractical to tarp or similarly cover the IRM piles. The need to work the piles somewhat frequently to transfer material makes the use of large tarps impractical. Applying tarps would also create a potential safety hazard for Facility employees working at the IRM piles, particularly during times when gusty wind conditions could cause the tarps to become airborne like a "sail" and threaten the ability of workers to control the tarp when trying to remove it or to secure it back onto the pile. Put simply, the IRM piles already become "enclosed" in a four-to-five inch-thick layer of concrete-like crust material when stored outside.

Nor are existing structures at the Facility sufficient to serve as enclosures. The IRM Process Silos do not have adequate volume and already serve an important role in the quality-control process. Even if the Silos were used for long-term IRM storage, AZR would still have to construct a new enclosure to serve as the new "QA" area.[30]

And some portions of the outdoors IRM transfer process are also already, in effect, enclosed. Section 3.0(7) of the BSM Rules recognizes that conveyors used to transfer bulk solids will, inevitably, be located outdoors sometimes, and so it allows for such systems to be "covered *or* enclosed" so long as this reduces fugitive-dust emissions "to the maximum extent practicable. *Id.* (emphasis added). In particular the conveyor system AZR operates to load barges shields the IRM on all sides from the wind. And at the end of the conveyor, where material is transferred to the hold of a barge, there is an enclosed chute that extends down from the covered conveyor into the hold. (See Figure 5, *supra*.)

AZR's most recent Fugitive Dust Plan describes the Facility's compliance with the provisions of the BSM Rules relating to material transport on site. Trains bringing EAF Dust to

[29] To demonstrate its commitment to installing and operating the FRM monitor, AZR has made reasonable efforts to follow up with the CDPH concerning its review of the MMP. In 2019, AZR or its consultant, Trinity Consultants, left voicemails with David Graham of CDPH on March 11th, March 15th, and March 28th. John Iwanski of Trinity Consulting also emailed Mr. Graham on March 15th. AZR is awaiting the CDPH's response. Once CDPH approves the MMP, AZR will be able to quickly proceed with installation and begin operating the new monitoring equipment.

[30] The Facility Map (Exhibit G) shows four, smaller, silos immediately west of the IRM Process Silos. These smaller silos are not structurally capable of storing IRM.

the facility are unloaded in the C&B Building, which is totally enclosed. Trucks at the Facility must obey a 5 mph speed-limit, which is significantly below the 8 mph limit imposed by Section 3.0(9) of the BSM Rules. Truck traffic is monitored by on-site personnel to ensure that these limits are obeyed.

After loading or unloading at the Facility, trucks are cleaned, sampled, and for loaded trucks, covered at a weigh station before exiting the Facility. Although the elimination of unpaved roads at the Facility significantly limits the potential for dirt to adhere to the tires of exiting trucks, AZR continues to operate rumble strips and wheel washes for outbound traffic. These practices were confirmed by CDPH during an inspection on August 13, 2018.

Current Status (10.2.h)

AZR believes that it has provided the requested statement concerning its current status of compliance related to the subject matter of this variance request. The above information provides the City with AZR's current status regarding the requirements of the City's Rules from which it is seeking a variance.

Fugitive Dust Monitoring Reports (Section 10.0(2)(i))

AZR commenced monitoring for PM_{10} on February 22, 2019. Therefore it only has one complete month of PM_{10} fugitive dust monitoring.[31] So AZR is including, as Exhibit J, the Method 9 and 22 opacity results for 4Q 2018—all of which show no visible dust at the property boundaries of the Chicago Facility. AZR's preparation of the 1Q2019 opacity results for submission to the CDPH is nearly complete and will be submitted shortly to the CDPH. Upon their submission, AZR incorporates by reference the 1Q2019 results into this variance request.

If the requested variance is granted by the CDPH, AZR will provide monthly fugitive dust monitoring reports as required by Section 10.0(2)(i) the BSM Rules. Based on preliminary information regarding the typical timing for receipt of the monitoring results, the requirement to submit the monthly manganese and other metals monitoring results by the 14th day of the month following the monitoring period is shorter than the typical turnaround provided by outside laboratories for such work. AZR requests that the CDPH allow an extension to the end of each month following the monitoring period for submitting the monitoring results so that it can avoid the significant cost premiums that may be imposed by outside laboratories for earlier receipt of the monthly monitoring results. Even the higher costs associated with the earlier receipt of laboratory results does not allow adequate time to perform quality assurance review and evaluation of the data as well as the preparation of the monitoring report for submission to the CDPH by the 14th day of the month.

Once the proposed FRM monitor and location is approved by CDPH, AZR will complete installation and setup as soon as practicable. Once installed, AZR will begin submitting monthly data to CDPH as required by Section 6.0(i) of the BSM Rules.

[31] As noted previously, February PM_{10} data was emailed to the CDPH on March 14, 2019; March PM_{10} data was emailed to the CDPH on April 12, 2019.

Variance Request — Enclosure Construction Schedule (Section 5.0(1)(b))

AZR is also requesting a variance from Section 5.0(1)(b) of the BSM Rules. Section 5.0(1)(b) calls for the submission of an interim Fugitive Dust Plan. This requirement is redundant. AZR already submitted—pursuant to Section 3.0(3) of the BSM Rules—a Fugitive Dust Plan in 2014, and has updated that Plan six times, most recently in January 2019. If AZR's variance request is approved, AZR is willing to either update its Fugitive Dust Plan to reflect the variance terms and conditions or to include all relevant methods for manganese dust control measures, devices, and technologies in a separate interim dust plan to be submitted to the CDPH.

Enforcing Section 5.0(1)(b) as written in these circumstances would impose an arbitrary and unreasonable burden on AZR. Indeed, the "interim" nature of this plan reflects the fact that, if the enclosure variance is granted, the interim plan would quickly be rendered obsolete. Accordingly, waiving the requirement to submit this plan by April 25, 2019, has no potential to create a public nuisance or adversely impact the surrounding environment. Allowing AZR to direct its resources towards active compliance monitoring efforts and the development of a non-interim Fugitive Dust Plan reflecting variance terms and conditions is preferable as a matter of public policy.

AZR respectfully submits that it has satisfied the requirements for a variance in Section 10.0 of the BSM Rules and requests that the Commissioner grant the requested variances from Part D of the BSM Rules and Section 5.0(1)(b) of the BSM Rules for the reasons described above.

Respectfully submitted,

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