DEPARTMENT OF PUBLIC HEALTH
CITY OF CHICAGO

February 19, 2020

Brad Sutek
Plant Manager
American Zinc Recycling (AZR)
2701 E. 114th Street
Chicago, IL 60617

RE: American Zinc Recycling (AZR), 2701 E. 114th Street
Request for Variance from Air Pollution Control Rules and Regulations for Control of Emissions from Handling and Storage of Bulk Material Piles

Dear Mr. Sutek,

The Chicago Department of Public Health ("CDPH") has reviewed submissions from American Zinc Recycling ("AZR") requesting a variance from requirements of CDPH's Rules and Regulations for Control of Emissions from the Handling and Storage of Bulk Material Piles, effective January 25, 2019 ("Bulk Material Rules" or "Rules"). Specifically, CDPH reviewed AZR's April 25, 2019 request letter and attached exhibits, as well as AZR's response to public comments dated August 19, 2019. Pursuant to the Bulk Material Rules, CDPH also reviewed written comments on the variance request submitted during a public comment period as described below.

The variance request pertains to the enclosure requirement for manganese-bearing material. Section 5.0 of the Bulk Material Rules requires all non-packaged manganese-bearing bulk material to be maintained in fully enclosed structures in accordance with the enclosure requirements set forth in the Rules. As set forth in greater detail below, CDPH finds that AZR has demonstrated that, in light of 1) recently collected air monitoring data, 2) the unique nature of the subject "Iron Rich Material" ("IRM"), and 3) AZR's description of relevant operations and management of the material, issuance of a variance is not likely to create a public nuisance

or adversely impact the surrounding area if certain additional precautions are taken. Therefore, CDPH grants the variance request subject to certain conditions set forth below.

Please note that pursuant to Section 10.0(3)(d) of the Bulk Material Rules, a variance may be revoked at any time if the Commissioner finds that operation of the facility is creating a public nuisance or otherwise adversely impacting the surrounding area, surrounding environment, or surrounding property uses.

DETAILED DISCUSSION

I. Requirements for Issuance of a Variance

Under Section 10.0 of the Bulk Material Rules, the burden of proof is upon the applicant for the variance to demonstrate that issuance of the requested variance will not create a public nuisance or adversely impact the surrounding area, the surrounding environment, or surrounding property uses. In the event that the applicant does not meet this burden, the variance request will be denied. Pursuant to Section 10.0(2), a variance request must be in writing and must set forth, in detail, all of the following (in pertinent part)[1]:

a) A statement identifying the regulation or requirement from which the variance is requested;

b) A description of the process or activity for which the variance is requested, including pertinent data on location, size, and the population and geographic area affected by, or potentially affected by, the process or activity;

c) The quantity and types of materials used in the process or activity in connection with which the variance is requested, as appropriate;

d) A demonstration that issuance of the variance will not create a public nuisance or adversely impact the surrounding area, surrounding environment, or surrounding property uses;

e) A statement explaining:

i. Why compliance with the regulations imposes an arbitrary or unreasonable hardship;

[1] Because the instant variance request does not involve a request for an extension of time for full enclosure, requirement 10.0(2)(i) is not relevant to this discussion, and is therefore omitted.

ii. Why compliance cannot be accomplished during the required timeframe due to events beyond the Facility Owner or Operator's control such as permitting delays or natural disasters; or

iii. Why the proposed alternative measure is preferable.

f) A description of the proposed methods to achieve compliance with the regulations and a timetable for achieving that compliance, if applicable;

g) A discussion of alternate methods of compliance and of the factors influencing the choice of applying for a variance;

h) A statement regarding the person's current status as related to the subject matter of the variance request[.]

In addition, Section 10.0(3) of the Bulk Material Rules sets forth the criteria for reviewing applications:

In determining whether to grant a variance, the Commissioner [of CDPH] will consider public comments received pursuant to 10.0(4) and will evaluate the information provided in the application to meet the requirements of 10.0(2). Particular consideration will be given to the following information:

i. Inclusion of a definite compliance program;

ii. Evaluation of all reasonable alternatives for compliance;

iii. Demonstration that any adverse impacts will be minimal.

The Commissioner may deny the variance if the application for the variance is incomplete or if the application is outside the scope of relief provided by variances.

The Commissioner may grant a variance in whole or in part, and may attach reasonable conditions to the variance, or require alternative measures, to ensure minimization of any adverse impacts.

Issuance of a variance is at the sole discretion of the Commissioner. A variance may be revoked at any time if the Commissioner finds that operation of the Facility is creating a public nuisance or otherwise adversely impacting the surrounding area, surrounding environment, or surrounding property uses.

II. Variance Process and Public Comments

In addition to the requirement that the Commissioner of CDPH ("Commissioner") consider public comments, as set forth in Section 10.0(3)(a) of the Bulk Material Rules, Section 10.0(5) also provides that the Commissioner will not grant any variance until members of the public have had an opportunity to submit written comments on the variance application. This section further provides that public notice will be provided by publication in a newspaper of general circulation published within the City and by publication on the City's website, and that the Commissioner will accept written comments for a period of not less than thirty (30) days from the date of the notice.

On May 1, 2019, public notice of AZR's variance request was provided by publication in the Chicago Sun-Times and on the City's website at www.cityofchicago.org/environmentalrules. This notice stated that, to be considered, written comments were to be received by CDPH on or before May 31, 2019. On May 17, 2019, a subsequent public notice was published in the same manner, notifying the public that the comment period had been extended upon request of members of the public. The new deadline for public comments was June 20, 2019. During the public comment period, CDPH received one written submission from the public, which is posted on the website referenced above.

The public comment letter, dated June 28, 2019, was submitted jointly by the Natural Resources Defense Council ("NRDC"), the Southeast Environmental Task Force ("SETF"), and the Chicago South East Side Coalition to Ban Petcoke (hereafter collectively referred to as "NRDC *et al*"). In their comment letter, NRDC *et al* opposed the variance request, stating that it "would perpetuate practices that have a significant, adverse and disproportionate impact on the community and environment." (Public Comment Letter, p. 1.) They noted that more than 3,600 people live within a one-mile radius of the AZR facility, 85% of whom are Hispanic or African-American and approximately 1,100 of whom are children. *Id.* They further took exception with AZR's description of the surrounding area, stating that AZR downplayed the nearby natural areas and neighboring people. *Id.* at 2.

NRDC *et al* also raised concerns regarding the release of dust, including manganese, from the AZR facility. In particular, the groups referred to a Notice of Violation ("NOV") issued by the U.S. Environmental Protection Agency ("EPA") on April 14, 2014, "alleging several categories of violations of particulate matter standards" and a May 13, 2019 NOV issued by

CDPH citing accumulations of spilled material and dust emissions. *Id.* at 2. They also pointed to AZR's PM-10 monitoring data and stated that it shows "recurrent spikes" despite the dust control measures set forth in AZR's fugitive dust plan. *Id.* at 7.

In addition, NRDC *et al* stated that AZR handles large quantities of manganese, "anywhere from 1,077 to 6,463 tons" per year, depending on the manganese content of IRM. *Id.* at 5. They also stated that "there is no reliable, empirically-verifiable basis to assess the manganese the facility handles" and that AZR's submittals referenced different percentages, ranging from 1% to 6%. *Id.* Further, they pointed to AZR's Safety Data Sheet, which describes the hazards posed by IRM's manganese component, particularly from the dust emissions.

In response to the public comments, AZR submitted additional information on August 19, 2019. (This information is also posted on the above-referenced website.) In its response letter, the company stated that AZR did not fail to describe the affected population and geographic areas, arguing that there is no evidence that airborne IRM reaches the populations or natural areas identified by the public commenters. AZR further reiterated that "IRM is too dense to become airborne in large quantities." (AZR Response Letter, p. 3.) In addition to forming a crust when exposed to the atmosphere, IRM has a particle density that "results in a lower predictive handling emissions potential." *Id.* With regard to the crusting of IRM, AZR noted that the crust forms more quickly because of frequent watering of the material and that "approximately 50% of exposed IRM on site has enough of a crust to prevent wind erosion" from storage piles. *Id.* at 4.

Regarding the 2014 EPA NOV, AZR noted that "EPA's sole observation regarding IRM was that the Facility lacked a permit for its IRM Storage Pile," and that the only emissions violation in the NOV concerned emissions from bag collectors, and not the IRM. *Id.* at 6. AZR also stated that additional control measures had been implemented since the issuance of the NOV. *Id.* at 7. Likewise, AZR pointed out that the May 2019 CDPH Inspection Report did not mention any compliance issues related to fugitive dust from the IRM storage piles. *Id.*

AZR also objected to NRDC *et al*'s analysis of AZR's PM10 monitoring data, as well as the public commenters' discussion of the manganese content of the IRM. AZR stated that the monitoring data supports the granting of the variance request, because it shows that "the AZR Facility is not causing an exceedance of health standard levels, as established by the NAAQS, and has not contributed to unhealthy air, as established by the AQI." *Id.* at 10. AZR also stated

that the data shows a contribution from off-site emissions sources and provided further discussion of certain elevated particulate events. *Id.* at 14 *et seq.*

On November 19, 2019 the NGOs submitted supplemental documents consisting of an analysis of PM10 trends from mid-February through September 2019 and a copy of AZR's metals monitoring data for September 2019. The NGOs stated that the monitoring data shows that manganese is present in air releases from the AZR site. (This comment is also posted on CDPH's website, referenced above.)

III. Variance Request Determination Detailed Analysis

A. Detailed Summary of Variance Request: As mentioned above, AZR requested a variance from Part D, Section 5.0 of the Bulk Material Rules, which requires the enclosure of manganese-bearing bulk material. In its recycling of electric arc furnace ("EAF") dust, the facility produces two materials known as "Waelz Oxide" and "Iron Rich Material." The variance request pertains only to the IRM, which, according to AZR, "cannot feasibly be handled in a totally enclosed manner like EAF dust." (AZR Variance Request, p. 4.) AZR produces approximately 76,000 cubic yards of IRM each year. As stated in the variance request, "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')," among other uses. *Id.*

AZR stated that its IRM contains a manganese concentration of approximately 1% - 2%, which "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)." *Id.* As explained in the variance request and subsequent response letter, the manganese percentage was determined through two analyses conducted by a certified lab on October 24, 2018. In the first analysis, using "X-ray powder diffraction" ("XRD"), the lab found a compound with 1.5% manganese. And in the second analysis, using a "Scanning Electron Microscope with a Tracor energy-dispersive x-ray detector" (SEM-EDX), the lab found 1.2% manganese in the metal flakes tested. (The lab report can be found at Exhibit F of AZR's variance request.)

NRDC *et al* pointed out that AZR's statement that its IRM contains only 1-2% manganese conflicts with a prior statement from AZR that IRM contains 4% manganese. The

commenters also noted that the Safety Data Sheet for IRM lists the concentration of manganese oxide as 4-6%. (Public Comment Letter, p. 4). However, CDPH notes that AZR's earlier estimate, provided in its June 13, 2018[2] comments to CDPH's proposed rules, predated the lab analyses referenced above. CDPH also acknowledges AZR's argument that the "SDS figures reflect general assumptions about the nature of similar (but not at all identical to IRM) High Temperature Metal Recovery (HTMR) materials that had undergone elemental analysis in the past. For this reason, the 4%-6% estimate… is likely an overestimate." (AZR Response Letter, p. 19.)

In any event, more important than the small percentage of manganese content in IRM is the likelihood that manganese dust will or will not emit from the material in quantities that might adversely impact the people and areas surrounding the facility. The variance request describes a comprehensive process of dust control (described below), which, based on air monitoring data collected to date, appears sufficient to prevent off-site emissions of manganese-containing particulate matter—especially with the addition of further precautions imposed as conditions to the variance.

B. Minimization of Adverse Impacts and Alternative Compliance Program. Section 10.0(2)(d) of the Rules requires a demonstration that issuance of the variance will not create a public nuisance or adversely impact the surrounding area, environment, or property uses; and Section 10.0(2)(g) of the Rules requires applicants to describe alternate methods of compliance.

As described by AZR, the IRM is formed in two kilns, which produce IRM in two forms: "fine" and "oversized." Per AZR, the "'oversized' IRM is about the size of a basketball and has no potential to become airborne." (AZR Variance Request, p. 5.) This material is taken to a bunker for quality-control testing and then processed through crushing and screening equipment. "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)." *Id.*

The "fine" IRM is sprayed with water upon exiting the kiln in order to cool it. This material passes through a cooler, "then travels along a series of three conveyor belts, each of

[2] NRDC *et al* mistakenly stated that AZR's 4% estimate was set forth on "page 4 of its April 13, 2018 comments." The estimate was actually provided on page 3 of its June 13, 2018 comments.

which is enclosed." *Id.* at 6. It is then deposited into a small three-sided building (known as a "junction building") with permanent water sprays. The wet material is then transported via front-end loader to a silo for quality-control testing, then moved to one of three areas: 1) a temporary staging area for barge loading; 2) an IRM storage bunker; and 3) an outdoor IRM product area. The barge loading process uses an enclosed conveyor and chute, which "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." *Id* at 7.

During loading and transfer of the IRM, the material is sprayed with water from one of two water trucks. During freezing conditions, a chemical stabilizer is applied for dust control, in accordance with the conditions of a variance granted by CDPH on September 14, 2018.

As stated by AZR, "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." *Id* at 10. AZR also provided information about the density of IRM and its propensity to form a hard, thick crust when exposed to the atmosphere. *Id.* at 8.

NRDC *et al* raised concerns about AZR's dust control measures, especially in light of an NOV issued by EPA in 2014 and an NOV issued by CDPH on May 13, 2019. However, CDPH notes that neither of the referenced NOVs pertained to fugitive dust from the IRM. The violations noted by CDPH pertained to accumulated coke material and WOX dust—which the facility promptly cleaned and addressed. A follow-up inspection on June 27, 2019 found no dust accumulations or emissions. (See Attachment A, "CDPH Inspection Report, June 27, 2019.") Moreover, the facility has made many changes to its operations since 2014, including the addition of a second water truck and a new misting cannon to increase watering for dust suppression.

Notably, in 2018, in response to AZR's request for a variance from dust monitoring requirements, CDPH found that IRM *does* have the potential to generate dust when disturbed. Therefore, AZR was required to comply with the dust monitoring requirements set forth in the Bulk Material Rules. Four fenceline PM10 monitors were installed in February 2019, and the data is submitted to CDPH each month. AZR's Reportable Action Level (RAL) for PM10 readings is a 24-hour average of 150 ug/m3 or greater. In addition, AZR has informed CDPH that its internal plant action threshold, or "internal alarm level" (which triggers an alarm for investigation) is currently 150 ug/m3 for a single hour.

Over the past eight months, there was one exceedance of the 24-hour RAL (on March 19, 2019). AZR investigated the event and reported that it had occurred during kiln maintenance activities. The facility took corrective actions to ensure it wouldn't happen again. (See Attachment B, "AZR Letter Dated 4-9-19.")

In addition, as the public commenters pointed out, there were a number of "spikes" in the data collected at the facility's north monitor, represented by hourly readings above 150 ug/m3. Out of a total of 19,404 hourly readings[3] over the past eight months, 2.1% of the individual readings triggered the company's alarm for the plant action threshold. Upon review, it appears that most of the spikes were isolated occurrences. However, there were six days (including the March 19th RAL event mentioned above) where multiple spikes[4] occurred in a 24-hour period.[5]

As reported to CDPH, AZR investigated the cause of the spikes and took corrective actions when necessary. For example, on March 27, 2019, the company investigated eleven alarms. Based on a comparison with the upwind monitor, it was determined that the majority of the elevated readings were due to contributions from off-site sources. However, one reading was found to be attributable to a "loader moving material." The company added additional water in response. (See Attachment C, "AZR Letter Dated October 8, 2019.")

Similarly, regarding the alarm on July 27, 2019, AZR stated:

> "Elevated concentrations between 7:00 and 16:00 LST we believe were associated with the turnout of both kilns, gusty winds, and the mentioned front-end loader moving material. The PM10 Alarm Response Form indicates that corrective action was initiated in a timely manner by halting the kilns temporarily while additional water spray was applied to control dust." [*Id.*]

In addition to the operation of the PM10 monitors, the Bulk Material Rules require quarterly opacity testing. According to AZR's visible emissions and opacity testing (conducted by professional trained and certified to read opacity in accordance with State standards), "the areas of the Facility where IRM is handled or stored show no opacity or minimal levels well

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[3] In general, each monitor takes readings once per hour, for a total of 24 readings per day per monitor. The number of readings listed above excludes 851 missed readings (or 4.4 percent of the total number of readings), during points in time when monitors were undergoing maintenance or otherwise not collecting data due to a power outage or equipment malfunction.

[4] In general, "multiple spikes" here means a reading above 150 for more than two consecutive hours, or multiple clusters of two hours.

[5] The six days were March 9, March 19, March 27, June 14, June 25, and July 27.

below 10% even when IRM is being removed from or added to the piles." (AZR Variance Request, p. 11.)

Finally, in accordance with the recent amendments to the Rules, AZR installed a filter-based metals monitor and began collecting data in September 2019. Under Section 2.0(16) of the Bulk Material Rules, the Manganese Limit ("ML") is "the concentration of manganese equal to or greater than 0.30 micrograms per cubic meter as averaged over a rolling three-month period." An exceedance of this limit is deemed to be a "condition detrimental to health" in violation of Section 7-28-060 of the Chicago Municipal Code. (As explained in CDPH's response to comments on the Amended Bulk Material Rules, this standard was based on the federal Minimal Risk Level (MRL) for manganese emissions.[6]) AZR's monitoring results from September through December 2019 are as follows: (See Attachment D.)

September: 0.1692 ug/m^3
October: 0.0777 ug/m^3
November: 0.0532 ug/m^3
December: 0.0674 ug/m^3

Thus, the data shows that the first rolling three-month average is 0.1000 (for September, October, and November). The average for the second rolling three-month period (for October, November, and December) is 0.0661. These results are well below the ML.

C. CDPH Determination: Pursuant to Section 10.0(3)(c) of the Rules, "[t]he Commissioner may grant a variance in whole or in part, and may attach reasonable conditions to the variance, or require alternative measures, to ensure minimization of any adverse impacts and to accomplish the purposes of Chapter 11-4 of the Code."

Upon review of all submittals from AZR and the public, and upon analysis of the available monitoring data, CDPH finds that fugitive dust from the IRM can be appropriately controlled to avoid any potential adverse impacts upon the surrounding community—especially if certain additional precautions are taken. Specifically, CDPH finds that, due to the unique

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

nature of the IRM, including its density and propensity to crust over, any fugitive dust generated from disturbance of the material can be minimized through consistent use of appropriate dust controls. CDPH believes that the occasional spikes in PM10 can be further reduced if AZR lowers its internal alarm trigger to a level below the current 150 ug/m^3. This will allow the operators to conduct an investigation and take corrective action before multiple spikes can occur in one day.

In conditionally granting the variance request, CDPH also took into account the relatively low percentage of manganese content in the IRM (which AZR must annually re-confirm, as specified below), along with the low level of manganese collected in the filter-based monitor. As mentioned above, the air monitoring data thus far shows that downwind PM10 concentrations are below the 24-hour limit for PM10, and that average manganese concentrations are below the ML. While NRDC *et al* object to any level of manganese emissions, CDPH believes that public health will be protected if emissions do not exceed the health-based threshold set forth in the Bulk Material Rules. Thus, if the filter-based monitoring data ever shows an exceedance of the Manganese Limit, this variance will be reconsidered.

Therefore, CDPH grants the variance request subject to the following conditions which must be incorporated into AZR's Fugitive Dust Plan:

1) When one or more of the AZR Facility monitors detects PM_{10} levels at or above **100 ug/m^3**, AZR must promptly conduct an assessment of Facility operations to determine whether any additional fugitive dust control activities should be commenced and, if so, shall implement such additional activities. The Facility must document such response activities on routine Facility logs maintained pursuant to Section 3.0(18) of the Bulk Material Rules.

2) AZR must periodically arrange for a re-testing of its IRM by laboratory analysis to confirm the percentage of manganese content and provide the testing results to CDPH with AZR's annual Fugitive Dust Plan update.

Please note that pursuant to Section 10.0(3)(d) of the Bulk Material Regulations, a variance may be revoked at any time if the Commissioner finds that operation of the facility is creating a public nuisance or otherwise adversely impacting the surrounding area, surrounding environment, or surrounding property uses.

CONCLUSION

CDPH's determinations regarding AZR's variance requests will be effective as of the date of this letter, and will be posted, along with appendices and supporting materials, on CDPH's website at www.cityofchicago.org/environmentalrules. Please be advised that if AZR fails to comply with the Bulk Material Rules within the timeframes provided above, AZR will be subject to enforcement action including daily fines in the amount of $1,000 to $5,000 per violation as provided by Section 11-4-810(a)(7) of the Chicago Municipal Code. Furthermore, CDPH may issue a summary abatement order pursuant to Section 11-4-025(c) of the Chicago Municipal Code, requiring AZR to correct any violations within a timeframe prescribed by the Commissioner.

Finally, in accordance with Section 10.0(3)(d) of the Bulk Material Regulations, CDPH reserves the right to revoke the variances granted herein if the Commissioner finds that operation of the facility pursuant to a variance is creating a public nuisance or otherwise adversely impacting the surrounding area, surrounding environment, or surrounding property uses.

Please contact Assistant Commissioner Dave Graham at (312) 745-4034 if you have any questions regarding the above.

Sincerely,

Allison Arwady, M.D.
Commissioner

cc: Mort Ames, DOL
Jennifer Hesse, CDPH

Attachments

Attachment A – CDPH Inspection Report, June 27, 2019
Attachment B – AZR Letter Dated April 9, 2019
Attachment C – AZR Letter Dated October 8, 2019
Attachment D – AZR FRM/PM10 Manganese Monitoring Data

ATTACHMENT A

CITY OF CHICAGO

DEPARTMENT OF PUBLIC HEALTH
PERMITTING AND ENFORCEMENT

NARRATIVE EVALUATION

INSPECTION DATE: 06/27/2019
SITE NAME: American Zinc Recycling Corp
SITE ADDRESS: 2701 E 114TH ST, CHICAGO, IL 60617
SITE CODE: American Zinc Recycling Corp
PERMIT #: ENVAIR112615

TIME: 1:05 pm
EMPLOYEE:EMMANUEL ADESANYA

COUNTY:COOK / CHICAGO
INSPECTION #: 1440608

SUMMARY

I carried out the follow up inspection of American Zinc Recycling (AZR) to the one conducted previously on May 13, 2019. In which AZR was cited for the violations of municipal codes. Michael Enos (CDPH environmental engineer) was with me during this inspection. Today was partly cloudy, temperature: high 88 degree F, low 67 degree F, wind: South at 16 mph, according to Weather Underground. Upon arrival we met Brad D. Sutek (The Facility plant Manager), and Ruth Grissman (Office manager/Environmental Specialist) Brad took us around the facility for today's inspection, after a brief meeting. Summary of the facility PROCESS DESCRIPTION, according to Brad D. Sutek: The facility receives metal-bearing wastes (electric furnace ash), which are blended with carbon-bearing material and conveyed to the Waelz kilns (two kilns are active at this facility). The Kilns convert electric arc furnace dust and other metal-bearing materials via a high temperature metal recovery process into two useful products: crude zinc oxide ("CZO") and Iron-Rich Material ("IRM"). Reduction and re-oxidation take place inside the kiln. Metcoke is used in this process. The CZO product is collected by means of product collection system, IRM product is discharged from the other end of the kiln. The main products are WOX (Zinc Oxide - Waelz Oxide, used by zinc industries as raw material in the production of high grade zinc) and IRM (Iron Rich Matrials) used by cement industries.

Previous inspection conducted on May 13, 2019 revealed the following:
1) Accumulation of coke material on the roof of the coke loading station structure. Brad doesn't know how long this accumulated material has been on the roof. The spilled material appeared to have been in place for longer than one work shift;
2) Accumulation of particulate dust material deposited on the ground, outside the building BC # 3 (rail car loading station building), and BC # 10. The accumulated dust was deposited between the two buildings. The spilled material appeared to have been in place for longer than one work shift;
3) I observed accumulation of material on the walls, beams, pipes and other structures of BC # 3. The accumulated material appeared to have been in place for longer than one work shift;
4) WOX dust emissions from BC # 3 (rail car loading station building),
5) Material pile close to the river.

As at the time of today inspection, all the problems observed during previous inspection conducted on May 13, 2019 have been corrected. All previously observed accumulations of dust and material were cleaned. Material pile is no longer closed to the river. No emissions were observed during today follow up inspection. See the attachments.

REPORT COMPLETED?	☐	YES	☑	NO	NOV ISSUED?	☐	YES	☑	NO
INVESTIGATION COMPLETED?	☑	YES	☐	NO	ATTACHMENTS?	☑	YES	☐	NO

I, EMMANUEL ADESANYA, an employee of the City of Chicago, Department of Public Health, declare that I have conducted an inspection of the above mentioned property on the date indicated. I further declare that the observations set forth on the report are true and accurate.

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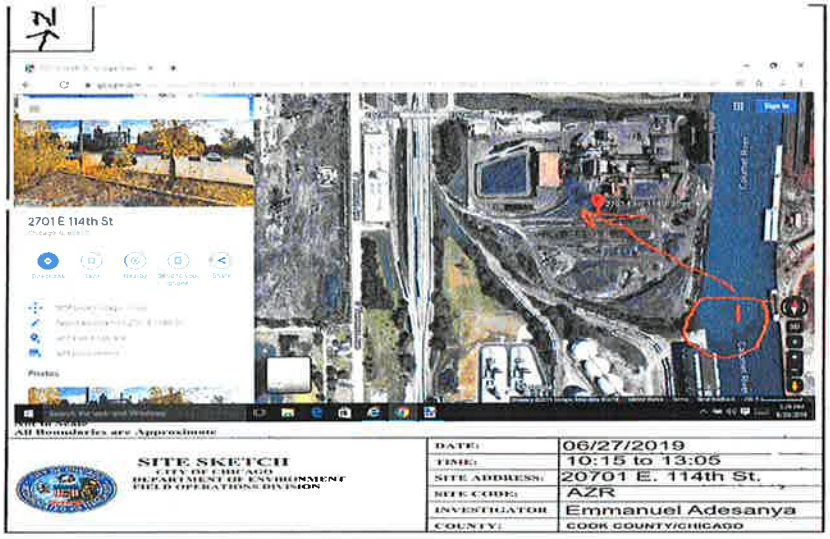
STAR #

SIGNATURE

DATE: 06/27/2019
SITE: 2701 E 114TH ST
SITE CODE: American Zinc Recycling Corp
PERMIT #: ENVAIR112615

TIME: 6/27/2019 1:05:00PM
INSPECTOR: EMMANUEL ADESANYA
COUNTY: COOK / CHICAGO
INSPECTION #: 1440608



COMMENTS:

COMMENTS:

DATE: 06/27/2019
SITE: 2701 E 114TH ST
SITE CODE: American Zinc Recycling Corp
PERMIT #: ENVAIR112615

TIME: 6/27/2019 1:05:00PM
INSPECTOR: EMMANUEL ADESANYA
COUNTY: COOK / CHICAGO
INSPECTION #: 1440608

COMMENTS: Photo #1 Direction: NW Comments: The picture shows the roof top without any particulate matter accumulations.

CITY OF CHICAGO
DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL PERMITTING AND INSPECTIONS

CITY OF CHICAGO

OTHER CDPH PERMITS

Permit Number	Permit Type	Expiration Date
ENVAIR1018429	ENV_AIR	
ENVAIR120401	ENV_AIR	
ENVAIR640674	ENV_AIR	
ENVAIR724590	ENV_AIR	
ENVAIR804727	ENV_AIR	

ATTACHMENT B

BRAD SUTEK
PLANT MANAGER

2701 E. 114TH ST.
CHICAGO, IL 60617
P: 773-933-9623
F: 803-259-2533
BSUTEK@AZR.COM

AZR AMERICAN ZINC RECYCLING
Delivering a Sustainable Future

April 9, 2019

City of Chicago Department of Public Health
Attn: Environmental Permitting and Inspection
333 South State St., Room 200
Chicago, IL 60604

Re: Notification per Control of Emissions from Handling and Storing Bulk Materials
American Zinc Recycling Corp.

American Zinc Recycling Corp. ("AZR"), located at 2701 East 114th Street in Chicago, is providing information contained herein pursuant to the City of Chicago Department of Public Health's ("CDPH") January 25, 2019 Amendments to the Rules and Regulations for Control of Emissions from the Handling and Storage of Bulk Solid Materials (the "BSM Rules").

AZR commenced PM_{10} monitoring per the BSM Rules at the end of February 2019 using four (4) Federal Equivalent Method (FEM) monitors. AZR is in the process of updating the contingency measures in the Fugitive Dust Plan for the facility, including our Reportable Action Level (RAL), per Condition 3.0(3)(f) of the BSM Rules.

AZR provided a notification letter to the CDPH on March 22, 2019, presenting available information following an incident that occurred on March 19, 2019. The incident involved the recording of particulate levels at one of the four monitors that exceeded the RAL. The notification letter reported that, although no apparent visual emissions were observed, an investigation was immediately conducted and precautionary measures to enhance dust suppression measures were taken at equipment in the vicinity of the monitor. AZR also inspected the data logger and monitoring equipment that had indicated RAL levels and confirmed that this equipment was operating correctly. AZR advised that its investigation would continue to evaluate the cause of this event, and CDPH would be updated on any progress. This letter provides information uncovered as a result of additional investigation that was done since the incident and prior notification was made to CDPH on March 22, 2019.

During a follow-up review with employees that were on site at the time of the subject monitor event on March 19, it was revealed that certain maintenance activities were being conducted at one of the kilns (Kiln 2). These activities involved using a robot to remove buildup of materials from the inner walls of the kiln. After material is dislodged from the walls of the kiln, the kiln is rotated to move the material ("kiln rubble") from the maintenance activity performed by the robot down the kiln to an opening where it can be removed. (The kiln remains shut down and does not produce material while the kiln rubble is removed.) AZR now believes that this kiln maintenance activity corresponded

with the monitor event (during the late afternoon and early evening hours on March 19th.) In particular, the periods where spiked levels of PM10 were recorded on the North monitor closely coincided with periods when the kiln was being rotated during the maintenance event to remove the kiln rubble.

To mitigate the potential for emissions resulting from this kiln maintenance activity in the future (as kiln maintenance of this sort is conducted approximately quarterly for each for each kiln), a procedure has been developed to ensure that water is used to suppress potential emissions associated with material exiting the kiln during a maintenance event. In addition, a capital project was initiated to design and install more permanent spray equipment, including water control valves to enable adjustments to be made to the amount of water applied for dust suppression at the kiln exit point. It is anticipated that this project will be completed in 2019.

AZR completed a similar kiln maintenance event for Kiln 1 on April 7, 2019 using the newly established water-suppression procedure. With the procedures in place, none of the PM10 monitors recorded elevated levels during this subsequent event.

Respectfully Submitted,

Brad D. Sutek

ATTACHMENT C

From: Brad Sutek <bsutek@azr.com>
Sent: Tuesday, October 8, 2019 11:04 AM
To: Brad Sutek <bsutek@azr.com>
Cc: Tim Klein <tklein@azr.com>; Ruth Grissman <rgrissman@azr.com>
Subject: RE: PM10 Alarms 3/27 and 7/27 2019

Dear Mr. Enos

This letter is being provided in response to your inquiry of Sept 27, 2019. In that inquiry, the Chicago Department of Public Health (CDPH) has requested additional information regarding the PM_{10} concentrations observed at AZR's North monitor on March 27, 2019 and July 27, 2019. Along with this letter, AZR is supplying the following three files.

1. A copy of the PM_{10} monitoring data for March 27, 2019, with comments beside each hour above our internal alarm level.
2. A copy of the PM_{10} monitoring data for July 27, 2019, with comments beside each hour above our internal alarm level.
3. A copy of the PM_{10} Alarm Response Form for the event on July 27, 2019.

March 27, 2019 Elevated Particulate Event
The March 27, 2019 event was largely characterized by offsite influence affecting readings at both the North and South Monitors. Data provided in the March 27, 2019 data file shows winds were predominantly out of the south throughout the day and the South PM_{10} monitoring site had greater concentrations than those measured at the North PM_{10} monitoring site from 07:00 to 14:00 LST, with the exception of 12:00 LST. The highest concentrations were observed between 07:00 and 15:00 LST, again when winds were out of the south; the East PM_{10} monitoring site also showed elevated concentrations but to a lesser extent. The North PM_{10} monitoring site had a 24-hour concentration for this date of 146.4 µg/m3, the South PM_{10} monitoring site had a corresponding 24-hour concentration of 100.3 µg/m3. Given the large impact the concentrations during the period between 07:00 and 15:00 LST had on the daily 24-hour concentration, and the predominant south wind direction during that time, offsite source contributions were a major factor for PM_{10} concentration for this day. With the exception of the 22:00 LST hour, concentrations observed at the North monitor after 15:00 continued to be higher than the other monitors within the network. However, the net concentration was below the threshold for triggering an alarm. The 22:00 LST hour had an elevated concentration which we believe may have been related to front-end loader activity related to movement of material. Corrective action was initiated in a timely manner by temporarily halting that operation and applying additional water to handling operations.

July 27, 2019 Elevated Particulate Event
During the July 27, 2019 event, elevated concentrations were generally associated with winds out of the southwest with gusts ranging between 15 and 27 miles per hour (mph). Elevated concentrations between 7:00 and 16:00 LST we believe were associated with front-end loader activity related to movement of material. Throughout the process, water was being applied to the material prior to being transported. At 19:00 LST, a spike in concentrations was associated with the turnout of both kilns, gusty winds, and the mentioned front-end loader moving material. The PM_{10} Alarm Response Form indicates that corrective action was initiated in a timely manner by halting the kilns temporarily while additional water spray was applied to control dust.

Respectfully,

BRAD SUTEK
PLANT MANAGER

2701 E. 114th Street
Chicago, IL 60617
773 933 9260 x263
773 933 9264 FAX
803-571-0452 Cell

AZR AMERICAN ZINC RECYCLING
Delivering a Sustainable Future

American Zinc Recycling (AZR)

2701 E 114th Street, Chicago, Illinois

PM_{10} Network Data

PM 10 Alarm Response form not yet in usage

Timestamp	Wind Speed	Wind Direction	Std. Dev. Wind Direction	Gust (3-second)	Temp	Precip	PM10 North	PM10 East	PM10 West	PM10 South	Notes
CST	mph	deg	deg	mph	°F	in.	µg/m3	µg/m3	µg/m3	µg/m3	
3/27/2019 0:00	1.4	193.0	8.2	4.2	33.1	0	42	28	29	43	
3/27/2019 1:00	1.7	167.8	12.5	4.8	32.7	0	69	14	39	14	
3/27/2019 2:00	2.9	173.6	12.1	6.0	32.5	0	39	13	14	15	
3/27/2019 3:00	2.9	172.1	12.7	5.4	32.3	0	92	11	17	15	
3/27/2019 4:00	3.0	169.3	17.4	6.0	32.1	0	AN	25	19	18	
3/27/2019 5:00	2.8	171.2	20.0	6.0	32.2	0	127	20	24	19	
3/27/2019 6:00	2.9	177.5	19.9	7.8	32.2	0	122	78	45	65	
3/27/2019 7:00	4.1	167.0	21.7	10.8	33.8	0	173	72	44	267	South Wind and higher Upwind Monitor (S) concentration - indicate material carried onto site
3/27/2019 8:00	5.8	170.4	20.9	12.5	37.9	0	268	111	34	503	South Wind and higher Upwind Monitor (S) concentration - indicate material carried onto site
3/27/2019 9:00	5.6	181.5	24.9	13.7	42.6	0	156	103	23	349	South Wind and higher Upwind Monitor (S) concentration - indicate material carried onto site
3/27/2019 10:00	7.6	202.6	27.1	18.5	46.2	0	139	146	17	198	South Wind and higher Upwind Monitor (S) concentration - indicate material carried onto site
3/27/2019 11:00	8.5	204.7	23.1	17.9	48.6	0	183	124	24	198	South Wind and higher Upwind Monitor (S) concentration - indicate material carried onto site
3/27/2019 12:00	7.8	203.2	26.2	16.1	51.1	0	393	39	17	27	South Wind continues but much lower Upwind Monitor (S) concentration. Unsure of impacting source on (N) monitor. Potentially lunch break for offsite source (?).
3/27/2019 13:00	8.6	197.5	20.6	19.7	53.2	0	171	112	21	211	South Wind and higher Upwind Monitor (S) concentration - indicate material carried onto site
3/27/2019 14:00	8.7	189.8	22.8	18.5	55.3	0	149	102	22	197	South Wind and higher Upwind Monitor (S) concentration - indicate material carried onto site
3/27/2019 15:00	9.1	191.0	28.0	19.7	56.7	0	116	69	18	113	
3/27/2019 16:00	8.8	190.7	24.8	21.5	57.1	0	155	47	14	35	Based on wind direction and std. deviation, largely South wind carrying material onto site, keeping below alarm threshold (Downwind (N) - Upwind (S))
3/27/2019 17:00	8.5	188.3	26.4	20.3	56.9	0	105	27	12	21	
3/27/2019 18:00	8.0	183.4	21.9	19.1	55.3	0	150	20	15	18	Based on wind direction and std. deviation, largely South wind carrying material onto site, keeping below alarm threshold (Downwind (N) - Upwind (S))
3/27/2019 19:00	6.8	169.4	21.7	14.9	54.0	0	119	52	27	34	
3/27/2019 20:00	8.0	175.8	23.7	21.5	53.7	0	101	23	19	24	
3/27/2019 21:00	9.0	191.9	25.8	19.7	52.7	0	129	26	14	24	
3/27/2019 22:00	5.9	224.7	29.2	20.3	51.2	0.03	211	24	26	17	Loader moving material. **Corrective Action:** Added water to material prior to moving.
3/27/2019 23:00	5.2	210.3	31.2	17.9	46.3	0.1	148	11	14	16	

EPA Qualifier Codes

https://aqs.epa.gov/aqsweb/documents/codetables/qualifiers.html

Qualifier Code	Qualifier Description
AN	Machine Malfunction.
AV	Power Outage.
BA	Maintenance. (Flow Check)

American Zinc Recycling (AZR)

2701 E 114th Street, Chicago, Illinois

PM_{10} Network Data

Timestamp	Wind Speed	Wind Direction	Std. Dev. Wind Direction	Gust (3-second)	Temp	Precip	PM10 North	PM10 East	PM10 West	PM10 South	
CST	mph	deg	deg	mph	°F	in.	µg/m3	µg/m3	µg/m3	µg/m3	
7/27/2019 0:00	5.3	186.2	27.6	12.5	74.8	0	55	25	18	19	
7/27/2019 1:00	3.8	192.4	48.3	11.4	73.8	0	62	21	29	23	
7/27/2019 2:00	3.9	197.1	45.4	12.0	73.4	0	55	18	20	22	
7/27/2019 3:00	3.5	193.7	44.7	10.2	72.9	0	44	22	21	22	
7/27/2019 4:00	4.1	187.9	36.1	10.8	72.6	0	49	18	18	27	
7/27/2019 5:00	3.6	191.4	50.6	10.2	72.1	0	40	25	18	19	
7/27/2019 6:00	4.3	189.2	39.5	10.2	72.7	0	24	21	13	26	
7/27/2019 7:00	4.5	225.7	52.4	16.1	74.5	0	161	33	28	41	Based on wind direction and std. deviation, largely South wind carrying material onto site, keeping below alarm threshold (Downwind [N] - Upwind [S])
7/27/2019 8:00	4.6	236.1	57.1	16.1	77.3	0	195	36	21	44	Loader moving material. **Corrective Action:** Added water to material prior to moving.
7/27/2019 9:00	6.2	247.0	42.6	14.9	79.8	0	152	23	26	28	Loader moving material. **Corrective Action:** Added water to material prior to moving. Below alarm threshold (Downwind [N] - Upwind [S]/[W])
7/27/2019 10:00	7.1	242.1	49.3	19.7	81.9	0	79	47	27	43	
7/27/2019 11:00	8.2	248.6	42.7	22.1	83.8	0	106	46	40	48	
7/27/2019 12:00	7.9	239.0	48.2	19.7	85.2	0	95	38	35	40	
7/27/2019 13:00	8.0	217.5	52.1	26.8	86.6	0	153	38	31	36	Based on wind direction and std. deviation, largely South wind carrying material onto site, keeping below alarm threshold (Downwind [N] - Upwind [S])
7/27/2019 14:00	8.3	244.0	47.8	20.3	87.1	0	239	38	34	33	Loader moving material. **Corrective Action:** Added water to material prior to moving.
7/27/2019 15:00	7.6	242.5	56.8	19.1	87.8	0	328	33	21	27	Loader moving material. **Corrective Action:** Added water to material prior to moving.
7/27/2019 16:00	7.4	222.8	51.0	19.7	87.6	0	184	28	26	25	Loader moving material. **Corrective Action:** Added water to material prior to moving.
7/27/2019 17:00	7.9	245.9	45.3	18.5	87.2	0	55	27	28	22	
7/27/2019 18:00	7.9	253.2	33.1	21.5	86.4	0	68	26	27	23	
7/27/2019 19:00	6.2	241.6	52.6	17.3	84.2	0	460	21	21	22	Turning out both Kilns. **Corrective Action:** Additional sprays applied which reduced concentration.
7/27/2019 20:00	4.2	226.0	52.5	17.3	81.4	0	85	17	16	20	
7/27/2019 21:00	4.0	210.5	56.1	11.4	79.9	0	24	22	16	17	
7/27/2019 22:00	3.9	238.8	51.4	11.4	78.5	0	22	17	17	18	
7/27/2019 23:00	4.0	240.6	54.9	11.4	77.7	0	18	12	13	19	

EPA Qualifier Codes

https://aqs.epa.gov/aqsweb/documents/codetables/qualifiers.html

Qualifier Code	Qualifier Description
AN	Machine Malfunction.
AV	Power Outage.
BA	Maintenance. (Flow Check)

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PM_{10} Alarm Response Form (XXX-XX-F01)

Date and Time of Alarm	**Date**	7-27-19	**Time**	8:14 PM
Weather Conditions	Clear ☐ Precipitation ☐ High Wind* ☐ * > 15 mph for 2 consecutive 5-minute periods		**Wind Speed and Direction**	10 MPH 217.415°
Monitor Triggering Alarm	East ☐	West ☐	North ☑	South ☐
Particulate Concentration			460	
Activities Occurring Near Monitor at the Time of the Alarm	Truck Traffic		☐	
	IRM Handling		☐	
	Front End Loader Movement		☑	
	Barge Loading		☐	
	None		☐	
Actual or Most Likely Source(s) of the Particulates	Gust, Turning out both isilns & Front end loader moving material			
Description of Any Unusual Activity Occurring at the Time of the Alarm	Gust of wind			
Corrective Actions	Watered Roads		☐	
	Applied Surfactant		☐	
	Watered Piles		☑	
	Suspended Movement of IRM		☑	
	Suspended IRM Screening/Crushing		☐	
	Reduced Truck Traffic		☐	
	Suspended Barge Loading		☐	
Description of Other Corrective Actions Taken	Stopped Isiln added sprays to stop dust			
Time When Corrective Actions Completed and Particulate Concentration	**Time**		**Particulate Concentration**	
	8:35 PM		460	
Particulate Concentration 30-Minutes after Corrective Actions	9:05 PM		85	
Name and Title of Person Completing Corrective Actions	**Name**		**Title**	
	Mike Powell		Shift foreman	

ATTACHMENT D

American Zinc Recycling (AZR)

2701 E 114th Street, Chicago, Illinois

FRM PM_{10} and Manganese (Mn) Data

Sampling Period: September 1, 2019 - September 30, 2019

Sampler Type: Met One E-SEQ-FRM

Notes: - Manganese concentrations are presented in nanograms per cubic meter (ng/m3).
- Per City of Chicago Rules: Manganese Limit (ML) is the concentration of manganese equal to or greater than 0.30 micrograms per cubic meter (ug/m3) as averaged over a rolling three-month period.
- PQL: Practical Quantitation Limit
- MDL: Method Detection Limit
- Method: Field: Measurement from field equipment during sample collection
IO-3.5: Measurement from analysis method
Calculation: Resultant concentration from field and method analysis

Work Order	Client Sample ID	Lab ID	Sample Date	Date Received	Matrix	Units	Analyte	Result	Qualifier	PQL	Analysis Date	Method	MDL
S1910077	2958527 #47	S1910077-001	9/6/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/6/2019	Field	
S1910077	2958527 #47	S1910077-001	9/6/2019	10/3/2019	Filter	ng/filter	Manganese	2340		600	10/8/2019	IO-3.5	5.45
S1910077	**2958527 #47**	**S1910077-001**	**9/6/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**97.4**		**25**	**10/9/2019**	**Calculation**	**0.227**
S1910077	2958528 #48	S1910077-002	9/9/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/9/2019	Field	
S1910077	2958528 #48	S1910077-002	9/9/2019	10/3/2019	Filter	ng/filter	Manganese	3180		600	10/8/2019	IO-3.5	5.45
S1910077	**2958528 #48**	**S1910077-002**	**9/9/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**132**		**25**	**10/9/2019**	**Calculation**	**0.227**
S1910077	2958529 #49	S1910077-003	9/12/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/12/2019	Field	
S1910077	2958529 #49	S1910077-003	9/12/2019	10/3/2019	Filter	ng/filter	Manganese	2220		600	10/8/2019	IO-3.5	5.45
S1910077	**2958529 #49**	**S1910077-003**	**9/12/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**92.5**		**25**	**10/9/2019**	**Calculation**	**0.227**
S1910077	2958531 #90	S1910077-005	9/15/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/15/2019	Field	
S1910077	2958531 #90	S1910077-005	9/15/2019	10/3/2019	Filter	ng/filter	Manganese	5110		600	10/8/2019	IO-3.5	5.45
S1910077	**2958531 #90**	**S1910077-005**	**9/15/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**213**		**25**	**10/9/2019**	**Calculation**	**0.227**
S1910077	2958532 #93	S1910077-006	9/18/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/18/2019	Field	
S1910077	2958532 #93	S1910077-006	9/18/2019	10/3/2019	Filter	ng/filter	Manganese	3850		600	10/8/2019	IO-3.5	5.45
S1910077	**2958532 #93**	**S1910077-006**	**9/18/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**160**		**25**	**10/9/2019**	**Calculation**	**0.227**
S1910077	2958533 #95	S1910077-007	9/21/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/21/2019	Field	
S1910077	2958533 #95	S1910077-007	9/21/2019	10/3/2019	Filter	ng/filter	Manganese	10300		600	10/8/2019	IO-3.5	5.45
S1910077	**2958533 #95**	**S1910077-007**	**9/21/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**430**		**25**	**10/9/2019**	**Calculation**	**0.227**
S1910077	2958534 #96	S1910077-008	9/24/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/24/2019	Field	
S1910077	2958534 #96	S1910077-008	9/24/2019	10/3/2019	Filter	ng/filter	Manganese	3970		600	10/8/2019	IO-3.5	5.45
S1910077	**2958534 #96**	**S1910077-008**	**9/24/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**165**		**25**	**10/9/2019**	**Calculation**	**0.227**
S1910077	2958535 #97	S1910077-009	9/27/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/27/2019	Field	
S1910077	2958535 #97	S1910077-009	9/27/2019	10/3/2019	Filter	ng/filter	Manganese	2980		600	10/8/2019	IO-3.5	5.45
S1910077	**2958535 #97**	**S1910077-009**	**9/27/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**124**		**25**	**10/9/2019**	**Calculation**	**0.227**
S1910077	2958536 #99	S1910077-010	9/30/2019	10/3/2019	Filter	m^3	Field-Actual Volume	24		0	9/30/2019	Field	
S1910077	2958536 #99	S1910077-010	9/30/2019	10/3/2019	Filter	ng/filter	Manganese	2610		600	10/8/2019	IO-3.5	5.45
S1910077	**2958536 #99**	**S1910077-010**	**9/30/2019**	**10/3/2019**	**Filter**	**ng/m³**	**Manganese**	**109**		**25**	**10/9/2019**	**Calculation**	**0.227**

American Zinc Recycling (AZR)

2701 E 114th Street, Chicago, Illinois

FRM PM_{10} and Manganese (Mn) Data

Sampling Period: October 1, 2019 - October 31, 2019

Sampler Type: Met One E-SEQ-FRM

Notes: - Manganese concentrations are presented in nanograms per cubic meter (ng/m3).
- Per City of Chicago Rules: Manganese Limit (ML) is the concentration of manganese equal to or greater than 0.30 micrograms per cubic meter (ug/m3) as averaged over a rolling three-month period.
- PQL: Practical Quantitation Limit
- MDL: Method Detection Limit
- Method: Field: Measurement from field equipment during sample collection
IO-3.5: Measurement from analysis method
Calculation: Resultant concentration from field and method analysis

Work Order	Client Sample ID	Lab ID	Sample Date	Date Received	Matrix	Units	Analyte	Result	Qualifier	RL	Analysis Date	Method
THH908370	P7106201	3161975	10/03/2019	11/6/2019	Filter	m^3	Volume - Std	24.19		0	11/8/2019	Field
THH908370	P7106201	3161975	10/03/2019	11/6/2019	Filter	ng/filter	Manganese	182		50	11/8/2019	IO-3.5
THH908370	**P7106201**	**3161975**	**10/03/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**7.54**		**2.1**	**11/8/2019**	**Calculation**
THH908370	P7106202	3161976	10/06/2019	11/6/2019	Filter	m^3	Volume - Std	24.24		0	11/8/2019	Field
THH908370	P7106202	3161976	10/06/2019	11/6/2019	Filter	ng/filter	Manganese	534		50	11/8/2019	IO-3.5
THH908370	**P7106202**	**3161976**	**10/06/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**22.0**		**2.1**	**11/8/2019**	**Calculation**
THH908370	P7106203	3161977	10/09/2019	11/6/2019	Filter	m^3	Volume - Std	24.24		0	11/8/2019	Field
THH908370	P7106203	3161977	10/09/2019	11/6/2019	Filter	ng/filter	Manganese	2040		50	11/8/2019	IO-3.5
THH908370	**P7106203**	**3161977**	**10/09/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**84.1**		**2.1**	**11/8/2019**	**Calculation**
THH908370	P7106204	3161978	10/12/2019	11/6/2019	Filter	m^3	Volume - Std	24.8		0	11/8/2019	Field
THH908370	P7106204	3161978	10/12/2019	11/6/2019	Filter	ng/filter	Manganese	4720		250	11/8/2019	IO-3.5
THH908370	**P7106204**	**3161978**	**10/12/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**190**		**10**	**11/8/2019**	**Calculation**
THH908370	P7106205	3161979	10/15/2019	11/6/2019	FIlter	m^3	Volume - Std	24.42		0	11/8/2019	Field
THH908370	P7106205	3161979	10/15/2019	11/6/2019	Filter	ng/filter	Manganese	2580		100	11/8/2019	IO-3.5
THH908370	**P7106205**	**3161979**	**10/15/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**106**		**4.1**	**11/8/2019**	**Calculation**
THH908370	P7106206	3161980	10/18/2019	11/6/2019	Filter	m^3	Volume - Std	24.74		0	11/8/2019	Field
THH908370	P7106206	3161980	10/18/2019	11/6/2019	Filter	ng/filter	Manganese	1700		50	11/8/2019	IO-3.5
THH908370	**P7106206**	**3161980**	**10/18/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**68.9**		**2.0**	**11/8/2019**	**Calculation**
THH908370	P7106207	3161981	10/21/2019	11/6/2019	Filter	m^3	Volume - Std	23.94		0	11/8/2019	Field
THH908370	P7106207	3161981	10/21/2019	11/6/2019	Filter	ng/filter	Manganese	4440		250	11/8/2019	IO-3.5
THH908370	**P7106207**	**3161981**	**10/21/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**185**		**10**	**11/8/2019**	**Calculation**
THH908370	P7106208	3161982	10/24/2019	11/6/2019	Filter	m^3	Volume - Std	25.11		0	11/8/2019	Field
THH908370	P7106208	3161982	10/24/2019	11/6/2019	Filter	ng/filter	Manganese	559		50	11/8/2019	IO-3.5
THH908370	**P7106208**	**3161982**	**10/24/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**22.3**		**2.0**	**11/8/2019**	**Calculation**
THH908370	P7106209	3161983	10/27/2019	11/6/2019	Filter	m^3	Volume - Std	24.49		0	11/8/2019	Field
THH908370	P7106209	3161983	10/27/2019	11/6/2019	Filter	ng/filter	Manganese	1950		50	11/8/2019	IO-3.5
THH908370	**P7106209**	**3161983**	**10/27/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**79.8**		**2.0**	**11/8/2019**	**Calculation**
THH908370	P7106210	3161984	10/30/2019	11/6/2019	Filter	m^3	Volume - Std	25.31		0	11/8/2019	Field
THH908370	P7106210	3161984	10/30/2019	11/6/2019	Filter	ng/filter	Manganese	289		50	11/8/2019	IO-3.5
THH908370	**P7106210**	**3161984**	**10/30/2019**	**11/6/2019**	**Filter**	**ng/m³**	**Manganese**	**11.4**		**2.0**	**11/8/2019**	**Calculation**

American Zinc Recycling (AZR)

2701 E 114th Street, Chicago, Illinois

FRM PM_{10} and Manganese (Mn) Data

Sampling Period: November 1, 2019 - November 31, 2019

Sampler Type: Met One E-SEQ-FRM

Notes: - Manganese concentrations are presented in nanograms per cubic meter (ng/m3).
- Per City of Chicago Rules: Manganese Limit (ML) is the concentration of manganese equal to or greater than 0.30 micrograms per cubic meter (ug/m3) as averaged over a rolling three-month period.
- PQL: Practical Quantitation Limit
- MDL: Method Detection Limit
- Method: Field: Measurement from field equipment during sample collection
IO-3.5: Measurement from analysis method
Calculation: Resultant concentration from field and method analysis

Work Order	Client Sample ID	Lab ID	Sample Date	Date Received	Matrix	Units	Analyte	Result	Qualifier	RL	Analysis Date	Method
THH908370	P7106211	3162664	11/02/2019	12/16/2019	Filter	m^3	Volume - Std	25.33		0	12/19/2019	Field
THH908370	P7106211	3162664	11/02/2019	12/16/2019	Filter	ng/filter	Manganese	497		50	12/19/2019	IO-3.5
THH908370	**P7106211**	**3162664**	**11/02/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**19.6**		**2.0**	**12/19/2019**	**Calculation**
THH908370	P7106212	3162665	11/05/2019	12/16/2019	Filter	m^3	Volume - Std	25.55		0	12/19/2019	Field
THH908370	P7106212	3162665	11/05/2019	12/16/2019	Filter	ng/filter	Manganese	1020		50	12/19/2019	IO-3.5
THH908370	**P7106212**	**3162665**	**11/05/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**39.8**		**2.0**	**12/19/2019**	**Calculation**
THH908370	P7106213	3162666	11/08/2019	12/16/2019	Filter	m^3	Volume - Std	26.20		0	12/19/2019	Field
THH908370	P7106213	3162666	11/08/2019	12/16/2019	Filter	ng/filter	Manganese	4000		100	12/19/2019	IO-3.5
THH908370	**P7106213**	**3162666**	**11/08/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**153**		**3.8**	**12/19/2019**	**Calculation**
THH908370	P7106214	3162667	11/11/2019	12/16/2019	Filter	m^3	Volume - Std	26.07		0	12/19/2019	Field
THH908370	P7106214	3162667	11/11/2019	12/16/2019	Filter	ng/filter	Manganese	100		50	12/19/2019	IO-3.5
THH908370	**P7106214**	**3162667**	**11/11/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**4**		**1.9**	**12/19/2019**	**Calculation**
THH908370	P7106215	3162668	11/14/2019	12/16/2019	Filter	m^3	Volume - Std	25.94		0	12/19/2019	Field
THH908370	P7106215	3162668	11/14/2019	12/16/2019	Filter	ng/filter	Manganese	673		50	12/19/2019	IO-3.5
THH908370	**P7106215**	**3162668**	**11/14/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**26**		**1.9**	**12/19/2019**	**Calculation**
THH908370	P7106217	3162670	11/17/2019	12/16/2019	Filter	m^3	Volume - Std	25.46		0	12/19/2019	Field
THH908370	P7106217	3162670	11/17/2019	12/16/2019	Filter	ng/filter	Manganese	1550		50	12/19/2019	IO-3.5
THH908370	**P7106217**	**3162670**	**11/17/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**60.9**		**2.0**	**12/19/2019**	**Calculation**
THH908370	P7106218	3162671	11/20/2019	12/16/2019	Filter	m^3	Volume - Std	25.14		0	12/19/2019	Field
THH908370	P7106218	3162671	11/20/2019	12/16/2019	Filter	ng/filter	Manganese	1210		50	12/19/2019	IO-3.5
THH908370	**P7106218**	**3162671**	**11/20/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**48**		**2.0**	**12/19/2019**	**Calculation**
THH908370	P7106219	3162672	11/23/2019	12/16/2019	Filter	m^3	Volume - Std	25.40		0	12/19/2019	Field
THH908370	P7106219	3162672	11/23/2019	12/16/2019	Filter	ng/filter	Manganese	2320		100	12/19/2019	IO-3.5
THH908370	**P7106219**	**3162672**	**11/23/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**91.4**		**3.9**	**12/19/2019**	**Calculation**
THH908370	P7106220	3162673	11/26/2019	12/16/2019	Filter	m^3	Volume - Std	24.88		0	12/19/2019	Field
THH908370	P7106220	3162673	11/26/2019	12/16/2019	Filter	ng/filter	Manganese	907		50	12/19/2019	IO-3.5
THH908370	**P7106220**	**3162673**	**11/26/2019**	**12/16/2019**	**Filter**	**ng/m³**	**Manganese**	**36.5**		**2.0**	**12/19/2019**	**Calculation**

American Zinc Recycling (AZR)

2701 E 114th Street, Chicago, Illinois

FRM PM_{10} and Manganese (Mn) Data

Sampling Period: December 1, 2019 - December 31, 2019

Sampler Type: Met One E-SEQ-FRM

Notes: - No sample was collected on December 29, 2019 due to a field issue with the filter cassettes.
- Manganese concentrations are presented in nanograms per cubic meter (ng/m3).
- Per City of Chicago Rules: Manganese Limit (ML) is the concentration of manganese equal to or greater than 0.30 micrograms per cubic meter (ug/m3) as averaged over a rolling three-month period.
- PQL: Practical Quantitation Limit
- MDL: Method Detection Limit
- Method: Field: Measurement from field equipment during sample collection
IO-3.5: Measurement from analysis method

Work Order	Client Sample ID	Lab ID	Sample Date	Date Received	Matrix	Units	Analyte	Result	Qualifier	RL	Analysis Date	Method
S2001111	2,961,494 #353	S2001111-001	12/2/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/02/2019	Field
S2001111	2,961,494 #353	S2001111-001	12/2/2019	01/08/2020	Filter	ng/filter	Manganese	ND		600	01/14/2020	IO-3.5
S2001111	**2,961,494 #353**	**S2001111-001**	**12/2/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**ND**		**25**	**01/21/2020**	**Calculation**
S2001111	2,961,495 #354	S2001111-002	12/5/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/05/2019	Field
S2001111	2,961,495 #354	S2001111-002	12/5/2019	01/08/2020	Filter	ng/filter	Manganese	1700		600	01/14/2020	IO-3.5
S2001111	**2,961,495 #354**	**S2001111-002**	**12/5/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**71**		**25**	**01/21/2020**	**Calculation**
S2001111	2,961,498 #356	S2001111-003	12/8/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/08/2019	Field
S2001111	2,961,498 #356	S2001111-003	12/8/2019	01/08/2020	Filter	ng/filter	Manganese	2400		600	01/14/2020	IO-3.5
S2001111	**2,961,498 #356**	**S2001111-003**	**12/8/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**98**		**25**	**01/21/2020**	**Calculation**
S2001111	2,961,499 #357	S2001111-004	12/11/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/11/2019	Field
S2001111	2,961,499 #357	S2001111-004	12/11/2019	01/08/2020	Filter	ng/filter	Manganese	1400		600	01/14/2020	IO-3.5
S2001111	**2,961,499 #357**	**S2001111-004**	**12/11/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**58**		**25**	**01/21/2020**	**Calculation**
S2001111	2,961,500 #358	S2001111-005	12/14/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/14/2019	Field
S2001111	2,961,500 #358	S2001111-005	12/14/2019	01/08/2020	Filter	ng/filter	Manganese	ND		600	01/14/2020	IO-3.5
S2001111	**2,961,500 #358**	**S2001111-005**	**12/14/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**ND**		**25**	**01/21/2020**	**Calculation**
S2001111	2,961,504 #371	S2001111-007	12/17/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/17/2019	Field
S2001111	2,961,504 #371	S2001111-007	12/17/2019	01/08/2020	Filter	ng/filter	Manganese	700		600	01/14/2020	IO-3.5
S2001111	**2,961,504 #371**	**S2001111-007**	**12/17/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**28.00**		**25**	**01/21/2020**	**Calculation**
S2001111	2,961,505 #372	S2001111-008	12/20/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/20/2019	Field
S2001111	2,961,505 #372	S2001111-008	12/20/2019	01/08/2020	Filter	ng/filter	Manganese	2300		600	01/14/2020	IO-3.5
S2001111	**2,961,505 #372**	**S2001111-008**	**12/20/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**95.00**		**25**	**01/21/2020**	**Calculation**
S2001111	2,961,506 #373	S2001111-009	12/23/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/23/2019	Field
S2001111	2,961,506 #373	S2001111-009	12/23/2019	01/08/2020	Filter	ng/filter	Manganese	3500		600	01/14/2020	IO-3.5
S2001111	**2,961,506 #373**	**S2001111-009**	**12/23/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**144.00**		**25**	**01/21/2020**	**Calculation**
S2001111	2,961,507 #374	S2001111-010	12/26/2019	01/08/2020	Filter	m^3	Field-Actual Volume	24.00		0	12/26/2019	Field
S2001111	2,961,507 #374	S2001111-010	12/26/2019	01/08/2020	Filter	ng/filter	Manganese	2700		600	01/14/2020	IO-3.5
S2001111	**2,961,507 #374**	**S2001111-010**	**12/26/2019**	**01/08/2020**	**Filter**	**ng/m^3**	**Manganese**	**113.00**		**25**	**01/21/2020**	**Calculation**