

ILLINOIS POLLUTION CONTROL BOARD  
September 4, 2008

IN THE MATTER OF: )  
)  
PETITION OF BIG RIVER ZINC ) AS 08-9  
CORPORATION FOR AN ADJUSTED ) (Adjusted Standard - Land)  
STANDARD UNDER 35 ILL. ADM. CODE )  
720.131(c) )

OPINION AND ORDER OF THE BOARD (by T.E. Johnson):

On April 1, 2008, Big River Zinc Corporation (BRZ) filed a petition to amend a condition of an existing adjusted standard. The adjusted standard, which concerns BRZ's electrolytic refinery in Sauget, St. Clair County, was granted by the Board to BRZ in 1999, Petition of Big River Zinc for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3. Today the Board modifies the condition and makes other changes to the conditions of the adjusted standard as warranted by the scope of BRZ's request.

The existing adjusted standard allows BRZ, under specified conditions, to receive certain secondary zinc oxide and use the material as a feedstock for the company's electrolytic zinc refining process at the Sauget facility, all without becoming subject to hazardous waste regulations. Without the adjusted standard, the secondary zinc oxide would be considered a "solid waste" and a "hazardous waste" under the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901 *et seq.*, and corresponding Illinois laws and regulations. The adjusted standard was issued under 35 Ill. Adm. Code 720.131(c), which allows the Board to determine that certain materials are not solid wastes if they meet required criteria.

The secondary zinc oxide received by BRZ is recovered from electric arc furnace (EAF) dust (listed hazardous waste K061) through a high temperature metals recovery (HTMR) process conducted by others off-site. The Board refers to this material as "EAF zinc oxide." The requested modification to the adjusted standard will allow BRZ, after washing EAF zinc oxide in a solution of water and soda ash at the Sauget facility, to then sell the washed material to third parties or return the washed material to suppliers. Without this modification, the washed material must undergo BRZ's electrolytic zinc refining process at Sauget to come within the adjusted standard. The Board's action today will enable BRZ to re-open its Sauget facility, which ceased process operations in June 2006. The Illinois Environmental Protection Agency (IEPA) has recommended that the Board grant this relief.

In this opinion, the Board first provides background on two prior BRZ proceedings and this case. The Board then sets forth the facts and discusses the merits of BRZ's current petition (Pet.). The adjusted standard, as amended, is contained in the order following this opinion.

## **BACKGROUND**

### **Prior Proceedings**

Two prior adjusted standard proceedings, relevant here, concern both BRZ's Sauget facility and relief granted under 35 Ill. Adm. Code 720.131(c): Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3; and Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 06-4.

#### **AS 99-3**

BRZ operated an electrolytic zinc refinery in Sauget, St. Clair County. The facility is located at 2401 Mississippi Avenue, near the Mississippi River. BRZ used various zinc-containing materials as feedstock for its refinery. In the 1998-99 proceeding, AS 99-3, BRZ sought an adjusted standard because it wanted to use a zinc-containing material recovered from dust emitted from EAFs used to produce steel. This secondary zinc oxide material, as noted above, would ordinarily be considered a "solid waste" and a "hazardous waste" under RCRA, 42 U.S.C. §§ 6901 *et seq.*, and Board regulations. Only those materials that are "solid wastes" can be regulated as "hazardous wastes." BRZ wanted to use the secondary zinc oxide material without becoming subject to Illinois' hazardous waste requirements.

To that end, BRZ filed a petition for an adjusted standard under 35 Ill. Adm. Code 720.131(c). As discussed above, Section 720.131(c) allows the Board to determine that certain materials are not solid wastes if required criteria are met. The secondary zinc oxide material for which BRZ sought an adjusted standard is recovered from EAF dust (listed hazardous waste K061) by an HTMR process.

In the 1998-99 proceeding, the Board found that EAF dust that has been processed in an HTMR unit has been initially but not fully reclaimed. BRZ further established that the secondary zinc oxide material produced by subjecting EAF dust to an HTMR process, referred to as "EAF zinc oxide," is commodity-like. Accordingly, the Board held that EAF zinc oxide is not a solid waste and granted BRZ's petition under Section 720.131(c) for an adjusted standard, subject to conditions. The Board emphasized that its determination applies only to EAF zinc oxide to be processed through BRZ's electrolytic zinc refinery in Sauget, and only to EAF zinc oxide when it is in Illinois and either at the Sauget facility or under a legally binding contract for sale to BRZ. *See* Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3 (Apr. 15, 1999 opinion and order) (May 6, 1999 order on reconsideration).

#### **AS 06-4**

In this 2006 proceeding, BRZ established that EAF dust delivered to its Sauget zinc refinery as a feedstock for a new proprietary refining process called "Leach, Solvent Extraction, Electrowinning" (LSXEW) is commodity-like. The Board therefore found that EAF dust, under those circumstances, is not a solid waste and granted BRZ's petition under Section 720.131(c) for an adjusted standard, subject to conditions. The Board stressed that its determination applied

only to EAF dust to be processed through LSXEW at BRZ's electrolytic zinc refinery in Sauget, and only to EAF dust shipments once they enter the gate of the BRZ facility and are physically present at the facility. See Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 06-4 (Nov. 16, 2006).

### **Current Proceeding**

Because BRZ was unable to locate sufficient amounts of competitively-priced feedstock, including EAF zinc oxide at issue in AS 99-3, BRZ ceased all process operations and laid-off or terminated all but approximately 19 employees at its Sauget facility, effective June 1, 2006. Pet. Aff. at 1.<sup>1</sup> In addition, BRZ was unable to install the proposed LSXEW process, the subject of AS 06-4, "due to rising costs of the technology." Pet. at 3, n.2.

On April 1, 2008, BRZ filed the instant petition, which the Board has docketed as AS 08-9. BRZ now seeks to amend a condition of the existing AS 99-3 adjusted standard granted by the Board to BRZ in 1999. See Petition of Big River Zinc for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3 (Apr. 15, 1999 opinion and order) (May 6, 1999 order on reconsideration). According to this petition, the amendment would allow BRZ to re-open the washing plant at the Sauget facility. In turn, according to BRZ, it could sell the washed EAF zinc oxide to third parties "for further refining" or return the washed EAF zinc oxide to the suppliers "for sale to another refiner," rather than being limited to refining the washed material on-site. Pet. at 1. BRZ seeks "only a revision to a Condition and not a new solid waste declassification" under Section 720.131(c). *Id.* at 3.

BRZ has waived hearing and no hearing was requested after provision of the statutory notice. On May 9, 2008, IEPA filed its recommendation (Rec.) that the Board grant BRZ's request, but proposed additional language for the modified condition and suggested that BRZ provide more economic information. The Board's May 15, 2008 order found that BRZ satisfied the notice requirement of the Environmental Protection Act (Act) (415 ILCS 5/28.1(d)(1) (2006)) and granted BRZ's motion to incorporate certain documents from the AS 99-3 and AS 06-4 dockets. On May 22, 2008, BRZ filed a response to IEPA's recommendation (Resp.).

On June 26, 2008, the hearing officer issued an order contemplated by the Board's May 15, 2008 order, requiring BRZ to file an amended petition addressing a number of issues set forth in an attachment to the hearing officer's order. In response, BRZ timely filed an amended petition (Am. Pet.) on July 14, 2008.

On July 29, 2008, BRZ filed a motion for expedited final decision (Mot. Exp.), stating that IEPA had no comment on BRZ's amended petition and that IEPA confirmed its recommendation that BRZ's petition be granted. Mot. Exp. at 2. BRZ sought expedition because it had recently entered into a contract with a supplier, Steel Dust Recycling. *Id.* That company would like to begin shipping EAF zinc oxide to BRZ for washing as soon as possible:

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<sup>1</sup> "Pet. Aff." refers to Attachment B of BRZ's petition, which is the affidavit of George Obeldobel, President and Chief Executive Officer of BRZ in Sauget.

Time is of the essence as BRZ does not want to lose the washing contract with Steel Dust Recycling. The contract could be lost if BRZ cannot begin washing for several months since a long delay will force SDR to look for alternatives. BRZ cannot afford to begin preparing the facility for washing until the Board issues its decision to amend the condition in BRZ's existing Adjusted Standard . . . . Mot. Exp. Aff.<sup>2</sup> at 1-2; Mot. Exp. at 2.

Recognizing BRZ's "economic urgency and the prospects for re-opening the Sauget facility," the Board stated in its August 7, 2008 order that it would "endeavor to issue a final decision at its scheduled August 21, 2008 meeting or as soon thereafter as is reasonably practicable, consistent with decision deadlines and available resources." Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 08-9, slip op. at 2 (Aug. 7, 2008). The Board today issues its final decision.

## **FACTS**

The Board made extensive findings of fact in its AS 99-3 and AS 06-4 decisions, which need not be repeated here. Those findings concerned, among other things, zinc and its markets, BRZ's facility and operations, EAF dust, EAF zinc oxide, and HTMR. *See* Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3, slip op. at 4-5 (May 6, 1999); Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3, slip op. at 3-9 (Apr. 15, 1999); Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 06-4, slip op. at 5-13 (Nov. 16, 2006). Below are additional facts providing updated information relevant to BRZ's current request.

### **Past Operations**

For more than 65 years, BRZ used the electrowinning process to recover zinc from ore concentrates at the Sauget refinery. As an electrolytic zinc refinery, BRZ also accepted EAF zinc oxide from suppliers as feedstock, washed the material on-site, and refined it into zinc metal. Pet. Aff. at 1. On June 1, 2006, BRZ stopped all process operations and laid-off or terminated all except approximately 19 employees at the Sauget facility because BRZ could not locate sufficient amounts of feedstock at competitive prices, including EAF zinc oxide. *Id.*

### **Plans to Re-Open**

BRZ would like to re-open its existing washing plant at the Sauget facility with a goal of re-opening the zinc refining operation "in the future as economically justified." Pet. Aff. at 1-2. BRZ plans to wash, in a water and soda ash solution, the EAF zinc oxide material it receives from suppliers and then return the washed product to the suppliers "for sale and further refining." *Id.*; Am. Pet. Aff. at 5, Exh. B. Depending on the number of current employees moved to this operation, the washing facility is expected to employ between 14 and 26 people. Pet. Aff. at 2.

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<sup>2</sup> "Mot. Exp. Aff." refers to the attachment to BRZ's motion to expedite, which is the affidavit of Mr. Obeldobel. *See* n.1 above.

It will take BRZ 3 to 4 weeks to call back or retain employees and ready the washing facility for re-opening. Mot. Exp. Aff. at 1. Specifically, BRZ will need to perform the following:

- a) Call back 7 employees (or retain new employees) — BRZ’ s former employees have not been working for BRZ since mid-2006;
- b) Conduct training — BRZ will train any new employees as required;
- c) Clean out the entire system and dry run test all equipment;
- d) Get all systems in place (safety, lab, accounting, record keeping, etc);
- e) Overhaul the Oxide washing filter press (requires rebuilding cylinders at a cost of about \$40,000 and 3 weeks work);
- f) Rebuild the pumps and install variable frequency drives on each pump;
- g) Provide compressed air, either by renting a cooling tower to run the main compressor, or by renting a compressor more adequately sized for the job;
- h) Clean spaces to be used for handling the washed oxide.
- i) Update lab equipment and/or retain a part-time assayer to monitor assay results for washed oxide and effluent;
- j) Purchase adequate safety supplies and spare parts to support the operation. *Id.* at 1-2.

BRZ would like to add a larger washing plant in the future to wash EAF oxide that is “produced at other facilities, including those planned by BRZ’s parent company, ZincOx Resources, plc.” Pet. Aff. at 2. Upon expansion of the washing facility, BRZ anticipates employing between 29 and 44 persons. *Id.* BRZ does not expect any expansion of the washing facility until approximately the second half of 2009, “when larger quantities of EAF Zinc oxide are delivered to BRZ for washing.” Am. Pet. Aff. at 6. It is anticipated that BRZ would install additional silos, as well as a more efficient pneumatic system for unloading and a more efficient system for handling and loading larger volumes. *Id.*

### **Need and Markets for Washing EAF Zinc Oxide**

To prevent equipment corrosion and aid in efficient zinc recovery, zinc refineries using electrowinning must limit the amount of chloride, fluoride, sodium, and potassium entering the solution circuit. Pet. Aff. at 2. There is no practical method to remove these inorganic salts after they enter the circuit. These materials must therefore be limited in the feed to the plant. *Id.*

During the zinc electrowinning process, an electric current passes through an aluminum cathode, a zinc sulfate solution, and a lead anode. Pet. Aff. at 2. Zinc metal is deposited onto the aluminum cathode while oxygen forms on the lead anode. Chloride in solution accelerates corrosion of process equipment, especially the electrodes (anodes and cathodes) in the cell house. *Id.* The more chloride in the solution, the more quickly the equipment corrodes. The relatively small anodes used at BRZ’s Sauget facility cost at least \$300 each. There were approximately 15,000 of them in use. Other zinc plants use many more electrodes than BRZ “in proportion to their production relative to BRZ.” *Id.* Zinc plants cannot risk destroying the

anodes and cathodes. In addition, high concentrations of chloride in the solution produce chlorine gas at the anode, a safety concern. *Id.*

Fluoride “attacks the boundary layer between the aluminum cathode and the zinc deposited from solution,” making it difficult to separate the two. Pet. Aff. at 3. High fluoride concentrations can make it “impossible to harvest the zinc metal,” resulting in production essentially stopping until clean cathodes can replace those “rendered useless by fluoride.” *Id.* Most of the zinc must be pried off of the cathodes to clean the cathodes. The remainder of the zinc must then be removed by chemical dissolution with acid or by physical brushing. *Id.*

Sodium and potassium salts are:

more soluble than the salt of zinc in a zinc electrowinning process. Therefore the presence of these cations reduces the solubility of zinc because of the common ion effect. The presence of the sodium and potassium limits the overall production rate of the plant. Pet. Aff. at 3.

BRZ expects the washed EAF zinc oxide to be processed by others to make zinc metal. Am. Pet. Aff. at 2. The market for washed EAF zinc oxide, however, is broader than zinc metal production. *Id.* Washed EAF zinc oxide can be used to make high purity zinc sulfate, which is used in products such as fertilizer and animal feed. Washed EAF zinc oxide can be used to produce high purity zinc oxide, which can be used in certain paints and ceramics. *Id.* Zinc oxide has pharmaceutical, agricultural, and commercial uses, including textiles, chemicals, and rubber products. In 2004, world use of zinc oxide was estimated at 1,000,000 tonnes. *Id.*

BRZ has recently finalized an agreement with Steel Dust Recycling of Millport, Alabama. Mot. Exp. Aff. at 1; Am. Pet. Aff. at 2. Steel Dust Recycling would deliver its EAF zinc oxide to BRZ for washing. Mot. Exp. Aff. at 1; Am. Pet. Aff. at 2. Once washed, Steel Dust Recycling plans to pick up the washed EAF zinc oxide and sell it to a zinc smelter. Am. Pet. Aff. at 2. Steel Dust Recycling expects to deliver to BRZ approximately 1,500 tons per month of EAF zinc oxide to be washed. *Id.* Steel Dust Recycling is ready to begin shipping EAF zinc oxide to BRZ and would like BRZ to begin washing “as soon as possible.” Mot. Exp. Aff. at 2; Am. Pet. Aff. at 2. .

BRZ is in preliminary discussions with PIZO, which is a joint venture of Heritage Environmental Services and Nucor Steel Corporation. Am. Pet. Aff. at 3. Estimated to begin in 2009, PIZO would deliver approximately 1,250 tons of EAF zinc oxide per month to BRZ for washing and return to PIZO. *Id.* PIZO expects to sell the washed EAF zinc oxide to a zinc smelter. *Id.*

Expected to be operational by the middle of 2010 is Zinc and Iron Recycling of Ohio, Inc., a sister company of BRZ. Am. Pet. Aff. at 3. Zinc and Iron Recycling of Ohio, Inc. is expected to produce approximately 7,000 tons per month of EAF zinc oxide to be washed by BRZ and “then returned or sold in the market,” though “[o]nce there is an adequate supply of zinc oxide,” BRZ will likely refine the material itself to make zinc metal. *Id.*

### Economics of Washing EAF Zinc Oxide

Washing EAF zinc oxide reduces chloride, fluoride, sodium, and potassium, making the EAF zinc oxide “more marketable” for refining or further processing into an end product. Pet. Aff. at 3; Resp. Aff.<sup>3</sup> at 1, n.1. Zinc plants using electrowinning can use more washed EAF zinc oxide than unwashed EAF zinc oxide. For example:

a plant limited to using 1,000 tons of unwashed EAF zinc oxide because of the chloride content could use at least 10,000 tons of washed EAF zinc oxide since the washing efficiency for chloride removal is 90% or better. *Id.*

“Unless the supplier of EAF zinc oxide is another BRZ facility or a related entity or affiliate,” BRZ “will receive payment, in cash or other valuable assets,” for washing the EAF zinc oxide. Resp. Aff. at 1. There are European companies that are washing similar zinc oxide material and currently charging 70-90 Euros per metric tonne of oxide. *Id.* European zinc smelters purchase washed zinc oxide from companies such as Befesa Zinc Aser that perform a washing process similar to that of BRZ. Am. Pet. Aff. at 1-2. The Nyrstar zinc smelter, located in Tennessee, currently purchases approximately 15,000 tons of washed zinc oxide per year from sources in Europe. *Id.* at 1. BRZ’s “direct cost to wash the zinc oxide in existing equipment, valued at millions of dollars to replace, is well in excess of \$60 per metric tonne of oxide.” Resp. Aff. at 1. BRZ intends to charge prices similar to those currently being charged for washing zinc oxide in Europe. *Id.*

The value of the washed oxide on the market is similar to that of mined zinc concentrate. Resp. Aff. at 2. For purchasing concentrates, there is a standard formula, the constants of which are negotiated each year. Though terms can vary from year to year, the long-term price is approximately 55% to 65% of the London Metal Exchange (LME) zinc price for the zinc contained in the oxide, delivered to the customer. *Id.* The LME zinc price has ranged during this decade from \$800 per metric tonne to approximately \$4,000 per metric tonne of zinc. *Id.* The washed oxide will contain roughly 65% zinc. *Id.* The current LME price is approximately \$2,200 per metric tonne of zinc. *Id.*, Attachment (page from LME). Therefore, the approximate value of washed oxide currently would be  $0.6 \times 65\% \times \$2,200 = \$858$  per metric tonne delivered. *Id.* Even if the zinc price falls on the LME, the difference in the market price and the washing fee “leaves significant room for profit for the supplier of the crude zinc oxide.” *Id.*

Mr. George Obeldobel, President and Chief Executive Officer of BRZ in Sauget, provided an affidavit stating that he is “not aware of any instances of speculative accumulation of similar washed zinc oxide materials. The product is simply too valuable to accumulate.” Resp. Aff. at 2.

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<sup>3</sup> “Resp. Aff.” refers to the attachment to BRZ’s response to IEPA’s recommendation, which is the affidavit of Mr. Obeldobel. See n.1 above.

**Effectiveness of Washing in Removing Inorganic Salts**

BRZ washed EAF zinc oxide, and plans to continue washing the material, in a solution of water and soda ash. Soda ash is designed to raise the pH to a level that would not dissolve zinc and other heavy metals but would dissolve the inorganic salts. Am. Pet. Aff. at 5, Exh. B. Based on data collected from BRZ's washing plant, the tables below show (1) the levels of chloride, fluoride, sodium, and potassium in EAF zinc oxide supplied to BRZ's Sauget facility, (2) the reduction of those constituents due to BRZ's washing, and (3) the average removal estimates over a period of seven years:

<b>Average Composite Assays by Year of Operation for Zinc Oxide Fed to Wash Operation</b>					
Year	% Zinc	% Chloride	% Fluoride	% Sodium	% Potassium
1999	63.7	5.63	0.20	2.35	2.26
2000	62.7	6.18	0.21	2.39	2.28
2001	62.4	5.88	0.23	2.22	2.07
2002	63.1	4.63	0.11	1.97	1.48
2003	58.1	6.88	0.17	2.65	2.44
2004	60.5	6.59	0.16	2.69	2.4
2005	59.8	6.81	0.16	2.49	2.18
<b>Average</b>	<b>61.5</b>	<b>6.09</b>	<b>0.18</b>	<b>2.39</b>	<b>2.16</b>

<b>Average Composite Assays by Year of Operation for Washed Zinc Oxide Produced</b>					
Year	% Zinc	% Chloride	% Fluoride	% Sodium	% Potassium
1999	70.32	0.31	0.11	0.23	0.1
2000	70.1	0.37	0.09	0.25	0.13
2001	66.6	0.27	0.06	0.17	0.09
2002	66.9	0.33	0.06	0.28	0.13
2003	64.4	0.67	0.16	0.24	0.13
2004	66.3	0.94	0.13	0.44	0.29
2005	64.8		0.03	0.75	0.42
<b>Average</b>	<b>67.1</b>	<b>0.48</b>	<b>0.09</b>	<b>0.34</b>	<b>0.18</b>

<b>Average Removal Estimates for the Seven-Year Period (% in - % out) x 100 / % in</b>			
Chloride	Fluoride	Sodium	Potassium
<b>92.1%</b>	<b>48.3%</b>	<b>85.9%</b>	<b>91.4%</b>

Pet. Aff. at 3-4. As shown above, over the seven-year period, washing also concentrated the average zinc level in EAF zinc oxide from a pre-wash level of 61.5% to a post-wash level of 67.1%. *Id.*

### **Sampling and Handling**

In testing EAF zinc oxide received at the Sauget facility, BRZ used “EPA sampling method 9253 for chloride, method 9214 for fluoride, and method 7000 for iron, lead, potassium, sodium and zinc.” Am. Pet. Aff. at 4. On monthly composite samples of unwashed zinc oxide, in order to determine the quality of material before washing, BRZ sampled for percentages of zinc, chloride, fluoride, sodium, potassium, and other materials. *Id.*

In addition to sampling EAF zinc oxide as it comes into the Sauget facility, BRZ plans that “each batch will be sampled and composited after the material is washed on a supplier-specific basis” to ensure the washed product’s quality, including compliance with supplier specifications:

BRZ will analyze washed samples for percentages of zinc, chloride, fluoride, sodium and potassium and other materials remaining in the washed zinc oxide, using EPA methods adapted to allow for the larger concentrations of elements being sampled. The composite will be analyzed on a frequency as required by the needs of the supplier or as required by the variability in washing efficiencies, but no less than once per month. Am. Pet. Aff. at 4.

The material will be sampled “to ensure the supplier’s specifications are met.” Am. Pet. Aff. at 4. Washed EAF zinc oxide that does not meet specifications could be returned to BRZ for re-washing, or sold “as is” by the supplier for either a different end use or the same use but at a discount. Such discounting is “typical for the handling of off-spec feed materials in the zinc refining industry.” *Id.*

Presently, BRZ does not plan to commingle different suppliers’ EAF zinc oxide received for washing, “meaning that a supplier will receive back its own material after washing.” Am. Pet. Aff. at 4. If the supply of EAF zinc oxide to be washed becomes “so significant and the facility is expanded,” commingling of different suppliers’ EAF zinc oxide could take place, but only with materials of “similar quality” and each supplier’s authorization. *Id.* at 4-5.

BRZ plans to use the “same handling methods and process” for incoming EAF zinc oxide as described in its AS 99-3 petition. Am. Pet. Aff. at 5. Most, if not all, of the EAF zinc oxide is expected to arrive by either rail or truck. Both rail cars and trucks would be unloaded by ventilated air slides (pneumatic unloading system) to silos equipped with HEPA filters. BRZ has installed two silos and one washing tank. *Id.*, Exh. B. As currently proposed, the washed EAF zinc oxide, in the form of wet filter cake, would be transported by truck approximately 200 feet to a covered storage building. Am. Pet. Aff. at 5. The washed material would:

be stored inside the covered storage building and on its concrete floor only long enough to collect sufficient quantity for transportation by the supplier, and not for more than approximately 2 months. *Id.*

“[N]o spillage typically occurs” because the material is in a damp solid form. *Id.* If spillage occurs during transportation or loading, BRZ uses a “road sweeper to pick up material and

transport it back to the storage building (roads are paved for this purpose).” *Id.* BRZ also has a “facility-wide accident response program” and trains its employees in proper handling procedures on a yearly basis. *Id.*

Under BRZ’s current proposal, the washed filter cake would be loaded inside the covered storage building into the shipping vehicle, “fob Sauget,<sup>4</sup> and the supplier is responsible for meeting any requirements for transportation by the supplier to a supplier-directed location.” Am. Pet. Aff. at 6; Exh. B. However, in the case of “BRZ’s related entity,” Zinc and Iron Recycling of Ohio, Inc., BRZ may take responsibility for the delivery of washed EAF zinc oxide. Pet. Aff. at 6, n.1. BRZ would load trucks or rail cars for transportation, depending upon the supplier’s request, and the vehicle would be covered before leaving the Sauget facility to avoid any loss of material during shipment. Am. Pet. Aff. at 6. The exterior of the trucks or rail cars would be “inspected for any visible oxide and cleaned before they leave the plant.” *Id.*

Upon the anticipated expansion of the washing operation, BRZ expects that the handling of the material would “remain the same in concept, but will simply allow for handling more volume, more efficiently.” Am. Pet. Aff. at 6.

In 1998, BRZ received from IEPA the construction permit No. 98070057 to construct the secondary zinc oxide receiving and washing plant, with environmental controls. Am. Pet. Aff. at 6. In 2005, BRZ received from IEPA a “notice of completion” for the company’s Clean Air Act Permit Program (CAAPP) operating permit No. 96030107, which includes the washing facility. BRZ also has the 2008-2009 wastewater discharge permit No. 08-101, issued by American Bottoms Regional Treatment Facility, which is “based upon BRZ washing zinc oxides and considers the specific composition of the washing solution.” *Id.*

### **AS 99-3 ADJUSTED STANDARD LANGUAGE**

BRZ petitions to amend condition 2(a)(1) of the existing AS 99-3 adjusted standard. The Board sets forth below all of the conditions of the AS 99-3 adjusted standard:

1. The Board finds that zinc oxide material produced by subjecting electric arc furnace (EAF) dust from the primary production of steel (K061 under 35 Ill. Adm. Code 721.132) to a high temperature metals recovery (HTMR) process is not a solid waste and grants Big River Zinc Corporation (BRZ) an adjusted standard under 35 Ill. Adm. Code 720.131(c).
2. The adjusted standard is subject to the following conditions:
  - a. The determination described in paragraph one of this order applies only to zinc oxide material:

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<sup>4</sup> “FOB” means “[f]ree on board some location (for example, FOB shipping point; FOB destination); the invoice price includes delivery at seller’s expense to that location. Title to goods usually passes from seller to buyer at the FOB location.” *Black’s Law Dictionary* 578 (5th ed. 1979).

- (1) that will undergo BRZ's electrolytic zinc refining process at its facility in Sauget, St. Clair County, Illinois;
  - (2) that is in Illinois; and
  - (3) that has arrived at BRZ's Sauget, St. Clair County, Illinois facility or that is under a legally binding contract for sale to BRZ;
- b. BRZ must maintain records identifying the suppliers of all zinc oxide material that BRZ accepts under this adjusted standard;
  - c. Each month, BRZ must take representative samples of the zinc oxide material that it accepts from each supplier and composite the samples on a supplier-specific basis. BRZ must test each composite sample on a monthly basis to determine the percentage by weight of zinc, lead, iron, total gangue materials (silica plus calcium plus magnesium), and chloride in the sample. Each sample must be collected and tested in accordance with generally accepted practices, such as those specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 (Third Edition); and
  - d. BRZ must maintain records of the information required in paragraphs 2(b) and 2(c) of this order for a period of three years and must make them available for the Illinois Environmental Protection Agency (IEPA) to inspect and copy at any reasonable time during normal business hours upon IEPA's request. Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3, slip op. at 6 (May 6, 1999).

### **BRZ's Current Request**

BRZ seeks to revise condition 2(a)(1) of its existing AS 99-3 adjusted standard to give BRZ "needed flexibility in its operations." Pet. at 1. BRZ describes current condition 2(a)(1) as requiring BRZ to conduct both steps of its "two-step process" (*i.e.*, (1) washing EAF zinc oxide to remove inorganic salts and (2) electrolytic refining) at BRZ's Sauget refinery. BRZ requests that condition 2(a)(1) be revised to allow BRZ:

to continue its process of accepting partially recovered zinc oxide from suppliers and washing the zinc oxide at BRZ's refinery in Sauget, Illinois, but then to *either* (i) continue the electrolytic refining process at BRZ's facility as described in AS-99-3, (ii) sell the washed zinc oxide to third parties for further refining, *or* (iii) return the washed zinc oxide to the suppliers for sale to another refiner. *Id.* (emphasis in original).

BRZ maintains that in each scenario, the “final product is a valuable, reclaimed zinc product.” *Id.*

In short, BRZ does not want to be “limited to conducting the complete refining process at its Sauget facility.” Pet. at 2; *see also id.* at 9 (“BRZ requests the Board enter an Order amending BRZ’s existing adjusted standard by expanding the locations at which further processing of washed EAF zinc oxide may occur.”). The “only change to the adjusted standard,” BRZ continues, is the “location at which the final steps of the reclaiming process may occur.” *Id.* at 4; *see also id.* at 7 (“the process of reclamation will not change, only the location”). For that reason, BRZ maintains that “there is no change in impact to the environment.” *Id.* at 7.

Describing the end products other than zinc metal that can result from further processing of the washed EAF zinc oxide, BRZ explains that zinc oxide can be used to make high purity zinc sulfate, which is used in fertilizer and animal feed, and high purity zinc oxide can be used in paints, ceramics, and rubber products. Am. Pet. at 1-2. BRZ stresses that because the purpose of the requested modification is to allow BRZ to wash EAF zinc oxide for others, BRZ wants to ensure that “the ultimate customer base is not limited to only processors of zinc metal.” *Id.* at 1.

BRZ asserts that its “contracts and agreements (including volume) for the acquisition of EAF zinc oxide for washing . . . are the ‘market’” for the washed material because after washing, the supplier will take back the material. Am. Pet. at 3. The value of the washed EAF zinc oxide, BRZ states, is similar to the value of mined zinc concentrate. BRZ notes that the long-term price is roughly 55% to 65% of London Metal Exchange (LME) zinc price for the zinc in the oxide, delivered to the customer, adding that the LME zinc price has ranged from \$800 per metric tonne to about \$4,000 per metric tonne of zinc during this decade. *Id.* at 4.

BRZ emphasizes that because it would continue to process the same material “already exempted by the Board” and “further reclamation will still take place,” the Board “need not reconsider the 720.131(c) criteria.” Pet. at 4; *see also id.* at 9 (“BRZ’s amendment is limited to a change in a Condition and not a substantive finding of the adjusted standard”). BRZ represents that it “will enter into contracts with its suppliers or third party refiners to ensure the final reclaiming occurs.” *Id.* at 5; *see also id.* at 7 (“EAF zinc oxide will continue to be fully reclaimed”).

BRZ expects to be supplied EAF zinc oxide by third parties or its parent, ZincOx Resources, plc. Pet. at 2-3. If the adjusted standard is amended as proposed, BRZ plans to enter into agreements with its EAF zinc oxide suppliers to begin receiving sufficient quantities of material for washing, and then re-open the washing building at the Sauget refinery. *Id.* at 5. In its July 14, 2008 amended petition, BRZ stated that it was:

close to finalizing a washing agreement with Steel Dust Recycling to deliver to BRZ approximately 1500 tons per month of zinc oxide to be washed. Steel Dust Recycling is ready to ship the material as soon as BRZ receives this amendment to Condition 2.a.(1). Am. Pet. at 2.

Since then, BRZ's washing agreement with Steel Dust Recycling has been finalized and Steel Dust Recycling "would like to begin shipments to BRZ as soon as possible." Mot. Exp. at 2. Additionally, BRZ is in discussions with another entity, PIZO, for washing, and "expects also to wash zinc oxide for BRZ's sister company [Zinc and Iron Recycling of Ohio, Inc.] by mid-2010." Am. Pet. at 2.

"[B]ecause the material will be sampled . . . to ensure the supplier's specifications are met," it is not likely that a supplier or third party will decline to accept a shipment of washed EAF zinc oxide. Am. Pet. at 3. Moreover, BRZ continues, even off-specification material has "significant market value." *Id.* Such material could either be sold "as is" by the supplier at a discount, which is typical in the zinc refining industry, or sold "as is" by the supplier for a different end use. *Id.*

BRZ states that for incoming EAF zinc oxide, the company will use the same handling methods and washing process it has used in the past "when the material would arrive for washing and then further refining by BRZ." Am. Pet. at 4. This includes unloading through:

closed pneumatic system ventilated air to silos equipped with HEPA filters, then to a washing tank, and then to a covered storage building [citation omitted]. Typically, material will be stored in the silos for 3 days or less, so as to allow a steady feed rate to the washing circuit. The unloading and washing process has not changed. Instead of washed material being transported from the covered storage building to BRZ's refining operation, however, this adjusted standard will allow BRZ the option of transportation by the supplier to a supplier-directed location. *Id.*

The washed EAF zinc oxide, in the form of wet filter cake, would be dropped through a chute into a truck and then transported approximately 200 feet to BRZ's covered storage building and stored inside on the building's concrete floor. Am. Pet. at 5. BRZ represents that "storage will only be long enough to collect sufficient quantity for efficient transportation by the supplier, and not for more than approximately 2 months." *Id.* Even with the anticipated expansion of BRZ's washing plant in 2009, the material handling process would remain generally the same. *Id.* at 5-6. As the washed material is damp, spillage does not typically occur and loss is minimized, but BRZ uses a "sweeper to pick up minimal quantities of material that might fall during transportation or loading." *Id.* at 5. The supplier, BRZ adds, is "responsible for transportation from BRZ (covered truck or rail) and meeting transportation requirements." *Id.* BRZ asserts that because the washed material has significant value, "all parties are incentivized to minimize loss." *Id.*

According to BRZ, the Board's AS 99-3 opinion "contains a detailed analysis of the criteria and the Board's analysis is not affected by this requested amendment." Pet. at 4; *see also id.* at 1 (revising the condition as proposed "does not alter the previous substance or findings" of the Board). BRZ proposes that condition 2(a)(1) be amended to read as follows:

2. [T]he adjusted standard is subject to the following conditions:

- a. The determination described in paragraph one of this order applies only to zinc oxide material:
- (1) That is either to be processed through BRZ's electrolytic zinc refinery in Sauget, St. Clair County, Illinois or that is washed at BRZ's facility and will depart or has departed from BRZ's facility to undergo further processing and (1) is destined for or has arrived at another BRZ facility, (2) is under a legally binding contract with the supplier of the EAF zinc oxide for return to the supplier, or (3) has been acquired by another entity under a legally binding contract for sale from BRZ. *Id.* at 6.

As proposed by BRZ, "[t]he remaining Conditions to AS-99-3 are unchanged." *Id.* at 7.

BRZ argues that its proposed wording for revising the condition is "identical in substance" to the adjusted standard language adopted by the Board in Petition of Horsehead Resource and Development Company, Inc. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 00-2 (Feb. 17, 2000), where the Board held that "zinc oxide treated with HTMR is commodity-like and not a solid waste." Pet. at 7-8. BRZ states that both Horsehead Resource and Development Company, Inc. (Horsehead) and BRZ were handling "zinc oxide partially reclaimed by HTMR" except that while BRZ sought to have the material "declassified as an *input* to its process," Horsehead sought to have it "declassified as an *output* of its production process." *Id.* at 8 (emphasis in original).

BRZ notes that the Board granted the adjusted standard to Horsehead on the condition that when the material departed Horsehead's Chicago facility, it must (1) be destined for another Horsehead facility, (2) be under a legally binding contract for sale to another entity, or (3) have been acquired by another entity under a legally binding contract for sale. Pet. at 8. This condition, according to BRZ:

would ensure that the initially reclaimed product be destined for further reclamation of an end product. Similarly, BRZ seeks the flexibility to have the washed EAF zinc oxide leave its facility. BRZ requests that the Board revise Condition 2.a (1) of its adjusted standard to allow for the output of EAF zinc oxide (after it is washed) from its facility. *Id.*

BRZ maintains that without the amendment, "BRZ's facility will remain shuttered." Pet. at 5.

### **IEPA's Recommendation**

IEPA observes that BRZ's petition seeks "an amendment to an existing Adjusted Standard instead of an Adjusted Standard itself." Rec. at 3. Subject to several comments, IEPA recommends that the Board grant BRZ's "Petition to amend its currently existing Adjusted Standard." *Id.* at 1, 3.

“[T]o ensure that the EAF Zinc Oxide material is not ‘speculatively accumulated’ at intermediate storage facilities or suppliers should the market for this material weaken,” IEPA suggests different language than that proposed by BRZ for revised condition 2(a)(1). Rec. at 2. Specifically, highlighting its alternative language, IEPA proposes that the AS 99-3 determination would apply to EAF zinc oxide:

that is either to be processed through BRZ’s electrolytic zinc refinery in Sauget, St. Clair County, Illinois or that is washed at BRZ’s facility and will depart or has departed from BRZ’s facility to undergo further refining and (1) is destined for or has arrived at another BRZ facility that is capable of refining that material, (2) is under a legally binding contract with the supplier of the EAF zinc oxide for return to the supplier that is capable of refining that material, or (3) has been acquired by another entity that is capable of refining that material under a legally binding contract for sale from BRZ. *Id.* at 2-3 (underscoring by IEPA).

IEPA notes that the “level of justification necessary for the requested Adjusted Standard is provided at 35 Ill. Adm. Code 720.131(c) and was found to be met by the Board in AS 99-3.” Rec. at 4. IEPA maintains that “the only substantive change” to the AS 99-3 adjusted standard “concerns the location at which the final steps of the reclaiming process may occur.” Rec. at 3. IEPA recommends that BRZ “include in its Petition an economic benefit analysis for the service they provide by washing the EAF Zinc Oxide material” in order to “bolster BRZ’s claim that further reclamation is occurring.” *Id.* According to IEPA:

That economic benefit would entail either what a company pays BRZ to wash the EAF Zinc Oxide material before returning it or would entail the increase in value of the EAF Zinc Oxide material between their purchase price and the price they can sell the EAF Zinc Oxide material for. *Id.*

IEPA concludes that “the proposed amendment to Condition 2.a (1) of the existing Adjusted Standard is identical to the Condition granted by the Board in *In Re* Horsehead Resource and Development Company, Inc., AS 00-2, February 17, 2000.” Rec. at 3.

### **BRZ’s Response to IEPA’s Recommendation**

BRZ responds that because IEPA recommends granting BRZ’s request and acknowledges that BRZ’s proposed language is identical to that adopted in Horsehead, the Board should accept IEPA’s recommendation and grant BRZ’s petition “without change.” Resp. at 1; *see also* Mot. Exp. at 1-2 (IEPA’s “two suggestions . . . did not affect the Agency recommendation to grant BRZ’s Petition.”). BRZ provides the IEPA-requested “limited economic benefit analysis” of washing EAF zinc oxide, the substance of which is set forth above in the Board’s findings of fact. Resp. at 1. However, BRZ opposes IEPA’s suggested language changes to condition 2(a)(1). *Id.* at 2.

According to BRZ, IEPA’s language “precludes BRZ from selling washed material to any broker or middleman because Illinois EPA would require any such entity be ‘capable of refining that material.’” Resp. at 2. BRZ explains:

In many cases, the supplier of the zinc oxide will be the producer of that oxide. That producer/supplier will compensate BRZ for washing the oxide so that it can sell the washed product to a “refiner.” As such, it is critical that BRZ have the right to wash the oxide for a “broker” or “middleman,” as opposed to only for refiners. *Id.*

BRZ asserts that IEPA, “without discussion,” also changed BRZ’s proposed use of the word “processing” EAF zinc oxide to “refining.” Resp. at 4, n.1. BRZ is concerned that IEPA’s amendment may “unnecessarily, and likely unintentionally, limit the final product made from the washed EAF zinc oxide.” *Id.* According to BRZ, the term “refine” has “specific meaning in the industry,” explaining that “[a] third party may purchase EAF zinc oxide and either refine it to zinc metal, or may further process it to produce other final commercial products such as zinc sulfate.” *Id.*, citing Resp. Aff. at 1, n.1.

BRZ maintains that IEPA’s concerns over “speculative accumulation” are addressed by the economic benefit analysis the company provides. Resp. at 2. BRZ argues that it is “contrary to principles of business and economics” to suggest that an entity will pay BRZ over \$100 per ton to wash EAF zinc oxide and then “allow the washed, valuable material to simply accumulate when its market value today is in excess of \$800 per ton.” *Id.*, citing Resp. Aff. at 2. BRZ further asserts that IEPA provides neither factual support for its concern nor examples of speculative accumulation suggesting “that the concern may even occur.” Resp. at 2. BRZ adds that it is unaware of any such accumulation in the industry of crude or washed zinc oxide derived from EAF dust through HTMR processing. *Id.*, citing Resp. Aff. at 2.

Moreover, BRZ continues, the Board addressed IEPA’s concern in Horsehead, and “BRZ’s proposed language is *exactly* the same as the language used by the Board in *In Re Horsehead*.” Resp. at 3 (emphasis in original). BRZ asserts that its proposed language for condition 2(a)(1) already addresses IEPA’s concern “by requiring contracts with any third party accepting the washed material and requiring further processing.” *Id.* According to BRZ, its proposed revision to condition 2(a)(1) “uses the language from the Horsehead opinion” and specifically states:

that the washed EAF zinc oxide will depart BRZ’s facility “*to undergo further processing* and . . . (2) is *under a legally binding contract* with the supplier of the EAF zinc oxide for return to the supplier or (3) has been acquired by another entity *under a legally binding contract*.” *Id.* (emphasis in original).

BRZ argues that its proposed language ensures that the washed EAF zinc oxide would be “destined to undergo processing for further recovery of an end product at either BRZ’s facility or another entity’s facility.” *Id.* at 4.

### **DISCUSSION**

Based on the 720.131(c) factors (35 Ill. Adm. Code 720.131(c)), the Board found in AS 99-3 that the EAF zinc oxide at issue is commodity-like and therefore not a solid waste. In

reaching that conclusion, the Board provided a detailed legal analysis under Section 720.131(c). *See* Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3, slip op. at 4-6 (May 6, 1999); Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3, slip op. at 9-18 (Apr. 15, 1999). The Board will highlight that analysis below and, as warranted, render additional legal conclusions to address BRZ's petition to amend condition 2(a)(1) of the existing AS 99-3 adjusted standard.

### **RCRA Hazardous Waste**

The status of materials as "solid wastes" is significant because under the laws and regulations that Congress and the United States Environmental Protection Agency (USEPA) have established, only those materials that are "solid wastes" can be regulated as "hazardous wastes" under RCRA. Those laws and regulations impose various requirements on persons who generate, treat, store, dispose, recycle, or transport hazardous waste. *See* 35 Ill. Adm. Code 722-726, 728. Materials that are not solid wastes are not subject to Illinois' hazardous waste regulations.

Generally, a solid waste is any discarded material. *See* 35 Ill. Adm. Code 721.102. A solid waste is a hazardous waste if it exhibits a "characteristic" of hazardous waste (*i.e.*, it is toxic, corrosive, ignitable, or reactive) or if it is "listed" as hazardous waste (*e.g.*, it comes from a specific type of process, such as electroplating). *See* 35 Ill. Adm. Code 721.103, 721, Subparts C and D.

A material may be considered "discarded" by being "reclaimed." A "listed sludge" being "reclaimed" is a solid waste. EAF zinc oxide is considered a "listed sludge." EAF dust, from which EAF zinc oxide is recovered, is a "sludge" because it is generated from an air pollution control facility. EAF dust is "listed" because it is listed as a hazardous waste from a specific source under 35 Ill. Adm. Code 721.132 (listing emission control dust/sludge from the primary production of steel in electric furnaces as hazardous waste K061). While this listing applies to EAF dust rather than EAF zinc oxide, a material derived from the treatment of a listed hazardous waste is itself the listed hazardous waste. *See* 35 Ill. Adm. Code 720.110, 721.102(a)(1), (2), (c)(3), 721.103(c)(2)(A), (d)(2), 721.Appendix Z.

EAF dust that is processed by HTMR into zinc oxide material is being "reclaimed." EAF zinc oxide that is washed in a solution of water and soda ash to remove contaminants (inorganic salts) is being "reclaimed." *See* 35 Ill. Adm. Code 721.101(c)(4). Because EAF zinc oxide is a listed sludge that is recycled by being reclaimed, it is a solid waste. Generally, a waste being reclaimed remains a waste until reclamation is completed. *See* 50 Fed. Reg. 614, 620, 633-634, 655 (Jan. 4, 1985). However, Section 720.131(c) of the Board regulations (35 Ill. Adm. Code 720.131(c)) provides an exception to this principle for material that is initially reclaimed, but that requires further reclaiming before recovery is completed.

**Section 720.131(c)**

Section 720.131(c) establishes standards and criteria for the Board to use in determining whether certain materials are not solid wastes. Section 720.131(c) reads:

The Board will determine that those materials that have been reclaimed but must be reclaimed further before recovery is completed are not solid wastes if, after initial reclamation, the resulting material is commodity-like (even though it is not yet a commercial product, and has to be reclaimed further). This determination will be based on the following criteria:

- 1) The degree of processing the material has undergone and the degree of further processing that is required;
- 2) The value of the material after it has been reclaimed;
- 3) The degree to which the reclaimed material is like an analogous raw material;
- 4) The extent to which an end market for the reclaimed material is guaranteed;
- 5) The extent to which the reclaimed material is handled to minimize loss; and
- 6) Other relevant factors. 35 Ill. Adm. Code 720.131(c).

In discussing the federal counterpart to Section 720.131(c), USEPA explains that the provision is designed to address those situations in which “the initial reclamation step is so substantial that the resulting material is more commodity-like than waste-like even though no end-product has been recovered.” 50 Fed. Reg. 614, 655 (Jan. 4, 1985). EAF dust that has been processed in an HTMR unit has been initially but not fully reclaimed.

The Board agrees with BRZ and IEPA that the Board’s rulings on the Section 720.131(c) factors in AS 99-3 are not altered by the requested amendment. After assessing those factors in 1999, the Board determined that the EAF zinc oxide at issue is commodity-like and accordingly not a solid waste. The Board’s determination, however, applied only to EAF zinc oxide to be processed through BRZ’s electrolytic zinc refinery in Sauget. With its pending modification to the AS 99-3 adjusted standard, BRZ wants to be able, after washing EAF zinc oxide received at the Sauget facility, to sell the washed material to third parties or return the washed material to suppliers. Without the requested modification, washed material that does not undergo BRZ’s electrolytic zinc refining process at Sauget does not qualify for this relief from Illinois hazardous waste regulation.

USEPA states that “the more substantial the initial processing, the more likely the resulting material is to be commodity-like.” 50 Fed. Reg. 614, 655 (Jan. 4, 1985). HTMR, which

is the initial processing, is a physical and chemical process performed in equipment such as a rotary kiln. HTMR processing of EAF dust can more than double the levels of zinc in EAF dust. Whether the “further processing that is required” is washing followed by refining into zinc metal or washing followed by processing into a different end product such as animal feed, the HTMR processing is substantial, both in terms of the process itself and its effect on EAF dust. *See* 35 Ill. Adm. Code 720.131(c)(1).

USEPA states that “the more valuable a material is after initial processing, the more likely it is to be commodity-like.” 50 Fed. Reg. 614, 655 (Jan. 4, 1985). Once EAF dust has been through the HTMR process, the value of the resulting secondary zinc oxide material approaches the value of mined zinc sulfide concentrates. From 1999 through 2005, the EAF zinc oxide received by BRZ contained an average of 61.5% zinc before washing. The price of zinc on the London Metal Exchange (LME) has ranged from \$800 per metric tonne to approximately \$4,000 per metric tonne of zinc during this decade and at present is approximately \$2,200 per metric tonne of zinc. EAF zinc oxide has significant value considering its zinc content and the price of zinc on the LME. *See* 35 Ill. Adm. Code 720.131(c)(2).

According to USEPA, “[i]f the initially-reclaimed material can substitute for a virgin material, for instance as a feedstock to a primary process, it is more likely to be commoditylike.” 50 Fed. Reg. 614, 655 (Jan. 4, 1985). EAF zinc oxide is very similar to and can be substituted for mined zinc sulfide concentrates. *See* 35 Ill. Adm. Code 720.131(c)(3).

USEPA states that if petitioner can show that there is “an existing and guaranteed end market for the initially-reclaimed material (for instance, value, traditional usage or contractual arrangements), the material is more likely to be commodity-like.” 50 Fed. Reg. 614, 655 (Jan. 4, 1985). Generally, the EAF zinc oxide received by BRZ will be taken back by the supplier after washing, which BRZ will perform for a fee. European companies wash similar zinc oxide material and charge 70 to 90 Euros per metric tonne of oxide. BRZ intends to charge a similar washing price, anticipated to be over \$100 per ton. European zinc smelters purchase washed zinc oxide from companies that perform a washing process similar to BRZ’s. A Tennessee zinc smelter currently purchases some 15,000 tons of washed zinc oxide each year from European sources.

BRZ has a contract in place with Steel Dust Recycling. Steel Dust Recycling plans to deliver its EAF zinc oxide to BRZ for washing, after which Steel Dust Recycling would retrieve the washed material to sell it to a zinc smelter. Each month, Steel Dust Recycling expects to deliver approximately 1,500 tons of EAF zinc oxide to BRZ for washing. BRZ is also in preliminary discussions with PIZO for a similar arrangement to start in 2009. In addition, BRZ anticipates receiving larger volumes of EAF zinc oxide for washing in 2010 from an affiliated company, Zinc and Iron Recycling of Ohio, Inc. It is expected that approximately 7,000 tons per month of EAF zinc oxide would be produced by Zinc and Iron Recycling of Ohio, Inc. to be washed by BRZ and then returned, sold in the market, or when there is an adequate supply, refined into zinc metal by BRZ at the Sauget facility.

The market for washed EAF zinc oxide includes refining into zinc metal and using the material to make high purity zinc sulfate and high purity zinc oxide, ultimately to produce

fertilizer, animal feed, paints, ceramics, textiles, chemicals, and rubber products. In 2004, an estimated 1,000,000 tonnes of zinc oxide were used worldwide. The value of the washed oxide on the market is similar to that of mined zinc concentrate. Mr. George Obeldobel, President and Chief Executive Officer of BRZ in Sauget, stated that he is “not aware of any instances of speculative accumulation of similar washed zinc oxide materials,” adding that “[t]he product is simply too valuable to accumulate.” Resp. Aff. at 2. The Board finds that there is an end market for EAF zinc oxide. *See* 35 Ill. Adm. Code 720.131(c)(4).

USEPA states that the “more carefully a material is handled, the more it is commoditylike.” 50 Fed. Reg. 614, 655 (Jan. 4, 1985). BRZ will use the same handling methods for incoming EAF zinc oxide that it has used in the past, which includes unloading through a pneumatic system to silos equipped with HEPA filters, as well as storing and loading the wet filter cake in a covered building. The washed material leaving the Sauget facility would be transported by covered truck or rail. As BRZ asserts, because both the unwashed and the washed EAF zinc oxide have significant market value, all parties have an incentive to minimize any loss of material. Am. Pet. at 5; Am. Pet. Aff. at 6. EAF zinc oxide will be handled to minimize loss. *See* 35 Ill. Adm. Code 720.131(c)(5).

### Conditions

As BRZ requests, the Board amends condition 2(a)(1) of BRZ’s AS 99-3 adjusted standard to encompass specified off-site distribution of EAF zinc oxide after washing at the Sauget facility. However, despite the claims in the pleadings, the Board finds that there is a critical difference between BRZ’s proposed amendatory language and the language adopted by the Board in Horsehead.

The operative condition from Horsehead limits the adjusted standard’s scope to the material:

- (1) that has been subject to Horsehead’s HTMR process at its facility in Chicago, Illinois and that will undergo further processing for the eventual recovery of an end product;
- (2) that is in Illinois; and
- (3) that will depart or has departed from Horsehead’s Chicago facility and that:
  - (a) is destined for or has arrived at another Horsehead facility;
  - (b) is under a legally binding contract for sale from Horsehead to another entity; or
  - (c) has been acquired by another entity under a legally binding contract for sale from Horsehead[.] Petition of Horsehead Resource and Development Company, Inc. for an Adjusted

Standard Under 35 Ill. Adm. Code 720.131(c), AS 00-2, slip op. at 16-17 (Feb. 17, 2000).

In Horsehead, the petitioner seeking the Section 720.131(c) determination was the entity performing the HTMR processing of EAF dust, creating for off-site distribution a “crude zinc oxide” or CZO. Horsehead described the CZO as “virtually identical” to the EAF zinc oxide received and processed by BRZ. Petition of Horsehead Resource and Development Company, Inc. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 00-2, slip op. at 13 (Feb. 17, 2000). In adopting the conditions of the Horsehead adjusted standard, the Board stated that it:

wants to ensure that the adjusted standard only applies to CZO that is destined to undergo processing for recovery of an end product at either another Horsehead facility or another entity’s facility. In addition, the Board also wants to ensure that Horsehead will not accumulate CZO at its Chicago facility. Section 720.131(c) of the Board’s rules only applies to situations in which initial reclamation has taken place and further reclamation must take place in order to recover an end product. Petition of Horsehead Resource and Development Company, Inc. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 00-2, slip op. at 15 (Feb. 17, 2000).

BRZ observes that the Board in Horsehead “solved the concern about accumulation of material by adding a condition to Horsehead’s adjusted standard requiring that the material ‘will undergo further processing for the eventual recovery of an end product’ and requiring legally binding contracts with third parties.” Resp. at 3. BRZ also states that the washed EAF zinc oxide “would be destined to undergo processing for further recovery of an end product at either BRZ’s facility or another entity’s facility.” Pet. at 3; *see also id.* at 5 (BRZ “will enter into contracts with its suppliers or third party refiners to ensure the final reclaiming occurs”). Further, BRZ proposes that it be subject to “the same limitations as the Board imposed on Horsehead to ensure that further reclamation occurs.” *Id.* at 8.

BRZ’s proposed amendment, however, does not include the Horsehead language requiring that the material “*will undergo further processing for the eventual recovery of an end product.*” Petition of Horsehead Resource and Development Company, Inc. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 00-2, slip op. at 16 (Feb. 17, 2000) (emphasis added). This Horsehead language is added here (¶ 2(a)(1)(ii)(B)), which helps to address IEPA’s concerns over the washed EAF zinc oxide being “speculatively accumulated,” without raising BRZ’s concerns about unduly restricting the further processing to “refining” or the recipients to those “capable of refining that material.”

The Board notes, however, that in Horsehead, the “further processing” and “end products” were more specifically described in the record and limited (*e.g.*, zinc metal refining, animal feed micronutrient production), and based on existing contracts with identified processors. *See* Petition of Horsehead Resource and Development Company, Inc. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 00-2, slip op. at 7-8 (Feb. 17, 2000).

Horsehead also represented to the Board that “CZO is not used for fertilizer.” Horsehead AS 00-2 Petition at 12-13 (Sept. 10, 1999).

Here, in contrast, besides refining, BRZ refers to numerous examples of possible end products, including fertilizer, and these products could result from any variety of unknown processors. The one current washing contract for BRZ is with Steel Dust Recycling, which is expected to sell the washed material for refining, as is PIZO under a pending arrangement. In this case, the Board finds that references in the adjusted standard language to “further processing” and “an end product,” without more, are too vague.

When describing markets for washed EAF zinc oxide other than “refin[ing] it to zinc metal” (Resp. Aff. at 1, n.1), BRZ states:

[T]he market for washed EAF zinc oxide is broader than only zinc metal. Washed EAF zinc oxide can also be used to make high purity zinc sulfate, which is used in products such as fertilizer and animal feed, and to produce high purity zinc oxide, which can be used in the composition of certain paints and ceramics. Am. Pet. Aff. at 2.

BRZ therefore “does not want to limit its customers to only processors of zinc metal, given that other beneficial markets do exist for the washed zinc oxide.” *Id.*

Given the comparatively open-ended nature of BRZ’s request in the context of this record, the Board finds it necessary to craft additional language for this order to ensure that washed EAF zinc oxide leaving the Sauget facility is either (1) refined or (2) further processed to make high purity zinc sulfate or high purity zinc oxide for the eventual recovery of an end product. The Board therefore adds these concepts, based on BRZ’s descriptions, to the Horsehead language used in condition 2(a)(1)(ii).

Further, the health and environmental concerns with recycling hazardous secondary materials to make zinc fertilizer products, particularly K061-derived zinc fertilizers, are well documented. *See* 67 Fed. Reg. 48393 (July 24, 2002). The Board adopts additional adjusted standard language (§ 2(a)(1)(ii)(B)) to address the prospect of washed EAF zinc oxide from BRZ being used to manufacture fertilizer. Specifically, unless RCRA hazardous waste regulations are met, the Board requires compliance with its detailed conditions for excluding from the “solid waste” definition those hazardous secondary materials used to make zinc fertilizers, including the Board’s product specifications for contaminants in zinc fertilizers. *See* 35 Ill. Adm. Code 721.104(a)(20), (21). Other states may have similar conditional exclusions. The Illinois provisions are “identical-in-substance” to corresponding USEPA regulations, 40 C.F.R. §§ 261.4(a)(20), (21), which the Board likewise cross-references. *See* RCRA Subtitle C Update, USEPA Amendments (July 1, 2002 through December 31, 2002), R03-18 (June 5, 2003).

Additionally, by way of footnote, BRZ states that “another BRZ facility” as used in its proposed language, “may include facilities owned by BRZ’s parent, ZincOx.” Pet. at 6, n.4. BRZ does not, however, propose referencing its parent company in the adjusted standard language. In context, BRZ’s proposed language refers to washed material that “is destined for or

has arrived at *another BRZ facility.*” Pet. at 6 (emphasis added). The Horsehead order contains similar language (“another Horsehead facility”), but the Horsehead company had a facility in addition to the one in Chicago at which it HTMR-processed EAF dust. See Petition of Horsehead Resource and Development Company, Inc. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 00-2, slip op. at 7, 12 (Feb. 17, 2000) (Horsehead’s Palmerton, Pennsylvania facility). This record contains no evidence that BRZ itself owns or operates any facility other than the Sauget refinery. For clarity, the Board adds language to the order addressing BRZ’s footnote reference to its parent company (§ 2(a)(1)(i)(A)).

The Board also finds that the addition of two new conditions is warranted based on the expanded scope of this adjusted standard resulting from BRZ’s requested amendment to condition 2(a)(1). When the Board granted the AS 99-3 adjusted standard to BRZ, the Board made plain that its determination “applies only to EAF zinc oxide to be processed through BRZ’s electrolytic zinc refinery in Sauget, Illinois.” Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 99-3, slip op. at 17 (Apr. 15, 1999). To avoid any potential ambiguity, the Board emphasized that “BRZ cannot accept the material under the adjusted standard for a different use or for processing at a different facility.” *Id.* As discussed above, BRZ now seeks to do just that.

With today’s amendment, for the first time under this adjusted standard, relief from Illinois’ hazardous waste regulations would not be limited to EAF zinc oxide that will undergo electrolytic zinc refining by BRZ at the Sauget facility. The departing washed material’s specific destinations and specific final processing steps are not spelled out in the language of the adjusted standard. After washing at Sauget, EAF zinc oxide may now leave the facility for further processing by others in ways other than refining, without being subject to RCRA hazardous waste regulation in Illinois. The Board finds it necessary, as it did in Horsehead, to impose a condition requiring the maintenance of records identifying the destinations of departing material. Accordingly, along with the existing condition requiring BRZ to maintain records identifying the suppliers of all EAF zinc oxide that BRZ accepts under this adjusted standard, a new condition is added (§ 2(b)(2)) requiring that BRZ maintain records identifying the destinations of all washed EAF zinc oxide that has departed from BRZ’s Sauget facility.

For EAF zinc oxide to be refined into zinc metal at the Sauget refinery, washing with a solution of water and soda ash to reduce levels of inorganic salts has been in BRZ’s economic self-interest. BRZ’s refining equipment could otherwise corrode at great expense. Now, there will be washed EAF zinc oxide that never enters BRZ’s electrolytic zinc refining circuit. BRZ’s washing will be performed for “payment, in cash or other valuable assets,” though that is not the case if the supplier of EAF zinc oxide is “another BRZ facility or a related entity or affiliate.” Resp. Aff. at 1. In the next few years, BRZ expects large volumes of EAF zinc oxide to arrive for washing from its sister company, Zinc and Iron Recycling of Ohio, Inc.

IEPA initially expressed concerns over what “economic benefit” washing adds to the EAF zinc oxide, requesting further information to “bolster BRZ’s claim that further reclamation is occurring.” Rec. at 3. BRZ has provided information responsive to those concerns and the Board does not question the legitimacy or efficacy of BRZ’s washing process. The analytical data from BRZ’s washing plant spanning 1999-2005 show an average removal estimate from

washing of 92.1% for chloride, 48.3% for fluoride, 85.9% for sodium, and 91.4% for potassium. Washing also further concentrated average zinc levels from 61.5% in pre-wash EAF zinc oxide to 67.1 % in post-wash EAF zinc oxide. Pet. Aff. at 3-4. Nevertheless, with the amendment to condition 2(a)(1), the washing step itself takes on a new significance for the scope of this adjusted standard.

The Board finds it necessary to impose a new condition requiring BRZ to perform sampling on EAF zinc oxide before and after washing, specifically to document washing's effectiveness in reducing inorganic salt levels and concentrating zinc. BRZ has been carrying out this testing for years and plans to continue doing so. Pet. Aff. at 3-4; Am. Pet. Aff. at 3-4. The language of the new condition (renumbered ¶ 2(d)) is based on BRZ's description of its past and planned sampling protocol (Am. Pet. Aff. at 4), as well as the adjusted standard's current sampling condition (¶ 2(c)). On monthly composite samples of unwashed EAF zinc oxide, BRZ has performed sampling "to determine the quality of material before washing." Am. Pet. Aff. at 4. BRZ states that it will composite samples from each batch of EAF zinc oxide after the material is washed on a supplier-specific basis "to ensure the quality of the washed product," testing for percentages of zinc, chloride, fluoride, sodium, and potassium remaining in the washed EAF zinc oxide. *Id.* BRZ plans to analyze the composite samples on a frequency required by the needs of the supplier or by the variability in washing efficiencies, but no less than once each month. *Id.*

As reflected by its approach to this sampling, BRZ does not presently plan to commingle different suppliers' EAF zinc oxide received for washing. However, if the supply of EAF zinc oxide to be washed becomes large enough and the Sauget facility is expanded, BRZ believes it may then commingle materials of similar quality from different suppliers, with each supplier's consent. Am. Pet. Aff. at 4-5. BRZ expansion may occur as early as 2009. Am. Pet. at 5. The Board wishes to build sufficient flexibility into this condition now, avoiding the need for BRZ to return for an amendment to address this circumstance.

Because of the acknowledged potential for commingling, the Board does not mandate supplier-specific sampling for this new condition.<sup>5</sup> Rather, each batch from the EAF zinc oxide washing plant must be sampled by BRZ before and after the material is washed, whether the batch consists of material from one supplier or more than one. BRZ must test unwashed and washed composite samples separately at least once per month for percentages by weight of zinc, chloride, fluoride, sodium, and potassium. Again, this new condition is designed to provide comparison data that will capture how well the washing is working. *See* Petition of Horsehead Resource and Development Company, Inc. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 00-2, slip op. at 17 (Feb. 17, 2000) (condition requiring post-process sampling).

Renumbered condition 2(e) correspondingly adds to BRZ's existing record-keeping requirements, ensuring that IEPA can inspect records identifying the off-site destinations of washed EAF zinc oxide and documenting the pre- and post-wash analytical results described above. Finally, the updated reference to USEPA SW 846 test methods, used in AS 06-4, is now

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<sup>5</sup> Supplier-specific sampling remains in existing condition 2(c).

provided in conditions 2(c) and (d). See Petition of Big River Zinc Corp. for an Adjusted Standard Under 35 Ill. Adm. Code 720.131(c), AS 06-4, slip op. at 25 (Nov. 16, 1999).

The Board finds that the language used in the modified and new conditions of the adjusted standard, set forth in the order below, is “necessary to accomplish the purposes of this Act.” 415 ILCS 5/28.1(a) (2006).

### **CONCLUSION**

As requested by BRZ, the Board modifies the existing AS 99-3 adjusted standard to allow BRZ, after washing EAF zinc oxide received at the Sauget zinc refinery, to then sell the washed material to third parties or return the washed material to suppliers. The modification will enable BRZ to re-open its Sauget facility, which in 2006 closed its process operations. Consistent with the Board’s decision in Horsehead, for the washed material departing the Sauget facility to fall within the scope of the adjusted standard and its relief from RCRA hazardous waste regulation in Illinois, the material must, among other requirements, undergo further processing for the eventual recovery of an end product. As necessitated by the breadth of BRZ’s request, the Board makes additional changes to the adjusted standard’s conditions, all as described above.

This opinion constitutes the Board’s findings of fact and conclusions of law.

### **ORDER**

1. The Board finds that zinc oxide material produced by subjecting electric arc furnace (EAF) dust from the primary production of steel (K061 under 35 Ill. Adm. Code 721.132) to a high temperature metals recovery (HTMR) process is not a solid waste and grants Big River Zinc Corporation (BRZ) an adjusted standard under 35 Ill. Adm. Code 720.131(c).
2. The adjusted standard is subject to the following conditions:
  - a. The determination described in paragraph one of this order applies only to zinc oxide material:
    - (1) that will undergo BRZ’s electrolytic zinc refining process at its facility in Sauget, St. Clair County, Illinois; or that will be washed at BRZ’s Sauget facility and:
      - i. will depart or has departed from BRZ’s Sauget facility after washing to undergo further processing and:
        - (A) is destined for or has arrived at another BRZ facility, including any facility owned by BRZ’s parent company, ZincOx Resources, plc;

- (B) is under a legally binding contract with the supplier of the zinc oxide material for return to the supplier; or
  - (C) has been acquired by another entity under a legally binding contract for sale from BRZ; and
- ii. will, after washing at and departure from BRZ's Sauget facility, undergo either:
  - (A) refining; or
  - (B) further processing to make high purity zinc sulfate or high purity zinc oxide for the eventual recovery of an end product; additionally, if the end product is fertilizer, applicable federal or state hazardous waste regulations or zinc fertilizer conditional exclusions must be met (*e.g.*, 40 C.F.R. §§ 261.4(a)(20), (21); 35 Ill. Adm. Code 721.104(a)(20), (21));
- (2) that is in Illinois; and
- (3) that has arrived at BRZ's Sauget, St. Clair County, Illinois facility or that is under a legally binding contract for sale to BRZ;
- b. BRZ must maintain records identifying:
  - (1) the suppliers of all zinc oxide material that BRZ accepts under this adjusted standard; and
  - (2) the destinations of all washed zinc oxide material that has departed from BRZ's Sauget facility;
- c. Each month, BRZ must take representative samples of the zinc oxide material that it accepts from each supplier and composite the samples on a supplier-specific basis. BRZ must test each composite sample on a monthly basis to determine the percentage by weight of zinc, lead, iron, total gangue materials (silica plus calcium plus magnesium), and chloride in the sample. Each sample must be collected and tested in accordance with generally accepted practices, such as those specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," USEPA Publication number SW-846 (Third Edition, Final Update IIIA, April 1998), as amended by Updates I, IIA, III, and IIIA (Document No. 955-001-00000-1);

- d. BRZ must take representative samples of each batch of zinc oxide material before and after washing and separately composite the samples of unwashed and washed material. BRZ must test each composite sample on a monthly basis to determine the percentage by weight of zinc, chloride, fluoride, sodium, and potassium. Each sample must be collected and tested in accordance with generally accepted practices, such as those specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," USEPA Publication number SW-846 (Third Edition, Final Update IIIA, April 1998), as amended by Updates I, IIA, III, and IIIA (Document No. 955-001-00000-1); and
- e. BRZ must maintain records of the information required in paragraphs 2(b), 2(c), and 2(d) of this order for a period of three years and must make them available for the Illinois Environmental Protection Agency (IEPA) to inspect and copy at any reasonable time during normal business hours upon IEPA's request.

IT IS SO ORDERED.

Section 41(a) of the Environmental Protection Act provides that final Board orders may be appealed directly to the Illinois Appellate Court within 35 days after the Board serves the order. 415 ILCS 5/41(a) (2006); *see also* 35 Ill. Adm. Code 101.300(d)(2), 101.906, 102.706. Illinois Supreme Court Rule 335 establishes filing requirements that apply when the Illinois Appellate Court, by statute, directly reviews administrative orders. 172 Ill. 2d R. 335. The Board's procedural rules provide that motions for the Board to reconsider or modify its final orders may be filed with the Board within 35 days after the order is received. 35 Ill. Adm. Code 101.520; *see also* 35 Ill. Adm. Code 101.902, 102.700, 102.702.

I, John T. Therriault, Assistant Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above opinion and order on September 4, 2008, by a vote of 4-0.



John T. Therriault, Assistant, Clerk  
Illinois Pollution Control Board