ILLINOIS POLLUTION CONTROL BOARD
April 4, 1974

BENJAMIN HARRIS & COMPANY	)	
v.	)	PCB 74-21
ENVIRONMENTAL PROTECTION AGENCY	)	

ME. KENNETH ROY GAINES, appeared on behalf of Benjamin Harris & Company
MRS. KATHRYN S. NESBURG and MR. PETER ORLINSKY, appeared on behalf of the Environmental Protection Agency

OPINION AND ORDER OF THE BOARD (by Mr. Dumelle):

Benjamin Harris & Company (Harris) filed a Petition for Variance on January 16, 1974 which they amended on February 28, 1974. The Environmental Protection Agency (Agency) filed a Recommendation on February 28, 1974. On March 1, 1974 a hearing was held at which time the parties submitted a detailed Stipulation. On March 8, 1974 Harris filed a Post Hearing Brief.

Harris owns and operates a brass and bronze foundry located at 11th and State Street in the City of Chicago Heights, Cook County, Illinois. The foundry is equipped with one 4-ton cupola, two 1-ton crucible furnaces, one 10-ton rotary furnace, and 4 brass and bronze reverberatory furnaces. The four reverberatory furnaces are equipped with a baghouse. The cupola and two crucibles are the subject of the present variance petition. The rotary furnace, while treated in a prior variance request, (PCB 73-215) is not included in the request for this extension of that variance.

This case involves an application by Benjamin Harris & Company for an extension of a variance granted to Harris by the Board on August 30, 1973 (PCB 73-215). The prior variance, from Rules 2-2.54 and 3-3.111 of the Rules and Regulations Governing the Control of Air Pollution (Air Rules) was granted, subject to several conditions, in order to allow Harris to operate their cupola, rotary furnace, and two crucible furnaces in violation of those Rules. The conditions required Harris to complete

phases one and two of their six phase emission abatement program for the above equipment, and to perform testing necessary to determine the parameters needed to size the abatement equipment. The variance was granted until February 4, 1974. Harris now seeks, in the instant case, a 9-1/2 month variance from Rule 203 of the Air Regulations in order to operate their cupola and two crucible furnaces while completing the remaining phases of their emission reduction program. The Agency recommended a denial of the petition for variance or in the alternative a grant subject to certain conditions.

The hearing record in the instant case consists of a stipulation of facts agreed to by Harris and the Agency, including the record in the previous variance case (PCB 73-215).There are two main issues in this case; the need for a variance from Rule 203, and the economic hardship if a variance were not granted.

The particulate emissions of concern to this case are emitted by the cupola and the two crucible furnaces, the rotary furnace not being in use (Harris' Petition, Page 2). During the prior variance period the cupola furnace was operated during two time periods,December 11-17, 1973 and January 24-27, 1974, to perform stack testing while the crucible furnaces were operated "continuously" (Stipulation, Page 3). During the variance period the crucible furnace exhausts were connected to the existing cupola control system which consists of an irrigated cyclone followed by an afterburner followed by a second irrigated cyclone. The rotary furnace was to have been, but has not yet been connected to the existing control system. The new emission control system to be completed during the next 9-1/2 months is a baghouse, with or without the existing cyclones and afterburner, downstream of the manifolded furnaces which will clean the exhausts from the cupola, crucible, and rotary furnaces simultaneously.

A stack test performed by Polytechnic, Inc. on December 17, 1973 (Stipulation, Ex. D-II) downstream of the existing cupola control equipment shows particulate emissions to the atmosphere of 163 lb./hr. These emissions are stipulated to and are indicated as being emitted from the cupola, even though the crucible furnaces were tied into the system at this time and could also have been contributing particulates. The cupola has a process weight rate of 8333 lb./hr. and the resulting allowable emissions are 5.35 lb./hr. (Stipulation, Para. 10), considerably less than those occurring according to the stack test. A particle size analysis performed by Polytechnic during this same test showed that 70% of the particles

emitted by weight will be 4 micrometers or less in diameter with the average diameter being 1 micrometer (Ex. D-II, Table III). It is interesting to note that Harris had estimated emissions from the cupola of 53 to 112 lb./hr. and the Agency 232 lb./hr. during the prior variance hearing, based on both parties use of AP-42 "Compilation of Air Pollution Emission Factors" and AP-58 "Air Pollution Aspects of Brass and Bronze Smelting and Refining Industry" (PCB 73-215, R. 138, 233).

The emissions from the crucible furnaces have not been measured, so the parties estimated them using emission factors, each party coming up with a different answer. Harris estimates the emissions per furnace as 2.0 lbs./hr. during "high zinc" melts based on a process rate of 900 lb./hr. per furnace and some, unknown, collection system efficiency (Stipulation, Page 12). The Agency estimates an emission rate of 5.8 lb./hr. per furnace during high zinc melts, based on the same process weight rate and a control system efficiency of 20% (Stipulation, Page 12). Both parties estimate an emission rate per furnace of 0.2 lb./hr. during "no zinc" melts (Stipulation, Page 12).

The Board has estimated the emissions from the crucible furnaces based on the stack test performed by Polytechnic. This test used in conjunction with the standard emission factors shows a collection efficiency for the existing system of 46%. Applying this efficiency to the emissions from the crucible furnaces, we calculate an estimated emission level of 3.9 lb./hr. per furnace during high zinc melts.

The allowable particulate emissions for the crucible furnaces is also an item of contention. Harris alledges that Rule 203(b) for existing sources if applicable with a total allowable level of 3.8 lb./hr. for the two furnaces (Stipulation, Page 11). The Agency alleges that Harris was not in compliance with Rule 203(b) as of the effective date of the regulation and thus is governed by Rule 203(a) for new sources which sets the limit for the two furnaces together at 2.4 lb./hr (Stipulation, Page 12). The Board finds that the Agency's point of view is a correct one and that, at least during high zinc melts, the crucible furnaces would be in violation of the Air Regulations since together their emissions would be at least 4.0 lb./hr. according to the lowest estimate, which is Harris' (Stipulation, Page 12).

Harris alleges economic hardship as the basis for their variance request. They need the revenue generated by the cupola and crucible furnaces to pay, at the minimum, the costs of their ongoing compliance program and cannot wait the 9-1/2 month period until the control program is complete before operating these furnaces and generating revenue (Harris' Brief, Page 4). Harris had lost a total of $554,000 in fiscal years 1970 through 1972 and had a profit of $75,000 in fiscal 1973 (Stipulation, Page 7). Notwithstanding this profit, Harris' line of credit was withdrawn on

August 31, 1973 and the company was forced to pay off the balance due of $575,000; which necessitated obtaining financing at much higher rates from another bank (Stipulation, Exhibit H). To pay the approximately $100,000 additional cost of the baghouse control system,Harris desires to operate the cupola and crucible furnaces in the interim (Stipulation, Page 7).

The cupola furnace reprocesses slag from the reverberatory furnace in a continuous operation lasting 24 hours a day for 5 days. The process refines the reverberatory slag, having essentially no value, into "black copper", a metallic material having a value of approximately 50 cents per pound (Exhibit H, Para. 3). Since the cupola furnace has not been operated except for the two weeks for testing, the reverberatory slag has been accumulating at a rate of 50 to 100 tons per week. During the two weeks of cupola operation in December, 1973 and January, 1974, Harris processed 993,000 pounds of slag into black copper and made a profit of $34,100 (Ex. H, Para. 4). In addition, in September, 1973 Harris shipped one million pounds of slag to an outside smelter for processing and made a profit of $4,600 on the transaction after paying the outside smelter $37,000 (Ex. H, Para. 7). The slag that had accumulated as of the prior variance hearing in August, 1973 was 7 to 8 million pounds (PCB 73-245, R. 30), which with additions and reprocessing is probably the amount on hand today.

Harris in their petition for variance asks to make fifteen 5-day cupola runs during the 9-1/2 month period. According to the above information, this would net them a profit of between $272,000 and $443,000 by the processing of 8.0 million pounds of slag--essentially all of the material that has accumulated.

The crucible furnaces are used by Harris to produce alloys of varying zinc content, those characterized as "high zinc" having a zinc content of 15% or more. Each run (or heat) takes 2.33 hours and Harris averages 40 high zinc heats per month. It is stipulated that the production of alloys containing no zinc produces negligible emissions (0.2 lbs./hr.) (Stipulation, Para. 11) but as we have concluded previously, during high zinc melts the furnaces are not in compliance. It is estimated by Harris based on 1973 data, that the yearly profit from the production of these high zinc alloys is $90,000. Thus if a variance for the crucible furnaces were granted for a 9-1/2 month period, the profit would be approximately $71,000. If a variance was not granted, the inability to produce these alloys would result in the loss of other business besides the high zinc alloys,according to Harris,since their customers purchase several different alloys from the same producer rather than from several producers (Ex. H, Para. 7).

The above financial information shows that Harris could expect to make a substantial saving in expense if their variance request for the cupola and crucible furnaces was granted; an amount considerably in excess of their additional compliance cost of $100,000.

Because of the excessive particulate emissions from the cupola and because the particulate analysis shows the average particle diameter to be 1 micrometer, the worst size in terms of retention in the lung (Stipulation, Page 9, Ex. D-II, Page 3), it seems to us that the operation of the cupola and crucibles should be limited as much as possible. In particular, the cupola would emit approximately 40 times the particulates as the crucibles but would only generate 3 to 7 times the profit during the 9-1/2 month period. Therefore, a variance granted by the Board on the basis of hardship should allow the full use of the crucible furnaces but only limited use of the cupola. The Board thus limits the cupola runs to six during the 9-1/2 month variance period. This would generate, including the crucible furnaces, a profit of approximately $173,000, an amount 70 percent greater than that required by Harris to complete their compliance program.

The above constitutes the Board's findings of fact and conclusions of law.

ORDER

The Board hereby grants Harris a variance from Rule 203 of the Air Regulations until January 19, 1975 subject to the following conditions:

1. Petitioner may operate its cupola furnace for a maximum of eight five-day runs to enable Petitioner to cover the expenses of the proposed control program.

2. Petitioner shall submit a monthly report to:

   Illinois Environmental Protection Agency
   Division of Air Pollution Control
   Control Program Coordinator
   2200 Churchill Road
   Springfield, Illinois 62706

   The reports shall describe furnace operations by type and quantity of metal processed, progress toward completion of Petitioner's program to achieve compliance, gross and net income due to furnace operation, and expenses incurred pursuant to completion of the program.

3. Petitioner shall modify the control program to include provisions to control emissions during the tapping operation.

4. Petitioner shall not run the rotary furnace during the period of any variance granted in this matter.

5. The crucible furnaces shall be run as much as possible to generate funds to pay for the control equipment. Emissions occurring from the crucible furnaces during the melting and tapping shall be ducted to the existing control equipment and not vented directly to the atmosphere when possible.

6. Within thirty (30) days of the Board Order in this matter, Petitioner shall post a Performance Bond in terms acceptable to the Agency and in an amount of $5,000 to ensure installation of control equipment.

IT IS SO ORDERED.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 4th day of April, 1974 by a vote of 5-0.

Christan L. Moffett

Christan L. Moffett, Clerk
Illinois Pollution Control Board