

December 4, 1998

MEMORANDUM

SUBJECT: Treatment of Aluminum Die Casting Operations for the Purposes of New Source Review Applicability

TO: Addressees

FROM: Thomas C. Curran, Director
Information Transfer and Program Integration Division (MD-12)

The purpose of this memorandum is to provide guidance in making case-by-case determinations of whether die casting plants should be categorized generally as secondary aluminum recovery plants or whether the processing steps within a die casting plant might be considered as a secondary aluminum support facility. This is in response to a request by the North American Die Casting Association (NADCA) for guidance on the issue of whether aluminum die casting facilities are secondary metal production plants under the Prevention of Significant Deterioration (PSD) regulations. Such guidance has bearing on the classification of aluminum die casting facilities as major sources for the reason that secondary metal production plants are subject to a 100-tons-per-year major source threshold rather than the 250-tons-per-year threshold applicable to many other types of sources. This memorandum contains EPA's analysis of the issues raised by NADCA's request.

The EPA agrees with NADCA that aluminum die casting facilities typically need not be considered secondary metal production plants. As a general matter, aluminum die casting facilities do not use the feedstock, do not engage in the elaborate processes, and do not produce the end products that are characteristic of facilities engaged in secondary aluminum recovery.

While information supplied by NADCA indicates that some die casting facilities employ certain process steps similar to those employed by secondary metal production facilities, EPA agrees with NADCA that these process steps are distinguishable in most cases. In exceptional cases, the process steps that cannot be distinguished from secondary metal production meet the criteria for a "nested" support facility that by itself is subject to the 100-tons-per-year major source threshold. Finally, it is possible that a die casting facility could be integrated with a secondary aluminum recovery process to such an extent that the principal products or activities would constitute a secondary metal production plant. The analysis that follows discusses the critical factors that should be evaluated in determining whether a die casting facility satisfies the rather specific and unique qualifications of being a secondary aluminum recovery plant or if certain process steps constitute a "nested" secondary aluminum recovery support facility.

The policies set forth in this document are not judicially reviewable. They do not change existing EPA regulations, are intended solely as guidance, do not represent final agency action, and cannot be relied upon to create rights enforceable by any party. Further, this guidance is not intended to reverse or supersede any case-by-case determination made previously by an EPA Regional Office, State or local permitting authority.

The Regional Offices should send this memorandum to the States within their jurisdiction. Questions concerning specific issues and cases should be directed to the appropriate Regional Office. The Regional Office staff may contact Mr. Dennis Crumpler of the Integrated Implementation Group at (919) 541-0871 if they have any questions. This document is available on the TTN Web at http://www.epa.gov/ttn/nsr/poly_gui.html. Users unfamiliar with this web site may obtain help by calling the TTN help line at (919) 541-5384.

Addressees:

Director, Office of Ecosystem Protection, Region I

Director, Division of Environmental Planning and Protection, Region II

Director, Air Protection Division, Region III

Director, Air, Pesticides, and Toxics Management Division, Region IV

Director, Air and Radiation Division, Region V

Director, Multimedia Planning and Permitting Division, Region VI

Director, Air, RCRA, and Toxics Division, Region VII

Assistant Regional Administrator, Office of Partnership and Regulatory Assistance, Region VIII

Director, Air Division, Region IX

Director, Office of Air, Region X

The EPA's Analysis of Die Casting Operations and Information Supplied by the North American Die Casting Association

Should die casting operations be classified as secondary metal production plants?

Our analysis suggests that die casting operations generally need not be classified as secondary metal production plants. In most cases, the processes and products of the two types of operations are sufficiently distinct to warrant this determination.

The Standard Industrial Classification (SIC) Code Manual provides the starting point for determining which pollutant-emitting activities should be considered as part of the same industrial grouping for the purposes of defining a stationary source. The exact term "secondary metal production plant," which is identified in Section 169 of the Clean Air Act as an industrial source category that is subject to a 100-ton-per-year major source threshold, does not appear in the SIC Code Manual. The SIC Code Manual does list, however, the category "Secondary Metal and Refining of Nonferrous Metals." This category includes sources primarily engaged in recovering nonferrous metals and alloys from new and used scrap and dross or in producing alloys from purchased refined metals.

The SIC Code Manual does not give a detailed technical description of the process that is used in secondary metals recovery. To gain a better description of the secondary aluminum process, we consulted the technical literature, including the McGraw-Hill Encyclopedia of Science and Technology and Compilation of Air Pollution Emission Factors, Fifth edition (AP-42) Section 12.8. From these references, we found that conventional secondary aluminum processing includes the following steps: receiving every conceivable kind of post-consumer scrap and recyclable waste aluminum¹; drying the scrap; shredding or grinding; and burning off organic and other volatile residues such as paint or oil; and sweating and decanting to separate the aluminum from other metals in the scrap. Most secondary aluminum processes use a reverberatory furnace to sweat or decant the scrap, but crucible furnaces can also be used for small, batch operations. After the preliminary separation, the molten aluminum still contains a significant amount of alloyed metals. These metals are removed by smelting while still in the reverberatory furnace. During this part of the process, the molten mixture is "fluxed" with chloride salts and/or chlorine gas to separate undesirable metals ("demagging") and impurities. Fluxing rates are typically in the range of 5-7 percent of the mass of aluminum that is smelted. Hydrogen gas is removed (degassed) by bubbling an inert gas through the melt. After

¹Post-consumer scrap aluminum is any aluminum product or intermediate which has been discarded by consumers after use. Examples would be broken ladders, discarded storm doors and windows, old gutters, empty cans, broken or otherwise unusable auto engine and body parts, home and building siding or inside panels in demolition waste, electrical wire, and demolished mobile home siding and parts. Post-industrial scrap, which includes dross from smelting and refining and any other scraps that are too dirty or too far out of specification to recycle directly back into product manufacturing process, is added to post-consumer scrap for recovery by secondary smelters.

impurities are removed, certain metals or minerals are added to bring product characteristics or quality back to customer specification. The process concludes with a final filtration, followed by casting the recovered aluminum into ingots, block (called billets), bars, and shot.

Die casting involves melting metal and then forcing it with pressure into molds through a series of channels and vents to form aluminum parts and products. To obtain detailed information regarding the die casting process, EPA met with NADCA and some of its members. EPA's Region V staff also obtained additional information during a visit to a die casting facility. From this, it appears that the typical die casting facility uses high quality metal of a specified alloy and purity as feedstock, in the form of ingots or billets, which are brought into the plant at ready-to-cast quality. The feedstock is melted in a furnace (of various types, but most typically a reverberatory furnace). As much as 1 percent by weight of a purifying flux is added to the furnace prior to receiving the charge to control oxidation and to maintain alloy specifications. Once the metal is heated and exposed to air in the furnace, a small amount of molten metal oxidizes to form dross that floats to the surface. The dross is skimmed off or filtered from the molten metal and sold to smelters. The molten aluminum may also be degassed of hydrogen by injecting nitrogen or argon gas into the melt. Trimmings from cast parts, turnings from drilling and milling the castings, and defective castings or quality rejects are recycled to the furnace.

In addition to the use of ingots or billets for feedstock, some die casting facilities purchase returns from other facilities in the die casting industry. Where the composition of the returns can be specified and controlled contractually, die casters can incorporate recyclable alloy grade aluminum into their feed without extensive fluxing or alloying. As a result, such inter-facility transfers of recyclable alloy grade aluminum have no different effect on the die casting facility's operations than the processing of its own in-house returns. In contrast, few die casters generate feedstock from post-consumer scrap or unspecified aluminum scrap from junk dealers because of quality control concerns.

With respect to plant output, die casters produce a marketable aluminum part or product. A facility may temporarily cast aluminum into intermediate forms, such as sows (large round blocks), for the purpose of storing its residual process raw material when equipment is shut down for maintenance or repair. This intermediate is not sold but fed back to the process upon restart.

As the above description illustrates, conventional secondary aluminum recovery plants and die casting facilities differ in several respects. Die casters do not typically produce feedstock from post-consumer or unspecified aluminum scrap. As a result, most die casters do not engage in a number of the cleaning and pretreatment steps typical of secondary aluminum recovery such as pyrolytic cleaning, sweating, and thermal separation. Die casters also use a relatively small amount of flux--less than one percent by weight of the processed aluminum--primarily to remove products of oxidation in the melt rather than to remove large portions of undesirable metals. Finally, die casters produce a marketable aluminum part or product rather than an intermediate form of feedstock such as billets, bars or ingots for sale to or use by mills that perform rolling, extrusion, drawing forging or casting.

As a result of this analysis, EPA will presume that a die casting facility is not engaged in secondary aluminum production as a primary activity as long as two conditions are met: (1) the facility uses feedstock such as ingots, billets, bars, sows or shot (or even as molten metal) that is of a specified alloy and purity or scrap from other industrial facilities for which the quality is specified and guaranteed by contract and for which little fluxing or alloying is required; and (2) the facility does not produce intermediate forms of feedstock (ingots, billets, bars, shot, sows, etc.) for sale or for use by other facilities.

If a plant produces cast aluminum parts but uses post-consumer or unspecified aluminum scrap as a feedstock, it will be a closer question whether the plant's primary activity is secondary aluminum recovery. The quality and origin of the post-consumer or unspecified aluminum scrap, the use of thermal cleaning or separation, as well as the amount used relative to the amount of specified-grade alloy feedstock, will have some bearing on whether secondary aluminum recovery is the primary activity.

Does the die casting facility utilize steps that would be considered secondary aluminum processing as a support facility?

Notwithstanding a determination that a facility's primary activity is not secondary aluminum recovery, the use of any post-consumer or unspecified aluminum scrap would result in a determination that certain operations at a die casting facility should be considered a "nested" secondary aluminum support facility. When determining whether a source contains a nested secondary aluminum support facility, the specific process steps of which would be subject to a 100 tpy major source threshold, a source's end product is not necessarily a determining factor.

The EPA addressed this issue in the context of secondary aluminum recovery at a finishing mill in a July 28, 1989 memorandum concerning Golden Aluminum from William B. Hathaway, Division Director, Air, Toxic and Radiation, EPA Region 6, to Steve Spaw of the Texas Air Control Board. The EPA's position was reaffirmed in subsequent letters of July 20, 1990, from Robert E. Hanneschlager to Jeff Civins and again in a September 3, 1991 letter from William G. Rosenberg to Carol Dinkins. With respect to the Golden Aluminum facility, EPA found that the source, even though it produced a specific end-product other than aluminum ingot or block, also engaged in recovering aluminum from used, scrap aluminum that was collected from outside the facility, with a process that included several classical secondary metal process steps identified above. Those secondary metals process steps were determined to be a nested support activity that was subject to the major source threshold of 100 tons per year specified by Congress in the Clean Air Act.

The EPA will presume that the recycling steps at a die casting facility do not constitute secondary metals production in a support facility capacity only under narrow circumstances. That is, if the facility recycles only in-house returns with original feedstock and uses the simple melting, fluxing and degassing process steps described above, then EPA will presume that the facility does not engage in secondary aluminum recovery. In-house returns of specified quality

that are purchased by contract from other die casting facilities also satisfy the feedstock criteria for this presumption. In any case where this presumption is rebutted, the total emissions from all the recycling steps must be compared against the 100-ton-per-year major source threshold.