Most of the conventional high efficiency air pollution control devices have been used more or less extensively on foundry emissions with some degree of success. Frequently, operating problems have been encountered. Electrostatic precipitators which have worked so well on other industries have not proved popular in the foundry industry. Precipitators operate most efficiently on steady state conditions of flow, temperature, and humidity. Cupola furnace operation is not conducive to steady gas flow conditions.

Bag filters have high efficiency but have temperature limitations and occasionally encounter high maintenance costs because of severe operating conditions. For these reasons wet collectors are used by many foundries. Because of the high percentage of submicron material, high energy scrubbers which are costly to operate are required to achieve high collection efficiency. A seldom thought of expense is that of disposing of the collected material, which in the case of foundries is a worthless item. Cost of controls is also a large factor. Many cupolas are small job-shops and operate only a few hours a day, 5 days a week. The high efficiency control required to remove the fine particulate may equal the capital investment for the cupola itself. For example a bag collector for a 6 ton per hour cupola may cost $50,000. Due to the high temperature encountered, maintenance cost on bag collectors is high, estimated by one operator to be $1,000 per month. As an alternate small job-shop cupolas frequently prefer wet collectors. A favorite is a "wet cap" which essentially forces the exhaust gas through a curtain of water. This type of collector may cost $12,000 for a small cupola. Unfortunately this type of control will not effectively remove the fine particulate in cupola exhaust gases and is not adequate to meet the air pollution controls necessary today.

There is an urgent need for control equipment at a cost the small foundry can afford to pay, which will operate at existing foundry process conditions and remove submicron material. Since equipment of this type is not available, many foundries have had to replace cupolas with electric induction or reverberatory furnaces. These furnaces do not require expensive air pollution control equipment.

Metal reclaiming and salvage is another troublesome metallurgical operation. Recycling these metal products back to useful products without creating a serious air pollution problem seems at times to be an unsurmountable task. A major area now being attacked is that of disposing of the mass of scrap automobile bodies. In the past, open burning was the most common method of removing paint, floor covering, undercoating and upholstery. This created great clouds of dense black smoke. Essentially smokeless incinerators have been developed to do this job but their cost is beyond the reach of most salvage yards. Mechanical separation of desired scrap iron and steel from unwanted materials is being practiced in a few areas, but mechanical separation equipment is also very expensive. Wire burning to salvage metal is another area creating pollution problems. Burning of the plastic coating now being used on wire results not only in ordors and particulate, but may result in the discharge of hydrogen chloride gas. Remote location is probably the most commonly practiced method of keeping the pollution from metal salvage operation out of urban areas. As our society grows this technique will be unsatisfactory and further control will be essential.

The fifth major industry of concern to us, Mr. Chairman, is the pulp and paper industry. Of the three major processes used in the pulp and paper industry, the sulfate or kraft process creates the most serious air pollution problems. While air pollution from this process is due to both particulate and odorous gas emissions, it is the odorous component of the pollution that is the most objectionable and difficult to abate. Particulates are emitted principally from lime kilns, recovery furnaces and, depending on the type of fuel used and firing practices, the plant boilers. Odorous gases such as hydrogen sulfide, mercaptans, and methyl sulfides, are generated mainly in the recovery furnaces, digesters, and evaporators.

The degree of control practiced from plant to plant varies widely. Control techniques are available to reduce particulate matter but methods of reducing odors need to be further developed.

Black liquor oxidation has been used since 1950 in western and northern mills to reduce odorous gaseous emissions. Methods were developed by the industry in 1962 to overcome foaming problems encountered in black liquor oxidation of southern pulp. Although black liquor oxidation reduces odorous emissions, its pollution control advantages may be overshadowed if the recovery furnace is