

A REGULATORY PERSPECTIVE ON THE RECIRCULATION OF INDUSTRIAL EXHAUST AIR

James Lim*

Abstract

The practice of recirculating industrial exhaust air is not widely used in California at present because California's climatic conditions do not make the practice economically attractive. California's current regulations on recirculation are minimal. California's present regulatory posture on recirculation is one of general permissiveness when the recirculation will not result in harmful exposures to workers. It is expected that recirculation will be used more in California as the cost of energy continues to rise. Anticipating this increased use, California views the need to adopt more effective and sensible regulations on recirculation which will provide necessary safeguards to protect employees' health when the exhaust air being recirculated has been exposed to very harmful agents, such as highly toxic or carcinogenic substances.

When I received a phone call from NIOSH asking if I would come to this symposium and express California's view on regulations pertaining to recirculation of industrial exhaust air, I responded, "I wouldn't know what to say about the subject. I don't think we have any regulations governing recirculation of industrial exhaust air in the work environment. Our only requirement is that the threshold limit value (TLV) not be exceeded. Recirculation of industrial exhaust air is not used much in California, and it is not an issue here." The NIOSH caller said, "That's fine. Just say that at the symposium." I suppose that I could end my presentation here, but I hardly think this would justify my airplane trip to Cincinnati.

The recirculation of industrial exhaust air is not used much in California because our climatic conditions generally do not warrant it. Although parts of California have extreme ambient air temperatures, such as Death Valley, most of our industrial activities are concentrated in areas where the climatic conditions are temperate. The economics of installing and operating industrial exhaust air purifying equipment generally cannot justify recirculation in California where the makeup air requires little or only moderate tempering. We do not have the same situation as the midwest or northern parts of the United States where there are much greater differences in climatic conditions,

*Supervising Industrial Hygiene Engineer, State Department of Health, Berkeley, California.

and where the workplace atmosphere requires substantial heating or cooling. Hence, the recirculation of industrial exhaust air for the purpose of conserving energy has not been a significant concern or consideration in California as it has been in other parts of the United States. However, with the rapidly rising cost of energy and increasingly stringent air pollution regulations requiring the cleaning of externally discharged air, I believe that the practice of recirculating industrial exhaust air in the work environment will become a more attractive and significant consideration in California.

To find out just what regulations California does have on recirculation of industrial exhaust air, I made a search through our General Industry Safety Orders. For those who do not know, California is an agreement State that operates its own OSHA program, and California has its own occupational safety and health standards, unlike most other agreement States that have just adopted the Federal OSHA standards. All of our Cal/OSHA standards and regulations are embodied in a series of safety orders, such as the "Tunneling and Mining Safety Orders," the "Construction Safety Orders," and the "General Industry Safety Orders." Our General Industry Safety Orders, which are in a book more than 2 inches thick, are at least as effective as the Federal standards, and in some cases, more stringent and more comprehensive than the Federal standards. In going through our General Industry Safety Orders, I found two situations or processes where the recirculation of industrial exhaust air is specifically prohibited. Section 3245(f) of California's General Industry Safety Orders prohibits the recirculation of exhaust air from motion picture projection booths, and Section 5153(c) prohibits the recirculation of exhaust air from flammable spray coating operations.

The other sections in our General Industry Safety Orders that refer to recirculation of exhaust air are permissive in nature. Section 5143, which specifies the general requirements for mechanical ventilation systems, has a paragraph "c" which states, "Collecting systems which return air to work areas may be used if contaminants which accumulate in the work area do not result in harmful exposure to employees." Section 5152(a) pertaining to grinding, polishing, and buffing operations states, "Every establishment performing dry grinding, dry polishing, or buffing shall provide suitable hoods or enclosures that are connected to exhaust systems which are run continuously during operations. Exception to this requirement will be made when the concentration at the operator's breathing zone of any airborne contaminant generated by such an operation is below the applicable limit prescribed in Section 5155 or any other section of Title 8." This means that the exhaust air from grinding, polishing, and buffing operations may be discharged into the work environment dirty, as long as the threshold limit value is not exceeded. Even our standard regulating carcinogens states that the exhaust air shall not be discharged to regulated areas, nonregulated areas, or the external environment, unless decontaminated. This means that carcinogen-exposed air which has been decontaminated may be recirculated.

As you can see, except for motion picture projection rooms and spray coating operations, California's present regulatory posture on recirculation of industrial exhaust air allows the practice if the recirculation will not result in harmful exposures to workers. The regulation prohibiting the recirculation of exhaust air in motion picture projection booths is an old California regula-

tion which was instituted to protect the projectionist from exposures of excessive ozone and oxides of nitrogen produced by the projector equipment. California's regulation prohibiting the recirculation of exhaust air from flammable spray coating operations is patterned after a Federal OSHA standard (1910.107, paragraph D9) as an "at least as effective as" standard.

I believe that California needs better regulations on recirculation of industrial exhaust air that will provide more protection of worker's health, even though recirculation is rarely used in California at present. An incident I recall illustrates California's regulatory deficiency on recirculation. About a year ago, an architect telephoned me to verify that Cal/OSHA had no regulations which pertained to the recirculation of exhaust air from polishing beryllium alloys. He said that he was designing an air conditioned dental office building which would include a large dental laboratory. The dental laboratory would manufacture dentures using alloys which contain beryllium, and the manufacturing operations would involve extensive grinding and polishing of beryllium alloys. He said that he was planning to return the exhaust air from these operations into the general air conditioning system of the building after passing the exhaust air through a high-efficiency filter. He wanted to recirculate the air to conserve and minimize air conditioning requirements. I asked him if his plans included fail-safe filter equipment and monitoring for beryllium-contaminated air. He said that he was not planning any unless it was required. Then I explained to him the severe health hazard of beryllium dust, and advised him to design the dental laboratory so that the beryllium alloy polishing operations would be isolated and confined in a separate room with a separate ventilation system and no recirculation of the exhaust air. I do not know if the architect followed my advice.

In discussing the need for better regulations on recirculation of industrial exhaust air with my industrial hygiene colleagues in the Cal/OSHA program, there is general agreement that recirculation should be permitted, but that there should be provisos, such as restrictions, requirements for fail-safe equipment, air monitoring, etc., to protect employees' health when exhaust air that has been exposed to very harmful agents, such as highly toxic or carcinogenic substances, is being recirculated. Since the practice of recirculation is not widely used in California at present, California has not given any priority to the development of better regulations on recirculation. But we expect recirculation to be used more in California in the future, and we are grateful that NIOSH is supporting activities, and symposiums such as this one, to provide the information necessary for development of effective and sensible regulations on the recirculation of industrial exhaust air in the work environment.

REFERENCE

1. "California Administrative Code," Title 8, Division of Industrial Safety, General Industry Safety Orders.

DISCUSSION

MR. WILLIAM HALL (Quaker Oats Co., Chicago, Illinois): I want to comment on one word he used that I thought was most appropriate, and I hope is never forgotten: sensible.

MR. DON SCARBOROUGH (Nordson Corp., Amherst, Ohio): We keep hearing this word "monitoring" cropping up, and I get an implication from the way it is used that we are referring only to instrumental monitoring. I do hope that not only the gentleman from California, but the entire panel here today, recognizes that the human being is a monitoring device and that sight and smell are often far superior to instrumental means available to determine that something just went sour with the ventilation system. I do hope that it is recognized as a viable system of operating, in a sense, as appropriate.

MR. LIM: We in California are open to whether monitors will be required or not. However, I personally think that some of the better candidates for recirculation would be the strong irritants, you know, where the main toxicological factor is irritation. With these substances, monitors may not be necessary, because you'll know if your system isn't working.

CHAIRMAN HUGHES: I might add just one thing to the use of irritants for a monitoring system. I think that irritants may be utilized, but only to supplement some kind of a more positive means, because there is a great difference in the susceptibility of different people to irritants. One of the thresholds can vary considerably. There is no question that if something is an irritant it is going to be an aid, but it can't be used as the sole method.

MR. STEPHEN MESSINGER (OSHA, Cincinnati, Ohio): I would like to make comments on the recirculation of air with the possibility of lead contamination. When you recirculate you're going to have lead throughout the whole plant instead of just one area. You're going to have to deal with it, and you're going to have to monitor with samples, and you're going to have to be sure the other employees are protected. This would go for other contaminants with ingestion hazards.

CHAIRMAN HUGHES: One thing I might mention--I was going to mention it later in more detail--is that NIOSH is conducting validation efforts in conjunction with recirculation. These are just getting under way. In fact, Mr Bullock from Envirex will be speaking tomorrow morning about one of our efforts. In this effort, we are looking at an area in recirculating lead. I don't know whether he is going to discuss that or not, but we have a situation where it is being done, and apparently is effective.

NIOSH

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health

the
RECIRCULATION
of **INDUSTRIAL**
EXHAUST AIR

...SYMPOSIUM PROCEEDINGS

THE RECIRCULATION OF INDUSTRIAL EXHAUST AIR

*Proceedings of a Symposium sponsored by the
National Institute for Occupational Safety
and Health at Cincinnati, Ohio 45226, October 1977.*

Contract No. 210-77-0056

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health
Division of Physical Sciences and Engineering
Cincinnati, Ohio 45226

April 1978

DISCLAIMER

The contents of this report are reproduced herein as received from the contractor.

The opinions, findings, and conclusions expressed herein are not necessarily those of the National Institute for Occupational Safety and Health, nor does mention of company names or products constitute endorsement by the National Institute for Occupational Safety and Health.

NIOSH Project Officer: Alfred A. Amendola
Principal Investigator: Franklin A. Ayer

DHEW (NIOSH) Publication No. 78-141