ENGINEERING AND ADMINISTRATIVE CONTROLS

ROBERT T. HUGHES

MR. BAIER:
In the statement I read earlier, I spoke of adequate ventilation, a very vague term that back in '44, I guess, had a meaning. In '76, it has many meanings and Bob Hughes will now speak to that.

MR. HUGHES:
Thank you, Ed. If Ed thinks I'm going to give a definition of adequate ventilation, I'm not. I welcome any such definition that anybody can give me. I think that therein lies a part of the problem. If you look at the literature on the control technology with respect to any given substance, you will find that this is basically what would be said: you should control with adequate methods or use adequate ventilation. This isn't what we need.

I want to give a definition of control technology. As applied to the industrial workplace, control technology consists of engineering control, work practices, and personal protective equipment.

With respect to engineering controls, there are several types in the hierarchy — with some considerably better than others. Engineering control can be designed into the process or the process machinery initially or it can be obtained by making changes after the installation of the process machinery. This type of control can either completely eliminate the emission or substantially reduce it. It can prevent emissions into the workplace. Of course, if you can keep the emissions out of the workplace, you have gone about 99 per cent or better toward controlling exposure.

Another method would be the modification of operational process machinery or processes. This can do the same thing to some degree, but it's obvious that it may be very difficult for many processes and probably nearly impossible in a majority of places if the process is already in operation.

Process modification could be used. Process modification could be the substitution of a less toxic material for one that's more toxic, or it could be a change in temperature for volatile materials to prevent excess volatilization. Of course, this depends very much on the process itself, and it has to be compatible with the end product. One of the most common type of control would be what I define as an add on or retrofit. This would be a control added to the process or the machinery after it was in place. Here, our friend adequate ventilation comes into play as ventilation systems and specifically local exhaust ventilation systems are the most commonly used.

If there is a process that is emitting a substance, the only practical control may be to run enough air across it to capture the material and, hopefully, get rid of it. The serious problem with this type of control is that the material or the substance has already escaped from the process itself into the workplace. Intercepting emissions and removing them depends greatly on the design and on the continued maintenance and operation of the system.

Very briefly, I mentioned work practices. Engineering controls basically should be used to keep the emissions from getting into the workplace; either contain them within the process or capture them after emission. The work practices used may or may not eliminate emissions in a workplace.

My definition of work practice includes scheduled maintenance — the maintenance of the process or the maintenance of the control system and the engineering controls. Another area of work practice would be using specific job procedures which separate the worker from the emission. Finally, there would be personal protective equipment such as respirators and protective clothing. I won't say anything more about those latter two because Mr. Todd will be

speaking after me and will go into more detail on those items — what they are and what we are doing about them.

In the application of engineering controls to the problem at hand, it was evident from Ron Young's slides that there are some of those processes that could use some controls. It's very hard to tell about the closed portion of the system — whether it's working properly or not because it's hard to see visually. I think there were many areas where the materials were being mixed and there was an absence of any kind of ventilation so any emissions or materials that would result from the processes could get into the workplace.

The shaker screen is usually an open area and the material, being agitated, can escape. If the material does escape, it surely isn't going to be captured without some kind of control equipment. Engineering controls in general should be used in all cases where toxic emissions can occur at levels which exceed defined harmful levels.

The question arises as to controls where the levels are not known. If there is a TLV or defined standard for that material, there should be a control in place and operating suitably that would control emissions to that level. The problem occurs if there isn't a known level. As has been related here, we are not sure what the problem may be with SBR. It may be one of these substances for which there is a level, or it may be a combination, or it could be a substance that isn't adequately defined. That is a question that's very difficult to answer, and it becomes more difficult as Alex was just saying when there could be 65 substances or combinations of substances.

I would like to now define very briefly in the NIOSH program what our future efforts will be in the area of control technology and, hopefully, relate this to the problem at hand.

We are now undertaking a program of control technology assessment. We will select industries and assess the state of the art of the control technology in that industry. We will assess and document the control technology that is available and how it works. This will also tell us whether there are processes or operations where the existing control technology is not adequate or indeed in many cases where it doesn't exist.

This program will cover engineering controls, work practices, personal protective equipment, and a fourth item not discussed so far, the methods of monitoring the processes or the operations in order to provide adequate warning in the case of a process or control system failure so that there would not be harmful exposure to the workforce.

This study will be primarily oriented toward engineering controls. We will try to identify those controls that are effective and determine the degree of effectiveness. Work practices will be observed. We will note whether personal protective equipment is used or not.

We are planning several assessments. One will cover the plastics and resins industry and, specifically, the polymerization processes. The SBR rubber industry would be covered by this. I would like to refer to Mr. Harrington's remark that he is interested and willing to cooperate with us. We do need the cooperation of industry in this. We would like to have a plant or plants which are representative of the industry, the processes, the operations, and, hopefully, the control technology so our contractor can assess all of these.

A study like this just can't be done unless we have the cooperation of industry. That is basically it. Does anybody have any questions?

MR. BELICZKY:

In the comments that you made regarding what you're going to look at in the plastics industry, you referred to specifically SBR. The styrene-butadiene rubber. In my earlier comments I indicated that perhaps if you don't do it on an industry-wide basis, please take a look at the acrylonitrile-butadiene-styrene and polymers, too, and just plain simple butadiene polymers so that you have an indication of what the total picture is and just don't limit it to SBR.

MR. HUGHES:

Maybe I misled you. It wasn't the intention of our effort to limit it to SBR. We have

not yet specifically defined those areas that we are going to look at. This is a part of the process and the effort is to define the industries where we can optimize the use of our resources. I merely mentioned that the problem with SBR has come to light since we initiated this, and this would be one of the areas that we do intend to look at — we intend to look at others too.

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