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OFFICE OF
AIR, NOISE, AND RADIATION

SUBJECT: Vinyl Chloride Standard : Safety Relief Valve Discharges

FROM: *David B. Hawkins*
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TO: Rebecca Hanmer, Regional Administrator
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This is in regard to John White's request in the December Senior Management Report for better guidance on control of vinyl chloride emissions from safety relief valve discharges. I understand that the regional offices in general have had difficulties in enforcing section 61.65(a) of the vinyl chloride standard which deals with relief valve discharges. I also understand that the number of relief valve discharges reported during the enforcement of the standard has been greater than may have been expected. This concerns me because of the large amount of emissions which can occur during one of these discharges.

The vinyl chloride standard is scheduled for review in 1981, five years from the original promulgation date. We are already beginning to develop a work plan for review of that standard. During the review of the standard, my staff plans to focus on the part of the regulation dealing with relief valve discharges. An effort will be made to identify any new developments in technology for control of these discharges. Also, my staff will contact the offices and obtain data on the frequency and causes of relief valve discharges which have occurred and evaluate alternative ways of writing this part of the standard to improve its clarity and effectiveness.

The following paragraphs provide information on the development of the regulation for relief valve discharges and guidance on the interpretation of it.

Section 61.65(a) of the vinyl chloride standard states that "Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service." An emergency relief discharge is defined as "a discharge which could not have been avoided by taking measures to prevent the discharge."

Although the regulation covers any relief valve on any equipment that contains at least 10 percent vinyl chloride, and is located in a

At the time of the vinyl chloride plant, the primary intent of regulation was to substantially reduce the number of relief valve discharges from polyvinyl chloride reactors. At the time the regulation was being developed, relief valve discharges from polyvinyl chloride reactors were a common occurrence and we were aware of specific measures that could be implemented to prevent these discharges. Relief valve discharges from other equipment occurred much less frequently and I did not include in our background documents specific information on how they can be prevented. They were included in the regulation, however, to ensure that emissions from these relief valves did not occur unnecessarily. Our intention was that primary attention be focused on the polyvinyl chloride reactor discharges which are the largest source of emissions and for which we had described specific preventive measures.

The information we obtained during the development of the standard indicated that the frequency of relief valve discharges from polyvinyl chloride reactors varies considerably from plant to plant. Some plants had less than one discharge per year; others had twenty or more. On the average, 5000 pounds of vinyl chloride was emitted from one of these discharges within a five to ten minute period.

Relief valve discharges from polyvinyl chloride reactors occur in order to prevent catastrophic rupture when pressure within the reactor builds up beyond the capabilities of the reactor to contain it. The production of polyvinyl chloride from vinyl chloride in reactors is an exothermic reaction. Reactors are equipped with agitation and cooling jackets to remove the heat due to the exothermic reaction. Pressure buildups in reactors can occur if the cooling equipment does not operate properly; this can happen if there is a power outage for example. It can also occur if the operator adds too much vinyl chloride or some other ingredient to the reactor during formulation of a batch.

In order to prevent discharges, several steps can be taken. For example, reactors can be equipped with temperature or pressure sensing devices. When high temperature or pressure is detected, chemicals can be manually or automatically added to the reactor to stop the reaction. Provisions can be made to remove enough of the contents of a reactor batch to another vessel so that the pressure is brought back down to a satisfactory level before it is necessary for the relief valve to discharge. Back-up power sources can also be provided to keep agitators operating during main power outages. Some of the newer plants contain computerized systems which automatically fill reactors with the proper quantity of each ingredient and which contain provisions for altering operations when overpressure is detected. Newer plants with computerized systems tend to have fewer discharges. These are several examples of preventive measures which had been demonstrated in existing plants at the time of development of the standard.

Not all relief valve discharges can be prevented. The intent of the regulation was that if a plant took steps such as those named above and still had a relief valve discharge, that relief valve discharge would be considered an emergency condition and would not be a violation. We expected such situations to be rare.

We did not specifically require that each plant take all of the preventive measures described above for a couple of reasons. First, some plants were having very few discharges (less than one per year) already without taking all of the above named steps. It did not appear prudent to require plants to unnecessarily install expensive equipment when they were preventing the discharges without it. There were wide variations among plants. Some contained numerous older, smaller reactors, while others contained large, more modern reactors. Relief valve discharges are much more easily controlled from the newer and larger reactors than from the older and smaller reactors. In addition, we did not want to preclude the development of improved technology which may be even more successful in preventing discharges than the technology available at the time we developed the regulation.

The intention of the regulation was that each plant install sufficient preventive equipment to reduce the number of polyvinyl chloride reactor discharges to a very small number. For plants who report essentially no discharges, no additional equipment would be required. However, for plants who do report discharges, more and more preventive measures would be required through enforcement actions until the occurrence of discharges from any one plant is rare.

I hope this information is useful to you. If you have additional questions, comments, or suggestions, please contact me.