Recent CMA Sponsored Health Studies of PVC and VCM Manufacturing Workers

This document summarizes what we know to date based on the draft reports of two CMA sponsored studies. This document is to be used as a reference document and not to be distributed as is. If you need additional information or help in responding to questions please call Dave Penney or Tom Grumbles.

These studies are two different kinds of investigations each providing insight into the factors that may influence the health of people in this industry

> Note This information is being provided to you even before there has been a chance for it to be reviewed and checked by other health scientists who did not conduct the studies but are experts in this field This is being done so that you may have the latest information However, you should bear in mind that it is possible, thought not likely in our opinion, that some of this information could change as these reviews continue If any significant changes occur as this process continues, we will let you know as soon as possible

Mortality Study

The first study is called a mortality study because it consists of counting the number of deaths from diseases within a group of people It may not sound pleasant, but we can learn about the factors that influence our health by knowing whether certain diseases are occurring at, below, or above normal levels. It's like a doctor doing an autopsy to learn something that helps save the lives of other people.

The group of people selected for this study are those that have received high levels of vinyl chloride exposure in the early years of the industry This includes people from our Aberdeen PVC and the Lake Charles VCM plants who, along with over 10,000 individuals, started working in PVC and VCM manufacturing facilities before 1972 This is before the strict exposure controls on vinyl chloride exposure were first put in place in 1974 This limit remains in effect today

This study is actually the most recent in a series of studies that CMA has conducted on this same group of people The primary reason CMA keeps studying this group is that some diseases, such as cancer, take a long time to develop and might have been missed if the study were to be stopped too soon Second, as this group ages, there are more deaths to analyze which leads to more accurate estimates of death rates due to the diseases in this group

Why study people that have had such high vinyl chloride exposures compared to today's levels? One reason is that it gives information that may be of use to people who experienced these high levels of exposure and are still alive today Another is that it is easier to detect the disease a chemical causes when high exposure levels exaggerate its effects

So what are the results?

Some of the things this study tells us are not entirely new, but confirm or refine previous findings. First, the overall number of deaths in this group is about normal for a working group of people. This is good considering that there have been a higher than normal number of deaths in this group from certain diseases It works out this way because there have been so many fewer deaths than normal from other diseases that more than make up the difference

Another thing this study tells us is that two of the diseases causing an above normal number of deaths in this group are liver angiosarcoma and brain cancer. The elevated level of liver angiosarcoma was found the first time that this group was studied in the early 70's Those results plus other types of information lead health scientists to conclude that the cause of these deaths was the vinyl chloride exposure those people had received at work. As for the brain cancers the question of their relation to workplace exposures is still being debated. Some researchers believe the excess brain cancers are due to vinyl chloride exposure, while others doubt this for a variety of reasons. Their doubts occur largely because, workers in the industry in other countries do not seem to have this excess of brain cancers. Unfortunately, the results of the present study do not provide especially convincing evidence either way. However, the second study that CMA conducted, which is summarized in a later section of this report, clearly casts doubt on a role for vinyl chloride in causing brain cancers at one of the plants included in this study

There was one thing this study told us that was entirely new This was that, besides the elevated liver angiosarcoma and brain cancer deaths, there were also an above normal, though small, number of deaths due to soft tissue sarcomas. Soft tissues connect, surround or hold other structures and organs in the body Soft tissues include muscles, tendons, fat, blood vessels, fibrous tissues, nerves, and tissues around joints. Sarcomas are fleshy growths that can spread to other organs in the body. Soft tissue sarcomas are rare. This doesn't mean they are more dangerous cancers, just they don't happen as often as others. About two out of every 100,000 people m the US get some kind of soft tissue cancer which includes soft tissue sarcomas.

This is the first time that excess deaths due to this form of cancer have been found in this or any other group of people in the industry. Previous studies of this group, using state-of-the-art techniques in use at the time, did conduct a separate analysis of such tumors. When the analysis was conducted using current state-of-the-art methods, the excess was revealed.

Does this mean that vinyl chloride can cause these kinds of cancers? The possibility cannot be ruled out at this time, particularly since angiosarcomas of the liver are a type of soft tissue sarcoma. Still, we don't know for sure, and it may be difficult to figure out, since soft tissue sarcomas are actually a diverse class of cancers, each of which may have its own specific cause

As in most studies of this size, a number of apparently "above normal" but uncertain results emerged This study was no exception, for example, a group of cancers of the "peritoneum and other digestive organs" appear to have occurred at above normal rates However, the researcher indicates that these tumors were broadly distributed by specific cancer site and likely have different causes In light of the absence of consistency of these cancers, the researcher concludes that this excess is unlikely to have occupational health significance. Another excess of this type also appears to have occurred for cancers of the tongue. However, this excess was not statistically significant and even less is known about what causes of these kinds of tumors. Consequently, the human health significance of this finding is also uncertain

Brain Cancer study

The second study focused on twelve brain cancer cases at the Bells Lane plant in Kentucky where PVC and other products have been made. Additional people, who did not have brain cancer, were selected for inclusion in this study based on their having similar times and lengths of employment to those who had died of brain cancer All of these people were employed between 1942 and May of 1988. The Bells Lane plant is one of the oldest in the industry and was included in the mortality study we've just discussed

The design of this study is based on the idea that, all things equal, the people with a disease that a chemical causes are the ones you would expect to have had the higher levels of exposure to a chemical which causes the

disease From what this study appears to show, there was no difference between estimated levels of exposure to vinyl chloride for the people who got brain cancers and those that didn't Or as the researcher states it, " results of these analyses indicate no statistical association between the accumulative exposure to vinyl chloride and brain cancer " This seems to point the finger towards something else besides vinyl chloride causing the problem We don't know what that something is This research is very interesting because it may provide leads to help solve the puzzle of what's causing some forms of brain cancer at least

So what does it all of this mean to your health?

Does this mean that you as someone who has worked in the PVC/VCM manufacturing industry or has been exposed to vinyl chloride are necessarily going to get either liver angiosarcoma, or brain cancer or soft tissue sarcoma?

The chance that you or any one else could get a disease from exposure to a chemical depends largely on your degree of exposure to that chemical and your individual sensitivity to it.

What can be done to protect us from these diseases?

Actually, the data provided in this and previous studies of this group suggest that much, if not all, of this problem was taken care of when the strict limits were imposed on vinyl chloride exposures in the early 70's Ever since that time, there has been a lowering of the death rate from all of these cancers Remember, this is amongst the people that had the potential for exposure toto high levels of vinyl chloride

Obviously, the best form of protection is to limit your exposure, as much as practical, to cancer causing chemicals. By the way, this is good advice for handling any chemical Both the company, and each one of us, has an obligation to do what we can to prevent accidents and maintain exposures within acceptable limits

Is there a medical test that can check whether I have these diseases or am likely to get them?

Although scientists are trying to find some sort of specific markers or predictors for these types of diseases, none is currently available The best that can be done is to obtain regular physical examinations and maintain an awareness of your own health and discuss any concerns you may have with your doctor If your doctor should have any questions about the diagnosis and treatment of these diseases, he or she should feel free to consult with CONDEA Vista's Medical Director, Dr. Bonnie New.