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UNION CARBIDE

News Release

UNION CARBIDE CORPORATION

P.O. BOX 670
BOUND BROOK, NJ 08805
TELEPHONE: 908-563-5872

FOR RELEASE: Immediately
CONTACT: Marion Jones, Media Representative - 908-563-5872
Ted Miller, Site Human Resources Manager - 908-563-5092

Bound Brook, NJ - August 26, 1993 - Union Carbide Corporation this week sent a letter to employees and retirees informing them of the results of two recently completed health studies of workers employed at the Bound Brook plant. In 1990, the company announced its plans to conduct a study of pancreatic cancer among Bound Brook employees. In a mortality study through 1983 of 5,932 Bound Brook employees who worked at the site for seven months or more from 1946 to 1967, an excess of this disease was identified among male hourly workers. The pancreatic cancer study was initiated to examine possible associations between the occurrence of pancreatic cancer and the workplace. The work assignments of the 28 hourly Bound Brook employees who died from pancreatic cancer were compared to the work assignments of 140 employees, similar in age, who did not die from this disease.

The follow-up study, called a "case-control" study, found the pancreatic cancer excess to be related to working long-term in a department which processed PVC (polyvinyl chloride) or polyethylene. Men assigned more than 16 years to this department had an increased risk of pancreatic cancer. Men who spent 16 years or less in this department showed no increased risk. Additional information was collected from retiree and other veteran employee interviews and the scientific literature to better understand the work in the department which might explain these findings. None of the pancreatic cancer cases worked in polyethylene processing. All the additional information also led to the conclusion that the risk was associated with vinyls processing during the early years of this operation, prior to the automation that occurred in the 1950s and 1960s. The Bound Brook facility stopped processing vinyls in about 1976. Outside of the finding of increased risk with long-term assignment to vinyls processing, there was no evidence to suggest workers in any other production or non production jobs were more likely to die from pancreatic cancer.

While conducting the case-control study of pancreatic cancer, epidemiologists also updated the general mortality study through 1988. The frequencies of cancer and non cancer causes of death for Bound Brook hourly and salaried employees were compared to those

of U.S. and N.J. men of the same age and over the same time period. This study group has now been followed for an average of 32 years and includes 1,859 deaths.

The findings indicate that -

- For all employees, the number of deaths (1,859) is considerably fewer than what would be expected (2,135), based on national or state averages, i.e., on average our workers live longer than the general population.
- For salaried employees, the number of deaths from cancer (128) is 12% lower than what would be expected (145) and their lung cancer death rate is 50% lower than the general population. This is largely explained by the smaller number of smokers in this group.
- For hourly men, the number of deaths from cancer (334) is similar to what would be expected (327) in a group of this size and age.

When specific causes of death were examined, the following causes were higher than what would be expected among workers employed during this time frame:

- Leukemia among Research and Development workers assigned to pilot plant operations and
- Pleural mesothelioma (a cancer of the lining of the lung, often associated with asbestos exposure) and pancreatic cancer among hourly workers (discussed in the case-control study results).

It was determined that 5 of the 8 men who died from leukemia in the Research and Development group transferred in the late 1950s to Bound Brook from Bloomfield, NJ and Perth Amboy, NJ, where they spent most of their early careers. There did not appear to be common projects at Bound Brook that involved these employees, and it was not possible to reconstruct the work they did at the older locations. Therefore, the study could not identify a specific cause for this finding.

Exposure to asbestos is known to cause pleural mesothelioma. Ten deaths due to this cause were identified in the study group from death certificates. In addition to the use of asbestos at the Bound Brook site, there was an asbestos plant nearby where some Bound Brook employees also worked. An excess of this disease was also evident in the 1983 update of mortality for these workers.

These findings have been submitted to the appropriate government agencies. The company is attempting to locate and communicate the pancreatic cancer findings in greater detail to former employees who worked in vinyls processing during the time period of the study.

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BOUND BROOK STUDY

QUESTIONS / ANSWERS

1. What was the reason for conducting the original studies?

   The apparent excess of pancreatic cancer noted by the Bound Brook plant physician and in an inter-industry survey of polyvinyl chloride (PVC) fabricators. In 1977, UCC entered into an agreement with the University of Pennsylvania to conduct a study. A report and several revisions were completed between 1979 and 1981.

   Outside peer review resulted in some criticism of the university's study. An audit by UCC epidemiologists found that the study population constructed by university researchers was relatively complete. However, major technical flaws did exist. An 10-year update, which corrected the deficiencies, has now been completed.

2. Have the results of the University of Pennsylvania study been previously announced?

   Results were made available to all employees and were published in the news media in the late 70s.

3. What did UCC do about the UPENN study?

   UCC epidemiologists evaluated the UPENN study, corrected the major deficiencies and extended follow-up of the workers for 10 more years, up to 1988.

4. What did the UCC update study show?

   For all employees, the number who have died (1,859) is considerably fewer than what would be expected (2,135), based on national or state averages, i.e., on average our workers live longer than the general population.

   For salaried employees, the number who have died from cancer (128) is 12% lower than what would be expected (145) and their lung cancer death rate is 50% lower than the general population. This is largely explained by the many fewer smokers in this group.

   For hourly men, the number who have died from cancer (334) is similar to what would be expected (327) in a group of this size and age.

When specific causes of death were examined the following causes were higher than what would be expected:

- Leukemia among Research and Development workers assigned to pilot plant operations and
- Pleural mesothelioma (a cancer of the lining of the lung) and pancreatic cancer among hourly workers.

5. **How many employees were involved in the study?**

   The study involved almost 6,000 male employees, including over 3,700 hourly employees.

6. **Were all the cases of pancreatic cancer in hourly employees?**

   No, but there was no excess of pancreatic cancer mortality in salaried workers. There were 25 cases identified in hourly workers when 17 would have been expected.

7. **Why were no women involved in the studies?**

   There were historically too few women involved in production to give meaningful results.

8. **We understand increases in leukemia and pleural mesothelioma (a cancer of the lining of the lung) deaths were noted. Why didn't you plan an additional study of these problems?**

   The leukemia excess occurred in R&D workers assigned to Pilot Plant operations. A review of their Bound Brook lab notebooks and interviews with veteran employees did not suggest common projects to which they may have been assigned. Furthermore, five of the eight cases transferred from older UCC locations and employee records from these locations were not available.

   Asbestos exposure is known to cause a rare cancer called mesothelioma. Asbestos was in use in the plant and the study group showed an excess of this disease. Also, some of these workers may have worked at a local asbestos manufacturing facility.

9. **Which employees were included in these studies?**

The general mortality study included 5,932 workers who worked seven months or more between 1946 and 1967 at the plant. Follow-up of these men was conducted between 1946 and 1988. The pancreatic cancer case-control study included 28 men who died from pancreatic cancer and a comparison group of 140 men similar in age who did not die from this disease.

10. **What did the pancreatic case-control study show?**

The study showed that men assigned more than 16 years to Department CN (also called 006), which processed polyvinyl chloride or polyethylene in Building 101 and 14, had an increased risk for pancreatic cancer. Men who spent 16 years or less in this department showed no increased risk. Additional information collected from retiree and other veteran employee interviews and the scientific literature led to the conclusion that the risk was associated with vinyls processing in Building 101.

11. **Were the pancreatic cancer death certificates checked against hospital records?**

Yes. We requested the National Institute for Occupational Safety and Health to conduct a verification since the cause of death information on death certificates is not always 100% accurate. Medical records were found for 19 of the 28 cases. All were recorded as pancreatic cancer.

12. **Why did the researchers conclude that the pancreatic cancer risk was related to vinyls processing and not polyethylene processing?**

There were several reasons for concluding that the pancreatic cancer risk was associated with vinyls processing. These include: 1) vinyls processing was a much bigger operation in the 1940s when almost all the cases first entered the unit, 2) other studies have suggested excess risk for digestive system cancers among PVC workers and pancreatic cancer is a digestive system cancer, 3) there was a much larger variety of potentially hazardous chemical additives in vinyls processing, 4) none of the cases in this department worked in Building 14, which processed polyethylene only and 5) there was greater potential for intense chemical exposures in vinyls processing due to the frequent manual cleaning of blenders prior to the automation of the 1950s and 1960s. Manual cleaning of blenders was much less frequently needed for polyethylene processing.

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Which chemical or chemicals used in the vinyls processing may have caused the pancreatic cancer?

The large number of chemicals, such as plasticizers, stabilizers, solvents, waxes and dyes, used over time in varying combinations and the lack of industrial hygiene measurements 50 years ago make it impossible to identify one or a few responsible chemicals.

Did the study consider other risk factors for pancreatic cancer, such as smoking?

An attempt was made to locate medical records for the cases and for the comparison group and collect data on smoking, alcohol consumption, other diseases and medical conditions. Medical records were found for only about 40% of the study subjects. The limited data were examined but were too sparse to be statistically analyzed. It is unlikely that patterns of smoking or other risk factors among hourly workers, similar in age, would vary by job assignment. This would have to happen for any of the other risk factors to be the explanation for the finding.

How many men who worked in vinyl and polyethylene processing died from pancreatic cancer?

Six of the nine cases worked for approximately 20 years or more in this department. Nearly all of the cases were first assigned to this department in the

1990 announcement of plans to conduct the pancreatic cancer mortality study said there were 21 cases in the Bound Brook study population. Why does the case-control study include 28 cases?

At the time of our announcement, the Bound Brook general mortality study identified 21 cases, as of follow-up through 1983. The study group has since been followed through 1988, which identified four more cases. Through company records we found two additional individuals who died from pancreatic cancer after 1983. In addition, all death certificates of Bound Brook workers with cause of death listed as digestive cancer were given to the National Institute for Occupational Safety and Health to verify the cause of death with hospital records. Two deaths due to pancreatic cancer was discovered where the death certificate incorrectly stated cancer of the bile duct as the cause of death. These

additional seven cases were added to the original 21, giving a total of 28 for the pancreatic case-control study.

17. Since R&D laboratories are involved with the same chemicals and processes as pilot plants, would these workers also be at risk for leukemia?

R&D laboratories use chemicals in much smaller volume than pilot plants. In the Bound Brook study, R&D workers who were not assigned to pilot plants did not show evidence of increased risk for leukemia. We do not have data, however, on the mortality experience of laboratory workers from Bloomfield or Perth Amboy, the Carbide locations from which five of the eight leukemia decedents transferred to Bound Brook. There are several studies in the scientific literature that suggest excess risk of leukemia among chemists and laboratory workers, with very little detail on the type of work conducted.

18. Did UCC operate vinyls processing at other locations?

None of our currently active locations are using this technology or have used it in the past. We are attempting to evaluate whether former Carbide locations ever used this technology.

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13. **Which chemical or chemicals used in the vinyls processing may have caused the pancreatic cancer?**

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15. **How many men who worked in vinyl and polyethylene processing died from pancreatic cancer?**

Nine. Six of the nine cases worked for approximately 20 years or more in this department. Nearly all of the cases were first assigned to this department in the 1940s.

16. **The 1990 announcement of plans to conduct the pancreatic cancer mortality study said there were 21 cases in the Bound Brook study population. Why does the case-control study include 28 cases?**

At the time of our announcement, the Bound Brook general mortality study included 21 cases, as of follow-up through 1983. The study group has since been updated through 1988, which identified four more cases. Through company records we found two additional individuals who died from pancreatic cancer after 1988. In addition, all death certificates of Bound Brook workers with cause of death listed as digestive cancer were given to the National Institute for Occupational Safety and Health to verify the cause of death with hospital records. Another death due to pancreatic cancer was discovered where the death certificate incorrectly stated cancer of the bile duct as the cause of death. These