

**HEALTH SURVEY OF RESIDENTS AND WORKERS
IN THE VICINITY OF 80 LISTER AVENUE,
NEWARK, NEW JERSEY**

JUNE 28, 1984

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**DIVISION OF EPIDEMIOLOGY
AND DISEASE CONTROL**



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NEWARK, NEW JERSEY

DIVISION OF EPIDEMIOLOGY AND DISEASE CONTROL
NEW JERSEY DEPARTMENT OF HEALTH
CN 360
TRENTON, NEW JERSEY 08625

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Following the discovery of dioxin contamination at the site of a former chemical plant at 80 Lister Avenue in Newark, New Jersey, the New Jersey Department of Health conducted a health survey of 368 residents and 595 workers in the vicinity. Numerous problems were encountered in administering the questionnaires. It is apparent in retrospect that a number of respondents did not understand the questions and left sections blank or answered questions inconsistently. Because the reported health effects of dioxin are non-specific and many of these individuals were exposed to chemicals which can cause similar non-specific effects, the lack of a control group makes interpretation of the response even more difficult.

Eight cases of cancer were reported by 305 workers but none were identified as the soft tissue sarcomas associated with dioxin. High response rates, which are of interest and may be indicative of health problems, were received to certain questions and in specific groups. Sherwin-Williams workers reported 15 of the 25 cases of liver disease of unspecified etiology possibly occurring after employment in the area while they composed less than 40% of the workers responding. About 42% of the Sherwin-Williams workers reported a skin rash or blistering problem, a rate nearly twice that of any other worker or resident group.

The Riverview residents reported 18 cases of adult acne while only 15 cases were reported among all the workers (predominantly chemical workers) in the area. These residents also reported that 23% of them experienced a skin rash with blisters which became worse with exposure to sunlight against only 4% of the workers and 0/64 Ironbound residents. High response rates were received to non-specific symptoms, such as tiredness, dizziness or light headedness, and headache, and to paresthesia questions among all groups queried. These results may be indicative of a number of medical problems or occupational or environmental health hazards.

INTRODUCTION

On June 1, 1983, in a meeting with the Governor, the Department of Environmental Protection (DEP) informed Commissioner of Health J. Richard Goldstein and other senior staff of the Department of the finding of high levels of dioxin in the soil at 80 Lister Avenue, Newark, New Jersey. In the spring of 1983, DEP initiated a program to test industrial sites where chemicals were produced which could have resulted in the presence or production of dioxin, specifically 2, 3, 7, 8-tetrachlorodibenzodioxin (TCDD). The first site to be tested was the former Diamond Shamrock site at 80 Lister Avenue.

From 1951 through 1970, the Diamond Alkali Company of Cleveland, Ohio, later merged to form Diamond Shamrock Company, operated a chemical plant at this site and manufactured the herbicides 2,4-D (2, 4-dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-trichlorophenoxyacetic acid). As a result of this herbicide manufacture, TCDD was produced as a contaminant in the production process. Anecdotal reports indicate that in the late 1950's and again in the early 1960's, explosions occurred at this site. From 1966 through 1968, the herbicide Agent Orange (2,4-D and 2,4,5-T) was produced under a Federal Government contract.

In mid-1969, Chemicaland Company purchased the site and operated from 1970 until 1971, when they declared bankruptcy. The property was sold to a private individual who apparently kept the site idle until 1981, when Marisol, Inc. purchased the site. Marisol initiated clean-up activities, but never began production on the site.

In light of the environmental contamination at the former Diamond Shamrock site and the ongoing public concern over the dioxin contamination of Times Beach, Missouri and the Agent Orange controversy, an immediate and intensive State response was felt to be in order in Newark. The role of the Department of Health was identified to be that of identifying public health problems and keeping the public informed of health concerns. Inherent in these activities was felt to be a need to recognize health effects from possible dioxin exposure of the residents and workers of the area. It was therefore decided that a health survey would be initiated immediately in the vicinity of 80 Lister Avenue.

METHODS

A survey of health complaints was conducted among individuals who lived and/or worked near the contaminated 80 Lister Avenue site. Self-administered questionnaires were distributed to workers of 7 firms in the area and to workers at the Farmers' Market, as well as to two groups of residents in the area, beginning on June 3, 1983, two days after the Department was informed of the problem (Figure 1 and 2). In the industrial setting, State Department of Health staff explained the questionnaire to groups of approximately 20 workers and remained available to answer questions while the workers completed the form. Department personnel distributed the questionnaire to workers in the Farmers' Market and assisted them in completion of the form.

On June 4, the State Department of Health personnel went door-to-door on Joseph, Esther, and Albert Streets to distribute the forms. These residents are subsequently referred to in this report as the Ironbound residents. The staff later returned to the houses to pick up the completed questionnaires. The residents could also return the completed forms to a staffed Department of Health van which was parked in the area until June 18.

On June 10 and 11, teams of State Department of Health personnel went door-to-door through the Riverview Apartments (F.D. Roosevelt Homes). The residents in these apartments are subsequently referred to as the Riverview residents. These teams of interviewers had Spanish-speaking members to meet the needs of Hispanic residents. If no one was home, a second visit was made and, if

unsuccessful, a questionnaire and instructions (English and Spanish) were left at the door requesting that the completed form be returned to the van or a Department of Health office in the apartments. (See Discussion concerning the use of multiple questionnaires).

Table 1 presents the 10 groups who were surveyed, the date of administration of the questionnaires, and the identification of the questionnaire administered to each group. The questionnaire used initially (Questionnaire A) was an abbreviated dioxin symptom questionnaire which Columbia University had developed under contract to the Department in 1980. Since the first page of this questionnaire asked questions specifically about Sherwin-Williams, workers of other firms completing this form were instructed to enter the appropriate information here for their company. This questionnaire and all those subsequently used may be found in Appendix A. Descriptions of the seven participating firms may be found in Appendix B.

Several revisions were made to this questionnaire prior to administration to the Ironbound residents. All questions relating to current employment in a firm in the area were deleted, as were the portions relating to occupational history and related adverse health affects, hobbies and their adverse effects, and living near a plant, mine, or facility associated with hazardous materials. Questions were added related to having ever worked at Diamond Shamrock, how often an individual had been pregnant, and the outcome of those pregnancies. Since this questionnaie is quite similar to the original questionnaire, it is referred to as Questionnaire A-1.

Questionnaire A-2 was a further adaptation of this form which was administered only to the summer employees of Marisol who had been involved in cleaning up the 80 Lister Avenue site. The question relating to having ever worked

at Diamond Shamrock was deleted. In its place, the workers were asked how long they had worked at the site, when, and what they did. The sections related to occupational history, hobbies, and living near a plant, etc. were also used in this form. Questions were also added relating to a history of cancer and a detailed history of employment at 80 Lister Avenue (activities, duration, protective equipment) was sought.

To reduce the amount of time necessary to complete the questionnaire, an extensive revision of the questionnaire was completed resulting in Questionnaire B. Questions deleted included many of those relating to veteran status, hair color or pattern, gastrointestinal symptoms (except hepatitis, jaundice, and cirrhosis), non-specific symptoms, joint swelling, stiffness, or pain, other symptoms for all joints except hands, fingers or feet, smoking, drinking, sterility, specific birth defect conditions, and the detailed history of Marisol employment. The skin rash questions were changed to one question requiring a skin rash with blisters that became worse with exposure to sunlight. Questionnaire B was administered to workers at Benjamin Moore, Thomasset, and Fiske.

Workers in the Farmers' Market were administered an abbreviated form, Questionnaire D, which focused upon a history of working at Diamond Shamrock, current employment, acne, and a skin rash with blisters that became worse with sunlight. The Riverview residents received a very similar questionnaire, Questionnaire D, which additionally asked about other exposure to 80 Lister Avenue.

RESULTS

Completed questionnaires were collected from 963 individuals in the vicinity of 80 Lister Avenue, including 595 workers and 368 residents (Table 2). The distributions by sex, race/ethnicity, and age among respondents are given in Tables 3-5.

The current number of employees for the six participating industries is shown in Appendix B. This is comparable to the number of workers at these companies at the time of the interview. The rate of participation among the workers ranged from 44% for SCA workers to 92% among Thomasset employees. Overall, 75% of the workers in these 6 companies completed a questionnaire. Estimates as high as 100 Ironbound residents and 800-1000 Riverview residents have been advanced for the total populations of the residents in the area who could have completed a questionnaire. Based upon these estimates, 67% of the Ironbound residents and 30-40% of the Riverview residents participated in the investigation.

The groups differed widely in their demographic characteristics. Males predominated among the workers (90%) while the majority (59%) of the residents responding were female. Whites composed 67% of the workers and 81% of the Ironbound residents while blacks and Hispanics formed 98% of the Riverview residents. The residents were younger than the workers as a rule with 39% of the residents responding being under 20 years of age against only 2% of the workers.

Liver Disease:

The Ironbound residents and all workers except the workers in the Farmers' Market were queried whether they had ever had jaundice, hepatitis, or cirrhosis.

Of the 594 individuals responding to these questions, 47 individuals indicated that at sometime they had experienced one or more of these conditions (Table 6). An analysis of the positive responses of the workers to these questions is given in Table 7. Table 8 shows the distribution of liver disease of unspecified etiology with onset after employment or date of onset unknown among workers. Workers with unspecified liver disease which occurred after beginning employment in the vicinity of 80 Lister Avenue ranged in age from 21 to 59 years with a mean age of 39.3 years. They had worked from less than one to 27 years, a mean of 10.0 years, before developing liver disease.

Seven of the Ironbound residents gave a history of liver disease. Three of these can be eliminated from concern as neonatal icterus, a gall bladder problem, and hepatitis incurred while in the service during World War II. Three others were reported as a single occurrence of hepatitis in the '50's, '60's, or '70's.

Acne:

All workers and residents were asked whether they had ever had acne and if it cleared up. Cases with onset before age 20 but persisting through age 20 to time of the questionnaire were considered Teen Persistent cases. Cases with onset after age 19 which subsequently cleared up were considered Adult Transient cases. Cases with onset after age 19 and persisting to time of the questionnaire were classified as Adult Persistent cases.

Responses to the acne questions were submitted by 560 workers and 348 residents. Teen persistent, adult transient, and adult persistent acne were reported by 21, 6, and 9 of the workers and 8, 6, and 12 of the residents, respectively (Table 9). Table 10 shows the distribution of these forms of acne among workers who had

onset after beginning employment in the vicinity of 80 Lister Avenue. The sizable reduction in the number of cases is due mainly to the deletion of the majority of the teen persistent cases which had onsets prior to employment. Tables 11-13 give the characteristics of workers with adult persistent or transient acne with onset after beginning employment and of all workers with teen persistent acne, respectively. Five of the 8 workers with adult persistent acne had their onset in 1982 or 1983.

Skin Rash/Blisters:

Individuals who received Questionnaire A, A-1, or A-2 were asked if they ever had a skin rash, a skin rash with blisters, and had any part of their body become more sensitive to light. Those who received Questionnaires B, C, or D were asked if they had a skin rash with blisters that became worse with exposure to sunlight.

Twenty three per cent of both the workers and each of the resident groups gave a positive response to one or more of the skin rash/blister questions (Table 14). When the analysis was restricted to workers with definite or possible onset of unspecified rashes or blisters after beginning employment in the vicinity of 80 Lister Avenue, the frequency of such reports was reduced to 16% (Table 15).

Since Questionnaires B, C, and D required a skin rash with blisters that gets worse with sunlight for a positive response, an analysis was performed comparing only cases from Questionnaires A and A-2 meeting these same criteria with the remaining workers. Table 16 shows the result of this comparison with the total

number of possible cases being reduced to 21 (4%). Although 15 of the 64 Ironbound residents answered affirmatively to one or more of the skin rash/blister questions, none had a skin rash with blisters that got worse with exposure to sunlight.

Non-Specific Symptoms:

Only the workers (262) and residents (64) completing Questionnaires A, A-1, and A-2 were asked the question relating to the non-specific symptoms (Figure 3). The highest response rates to any question were received to this question (Table 17). At least half of the workers and residents responding to this question had experienced a persistent problem with one or more of the symptoms. Twelve workers had onset of their symptoms prior to employment and were omitted from further analyses. A diagnosis for all their problems was presented by 19 workers while another 11 had diagnoses for some but not all of their symptoms (Table 18). When frequency of occurrence of the non-specific symptoms was compared between the workers with a diagnosis, workers without a diagnosis but onset given, and workers without a diagnosis with unknown onset, tiredness, dizziness or lightheadedness, and headaches were consistently the most frequently observed symptoms (Table 19).

Diagnoses were presented by 6 residents for each of their symptoms while 3 more residents accounted for some but not all of their symptoms (Table 20). As with the workers, tiredness, dizziness or lightheadedness, and headaches were the most frequently reported non-specific symptoms (Table 21).

Paresthesia:

In Questionnaires A, A-1, and A-2, the individuals were asked if they had experienced tingling or numbness in any of 12 specific joints. Individuals completing Questionnaire B were asked the same question for only the hands, fingers, and feet. Responses to this question were received from 565 workers and 54 Ironbound residents. Positive responses to numbness or tingling in any joint were recorded by 28% of the workers and 19% of the Ironbound residents (Table 22). When positive responses were restricted to the hands, fingers, or feet, the prevalence of such responses was reduced to 24% among the workers and 15% among the Ironbound residents (Table 23).

There was no statistically significant association of paresthesia symptoms in the hands, fingers, or feet of workers with age (Chi Square Goodness of Fit Test, $.50 > p > .30$). The prevalence of such complaints was 19% in the under 30 age group, peaked at 30% in the 40-49 year olds, and decreased to 21% in those over 60 years of age. Similarly, no statistical association could be made between number of years worked and a corresponding increase in paresthesia complaints. While such a comparison of workers who worked more than 10 years against those who worked less than 10 years approached statistical significance, when a comparison point of 15 years was used there was clearly no statistical significance (Chi Square Test, $x^2 = 1.46, .30 > p > .20$).

Difficulty Conceiving:

The analysis of this health concern was based on two questions. First, have you and your spouse had children or tried to have children. If this was answered affirmatively, a second question was then asked of the respondents to determine if

they had experienced difficulty having children. Among the workers, 338 indicated they had children or had tried to have children and 40 indicated they had difficulty conceiving. Among the Ironbound residents, 23 individuals or couples indicated they had tried to have children, all without any difficulty (Table 24).

Birth Defects:

A variety of questions were asked relating to birth defects. Individuals completing Questionnaire A were asked whether any of their children were born with any of several specific birth defects. Those completing Questionnaire A-1 or A-2 were additionally asked to list the years of such defects. Workers completing Questionnaire B were asked only to list the years of birth defects.

This section was completed by 317 workers and 18 Ironbound residents (Table 25). No birth defects were reported by the Ironbound residents while 16 were reported among the workers. Dates of occurrence were not volunteered by most of the Sherwin-Williams, Duralac, or SCA workers, who reported a rate of 8 birth defects per 100 workers. The remaining workers provided the date of occurrence and had a rate of 3 birth defects per 100 workers after employment. Unfortunately, inadequate information was provided to determine birth defect rates per live births.

Light Sensitivity of Eyes:

Individuals who received Questionnaires A, A-1, or A-2 were queried whether their eyes had become more sensitive to light. Of the 257 workers responding, 23% answered in the affirmative and had a definite or possible onset after beginning employment in the area (Table 26). At the same time, 21 of the 63 Ironbound residents responding stated their eyes had become more sensitive.

Cancer:

Workers to whom Questionnaires A-2 and B were administered were queried whether they had ever had cancer. Eleven of the 305 workers responded that they had been diagnosed as having cancer but only eight were diagnosed after beginning employment in this area of Newark (Table 27). One had lung cancer, one had kidney cancer, three had skin cancer, and 3 did not give adequate information to determine the type of cancer.

Other Conditions:

Questions relating to numerous other conditions or risk factors were asked on one or more of the questionnaires. Detailed analyses of these questions were not attempted for a variety of reasons, including a low rate of positive responses or a high percentage of the responses to the question being uninterpretable. A summary tabulation of these questions was completed, however, and is available for review in Appendix C.

DISCUSSION

The anticipated public concern over the discovery of the dioxin contaminated 80 Lister Avenue site necessitated a prompt New Jersey Department of Health response. Upon being informed of the presence of dioxin on this vacant property late on June 1, 1983 the Department recognized the need to make a rapid determination of untoward health effects among residents and workers in the area, to provide the best available health information to concerned citizens, and to ascertain whether there were potential health hazards in the area which required public health intervention until the extent of the contamination could be delineated. In an attempt to meet the first of these needs, the Department initiated a health survey of the residents and workers on June 3, 1983.

In order to quickly initiate the health survey, the Department utilized a questionnaire which it had prepared by Columbia University three years earlier. This questionnaire was delivered to individuals in the area and was self-administered by them. The questionnaire underwent numerous modifications as it was administered to the various groups to make it specific for each group, to reduce the lengthiness of the questionnaire, to eliminate questions which were so non-specific it was apparent that we would be unable to determine if they were chemically related, or to eliminate questions which were being answered with great frequency in an uninterpretable way. The numerous modifications of the questionnaire required that extreme caution be taken in the analysis of the data between the various groups.

Additional problems in the analysis of the data were also introduced by the lack of control groups (residents and workers outside the potential area of dioxin

contamination). Without such individuals to compare against the Newark residents and workers, it is difficult to determine what "normal" or expected levels of responses to at least some of the questions should be.

It is also possible that the anxiety and personal concerns of the individuals completing the questionnaires, particularly those completing the forms immediately after the initial public announcement of the possible health hazard or other similar public announcements, may have resulted in a higher frequency of positive responses, particularly to the more subjective questions. We are also aware that we did not receive responses from all possible respondents to the questionnaires. For instance, SCA had about 68 employees but only 30 completed and returned the questionnaire. Similarly, we estimated that 800 to 1000 individuals lived in the Riverview Apartments but only 300 submitted a completed questionnaire to us. We can not ascertain what epidemiologists call respondent bias since we can not determine if those responding are a representative cross-section of the populations or if they represent those individuals with health concerns or perceived health concerns.

Nonetheless, certain interpretations of the data are possible and certain conclusions can be drawn from these interpretations. The groups who were surveyed in this study did differ from each other significantly. The workers were basically an adult, white male population, with only a 10% female component and about one third of the workers being members of minority groups. Both resident groups on the other hand were composed of a majority of females and had a substantial percentage of respondents being under 20 years of age. While the Ironbound residents responding were basically white, with 19% classifying themselves as of Hispanic origin, the Riverview respondents classified themselves as black (67%) or Hispanic (31%).

Dioxin, specifically 2, 3, 7, 8, -tetrachlorodibenzodioxin (TCDD), has been shown in animal tests to be one of the most toxic compounds known. It causes cancer, birth defects, and miscarriages, as well as death at low doses in animals. Studies of workers exposed to dioxin have shown a special type of acne (chloracne), inflammation of the liver, and pains and weakness in the arms and legs. More recent evidence in the medical literature suggests that dioxin is associated with the occurrence of soft tissue sarcomas in humans, although further studies are necessary.

On initial review of the data, a seemingly high percentage (8%) of the workers gave a history of ever having jaundice, hepatitis, or cirrhosis. When cases with onset prior to employment and apparent cases with an infectious etiology were excluded from the analysis, the frequency of such reports dropped markedly. One group of workers, the Sherwin-Williams workers, remained of concern, however. Over half of the individuals reporting possible cases of liver diseases among this work group failed to give a date of onset of illness. It is therefore impossible to clearly ascertain from this survey whether this group is experiencing an untoward level of hepatic disease as a result of either an environmental exposure at this work location or as a result of occupation exposures.

Seven of the 64 Ironbound residents responding to the liver disease questions indicated that they had experienced at least one occurrence of liver disorder. Three of these, neonatal icterus, a gall bladder disorder, and hepatitis while in the service during World War II, could be disassociated from environmental exposure due to the 80 Lister Avenue site. Three other individuals had single episodes of liver disease over the last 30 years which are suggestive of an infectious etiology. There is no clear association of liver disorders as a result of living in the section of Newark.

Perhaps the most frequently reported symptoms reported in the literature among dioxin workers are the skin lesions associated with chloracne. In addition to exposure to dioxin, chloracne may also result from exposure to other chlorinated hydrocarbon compounds, which many of these workers could be expected to encounter in their jobs. In order to identify possible cases of chloracne, we tabulated the teen persistent, adult transient, and adult persistent acne reports received from the questionnaires. Six percent of the workers had a positive response to the acne question other than teen or adolescent transient acne. When the cases of acne with an onset prior to employment were removed from the analysis, the number of suspicious cases was reduced by more than half. This resulted from the elimination of the teen persistent cases primarily. It is conceivable that at least some of these teen persistent acne cases may be a result of continuing chemical exposures at the workplace. It is also noteworthy that 5 of the 8 adult persistent acne cases had an onset of one year or less. In June of 1983, the Department of Health offered free dermatologic examinations to workers and residents of this area. Many of the workers reporting one of the forms of acne of concern received that examination. None of those workers in whom chloracne was suspected from their responses on the questionnaires and who were subsequently examined, however, had chloracne. A full report on the findings of these dermatologic examinations is presented in Appendix D.

Residents of the Riverview Apartments reported more adult acne (18 cases) than were reported for all the chemical workers in the area, a group nearly twice as large. We can not explain this finding. Subsequent environmental testing in the area of the apartments basically failed to disclose the presence of detectable dioxin (dioxin was present in one of 20 samples at 0.16 ppm, well below any action level). Therefore, it is difficult to attribute these lesions to dioxin, although it is

possible that the acne could be a result of exposure to other chemicals present at work or in the environment. It is also conceivable that the respondents could have misunderstood or misinterpreted the question on acne.

Major interpretative problems occurred in the analysis of the skin rash/blister section of the questionnaire. The purpose of these questions was to ascertain the presence of porphyria cutanea tarda. The Sherwin-Williams, Duralac, and SCA workers and the Ironbound residents were administered questionnaires which asked three distinct questions relating to skin rashes, blisters, and whether such lesions grew worse with exposure to sunlight. The remaining individuals were administered one question which required a skin rash with blister that was worse in the sunlight. Not surprisingly, when the forms were analyzed for any positive responses to these questions, the Sherwin-Williams, Duralac, and SCA workers and the Ironbound residents consistently gave a higher rate of positive responses than almost any other group. Indeed, the Sherwin-Williams workers gave a positive rate nearly twice that of the other three groups receiving the same questionnaire. The questionnaires were administered to the three worker groups the same day and to the Ironbound residents the following day. By analyzing only skin rashes with blisters which get worse with sunlight, the number of positive responses among workers was markedly reduced from 128 to 21. Similarly, the number of cases among Ironbound residents were reduced from 15 to none.

One exception to these findings were the Riverview residents once again. These individuals were queried with only the single question requiring a skin rash, blisters, and the rash becoming worse in the sunlight. Twenty three percent of the respondents answered that they had experienced such a symptom complex. This is comparable to the rate of positive responses experienced by the individuals asked

whether they had experienced any of these three conditions. We feel this is suggestive that this question was misinterpreted as the Riverside residents completed their questionnaires. We are not aware of higher rates of porphyria cutanea tarda among residents as suggested by the positive responses on the questionnaires.

The highest response rates to any questions were to those relating to non-specific symptoms, particularly such subjective symptoms as tiredness, headaches, and dizziness or light headedness. Similarly high rates of positive responses were obtained for the paresthesia and light sensitivity of the eyes questions. The responses to these questions once again represent rather subjective or interpretative responses. Feeling that the prevalence of paresthesia of the hands, fingers, or feet may increase with prolonged exposure to the vicinity of 80 Lister Avenue, we attempted to correlate the time worked with positive responses. Such a finding could not be made nor could a correlation be made with increasing age of the respondents. We can not interpret the meaning of the response rates we received to these questions. Without unexposed controls having been asked the same questions relating to non-specific symptoms, paresthesia, and light sensitivity of the eyes, we are unable to compare these rates to normal or expected levels of responses.

The sections of the questionnaires relating to adverse reproductive outcomes were the most difficult to analyze as they were answered. Only the portion related to difficulty conceiving and birth defects could be analyzed with some degree of confidence. High rates of birth defects per 100 workers were not observed for any group except the Duralac workers. In that instance, the high rate is based upon a very small number of respondents and must be interpreted cautiously. In addition

to problems with the questionnaires on this question, we also lack control groups against whom these responses can be compared.

There is currently considerable concern as to whether dioxin is carcinogenic for humans. The forms of cancer being considered as possibly resulting from dioxin exposure are the soft tissue sarcomas. Over half the workers surveyed were asked whether they had ever had cancer. Only 2% of them had been diagnosed with some form of cancer since beginning employment in the vicinity of 80 Lister Avenue. Five of these 8 workers identified the form of cancer they had. None had been diagnosed as having soft tissue sarcomas.

While a quick response to the public health hazard posed by the finding of dioxin in the vicinity of 80 Lister Avenue resulted in using questionnaires which ultimately gave us results that are partially uninterpretable and do not demonstrate definite health effects, or the lack thereof, attributable to dioxin, this survey does indicate that there are some health complaints in this area of Newark which require further investigation. For instance, Sherwin-Williams workers consistently reported high levels of positive responses, if not the highest levels, to virtually every health concern or condition about which they were queried. A number of these require further investigation, such as the responses to the liver disease questions.

Additionally, the reporting of high frequencies of skin lesions - acne and skin rashes with blisters which become worse when exposed to the sunlight - among Riverview residents requires further explanation. To clarify these issues, it will be necessary to administer additional questionnaires to at least selected individuals and it may be necessary to perform limited physical examinations for some.

Further, it may be necessary to identify control groups to receive identical follow-up to help interpret the findings in the 80 Lister Avenue vicinity.

The Department of Health proposes that additional studies be carried out to investigate in detail the reported health effects described in this report. Such studies have already been conducted for the SCA and Marisol workers. A report on those findings will be forthcoming as soon as it is completely discussed with the involved parties. These additional studies will involve both worker and resident groups.

The Department has also been deeply involved in negotiations with the National Institute of Occupational Safety and Health to thoroughly study the former Diamond Shamrock workers for long-term effects of dioxin. Both the worker/resident and Diamond Shamrock studies must be done in a carefully planned manner to avoid the pitfalls experienced in this quickly implemented study. Only through such carefully planned studies can we hope to accurately assess the health impact of the contaminated 80 Lister Avenue site upon the residents and workers in the adjacent area.

CONCLUSIONS

The health survey of residents and workers in the vicinity of 80 Lister Avenue does not establish a relationship between health complaints and exposure to dioxin. While there were seemingly high response rates to a number of health complaints, it is difficult to interpret the significance of the responses. To some extent, this is due to the apparent difficulty a number of the respondents had with the questions and the lack of a control group as well as the non-specific health effects which have been associated in the medical literature with dioxin.

High response rates were received to non-specific symptoms and to paresthesia questions among all groups queried. Among the workers, the Sherwin-Williams workers consistently had the highest response rates to the symptoms or conditions for which they were queried. In particular, they had high response rates to liver disease of unspecified etiology possibly occurring after employment and to skin rashes and/or blistering. The Riverview residents reported high response rates to skin problems, namely, adult acne and skin rashes with blisters which became worse with exposure to sunlight.

Most of the workers who were surveyed work in industries which may be characterized as chemical industries. It would be anticipated that many of the chemicals with which they work could be potentially toxic with health effects similar to those which were studied in this survey. With such chemicals being utilized in this area of Newark, it is quite conceivable that the results obtained in this survey may be indicative of occupational or environmental health hazards other than dioxin.

In light of the findings of this survey, the New Jersey Department of Health makes the following recommendations:

1. Additional studies should be conducted among individual groups of workers and residents to better define the health effects/complaints, including possible identification of the sources of the complaints.
2. Studies in each group of workers or residents should be carefully prepared to be specific for each group in order to accurately assess their health status.
3. Control groups should be identified and concurrently studied for each appropriate study group.
4. A study should be conducted among the former Newark Diamond Shamrock workers to determine the long-term effects of dioxin.
5. The Department of Health should continue to review the proposed clean-up plans for 80 Lister Avenue and monitor the actual clean-up activities.
6. The Department of Health should continue to review the environmental monitoring data for potential health hazards.

FIGURES AND TABLES

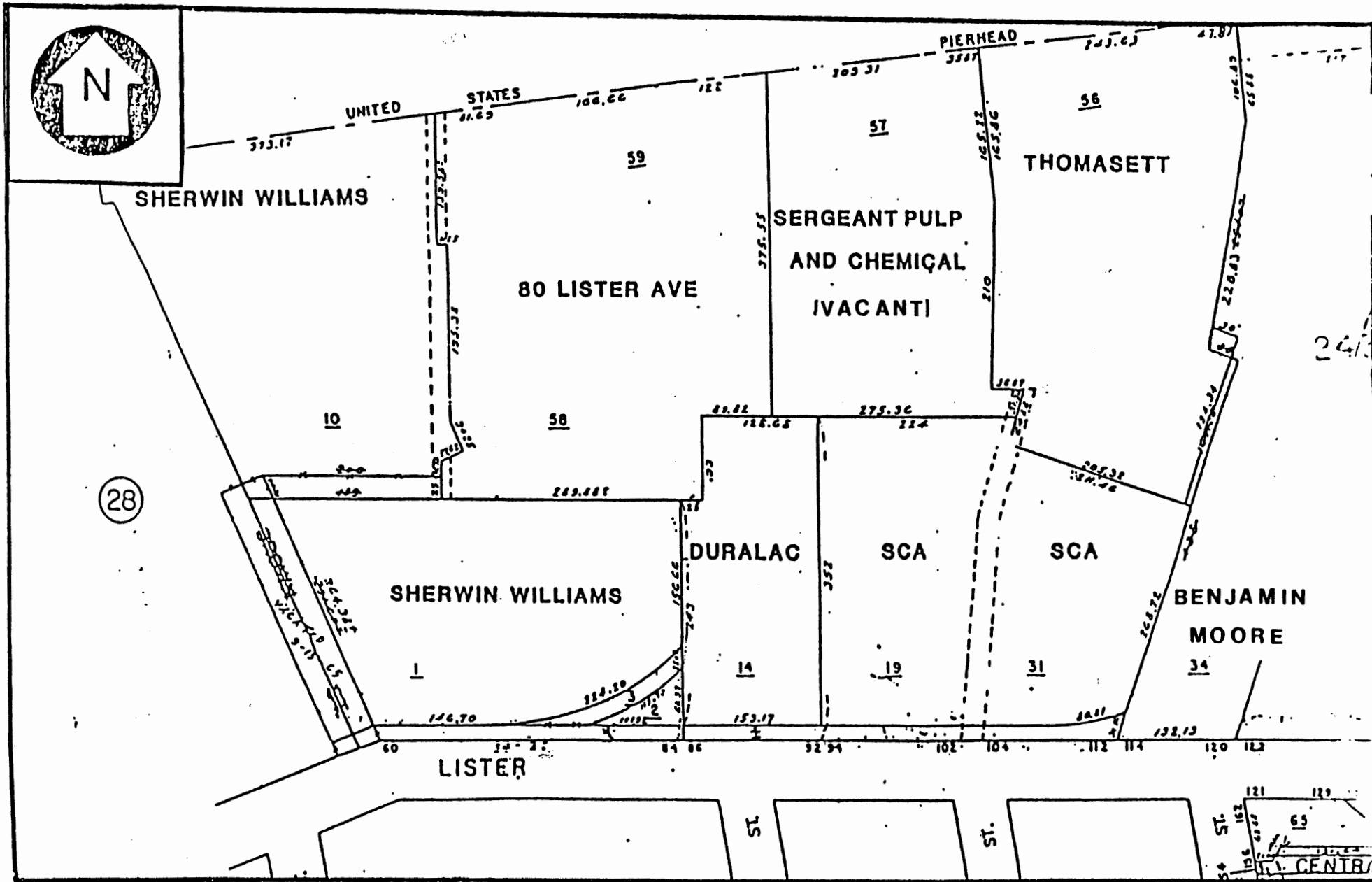


FIGURE 1

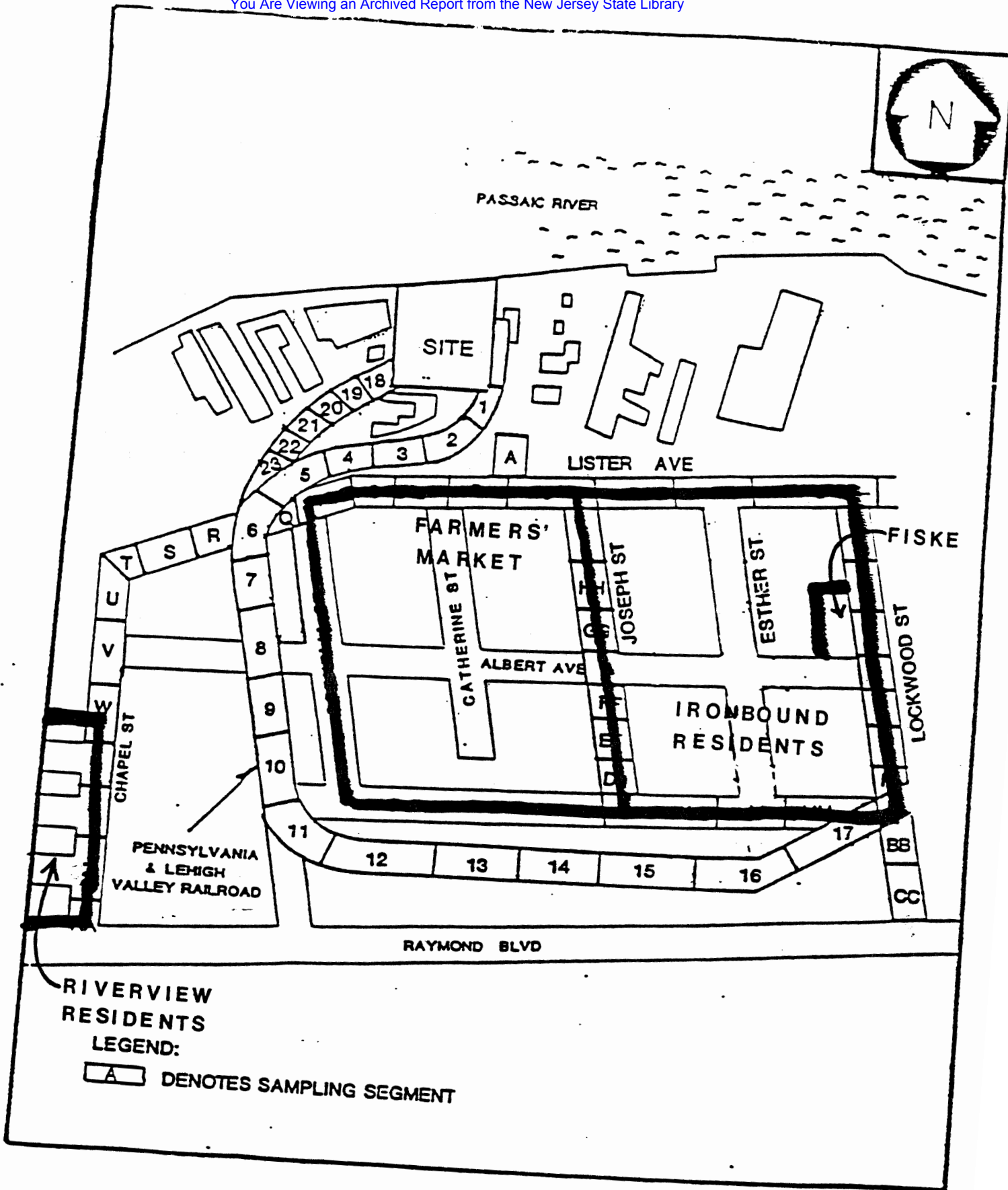


FIGURE 2

FIGURE 3

Have you at any time had a persistent problem with any of the symptoms below?

Please fill in boxes below.

<u>Problem</u>			<u>Did you seek medical attention?</u>		<u>What Year?</u>	<u>If a name was given to your problem (diagnosis) what was it?</u>		
a. Tiredness	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____
b. Headaches	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____
c. Nervous disorders	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____
d. Hearing loss	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____
e. Difficulty with memory or concentration	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____
f. Dizziness or light headedness	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____
g. Feel faint	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____
h. Fainted more than twice (not related to drinking)	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____
i. Blurred vision (other other needing glasses?)	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	<input type="checkbox"/>	no <input type="checkbox"/>	yes <input type="checkbox"/>	_____	_____

TABLE 1
QUESTIONNAIRE ADMINISTERED TO EACH OF GROUPS
IN VICINITY OF 80 LISTER AVENUE

<u>Worker</u>	<u>Date Administered</u>	<u>Questionnaire</u>
Sherwin-Williams	June 3	A
Duralac	June 3	A
SCA	June 3	A
Thomasset	June 8	B
Benjamin Moore	June 7	B
Fiske	June 8	B
Farmers' Market	June 10	C
Marisol (Summer Employees)	June 6	A-2
<u>Residents</u>		
Ironbound residents	June 4	A-1
Riverview residents	June 10, 11	D

TABLE 2
SOURCE AND NUMBER OF RESPONDENTS TO QUESTIONNAIRES

<u>Worker</u>	
Sherwin-Williams	204
Duralac	20
SCA	30
Thomasset	35
Benjamin Moore	222
Fiske	44
Farmers' Market	22
Marisol (Summer Employees)	18
<u>Residents</u>	
Ironbound residents	67
Riverview residents	<u>301</u>
TOTAL	963

TABLE 3
SEX DISTRIBUTION OF RESPONDENTS TO QUESTIONNAIRES

<u>Workers</u>	<u>Male</u>	<u>Female</u>
Sherwin-Williams	162	42
Duralac	18	2
SCA	26	3
Thomasset	33	2
Benjamin Moore	206	15
Fiske	38	6
Farmers' Market	21	1
Marisol (Summer Employees)	18	0
 <u>Residents</u>		
Ironbound residents	26	38
Riverview residents	<u>122</u>	<u>179</u>
TOTAL	670	288

TABLE 4

RACE/ETHNICITY DISTRIBUTION OF RESPONDENTS TO QUESTIONNAIRES

<u>Workers</u>	<u>White</u>	<u>Black</u>	<u>Hispanic</u>	<u>Other or Non-respondents</u>
Sherwin-Williams	104	71	24	5
Duralac	12	7	0	1
SCA	13	16	0	1
Thomasset	8	21	4	2
Benjamin Moore	175	34	7	6
Fiske	44	0	0	0
Farmers' Market	15	5	1	1
Marisol (Summer Employees)	18	0	0	0
 <u>Residents</u>				
Ironbound residents	52	0	12	3
Riverview residents	<u>6</u>	<u>196</u>	<u>92</u>	<u>7</u>
TOTAL	447	350	140	26

TABLE 5
AGE DISTRIBUTION OF RESPONDENTS TO QUESTIONNAIRES

<u>Workers</u>	Age in Years									
	<u>0 - 19</u>		<u>20 - 39</u>		<u>40 - 59</u>		<u>60+</u>		<u>Not Given</u>	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
<u>Sherwin Willaims</u>										
Office	-	-	25	(55)	18	(39)	3	(6)	-	-
Production	-	-	37	(52)	28	(39)	5	(7)	1	(2)
Shipping	1	(2)	22	(44)	22	(44)	5	(10)	-	-
Maintenance and Labs	-	-	8	(21)	20	(54)	6	(16)	3	(8)
(Aggregate)	(1)	(0.5)	(92)	(46)	(88)	(44)	(19)	(9)	(4)	(2)
Duralac	-	-	7	(35)	11	(55)	2	(10)	-	-
SCA	-	-	16	(54)	11	(36)	2	(7)	1	(3)
Thomasset	-	-	9	(26)	20	(58)	5	(14)	1	(3)
<u>Benjamin Moore</u>										
Production	4	(4)	51	(50)	32	(32)	13	(13)	2	(2)
Labs	-	-	27	(46)	20	(35)	8	(14)	3	(5)
Shipping	3	(8)	20	(51)	14	(36)	2	(5)	-	-
Office	-	-	10	(43)	8	(35)	5	(22)	-	-
(Aggregate)	(7)	(3)	(108)	(49)	(74)	(34)	(28)	(13)	(5)	(2)
<u>Fiske</u>										
Production and Shipping	-	-	11	(41)	9	(33)	7	(26)	-	-
Office	-	-	8	(47)	5	(30)	4	(24)	-	-
(Aggregate)	-	-	(19)	(43)	(14)	(31)	(11)	(25)	-	-
Farmers' Market	1	(5)	6	(27)	9	(41)	4	(18)	2	(9)
Marisol	6	(33)	11	(61)	-	-	-	-	1	(6)
<u>Residents</u>										
Ironbound residents	20	(30)	16	(23)	10	(15)	17	(25)	4	(6)
Riverview residents	114	(38)	76	(25)	63	(21)	38	(13)	10	(3)

TABLE 6

POSITIVE RESPONSE TO ONE OR MORE LIVER DISEASE QUESTIONS

<u>Employees</u>	<u>Total Responding</u>	<u>#</u>	<u>%</u>
Sherwin-Williams			
Office	46	6	13
Production	71	4	6
Shipping	47	6	13
Maintenance and Labs	<u>34</u>	<u>4</u>	<u>12</u>
	198	20	10
Duralac	18	1	6
SCA	30	0	0
Thomasset	33	4	12
Benjamin Moore			
Office	23	1	4
Production	102	4	4
Shipping	37	2	5
Labs	<u>58</u>	<u>2</u>	<u>3</u>
	189	9	5
Fiske			
Office	17	1	6
Production and Shipping	<u>27</u>	<u>3</u>	<u>11</u>
	44	4	9
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>2</u>	<u>11</u>
TOTAL WORKERS	530	40	8
<u>Residents</u>			
Ironbound residents	64	7	11
Riverview resident	ATTRIBUTE NOT SURVEYED		

TABLE 7
ANALYSIS OF POSITIVE RESPONSES TO LIVER DISEASE
QUESTIONS AMONG WORKERS

<u>Liver disease not associated with employment</u>	
Liver disease, prior to employment	12
Infectious mononucleosis hepatitis	2
Hepatitis carrier	<u>1</u>
	15
<u>Liver disease possibly associated with employment</u>	
Liver disease at work, prior to 1951	2
Liver disease at work, after 1950	12
Liver disease, onset date not given	<u>11</u>
	25

TABLE 8

UNSPECIFIED LIVER DISEASE AMONG WORKERS
WITH POSSIBLE ONSET AFTER BEGINNING OF EMPLOYMENT

	<u>Total Responding</u>	<u>Onset After Employment</u>	<u>Date of Onset Unknown</u>	<u>Total Possible Cases (%)</u>	
Sherwin-Williams					
Office	46	2	1	3	(7)
Production	71	3	1	4	(8)
Shipping	47	1	4	5	(11)
Maintenance & Labs	34	1	2	3	(9)
	<u>198</u>	<u>7</u>	<u>8</u>	<u>15</u>	<u>(8)</u>
Duralac	18	1	0	1	(6)
SCA	30	0	0	0	(0)
Thomasset	33	1	2	3	(9)
Benjamin Moore					
Office	23	0	0	0	(0)
Production	71	2	0	2	(3)
Shipping	37	1	0	1	(3)
Labs	58	0	0	0	(0)
	<u>189</u>	<u>3</u>	<u>0</u>	<u>3</u>	<u>(2)</u>
Fiske					
Office	17	1	0	1	(6)
Production & Shipping	27	1	1	2	(7)
	<u>44</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>(7)</u>
Farmers' Market		ATTRIBUTE NOT SURVEYED			
Marisol	<u>18</u>	<u>0</u>	<u>0</u>	<u>0</u>	(0)
TOTAL WORKERS	530	14	11	25	(5)

TABLE 9

POSITIVE RESPONSE TO ACNE QUESTION, OTHER THAN TRANSIENT
ADOLESCENT CASES

<u>Workers</u>	<u>Number Responding</u>	<u>Teen Persistent</u>	<u>Adult Transient</u>	<u>Adult Persistent</u>	<u>Total (%)</u>
<u>Sherwin-Williams</u>					
Office	45	3	-	-	3 (7)
Production	70	1	-	-	1 (1)
Shipping	47	-	1	3	4 (9)
Maintenance & Labs	<u>36</u>	<u>2</u>	<u>-</u>	<u>1</u>	<u>3</u> (8)
	198	6	1	4	11 (6)
Duralac	17	-	1	-	1 (6)
SCA	29	1	-	1	2 (7)
Thomasset	27	1	2	-	3 (11)
<u>Benjamin Moore</u>					
Office	22	-	-	-	- (0)
Production	98	3	1	3	7 (7)
Shipping	34	3	-	-	3 (9)
Labs	<u>56</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>4</u> (7)
	210	8	2	4	14 (7)
<u>Fiske</u>					
Office	16	1	-	-	1 (6)
Production & Shipping	<u>24</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u> (0)
	40	1	-	-	1 (2)
Farmers' Market	21	-	-	-	- (0)
Marisol	<u>18</u>	<u>4</u>	<u>-</u>	<u>-</u>	<u>4</u> (22)
TOTAL WORKERS	560	21	6	9	36 (6)
<u>Residents</u>					
Ironbound residents	62	1	-	-	1 (2)
Riverview residents	286	7	6	12	25 (9)

TABLE 10

ACNE AMONG WORKERS WITH ONSET AFTER BEGINNING EMPLOYMENT

<u>Workers</u>	<u>Number Responding</u>	<u>Teen Persistent</u>	<u>Adult Transient</u>	<u>Adult Persistent</u>	<u>Total (%)</u>
Sherwin-Williams					
Office	45	-	-	-	- (0)
Production	70	-	-	-	- (0)
Shipping	47	-	-	3*	3 (6)
Maintenance & Labs	<u>36</u>	<u>-</u>	<u>1</u>	<u>-</u>	<u>1</u> (3)
	198	-	1	3	4 (2)
Duralac	17	-	1	-	1 (6)
SCA	29	-	-	1	1 (3)
Thomasset	27	-	2	-	2 (7)
Benjamin Moore					
Office	22	-	-	-	- (0)
Production	98	-	-	2	2 (2)
Shipping	34	-	1**	-	1 (3)
Labs	<u>56</u>	<u>-</u>	<u>1</u>	<u>2</u>	<u>3</u> (5)
	210	-	2	4	6 (3)
Fiske					
Office	21	-	-	-	- (0)
Production & Shipping	<u>24</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u> (0)
	40	-	-	-	- (0)
Farmers' Market	16	-	-	-	- (0)
Marisol	<u>18</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>1</u> (6)
TOTAL WORKERS	560	1	6	8	15 (3)

*22 y.o. had worked 3 weeks prior to administration of questionnaire; acne began in 1983.

**21 y.o. had worked summers of 1982 and 1983; transient acne began sometime in 1982.

TABLE 11

CHARACTERISTICS OF WORKERS WITH ADULT PERSISTENT ACNE
WITH ONSET AFTER BEGINNING EMPLOYMENT

	Age at Onset (n=8)	Years Worked at Onset (n=8)	Duration of Rash (Years) (n=8)
Range	20-51	0-18	0-9*
Mean	30.9	3.6	2.8
Median	28	1.5	1.0

*5 had onset in 1982 or 1983.

TABLE 12

CHARACTERISTICS OF WORKERS WITH ADULT TRANSIENT ACNE
WITH ONSET AFTER BEGINNING EMPLOYMENT

	Age at Onset (n=6)	Years Worked at Onset (n=6)
Range	20-48	0-20
Mean	34.2	8.3
Median	38.5	6.0

TABLE 13
 CHARACTERISTICS OF ALL WORKERS WITH TEEN PERSISTENT ACNE

	Current Age <u>(n=19)</u>	Age at Onset <u>(n=18)</u>	Duration of Acne (Years) <u>(n=16)</u>	<u>Years With Acne</u>	
				Before Employ. <u>(n=15)</u>	After Employ. <u>(n=18)</u>
Range	20-55	11-19	2-39	0-26	1/4-38
Mean	29.3	14.8	14.8	6.3	7.1
Median	25	15.0	11.5	5.0	4.5

TABLE 14

POSITIVE RESPONSE TO SKIN RASH/BLISTER QUESTIONS

<u>Workers</u>	<u>Number Responding</u>	<u>#</u>	<u>%</u>
Sherwin-Williams			
Office	46	20	43
Production	70	19	27
Shipping	49	29	59
Maintenance and Labs	<u>36</u>	<u>17</u>	<u>47</u>
	201	85	42
Duralac	18	4	22
SCA	30	6	20
Thomasset	28	4	14
Benjamin Moore			
Office	22	0	0
Production	97	7	7
Shipping	36	2	6
Labs	<u>57</u>	<u>2</u>	<u>4</u>
	210	11	5
Fiske			
Office	16	0	0
Production and Shipping	<u>24</u>	<u>4</u>	<u>17</u>
	40	4	10
Farmers' Market	22	1	5
Marisol	<u>18</u>	<u>13</u>	<u>72</u>
TOTAL WORKERS	567	128	23
<u>Residents</u>			
Ironbound residents	64	15	23
Riverview resident	282	66	23

TABLE 15

UNSPECIFIED SKIN RASHES/BLISTERS AMONG WORKERS WITH ONSET DEFINITELY
OR POSSIBLY AFTER BEGINNING EMPLOYMENT

	<u>Number Responding</u>	<u>Definitely After Employment</u>	<u>Possibly After Employment</u>	<u>Total Possible (%)</u>
Sherwin-Williams				
Office	46	11	4	15 (33)
Production	70	12	4	16 (23)
Shipping	49	16	5	21 (43)
Maintenance & Labs	36	10	2	12 (33)
	<u>201</u>	<u>49</u>	<u>15</u>	<u>64</u> (32)
Duralac	18	1	0	1 (6)
SCA	30	1	0	1 (3)
Thomasset	28	0	3	3 (11)
Benjamin Moore				
Office	22	0	0	0 (0)
Production	97	0	6	6 (6)
Shipping	36	0	2	2 (6)
Labs	57	0	2	2 (4)
	<u>210</u>	<u>0</u>	<u>10</u>	<u>10</u> (5)
Fiske				
Office	16	0	0	0 (0)
Production & Shipping	24	0	3	3 (13)
	<u>40</u>	<u>0</u>	<u>3</u>	<u>3</u> (8)
Farmers' Market	22	1	0	1 (6)
Marisol	<u>18</u>	<u>2</u>	<u>4</u>	<u>6</u> (33)
TOTAL WORKERS	567	54	35	89 (16)

TABLE 16

UNSPECIFIED SKIN RASHES WITH BLISTERS THAT GETS WORSE WITH SUNLIGHT
WITH DEFINITE OR POSSIBLE ONSET AFTER BEGINNING EMPLOYMENT

	<u>Number Responding</u>	<u>Definitely After Employment</u>	<u>Possibly After Employment</u>	<u>Total Possible (%)</u>	
Sherwin-Williams					
Office	46	2	0	2	(4)
Production	70	0	1	1	(1)
Shipping	49	0	0	0	(0)
Maintenance & Labs	36	0	0	0	(0)
	<u>201</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>(1)</u>
Duralac	18	0	0	0	(0)
SCA	30	0	0	0	(0)
Thomasset	28	0	3	3	(11)
Benjamin Moore					
Office	22	0	0	0	(0)
Production	97	0	6	6	(6)
Shipping	36	0	2	2	(6)
Labs	57	0	2	2	(4)
	<u>210</u>	<u>0</u>	<u>10</u>	<u>10</u>	<u>(5)</u>
Fiske					
Office	16	0	0	0	(0)
Production	24	0	3	3	(13)
	<u>40</u>	<u>0</u>	<u>3</u>	<u>3</u>	<u>(8)</u>
Farmers' Market	22	1	0	1	(5)
Marisol	<u>18</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>(6)</u>
TOTAL WORKERS	567	3	18	21	(4)

TABLE 17

TOTAL POSITIVE RESPONSE TO NON-SPECIFIC SYMPTOMS QUESTIONS

<u>Workers</u>	<u>Total Responding</u>	<u>#</u>	<u>%</u>
Sherwin-Williams			
Office	45	27	60
Production	71	32	45
Shipping	46	30	65
Maintenance & Labs	<u>35</u>	<u>24</u>	<u>69</u>
	197	113	57
Duralac	18	5	28
SCA	29	10	35
Thomasset	ATTRIBUTE NOT STUDIED		
Benjamin Moore	ATTRIBUTE NOT STUDIED		
Fiske	ATTRIBUTE NOT STUDIED		
Farmers' Market	ATTRIBUTE NOT STUDIED		
Marisol	<u>18</u>	<u>13</u>	<u>72</u>
TOTAL WORKERS	262	141	54
<u>Residents</u>			
Ironbound residents	64	32	50
Riverview resident	ATTRIBUTE NOT STUDIED		

TABLE 18
 DIAGNOSES GIVEN FOR NON-SPECIFIC SYMPTOMS AMONG WORKERS
 WITH ONSETS AFTER BEGINNING EMPLOYMENT

<u>Diagnosis</u>	<u>No.</u>
Hypertension	7
Colds	4
Mononucleosis	2
Hypotension	2
Stress	2
Blood pressure	2
Anxiety	2
Glasses	2
Anemia	2
Normal headaches	1
Tension headaches	1
Inner ear infection	1
Wax build-up in ears	1
Herpes	1
Lupus	1
Heart condition	1
Labrinthitis	1
Hepatitis	1
Working around noise	1
Asthma	1
Spasms	1

TABLE 19

RANKING OF NON-SPECIFIC SYMPTOMS AMONG
WORKERS WITH POSSIBLE ONSET AFTER BEGINNING
EMPLOYMENT

Rank	Workers with a Diagnosis (n=30)*		Workers without Diagnosis	
			Onset Given (n=57)	No Onset (n=53)
1.	T	(57%)	T (56%)	T (58%) HA (58%)
2.	D	(40%)	HA (47%) D (47%)	---
3.	HA	(37%)	---	D (47%)
4.	FF	(23%)	V (42%)	M (23%)
5.	N V	(20%) (20%)	FF (39%) M (39%)	H (19%)
6.	---		---	N (17%) V (17%)
7.	H	(17%)	N (19%) H (19%)	---
8.	F	(7%)	---	FF (15%)
9.	M	(0%)	F (9%)	F (4%)

*Includes 11 workers who had diagnoses for some but not all symptoms.

- T = Tiredness
- HA = Headaches
- N = Nervous disorders
- H = Hearing loss
- M = Difficulty with memory or concentration
- D = Dizziness or light headedness
- FF = Feel faint
- F = Fainted more than twice
- V = Blurred vision

TABLE 20

DIAGNOSES GIVEN FOR NON-SPECIFIC SYMPTOMS AMONG RESIDENTS

<u>Diagnosis</u>	<u>No.</u>
Old age	2
Migraine headaches	2
Anxiety	2
Arthritis	2
Middle ear infection	1
Allergy	1
Anemia	1
Shingles	1
Hardening of arteries	1
Loud rock and roll music	1

TABLE 21
 RANKING OF NON-SPECIFIC SYMPTOMS AMONG
 WORKERS WITH POSSIBLE ONSET AFTER BEGINNING
 EMPLOYMENT

<u>Rank</u>	<u>Residents With a Diagnosis (n=9)*</u>	<u>Residents Without a Diagnosis (n=26)</u>
1.	T (78%)	HA (54%)
2.	HA (56%)	T (46%)
3.	D (44%)	D (35%)
4.	N (33%) H (33%) FF (33%)	M (27%)
5.	---	FF (15%) V (15%)
6.	---	---
7.	V (22%)	H (12%)
8.	M (11%) F (11%)	N (8%)
9.	---	F (0%)

*Includes 3 residents who had diagnoses for some but not all symptoms.

TABLE 22

POSITIVE RESPONSE TO NUMBNESS OR TINGLING OF ANY JOINT

<u>Employees</u>	<u>Total Responding</u>	<u>#</u>	<u>%</u>
Sherwin-Williams			
Office	45	11	24
Production	71	12	17
Shipping	50	21	42
Maintenance and Labs (Aggregate)	(203)	(59)	(29)
Duralac	18	1	6
SCA	30	4	13
Thomasset	32	12	38
Benjamin Moore			
Office	23	4	17
Production	102	38	37
Shipping	38	13	34
Labs (Aggregate)	57 (220)	16 (71)	28 (32)
Fiske			
Office	17	2	12
Production and Shipping (Aggregate)	27 (44)	11 (13)	41 (30)
Farmers' Market	ATTRIBUTE NOT STUDIED		
Marisol (Summer employees)	<u>18</u>	<u>0</u>	<u>0</u>
TOTAL WORKERS	565	160	28
 <u>Residents</u>			
Ironbound residents	54	10	19
Riverview resident	ATTRIBUTE NOT STUDIED		

TABLE 23

POSITIVE RESPONSE TO NUMBNESS OR TINGLING OF HANDS, FINGERS, OR FEET

<u>Workers</u>	<u>Total Responding</u>	<u>#</u>	<u>%</u>
Sherwin-Williams			
Office	45	8	18
Production	71	7	10
Shipping	50	14	28
Maintenance and Labs	<u>37</u>	<u>8</u>	<u>22</u>
	203	37	18
Duralac	18	1	6
SCA	30	3	10
Thomasset	32	12	38
Benjamin Moore			
Office	23	4	17
Production	102	38	37
Shipping	38	13	34
Labs	<u>57</u>	<u>16</u>	<u>24</u>
	220	71	32
Fiske			
Office	17	2	12
Production and Shipping	<u>27</u>	<u>11</u>	<u>41</u>
	44	13	30
Farmers' Market	ATTRIBUTE NOT STUDIED		
Marisol	<u>18</u>	<u>0</u>	<u>0</u>
TOTAL WORKERS	565	137	24
 <u>Residents</u>			
Ironbound residents	54	8	15
Riverview resident	ATTRIBUTE NOT STUDIED		

TABLE 24

RESPONSES TO QUESTIONS RELATING TO DIFFICULTY CONCEIVING

<u>Workers</u>	<u>Total Responding</u>	<u>#</u>	<u>%</u>
Sherwin-Williams			
Office	26	6	23
Production	52	0	0
Shipping	32	7	22
Maintenance and Labs	<u>25</u>	<u>2</u>	<u>8</u>
	135	15	11
Duralac	9	0	0
SCA	19	2	11
Thomasset	24	4	17
Benjamin Moore			
Office	15	2	13
Production	53	5	9
Shipping	23	3	13
Labs	<u>31</u>	<u>5</u>	<u>16</u>
	122	15	12
Fiske			
Office	6	0	0
Production and Shipping	<u>19</u>	<u>4</u>	<u>21</u>
	25	4	16
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>4</u>	<u>0</u>	<u>0</u>
TOTAL WORKERS	338	40	12
 <u>Residents</u>			
Ironbound residents	23	0	0
Riverview resident	ATTRIBUTE NOT SURVEYED		

TABLE 25

BIRTH DEFECTS IN CHILDREN BORN TO WORKERS* AND RESIDENTS
IN VICINITY OF 80 LISTER AVENUE

<u>Workers</u>	<u>Number Responding</u>	<u>#</u>	<u>%</u>
Sherwin-Williams			
Office	24	1	4
Production	50	2	4
Shipping	26	3	12
Maintenance and Labs	<u>23</u>	<u>3</u>	<u>13</u>
	123	9	7
Duralac	6	2	33
SCA	17	0	0
Thomasset	23	1	4
Benjamin Moore			
Office	16	0	0
Production	52	2	4
Shipping	20	0	0
Labs	<u>32</u>	<u>1</u>	<u>3</u>
	120	3	3
Fiske			
Office	6	0	0
Production	<u>18</u>	<u>1</u>	<u>6</u>
	24	1	4
Farmers' Market	ATTRIBUTE NOT STUDIED		
Marisol	<u>4</u>	<u>0</u>	<u>0</u>
TOTAL WORKERS	317	16	5
<u>Residents</u>			
Ironbound residents	18	0	0
Riverview resident	ATTRIBUTE NOT STUDIED		

*Birth defects which possibly occurred after beginning employment; dates of occurrence not volunteered for most Sherwin-Williams, Duralac, and SCA workers.

TABLE 26

INCREASED LIGHT SENSITIVITY OF THE EYES AMONG WORKERS
WITH POSSIBLE ONSET AFTER BEGINNING EMPLOYMENT

<u>Workers</u>	<u>Responding</u>	<u>Onset After Employment</u>	<u>Onset Not Given</u>	<u>(%)</u>
Sherwin-Williams				
Office	44	12	3	34
Production	66	8	1	14
Shipping	46	16	6	48
Maintenance & Labs	<u>35</u>	<u>6</u>	<u>2</u>	<u>23</u>
	191	42	12	28
Duralac	20	1	0	5
SCA	29	1	0	3
Thomasset		ATTRIBUTE NOT SURVEYED		
Benjamin Moore		ATTRIBUTE NOT SURVEYED		
Fiske		ATTRIBUTE NOT SURVEYED		
Farmers' Market		ATTRIBUTE NOT SURVEYED		
Marisol	<u>17</u>	<u>1</u>	<u>3</u>	<u>24</u>
TOTAL WORKERS	257	45	15	23

TABLE 27

CANCER AMONG WORKERS WITH DIAGNOSIS AFTER
BEGINNING EMPLOYMENT

<u>Workers</u>	<u>Total Responding</u>	<u>#</u>	<u>%</u>
Sherwin-Williams	ATTRIBUTE NOT SURVEYED		
Duralac	ATTRIBUTE NOT SURVEYED		
SCA	ATTRIBUTE NOT SURVEYED		
Thomasset	28	1	4
Benjamin Moore			
Office	23	1	4
Production	99	0	0
Shipping	37	0	0
Labs	<u>56</u>	<u>4</u>	<u>7</u>
	215	5	2
Fiske			
Office	17	0	0
Production & Shipping	<u>27</u>	<u>2</u>	<u>7</u>
	44	2	5
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>0</u>	<u>0</u>
TOTAL WORKERS	305	8	3
Residents	ATTRIBUTE NOT SURVEYED		

APPENDIX A



QUESTIONNAIRE A
(Sherwin Williams, Duralac.
SCA)

State of New Jersey

DEPARTMENT OF HEALTH

JOHN FITCH PLAZA

CN 360, TRENTON, N.J. 08625

J. RICHARD GOLDSTEIN, M.D.
COMMISSIONER

C O N S E N T

I have been informed that the New Jersey State Department of Health is conducting a study of environmental factors and their effect on the health of individuals. This study involves obtaining information from me about my residence, occupation, and health, as well as some information about other substances I may have been exposed to. I understand it may be necessary to contact me again.

I have agreed to take part in this study and to give information understanding that:

1. My responses will be kept completely confidential.
2. My participation is voluntary and I am free to discontinue participation at any time.
3. The information in this study will be summarized by the New Jersey State Department of Health to determine whether environmental factors in this area may contribute to health problems.

Name of Participant (Print)

Signature

Date

1. Name: _____

Address: _____
Street

_____ City State Zip

Home Phone: () _____
AC

2. Date of Birth _____
Mo. Day Yr.

3. Social Security No: _____

4. Sex: Male _____ Female _____

4. Race: White _____ Black _____
Hispanic _____
Other _____

6. Veterans Status:

Are you a veteran? Yes ___ No ___

When were you in the Service? _____

If Vietnam Veteran, did you serve in IndoChina? Yes ___ No ___

When? _____

Where? _____

7. What is your current job title at Sherwin Williams? _____

8. What area/department do you work in? _____

a) What shift do you work? _____

b) How long have you been working in this area? _____

9. Have you had any other job titles while working at Sherwin Williams? Yes ___

No ___

10. If yes, please list them:

11. Please list in order, all other jobs you have had. (Start with your first job)

	Years From - To	1. Name of Company 2. What did they do or mfg. 3. What was your job title?			Were You Exposed to Chemicals? Yes No	
1. First regular job		1.				
		2.				
		3.				
2. Next regular job		1.				
		2.				
		3.				
3. Next regular job		1.				
		2.				
		3.				
4. Next regular job		1.				
		2.				
		3.				
5. Next regular job		1.				
		2.				
		3.				
6. Vacation jobs		1.				
		2.				
		3.				
7. "Second" jobs		1.				
		2.				
		3.				
8. Temporary work		1.				
		2.				
		3.				
9. Wartime Employment (incl. WW II)		1.				
		2.				
		3.				

12. Any adverse effects noted from above jobs?

List by Job Number.

13. Any of your hobbies involve adverse exposure? Yes ___ No ___

When _____

Exposures _____

14. Ever live near Plant, Mine or Facility that could have released hazardous material? Yes ___ No ___

Where _____

Skin Disorders

1. Did you ever have acne? Yes ___ No ___

If yes, how old were you? _____

Did it clear up? Yes ___ No ___

2. Have you ever had a skin rash? Yes ___ No ___

If yes, when _____
year

3. Have you ever had a skin rash with blisters? Yes ___ No ___

If yes, when _____
year

4. Have your eyes become more sensitive to light? Yes ___ No ___

If yes, when _____
year

5. Has any other part of your body become more sensitive to light? Yes ___ No ___

If yes, have any of the following developed?

Blisters _____ Sores _____ Worsening of rash _____

Other (describe) _____
_____ Year it began _____

6. Have you ever noticed a change in your hair color or pattern? Yes ___ No ___

Digestive System

	No	Yes	Has it happened more than once?	Year it first began
1. Have you lost 20 or more pounds without changing your diet?				
2. Do you regularly experience loss of appetite?				
3. Have you ever been repeatedly nauseous when you haven't had a flu or other sickness				
4. Are you regularly troubled with constipation?				
5. Are you regularly troubled with diarrhea?				
6. Have you ever had jaundice (yellow eyes and skin)?				
7. Have you ever had hepatitis?				
8. Has a doctor ever told you that you had cirrhosis of the liver?				
9. Have you ever passed urine that is oak brown (coca-cola colored)?				

1. How many hours do you normally sleep? _____
 2. In addition, do you take regular naps? (at least 3 times per week) yes no
 3. Do you usually wake up rested? yes no
 4. Have you noticed a change in your sense of smell or taste? yes no
If yes,
Smell: increase decrease Taste: increase decrease
 5. Have you or your family ever noticed a personality change? yes no
 6. Do you regularly (not just once in a while) show any of the following?
Check box: depression get into violent rage anxiety (uptight)
 irritable other _____
- When did this begin _____
year

Have you at any time had a persistent problem with any of the symptoms below?

Please fill in boxes below.

<u>Problem</u>			<u>Did you seek medical attention?</u>		<u>What Year?</u>	<u>If a name was given to your problem (diagnosis) what was it?</u>				
a. Tiredness	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____
b. Headaches	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____
c. Nervous disorders	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____
d. Hearing loss	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____
e. Difficulty with memory or concentration	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____
f. Dizziness or light headedness	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____
g. Feel faint	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____
h. Fainted more than twice (not related to drinking)	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____
i. Blurred vision (other than needing glasses?)	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	yes	_____	_____

MUSCLE AND BONE SYSTEM

We want to know if you've experienced unusual tightening, numbness, pain, swelling, or stiffness in any of the following joints (not associated with exercise or exertion). Please check any such experience below.

Symptoms In Joints

	Tingling	Numbness	Swelling	Stiffness	Pain
1. Hands					
2. Fingers					
3. Wrists					
4. Elbows					
5. Arms					
6. Shoulders					
7. Hips					
8. Knees					
9. Ankles					
10. Feet					
11. Toes					
12. Neck					

1. Do you smoke cigarettes? Yes ___ No ___ How many cigarettes a day? _____

2. Did you smoke previously and quit? Yes ___ No ___ When? _____

3. Do you drink alcoholic beverages regularly? Yes ___ No ___

If yes, show how many glasses or shots each day: Beer ___ Wine ___ Liquor ___

FAMILY HISTORY

1. Have you and your spouse had children or tried to have children? Yes ___ No ___

2. Who is completing this section? Mother ___ Father ___ Both ___

3. Have you ever experienced difficulty in having children? Yes ___ No ___

4. Did you or your spouse see a doctor regarding this? Yes ___ No ___

5. What was the diagnosis? _____

6. Have you or your wife been tested for sterility? Yes ___ No ___

If yes, check which Husband ___ Wife ___ Both ___

What were the results of this test? _____

7. Have any of your children been born with any of the following conditions?

<u>Condition</u>	<u>Yes</u>	<u>No</u>	<u>How Many Children?</u>
a) Cleft palate/cleft lip	___	___	_____
b) Clubfoot	___	___	_____
c) Congenital Heart defect (present at birth)	___	___	_____
d) Missing fingers/toes	___	___	_____
e) Extra fingers/toes	___	___	_____
f) Deformed fingers/toes	___	___	_____
g) Spina bifida	___	___	_____
h) Other	___	___	_____



State of New Jersey

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1. My responses will be kept completely confidential.
2. My participation is voluntary and I am free to discontinue participation at any time.
3. The information in this study will be summarized by the New Jersey State Department of Health to determine whether environmental factors in this area may contribute to health problems.

Name of Participant (Print)

Signature

Date

1. Name: _____ 2. Date of Birth _____
Mo. Day Yr.

Address: _____ 3. Social Security No.
Street # _____

_____ City State Zip

Home Phone () _____
AC

4. Sex: Male _____ Female _____

5. Race: White _____ Black _____ Hispanic _____ Other _____

6. Veterans Status:

Are you a veteran? Yes _____ No _____

When were you in the Service? _____

If Vietnam Veteran, did you serve in IndoChina? Yes _____ No _____

When? _____ Where? _____

7. Did you ever work at Diamond Shamrock? Yes _____ No _____

If yes, dates _____ to _____

Job Title _____

Skin Disorders

1. Did you ever have acne? Yes ___ No ___

If yes, how old were you? _____

Did it clear up? Yes ___ No ___

2. Have you ever had a skin rash? Yes ___ No ___

If yes, when _____
year

3. Have you ever had a skin rash with blisters? Yes ___ No ___

If yes, when _____
year

4. Have your eyes become more sensitive to light? Yes ___ No ___

If yes, when _____
year

5. Has any other part of your body become more sensitive to light? Yes ___ No ___

If yes, have any of the following developed?

Blisters _____ Sores _____ Worsening of rash _____

Other (describe) _____
_____ Year it began _____

6. Have you ever noticed a change in your hair color or pattern? Yes ___ No ___

Digestive System

	No	Yes	Has it happened more than once?	Year it first began
1. Have you lost 20 or more pounds without changing your diet?				
2. Do you regularly experience loss of appetite?				
3. Have you ever been repeatedly nauseous when you haven't had a flu or other sickness				
4. Are you regularly troubled with constipation?				
5. Are you regularly troubled with diarrhea?				
6. Have you ever had jaundice (yellow eyes and skin)?				
7. Have you ever had hepatitis?				
8. Has a doctor ever told you that you had cirrhosis of the liver?				
9. Have you ever passed urine that is oak brown (coca-cola colored)?				

1. How many hours do you normally sleep? _____
2. In addition, do you take regular naps? (at least 3 times per week) yes no
3. Do you usually wake up rested? yes no
4. Have you noticed a change in your sense of smell or taste? yes no
If yes,
Smell: increase decrease Taste: increase decrease
5. Have you or your family ever noticed a personality change? yes no
6. Do you regularly (not just once in a while) show any of the following?
Check box: depression get into violent rage anxiety (uptight)
 irritable other _____
When did this begin _____
year

Have you at any time had a persistent problem with any of the symptoms below?

Please fill in boxes below.

<u>Problem</u>	<u>Did you seek medical attention?</u>				<u>What Year?</u>	<u>If a name was given to your problem (diagnosis) what was it?</u>
a. Tiredness	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
b. Headaches	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
c. Nervous disorders	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
d. Hearing loss	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
e. Difficulty with memory or concentration	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
f. Dizziness or light headedness	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
g. Feel faint	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
h. Fainted more than twice (not related to drinking)	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
i. Blurred vision (other other needing glasses?)	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____

MUSCLE AND BONE SYSTEM

We want to know if you've experienced unusual tightening, numbness, pain, swelling, or stiffness in any of the following joints (not associated with exercise or exertion). Please check any such experience below.

Symptoms In Joints

	Tingling	Numbness	Swelling	Stiffness	Pain
1. Hands					
2. Fingers					
3. Wrists					
4. Elbows					
5. Arms					
6. Shoulders					
7. Hips					
8. Knees					
9. Ankles					
10. Feet					
11. Toes					
12. Neck					

1. Do you smoke cigarettes? Yes ___ No ___ How many cigarettes a day? _____
2. Did you smoke previously and quit? Yes ___ No ___ When? _____
3. Do you drink alcoholic beverages regularly? Yes ___ No ___
 If yes, show how many glasses or shots each day: Beer ___ Wine ___ Liquor ___

FAMILY HISTORY (FOR ADULTS ONLY)

1. Have you and your spouse had children or tried to have children? Yes ___ No ___
2. Who is completing this section? Mother ___ Father ___ Both ___
3. Have you ever experienced difficulty in having children? Yes ___ No ___
4. Did you or your spouse see a doctor regarding this? Yes ___ No ___
5. What was the diagnosis? _____
6. Have you or your wife been tested for sterility? Yes ___ No ___
 If yes, check which: Husband ___ Wife ___ Both ___
 What were the results of this test? _____

7. Have any of your children been born with any of the following conditions?

<u>Condition</u>	<u>Yes</u>	<u>No</u>	<u>How Many Children?</u>
a) Cleft palate/cleft lip	___	___	_____
b) Clubfoot	___	___	_____
c) Congenital Heart defect (present at birth)	___	___	_____
d) Missing fingers/toes	___	___	_____
e) Extra fingers/toes	___	___	_____
f) Deformed fingers/toes	___	___	_____
g) Spina bifida	___	___	_____
h) Other	___	___	_____

8. Have you ever been pregnant? (include miscarriages, abortions, stillbirths)
Yes ___ No ___ If yes, how many times? _____

9. List year(s) of normal births: _____
- List year(s) of miscarriages: _____
- List year(s) of stillbirths: _____
- List year(s) of birth defects: _____



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3. The information in this study will be summarized by the New Jersey State Department of Health to determine whether environmental factors in this area may contribute to health problems.

Name of Participant (Print)

Signature

Date

1. Name: _____ 2. Date of Birth _____
Mo. Day Yr.
Address: _____
Street

City State Zip

3. Social Security No: _____

Home Phone: (____) _____
AC

4. Sex: Male _____ Female _____

5. Race: White _____ Black _____
Hispanic _____
Other _____

6. Veterans Status:

Are you a veteran? Yes _____ No _____

When were you in the Service? _____

If Vietnam Veteran, did you serve in IndoChina? Yes _____ No _____

When? _____

Where? _____

7. How long did you work at the site in Newark? _____ When? _____

8. What did you do? _____

11. Please list in order, all other jobs you have had. (Start with your first job)

	Years From - To	1. Name of Company 2. What did they do or mfg. 3. What was your job title?			Were You Exposed to Chemicals? Yes No	
1. First regular job		1.				
		2.				
		3.				
2. Next regular job		1.				
		2.				
		3.				
3. Next regular job		1.				
		2.				
		3.				
4. Next regular job		1.				
		2.				
		3.				
5. Next regular job		1.				
		2.				
		3.				
6. Vacation jobs		1.				
		2.				
		3.				
7. "Second" jobs		1.				
		2.				
		3.				
8. Temporary work		1.				
		2.				
		3.				
9. Wartime Employment (incl. WW II)		1.				
		2.				
		3.				

12. Any adverse effects noted from above jobs?

List by Job Number.

13. Any of your hobbies involve adverse exposure? Yes ___ No ___

When _____

Exposures _____

14. Ever live near Plant, Mine or Facility that could have released hazardous material? Yes ___ No ___

Where _____

Skin Disorders

1. Did you ever have acne? Yes ___ No ___

If yes, how old were you? _____

Did it clear up? Yes ___ No ___

2. Have you ever had a skin rash? Yes ___ No ___

If yes, when _____
year

3. Have you ever had a skin rash with blisters? Yes ___ No ___

If yes, when _____
year

4. Have your eyes become more sensitive to light? Yes ___ No ___

If yes, when _____
year

5. Has any other part of your body become more sensitive to light? Yes ___ No ___

If yes, have any of the following developed?

Blisters _____ Sores _____ Worsening of rash _____

Other (describe) _____
_____ Year it began _____

6. Have you ever noticed a change in your hair color or pattern? Yes ___ No ___

Digestive System

	No	Yes	Has it happened more than once?	Year it first began
1. Have you lost 20 or more pounds without changing your diet?				
2. Do you regularly experience loss of appetite?				
3. Have you ever been repeatedly nauseous when you haven't had a flu or other sickness				
4. Are you regularly troubled with constipation?				
5. Are you regularly troubled with diarrhea?				
6. Have you ever had jaundice (yellow eyes and skin)?				
7. Have you ever had hepatitis?				
8. Has a doctor ever told you that you had cirrhosis of the liver?				
9. Have you ever passed urine that is oak brown (coca-cola colored)?				

1. How many hours do you normally sleep? _____
2. In addition, do you take regular naps? (at least 3 times per week) yes no
3. Do you usually wake up rested? yes no
4. Have you noticed a change in your sense of smell or taste? yes no
If yes,
Smell: increase decrease Taste: increase decrease
5. Have you or your family ever noticed a personality change? yes no
6. Do you regularly (not just once in a while) show any of the following?
Check box: depression get into violent rage anxiety (uptight)
 irritable other _____
When did this begin _____
year

Have you at any time had a persistent problem with any of the symptoms below?

Please fill in boxes below.

<u>Problem</u>			<u>Did you seek medical attention?</u>		<u>What Year?</u>	<u>If a name was given to your problem (diagnosis) what was it?</u>
a. Tiredness	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
b. Headaches	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
c. Nervous disorders	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
d. Hearing loss	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
e. Difficulty with memory or concentration	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
f. Dizziness or light headedness	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
g. Feel faint	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
h. Fainted more than twice (not related to drinking)	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____
i. Blurred vision (other other needing glasses?)	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	_____	_____

MUSCLE AND BONE SYSTEM

We want to know if you've experienced unusual tightening, numbness, pain, swelling, or stiffness in any of the following joints (not associated with exercise or exertion). Please check any such experience below.

Symptoms In Joints

	Tingling	Numbness	Swelling	Stiffness	Pain
1. Hands					
2. Fingers					
3. Wrists					
4. Elbows					
5. Arms					
6. Shoulders					
7. Hips					
8. Knees					
9. Ankles					
10. Feet					
11. Toes					
12. Neck					

1. Do you smoke cigarettes? Yes ___ No ___ How many cigarettes a day? _____

2. Did you smoke previously and quit? Yes ___ No ___ When? _____

3. Do you drink alcoholic beverages regularly? Yes ___ No ___

If yes, show how many glasses or shots each day: Beer ___ Wine ___ Liquor ___

FAMILY HISTORY (FOR ADULTS ONLY)

1. Have you and your spouse had children or tried to have children? Yes ___ No ___
2. Who is completing this section? Mother ___ Father ___ Both ___
3. Have you ever experienced difficulty in having children? Yes ___ No ___
4. Did you or your spouse see a doctor regarding this? Yes ___ No ___
5. What was the diagnosis? _____
6. Have you or your wife been tested for sterility? Yes ___ No ___
If yes, check which: Husband ___ Wife ___ Both ___
What were the results of this test? _____

7. Have any of your children been born with any of the following conditions?

<u>Condition</u>	<u>Yes</u>	<u>No</u>	<u>How Many Children?</u>
a) Cleft palate/cleft lip	___	___	_____
b) Clubfoot	___	___	_____
c) Congenital Heart defect (present at birth)	___	___	_____
d) Missing fingers/toes	___	___	_____
e) Extra fingers/toes	___	___	_____
f) Deformed fingers/toes	___	___	_____
g) Spina bifida	___	___	_____
h) Other	___	___	_____

8. Has your spouse been pregnant? (include miscarriages, abortions, stillbirths)

Yes ___ No ___ If yes, how many times? _____

9. List year(s) of normal births: _____
- List year(s) of miscarriages: _____
- List year(s) of stillbirths: _____
- List year(s) of birth defects: _____

EMPLOYMENT AT MARISOL

1. What is the total length of time you were employed by Marisol?
Days _____ Months _____ Years _____

2. What date did you start to work for Marisol?
Day (if known) _____ Month _____ Year _____

3. Are you currently employed by Marisol?
Yes _____ No _____

4. If not, when did employment terminate?
Day (if known) _____ Month _____ Year _____

5. How long did you work at Lister Street site?
Days _____ Months _____ Years _____

6. Describe your activities at the Lister site?

7. While working at the Lister site, did you wear
1. Protective clothing Yes _____ No _____
If yes, what type _____

If yes, how frequently Every day _____ For special jobs (describe)

Never _____

2. Respirator Yes _____ No _____

If yes, check the type
Disposable _____
Half-face _____
Quarter-face _____
Air-supplied _____

If you wore a respirator, describe frequency and circumstances when you wore a respirator.

Any other comments. _____



State of New Jersey
DEPARTMENT OF HEALTH
JOHN FITCH PLAZA
CN 360, TRENTON, N.J. 08625

J. RICHARD GOLDSTEIN, M.D.
COMMISSIONER

C O N S E N T

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3. The information in this study will be summarized by the New Jersey State Department of Health to determine whether environmental factors in this area may contribute to health problems.

Name of Participant (Print)

Signature

Date

1. Name: _____ 2. Date of Birth: _____
Mo. Day Yr
- Address _____ 3. Social Security No.: _____
Street
- City State Zip
- Home Phone: () _____
AC
4. Sex: Male _____ Female _____ 5. Race: White _____ Black _____
Hispanic _____
Other _____
6. Name of present employer? _____
7. What is your current job title? _____
8. What area/department do you work in? _____
9. How long have you worked with this company? _____

10. Please list in order, all other jobs you have had. (Start with your first job)

	Years From - To	1. Name of Company 2. What did they do or mfg. 3. What was your job title?			Were You Exposed to Chemicals? Yes No	
1. First regular job		1.				
		2.				
		3.				
2. Next regular job		1.				
		2.				
		3.				
3. Next regular job		1.				
		2.				
		3.				
4. Next regular job		1.				
		2.				
		3.				
5. Next regular job		1.				
		2.				
		3.				
6. Vacation jobs		1.				
		2.				
		3.				
7. "Second" jobs		1.				
		2.				
		3.				
8. Temporary work		1.				
		2.				
		3.				
9. Wartime Employment (incl. WW II)		1.				
		2.				
		3.				

11. Have you had any health problems which were related to any of the above jobs? Yes _____ No _____
12. If yes, please list them by job number.

<u>Job Number</u>	<u>Health Problem</u>
_____	_____
_____	_____
_____	_____
_____	_____

Skin Disorders

1. Did you ever have acne? Yes _____ No _____
 If yes, how old were you? _____
 Did it clear up? Yes _____ No _____
2. Do you have a skin rash with blisters that gets worse with sunlight? Yes _____ No _____

Digestive System

	No	Yes	Has it happened more than once?	Year it first began
1. Have you ever had jaundice (yellow eyes and skin)?				
2. Have you ever had hepatitis?				
3. Has a doctor ever told you that you had cirrhosis of the liver?				

MUSCLE AND BONE SYSTEM

We want to know if you've experienced unusual tightening or numbness, in any of the following joints (not associated with exercise or exertion.) Please check any such experienced below:

Symptoms in Joints

	Tingling	Numbness
1. Hands		
2. Fingers		
3. Feet		

FAMILY HISTORY

1. Have you and your spouse had children or tried to have children? Yes___ No___
2. Have you ever experienced difficulty in having children? Yes___ No___
3. Have you or your spouse ever been pregnant (include miscarriages, abortions, stillbirths)
Yes___ No___ If yes, how many times? _____
4. List year(s) of normal births: _____
List year(s) of miscarriages: _____
List year(s) of stillbirths: _____
List year(s) of birth defects: _____
5. Have you ever had cancer? Yes___ No___
If yes, what type cancer or site? _____
What year was the cancer diagnosed? _____



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Name of Participant (Print)

Signature

Date

New Jersey State
Department of Health

DIOXIN SURVEY
NEWARK
(C)

THIS QUESTIONNAIRE SHOULD BE COMPLETED FOR ALL INDIVIDUALS INCLUDING CHILDREN.

O. IDENTIFICATION NO.

--	--	--	--	--	--	--

1. Name	2. Date of Birth Mo DAY YEAR	3. Social Security No.
---------	---------------------------------	------------------------

Address	Zip Code	Home Telephone No. ()
---------	----------	---------------------------

4. Sex 1. <input type="checkbox"/> Male 2. <input type="checkbox"/> Female	5. Race 1. <input type="checkbox"/> White 2. <input type="checkbox"/> Black 3. <input type="checkbox"/> Hispanic 4. <input type="checkbox"/> Other-Specify _____
---	---

6. Did you ever work at Diamond Shamrock?
1. Yes 2. No If Yes, give dates: _____ Mo./Yr. to _____ Mo./Yr.

Job Title: _____

7. Where do you work? _____
How long (years) _____

8. Did you ever have acne?
1. Yes 2. No
If Yes, how old were you _____

9. Did it clear up?
1. Yes 2. No
If Yes, when (year) _____

10. Have you ever had a skin rash with blisters that became worse with sunlight?
1. Yes 2. No
If Yes, when (year) _____

11. Did it clear up?
1. Yes 2. No
If Yes, when (year) _____

Name of Interviewer	Date of Interview
---------------------	-------------------

Not Applicable, Refused, or No Response, Code 9.



State of New Jersey

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Name of Participant (Print)

Signature

Date

THIS QUESTIONNAIRE SHOULD BE COMPLETED FOR ALL INDIVIDUALS INCLUDING CHILDREN.

O. IDENTIFICATION NO.

1. Name					2. Date of Birth			3. Social Security No.			
					MO	DAY	YEAR				
Address					Zip Code			Home Telephone No. ()			
4. Sex			5. Race						Other-Specify		
1. <input type="checkbox"/> Male 2. <input type="checkbox"/> Female			1. <input type="checkbox"/> White			2. <input type="checkbox"/> Black		3. <input type="checkbox"/> Hispanic		4. <input type="checkbox"/> _____	
6. Did you ever work at Diamond Shamrock?											
1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No If Yes, give dates: _____ to _____ Mo./Yr. Mo./Yr.											
Job Title: _____											
7. Did you ever enter the Diamond Shamrock Site?											
1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No											
If Yes, when _____											
8. Have your children ever played there?											
1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No											
If Yes, when _____											
9. How long have you lived at your current residence?											
Years _____											
10. Did you ever have acne?											
1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No											
If Yes, how old were you _____											
11. Did it clear up?											
1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No											
If Yes, when (year) _____											
12. Have you ever had a skin rash with blisters that became worse with sunlight?											
1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No											
If Yes, when (year) _____											
13. Did it clear up?											
1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No											
If Yes, when (year) _____											
Name of Interviewer							Date of Interview				

APPENDIX B

COMPANIES LOCATED NEAR 80 LISTER AVENUE,
NEWARK, NEW JERSEY 07105

Duralac Chemical Co. is located at 84 Lister Avenue. They have been manufacturing industrial paints at this address since 1930.

Fiske-Lubriplate is located at 101 Lister Avenue in Newark. They manufacture lubricating oils and greases. The oils are blended. The greases are made by mixing fats with caustic soda and subjecting the mixture to heat. They have operated at this address since the mid 1920's.

Sherwin-Williams is located at Brown Street and Lister Avenue. They have been manufacturing paint at this facility since the turn of the century. (1900)

Thomasset Colors (a division of Hilton-Davis) is located at 120 Lister Avenue. They manufacture pigments for paints and textiles. They also manufacture a lesser amount of pigments for the cosmetic industry. They have been operating at this address since 1954.

SCA Services Inc. is located at 100 Lister Avenue. This company receives, analyzes, and processes liquid chemical wastes. They have been in operation at this location since 1978. Previously another owner performed similar work at the same address from 1969 to 1977. Approximately 20 of the 68 SCA employees at this address had worked for the previous owner. (IMC)

Benjamin Moore has manufactured paint at 134 Lister Avenue since 1925. They also do research and development at this facility.

In June 1981, Marisol Incorporated purchased two lots on Lister Avenue in Newark. This property was the site of the Diamond Alkali/Shamrock Co. which operated a plant on this site from 1951 to 1969. From June 1981 to May 1983, Marisol Incorporated conducted clean-up activities at this site. These activities included general maintenance work, transfer of chemicals from reaction vessels into drums for disposal, steam cleaning of vessels and renovation work on some buildings located on site.

PERSONNEL DATA: NUMBER OF EMPLOYEES

	<u>TOTAL</u>		<u>SALARY</u>		<u>HOURLY</u>		<u>PRODUC- TION</u>		<u>MAINT- ENANCE</u>		<u>LABORA- TORY</u>		<u>OFFICE</u>		<u>OTHER</u>	
SCA	68															
SERVICES	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
	61	7	17	2	44	5	36	0	10	0	2	5	13	2		
THOMASSET	38															
COLORS	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
	36	2	9	2	27	0	26	0	4	0	3	0	0	2	3	0
SHERWIN	227															
WILLIAMS	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
	161	66	25	60	136	6	125	6	14	0	7	0	15	60		
FISKE	65															
LUBRIPLATE	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
	56	9	21	9	35	0	34	0	0	5	1	0	16	9		
DUROLAC	27															
	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
	24	3	10	3	14	0	12	0	0	0	5	0	2	3	5	
BENJAMIN MOORE	316															
(No Other Data Available)	<u>M</u>	<u>F</u>														

M = Males F = Females

APPENDIX C

TABLE C1
VETERAN STATUS QUESTIONS

6. Veterans Status

Are you a veteran? Yes _____ No. _____

If Vietnam veteran, did you serve in Indochina? Yes _____ No _____

<u>Workers</u>	Veterans		Indochina	
	<u>Responding</u>	<u>Positive (%)</u>	<u>Responding</u>	<u>Positive (%)</u>
Sherwin-Williams				
Office	45	8 (18)	7	0 (0)
Production	70	20 (29)	24	3 (12)
Shipping	47	18 (38)	17	1 (6)
Maintenance and Labs	<u>37</u>	<u>27 (73)</u>	<u>17</u>	<u>2 (12)</u>
	199	73 (37)	65	6 (9)
Duralac	18	6 (33)	2	0 (0)
SCA	30	10 (33)	7	1 (14)
Thomasset		ATTRIBUTE NOT SURVEYED		
Benjamin Moore		ATTRIBUTE NOT SURVEYED		
Fiske		ATTRIBUTE NOT SURVEYED		
Farmers' Market		ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>2 (11)</u>	<u>3</u>	<u>2 (67)</u>
TOTAL WORKERS	265	91 (34)	77	9 (12)
<u>Residents</u>				
Ironbound residents	56	10 (18)	23	0 (0)
Riverview residents		ATTRIBUTE NOT SURVEYED		

TABLE C2

SMOKING QUESTIONS

1. Do you smoke cigarettes? Yes _____ No _____ How many cigarettes a day? _____
2. Did you smoke previously and quit? Yes _____ No _____ When? _____

<u>Workers</u>	<u>Responding</u>	<u>Current Smokers (%)</u>	<u>Former Smoker (%)</u>	<u>Non- Smoker (%)</u>
Sherwin-Williams				
Office	47	16 (34)	6 (13)	25 (53)
Production	68	28 (41)	12 (18)	28 (41)
Shipping	49	21 (43)	8 (16)	20 (41)
Maintenance and Labs	<u>36</u>	<u>10 (28)</u>	<u>12 (33)</u>	<u>14 (39)</u>
	200	75 (38)	38 (19)	87 (44)
Duralac	17	7 (41)	1 (6)	9 (53)
SCA	29	12 (41)	8 (28)	9 (31)
Thomasset		ATTRIBUTE NOT SURVEYED		
Benjamin Moore		ATTRIBUTE NOT SURVEYED		
Fiske		ATTRIBUTE NOT SURVEYED		
Farmers' Market		ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>3 (17)</u>	<u>2 (11)</u>	<u>13 (72)</u>
TOTAL WORKERS	264	97 (37)	49 (19)	118 (45)
<u>Residents</u>				
Ironbound residents	62	21 (34)	11 (18)	30 (48)
Riverview residents		ATTRIBUTE NOT SURVEYED		

TABLE C3
DRINKING QUESTION

3. Do you drink alcoholic beverages regularly? Yes _____ No _____
If yes, show how many glasses or shots each day: Beer _____ Wine _____ Liquor _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams			
Office	47	10	21
Production	66	26	39
Shipping	47	13	28
Maintenance and Labs	<u>34</u>	<u>8</u>	<u>24</u>
	194	57	29
Duralac	17	6	35
SCA	28	6	21
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>8</u>	<u>44</u>
TOTAL WORKERS	257	77	30
<u>Residents</u>			
Ironbound residents	59	15	25
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C4

HEALTH EFFECTS FROM PREVIOUS JOBS

12. Any adverse effects noted from above (listing of previous jobs) jobs?

List by job number

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
<u>Sherwin-Williams</u>			
Office	26	4	15
Production	14	0	0
Shipping	25	1	4
Maintenance and Labs	<u>18</u>	<u>5</u>	<u>28</u>
	83	10	12
Duralac	7	1	14
SCA	16	0	0
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>13</u>	<u>4</u>	<u>31</u>
TOTAL WORKERS	119	15	13
<u>Residents</u>			
Ironbound residents	ATTRIBUTE NOT SURVEYED		
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C5

ADVERSE EXPOSURE FROM HOBBIES

13. Any of your hobbies involve adverse exposure? Yes _____ No _____

When _____

Exposure _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams			
Office	44	1	2
Production	67	1	2
Shipping	46	2	4
Maintenance and Labs	<u>34</u>	<u>0</u>	<u>0</u>
	191	4	2
Duralac	18	0	0
SCA	28	0	0
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>16</u>	<u>0</u>	<u>0</u>
TOTAL WORKERS	253	4	2
<u>Residents</u>			
Ironbound residents	ATTRIBUTE NOT SURVEYED		
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C6

LIVE NEAR EXPOSURE QUESTION

14. Ever live near Plant, Mine or Facility that could have released hazardous material?

Yes _____ No _____

Where? _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams			
Office	44	7	16
Production	69	6	9
Shipping	48	14	29
Maintenance and Labs	<u>36</u>	<u>9</u>	<u>25</u>
	197	36	18
Duralac	18	0	0
SCA	30	1	3
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>16</u>	<u>0</u>	<u>0</u>
TOTAL WORKERS	261	37	14
<u>Residents</u>			
Ironbound residents	ATTRIBUTE NOT SURVEYED		
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C7
HAIR COLOR QUESTION

6. Have you ever noticed a change in your hair color or pattern? Yes _____ No _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
<u>Sherwin-Williams</u>			
Office	46	6	13
Production	67	19	28
Shipping	46	18	39
Maintenance and Labs	<u>34</u>	<u>7</u>	<u>21</u>
	193	50	26
Duralac	18	2	11
SCA	28	2	7
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>17</u>	<u>2</u>	<u>12</u>
TOTAL WORKERS	256	56	22
<u>Residents</u>			
Ironbound residents	61	5	8
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C8

WEIGHT LOSS QUESTION

1. Have you lost 20 more pounds without changing your diet? Yes _____ No _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>

Sherwin-Williams			
Office	46	4	9
Production	70	3	4
Shipping	49	2	4
Maintenance and Labs	<u>34</u>	<u>2</u>	<u>6</u>
	199	11	6
Duralac	18	0	0
SCA	30	1	3
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>17</u>	<u>1</u>	<u>6</u>
TOTAL WORKERS	264	13	5
<u>Residents</u>			
Ironbound residents	61	4	7
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C9
LOSS OF APPETITE QUESTION

2. Do you regularly experience loss of appetite? Yes _____ No _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams			
Office	47	7	15
Production	71	8	11
Shipping	49	7	14
Maintenance and Labs	<u>34</u>	<u>4</u>	<u>12</u>
	201	26	13
Duralac	18	0	0
SCA	30	1	3
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>5</u>	<u>28</u>
TOTAL WORKERS	267	32	12
<u>Residents</u>			
Ironbound residents	63	7	11
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C10
 NAUSEA QUESTION

3. Have you ever been repeatedly nauseous when you haven't had a flu or other sickness? Yes _____ No _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams			
Office	47	8	17
Production	71	8	11
Shipping	49	8	16
Maintenance and Labs	<u>34</u>	<u>8</u>	<u>24</u>
	201	32	16
Duralac	18	2	11
SCA	30	2	7
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>3</u>	<u>17</u>
TOTAL WORKERS	267	39	15
<u>Residents</u>			
Ironbound residents	63	5	8
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C11
CONSTIPATION QUESTION

4. Are you regularly troubled with constipation? Yes _____ No _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams			
Office	47	9	19
Production	70	5	7
Shipping	49	10	20
Maintenance and Labs	<u>34</u>	<u>4</u>	<u>12</u>
	200	28	14
Duralac	17	1	6
SCA	30	0	0
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>3</u>	<u>17</u>
TOTAL WORKERS	265	32	12
<u>Residents</u>			
Ironbound residents	63	8	13
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C12
DIARRHEA QUESTION

5. Are you regularly troubled with diarrhea? Yes _____ No _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams			
Office	47	3	6
Production	70	7	10
Shipping	49	6	12
Maintenance and Labs	<u>34</u>	<u>2</u>	<u>6</u>
	200	18	9
Duralac	17	0	0
SCA	30	1	3
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>3</u>	<u>17</u>
TOTAL WORKERS	265	22	8
<u>Residents</u>			
Ironbound residents	63	3	5
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C13

SLEEPING QUESTIONS

1. How many hours do you normally sleep? _____
2. In addition, do you take regular naps? (at least 3 times/week) Yes _____ No _____
3. Do you usually wake up rested? Yes _____ No _____

<u>Workers</u>	HOURS SLEPT		NAPS		RESTED	
	<u>Respond- ing</u>	<u>Positive *(%)</u>	<u>Respond- ing</u>	<u>Positive (%)</u>	<u>Respond - ing</u>	<u>Positive (%)</u>
<u>Sherwin-Williams</u>						
Office	47	2 (4)	46	13 (28)	46	30 (65)
Production	71	10 (14)	69	16 (23)	70	41 (59)
Shipping	50	6 (12)	48	17 (35)	49	31 (63)
Maintenance and Labs	<u>36</u>	<u>3 (8)</u>	<u>35</u>	<u>8 (23)</u>	<u>32</u>	<u>23 (72)</u>
	204	21 (10)	198	54 (27)	197	125 (64)
Duralac	18	2 (11)	18	2 (11)	18	16 (89)
SCA	30	3 (10)	30	10 (33)	30	21 (70)
Thomasset	ATTRIBUTE NOT SURVEYED					
Benjamin Moore	ATTRIBUTE NOT SURVEYED					
Fiske	ATTRIBUTE NOT SURVEYED					
Farmers' Market	ATTRIBUTE NOT SURVEYED					
Marisol	<u>17</u>	<u>1 (6)</u>	<u>18</u>	<u>3 (17)</u>	<u>18</u>	<u>9 (50)</u>
TOTAL WORKERS	269	27 (10)	264	69 (26)	263	171 (65)

Residents

Ironbound residents	62	1 (2)	63	18 (29)	62	38 (61)
Riverview residents	ATTRIBUTE NOT SURVEYED					

*5 hours or less sleep per night

TABLE C14

SENSE OF SMELL QUESTIONS

1. Have you noticed a change in your sense of smell or taste? Yes _____ No _____

If yes,

Smell: _____ increase _____ decrease _____ Taste: _____ increase _____ decrease _____

<u>Workers</u>	<u>Responding</u>	<u>Increased (%)</u>	<u>Decreased (%)</u>
<u>Sherwin-Williams</u>			
Office	47	4 (8)	4 (8)
Production	65	0 (0)	7 (11)
Shipping	50	3 (6)	7 (14)
Maintenance and Labs	<u>35</u>	<u>2 (6)</u>	<u>5 (14)</u>
	197	9 (5)	23 (12)
Duralac	18	0 (0)	0 (0)
SCA	30	0 (0)	3 (10)
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>17</u>	<u>1 (6)</u>	<u>1 (6)</u>
TOTAL WORKERS	262	10 (4)	27 (10)
<u>Residents</u>			
Ironbound residents	64	7 (11)	2 (3)
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C15

SENSE OF TASTE QUESTION

1. Have you noticed a change in your sense of smell or taste? Yes _____ No _____

If yes,

Smell: _____ increase _____ decrease _____ Taste: _____ increase _____ decrease _____

<u>Workers</u>	<u>Responding</u>	<u>Increased (%)</u>	<u>Decreased (%)</u>
Sherwin-Williams			
Office	47	1 (2)	4 (8)
Production	65	0 (0)	6 (9)
Shipping	50	2 (4)	7 (14)
Maintenance and Labs	<u>35</u>	<u>1 (3)</u>	<u>5 (14)</u>
	197	4 (2)	22 (11)
Duralac	18	0 (0)	0 (0)
SCA	30	0 (0)	0 (0)
Thomasset		ATTRIBUTE NOT SURVEYED	
Benjamin Moore		ATTRIBUTE NOT SURVEYED	
Fiske		ATTRIBUTE NOT SURVEYED	
Farmers' Market		ATTRIBUTE NOT SURVEYED	
Marisol	<u>17</u>	<u>0 (0)</u>	<u>0 (0)</u>
TOTAL WORKERS	262	4 (2)	22 (8)
<u>Residents</u>			
Ironbound residents	64	4 (6)	6 (9)
Riverview residents		ATTRIBUTE NOT SURVEYED	

TABLE C16

PERSONALITY CHANGE QUESTION

5. Have you or your family ever noticed a personality change? Yes _____ No _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams			
Office	46	8	17
Production	63	11	18
Shipping	48	15	31
Maintenance and Labs	<u>32</u>	<u>5</u>	<u>16</u>
	189	39	21
Duralac	17	0	0
SCA	28	3	11
Thomasset	ATTRIBUTE NOT SURVEYED		
Benjamin Moore	ATTRIBUTE NOT SURVEYED		
Fiske	ATTRIBUTE NOT SURVEYED		
Farmers' Market	ATTRIBUTE NOT SURVEYED		
Marisol	<u>18</u>	<u>2</u>	<u>11</u>
TOTAL WORKERS	252	44	18
<u>Residents</u>			
Ironbound residents	59	4	7
Riverview residents	ATTRIBUTE NOT SURVEYED		

TABLE C17

PERSONALITY MANIFESTATION QUESTION

6. Do you regularly (not just once in a while) show any of the following?*

_____ depression _____ get into violent rage _____ anxiety (uptight)
 _____ irritable _____ other

<u>Workers</u>	<u>Respond- ing</u>	<u>Depres- sion (%)</u>	<u>Rage (%)</u>	<u>Anxiety (%)</u>	<u>Irritable (%)</u>	<u>Other (%)</u>
Sherwin-Williams						
Office	19	5 (26)	7 (37)	4 (21)	2 (10)	1 (5)
Production	38	13 (34)	16 (42)	6 (16)	3 (8)	0 (0)
Shipping	23	0 (0)	6 (26)	10 (44)	4 (17)	3 (13)
Maintenance and Labs	<u>16</u>	<u>1 (6)</u>	<u>8 (50)</u>	<u>4 (25)</u>	<u>3 (19)</u>	<u>0 (0)</u>
	96	19 (20)	37 (38)	24 (25)	12 (12)	4 (4)
Duralac	7	1 (14)	4 (57)	2 (28)	0 (0)	0 (0)
SCA	16	10 (62)	6 (38)	1 (6)	0 (0)	0 (0)
Thomasset	ATTRIBUTE NOT SURVEYED					
Benjamin Moore	ATTRIBUTE NOT SURVEYED					
Fiske	ATTRIBUTE NOT SURVEYED					
Farmers' Market	ATTRIBUTE NOT SURVEYED					
Marisol	<u>11</u>	<u>5 (46)</u>	<u>1 (9)</u>	<u>3 (27)</u>	<u>1 (9)</u>	<u>1 (9)</u>
TOTAL WORKERS	130	35 (27)	48 (37)	30 (23)	13 (10)	5 (2)
Residents						
Ironbound residents	30	9 (30)	9 (30)	5 (17)	3 (10)	4 (13)
Riverview residents	ATTRIBUTE NOT SURVEYED					

*The way this question is presented gives the people who want to answer "no", no choice other than to not respond. Therefore, it is anticipated that the "true negatives" are among the non-responders.

TABLE C18

NORMAL BIRTH QUESTION

3. Have you or your spouse ever been pregnant (include miscarriages, abortions, stillbirths)? Yes _____ No _____ If yes, how many times _____

4. List year(s) of normal births: _____

<u>Workers</u>	<u>Responding</u>	<u>Number Pregnant</u>	<u>Total Number Pregnancies</u>	<u>Number with at least one Normal Birth</u>	<u>Total* Normal Births</u>
Sherwin-Williams		ATTRIBUTE NOT SURVEYED			
Duralac		ATTRIBUTE NOT SURVEYED			
SCA		ATTRIBUTE NOT SURVEYED			
Thomasset	27	22	51	16	38
Benjamin Moore					
Office	21	11	28	11	23
Production	81	49	141	38	95
Shipping	28	18	44	16	31
Labs	55	30	86	25	73
	<u>185</u>	<u>108</u>	<u>299</u>	<u>90</u>	<u>222</u>
Fiske					
Office	16	9	17	5	14
Production and Shipping	<u>21</u>	<u>16</u>	<u>48</u>	<u>15</u>	<u>40</u>
	37	25	65	20	54
Farmers' Market					
		ATTRIBUTE NOT SURVEYED			
Marisol	<u>5</u>	<u>4</u>	<u>8</u>	<u>4</u>	<u>8</u>
TOTAL WORKERS	254	159	423	130	322
<u>Residents</u>					
Ironbound residents	32	16	44	14	40
Riverview residents		ATTRIBUTE NOT SURVEYED			

*Not all outcomes were reported.

TABLE C19

MISCARRIAGES QUESTION

3. Have you or your spouse ever been pregnant (include miscarriages, abortions, stillbirths)? Yes _____ No _____ If yes, how many times _____

4. List year(s) of miscarriages: _____

<u>Workers</u>	<u>Number Pregnant</u>	<u>Total Number Pregnancies</u>	<u>Number with at Least One Miscarriage</u>	<u>Total * Miscarriages (after Employment)</u>
Sherwin-Williams		ATTRIBUTE NOT SURVEYED		
Duralac		ATTRIBUTE NOT SURVEYED		
SCA		ATTRIBUTE NOT SURVEYED		
Thomasset	22	51	2	6 (4)
Benjamin Moore				
Office	11	28	4	4 (1)
Production	49	141	9	12 (8)
Shipping	18	44	4	4 (3)
Labs	30	86	5	8 (4)
	<u>108</u>	<u>299</u>	<u>22</u>	<u>28 (16)</u>
Fiske				
Office	9	17	2	3 (3)
Production and Shipping	16	48	5	5 (5)
	<u>25</u>	<u>65</u>	<u>7</u>	<u>8 (8)</u>
Farmers' Market				
		ATTRIBUTE NOT SURVEYED		
Marisol	<u>4</u>	<u>8</u>	<u>0</u>	<u>0 (0)</u>
TOTAL WORKERS	159	423	31	42 (28)
<u>Residents</u>				
Ironbound residents	16	44	2	2
Riverview residents		ATTRIBUTE NOT SURVEYED		

*Not all outcomes were reported.

TABLE C20

STILLBIRTH QUESTION

3. Have you or your spouse ever been pregnant (include miscarriages, abortions, stillbirths)? Yes _____ No _____ If yes, how many times _____

4. List year(s) of stillbirths: _____

<u>Workers</u>	<u>Number Pregnant</u>	<u>Total Number Pregnancies</u>	<u>Number with at Least One Stillbirth</u>	<u>Total * Stillbirths (after Employment)</u>
Sherwin-Williams		ATTRIBUTE NOT SURVEYED		
Duralac		ATTRIBUTE NOT SURVEYED		
SCA		ATTRIBUTE NOT SURVEYED		
Thomasset	22	51	0	0 (0)
Benjamin Moore				
Office	11	28	1	1 (0)
Production	49	141	1	1 (1)
Shipping	18	44	0	0 (0)
Labs	30	86	0	0 (0)
	<u>108</u>	<u>299</u>	<u>2</u>	<u>2 (1)</u>
Fiske				
Office	9	17	0	0 (0)
Production and Shipping	16	48	0	0 (0)
	<u>25</u>	<u>65</u>	<u>0</u>	<u>0 (0)</u>
Farmers' Market				
		ATTRIBUTE NOT SURVEYED		
Marisol	<u>4</u>	<u>8</u>	<u>0</u>	<u>0 (0)</u>
TOTAL WORKERS	159	423	2	2 (1)
<u>Residents</u>				
Ironbound residents	16	44	1	1
Riverview residents		ATTRIBUTE NOT SURVEYED		

*Not all outcomes were reported.

TABLE C21

WORK HISTORY AT DIAMOND SHAMROCK

1. Did you ever work at Diamond Shamrock? Yes _____ No _____

<u>Workers</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams		ATTRIBUTE NOT SURVEYED	
Duralac		ATTRIBUTE NOT SURVEYED	
SCA		ATTRIBUTE NOT SURVEYED	
Thomasset		ATTRIBUTE NOT SURVEYED	
Benjamin Moore		ATTRIBUTE NOT SURVEYED	
Fiske		ATTRIBUTE NOT SURVEYED	
Farmers' Market	22	1	4
Marisol		ATTRIBUTE NOT SURVEYED	
<u>Residents</u>			
Ironbound residents	63	2	3
Riverview residents	292	0	0

TABLE C22

EXPOSURE TO DIAMOND SHAMROCK SITE

1. Did you ever enter the Diamond Shamrock site? Yes _____ No _____
2. Have your children ever played there? Yes _____ No _____

<u>Worker</u>	Entered site			Played on site		
	<u>Responding</u>	<u>Positive</u>	<u>%</u>	<u>Responding</u>	<u>Positive</u>	<u>%</u>
Sherwin-Williams	ATTRIBUTE NOT SURVEYED					
Duralac	ATTRIBUTE NOT SURVEYED					
SCA	ATTRIBUTE NOT SURVEYED					
Thomasset	ATTRIBUTE NOT SURVEYED					
Benjamin Moore	ATTRIBUTE NOT SURVEYED					
Fiske	ATTRIBUTE NOT SURVEYED					
Farmers' Market	ATTRIBUTE NOT SURVEYED					
Marisol	ATTRIBUTE NOT SURVEYED					
 <u>Residents</u>						
Ironbound residents	ATTRIBUTE NOT SURVEYED					
Riverview residents	275	25	9	255	16	6

TABLE C23

The Department received 16 complete questionnaires, Questionnaires C or D, from individuals who worked in other small industries in the area, were "walk-ins", or former workers in the area. These questionnaires are summarized below and are referred to as the Miscellaneous Group.

SEX

Male: 11

Female: 4

Not Given: 1

RACE/ETHNICITY

White: 8

Black: 5

Hispanic: 0

Other: 1

Not Given: 2

AGE (Years)

0-19: 1

20-39: 6

40-59: 7

60+: 2

ACNE

No Acne: 12

Teen Treatment: 1

Teen Persistent: 0

Adult Transient: 0

Adult Persistent: 3

SKIN RASH WITH BLISTERS WORSE IN SUNLIGHT

Responding: 16

Positive: 3

APPENDIX D

Results of Dermatological Examinations

at Van in Farmer's Market

Introduction

As part of the State Health Department's investigation of potential dioxin related health problems, skin examinations for chloracne and porphyria cutanea tarda were conducted. Neither of the above two skin conditions are pathognomonic for dioxin exposure. However, porphyria cutanea tardea had been described in the 1960's among workers from the 80 Lister Avenue site in Newark and an increased prevalence of chloracne has been found among all dioxin exposed groups studied around the world who have had significant dioxin exposure.

Methodology

On June 14 from 2:00-7:00 p.m., June 16 from 1:00-6:00 p.m., and June 17 from 9:00 a.m.-12:00 noon, a dermatologist was located in a van at the Farmers' Market near the former Diamond Shamrock site at 80 Lister Avenue. The dermatologist was available for any individual who lived or worked in the area who wished to have a dermatologic examination. Leaflets were distributed to all residences and companies in the area advertising this free examination. In addition, seventeen individuals were specifically asked to come for an examination. These seventeen individuals were selected from 324 individuals who worked or lived in the area and who had filled out questionnaires. Individuals were invited because they stated they had 1) a skin rash which had developed since they began to work or live in the area, or, if residents, 2) acne that had not cleared up after their teenage years.

Results

Fourteen of the seventeen individuals who were invited showed up for an appointment. None of these individuals had rashes consistent either with chloracne or porphyria cutanea tardea. The results of the dermatological examination by place of employment are shown in Table I. All 73 individuals examined had some skin abnormality. The three individuals at Sherwin-Williams who had possible dioxin related skin problems include one worker with hypertrichosis (increased hair growth) who worked from 1969-1970, one worker who had been employed for eighteen years, and one worker who had been employed for 40 years. Two former employees of Diamond Alkali had scarring consistent with chloracne while one still had a few comedones. The one SCA employee had worked at SCA some time in the past. The one employee from the miscellaneous companies had worked for Diamond Shamrock in Kearny.

Discussion

Other chlorinated compounds besides dioxin cause chloracne (Table II). The association of some of these substances with chloracne has recently been described and additional associations will probably be made. Porphyria cutanea tardea is typically associated with excessive alcohol ingestion. Exposure to hexachlorobenzene has also been associated with porphyria cutanea tardea.

Further work on populations not thought to be exposed to dioxin needs to be done, in order to assess the meaning of the positive results among the employees of Sherwin-Williams, SCA and Diamond Shamrock (Kearny). Whether these findings are related to dioxin or other chemicals will depend on following up these individuals' actual exposures as well as determining the background prevalence of these dermatological findings.

TABLE I
Results of Dermatological Examination of Individuals Screened at
the Van in Farmers' Market June 14-17, 1983

Location	Total Examined	Findings Consistent Chloracne		Findings Consistent PCT*		Acne Vulgaris		Other Skin Abnormalities	
		#	%	#	%	#	%	#	%
Sherwin-Williams	15	2	13.3	1	6.7	0	-	12	80.
80 Lister Avenue (Kolker Chemical/ Diamond Alkali/ Diamond Shamrock/ Chemicaland)	6	2	33.3	0	-	2	33.3	2	33.3
Thomasset	8	0	-	0	-	1	12.5	7	87.5
Benjamin-Moore	4	0	-	0	-	1	2.5	3	75.0
SCA	2	1	50.0	0	-	1	50.0	0	-
Other Companies	29	1	3.5	0	-	1	3.5	28	93.7
Residents	9	0	-	0	-	0	-	9	100.0
Total	73	6	8.2	1	1.4	6	8.2	60	82.2

* PCT=Porphyria cutanea tarda