

HUMBLE OIL & REFINING COMPANY'S BAYTOWN REFINERY

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I. MEDICAL MEASURES

The medical program at Humble Oil & Refining Company's Baytown Refinery for the control of the potential carcinogenic health hazard associated with the handling of high boiling catalytically-cracked oils and related materials was started just as soon as the nature of the problem became known. It goes without saying that a program of this type requires considerable time and detailed planning for its satisfactory establishment. In the beginning, the exact nature and scope of the problem was presented to Humble's top management in Houston and at the Refinery. It was decided that the supervisors and employees alike should be informed upon the exact and true nature of the potential health hazard involved.

A series of meetings was held with two hundred and twenty supervisors in February, 1949. These meetings were conducted by the division head, the Safety Supervisor, and the Plant Physician. The scope, objectives, and control measures of the program and the potential skin cancer hazard were carefully and briefly detailed. Supervisory and employee cooperation and assistance in carrying out the program were requested. The supervisors did a very fine job of communicating this information down through the line organization. There were no signs of hysteria or marked anxiety of any kind from the employees. The response was immediate, as noted by the increased number and variety of skin conditions or lesions that were reported. Informing the employees upon this subject seemingly removed their reluctance to report for frequent medical examinations. In fact, employees expressed their appreciation for having been told of the potentialities involved and have cooperated in a very excellent manner.

The general plan of procedure in the conduct of this program at the Baytown Refinery was evolved following an exchange of ideas between Humble and affiliated companies at a meeting on October 10, 1947. The addition of another physician and clerical employee

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to the staff has been of great assistance in carrying out the required work associated with this undertaking.

Medical examinations are being done at six-month intervals. Experience shows this to be quite satisfactory. Any employee having over ten hours working exposure in any one month, or more than five short exposures during a six months' period, is included in the examination schedule. An employee having had sufficient exposure to be included in this schedule is to be followed for a period of at least two years after he is removed from the hazardous environment and longer if then considered necessary. The method of arriving at what constitutes a significant exposure is certainly an arbitrary one and it is possible that other procedures would be equally suitable for this purpose. The actual working hours of exposure are catalogued or recorded for Mechanical Department employees and, for the most part, their exposures are of the relatively short interval type. The rotation of the mechanics is assured and this seems favorable from the standpoint of reducing the frequency and length of exposure. Operating employees are considered as having a less hazardous degree of exposure, owing to the nature of their work, but one of a continuing nature.

From April 1, 1949 to September 1, 1950, inclusive, 3,010 skin examinations have been made with an average of 177 examinations per month. During this period of time, an average of 546 employees per month were reported as having working exposures. Many of these employees have had several exposures during this period of time. In all, 81,181 hours of working exposure have been recorded during this period of time with an average of 4,675 working hours of exposure per month among mechanics. The greatest part of this exposure occurred from working on equipment at the two Catalyst Units at downtime.

Currently, 78 cases are being followed at intervals ranging from one to three months where the skin lesion is of interest in this program. These cases include cancer as well as warts, moles, keratoses, dermatitis, or any other suspicious lesions of any part of the body, regardless of whether or not the individual has working exposure to the high boiling catalytically-cracked oils. Forty-five cases having skin lesions were advised to get treatment and these are being fol-

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lowed. Any employee having a suspicious lesion or skin condition of interest may be examined as frequently as desired.

It is the practice of the Medical Department to select employees for certain types of work or to recommend their removal from certain contacts with oils if it is found that they have so-called cancer susceptible skins or have existing precancerous lesions which might become malignant provided they are exposed to these oils. A few of these cases have attracted attention and have been handled successfully. A great deal of clinical acumen and judgment is seemingly necessary in some cases to decide upon the advisability of making the recommendation to remove employees from possible contact exposure.

To date, it has not become necessary to recommend removal of an employee because of a developing lesion associated with the handling of these oils. If the necessity should arise, it is believed that the proper procedure can be developed. Often times, it is difficult to remove an employee from a working exposure because of limitations of available similar jobs governed by job classification, promotions, rate of pay, etc. This is especially true for the operating group of employees. No such difficulty confronts Mechanical Department employees. Much employee dissatisfaction can arise from this procedure if careful planning is not done in advance of any action. Careful evaluation of each individual case and all the factors involved is highly important to assure success in this undertaking.

As concerns prompt treatment of lesions, a need developed for consultative dermatological, surgical, and pathological assistance. Consequently, arrangements were made with the local M. D. Anderson Cancer Foundation to cooperate with and assist in this work. To date, ten small tumors, mostly of the verruca vulgaris type, have been surgically excised and tissue diagnosis has been made. Three of these cases were malignant in type. Incidentally, the first of these cases sent in under the program resulted in the diagnosis of malignant melanoma of the right arm. The immediate advantage of such service were readily evident. This service is furnished at Company expense. It is felt that papillomas, warts, or other suspicious lesions occurring on exposed surfaces of the body particularly upper and lower extremities and face, should be handled in the manner just described. Accumulation of data from such cases may in time be helpful in evaluating the possible incidence of skin cancer

from these oils. A group of the most interesting skin lesions seen has been photographed and a series of lantern slides has been made.

Dr. V. C. Baird, Mr. J. W. Hammond, and Dr. R. W. Pipkin are active as members of the Medical Department in directing and keeping in touch with the progress of this program. Also, other members of the Baytown Refinery Health and Sanitation Committee, which consists of a member of Refinery top management, the Safety Supervisor, the Assistant Industrial Relations Supervisor, and a representative from the Laboratory Division, are active in this program. It is felt that the medical supervision is adequate, but a survey over the Refinery at frequent intervals is of the utmost importance with regard to what is being accomplished and to keep in touch with changing conditions. Plant personnel is constantly changing and so are the number of employees coming in contact with these oils. Continued application to the job at hand by all concerned is necessary. The Health and Sanitation Committee has been meeting at approximately three-month intervals for the past two years to review the progress of the program. The minutes of these meetings reveal the scope and extent of the problems and accomplishments in the development of the program. A "Manual for Safe Handling of High Boiling Oils from Catalytic-Cracking" is in the process of being prepared. It is formulated along similar lines to the one put out by the Safety Department of the Bayway Refinery, Esso Standard Oil Company. It is intended for use at the Baytown Refinery by supervisors and employees with working exposures. The advantages of such a manual as a source of safety information for educational purposes are readily evident.

In accordance with the recommendation of authorities that periodic surveys should be made by representatives of the Medical Department at approximately six-month intervals in plants where this problem exists, Mr. J. W. Hammond, Industrial Hygienist, is performing this function.

Medical reports have been prepared and submitted at intervals; but, due to certain difficulties, it has been impossible to furnish complete medical data on all case reports and statistics. Since the addition of one physician and a clerical employee to the staff in May, 1949, the records system is much more complete and dependable. The combination clerk-chemist is a valuable addition to the staff. He is capable of keeping up-to-date the records of skin examinations,

follow-up examinations, and furnishing monthly summaries of work done as well as obtaining occupational histories. This employee has a scientific approach which the average clerk does not possess. Likewise, this man's ability is being utilized in the industrial hygiene program as an assistant in laboratory procedures which require testing by analytical methods, etc. The Medical Department is now in a position where occupational history and clinical findings can be correlated with a greater degree of accuracy and reliability. All known cases of cancer of any part of the body, suspicious pre-malignant lesions, or other skin conditions of interest, past and present, are being summarized or are in the process of being summarized to furnish the data that has been requested. Admittedly, the data on some of these cases are incomplete, but it is believed that the information will be more complete in the future.

The development of a precautionary control program associated with the handling of heavy catalytically-cracked gas oils has seemingly been retarded at times, yet a rather remarkable degree of progress has been made to date. The program has just reached the stage where the necessary medical data and statistics can be obtained for an evaluation of conditions as they actually exist concerning this potential hazard. To date, it is impossible to say that a single case of skin cancer has been found which could be associated with the handling of these oils. A number of pre-malignant skin lesions or suspicious skin lesions have been found to be about the extent that one would expect in the average population. It may well be that evidence of multiple, rapidly growing skin papillomas will begin to appear out of all proportion to the usual incidence or some other development may arise to focus suspicion on these oils in due course of time; hence, the reason for alertness and continued study of the problem. This program is noteworthy from the standpoint that it has established a cancer consciousness among employees and plant physicians alike which did not previously exist to such a marked degree. This within itself is certainly a valuable development in the field of cancer control.

It is very gratifying to note that practically all major obstacles have been overcome in developing the medical program along the outlined procedures. Management and employees alike participating in this work have cooperated in a very fine manner. It may well be that ideas and procedures will have to be changed from time to time in accord with trends and developments.

II. INDUSTRIAL HYGIENE MEASURES

The only materials under consideration at this time by Humble Oil & Refining Company at its Baytown Refinery are the heavy fractions of the catalytically-cracked oils and their concentrated products.

The number of employees in the Refinery having authority to handle high boiling fractions of these oils and who work around or on the equipment that contains such has not been limited by Management order. However, they are limited by restriction of issuance of work permits in these areas to those essential to efficient production and maintenance. It is the responsibility of the process operators on tour to see that this regulation is carried out and that those assigned to or working around the units are informed of the potential hazard.

The formation of special repair crews has been considered but the execution of such a plan seemed to Management to be both costly and cumbersome. Instead, it was agreed that whatever measures necessary to protect the greater number of employees would be taken. Furthermore, it was Management's desire not to expose a few craftsmen to a greater potential hazard than the general employees in those respective crafts. This decision resulted in an increase in the work involved in the control activities of the Medical, Safety, and Training Departments. Other adopted control measures tend to offset this extra work load.

All personnel having jobs which involve a probable contact with these oil fractions are supplied, and must wear, protective clothing. This equipment, which is supplied and cleaned by the Company, includes gloves, aprons, boots, gas masks, rubber suits, and coveralls. When any employee's clothes are soiled with these oils, the soiled clothing must be removed and, if necessary, the Company supplies coveralls. Protective equipment, except coveralls, is cleaned by the Safety Department. Coveralls are laundered by a commercial laundry.

The personal hygiene educational activities of this program are carried out by the physicians at the time of the physical and skin examinations. At the same time, the employees are warned of the

hazards of touching any skin surface with oil-soaked hands and wearing soiled clothes, especially dirty underwear.

Safety releases on precautionary measures and safe practices on this problem have included statements stressing the necessity of immediate removal of oils from the skin. This phase was reemphasized during the program directed toward informing the employees of the entire story of the potential hazard. Furthermore, this precaution is on every warning label and placard used to identify these oils.

Locker and bath facilities for every employee in the program have been provided and assigned. The employees are urged, but not forced to take a shower before leaving the plant. This phase has been fairly successful. At least, those employees with the greatest potential exposure follow this practice very well. A health educational program has been planned for the coming year in which special emphasis will be placed upon this phase of the protective program.

A careful study of the flow plan of these oils was made. It revealed that they were being sent in concentrated strength at times to almost every unit in the refinery. Instructions by process management were then issued to limit these oils to a minimum number of rundown tanks, separate cracking-coils, and product storage tanks where dilutions would be made. It took five steps to accomplish this goal. Each change was recorded by the Pumping and Gauging Department on a flow plan to show the improvement, and copies of it were issued to all other departments concerned.

Today only the cat units, one set of thermal cracking-coils, connecting lines, and eight tanks contain these oils.

Changes in design of equipment have been made to affect better removal of oil by draining and subsequent flushing with safe oils as solvents prior to opening equipment for inspection or repairs. The thermal coils are steamed at 150 pounds of steam pressure for a period of three to five hours before the soakers, heating coils, lines, and such parts are opened.

Approximately an eighty per cent reduction has been made in the number and amount of equipment that was at times carrying these oils. This amounts to a corresponding over-all reduction in the number of process employees with potential exposure. Probably a 25-35

per cent reduction in number of mechanical and craft employees was accomplished by these flow plan changes.

Oil-soaked ground, walkways, and pavements are roped off and warning signs are posted. Janitor and labor forces who clean these areas and who repair waste sewers carrying these oils are supplied with protective equipment and are subject to the medical skin examination.

Samples from units, separators, and other places are being continually submitted to the analytical laboratory for identification and evaluation in regard to the concentration of heavy catalytically-cracked oil they might contain.

All units, tanks, lines, pumps, and large equipment containing these oils are identified by a metal or fiberboard weatherproof placard. All equipment removed for repair is tagged with a characteristic label. The same color scheme and wording are used on all precautionary signs, which are placed in the most conspicuous positions on the units and equipment. A safe practice manual in which each unit and tank will be more specifically described and identified is in preparation. All sampling points are identified. All samples collected at these points must be marked by proper tags, which must remain on them until the container is properly washed.

The repairmen and the operators have been warned of the danger of inhalation of oil mist. Furthermore, they have been instructed to wear gas masks while in the vicinity of oil fumes or mist from the equipment having precautionary labels. The mechanical groups have been substituting pump packing glands whenever deemed advisable in an attempt to reduce the escape of oil and fumes from these points.

As soon as these fractions are finished for sale, they are either shipped directly or blended in the products storage tank with safe oils. The oil sold in the concentrated fractions goes to a carbon black manufacturer in tank car lots. The customer has been repeatedly given all the toxicological information available about these oils. An offer has been made also to determine by survey whether the plant is properly equipped and following through on the recommended safe practices associated with this problem.