

ETHYL CORPORATION

INTER-OFFICE CORRESPONDENCE

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SUBJECT Report on Hygienic Aspects of Operation DATE 19 October 1948
of Associated Ethyl Company, Ltd.

1. Purpose

This report serves to communicate the results of a study of the operations of Associated Ethyl Company, Ltd., made in the period 13 to 21 September 1948. Information was obtained in discussion and during plant visits. Sources were personnel of the operating company, employees of the manufacturing plant, plant records, and inspection of operations.

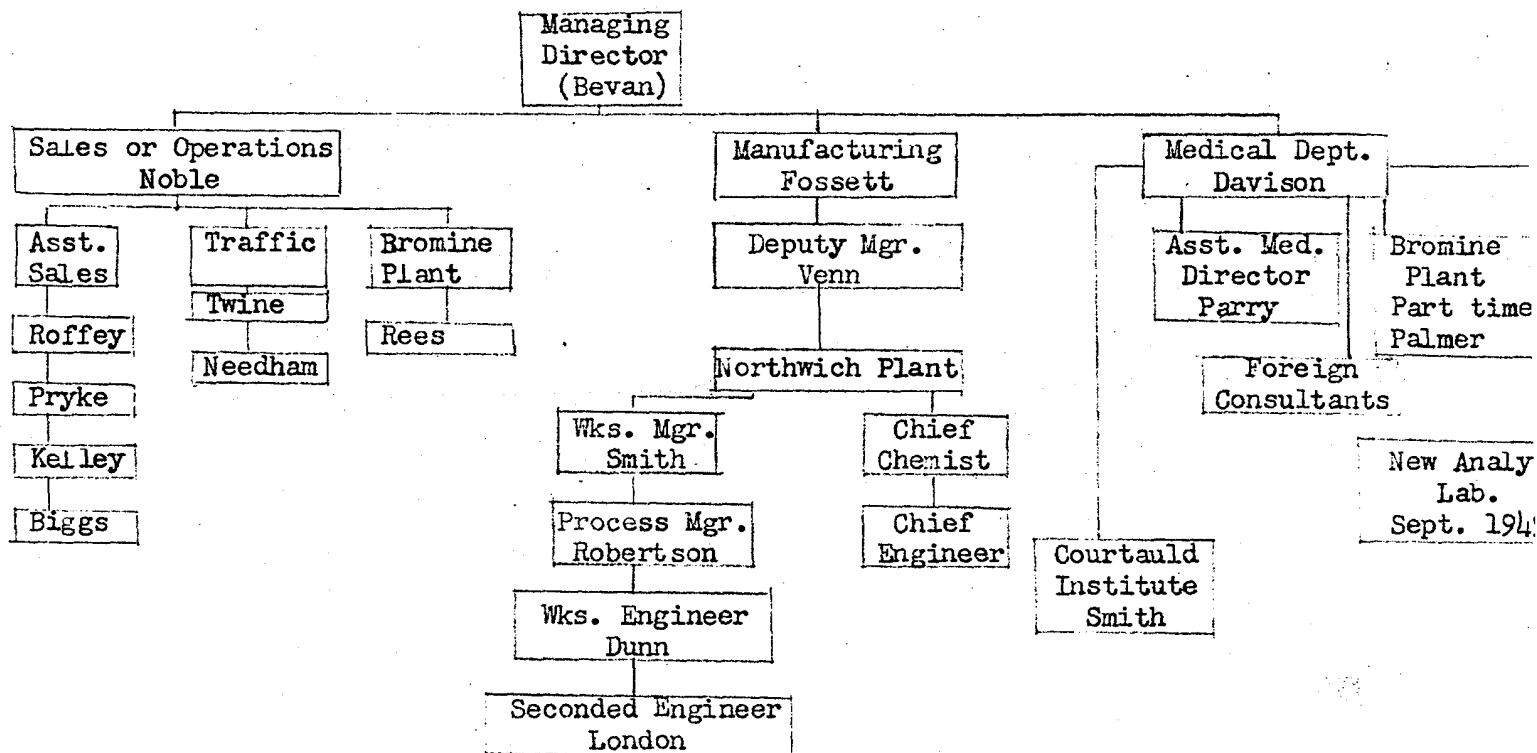
2. Hygienic Policy

Policy of management follows in principle that of the United States company and is in general good. The small size of the British company and the realization of the impracticality of maintenance of full supervision, has resulted in the relegation of responsibility for certain hygienic controls to the customer oil companies, notably the task of safeguarding tank cleanings. Medical monitoring of all operations remains the responsibility of the medical director and consultants of Associated Ethyl.

3. Organization

The medical director reports directly to the managing director of the company, supervises the activities of the consultants, and acts in an advisory capacity to the manufacturing and sales departments. This arrangement is good. The direct access by the medical director to the management gives his advice a degree of implied authority and enables more rapid implementation of recommendations. Approximate scheme of overall functional organization follows:

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4. Manufacturing

- a. Raw Materials - Lead in stock 600 tons average. Ranges 400 to 800. All obtained by allocation from Ministry of Supply. Source Broken Hill - is desilvered and presumably bismuth-free. Sodium received in drums from I.C.I. and is in short supply with low inventory. Ethyl chloride also in short supply result breakdown one of I.C.I. plants.
- b. Process - Charges 3,800 to 3,900 lbs. - four-hour cycle in autoclaves - thence usual, dump to still, distilled, washed, thence to blender. No aeration done. settling carried out in wash building. Soda-ash blanket over storage rather than glycerine. Small amounts sodium thiosulfate, FeCl_3 , and Me_2CO used in reaction. Ethyl chloride recovered in conventional still - non-condensibles vented off - no fires.
- c. Accidents - One fire in recovery building result back-flash from oil burner; was local and quickly extinguished. Second fire in pit which takes drainage from drum-washing booths. Sludge from fluid storage drains into same sump. No previous difficulty. Smoked and fired on one occasion only - sludge in usual amount but was preceded by unusually large drum-washing load.

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- d. Plant - Third and fourth floors in main building are worst, as is usual. Excretion levels are high, as indicated by reports - no cases of suspected or incipient poisoning have occurred. The blender building has been unusually bad in the past year due to the large number of bad barrels and leakers. Air analyses have averaged about 0.1 mgm./M³ with urinary excretions (spot) often as high as 0.5 mgm./L. Work is now limited to 52 hr./wk. followed by a break of one or two days. Despite high levels no clinical signs of intoxication have been apparent among the workers.

Furnace building (B) is another source of potential difficulty. The deteriorated, roughened floors cannot be washed because of poor drainage and the danger of wetting melt pot coils. Excess moisture in sludge and erratic functioning of dryer lead to additional contamination. Until improvements are made, situation is being dealt with by use of dust masks. Air values have been below 0.15 mgm./M³, urines range below 0.4 mgm./L, and feces at 1.2 mgm./sample consistently.

Alloy building (C) is not provided with adequate ventilation, and dust is widely distributed. Casters are in need of overhauling and leak badly. Boots are as usual in continual need of maintenance - the provision of sufficient new replacements is difficult. Hopper filling is a continuing problem as a result of nitrogen blow-outs. Men are now protected by baffles, but there is frequent contamination of general air. A special cleaning gang has been assigned to this operation, and conditions have improved of late. Fecal levels which were previously above 1.0 mgm./sample are now about 0.9/sample.

- e. Storage - A special problem is created by the accumulated storage of approximately 5,000 unserviceable drums. Several hundred of these in various stages of decay are piled up in the plant area. Owing to the acute shortage of drums, the stockpile has been sorted over at times in the hope of finding usable containers. A program for disposal of the lot will be initiated.

5. Transportation

Practically all shipments are in large drums - 10 gal. shipments being negligible. Most go by rail, a few by haulage contractor. There is good supervision of outgoing materials but no systematic control of returns. One driver who had returned a full leaker exhibited some symptoms and had a urinary lead excretion of 0.15 mg./L. Leaking drums are a constant problem. Most leaks are about the bungs which are now being sealed. Drums now supplied by Braby, Ltd., appear not to be sufficiently stout and durable. Inner bungs commonly leak -- one report from Abadan stated inner bung fell out following removal of outer bung. Drum supply is inadequate. Most new 12 gauge drums go abroad -- some old 14 gauge are used for domestic shipments and would be considered unserviceable by our standards. Some may have suffered earlier condemnation.

6. Blending

Thirteen plants in British Isles now in operation versus nine at beginning of year. Further increase anticipated. All sales to large companies in U.K. No jobbers. No hygiene problems. Physical standard blenders progressively improving since the war by gradual replacement old crews. Average number blenders each location is six. These are examined every 3 or 4 months depending upon frequency of blending. No cases of suspected poisoning.

7. Tank Cleaning

Twenty-nine cases tetraethyl lead intoxication with three deaths in 1945. No cases in past two years. Careful indoctrination of tank cleaners done by Dr. Davison. Crews

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examined three to four times per year. Some large refineries (e.g., Avonmouth) have crews of 20 or 30. Spot samples within normal limits. Little tank cleaning now being done. A system of reporting is planned, and sludge and air samples will be taken using the two lead analyzers on hand.

8. Commerce

No reports of unauthorized use in U.K. No claims or reported cases. Four suspected cases reported from Suez in 1946 determined to be bilharziasis. The Swiss cases have been reported.

9. Medical Department Activities

a. Scope

- (1) Three hundred men at Northwich plant, 200 of whom are examined at three-weekly intervals -- 100 annually.
- (2) Two hundred blenders at 15 locations with high turnover.
- (3) Sixty to seventy tank cleaners.
- (4) Laboratory workers, engine test, and incidental 90 with high turnover.
- (5) Supervision and maintenance of relations with about 50 consultants outside England. These are scattered widely and an additional 20-30 will be required.
- (6) Maintenance of contacts and establishment of relations with industrial hygiene leaders, state physicians, and the like, in various countries.
- (7) Consultation on industrial hygiene matters with public health authorities.
- (8) Clinical investigations and establishment of base line data on lead exposure of population of U.K.
- (9) Supervision of all safety activities.
- (10) Overall supervision.
- (11) Medical program of bromine plants.

b. Administration - Satisfactory organization with all medical matters heading up under Davison as chief medical officer.

c. Personnel - Davison's associate, Parry, is leaving. Is not greatly interested in the work or in the scale of pay of £1100/year.

Two secretaries and two technicians are on hand.

There is no overall safety organization outside the plant. There are two safety men within the plant.

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- d. Space and equipment - Space was designed for wartime operations and has adequate provisions for one doctor and one technician. Additional space is badly needed.

The medical department has no X-ray facilities and no electrocardiograph. Four medical journals are taken by subscription and the supply of medical books is adequate. A laboratory is proposed for study of public health problems and for clinical research. This will also do some biochemical work and carry out the routine analyses for the plants. I.C.I. at Winnington have been doing 90% of the routine, and Dodds about 10%. The capacity of these facilities has been exceeded by the load.

10. Activities outside U.K.

In general the relationship with medical and operating personnel outside U.K. is very loose, this being a reflection of the generally indeterminate relationships between the managements who are developing working agreements.

- a. Germany - The underground plant never operated. The Russians removed the other. Marketing in Germany is under way. It is not anticipated that the German plants will be restored, but Fluid will be supplied by Associated.
- b. France - The medical department has had no contact with Coste or the French plant. Coste remains diffident and seems to prefer keeping matters in his own hands. Davison, therefore, has no supervisory control, and has not yet been called upon for advice. Relationships between Associated Ethyl and Kuhlman have not been effectively re-established since the war. Associated, which presumably still has joint ownership of the plant with Kuhlman, would like very much to see the plant restored because of Associated Ethyl's present inability to meet demands for Fluid. The French plant is operating four autoclaves and producing approximately 180 tons/month (this is believed to be an optimistic figure). Raw material shortages are the current limiting factor. If more German ethyl chloride and sodium becomes available, production is expected to increase.

All current delivery by drums to the 15 blending points, 10 of which are operating regularly. Eight blending points will be converted to tank car handling in the near future.

No reports of trouble from tank cleaning. Prior to 1939 leaded only premium and aviation - now all fuels. Journeau devotes full time to safety matters and attends tank cleanings from time to time.

- c. Spain - State controls operations. No medical liaison or supervision. Fluid supplied by Associated.
- d. Italy - Montecatini plant still dispersed. Other plant back in operation and supplying government. Associated will distribute to Italy.
- e. Switzerland - Fair medical liaison. No one from Associated has seen the military mixing installations. The situation with respect to Professor Dettling and the suspected cases has been reported.

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- f. Argentina - A two or four autoclave plant will probably be built 50-50 with Y.P.F. Pavlovsky will assume medical responsibility. He is, however, a doubtful quantity, since he does not want to do the work but may supervise.
- g. Formosa - The Chinese are operating a partly restored Japanese plant, the lead being shipped from England. The only medical control is a Japanese-trained first-aid man.
- h. Trinidad - Consideration is being given to the construction of a two to four autoclave manufacturing plant.
- i. Saudi Arabia (Rustannia, Persian Gulf) - Consideration is being given to a two to four autoclave manufacturing plant.
- j. Tripoli - Some consideration has been given to construction of a manufacturing plant at the end of the pipe line.
- k. Ellesmere - In lieu of all the above, except the Argentina plant, there is a proposal under consideration for construction of a 32 autoclave plant in the Ellesmere port area, Mersey. The currently anticipated British production is 2,000,000 pounds/year. Very much larger quantities of Fluid are needed and it is anticipated new plants will be built somewhere to meet the requirements.

11. Comments

- a. Davison is unusually capable and energetic and any success that has been achieved in maintaining hygienic control is largely due to his efforts.
- b. The policy in organizational relationships in which he operates are good. More complete understanding of the hygienic problem throughout the organization is needed, if Davison's full capacities are to be utilized.
- c. Additional personnel and assistants for the medical director are required. In the past two years Davison has covered the Middle East and Europe (except France). He requires competent assistance to care for the work at the plants and in the British Isles if he is to have time to establish relationships with the medical consultants and governmental agencies.
- d. Davison's present salary (approximately \$1750) is not adequate, nor proper to his position. There is further a ceiling (sic) of \$2000 quoted for department heads. This means that Davison has little to look forward to if this policy exists and is pursued, and consequently there is no assurance that Associated Ethyl can retain him. Our own opinion is that he is quite willing to entertain other offers. We recommended to Bevan that serious consideration be given to having an understanding with Davison and entering into some long term arrangement.
- e. The hygienic status of the manufacturing plant can be described in simple terms as one in which the physical equipment is borderline, if not dangerous, and that safe operation has been made possible only by extra good medical supervision and excellent housekeeping. Under the present system of allocation of materials, we believe that it will be at least a year or two before all the mechanical improvements can be made.

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