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ETHYL CORPORATION

Inter-Office

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SUBJECT: Lead Alkyls Area - Proposed Program
for Reducing Contamination

December 22, 1966

A proposed program for reducing contamination in the lead alkyls area is outlined in this memorandum as agreed upon by TEL Operations and TEL Technical Services. Included in this program are recommendations for modifications in equipment and procedures to reduce the contamination level and personnel exposure. Also included are studies which must be conducted to better define specific contamination sources.

Specific proposals and recommendations, as agreed, are listed below:

1. Ventilation and Hygiene Consultant - Dr. Melvin W. First

Implement Dr. First's acceptable recommendations after evaluation.

2. Foxboro "Total Hydrocarbon Analyzer"

Obtain the Foxboro "Total Hydrocarbon Analyzer" (hydrogen flame ionization carbon bond detector) on a rental basis to determine if it is suitable for detecting process leaks in the manufacturing buildings. If it is found to be satisfactory for this purpose, buy it and make a thorough survey for leaks. If the survey is made, additional technical manpower may be required. This survey will not supersede the routine leak checking now being done by TEL Operations.

3. Equipment Failures

Continue to work to reduce the frequency of equipment failures, and implement all corrective action as quickly as possible. Review maintenance and operating procedures and modify where necessary to ensure that all possible precautions are taken to reduce the exposure of personnel to

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contaminated material. Specific items of immediate concern are:

- a. Angle valves - Install flat-faced seats, especially in TML service. Obtain more air samples when an angle valve is being changed properly to ensure that the existing procedures are adequate.
- b. Duraseals - Determine whether to use sleeve or standard or J. D. Daigre seals comparing service factor with exposure during seal replacement. Obtain air samples to establish facts about exposure during seal changes.
- c. Charging head plug cocks - Obtain air samples during charging head plug cock replacement to determine whether this contributes to contamination.
- d. Plugged drop legs - Install valves on the drop leg lateral plates in "C" Building permanently. The type and size of the valves must be determined. Replace drop legs with units containing a sprayed Teflon lining when replacement of the existing drop legs becomes necessary. Meanwhile, continue to search for a better lining. Install a permanent high-pressure water header with hose connections on the fourth floor for water flushing and unplugging drop legs.
- e. Slide valves - Replace the existing slide valve stem packing with Teflon "Self Mold" packing which has performed satisfactorily on two test units in "B" Building.
- f. Valves (General) - Process valves which are operated during every cycle develop packing gland leaks and cause contamination. A record of valve failures is attached as Table I, "Valves Repaired or Replaced on Fourth and Fifth Floors of "C" Building during 1966." Daily leak checks of ball valves installed at C-2 autoclave have disclosed no leaks since the test began more than five months ago. The test included ball valves in the following services:
 - (1) MeCl scale tank vent.
 - (2) Nitrogen to scale tank.
 - (3) MeCl scale tank pressure gage.
 - (4) MeCl scale tank vapor line main block.
 - (5) MeCl take-up line at scale tank.
 - (6) MeCl feed line at scale tank.
 - (7) MeCl rear feed.

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- (8) MeCl feed diaphragm valve bypass.
- (9) Charging vent.
- (10) Primary vent.

It is therefore recommended that the following valves in "C" Building, all of which are operated every cycle, be replaced with ball valves on a stepwise schedule in the following order of priority:

- revised
as capacity
is possible
split in
7/12/52
JMS*
- (1) MeCl rear feed and MeCl feed line at scale tank.
 - (2) Primary vent.
 - (3) MeCl take-up line at scale tank.

It is further recommended that the following valves also be changed pending further evaluation of their performance while the aforementioned valves are being replaced:

- (1) Charging vent.
- (2) MeCl scale tank vent.

In the meantime, the present valves in the nitrogen lines to the scale tanks should be checked to ensure that they are installed in such a way that nitrogen pressure rather than scale tank pressure is applied to the steam packing when the valves are closed. Similarly, the present MeCl scale tank vent valves should be checked to see that the packing is exposed to the downstream pressure rather than scale tank pressure when the valves are closed.

4. Alloy Hoppers - Determine whether the contamination from the hoppers as indicated by the high lead analyses in "C" Building elevator and tunnel is caused by contaminated vapor from empty hoppers or by contamination on the outside surface of the hopper slide valves.

Several alternate solutions exist for reducing or eliminating the contamination which results from vapors inside the hoppers. These alternates have been reviewed by TEL Operations and Technical Services since the last contamination meeting was held in November. The consensus is that these alternates should be evaluated by plant testing in the following order of priority until a satisfactory solution is found:

- 1. Evacuate empty hoppers to a high vacuum to remove contaminated vapors after charging.
- 2. Increase the present hopper purge rate.

3. Increase the present hopper purge time.
4. Reduce the alloy charging rate.

The present hopper purge system in "C" Building has not reduced the contamination in the elevator and tunnel to acceptable levels. A controlled evaluation of this purging system will be conducted during which an operating foreman will closely supervise the purging operation to ensure that the proper procedure is followed.

Greasing of the hopper slide valves began November 24. However, the contamination levels in "C" Building elevator and tunnel continue to be very high.

5. Outside Air Contamination - Contamination of outside air is a major contributor to the contamination problem inside the buildings. The major sources of this contamination are believed to be the copper ducts and furnace pit exhaust ducts. The organic lead content of vent streams at "B" and "C" Buildings has been determined as follows based on continuous samples and spot flow measurements.

	<u>"B" Bldg.</u> <u>TEL, lb/day</u>	<u>"C" Bldg.</u> <u>TML, lb/day</u>
a. Copper duct	351	736
b. Primary tails gas	0.3	-
c. Sniff tails gas	0.1	-
d. Furnace pit exhaust	315	280
e. North sump	11	0

It should be noted that the lead content of the vent gases from the north sumps was very high. However, there was little or no flow of these gases into the plenum of the building exhaust fans indicating that the level in the process ditches may be high. Past measurements have shown that a fairly high air rate should exist from the north sumps to the building exhaust fans. The process ditches should be cleaned and inspected regularly. Air samples will be obtained in the vicinity of the north sump between the buildings and the furnaces to determine whether this area is contaminated. The organic lead content of "D" Building copper duct and the exhaust ducts from the furnace pits at the remainder of the operating furnaces will be determined.

6. Timetable and Manpower Requirement

A calendar timetable and manpower requirement for the studies mentioned above is attached as Table II, "Timetable and Manpower Requirement for

Future Contamination Studies." Since these studies require extensive air sampling and subsequent analysis by CR&D personnel, the projected schedule is greatly dependent on the priority placed on this program by the Analytical Group of CR&D.

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TABLE I
Valves Repaired or Replaced on Fourth and Fifth Floors of
"C" Building During 1966*

<u>Valve Identification</u>	<u>Number of Valves Repaired or Replaced</u>					
	<u>Feb.</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>
1. MeCl Scale Tank Vent	3	**	0	4	2	0
2. Nitrogen to Scale Tank						
3. MeCl Take-up Line at Scale Tank	3	4	1	8	0	4
4. MeCl Rear Feed	11	4	1	9	2	1
5. Charging Vent	5	10	2	2	0	0
6. Primary Vent	3	1	3	9	2	0

* Based on contamination reports of building supervisor (excludes angle valves, sliding tank valves, feed diaphragm valves, sniff diaphragm valves, valves in nitrogen line (overhead) and drop legs, and charging head plug cocks.

** Repacked all scale tank vent valves on 3-31-66

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