



8/16/54

REVIEW OF AIR ANALYSES PERFORMED BY KEM-TECH LABORATORIES

Since April, 1953, Kem-Tech Laboratories, operated by Dr. A. R. Choppin and Dr. P. W. West of Louisiana State University, have been making periodic surveys of atmospheric contamination in the refinery and at our Maryland and Anchorage Tank farms. Spot checks have been made twice each month at five points within the refinery; the Anchorage and Maryland points have been checked once each month. For comparison a sample has been taken in an outlying portion of the city each time the refinery points were checked. The analyses made include a dust count, a qualitative examination to identify dusts and tests for certain chemicals, including ammonia, chlorides, chlorine, sulfates, hydrogen sulfide, sulfur dioxide and aromatic hydrocarbons. In addition test panels of different metals have been placed at each of the sample points for corrosion studies and dust fall studies covering periods of several weeks have been made. The attached tables summarize very briefly the results obtained so far.

The data are as yet too few to give us a comprehensive picture. Nevertheless, the following conclusions may be drawn:

1. There is no health hazard. All concentrations of contaminants have been well below limits established by the various public health agencies. Our own Medical Department has some evidence that concentrations of chlorine gas approaching hazardous limits have been released for brief periods by a neighboring industry, but the Kem-Tech surveys have never caught any of these.
2. Other industries are contributing more to air contamination than Esso. Our sample points are located around the edges of Esso property. When the wind is across Esso to the sample points, negligible quantities of contaminants are found. When the wind is from the west and north, samples taken nearest to other industries at times show appreciable concentrations of contaminants. A special survey conducted for SO₂ showed this situation most clearly. The investigators, over a period of about a week, found no SO₂ originating in the refinery. They did find some SO₂ moving onto Esso property from the north and northwest. They also found chlorine in several locations, and Esso does not have any operations that would account for this.
3. Dust concentrations are not seriously high. At most of the sample points dust concentrations average about 8 million particles per cubic meter. This compares with 3.5 to 4 million particles in clean country air. At the northwest corner station, which is located just east of the junction of the Solway and Gulf States properties, dust concentrations are also in the order of 8 million particles when winds are blowing across Esso to the sample point. However, when winds are from the north and west, dust counts average 15 million and have been as high as 20 million. We understand that dust counts made in the vicinity of the Mississippi River Bridge have run as high as 40 million. Even these figures are much lower than limits considered hazardous to health. For instance, the limit of safety for silica dusts, which are considered very bad, is about 150 million particles per square-decimeter.
sub. meter
4. The atmosphere within the refinery is only moderately corrosive. Specimens of soft steel and chromium plate in the refinery show corrosion rates about three times as great as control strips maintained at Dr. Choppin's home on

yes

4. Cont'd.

Aubin Lane, several miles southeast of the refinery. Copper, galvanized iron and aluminum strips also show higher rates in the refinery, but corrosion is negligible in either case. By the standards of our Equipment Inspection Department the corrosion rates found for steel and chromium in the refinery are still very low. For steel the rate is in the order of 0.25 to 0.50 mg/ sq. decimeter/day. This compares with published figures of 5 to 40 mg/sq. dec./day for iron in normal urban atmospheres. It should be noted that the exposure periods for the test strips here were from 2 to 4 months. Most authorities believe periods of 3 years are necessary to get even tentative results. According to our Inspection Department there are two trouble spots for corrosion within the refinery. These are Knox Field No. 2 and the area along the west fence of Chemical Products Division. They believe that high corrosion rates experienced on equipment in these areas are due to contaminants such as chlorine, chlorides and acids released by other industries to the north and west.

Dust fall data are inconclusive to date. The method originally used proved unsatisfactory. Another method is now being tried, but it is too early to tell whether it will be satisfactory.

We have information on four samples taken at points outside Esso property during smog conditions. Two of these were taken near the Chemical Products area. One was taken south of the bridge on the Port Allen side and another north of the bridge under the Ideal Cement Co. land. Dust counts ranged from 10 to 23 and averaged 17. In three cases out of four ammonium chloride was present in small amounts and in two cases free chlorine was present.

At the end of the first year's contract Kam-Tech recommended extending the program to have a full time man taking samples three days each week in and outside the plant to be sure that Esso is not causing trouble to those on the outside. This recommendation was not approved because the data, although scant, gave no indication that this might be so. In view of recent developments we may wish to reconsider this decision, if only to prove conclusively that Esso's hands are clean. The cost would be \$5000 to \$7000 above the present cost of \$7200/yr. Our present contract expires April 1, 1955.

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8/16/54

SUMMARY TABLE - KEM-TECH AIR SURVEYS

ANALYTICAL DATA

<u>Sample Point</u>	<u>Wind Direction</u>	<u>Dust, Million Particles/Cu.Meter</u>	<u>Other</u>
Southwest Corner		4 to 13. Ave. 8. No correlation with wind direction or velocity.	Essentially no chemical contamination. 26 samples taken. Trace amounts of NH ₃ 7 times, Chloride 5 times, Chlorine 3.
South Gate		2 - 11. Ave. 8. One reading 45, Apparently from Solway.	Zero contamination 10 days out of 28. Traces of NH ₃ 8-times. Appreciable quantities of chlorides 4 times when wind south and SW; once when wind NW. Chlorine 4 times, from south, SE and east. Sulfate 2 times, from south and east.
Northwest Corner, near Gulf States and Solway	Wind NW S-SW-SSE E-NE	5 - 20. Ave. 14 6 - 11. Ave. 9 5 - 12. Ave. 8	NH ₃ once. Cl ₂ up to 0.5 ppm 3 times. Essentially zero chemical contamination chlorides and chlorine in relatively high concentrations several times
Northwest Corner near CPD Mechanical Bldg.		4 - 15. Ave. 9. Usually above 10 when wind north or northwest below 10 when wind from south, SE or SW.	Zero contamination 15 times out of 27. Chief contaminants on other occasions chlorides, chlorine and SO ₂ . Little correlation with wind direction.
North of Cafeteria		4-16. Ave. 7. Little correlation with wind direction.	Zero contamination 14 times out of 26. Small amounts ammonia, chlorides and chlorine on other occasions. Chlorine as high as 0.9 ppm and 0.6 ppm on two occasions (1 ppm considered high).
Anchorage	S and SW N and NE	3-6. Ave. 4 6-13. Ave. 10	Traces of Cl ₂ when wind in northeast.
Maryland		4-11. Ave. 6 Little correlation with wind direction.	Very little chemical contamination. Traces of ammonia chlorides and chlorine when wind in SW.
Controls - Arabia Lane, South-		2-9. Ave. 4. One value of 9 at Arabia Lane when NE wind 1 mph.	Zero chemical contamination, one instance traces NH ₃ , chlorides and chlorine at

SUMMARY TABLE - CORROSION TESTS BY KIM-TICK LABORATORIES

CONVERSION - MG/8Q. DISTINCTION/DAY*

Material	Sample Location							
	South Gate	East Field	H. W. Corner	North of Cafeteria	Ches. Products	Maryland Tank Farm	Anchorage	Aubin Lane
Steel	0.247	0.194	0.328	0.288	0.170	0.118	0.161	0.062
Carbons	0.170	0.181	0.309	0.266	0.173	0.087	0.076	0.030
Galv. Iron	0.008	0.005	0.013	0.006	0.006	0.006	0.006	0.007
Copper	0.009	0.005	0.010	0.026	0.008	0.005	0.006	0.008
Aluminum	0.005	0.004	0.008	0.006	0.004	0.007	0.004	0.004

five. of three periods: 7/21/53 to 11/22/53
11/22/53 to 1/22/54
1/22/54 to 4/30/54