

Prepared for

ALLEGHENY COUNTY HEALTH DEPARTMENT
BUREAU OF AIR POLLUTION CONTROL
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ODOR STUDY AND ENGINEERING
EVALUATION OF THE LTV STEEL
COMPANY COKE PLANT IN THE
HAZELWOOD AREA OF PITTSBURGH

Final Report

April 1989

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A88-577

SECTION 1

HISTORICAL ODOR COMPLAINT DATA REVIEW - TASK 1

OS&E staff reviewed the LTV coke plant odor complaint data for the time period June 1985 to July 1987 on file with ACHD. The data consisted of a total of 229 complaints filed by different households. The monthly breakdown of these complaints is tabulated in Table 1-1 and mapped in Figure 1-1. Forty-six complaint locations (indicated by location number) and the number of complaints per location are illustrated on Figure 1-1. Complaints which are not indicated on Figure 1-1 are omitted because either no street address was given, or the address could not be located on the map. The complaint location identifier is followed by the number of complaints. Sixty-six percent (66%) of the total number of complaints were received from ten complaint locations indicated by arrows.

Odor complaints are directly related to wind speed and wind direction. The analysis of the odor complaints correlated by resultant wind direction, are illustrated in Figure 1-2. Eighty-nine percent (89%) of all complaints occurred during periods when winds were from the south to west sectors. Eighty-six percent (86%) of all complaints coincided with moderate-to-light wind speeds of less than 10 mph. Of 199 complaints illustrated in Figure 1-4, 40 percent are located within a 1-mile radius of the LTV coke plant. Twenty-three of these complaints (11.5 percent of the total number of complaints) were filed by the same household. Forty-seven percent (47%) of all complaints filed during the study period were issued from distances greater than 2 miles from the plant.

The Allegheny County Health Department's odor complaint data for the most recent August 1987 to July 1988 period were analyzed by Alliance/OS&E. A total of 76 LTV plant-related odor complaints were indicated. There were fewer complaints made during the August to June time period this year than for

TABLE 1-1. LTV COKE PLANT-RELATED ODOR COMPLAINTS - JUNE 1985
THROUGH JULY 1987 (BREAKDOWN BY MONTH)

Year	Month	No. of Complaints
1985	July	14
	August	17
	September	26
	October	7
	November	7
	December	0
1986	January	6
	February	3
	March	8
	April	7
	May	7
	June	2
	July	10
	August	11
	September	17
	October	13
	November	1
	December	8
1987	January	1
	February	2
	March	5
	April	6
	May	11
	June	21
	July	19
Total		229



Figure 1-1.
Area of coke plant odor complaints
1985 - 1987
as prepared by ACHD.

the same time period for the previous two years. There were 90 complaints filed from August 1985 through June 1986, and 96 complaints from August 1986 through June 1987. The monthly breakdown for the 1987-1988 period is listed in Table 1-2. The complaint locations were generally the same as previously illustrated for the 1985-1987 data in Figure 1-1, with the addition of a few locations directly east of the LTV coke plant. Thirteen of the complainants were repeat complainants from the previous analysis. There were 17 new complainants for the period of August 1987 through July 1988. Most complainants did not specify an odor character; those that did described the odor as chemical, sulfur, or burning.

As an additional effort under Task 1, Alliance compared times of report LTV process upsets against times of odor complaints. Through this effort, Alliance found no significant relationship between the frequency of complainant and plant upset incidents. The principal plant upsets reported are shutdown of the desulfurization plant or the battery pushing controls. Available complaint and plant upset data overlapped during the period of August 1986 to July 1987. During this time, there were 58 reports of plant upsets and 115 complaints were filed. Eighteen of these complaints coincided with plant upsets. The data are plotted on the timeline, Figure 1-3. Of those 18 complaints, 12 occurred between June 1 and 15, 1987 when a desulfurization station outage occurred down due to an explosion on the top of the destructor and pluggage in the sulfur condenser and No. 2 heat exchanger. In summary, only 16 percent of all complaints follow plant upsets. If the 12 complaints which occurred in June 1987 are not included in this percentage, then only 5.2 percent of odor complaints coincided with plant upset incidents.

intensity 4.0 or above (on the butanol scale) which were characteristic of the V coke plant. Because an insufficient number of samples were collected by September 23, 1988, an alternate method of collecting data was developed. This method is detailed in Section 3.

The odor logs of the seven community observers were evaluated for the period between August 24, 1988 and October 16, 1988, inclusive. The observers had been instructed to record any detectable odor not just odors they considered objectionable, i.e. at a level that would elicit a complaint from them. They were also instructed to record their location, time of day, odor intensity on the n-butanol scale, odor character, wind speed and wind direction.

Detectable odors were recorded by at least one observer at his or her home on 34 days out of the total of 53 days in the observation period, a percentage of 64 percent. Detectable odors were never recorded by all seven of the observers on any one day. For a single observer the range of total observations recorded and the number of days on which odors were noted varied from a low of two observations on a total of two days to 28 observations recorded on a total of 23 days. The total number of observations recorded each day and the total number of households observing odors on any single day are summarized in Table 2-1. The distribution of odor observations by day of the week and the range of observer households noting odor on that day are given in Table 2-2. This table shows that there is no obvious likelihood that odor will be detected on any given day of the week more often than any other. Although odors were recorded on Sunday more often than any day of the week this was largely due to a single observer. The day to day variability is more likely the result of variations in local meteorological conditions rather than any significant change in emission patterns or rates from the LTV plant.

The distribution of odor observations according to time of day is shown in Table 2-3. It would be expected that more odors would be noted under near normal or inversion atmospheric conditions which occur most frequently at night. The data on Table 2-3 do show a preponderance of odor observations between 8 p.m. (2001) and 4 a.m. (0400). However, odors were recorded at about the same frequency during each four-hour period of the day. The relation between perceived odor intensity, as measured on the butanol scale, and wind speed is shown much more clearly on Table 2-4. This table demonstrates that odor detection is, in fact, highly correlated in inverse relation with wind speed as would be expected.

TABLE 2-5
OBSERVATIONS AND RECORDED ODOR CHARACTER

CHARACTER	NUMBER OF OBSERVATIONS	PERCENT OF TOTAL OBSERVATIONS	
BURNT MOTHBALLS	3	23	26
MOTHBALLS	8		
SULFUR/MOTHBALLS	6		
NAPHTHALENE	5		
SOLVENT/MOTHBALLS	1		
SULFUR	9	15	17
SULFUR/BURNT RUBBER	1		
SULFUR/TAR	3		
PHENOL/SULFUR	1		
BURNT RUBBER	1		
TAR	8	18	20
TAR-LIKE	9		
COAL/TAR	1		
COAL	2	4	4
SOLVENT	1		
WOODBURNING	1		
NO SPECIFIC CHARACTER GIVEN OTHER THAN GENERAL COKE PLANT ODOR	29 89		33 100