Technical Report No. 2

AIR POLLUTION AT NEWHALL RANCH

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Development Department
The Newhall Land and Farming Company
Saugus, California

TABLE OF CONTENTS

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INTRODUCTION

Smog as it has developed in Los Angeles in the past ten or fifteen years is truly a major catastrophe. Only those who have experienced severe smog conditions there can appreciate the nuisance, the economic loss, and the hazard to health and property that this phenomenon represents. It is natural, therefore, that one of the first things to consider in the development of a new town at Newhall Ranch is the question of air pollution.

At the present time there is no air pollution problem in the Eastern end of the Santa Clara Valley. We aim to keep it that way, to the very best of our ability.

In order to keep our present pure air, we must know just what the contaminants are that must be controlled, and how much of these contaminants can be tolerated with the particular topographical and meteorological conditions that we have. We must also have a clear picture of the sources from which the damaging contaminants come.

In this report, we will not concern ourselves too much with the chemical and physical nature of smog, except as it is necessary to identify it. What we will do is to try and tag it, and measure its possibilities, so that we can know what to do to control it.

At the present time the leakage of smog from the San Fernando Valley into the Santa Clara Valley is negligible. While it is conceivable that greater concentrations of contaminants in the air leaking into our valley could be detrimental, it is also inconceivable that the people of Los Angeles can tolerate a concentration so great that it would present any nuisance when leaked in small amounts into our valley. For this reason, this report will ignore the leakage factor as a potential problem.

SUMMARY

The most important man-made contaminants in the air in the Los Angeles area that contribute to Smog are gaseous organic compounds, coming from the daily activities of the general public and industry. These in themselves are not sufficient to cause Smog, unless stagnant weather conditions permit contaminants to concentrate above the permissable level.

Weather conditions in general at Newhall Ranch will be similar to those experienced in Los Angeles. The greater air turbulence caused by greater temperature variations will tend toward a lesser build-up of pollutants, however.

By proper planning, air contamination from industry and from household incinerators at Newhall Ranch will be kept at a minimum. The principle source of gaseous organic materials will be automobile exhausts.

By the time that Newhall Ranch builds up to a population of 75,000, the concentration of automobile exhausts will be only about 40% of that in Los Angeles from the same source, assuming that nothing is done to eliminate or minimize organic materials in exhaust. The lower concentration in Newhall results from the relatively greater volume of air available in which to disperse the contaminants. Eventually development of an effective device for controlling automobile exhaust should essentially remove any air pollution hazard at Newhall.

What little nuisance there might be from air contaminants from industrial installations will be minimized because prevailing winds will drive fumes and smoke away from the residential areas.

With proper planning, air pollution at Newhall Ranch should never present a serious problem.

SMOG - THE INGREDIENTS

Smog as it is known in the Western states (particularly Southern California) is entirely different than the atmospheric pollution that is common in the Eastern and mid-Western cities of the United States. In the large cities to our east, such as Pittsburgh, New York, St. Louis and Chicago, air pollution is caused primarily by soot and solid particles, resulting from the burning of coal and coke. In Los Angeles, smog is the result of the burning of liquid and gaseous fuels (primarily gasoline, fuel oil and natural gas), augmented by the processing of these fuels and the burning of rubbish in backyard incinerators.

In metropolitan Los Angeles, there is a total of about 2,700 tons per day of pollutants put into the air from various combusion sources. Of this total, the fraction which causes troubles in the form of eye irritation, reduced visibility and vegetation damage is called "organic", and totals about 1,500 tons per day.

In 1953, the make-up of these organic effluents in Los Angeles was as follows:

General Public Emissions

Fuel gas	11 tons	
Fuel oil	11	
Gasoline	1,016	
Refuse	414	
		1,452 tons

Petroleum Industry Emissions

Fuel gas	16	
Fuel oil	12	
		28 tons

Other Industry Emissions

Fuel gas	8	
Fuel oil	17	
Refuse	29	
		54 tons
		1,534 tons

SMOG - THE TRIGGER

It must be remembered that on many days of the year, the 1,500 tons per day of organic effluents put into the air of Los Angeles cause little or no trouble. The only time when these pollutants build up to intolerable proportions are on those days (usually in late Summer and Fall) when weather conditions conspire to trap the materials over the city.

In the Summer and Fall, Los Angeles experiences frequent and long "inversions". A temperature inversion consists of a layer of warm air, suspended at some distance above the ground, that prevents the usual air turbulence. Such an inversion at a height of 1,000 ft. or less over Los Angeles, will effectively seal in the air contaminants, since the wall of mountain surrounding the city will not permit the polluted air to escape from under the inversion. Over the Los Angeles basin a severe, low inversion may persist for many days, even a week or two. When this happens, the build-up of pollutants reaches truly intolerable levels, such as during Thanksgiving week of this year, when there were thousands of traffic accidents because of poor visibility, air traffic was grounded, crops damaged, and severe eye irritation experienced.

The inversions that form over the Los Angeles Basin have their origin over the Pacific Ocean and extend over Newhall as well. The Eastern Santa Clara Basin is much smaller however, and farther inland. With a larger proportion of mountainside to air volume, and with a wider daily fluctuation in temperature, we get a greater turbulence during the day which serves to destroy the inversion or at least raise it high enough to permit dilution and escape of any pollutants that might be present. Thus, although our nighttime inversion will be as severe (and possibly a little more so) than Los Angeles will have, this will be completely or partially broken up during the day, with the result that we do not have the problem of coping with the build-up of many days' production of air pollutants.

SMOG POTENTIALITIES AT NEWHALL

Smog in Southern California is caused by a combination of organic pollutants and adverse weather conditions. Weather conditions in the Newhall area are not so bad in this respect as in the Los Angeles area, and much can be done to eliminate or control organic emissions to the atmosphere. This means that Smog can be controlled by taking preventative measures.

In our planned community, only industry that contributes a negligible amount of contaminants to the air will be allowed, and the general public will burn little or no refuse. On this basis, the Los Angeles figures for total organic contaminants to the air would have looked somewhat as follows:

General Public Emissions

	Tons/Day	Percentage
Fuel gas and oil	22	2
Gasoline	1,016	96
	1,038	98

Industry Emissions

Fuel gas and oil	25	2
	1,063	100

If we can follow a pattern such as this at Newhall Ranch, 98% of the pollutants will come from the general public, with 96% from the operation of automobiles.

Even without any corrective devices on the automobile exhaust pipes, the automobile picture will not be so bad at Newhall, as it might appear. The present population of Los Angeles County is about 5,000,000 people, and the exhaust from their 2,000,000 automobiles spreads over about 1,600 square miles, which means that the automobile "loading" is about 1,250 per square mile. When the population of Newhall Ranch reaches 75,000, there will be about 75 square miles for the 30,000 automobile exhausts to spread over (even though the town itself will occupy only about 15 square miles), a loading of approximately 400 automobiles per square mile. The car exhaust problem will therefore only be about 30% as bad as in Los Angeles, and this situation is further improved to an unknown degree by the greater degree of air turbulence in the Santa Clara Valley.

As soon as a useful catalytic device is developed, Los Angeles County will undoubtedly require such a device on the exhaust system of all automobiles, for the purpose of eliminating or minimizing the organic effluents. When this is achieved, almost complete elimination of any smog potential at Newhall Ranch would seem a distinct possibility.

Although the industry emissions at Newhall Ranch will be small in the aggregate, they can be a potential local nuisance because of the relatively large concentration from a few sources. In our case, this should present no problem, since the prevailing winds are from the South and Southeast, and our industrial district will be on the Northern edge of the town, along Saugus Road. Winds from the Northeast and Northwest are frequently experienced during the Winter, but these are invariably so strong that there is no possibility for the accumulation of air contaminants. (See Appendices A and B.)

Appendix A

WIND DIRECTIONS AT SAUGUS

Percentage of Time

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
Jan.	5	2	8	1	2	#	13	3	10	1	4	#	3	1	13	3	31
Feb.	4	1	6	1	1	#	15	3	11	1	6	#	3	#	8	1	39
Mar.	3	1	3	1	1	#	12	4	13	1	6	1	4	1	7	3	39
Apr.	2	1	3	#	1	#	15	4	13	2	6	2	5	1	7	2	36
May	2	#	1	#	1	#	21	5	13	1	6	2	4	1	6	1	36
June	1	#	#	0	1	#	27	7	10	1	4	1	2	1	5	1	39
July	2	#	#	#	#	1	27	5	11	1	3	1	3	#	6	1	39
Aug.	2	#	1	#	1	#	20	6	14	1	4	1	4	1	5	1	39
Sept.	2	#	1	#	1	1	23	6	11	1	3	1	3	1	5	1	40
Oct.	2	1	6	2	1	#	16	5	15	1	4	1	2	#	6	1	37
Nov.	5	2	10	2	1	#	17	3	11	1	2	#	2	1	11	2	30
Dec.	5	2	9	2	1	#	12	4	9	1	4	#	2	1	11	3	34
Year Avg.	3	1	4	1	1	#	18	4	12	1	4	1	3	1	7	2	37

- Negligible

Source: National Weather Records Center,
Years 1934 - 1938 inclusive

Appendix B

WIND CONDITIONS AT SAUGUS

	Wind Direction					Wind Velocity - %			Max. Wind Vel.
	Most Common		Second			4-15	16-31	32-47	
	Dir.	%	Dir.	%	Calm	mph	mph	mph	mph
Jan.	NW	13	SE	13	31	58	11	#	38
Feb.	SE	15	S	11	39	50	10	1	40
Mar.	S	13	SE	12	39	52	9	#	39
Apr.	SE	15	S	13	36	54	10	#	36
May	SE	21	S	13	36	54	10	#	43
June	SE	27	S	10	39	49	12	-	-
July	SE	27	S	11	39	50	11	-	-
Aug.	SE	20	S	14	39	52	9	-	-
Sept.	SE	23	S	11	40	54	6	#	45
Oct.	SE	16	S	15	37	56	8	#	35
Nov.	SE	17	SW	11	30	59	11	#	35
Dec.	SE	12	NW	11	34	57	9	#	43
Year Avg.	SE	18	S	12	37	54	9	#	45

- Negligible

MOST PREVALENT HIGH WINDS AT SAUGUS

	16-31 mph	32-47 mph
January	NW-NE	NW
February	NW-NE	NW
March	NW-NNW-SE	NNW-NW
April	NW-NE	-
May	SE	-
June	SE	-
July	SE	-
August	SE	-
September	SE	-
October	SE	-
November	NE	-
December	NE	-
Year Avg.	SE	NW

Source: National Weather Records Center, years 1934 - 1938 inclusive

Appendix C

MISCELLANEOUS WEATHER CONDITIONS AT SAUGUS

Percentage Frequency of Occurence

	Lt. and Mod. Fog	Dense Fog	Thick haze smoke, dust	Precipitation	Thunderstorms
Jan.	3.3	0.3	0.0	4.7	0.0
Feb.	7.7	0.6	0.0	12.1	0.0
Mar.	4.8	0.9	0.0	4.7	0.0
Apr.	4.7	0.6	0.0	2.4	0.0
May	4.3	0.5	0.0	1.0	0.0
June	4.0	0.8	0.0	1.2	0.0
July	1.5	0.2	0.0	0.2	0.0
Aug.	1.9	0.4	0.0	0.2	0.0
Sept.	3.8	0.6	0.0	0.7	0.1
Oct.	4.2	0.8	0.0	1.9	0.0
Nov.	3.4	1.0	0.0	1.9	0.0
Dec.	4.4	0.5	0.0	8.6	0.1
Year	4.0	0.6	0.0	3.3	0.0

Ceiling, Percentage Frequency

	0-1000 ft.	1001-5000 ft.	5001-9750 ft.	Over 9750 ft.
Jan.	2.2	11.4	3.1	83.4
Feb.	5.3	22.7	3.8	68.3
Mar.	3.0	16.1	2.9	78.0
Apr.	3.7	12.9	0.9	82.4
May	3.3	19.9	0.9	76.0
June	3.2	11.5	0.5	84.7
July	1.0	2.3	0.9	95.8
Aug.	1.0	2.7	1.0	95.4
Sept.	2.7	5.2	0.9	91.2
Oct.	2.1	10.7	1.9	85.3
Nov.	2.3	5.3	1.7	90.7
Dec.	2.7	13.6	3.5	80.2
Year	2.8	11.2	1.9	84.3

Visibility, Percentage Frequency

	0-1 miles	1½-6 miles	7-12 miles	Over 13 miles
Jan.	1.1	6.1	13.3	79.6
Feb.	1.5	11.3	19.6	67.5
Mar.	1.8	8.0	15.7	74.4
Apr.	1.4	8.9	14.1	75.5
May	1.0	8.8	19.5	70.6
June	1.4	14.4	21.3	62.9
July	0.7	3.5	14.0	81.8
Aug.	0.7	4.4	18.2	76.7
Sept.	1.6	6.0	14.2	78.2
Oct.	1.6	6.2	16.0	76.3
Nov.	2.3	4.5	8.5	84.7
Dec.	1.3	8.1	12.0	78.8
Year	1.4	7.5	15.5	75.6

Source: National Weather Records Center, years 1934 - 1938 inclusive