A-96-01
II-A-1106

#6

EPA HEALTH AND WELFARE ANALYSES

NOISE EMISSIONS STANDARDS
~~CONCUR~~ -- #6

ONAC 81-02

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

OFFICE OF
AIR, NOISE, AND RADIATION

December 4, 1980

MEMORANDUM

SUBJECT: International Harvester: Petition for Reconsideration 1982 Medium and Heavy Truck Noise Emission Regulation

FROM: Jeffrey Goldstein, Bioacoustical Scientist
Scientific Assistant's Staff

TO: Gerry Smith, Standards and Regulations Division

THRU: R.M. [illegible]zzo, Scientific Assistant
to the Deputy Assistant Administrator, ONAC

This memorandum is in response to your note, dated December 2, 1980, requesting comments on the validity of arguments submitted by International Harvester (IH) as a basis for their petition for reconsideration of the 1982 Medium and Heavy Truck Noise Emission Regulation. From the brief description of the Battelle Traffic Noise Exposure Model as furnished in Appendix A of the petition, it is evident that the EPA roadway traffic noise prediction computer model and the Battelle model are sufficiently similar to one another in structure and concept as not to constitute a basis of contention to the EPA regulatory analysis. Nevertheless, based upon my examination of the petition, it is clear that the interpretations of the analytical results derived from the Battelle model, as offered by IH, are quite narrow, bear little resemblance to real-world impact conditions, and appear to be unduly biased in the direction of showing minimal benefits per unit cost. My specific comments to the arguments presented within the petition follow:

1. On page 3 of the petition, IH states that from their analysis they find "...that in excess of 9 million people will be impacted by the 80 dB(A) Standard at Ldn levels equal to or greater than 55 dB(A)." Upon examination of Exhibit III to the petition, it is evident that the IH cited figure of 9 million people benefiting from the truck regulation represents only the numerical difference between the number of people living in areas exposed to Ldn of 55 dB or greater with an 83 dB regulation in effect (i.e., 104 million people), and the number of people similarly exposed after promulgation of a more stringent 80 dB regulation (i.e., 95 million people). In other words, the only regulatory benefit recognized by IH is the number of people who would be fully removed from long-term exposure to average noise levels exceeding a value of Ldn = 55 dB (a level identified by EPA below which the American public would be at no risk) after a more stringent limit were imposed. Conversely, it appears that IH does not wish to acknowledge the other 95 million Americans who, although not fully removed from impact, would subsequently

#6

experience a quieter, more livable environment. Although removal from risk is one measure of health and welfare benefit, to focus only on this factor represents an extremely parochial view of the benefits that would be gained from the more stringent regulation. As point in fact, again using the analytical results furnished by IH, 104 million Americans are projected to remain exposed at levels above those identified as requisite to protect health and welfare after promulgation of an 83 dB truck noise regulation. Therefore, by imposing an even more stringent noise emission standard, all 104 million people would logically benefit from lessened noise, representing almost one half of the U.S. population, not a mere 4 percent as presumed by IH.

2. The IH analysis, as admittedly did the earlier EPA analysis, fails to recognize that anticipated growth in U.S. population and associated increases in traffic volume will result in many more people impacted by traffic noise than the 104 million people referred to above. EPA estimates that even with an 83 dB regulation in effect, over 136 million people would reside in areas exceeding the identified minimal risk threshold of Ldn = 55 dB, and, accordingly, all 136 million would derive benefits from the issuance of more stringent noise emission limits.

3. The interpretation of the analytical results as offered by IH assumes that no health and welfare benefits would accrue by lessening truck noise emissions to a level even lower than 80 dB. This assumption erroneously fosters the image that the marginal benefits yielded between the current 83 dB standard and the future 80 dB regulatory limit is beyond a point where meaningful health and welfare benefits can be gained. Ostensibly, IH argues that it makes little sense to go to an 80 dB regulation since most of the benefits would have been captured at the 83 dB level. However, this argument misrepresents the magnitude of benefits that can be fully realized. For example, as shown in the EPA regulatory analysis assuming full replacement of the truck fleet and no increases in either traffic volume or U.S. population growth, an 83 dB regulation would, in the year 2001, yield a 21 percent reduction in the extent and severity of national traffic noise impact, while an 80 dB limit would provide a 27 percent benefit. However, an even more stringent limit of, say, 75 dB would yield benefits on the order of 35 percent! Clearly, the benefits derived continue to be quite substantial at regulatory levels even more stringent than the proposed 1982 limit. The 80 dB regulatory level is a significant step toward achieving even greater noise relief.

4. On page 3 of the petition, IH states that a daily average benefit of 0.6 dB is imperceptible. This statement unfortunately reflects some serious misconceptions that prejudice the importance of noise relief for millions of Americans exposed to excessive traffic noise. In making this statement, IH is confusing the concept of noise level with that of noise exposure. While differences on the order of 0.6 dB between two successive transient events may be imperceptible, such small differences in community noise exposure over extended periods of time are meaningful and quite predictable. The benefits derived from small reductions in noise exposure over the long term are quantifiable in a statistical manner in terms of aggregate community response.

5. Also on page 3 of the petition, IH states that they believe their estimates of benefits are ultraconservative since EPA's identified level of 55 dB to protect public health and welfare includes a built-in margin of 5 to 7 dB below "...a level of 'significant complaint' community reaction." It should be noted that the identified level was reached through consensus among nationally and internationally recognized experts as a level below which the U.S. population would be subjected to only minimal risk from noise exposure. Moreover, in view of recently available community attitudinal data, it appears that there exists a firm basis to further reduce the identified threshold value to below 55 dB, i.e., if anything, the 55 dB threshold may be too high. The identified protective community noise level is not based on the significance of overt complaints (which are greatly influenced by a host of socioeconomic factors), but is concerned with the totality of the noise pollution problem which is, for the most part, not duly reflected in complaint behavior.

RESPONSE TO INTERNATIONAL HARVESTER (IH) PETITION ON
THE BENEFITS ANALYSIS FOR THE MEDIUM AND HEAVY TRUCK
NOISE EMISSION REGULATION

(Summary of December 4, 1980 memorandum from J. Goldstein
to G. Smith)

The IH petition relies heavily on results from the roadway traffic noise prediction model developed by Battelle Laboratories. Because the Battelle model is quite similar to the EPA roadway traffic noise prediction model, the results from the two models are essentially the same. However, the interpretations are substantially different. The IH interpretations bear little resemblance to real-world impact conditions, and are unduly biased in the direction of showing minimal benefits. Specific observations on the IH interpretations are:

1. IH greatly underestimates the number of Americans who would benefit from an 80 dB truck regulation--9 million (difference between the 104 million people living in areas exposed to an Ldn of 55 dB or greater with an 83 dB regulation minus the 95 million people exposed to an 80 dB regulation). IH does not acknowledge the other 95 million Americans who, although not fully removed from impact, would benefit from a quieter, more livable environment. Therefore, almost half of the U.S. population would benefit from the 80 dB regulation, not a mere 4 percent as stated by IH.

2. The IH analysis fails to recognize that anticipated growth in the U.S. population and associated increases in traffic volume will result in many more Americans impacted by traffic noise than 104 million people. Considering population and traffic growth, EPA estimates that 136 million Americans would benefit from the 80 dB truck regulation.

3. IH argues that it makes little sense to go to an 80 dB truck regulation since most of the benefits would be gained with an 83 dB level. This argument erroneously assumes that no benefits would be gained below an 80 dB level. EPA projects that in the year 2001, an 83 dB regulation would reduce the impact about 21 percent, while an 80 dB regulation would provide a benefit of 27 percent. A more stringent limit of, say, 75 dB would yield benefits about 35 percent. The benefits therefore, of going from an 83 dB to an 80 dB regulation are not, as IH asserts, the maximum that can be achieved.

4. IH states that a benefit of 0.6 dB reduction in average daily noise level cannot be perceived. IH is confusing the concept of noise level with that of noise exposure. While noise level differences on the order of 0.6 dB between two successive truck pass-bys may be imperceptible, such small differences in community noise exposure over long periods of time are quite meaningful and quantifiable in terms of overall community response.

5. IH is in error in stating that their estimates of benefits are ultra-conservative since EPA's identified level of 55 dB to protect public health and welfare includes a built-in margin of 5 to 7 dB below a level of significant community complaint reaction. The EPA identified level was agreed upon by internationally recognized experts as a level below which the U.S. population would not be at risk from noise exposure. Recent community survey data suggest the identified value of 55 dB may be too high.

1-8-81

GENERAL ADVERSE RESPONSE

BASELINE ANALYSES

NO REGULATIONS

#6

TABLE 7 AREA SPECIFIC IMPACT METRICS *BASELINE*09/11/83*

		AREA TYPE, J									
		1	2	3	4	5	6	7	8	9	ALL J
PLACE SIZE, THOUSANDS		OVER 2000	1000-2000	500-1000	200-500	100-200	50-100	25-50	5-25	RURAL	
YEAR	VARIABLE	PEXP AND LWP IN MILLIONS, NII IN PERCENT.									
1974	EXPOSED>	29.63	17.73	7.92	10.45	5.40	3.47	3.56	7.07	1.79	82.11
	NII, % >	13.77	18.55	15.79	17.00	15.34	13.02	12.22	11.97	0.63	11.85
	LWP >	9.29	4.21	2.54	3.21	1.68	1.03	1.06	2.15	0.40	25.67
1981	EXPOSED>	36.63	15.55	9.06	12.01	6.22	4.06	4.11	6.04	2.43	98.71
	NII, % >	21.70	21.31	18.18	20.26	17.71	15.22	14.16	13.65	0.77	13.45
	LWP >	11.78	5.24	3.17	3.19	1.98	1.23	1.29	2.55	0.56	31.67
1984	EXPOSED>	43.81	17.33	10.75	12.93	6.70	4.43	4.46	8.68	2.77	106.84
	NII, % >	23.50	22.97	19.62	21.16	15.09	16.51	15.31	14.94	0.84	14.47
	LWP >	13.24	5.88	3.56	4.24	2.16	1.32	1.41	2.78	0.65	35.23
1986	EXPOSED>	43.69	18.54	11.48	13.53	7.02	4.61	4.65	9.16	3.00	115.71
	NII, % >	24.64	24.01	20.53	22.66	19.95	17.31	16.04	15.64	0.89	15.11
	LWP >	14.23	6.30	3.83	4.46	2.27	1.39	1.48	2.93	0.71	37.59
1988	EXPOSED>	46.47	19.67	12.17	14.06	7.30	4.69	4.91	9.61	3.22	122.21
	NII, % >	25.67	24.95	21.33	23.76	20.72	18.02	16.71	16.27	0.93	15.68
	LWP >	15.19	6.72	4.06	4.17	2.37	1.45	1.55	3.06	0.76	39.64
1990	EXPOSED>	49.07	20.73	12.83	14.14	7.56	4.97	5.11	10.02	3.44	128.27
	NII, % >	26.59	26.78	22.05	24.17	21.43	18.68	17.31	16.84	0.97	16.19
	LWP >	15.68	7.11	4.32	4.66	2.47	1.52	1.62	3.19	0.82	41.99
1995	EXPOSED>	55.50	25.21	14.42	15.07	8.16	5.37	5.57	10.97	3.99	142.96
	NII, % >	23.72	27.71	23.73	26.47	23.19	20.22	18.71	18.70	1.07	17.38
	LWP >	13.38	8.11	4.95	5.21	2.70	1.67	1.76	3.50	0.96	47.33
2000	EXPOSED>	61.96	25.83	16.01	16.77	8.73	5.75	5.99	11.65	4.59	157.48
	NII, % >	33.74	29.53	25.30	21.19	24.73	21.73	20.06	19.57	1.17	18.52
	LWP >	23.74	9.13	5.56	5.76	2.93	1.62	1.93	3.61	1.17	57.80
2010	EXPOSED>	75.35	31.67	19.55	18.05	9.84	6.51	6.71	13.47	5.54	167.38
	NII, % >	34.69	33.07	28.37	21.16	27.93	24.73	22.67	22.11	1.25	20.72

TABLE 8 IMPACT METRICS BY ROADWAY TYPE, IN MILLIONS

BASELINE 09/11/80

YEAR	VARIABLE	ROADWAY TYPE, K						TOTAL ALL TYPES
		1	2	3	4	5	6	
1974	EXPOSED>	2.43	2.02	11.53	16.01	14.45	35.67	82.11
	IMPACTED>	2.43	2.02	11.53	16.01	14.45	35.67	82.11
	LHR. >	1.83	1.40	6.07	5.48	3.71	7.18	25.67
1981	EXPOSED>	2.65	2.24	12.33	17.39	16.31	47.79	98.71
	IMPACTED>	2.65	2.24	12.33	17.39	16.31	47.79	98.71
	LHR. >.	2.08	1.60	7.00	6.61	4.69	9.69	31.67
1984	EXPOSED>	2.76	2.34	12.71	18.01	17.10	55.93	108.84
	IMPACTED>	2.76	2.34	12.71	18.01	17.10	55.93	108.84
	LHR. >	2.20	1.70	7.42	7.22	5.23	11.41	35.23
1986	EXPOSED>	2.83	2.41	12.95	18.40	17.55	61.57	115.71
	IMPACTED>	2.83	2.41	12.95	18.40	17.55	61.57	115.71
	LHR. >	2.28	1.76	7.78	7.60	5.57	12.60	37.59
1988	EXPOSED>	2.89	2.47	13.20	18.77	17.98	66.89	122.21
	IMPACTED>	2.89	2.47	13.20	18.77	17.98	66.89	122.21
	LHR. >	2.36	1.83	8.04	7.96	5.89	13.76	39.84
1990	EXPOSED>	2.96	2.54	13.44	19.15	18.39	71.78	128.27
	IMPACTED>	2.96	2.54	13.44	19.15	18.39	71.78	128.27
	LHR. >	2.44	1.89	8.31	8.30	6.19	14.87	41.99
1995	EXPOSED>	3.14	2.71	14.06	20.08	19.39	83.58	142.96
	IMPACTED>	3.14	2.71	14.06	20.08	19.39	83.58	142.96
	LHR. >	2.63	2.04	8.98	9.13	6.92	17.64	47.33
2000	EXPOSED>	3.32	2.89	14.68	21.01	20.34	95.24	157.48
	IMPACTED>	3.32	2.89	14.68	21.01	20.34	95.24	157.48
	LHR. >	2.82	2.19	9.66	9.96	7.65	20.53	52.80
2010	EXPOSED>	3.69	3.26	15.95	22.89	22.21	119.38	187.38
	IMPACTED>	3.69	3.26	15.95	22.89	22.21	119.38	187.38
	LHR. >	3.21	2.52	11.06	11.66	9.14	26.83	64.42

TABLE 9 LEVEL-WEIGHTED POPULATION IN DB BANDS ABOVE 55 *BASELINE:09/11/009

LMPC	DBA RANGE, IDB												
	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
DBA RANGE	91.- 88.	88.- 85.	85.- 82.	82.- 79.	79.- 76.	76.- 73.	73.- 70.	70.- 67.	67.- 64.	64.- 61.	61.- 58.	58.- 55.	
YEAR	MILLIONS OF LEVEL-WEIGHTED PEOPLE												
1974	0.0	0.00	0.00	0.19	0.54	1.26	2.47	3.91	5.25	5.49	4.54	2.02	25.67
1981	0.0	0.00	0.02	0.33	0.77	1.80	3.26	4.93	6.40	6.33	5.45	2.39	31.67
1984	0.0	0.00	0.04	0.40	0.91	2.11	3.71	5.53	7.01	6.85	6.04	2.63	35.23
1986	0.0	0.00	0.06	0.45	1.01	2.31	4.00	5.91	7.40	7.22	6.42	2.80	37.59
1988	0.0	0.00	0.08	0.50	1.11	2.50	4.28	6.20	7.75	7.59	6.80	2.96	39.84
1990	0.0	0.00	0.11	0.54	1.21	2.68	4.55	6.62	8.08	7.96	7.14	3.10	41.99
1995	0.00	0.00	0.18	0.66	1.49	3.14	5.22	7.49	8.87	8.87	7.98	3.41	47.33
2000	0.00	0.00	0.26	0.78	1.82	3.63	5.93	8.39	9.68	9.79	8.82	3.69	52.80
2010	0.00	0.02	0.46	1.11	2.57	4.76	7.46	10.26	11.26	11.78	10.53	4.22	64.42

TABLE 10 POPULATION EXPOSED IN DB BANDS ABOVE 55

*BASELINE*09/11/80*

PEXP	DBA RANGE, DB												TOTAL
	2	3	4	5	6	7	8	9	10	11	12	13	
DBA RANGE	91.- 88.	88.- 85.	85.- 82.	82.- 79.	79.- 76.	76.- 73.	73.- 70.	70.- 67.	67.- 64.	64.- 61.	61.- 58.	58.- 55.	
YEAR	MILLIONS OF PEOPLE												
1974	0.0	0.00	0.00	0.15	0.48	1.30	3.01	5.81	10.00	14.55	20.15	26.64	82.10
1981	0.0	0.00	0.01	0.26	0.69	1.85	3.96	7.32	12.18	16.77	24.15	31.52	98.70
1984	0.0	0.00	0.03	0.32	0.82	2.18	4.51	8.20	13.33	18.15	26.68	34.61	108.83
1986	0.0	0.00	0.05	0.36	0.90	2.38	4.86	8.77	14.07	19.17	28.41	36.73	115.70
1988	0.0	0.00	0.06	0.39	0.99	2.57	5.20	9.31	14.74	20.16	30.05	38.72	122.20
1990	0.0	0.00	0.08	0.43	1.08	2.76	5.53	9.82	15.35	21.16	31.59	40.47	128.27
1995	0.00	0.00	0.13	0.52	1.33	3.23	6.34	11.11	16.85	23.62	35.32	44.49	142.95
2000	0.00	0.00	0.19	0.62	1.63	3.73	7.21	12.44	18.37	26.09	39.02	48.18	157.47
2010	0.00	0.01	0.33	0.87	2.30	4.89	9.05	15.20	21.35	31.36	46.59	55.42	187.37

GENERAL ADVERSE RESPONSE

TRUCKS REGULATED TO 83dB (1978)

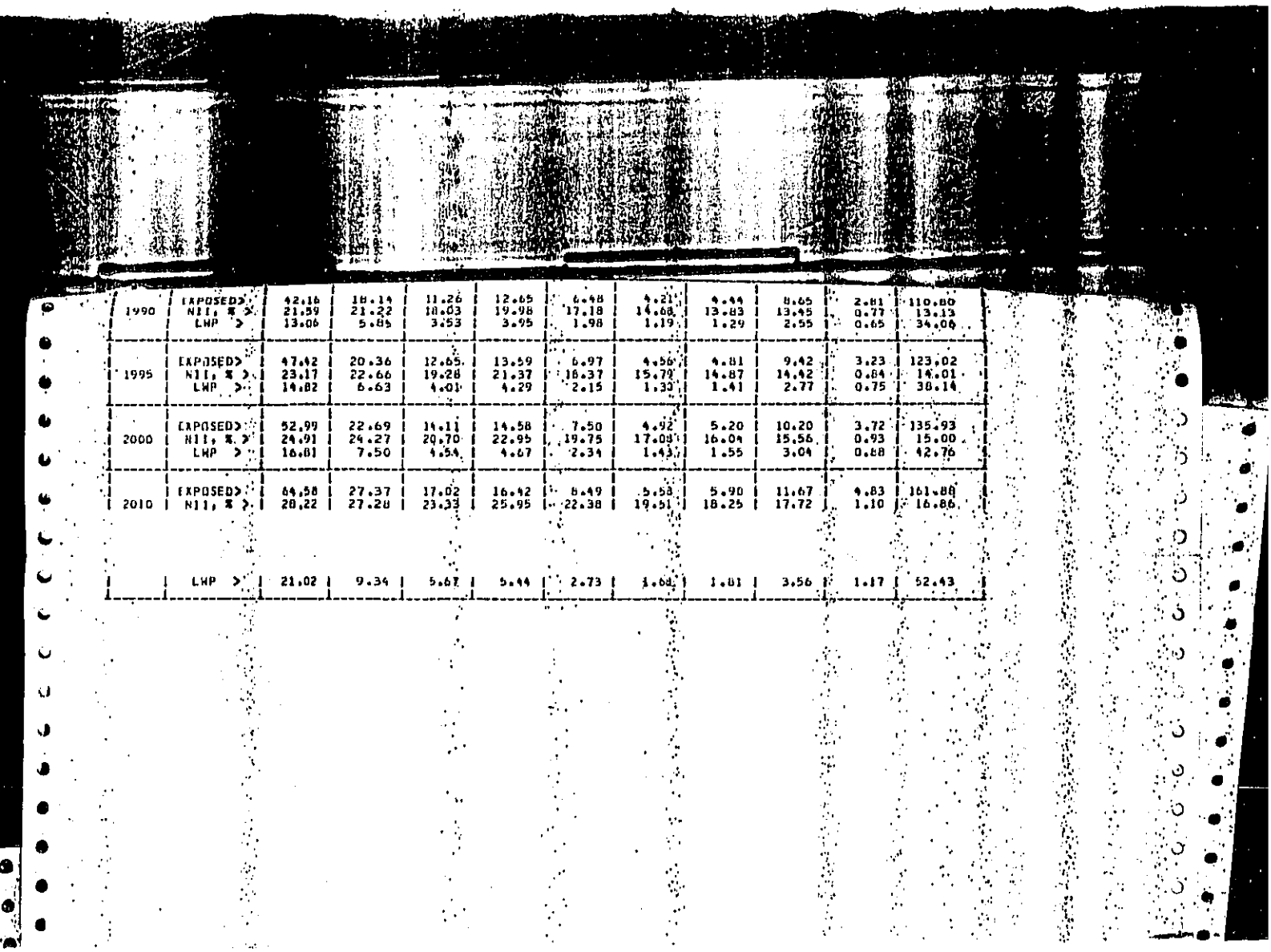
LIGHT VEHICLES, MOTORCYCLES AND BUSES NOT REGULATED

TABLE 7 AREA SPECIFIC IMPACT METRICS

TRUCKSB3:09/11/80

#6

		AREA TYPE J									
		1	2	3	4	5	6	7	8	9	ALL J
PLACE SIZE, THOUSANDS		OVER 2000	1000- 2000	500- 1000	200- 500	100- 200	50- 100	25- 50	5- 25	RURAL	
YEAR	VARIABLE	PEXP AND LWP IN MILLIONS, NII IN PERCENT.									
1974	EXPOSED>	29.68	12.73	7.92	10.45	5.40	3.49	3.56	7.07	1.79	82.11
	NII, % >	18.77	18.59	15.79	17.60	15.34	13.02	12.22	11.97	0.63	11.85
	LWP >	9.29	4.21	2.54	3.31	1.68	1.00	1.08	2.15	0.40	25.67
1981	EXPOSED>	34.33	14.60	9.07	11.26	5.80	3.76	3.85	7.59	2.23	92.50
	NII, % >	19.85	19.60	16.66	18.55	16.13	13.73	12.87	12.60	0.70	12.30
	LWP >	10.78	4.82	2.91	3.57	1.80	1.08	1.17	2.32	0.51	28.96
1984	EXPOSED>	36.70	15.70	9.74	11.68	6.00	3.89	4.02	7.90	2.41	98.05
	NII, % >	20.33	20.04	17.09	18.93	16.39	13.96	13.10	12.80	0.72	12.51
	LWP >	11.46	5.13	3.09	3.67	1.85	1.11	1.20	2.38	0.55	30.45
1988	EXPOSED>	38.46	16.49	10.24	12.00	6.16	3.99	4.16	8.14	2.54	102.18
	NII, % >	20.71	20.39	17.33	19.24	16.61	14.16	13.31	12.98	0.74	12.69
	LWP >	11.96	5.35	3.23	3.76	1.89	1.14	1.23	2.43	0.58	31.56
1990	EXPOSED>	40.27	17.31	10.74	12.32	6.31	4.10	4.30	8.38	2.67	106.40
	NII, % >	21.12	20.77	17.65	19.58	16.86	14.38	13.54	13.19	0.75	12.89
	LWP >	12.49	5.59	3.38	3.85	1.93	1.16	1.26	2.48	0.62	32.75
1995	EXPOSED>	42.16	18.14	11.26	12.65	6.48	4.21	4.44	8.65	2.81	110.80
	NII, % >	21.59	21.22	18.03	19.98	17.18	14.68	13.83	13.45	0.77	13.13
	LWP >	13.06	5.86	3.53	3.95	1.98	1.19	1.29	2.55	0.65	34.06
2000	EXPOSED>	47.42	20.36	12.65	13.59	6.97	4.56	4.81	9.42	3.23	123.02
	NII, % >	23.17	22.66	19.28	21.37	18.37	15.79	14.87	14.42	0.84	14.01
	LWP >	14.82	6.63	4.01	4.29	2.15	1.30	1.41	2.77	0.75	38.14
2010	EXPOSED>	52.99	22.69	14.11	14.58	7.50	4.92	5.20	10.20	3.72	135.93
	NII, % >	24.91	24.27	20.70	22.95	19.75	17.08	16.04	15.56	0.93	15.00
	LWP >	16.81	7.50	4.54	4.67	2.34	1.43	1.55	3.04	0.88	42.76
2010	EXPOSED>	64.58	27.37	17.02	16.42	8.49	5.58	5.90	11.67	4.83	161.88
	NII, % >	28.22	27.28	23.33	25.95	22.38	19.51	18.25	17.72	1.10	16.86



1990	EXPOSED>	42.16	18.14	11.26	12.65	6.48	4.21	4.44	8.65	2.81	110.80
	NII, % >	21.59	21.22	18.03	19.98	17.18	14.68	13.83	13.45	0.77	13.13
	LHP >	13.06	5.85	3.53	3.95	1.98	1.19	1.29	2.55	0.65	34.06
1995	EXPOSED>	47.42	20.36	12.65	13.59	6.97	4.56	4.81	9.42	3.23	123.02
	NII, % >	23.17	22.66	19.28	21.37	18.37	15.79	14.87	14.42	0.84	14.01
	LHP >	14.82	6.63	4.01	4.29	2.15	1.33	1.41	2.77	0.75	38.14
2000	EXPOSED>	52.99	22.69	14.11	14.58	7.50	4.92	5.20	10.20	3.72	135.93
	NII, % >	24.91	24.27	20.70	22.95	19.75	17.08	16.04	15.56	0.93	15.00
	LHP >	16.81	7.50	4.54	4.67	2.34	1.43	1.55	3.04	0.88	42.76
2010	EXPOSED>	64.58	27.37	17.02	16.42	8.49	5.58	5.90	11.67	4.83	161.80
	NII, % >	28.22	27.28	23.33	25.95	22.38	19.51	18.25	17.72	1.10	16.86
	LHP >	21.02	9.34	5.67	5.44	2.73	1.68	1.81	3.56	1.17	52.43

TABLE 8 IMPACT METRICS BY ROADWAY TYPE, IN MILLIONS

TRUCK 583:09/11/80

YEAR	VARIABLE	ROADWAY TYPE, K						TOTAL ALL TYPES
		1	2	3	4	5	6	
1974	EXPOSED>	2.43	2.02	11.53	16.01	14.45	35.67	82.11
	IMPACTED>	2.43	2.02	11.53	16.01	14.45	35.67	82.11
	LHP >	1.83	1.40	6.07	5.48	3.71	7.18	25.67
1981	EXPOSED>	2.63	2.20	12.30	17.20	15.71	42.45	92.50
	IMPACTED>	2.63	2.20	12.30	17.20	15.71	42.45	92.50
	LHP >	2.02	1.52	6.63	6.12	4.17	8.51	28.96
1984	EXPOSED>	2.72	2.28	12.65	17.73	16.22	46.45	98.05
	IMPACTED>	2.72	2.28	12.65	17.73	16.22	46.45	98.05
	LHP >	2.11	1.56	6.84	6.38	4.34	9.23	30.45
1986	EXPOSED>	2.78	2.33	12.88	18.08	16.58	49.52	102.18
	IMPACTED>	2.78	2.33	12.88	18.08	16.58	49.52	102.18
	LHP >	2.17	1.58	6.98	6.57	4.46	9.81	31.56
1988	EXPOSED>	2.84	2.38	13.11	18.44	16.95	52.67	106.40
	IMPACTED>	2.84	2.38	13.11	18.44	16.95	52.67	106.40
	LHP >	2.23	1.61	7.14	6.76	4.60	10.41	32.75
1990	EXPOSED>	2.91	2.44	13.35	18.80	17.35	55.96	110.80
	IMPACTED>	2.91	2.44	13.35	18.80	17.35	55.96	110.80
	LHP >	2.29	1.65	7.31	6.98	4.76	11.06	34.06
1995	EXPOSED>	3.07	2.59	13.94	19.75	18.47	65.20	123.02
	IMPACTED>	3.07	2.59	13.94	19.75	18.47	65.20	123.02
	LHP >	2.46	1.77	7.88	7.67	5.33	13.03	38.14
2000	EXPOSED>	3.24	2.75	14.55	20.69	19.58	75.12	135.93
	IMPACTED>	3.24	2.75	14.55	20.69	19.58	75.12	135.93
	LHP >	2.64	1.91	8.52	8.43	6.00	15.27	42.76
2010	EXPOSED>	3.59	3.09	15.79	22.56	21.57	95.28	161.88
	IMPACTED>	3.59	3.09	15.79	22.56	21.57	95.28	161.88
	LHP >	3.02	2.20	9.61	9.98	7.34	20.07	52.43

TABLE 9 LEVEL-WEIGHTED POPULATION IN DB BANDS ABOVE 55 *TRUCK583:09/11/80*

LWP	DBA RANGE, 1DB												TOTAL
	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
DBA RANGE	91.- 89.	88.- 85.	85.- 82.	82.- 79.	79.- 76.	76.- 73.	73.- 70.	70.- 67.	67.- 64.	64.- 61.	61.- 58.	58.- 55.	
YEAR	MILLIONS OF LEVEL-WEIGHTED PEOPLE												
1974	0.0	0.00	0.00	0.19	0.54	1.26	2.47	3.91	5.25	5.49	4.54	2.02	25.67
1981	0.0	0.00	0.01	0.25	0.65	1.49	2.82	4.41	5.86	6.05	5.14	2.29	28.96
1984	0.0	0.00	0.00	0.27	0.69	1.57	2.94	4.60	6.09	6.34	5.50	2.45	30.45
1986	0.0	0.00	0.01	0.29	0.71	1.62	3.02	4.73	6.26	6.56	5.77	2.58	31.56
1988	0.0	0.00	0.02	0.30	0.75	1.69	3.12	4.88	6.44	6.81	6.04	2.70	32.75
1990	0.0	0.00	0.02	0.32	0.79	1.77	3.24	5.05	6.66	7.06	6.32	2.81	34.06
1995	0.0	0.00	0.04	0.41	0.93	2.08	3.70	5.67	7.37	7.76	7.07	3.08	38.14
2000	0.0	0.00	0.08	0.50	1.12	2.45	4.27	6.40	8.16	8.59	7.85	3.35	42.76
2010	0.00	0.00	0.19	0.72	1.58	3.26	5.49	7.95	9.74	10.22	9.37	3.90	52.43

TABLE 13 POPULATION EXPOSED IN DB BANDS ABOVE 55 *TRUCKS83:09/11/80*

PEXP	DBA RANGE, IDB												
	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
DBA RANGE	91.- 88.	88.- 85.	85.- 82.	82.- 79.	79.- 76.	76.- 73.	73.- 70.	70.- 67.	67.- 64.	64.- 61.	61.- 58.	58.- 55.	
YEAR	MILLIONS OF PEOPLE												
1974	0.0	0.00	0.00	0.15	0.48	1.30	3.01	5.81	10.00	14.55	20.15	26.64	82.10
1981	0.0	0.00	0.00	0.20	0.58	1.54	3.43	6.55	11.16	16.04	22.01	30.18	92.49
1984	0.0	0.00	0.00	0.22	0.61	1.62	3.57	6.82	11.60	16.82	24.62	32.34	98.04
1986	0.0	0.00	0.01	0.23	0.64	1.68	3.68	7.02	11.92	17.43	25.62	33.95	102.17
1988	0.0	0.00	0.01	0.24	0.67	1.74	3.79	7.24	12.26	18.09	26.83	35.50	106.39
1990	0.0	0.00	0.02	0.26	0.70	1.83	3.94	7.50	12.69	18.79	28.07	37.01	110.79
1995	0.0	0.00	0.03	0.32	0.85	2.14	4.50	8.40	14.04	20.70	31.32	40.62	123.01
2000	0.0	0.00	0.06	0.40	1.00	2.52	5.19	9.49	15.52	22.85	34.84	44.06	135.92
2010	0.00	0.00	0.14	0.57	1.41	3.36	6.68	11.79	18.51	27.18	41.46	50.80	161.87

GENERAL ADVERSE RESPONSE

TRUCKS REGULATED TO 83 dB (1978)
TRUCKS REGULATED TO 80 dB (1982)

LIGHT VEHICLES, MOTORCYCLES AND BUSES
NOT REGULATED

#6

TABLE 7 AREA SPECIFIC IMPACT METRICS

TRUCKS80130/11/80

#6

		AREA TYPE,J									
		1	2	3	4	5	6	7	8	9	ALL J
PLACE SIZE, THOUSANDS		OVER 2000	1000-2000	500-1000	200-500	100-200	50-100	25-50	5-25	RURAL	
YEAR	VARIABLE	EXP AND LMP IN MILLIONS, NII IN PERCENT.									
1974	EXPOSED>	29.68	12.73	7.92	10.46	5.40	3.49	3.56	7.07	1.79	82.11
	NII, % >	18.77	18.59	15.79	17.60	15.34	13.02	12.22	11.97	0.63	11.85
	LMP >	9.29	4.21	2.54	3.31	1.68	1.00	1.08	2.15	0.40	25.67
1981	EXPOSED>	34.33	14.60	9.07	11.26	5.80	3.76	3.85	7.59	2.23	92.50
	NII, % >	15.85	19.60	16.66	18.55	16.13	13.73	12.87	12.60	0.70	12.30
	LMP >	10.78	4.82	2.91	3.57	1.80	1.00	1.17	2.32	0.51	28.96
1984	EXPOSED>	35.95	15.39	9.55	11.44	5.87	3.79	3.93	7.75	2.35	96.03
	NII, % >	15.75	19.50	16.55	18.39	15.88	13.49	12.69	12.39	0.70	12.15
	LMP >	11.13	4.99	3.01	3.57	1.79	1.00	1.16	2.30	0.54	29.57
1986	EXPOSED>	37.15	15.98	9.90	11.60	5.93	3.82	4.01	7.87	2.42	98.69
	NII, % >	15.73	19.46	16.51	18.32	15.74	13.35	12.60	12.28	0.70	12.07
	LMP >	11.39	5.11	3.08	3.58	1.79	1.07	1.16	2.30	0.55	30.03
1988	EXPOSED>	38.40	16.57	10.26	11.77	5.99	3.86	4.08	8.00	2.50	101.45
	NII, % >	15.74	19.47	16.50	18.29	15.64	13.25	12.54	12.20	0.70	12.02
	LMP >	11.67	5.24	3.16	3.59	1.79	1.07	1.17	2.30	0.57	30.55
1990	EXPOSED>	39.76	17.21	10.66	11.97	6.08	3.92	4.17	8.15	2.59	104.50
	NII, % >	19.85	19.57	16.58	18.36	15.65	13.24	12.56	12.21	0.71	12.05
	LMP >	12.01	5.40	3.25	3.63	1.80	1.08	1.17	2.31	0.59	31.24
1995	EXPOSED>	44.16	19.13	11.85	12.70	6.46	4.17	4.47	8.76	2.93	114.62
	NII, % >	20.86	20.51	17.38	19.23	16.35	13.88	13.19	12.78	0.75	12.58
	LMP >	12.35	6.00	3.61	3.86	1.91	1.14	1.25	2.46	0.67	34.26
2000	EXPOSED>	49.31	21.31	13.24	13.62	6.95	4.52	4.85	9.52	3.37	126.67
	NII, % >	22.39	21.94	18.63	20.61	17.58	15.01	14.22	13.78	0.83	13.46
	LMP >	15.11	6.78	4.09	4.20	2.00	1.26	1.37	2.69	0.78	38.37
2010	EXPOSED>	59.96	25.74	16.04	15.37	7.88	5.17	5.53	10.89	4.37	150.95
	NII, % >	25.38	24.71	21.08	23.33	19.97	17.25	16.25	15.76	0.98	15.16

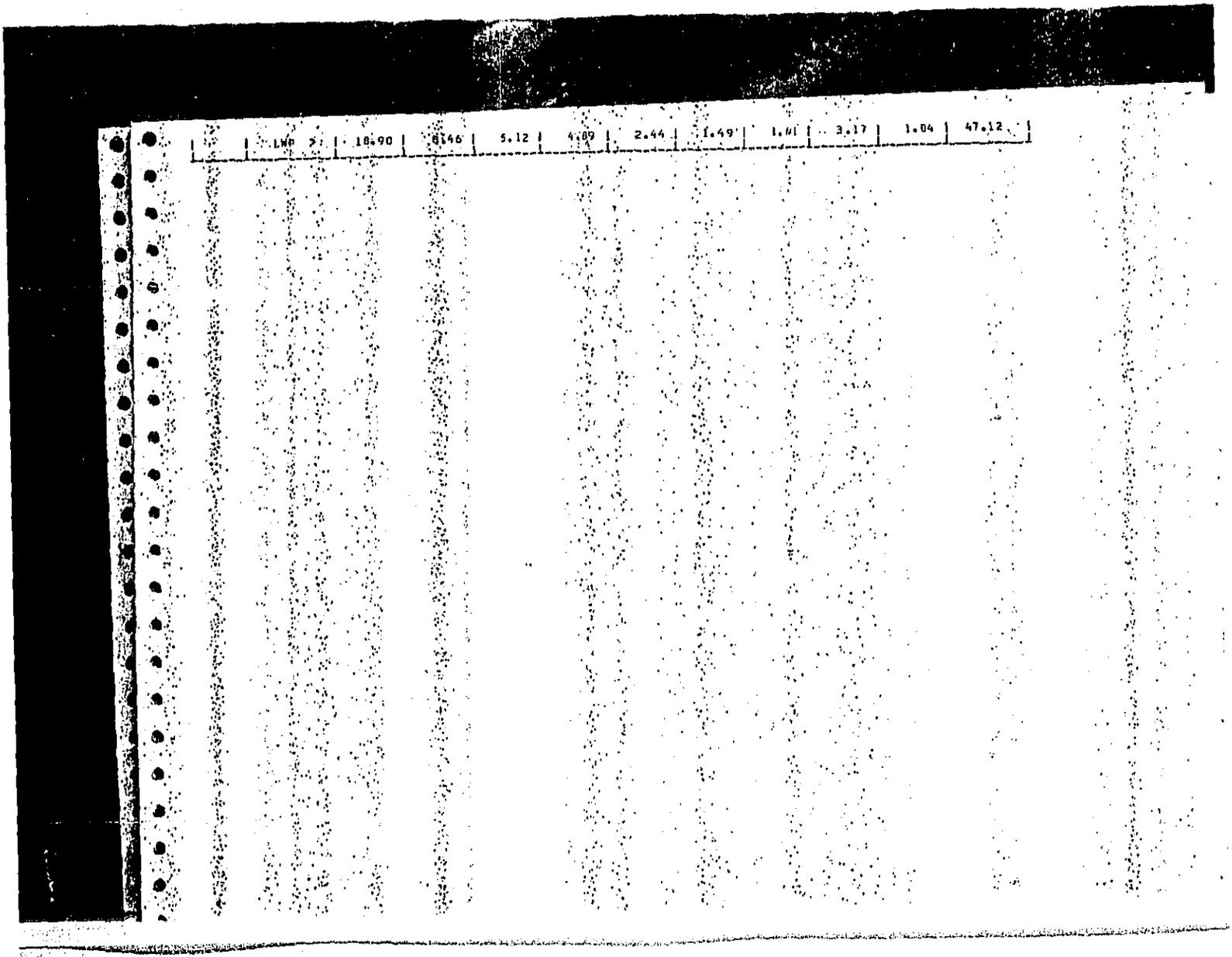

LMP 7
18.90
8146
5.12
4.09
2.44
1.49
1.41
3.17
1.04
47.12

TABLE 8 IMPACT METRICS BY ROADWAY TYPE, IN MILLIONS.

TRUCKS80:09/11/80

YEAR	VARIABLE	ROADWAY TYPE: K						TOTAL ALL TYPES
		1	2	3	4	5	6	
1974	EXPOSED>	2.43	2.02	11.53	16.01	14.45	35.67	82.11
	IMPACTED>	2.43	2.02	11.53	16.01	14.45	35.67	82.11
	LWP >	1.83	1.40	6.07	5.48	3.71	7.18	25.67
1981	EXPOSED>	2.63	2.20	12.30	17.20	15.71	42.45	92.50
	IMPACTED>	2.63	2.20	12.30	17.20	15.71	42.45	92.50
	LWP >	2.02	1.52	6.63	6.12	4.17	8.51	28.96
1984	EXPOSED>	2.72	2.27	12.63	17.65	15.95	44.80	96.03
	IMPACTED>	2.72	2.27	12.63	17.65	15.95	44.80	96.03
	LWP >	2.09	1.53	6.71	6.21	4.16	8.86	29.57
1986	EXPOSED>	2.77	2.31	12.85	17.95	16.11	46.69	98.69
	IMPACTED>	2.77	2.31	12.85	17.95	16.11	46.69	98.69
	LWP >	2.13	1.63	6.76	6.28	4.16	9.16	30.03
1988	EXPOSED>	2.83	2.36	13.07	18.25	16.28	48.65	101.45
	IMPACTED>	2.83	2.36	13.07	18.25	16.28	48.65	101.45
	LWP >	2.18	1.54	6.82	6.35	4.18	9.48	30.55
1990	EXPOSED>	2.89	2.40	13.29	18.57	16.52	50.82	104.50
	IMPACTED>	2.89	2.40	13.29	18.57	16.52	50.82	104.50
	LWP >	2.23	1.55	6.91	6.46	4.23	9.06	31.24
1995	EXPOSED>	3.04	2.54	13.88	19.49	17.55	58.13	114.62
	IMPACTED>	3.04	2.54	13.88	19.49	17.55	58.13	114.62
	LWP >	2.38	1.63	7.34	6.98	4.60	11.32	34.26
2000	EXPOSED>	3.21	2.69	14.49	20.47	18.82	66.99	126.67
	IMPACTED>	3.21	2.69	14.49	20.47	18.82	66.99	126.67
	LWP >	2.56	1.76	7.93	7.68	6.19	13.25	38.37
2010	EXPOSED>	3.55	3.01	15.72	22.31	21.09	85.21	150.95
	IMPACTED>	3.55	3.01	15.72	22.31	21.09	85.21	150.95
	LWP >	2.92	2.03	9.17	9.13	6.42	17.44	47.12

TABLE 9 LEVEL-WEIGHTED POPULATION IN DB BANDS ABOVE 55 *TRUCKS80:09/11/00*

LNP	DBA RANGE, DB												
	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
DBA RANGE	91.- 88.	88.- 85.	85.- 82.	82.- 79.	79.- 76.	76.- 73.	73.- 70.	70.- 67.	67.- 64.	64.- 61.	61.- 58.	58.- 55.	
YEAR	MILLIONS OF LEVEL-WEIGHTED PEOPLE												
1974	0.0	0.00	0.00	0.19	0.54	1.26	2.47	3.91	5.25	5.49	4.54	2.02	25.67
1981	0.0	0.00	0.01	0.25	0.65	1.49	2.82	4.41	5.86	6.05	5.14	2.29	28.96
1984	0.0	0.00	0.00	0.25	0.65	1.47	2.80	4.43	5.90	6.22	5.41	2.43	29.57
1986	0.0	0.00	0.00	0.25	0.65	1.46	2.78	4.44	5.93	6.36	5.61	2.53	30.03
1988	0.0	0.00	0.01	0.25	0.66	1.46	2.77	4.46	5.98	6.50	5.82	2.64	30.55
1990	0.0	0.00	0.01	0.25	0.68	1.47	2.80	4.51	6.07	6.67	6.04	2.74	31.24
1995	0.0	0.00	0.02	0.30	0.77	1.66	3.07	4.90	6.58	7.27	6.68	3.00	34.26
2000	0.0	0.00	0.05	0.39	0.91	1.96	3.52	5.53	7.31	8.03	7.41	3.25	38.37
2010	0.00	0.00	0.12	0.57	1.27	2.65	4.59	6.88	8.82	9.61	8.88	3.73	47.12

TABLE 10 POPULATION EXPOSED IN DB BANDS ABOVE 55

TRUCKSHD:04/11/80

PEXP	DBA RANGE, DB												
	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
DBA RANGE	91.- 88.	88.- 85.	85.- 82.	82.- 79.	79.- 76.	76.- 73.	73.- 70.	70.- 67.	67.- 64.	64.- 61.	61.- 58.	58.- 55.	
YEAR	MILLIONS OF PEOPLE												
1974	0.0	0.00	0.00	0.19	0.48	1.30	3.01	5.81	10.00	14.55	20.15	26.64	82.10
1981	0.0	0.00	0.00	0.20	0.58	1.54	3.43	6.55	11.16	16.04	22.81	30.18	92.49
1984	0.0	0.00	0.00	0.20	0.58	1.52	3.40	6.57	11.25	16.53	24.00	31.96	96.02
1986	0.0	0.00	0.00	0.20	0.58	1.51	3.38	6.59	11.31	16.89	24.90	33.31	98.68
1988	0.0	0.00	0.00	0.20	0.59	1.50	3.37	6.62	11.40	17.30	25.81	34.64	101.44
1990	0.0	0.00	0.01	0.20	0.60	1.52	3.40	6.70	11.57	17.75	26.79	35.95	104.49
1995	0.0	0.00	0.02	0.24	0.69	1.71	3.73	7.28	12.54	19.37	29.68	39.37	114.62
2000	0.0	0.00	0.03	0.31	0.81	2.02	4.29	8.20	13.93	21.39	32.94	42.74	126.66
2010	0.00	0.00	0.09	0.45	1.13	2.73	5.58	10.21	16.77	25.58	39.41	48.99	150.94