

HETA 91-194-2153
OCTOBER 1991
MCKESSON DRUG COMPANY
FAIRFIELD, OHIO

NIOSH INVESTIGATORS:
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I. SUMMARY

On May 28-29 1991, the National Institute for Occupational Safety and Health (NIOSH) conducted an investigation at the McKesson Drug Company, Fairfield, Ohio. This investigation was performed in response to an employee request for evaluation of exposures to potentially hazardous noise in the workplace. The McKesson Drug Company distributes various health and beauty aides, over-the-counter drugs, and prescription drugs to retail stores and hospitals in the midwestern part of the United States. Employees are exposed during the course of their work to noise produced primarily by several motorized conveyor belts and occasional alarms.

During the investigation, personal noise dosimetry was performed, along with octave band area noise measurements at various locations throughout the facility. Analysis of the results of the personal and area noise measurements indicated that the measured values in the shipping area of the facility approach the NIOSH recommended exposure limit (REL) and Occupational Safety and Health Administration (OSHA) action level (AL) of 85 decibels [dB(A)] for an 8-hour time-weighted average (TWA).

These noise results reveal that no noise hazard exists at the McKesson Drug Company. However, noise levels in the shipping area are only slightly below the NIOSH REL and OSHA AL. Therefore, recommendations are made to further reduce employee exposures to noise using engineering and administrative controls.

KEYWORDS: SIC 5122 (Drug Proprietaries, Drug Sundries), Noise, Warehousing.

II. INTRODUCTION

On April 17, 1991, employee representatives of McKesson Drug Company, Fairfield, Ohio, requested that the National Institute for Occupational Safety and Health (NIOSH) perform a health hazard evaluation (HHE) investigating workers' exposure to noise. On

May 15, 1991, NIOSH investigators conducted an initial site visit and a walk-through survey of the plant, to collect information about plant processes and to talk with management and employees concerning the request. During the site visit, a decision was made to conduct the HHE during third shift to obtain a worst case scenario of exposure to noise in the workplace.

On May 28-29, 1991, NIOSH investigators conducted environmental monitoring, obtaining personal and area noise measurements from various locations throughout the facility. Personal noise samples were collected using calibrated noise dosimeters. Octave band noise measurements were taken at various locations in the facility.

III. BACKGROUND

The McKesson Drug Company has been located at its current location for approximately 2 years and distributes various health and beauty aides, over-the-counter drugs, and prescription drugs to retail stores and hospitals in the midwestern part of the United States. During the time of the NIOSH evaluation, approximately 95 people were employed. This figure includes warehouse workers, truck drivers, and office personnel.

The company has a two-phase operation, order-filling and shipping. Orders for products requested by retail stores and hospitals are filled by workers in the upper and lower picking areas of the facility. Filled orders are transported in plastic crates by a motorized conveyor belt from the picking areas to the shipping area, where they are sorted for shipment.

The HHE request resulted from concerns relating to the noise produced in the shipping area. There is a total of nine conveyor lines that carry orders from picking areas to the shipping area. Five lines were in full operation on the day of the investigation. Four to five lines are generally in operation during each shift. Additionally, alarms located in the shipping area and upper/lower picking areas are sounded several times during the workshift to signal rest and lunch breaks, and during times when the conveyors are stopped due to a line back-up.

IV. INDUSTRIAL HYGIENE EVALUATION

Personal noise exposure measurements were taken on 10 workers using Metrosonic Model dB301/26 Metrologger dosimeters with 1/4" remote microphones clipped to the shirt collar of the workers' clothing. An 8-hour sampling period was attempted for each personal dosimeter where possible. The 10 employees monitored for personal noise exposure included 3 employees in the shipping area, 4 employees in the picking area, 1 employee in the care department, 1 employee in the computer room, and 1 supervisor who moved through various areas of the facility. According to the manufacturer's instructions, each personal dosimeter was calibrated before sampling. After the recording period was completed, the dosimeter was removed from the worker and placed in the standby mode of operation. The data was later transferred to a Metrosonics Model dt-390 Metroreader/Data Collector following the day's noise sampling. Prior to turning off the dosimeter, it was again calibrated to assure that the device had not changed during the sampling period. The dosimeter information was then transferred to a personal computer with supporting Metrosonics Metrosoft computer software for permanent data storage and later analysis.

General area noise measurements were made at various locations within the facility with a calibrated GenRad Model 1982 Precision Sound Level Meter. This sound level meter is capable of measuring octave bands as well as the A, B, C, and "flat" weighting networks. Area noise measurements were taken under conveyors, near warning buzzers, and at several locations in the shipping dock area. The octave band measurements were taken for spectral analyses to determine the frequencies of the major noise sources, as well as to assist in the development of noise reduction recommendations.

V. EVALUATION CRITERIA

Occupational deafness was first documented among metalworkers in the sixteenth century.¹ Since then, it has been shown that workers have experienced excessive hearing loss in many occupations associated with noise. Noise-induced loss of hearing is an irreversible, sensorineural condition that progresses with exposure. Although hearing ability declines with age (presbycusis) in all populations, exposure to noise produces hearing loss greater than that resulting from the natural aging process. This noise-induced loss is caused by damage to nerve cells of the inner ear (cochlea) and, unlike some conductive hearing disorders, cannot be treated medically.²

While loss of hearing may result from a single exposure to a very brief impulse noise or explosion, such traumatic losses are rare. In most cases, noise-induced hearing loss is insidious. Typically, it begins to develop at 4000 or 6000 Hertz (Hz) (the hearing range is

20 Hz to 20000 Hz) and spreads to lower and higher frequencies. Often, material impairment has occurred before the condition is clearly recognized. Such impairment is usually severe enough to permanently affect a person's ability to hear and understand speech under everyday conditions. Although the primary frequencies of human speech range from 200 Hz to 2000 Hz, research has shown that the consonant sounds, which enable people to distinguish words such as "fish" from "fist", have still higher frequency components.³

The OSHA standard for occupational exposure to noise (29 CFR 1910.95)⁴ specifies a maximum permissible exposure limit (PEL) of 90 dB(A)-slow response for a duration of 8 hours per day. The regulation, in calculating the PEL, uses a 5 dB(A) time/intensity trading relationship. This means that in order for a person to be exposed to noise levels of 95 dB(A), the amount of time allowed at this exposure level must be cut in half in order to be within OSHA's PEL. Conversely, a person exposed to 85 dB(A) is allowed twice as much time at this level (16 hours) and is within their daily PEL. Both NIOSH, in its Criteria for a Recommended Standard,⁵ and the American Conference of Governmental Industrial Hygienists (ACGIH), in their Threshold Limit Values (TLVs),⁶ propose an exposure limit of 85 dB(A) for 8 hours, 5 dB(A) less than the OSHA standard. Both of these latter two criteria also use a 5 dB(A) time/intensity trading relationship in calculating exposure limits.

Time-weighted average (TWA) noise limits as a function of exposure duration are shown as follows:

Duration of Exposure (hrs/day)	Sound Level (dB(A))	
	NIOSH/ACGIH	OSHA
16	80	85
8	85	90
4	90	95
2	95	100
1	100	105
1/2	105	110
1/4	110	115 *
1/8	115 *	--- **

* No exposure to continuous or intermittent noise in excess of 115 dB(A).

** Exposure to impulsive or impact noise should not exceed a 140 dB(A) peak sound pressure level.

The OSHA regulation has an additional action level (AL) of 85 dB(A) which stipulates that an employer shall administer a continuing, effective hearing conservation program when the TWA value exceeds the AL. The program must include monitoring, employee notification,

observation, an audiometric testing program, hearing protectors, training programs, and recordkeeping requirements. All of these stipulations are included in 29 CFR 1910.95, paragraphs (c) through (o).

The OSHA noise standard also states that when workers are exposed to noise levels in excess of the OSHA PEL of 90 dB(A), feasible engineering or administrative controls shall be implemented to reduce the workers' exposure levels. Also, a continuing, effective hearing conservation program shall be implemented.

VI. RESULTS AND DISCUSSION

Results of personal noise dosimetry are presented in Table 1. The table reports the number of dosimeter samples obtained at each sample location and the average 8-hour TWA, the range of 8-hour TWAs, and the maximum 1-minute noise level for each sample. The data collected in the upper/lower picking areas, care department, and the computer room were all less than the NIOSH REL of 85 dB(A). Specifically, the TWA noise levels were found to range from 72.1 to 78.9 dB(A) for 8-hour TWAs. These recorded levels occurred even with personal radios in use throughout the warehouse. The noise levels measured on employees in the shipping area were found to be close to the NIOSH REL, ranging from 84.1 to 84.7 dB(A) for 8-hour TWAs. Personal hearing protection was only provided for employees who worked in the shipping area, but were not used by workers on the day of the investigation.

Individual dosimeter data for each employee are presented in Figures 1-10. The results show that the personal noise exposures of those employees who work in the shipping dock area are consistently above the REL of 85 dB(A) while in the area; however, rest and lunch breaks that were taken lowered the 8-hour TWA to a value less than 85 dB(A).

The spectral analyses of the shipping area are presented in Figures 11 to 13. The measurements were made at the end of three conveyor lanes near the truck bay doors and also at the beginning of the lane at the inclined portion of the conveyor. The figures reveal that the maximum sound energy occurs in the 500 Hertz (Hz) octave band with lesser amounts of sound energy in the higher and lower frequency bands. All A-weighted measurements were near 85 dB(A). An inspection of the conveyor system on a catwalk located on the east wall of the shipping area revealed that the rubberized belts which moved products to the various lanes seemed to be the primary source of noise. The motor which powers the belts did not seem to contribute much additional noise to the area.

VII. RECOMMENDATIONS

The noise results from this one shift survey reveal that no significant noise hazard exists at McKesson Drug Company. However, the measured values in the shipping area are close to exceeding the NIOSH REL and OSHA AL of 85 dB(A). The dosimeter readings from this area were confirmed by the area spectral noise measurements. Additionally, several safety hazards were also discovered. Therefore, the following recommendations are made to the McKesson Drug Company.

1. Any type of engineering control which will reduce the noise exposures to workers or administrative controls which will reduce the amount of time that a worker spends in the shipping area will help to add a margin of safety for noise exposures. The shipping area is made of many hard, reflecting surfaces. When all of the motorized conveyor system is turned off, you can hear voices echo quite readily in the bay. Any acoustical material that is effective in reducing sound transmission in the 250 - 1000 Hz range should help to lower worker exposures. An acoustical engineer should be consulted in order to maximize the control for the area.
2. Periodic noise monitoring of the shipping area should be implemented because of the proximity of the levels to the evaluation criteria. Specifically, TWA values which routinely exceed 85 dB(A) trigger several procedures which must be conducted by the company in order to comply with OSHA hearing conservation regulations. These procedures include audiometric testing of affected employees, issuing of hearing protection devices, annual training requirements, recordkeeping, and periodic noise monitoring. As long as the noise exposure levels remain below the AL, these requirements need not be met.
3. The alarm system on the conveyor which signals the start up of the conveyor has speakers near the button which the operator must push to reactivate the conveyor. The employee who is pushing the button already knows that the conveyor system is about to restart and thus needs no warning signal. Rather, it is the employees removed from this location who need to be alerted. Therefore, the alarm speaker near the conveyor restart button should be moved to an area where fewer employees are constantly located in near proximity to the speaker.
4. The eye wash station, located at the battery charger, was completely blocked by a tow-motor. In case of an accident, access to the eye wash station would be difficult.
5. While filling orders, some employees in the upper and lower picking areas were observed standing on the side of the conveyor to have access to supply boxes that were out of reach. This is

considered to be an unsafe work behavior which could result in an accident. Management may want to consider tilting the supply boxes at a 45° angle so that the products in the boxes will slide forward within reach of the workers, thus reducing the probability of an accidental injury.

6. The bump guard on lane 201 of the picking area should be replaced to prevent accidental head injuries.

VIII. REFERENCES

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6. ACGIH [1990]. *1990-1991 threshold limit values for chemical substances and physical agents and biological exposure indices*. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists.

IX. Authorship and Acknowledgements

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1. The McKesson Drug Company
2. Requestor
3. Department of Labor - OSHA, Region V

For the purpose of informing affected employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees for a period of 30 calendar days.

TABLE 1
 Results of Personal Noise Dosimetry
 Mckesson Drug Company
 Fairfield, Ohio
 HHE 91-194
 May 28-29, 1991

Location	# Samples	Avg. 8-hr TWA dB(A)	Range 8-hour TWA (dB(A))	Max. 1-min Period dB(A)
Dock Area	3	84.3	84.1-84.7	108
Picking Areas	4	76.1	73.0-78.9	93
Care Dept.	1	75.7	--	94
Computer Room	1	72.1	--	84
Supervisor/Roamer	1	76.9	--	90

NIOSH and ACGIH Criteria = 85 dB(A)
 OSHA Regulation = 90 dB(A)

Figure 1
McKesson Drug Co.
HETA 91-194
Computer Room Operator
May 28-29, 1991

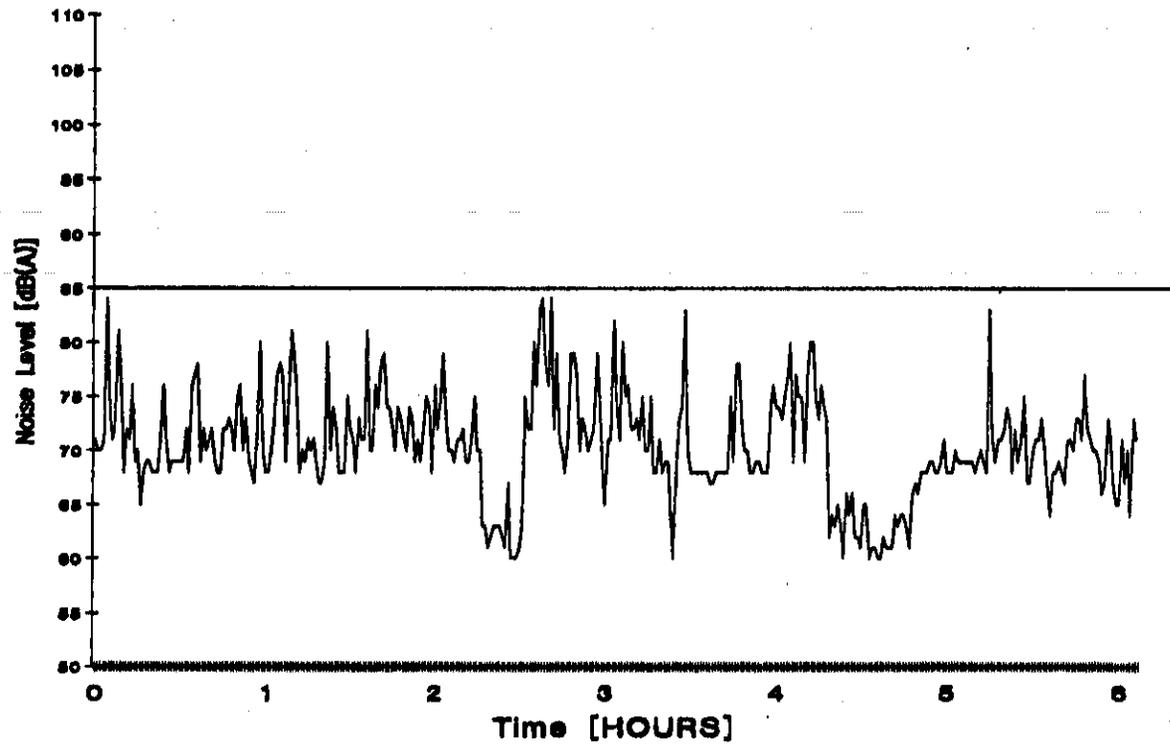


Figure 2
McKesson Drug Co.
HETA 91-194
Pick Area F Operator
May 28-29, 1991

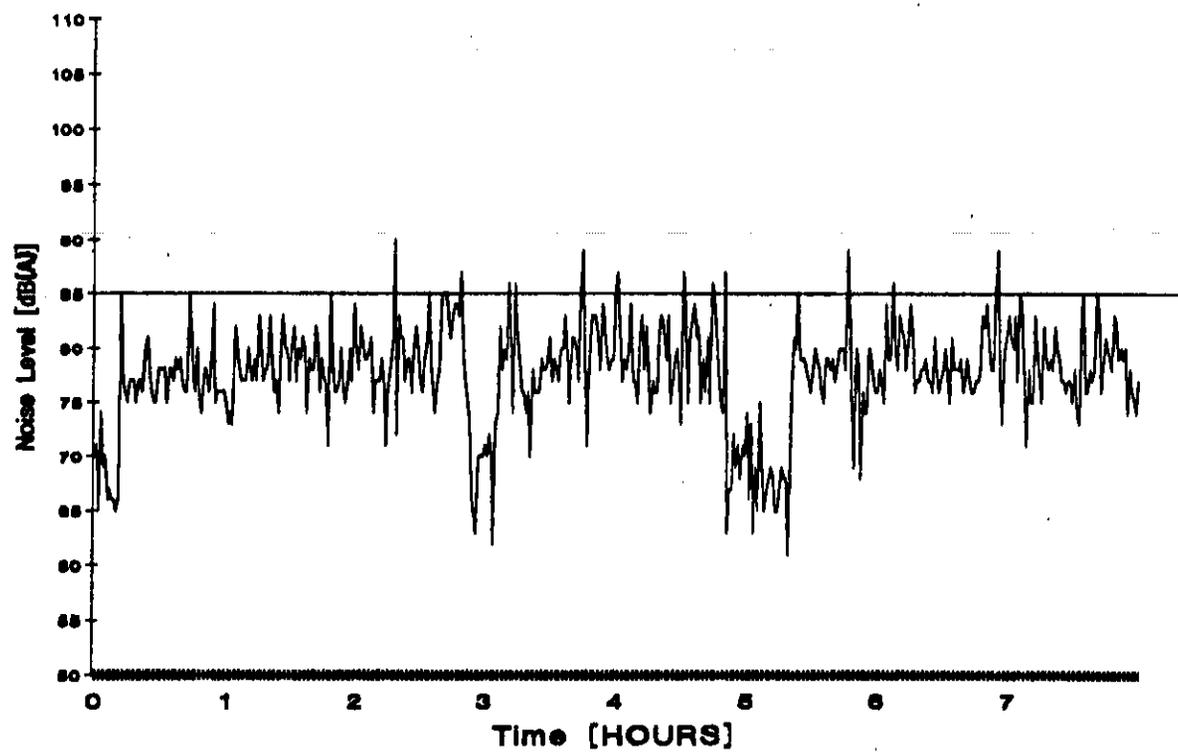


Figure 3
McKesson Drug Co.
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Pick Area A Operator
May 28-29, 1991

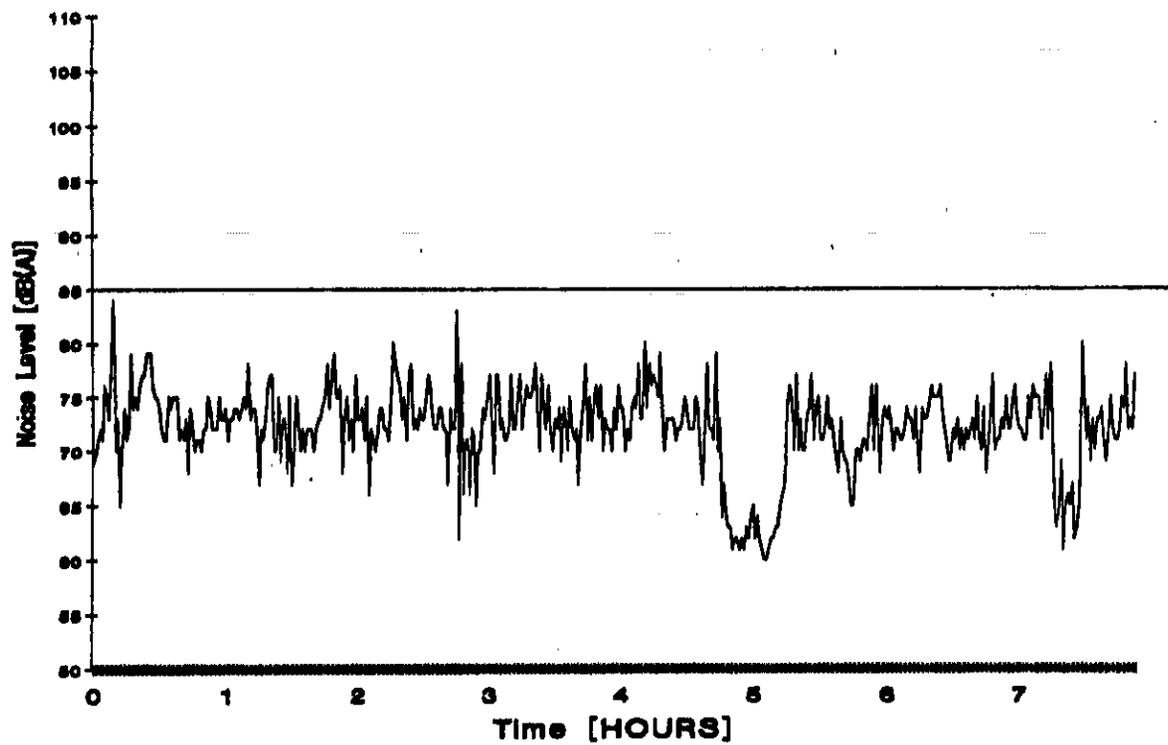


Figure 4
McKesson Drug Co.
HETA 91-194
Pick Area A Operator 2
May 28-29, 1991

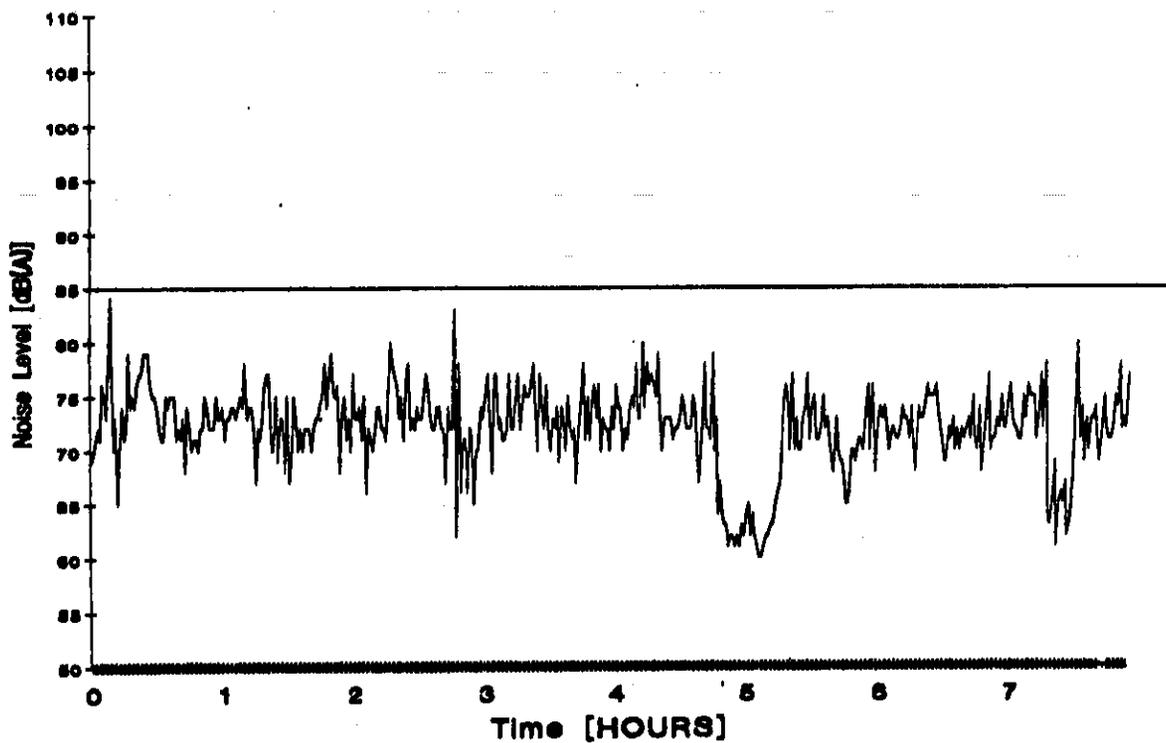


Figure 5
McKesson Drug Co.
HETA 91-194
Dock Area Operator
May 28-29, 1991

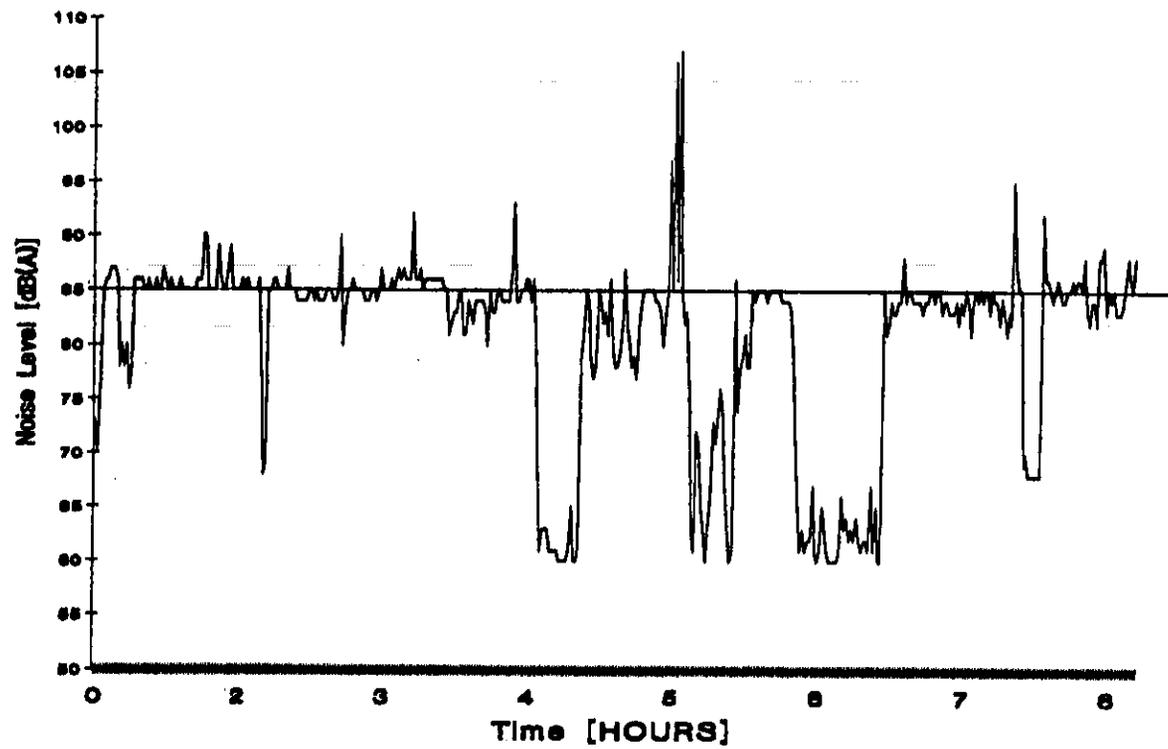


Figure 6
McKesson Drug Co.
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G-Station Packer
May 28-29, 1991

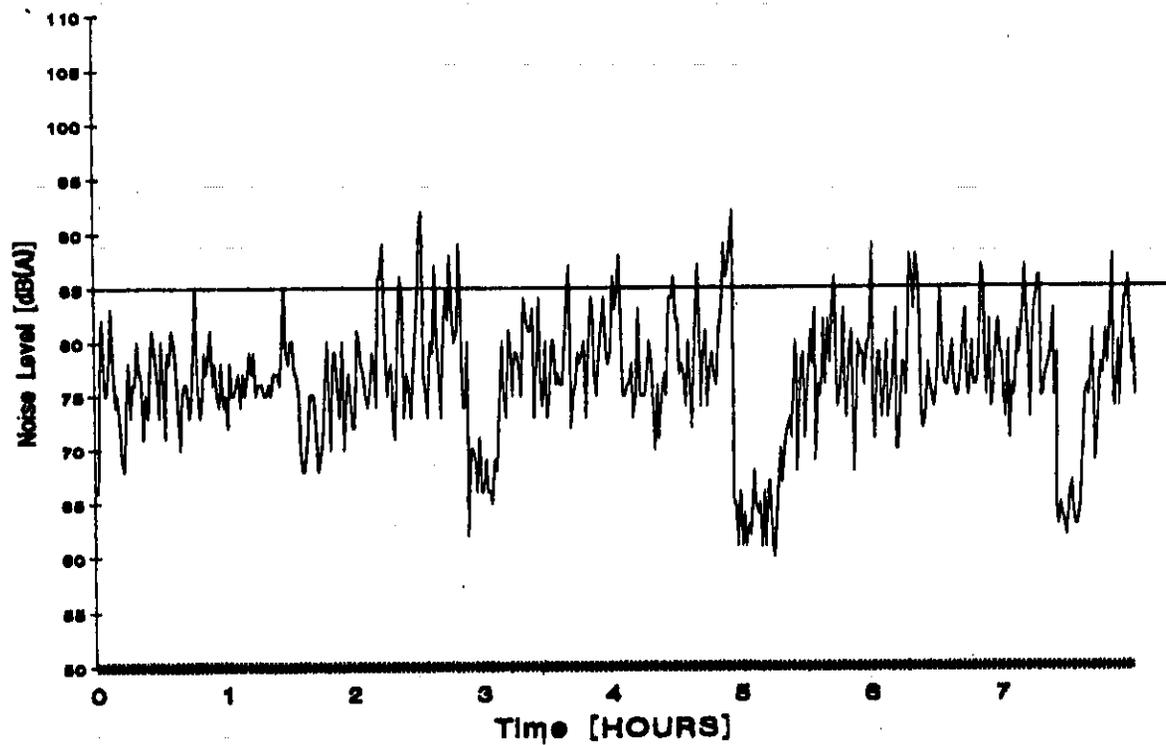


Figure 7
McKesson Drug Co.
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Care Department
May 28-29, 1991

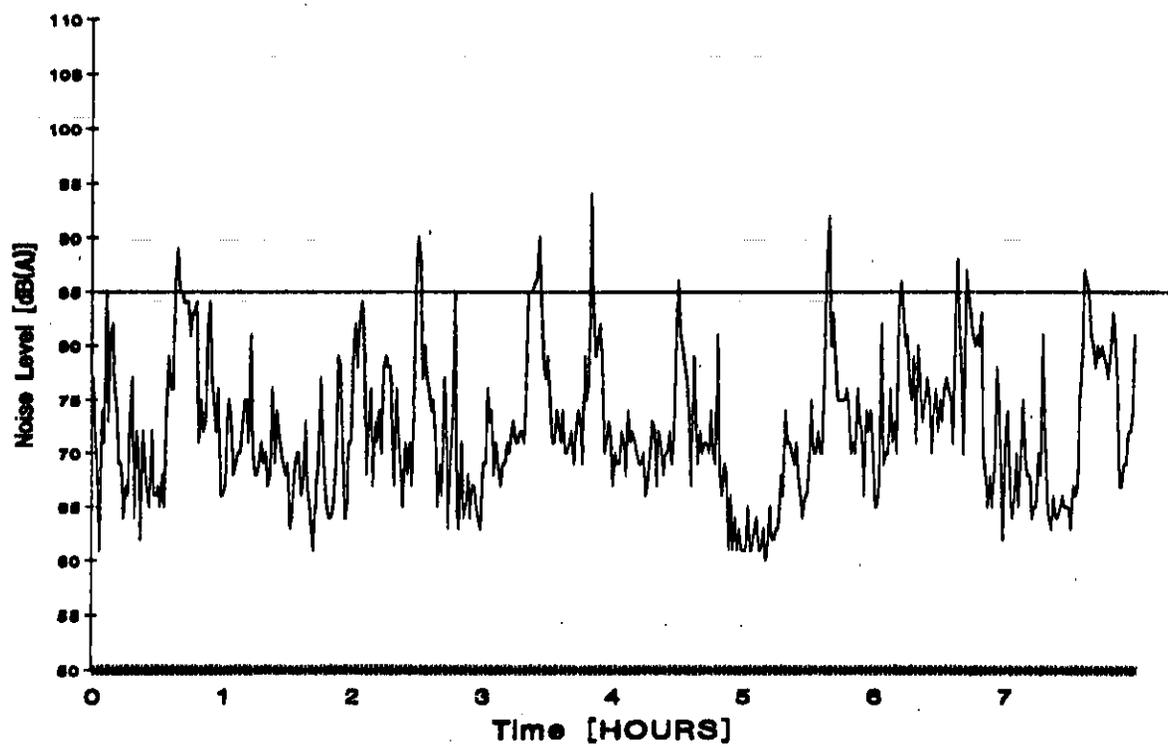


Figure 8
McKesson Drug Co.
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Dook Area Operator
May 28-29, 1991

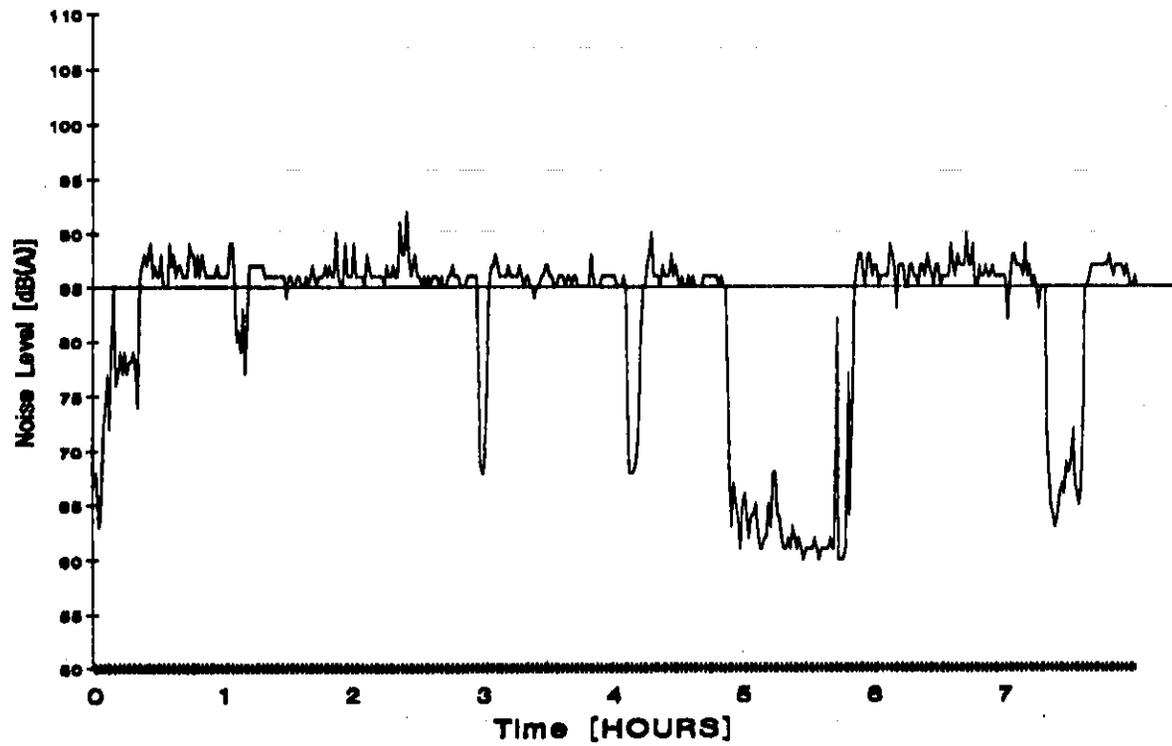


Figure 9
McKesson Drug Co.
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Shift Supervisor
May 28-29, 1991

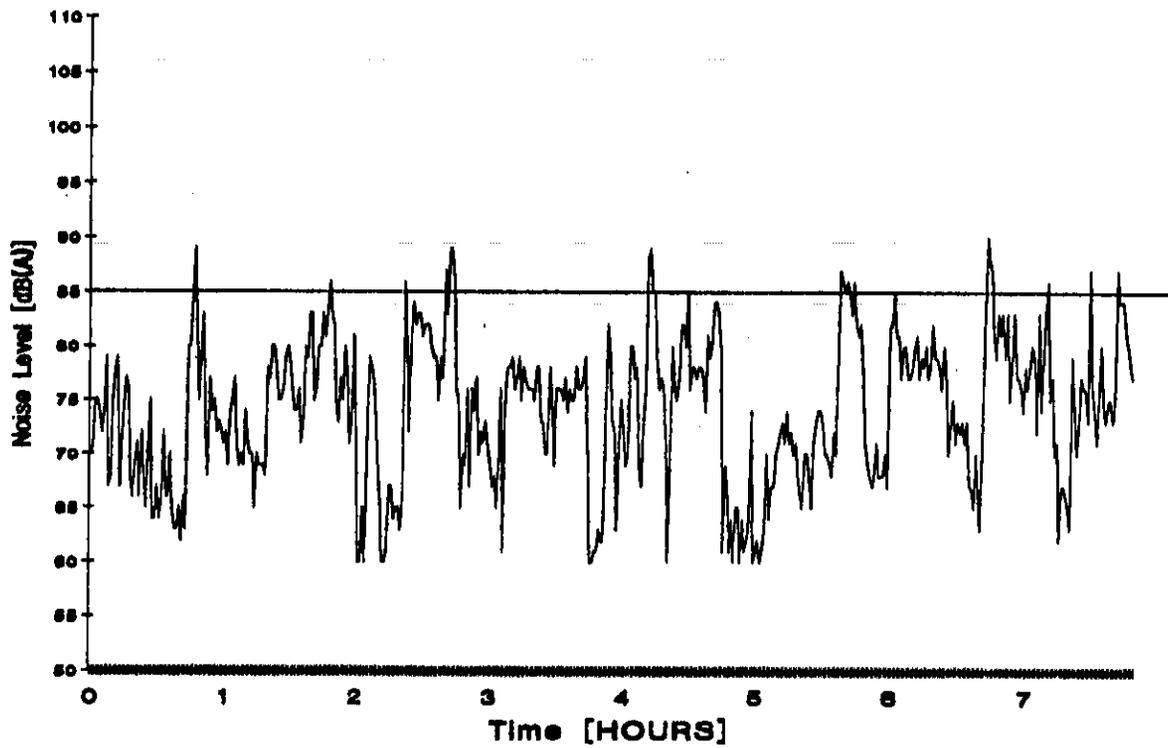
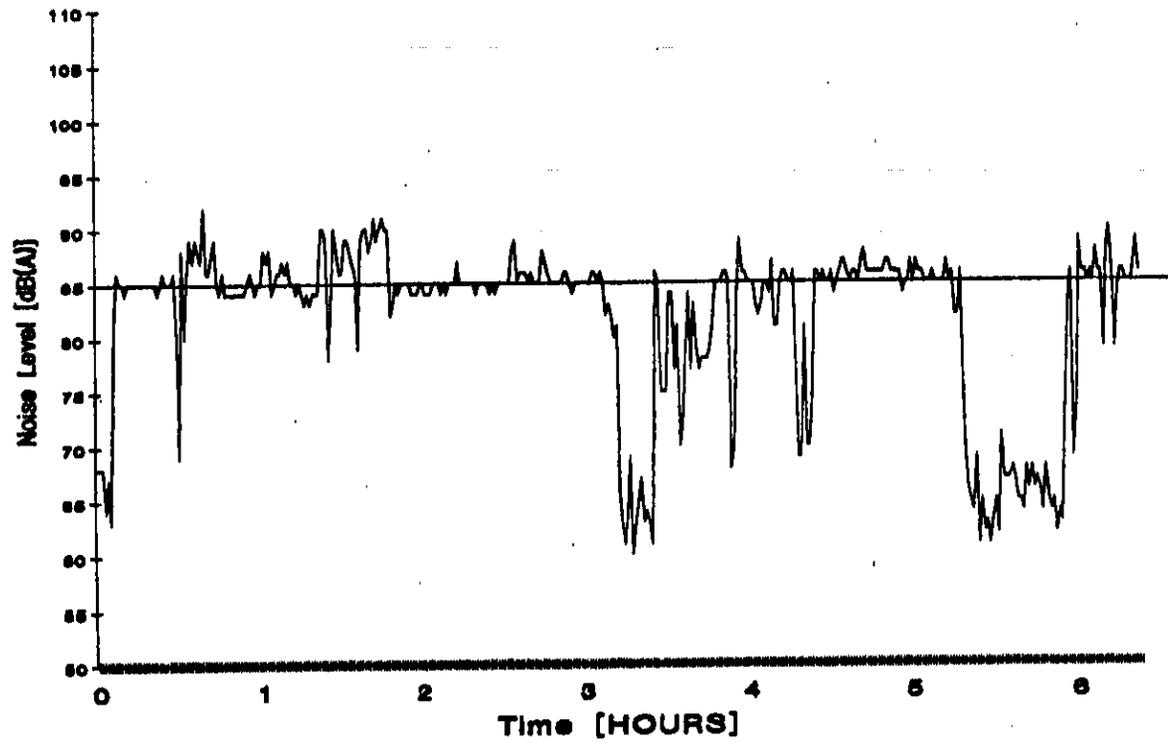


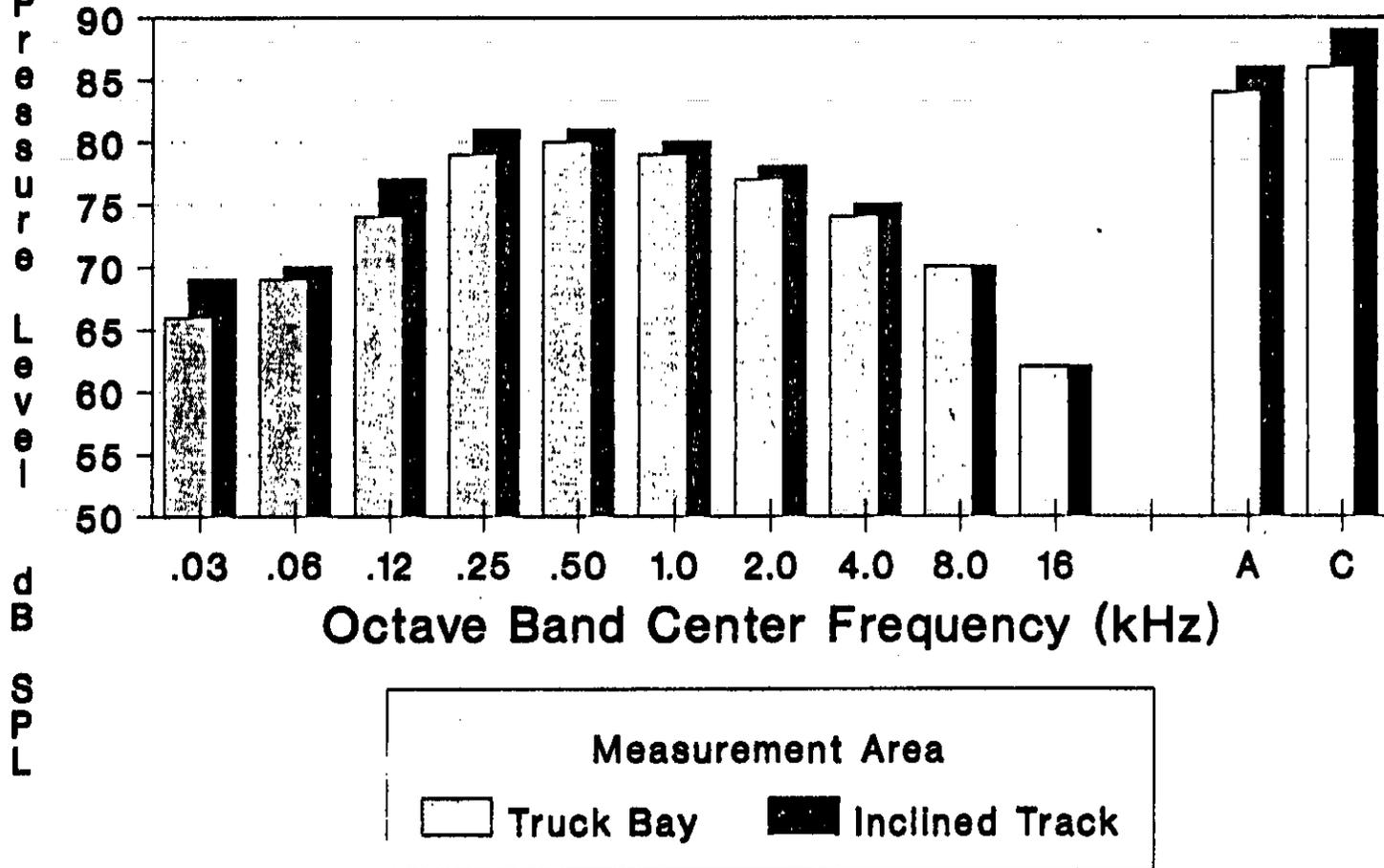
Figure 10
McKesson Drug Co.
HETA 91-194
Shipping Dock Operator
May 28-29, 1991



**McKesson Drug Company
Fairfield, Ohio
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May 29, 1991**

Figure 11

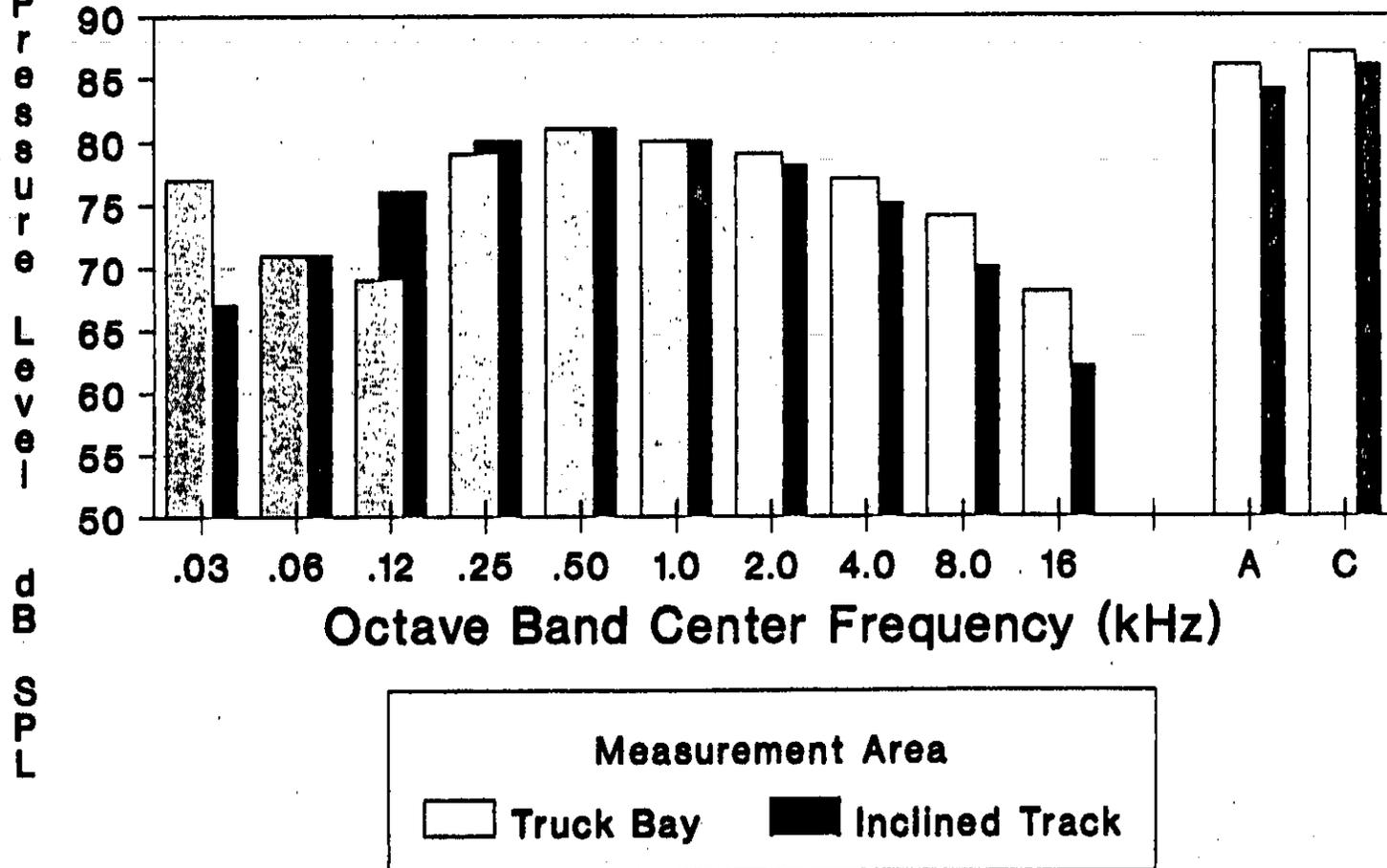
Shipping Dock - Lane 4



McKesson Drug Company
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Figure 12

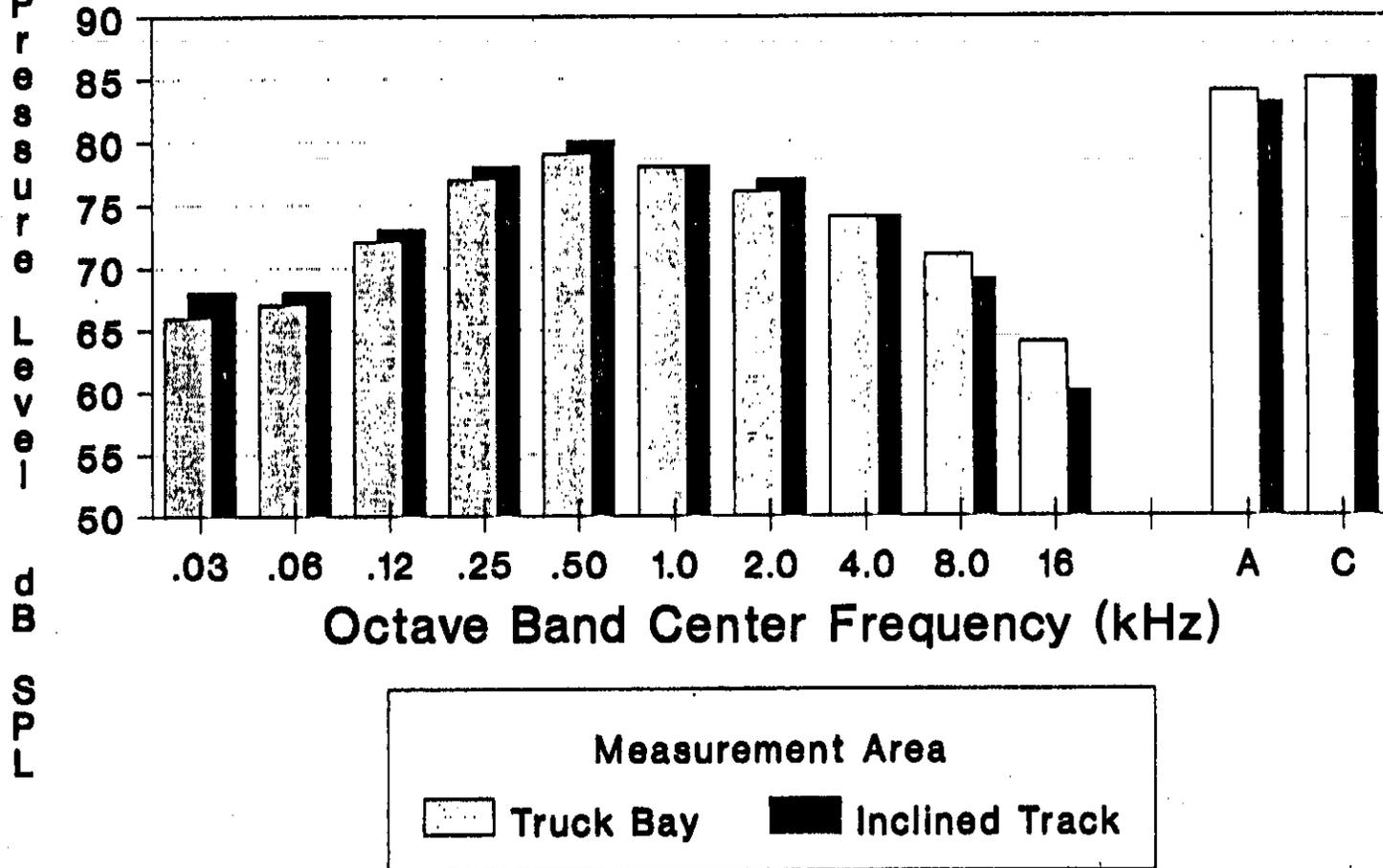
Shipping Dock - Lane 6

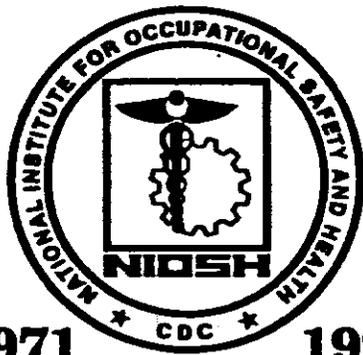


**McKesson Drug Company
Fairfield, Ohio
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Figure 13

Shipping Dock - Lane 8





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