

**NATIONAL OCCUPATIONAL EXPOSURE SURVEY
FIELD GUIDELINES**

Joseph A. Seta, David S. Sundin and David H. Pedersen

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations and Field Studies
Cincinnati, Ohio 45226**

March 1988

DISCLAIMER

Mention of company name or product does not constitute endorsement by the National Institute for Occupational Safety and Health.

DHHS (NIOSH) Publication No. 88-106

FOREWORD

The National Institute for Occupational Safety and Health (NIOSH), Division of Surveillance, Hazard Evaluations and Field Studies, Surveillance Branch, Hazard Section conducted the National Occupational Exposure Survey (NOES) from 1981-1983. The sample of businesses surveyed in the NOES consists of 4,490 establishments in 98 different geographic locations throughout the United States. The set of surveyed facilities was designed to be representative of virtually all the non-agricultural, non-mining, and non-governmental businesses covered under the Occupational Safety and Health Act of 1970.

Like its predecessor, the National Occupational Hazard Survey (NOHS), which was conducted from 1972-1974, the NOES was designed to provide the data necessary to describe potential exposure agents and profile health and safety programs in American workplaces. Specifically, the survey provides data on potential occupational exposures to chemical, physical, and biological agents, and permits an analysis of the changes in the workplace since the NOHS.

The material presented here is a compilation of the instructions originally provided to the NOES surveyors and is intended as a reference for those evaluating the survey data and the procedures used in collecting and recording information.

I. ABSTRACT

The National Occupational Exposure Survey (NOES) was a nationwide data gathering effort designed to develop a base of data which would support the development of estimates of the number of workers potentially exposed to various chemical, physical and biological agents, and describe the distribution of those potential exposures. Data relating to in-plant health and safety programs were also collected. An ancilliary objective was to compile the data in such a way that analysis of potential exposure trends would be possible by comparing NOES data with similar data in the National Occupational Hazard Survey (NOHS).

Field investigations began in November 1980 and continued for the next 30 months. Trained surveyors conducted on-site visits to each facility in the sample to administer a questionnaire to plant management, to observe processes and operations, and to record potential exposures to all employees.

Walk-through investigations were conducted in 4,490 facilities in 523 different industry types employing approximately 1,800,000 workers in 410 occupational categories. More than 10,000 different potential exposure agents and over 100,000 unique tradename products were seen during the on-site visits.

This manual presents historical information, instructions and procedures provided to the NOES surveyors. It is intended as a reference for evaluating the survey data, the survey procedures, and the data collection guidelines.

CONTENTS

	<u>Page</u>
FOREWORD	iii
I. ABSTRACT	iv
II. ACKNOWLEDGEMENTS	viii
III. INTRODUCTION	1
IV. HISTORY	2
A. Recruiting	2
B. Turnover	4
C. Scheduling	4
D. Teams	7
V. SURVEYOR TRAINING	27
A. The Industrial Hygiene Section	28
B. The Industrial Processes Section	29
C. Recognition of Chemical, Physical, and Biological Agents	30
D. Survey Interview and Data Encoding Procedures	30
1. Part I - Survey Form Interview Procedures	31
2. Part II - Survey Form Data Encoding Procedures	31
3. Part III - Survey Form Encoding Procedures	32
E. Field Training of the NOES Surveyor	33
VI. FACILITY SCHEDULING, SURVEYING, AND DECISION MATRIX FOR FIELD STAFF	35
VII. FORMS PREPARATION INSTRUCTIONS	39
A. Part I Survey Form Preparation	42
1. Part I - Survey Form Instructions	50
B. Surveyor's Manual and Definitions	129
C. Part II Survey Form Preparation	139
D. Part III Survey Form Preparation	177
E. Part II Coding - Example Industrial Situations	186

CONTENTS (Cont.)

	<u>Page</u>
APPENDIX A - Notification Letter	A-1
APPENDIX B - List of In-Scope Four-Digit SIC Codes and Narrative Descriptions	B-1
APPENDIX C - Intended Control Codes	C-1
APPENDIX D - Physical Exposures	D-1
APPENDIX E - NOES Product Use Terms (PUTs)	E-1
APPENDIX F - Operational Definitions of Eleven Critical Chronic Trauma Hazards	F-1
APPENDIX G - Jobs and Chronic Effects of Trauma	G-1
APPENDIX H - Coding Conventions for Welding, Brazing, Soldering, and Thermal Cutting Processes	H-1

FIGURES

	<u>Page</u>
1A Preface - Part I - Questionnaire	45
1B Part I - Management Interview	118
2 Part II - Exposure Data	140
3 Part III - Surveyor Assessment	175
4 Part II Coding - Example Industrial Situation	187
5 Part II Coding - Example Industrial Situation	189
6 Part II Coding - Example Industrial Situation	192

TABLES

1 NOES Surveyors	5
2 Number of Facilities Surveyed By Month By PSU	9
3 NOES Sample PSUs, Major City, State(s), Counties	17
4 Average Number of Facilities Surveyed Per Surveyor	24
5 Total Facilities Surveyed Per Month	25
6 Average Time to Complete Various Survey Tasks by Facility Size	26

II. ACKNOWLEDGEMENTS

The individuals who collected data during this field survey deserve special recognition. They were asked to endure the rigors of transitory assignments in a variety of geographic settings. Their work took them into a broad spectrum of worksites where they encountered a staggering array of potential exposure agents. The National Occupational Exposure Survey owes much to their grace under pressure, their persistence in the face of adversity, and their commitment to the goals of the survey.

James R. Baburich
Carol B. Berman
Anne M. Bostrom
Michael A. Brown
Susan Butts
Burt J. Cooper
Wayne C. Cooper
David E. Cummings
Arthur Davis
Francisco Estevez

Gary B. Fillmore
Joseph L. Fullenkamp
David L. Gray
Nanci Habibi
Keith W. Hall
Paul J. Hawes, Jr.
Bruce W. Hills
Michele C. Hefferan
Patrick S. Herring
Stephen Joyce

John R. Love
Jay K. Olexa
Elizabeth Payton
Raymond A. Reilman
Maurine J. Rickard
LuAnn Ruther
Peter Sorock
John W. Spencer
Karl E. Wende

Special acknowledgement is also due the following individuals: Mr. Kenneth Kriete, for his work in designing the survey form and reporting guidelines; Mr. David Pedersen, for his role in training the surveyors; Mr. Joseph Seta, who helped train the surveyors and supervised their field activities; Mr. Randy Young, who designed and tested the software for editing field data; Mrs. Kathy Mitchell, for her patience in bringing this publication to its final form.

III. INTRODUCTION

The basic objective of the National Occupational Exposure Survey (NOES) was to collect data systematically on all potential occupational exposure agents observed in a structured sample of establishments. This data gathering activity has produced a base of information which can be used to identify areas where further occupational health and safety research is warranted. Consisting, as it does, of observational data on potential occupational exposures to a wide range of chemical, physical, and biological agents, the NOES is unique.

This manual is intended both as a basic background document to be referenced by those using data from the NOES, and as a guide to others who may undertake a large-scale data-gathering activity designed to compile information on potential exposure agents. Because of this dual purpose, the manual treats in some detail the specific history of this survey, methods of training field surveyors, and techniques for scheduling and sequencing facility surveys. Later sections of the manual deal with the more readily generalized aspects of the survey, including basic definitions of terms and instructions for preparing the survey forms.

IV. HISTORY

An in-depth analysis of the historical information available from the National Occupational Hazard Survey (NOHS) was the starting point in planning for the National Occupational Exposure Survey (NOES).

Basic concepts of the NOES were not radically different from the NOHS. The primary objective was to provide a national profile of potential exposures to workplace hazards. The basic sample design of the survey was modified to improve the statistical validity of the results. The recruiting, hiring, training and utilization of field personnel for the NOES was also modified to improve the quantity and quality of the data and to minimize the time spent in collecting data.

A. Recruiting

Each of the 20 NOHS surveyors was contacted in an effort to elicit comments regarding the conduct of the first survey. Their comments pertaining to travel, living accommodations, per diem, assignments, working conditions, rapport and communications with survey Headquarters were informative and useful inputs in the initial planning process. Most of the surveyor's complaints and difficulties appeared to stem from a feeling of isolation during the field phase of the survey and a perceived lack of contact with survey Headquarters personnel.

There was a lack of extensive historical information pertaining to right of entry problems and warrant procedures. The best information available indicated that there were very few company officials who refused to cooperate or challenged a NIOSH employee's statutory right to enter the facility to conduct research. In planning the NOES, however, it was anticipated that right of entry and warrant situations would be more frequent. Procedures for handling these special situations are discussed in Section VI.

From March 1979, through September 1979, numerous planning sessions were held to evaluate and discuss field staff requirements and activities. It was decided that:

- 21 surveyors would be hired.
- Surveyors would be deployed in teams.
- The surveyors would be recruited from the industrial hygiene, occupational health or biological science fields. A minimum of 15 to 30 quarter credit hours of college-level chemistry or its equivalent would be required.
- All surveyors would receive specialized training (explained in Section V).
- Each team would have an industrial hygienist team leader whose education and/or experience would be commensurate with grade-level GS-11 or higher.

The team leader positions were critical. It was decided that the leader would:

- Function as a first-line supervisor.
- Make all arrangements for accommodations and travel for the team.
- Provide technical guidance and expertise as needed.
- Assign facilities to all surveyors.
- Periodically accompany surveyors on site visits as an observer for the express purpose of evaluating the surveyor's performance and adherence to survey guidelines.
- Conduct staff meetings at least weekly to enhance communication and resolve difficulties.
- Carefully review all completed survey forms prior to transmittal to survey Headquarters.
- Act as a liaison between the field staff and survey Headquarters.
- Resolve, if possible, right of entry problems.
- Initiate warrant procedures.
- Obtain replacement facilities from survey Headquarters.

It was estimated that administrative and supervisory duties would account for approximately 75% of the team leader's time. In addition to administrative and supervisory duties, the team leader was expected to conduct three or four surveys of moderately sized facilities in each geographical area or Primary Sampling Unit (PSU) assigned to the team. The first team leader/surveyor was hired in November, 1979, and reported for duty in December of that same year.

Position descriptions for surveyors, vacancy announcements and other notices were sent to numerous colleges throughout the United States, to the Office of Personnel Management of the U.S. Government (Civil Service), the Public Health Service Commission Corps, and the employment advertisement and notification committee of the American Industrial Hygiene Conference (AIHC). Approximately 75 applicants responded to the vacancy announcements. Applicants were rated by the Civil Service Commission and eligible candidates were contacted for a personal interview. In May, 1980, representatives of the Hazard Section attended the American Industrial Hygiene Conference in Houston, Texas. Position descriptions were posted in the employment opportunity suite in an effort to attract as many eligible applicants as possible. Approximately 30 interviews were held during that week.

Between March and July, 1980, 14 surveyors were hired; two each in March, April, May and July, and six in June. The two surveyors hired in March terminated their employment prior to the start of training at the Occupational Safety and Health Administration Training Institute in Chicago, Illinois. After the in-house training period but prior to the field start date, three other surveyors resigned and one surveyor was hired. On November 3, 1980, ten surveyors and the team leader traveled to Chicago, Illinois, to begin the field investigation phase of the NOES.

Eight weeks after the field investigation phase started, three more surveyors were hired, trained and sent to meet the team in Los Angeles, California to receive additional on-the-job training. After this training these surveyors became functional members of the field staff. Another surveyor resigned in January, 1981. Additional surveyors were hired and reported for field duty as presented in Table 1.

B. Turnover

During the planning cycle, it was estimated that surveyor turnover during the field phase would be less than 20% in the first year and approximately 70% over the two-year period. In the first year, five of the eleven original surveyors resigned, resulting in a 45% turnover rate. Through the two-year period, a 73% turnover rate was realized. Calculating a turnover rate based only on the original surveyors, however, does not present an accurate assessment of this personnel problem.

Personnel hiring limits were more restrictive than assumed during the planning phase making it impossible to acquire a full staff of 21 surveyors. Furthermore, candidates willing to commit to a project requiring 100% travel for a two-year period were difficult to locate. Fortunately, a total of 15 surveyors expressed a sincere commitment to the project and its requirements. Only seven surveyors, however, fulfilled their full 2-year commitment, yielding a 53% turnover rate.

Due to the limited number of field staff, it was obvious that facility surveys would not be completed as scheduled unless additional surveyors could be hired. Survey Headquarters staff were assigned to conduct surveys until other surveyors could be recruited, hired and trained. In 1982, seven surveyors were hired for 15 months and seven surveyors for a 12-month period. These additional surveyors reported for field work and on-the-job training in March and May respectively. In May of 1982, a full team of surveyors were in the field conducting surveys. The size of the field staff remained relatively constant until March, 1983.

C. Scheduling

At the start of the field investigation phase in Chicago, Illinois, several initial start-up problems surfaced, but were quickly rectified. For example, notification letters to companies failed to arrive before the surveyors initial contact was made, and survey

TABLE 1. NOES SURVEYORS

SURVEYOR	FIELD DATES	1980			1981			1982			1983																				
		11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6										
A	11/80-03/83	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
B	11/80-04/82	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
C	11/80-04/82	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
D	01/81-03/83			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
E	02/81-06/83			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
F	11/80-11/82	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
G	11/80-09/81	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
9	05/82-08/82																														
H	11/80-01/81																														
h	02/82-03/83	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
I	11/80-08/81																														
J	03/81-03/83	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
K	11/80-04/82	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
L	11/80-03/83	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
M	11/80-06/81	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
m	05/82-03/83																														
N	11/80-07/81	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
n	05/82-02/83																														
O	05/82-03/83																														
P	05/82-03/83																														
P	01/81 3-4/81																														
P	06/81			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
Q	05/82-02/83																														
R	02/81-06/83				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
R	03/82-04/83																														
S	03/82-04/83																														
T	03/82-04/83																														
U	05/82-09/82																														
V	03/82-04/83																														
W	03/82-04/83																														
X	03/82-04/83																														
Y	05/82-05/83																														
Z	03/82-07/83																														
TOTALS		11	11	13	13	15	15	14	15	12	11	11	10	10	10	11	17	14	22	22	22	22	21	20	19	19	19	17	9	4	3

scheduling required more effort and time than expected. Initially, refusals and potential warrant situations were significantly higher than anticipated. Headquarter staff responsibilities and assignments in support of the surveyors were more clearly defined and streamlined to address these problems.

Headquarter staff responsibilities were categorized into three areas; travel, per diem, vouchers and other similar activities were assigned to the secretarial staff; replacement facilities, warrants, facility computer listings, contact with the sample design contractor, etc. was assigned to the senior programmer specialist; field personnel assignments, recruiting, PSU sequencing and other operational management activities were delegated to the alternate project officer.

PSU sequencing and team assignments (Tables 2 and 3) were critical elements of the NOES. Facility listings from the sample design contractor had to be received far enough in advance to:

1. Notify NIOSH Regional Offices.
2. Notify company representatives that their facility had been selected for participation in the Survey.
3. Notify team leaders and surveyors of their future assignments.
4. Permit team leaders sufficient time to make arrangements for travel and living accommodations.
5. Allow surveyors flexibility in scheduling their site visits.

Upon receipt of the facility listing for the next PSU assignment, team leaders were instructed to distribute the facility assignments to each surveyor. The surveyor would, as time permitted, contact and schedule as many facilities as possible before arrival in the next PSU. This procedure, in effect, maximized surveyor efficiency, enhanced work schedule flexibility, and provided sufficient time for refusals, warrants and other problems to be dealt with.

Time required to complete activities in a PSU and travel costs between PSU's were important inputs in the PSU sequencing strategy. The first three PSU's surveyed (Chicago, Detroit, Los Angeles) were large. Team workload was more than the staff could complete in a one month period. Per diem regulations and GSA rental restrictions were major factors in limiting the stay in a PSU to a maximum of three or four weeks. If all facility surveys were not completed, the PSU was rescheduled for a return visit at a later date.

Effort was made to minimize travel time and costs between PSU assignments. Travel day(s) proved to be a disruptive and unsettling experience for the surveyors. Packing, shipping luggage and equipment, waiting in airports, unpacking at the new location, renting cars, purchasing maps of the city, etc., were factors which contributed to surveyor dissatisfaction. The anticipation of travel

to a more favorable geographic area, however, was instrumental in reducing travel day dissatisfaction.

After Chicago and Detroit, PSU sequencing took the following pattern: West, Northwest, Southwest, South, East, Northeast, Midwest, and was then repeated. This pattern of travel remained constant, with few exceptions, for the duration of the survey. Periodic modifications were necessary during the later stages of the survey in order to complete the required number of survey sites in designated geographical areas.

Completing the field phase of NOES in two years was an achievable goal if:

1. Productivity was consistent with expectations.
2. Employee turnover rate was low (20%)
3. A full complement of surveyors remained in the field.

NOES productivity is graphically presented in Tables 4 and 5. Table 4 illustrates the average number of facilities completed per surveyor per month. Table 5 presents the total number of surveys conducted per month for all surveyors. Table 6 indicates the average time of several survey tasks for all surveyors and all facilities and displays the average time for each component by facility size.

NOHS statistics were:

1. Average of 20 surveyors/month for 24 months.
2. 4,636 facilities completed with 860,000 employees on payroll.
3. 9.65 (average) completed surveys/surveyor/month.

NOES statistics were:

1. Average of 15 surveyors/month for 30 months.
2. 4,490 facilities completed with 1.8 million employees on payroll.
3. 9.85 (average) completed surveys/surveyor/month.

D. Teams

There was only one survey team during the first three months of the survey for reasons previously stated. Two teams were formed in February, 1981, and remained relatively intact for the next twelve months. With more field personnel available in the second year, the number of teams increased to four. At the same time, several surveyors worked alone to complete unfinished PSU's, small

PSU's (less than 2 person-weeks of work) and large facilities that had been difficult to schedule.

During the last three months of the survey, surveyors worked independently and traveled extensively in an effort to complete the field investigations. Most of the facilities during this period were large facilities (over 5,000 employees) that had been temporarily closed, or had initially refused to voluntarily participate.

TABLE 2. NUMBER OF FACILITIES SURVEYED BY MONTH BY PSU

<u>Date</u>	<u>PSU Site Number</u>	<u>No. Facilities Surveyed/PSU</u>	<u>Facility Total/Month</u>
November, 1980	310	69	71
	999*	2	
December, 1980	320	50	56
	999*	6	
January, 1981	710	102	108
	999*	6	
February, 1981	710	2	134
	720	35	
	731	54	
	801	39	
	999*	4	
March, 1981	381	3	185
	520	11	
	530	38	
	617	1	
	731	1	
	761	32	
	801	3	
	804	37	
	805	57	
	999*	2	
April, 1981	381	1	142
	120	20	
	214	17	
	520	17	
	530	1	
	601	15	
	617	26	
	804	4	
	808	37	
	999*	4	
May, 1981	110	20	120
	120	23	
	201	1	
	205	19	
	214	2	
	330	5	
	340	27	
	611	14	
	624	3	
	999*	6	

TABLE 2. NUMBER OF FACILITIES SURVEYED BY MONTH BY PSU (Cont.)

<u>Date</u>	<u>PSU Site Number</u>	<u>No. Facilities Surveyed/PSU</u>	<u>Facility Total/Month</u>
June, 1981	201	23	184
	330	22	
	371	37	
	406	12	
	407	25	
	412	19	
	414	3	
	606	13	
	624	21	
	999*	9	
July, 1981	310	19	165
	381	34	
	160	15	
	406	1	
	414	2	
	415	25	
	561	36	
	606	10	
	624	1	
	710	15	
	999*	7	
August, 1981	320	1	127
	381	2	
	160	4	
	203	29	
	402	10	
	409	12	
	417	16	
	619	5	
	627	36	
	999*	12	
September, 1981	150	11	156
	203	3	
	207	36	
	330	18	
	409	14	
	411	23	
	417	6	
	622	41	
	999*	4	
October, 1981	120	44	153
	150	48	
	211	40	
	330	10	

TABLE 2. NUMBER OF FACILITIES SURVEYED BY MONTH BY PSU (Cont.)

<u>Date</u>	<u>PSU Site Number</u>	<u>No. Facilities Surveyed/PSU</u>	<u>Facility Total/Month</u>
	622	8	
	999*	3	
November, 1981	381	1	117
	120	8	
	142	12	
	150	2	
	202	29	
	204	30	
	211	7	
	212	21	
	999*	7	
December, 1981	142	18	84
	150	3	
	202	10	
	204	1	
	209	30	
	212	13	
	999*	9	
January, 1982	110	15	142
	142	9	
	208	1	
	710	110	
	999*	7	
February, 1982	110	14	92
	207	1	
	212	1	
	710	1	
	742	22	
	802	11	
	806	28	
	809	11	
	999*	3	
March, 1982	604	2	120
	610	23	
	631	16	
	752	16	
	802	34	
	806	1	
	807	6	
	808	2	
	809	11	
	999*	9	

TABLE 2. NUMBER OF FACILITIES SURVEYED BY MONTH BY PSU (Cont.)

<u>Date</u>	<u>PSU Site Number</u>	<u>No. Facilities Surveyed/PSU</u>	<u>Facility Total/Month</u>
April, 1982	603	6	104
	604	13	
	605	22	
	607	31	
	610	3	
	613	7	
	752	5	
	807	10	
	808	1	
	999*	6	
May, 1982	552	8	118
	603	21	
	604	3	
	609	37	
	613	18	
	616	14	
	628	12	
	999*	5	
June, 1982	552	22	181
	602	20	
	608	25	
	609	3	
	616	12	
	618	19	
	623	38	
	629	37	
	999*	5	
	July, 1982	110	
340		26	
404		26	
602		5	
612		8	
615		27	
618		5	
620		34	
625		8	
803		17	
999*		1	
August, 1982		310	13
	110	54	
	120	2	
	142	1	
	150	1	
	212	1	
	214	2	

TABLE 2. NUMBER OF FACILITIES SURVEYED BY MONTH BY PSU (Cont.)

<u>Date</u>	<u>PSU Site Number</u>	<u>No. Facilities Surveyed/PSU</u>	<u>Facility Total/Month</u>
	310	35	
	340	3	
	401	20	
	404	5	
	405	20	
	511	10	
	542	29	
	612	25	
	615	1	
	620	1	
	622	1	
	625	9	
	999*	5	
September, 1982	310	28	220
	110	11	
	130	38	
	201	1	
	320	28	
	401	16	
	405	8	
	413	33	
	511	36	
	542	10	
	625	1	
	999*	10	
October, 1982	310	36	208
	130	44	
	202	9	
	320	19	
	413	1	
	416	31	
	614	25	
	621	24	
	625	2	
	999*	15	
November, 1982	310	4	181
	120	1	
	130	2	
	201	15	
	205	15	
	208	32	
	209	2	
	214	3	
	392	24	
	402	3	
	403	12	

TABLE 2. NUMBER OF FACILITIES SURVEYED BY MONTH BY PSU (Cont.)

<u>Date</u>	<u>PSU Site Number</u>	<u>No. Facilities Surveyed/PSU</u>	<u>Facility Total/Month</u>
	406	3	
	410	38	
	416	1	
	618	7	
	621	1	
	625	5	
	999*	13	
December, 1982	204	5	162
	206	29	
	208	9	
	209	3	
	212	5	
	214	13	
	310	1	
	392	5	
	402	25	
	406	13	
	408	16	
	602	1	
	618	1	
	625	1	
	628	4	
	630	13	
	999*	18	
January, 1983	206	2	237
	208	1	
	213	40	
	310	1	
	403	19	
	408	23	
	414	19	
	511	1	
	520	49	
	552	8	
	602	13	
	607	10	
	608	3	
	611	10	
	630	15	
	631	1	
	752	5	
	807	3	
	999*	14	
February, 1983	381	1	197
	210	24	
	213	4	

TABLE 2. NUMBER OF FACILITIES SURVEYED BY MONTH BY PSU (Cont.)

<u>Date</u>	<u>PSU Site Number</u>	<u>No. Facilities Surveyed/PSU</u>	<u>Facility Total/Month</u>
	350	11	
	418	32	
	520	1	
	530	45	
	601	14	
	603	5	
	604	2	
	610	1	
	611	3	
	619	4	
	631	2	
	710	1	
	720	27	
	731	1	
	805	1	
	809	5	
	999*	13	
March, 1983	160	26	160
	210	16	
	320	1	
	350	33	
	404	2	
	409	1	
	415	1	
	603	2	
	604	1	
	606	14	
	626	29	
	720	1	
	742	1	
	806	9	
	809	5	
	999*	18	
April, 1983	160	1	51
	206	1	
	320	2	
	350	1	
	404	2	
	408	1	
	409	2	
	414	1	
	418	1	
	511	1	
	542	1	
	614	2	
	619	9	
	621	1	

TABLE 2. NUMBER OF FACILITIES SURVEYED BY MONTH BY PSU (Cont.)

<u>Date</u>	<u>PSU Site Number</u>	<u>No. Facilities Surveyed/PSU</u>	<u>Facility Total/Month</u>
	622	11	
	631	4	
	999*	10	
May, 1983	110	3	48
	120	2	
	212	1	
	214	2	
	340	5	
	417	1	
	418	5	
	530	7	
	605	4	
	614	1	
	626	1	
	710	1	
	720	1	
	761	1	
	999*	13	
June, 1983	371	2	18
	403	3	
	520	1	
	530	1	
	603	1	
	611	2	
	617	3	
	626	3	
	999*	2	
July, 1983	320	1	7
	409	1	
	416	1	
	418	1	
	552	1	
	625	1	
	626	1	
August, 1983	320	1	3
	413	1	
	618	1	

* PSU 999 was the designation given to large facilities (2,500 or more employees) which were sampled without regard to geographic location. If these facilities were not located within a sampled PSU, they were assigned to the survey team when they visited a PSU within a reasonable travel distance.

TABLE 3. NOES SAMPLE PSU'S MAJOR CITY, STATE(S), COUNTIES

<u>PSU Number</u>	<u>Major City</u>	<u>State(s)</u>	<u>Counties</u>
110	New York	New Jersey New York	Bergen Bronx, Kings, New York, Putnam, Queens, Richmond, Rockland, Westchester
120	Burlington Philadelphia	New Jersey Pennsylvania	Burlington, Camden, Gloucester Bucks, Chester, Delaware, Montgomery, Philadelphia
130	Boston	Massachusetts New Hampshire	Barnstable, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk Rockingham
142	Freeport	New York	Nassau, Suffolk
150	Newark	New Jersey	Essex, Hunterdon, Morris, Somerset, Union
160	Pittsburgh	Pennsylvania	Allegheny, Beaver, Washington, Westmoreland
201	Albany	New York	Albany, Greene, Montgomery, Rensselaer, Saratoga, Schenectady
202	Providence	Rhode Island	Bristol, Kent, Newport, Providence, Washington
203	Buffalo	New York	Erie, Niagara
204	New London	Connecticut	New London, Windham
205	Augusta	Maine	Hancock, Kennebec, Knox, Lincoln, Waldo, Washington
206	Harrisburg	Pennsylvania	Blair
207	Jamestown	New York	Cattaraugus, Chautauqua
208	Lancaster	Pennsylvania	Lancaster
209	Bridgeport Lancaster	Connecticut New York	Fairfield Lancaster
210	Scranton	Pennsylvania	Lackawanna, Luzerne, Monroe, Wyoming

TABLE 3. NOES SAMPLE PSU'S MAJOR CITY, STATE(S), COUNTIES (Cont.)

<u>PSU Number</u>	<u>Major City</u>	<u>State(s)</u>	<u>Counties</u>
211	Sussex	New Jersey	Passaic, Sussex
212	Trenton	New Jersey	Mercer
213	Berwick	Pennsylvania	Columbia, Montour, Schuylkill, Sullivan
214	E. Brunswick	New Jersey	Middlesex
310	Chicago	Illinois	Cook, Dupage, Kane, Lake, McHenry, Will
320	Detroit	Michigan	Lapeer, Livingston, Macomb, Oakland, St. Clair, Wayne
330		Illinois	Clinton, Madison, Monroe, St. Clair
	St. Louis	Missouri	Franklin, Jefferson, St. Charles, St. Louis
340	St. Paul	Minnesota	Anoka, Carver, Chicago, Dakota, Hennepin, Isanti, Ramsey, Scott, Washington, Wright
		Wisconsin	St. Croix
350	Cleveland	Ohio	Cuyahoga, Geauga, Lake, Medina
371	Milwaukee	Wisconsin	Milwaukee, Ozaukee, Washington, Waukesha
381	Cincinnati	Ohio	Brown, Clermont, Hamilton, Warren
		Indiana	Dearborn
		Kentucky	Boone, Campbell, Kenton
392	Kansas City	Kansas	Johnson, Wyandotte
		Missouri	Cass, Clay, Jackson, Platte, Ray
401	Flint	Michigan	Genesee, Shiawassee
402	Indianapolis	Indiana	Boone, Hamilton, Hancock, Hendricks, Johnson, Marion, Morgan, Shelby

TABLE 3. NOES SAMPLE PSU'S MAJOR CITY, STATE(S), COUNTIES (Cont.)

<u>PSU Number</u>	<u>Major City</u>	<u>State(s)</u>	<u>Counties</u>
403	Omaha	Nebraska Iowa	Douglas, Sarpy Pottawattamie
404	St. Cloud	Minnesota	Benton, Sherburne, Stearns
405	Green Bay	Wisconsin	Brown
406	Kansas City	Kansas	Lawrence, Douglas, Franklin, Leavenworth, Miami
	Kansas City	Missouri	
407	Cambridge	Ohio	Guernsey, Harrison, Tuscarawas
408	Columbus	Ohio	Delaware, Fairfield, Franklin, Madison, Pickaway
409	Toledo Monroe	Ohio Michigan	Fulton, Lucas, Ottawa, Wood Monroe
410	Ft. Wayne	Indiana	Adams, Allen, DeKalb, Wells, Whitley
411	Columbia	Missouri	Audrain, Boone, Callaway, Howard, Randolph
412	Topeka	Kansas Missouri	Allen, Anderson, Bourbon, Coffey, Linn, Woodson St. Clair, Vernon
413	Racine	Wisconsin	Racine
414	Marion	Ohio	Knox, Marion, Morrow
415	Hillsdale	Michigan	Hillsdale, Lenawee
416	Angola Defiance	Indiana Ohio	Lagrange, Steuben Defiance, Henry, Paulding, Williams
417	Evansville	Indiana	Dubois, Knox, Pike, Spencer
418	Akron	Ohio	Cuyahoga Falls, Kent, Portage, Summit

TABLE 3. NOES SAMPLE PSU'S MAJOR CITY, STATE(S), COUNTIES (Cont.)

<u>PSU Number</u>	<u>Major City</u>	<u>State(s)</u>	<u>Counties</u>
511	Arlington	Virginia	Arlington, Fairfax, Loudoun, Prince William, Cities of: Alexandria, Fairfax, Falls Church, Manassas, Manassas Park
	Rockville	Maryland	Calvert, Charles, Frederick, Montgomery, Prince Georges
	Washington	DC	
520	Dallas	Texas	Collin, Dallas, Denton, Ellis, Hood, Johnson, Kaufman, Parker, Rockwall, Tarrant, Wise
530	Houston	Texas	Brazoria, Chambers, Fort Bend, Harris, Libert, Montgomery, Waller
542	Baltimore	Maryland	Anne Arundel, Baltimore, Carroll, Harford, Howard, City of Baltimore
552	Atlanta	Georgia	Butts, Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Newton, Paulding, Rockdale, Spaulding, Walton
561	Miami	Florida	Dade, Monroe
601	Corpus Christi	Texas	Bee, Brooks, Dimmit, Duval, Frio, Goliad, Jim Hogg, Jim Wells, Karnes, Kenedy, Kinney, Kleberg, LaSalle, Live Oak, Maverick, McMullen, Starr, Uvalde, Willacy, Zapata, Zavala
602	Ft. Lauderdale	Florida	Broward
603	New Orleans	Louisiana	Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. Tammany

TABLE 3. NOES SAMPLE PSU'S MAJOR CITY, STATE(S), COUNTIES (Cont.)

<u>PSU Number</u>	<u>Major City</u>	<u>State(s)</u>	<u>Counties</u>
604	San Antonio	Texas	Atascosa, Bandera, Blanco, Bosque, Burnet, Caldwell, Comanche, Erath, Gonzales, Hamilton, Kerr, Medina, Mills, San Saba, Somervell, Wilson
605	Bay City	Texas	Austin, Bastrop, Colorado, Fayette, Jackson, Lavaca, Lee, Matagorda, Wharton
606	Jackson	Mississippi	Hinds, Madison, Rankin
607	Wichita Falls	Texas	Clay, Montague, Wichita
608	Tampa	Florida	Hillsborough, Pasco, Pinellas
609	Memphis	Tennessee Arkansas Mississippi	Shelby, Tipton Crittenden DeSota
610	Tulsa	Oklahoma	Creek, Mayes, Osage, Rogers, Tulsa, Wagoner
611	Montgomery	Alabama	Autauga, Elmore, Montgomery
612	Columbia	South Carolina	Lexington, Richland
613	Little Rock	Arkansas	Pulaski, Saline
614	Wilmington	Delaware Maryland New Jersey	New Castle Cecil Salem
615	Petersburg	Virginia	Dinwiddie, Prince George, Cities of Colonial Heights, Hopewell, Petersburg
616	Jackson	Alabama	Choctaw, Clarke, Conecuh, Monroe, Washington
617	Georgetown	South Carolina	Clarendon, Georgetown, Williamsburg

TABLE 3. NOES SAMPLE PSU'S MAJOR CITY, STATE(S), COUNTIES (Cont.)

<u>PSU Number</u>	<u>Major City</u>	<u>State(s)</u>	<u>Counties</u>
618	Wilson	North Carolina	Johnson, Wilson
619	Ashland	Kentucky	Bath, Elliot, Fleming, Johnson, Laurence, Lewis, Magoffin, Martin, Mason, Menifee, Montgomery, Morgan, Nicholas, Robertson, Rowan, Wolfe
620	Greenville	South Carolina	Greenville, Pickens, Spartanburg
621	Salisbury	Maryland	Somerset, Wicomico, Worcester
622	Greensboro	North Carolina	Davidson, Davie, Forsyth, Guilford, Randolph, Stokes, Yadkin
623	Chattanooga	Tennessee Georgia	Hamilton, Marion, Sequatchie Catoosa, Dade, Walker
624	Gadsden	Alabama	Calhoun, Etowah
625	Rocky Mount	Virginia	Bedford, Franklin, Rockbridge, Cities of Bedford, Buena Vista, Lexington
626	Parkersburg	West Virginia Ohio	Wirt, Wood Washington
627	Durham	North Carolina	Caswell, Granville, Person, Rockingham
628	Columbus	Mississippi	Clay, Lowndes, Webster
629	Chatsworth	Georgia	Dawson, Fannin, Gilmer, Habersham, Lumpkin, Murray, Pickens, Rabun, Towns, Union
630	Cookeville	Tennessee	DeKalb, Putnam, White

TABLE 3. NOES SAMPLE PSU'S MAJOR CITY, STATE(S), COUNTIES (Cont.)

<u>PSU Number</u>	<u>Major City</u>	<u>State(s)</u>	<u>Counties</u>
631	Frankfort	Kentucky	Anderson, Bracken, Carroll, Franklin, Gallatin, Grant, Harrison, Henry, Owen, Pendleton, Shelby, Spencer, Trimble
710	Los Angeles	California	Los Angeles
720	San Francisco	California	Alameda, Contra Costa, Marin, San Francisco, San Mateo
731	Anaheim	California	Orange
742	San Diego	California	San Diego
752	Denver	Colorado	Adams, Arapahoe, Boulder, Denver, Douglas, Gilpin, Jefferson
761	Seattle	Washington	King, Snohomish
801	Sacramento	California	Placer, Sacramento, Yolo
802	Bakersfield	California	Kern
803	Fairbanks	Alaska	Divisions of: Upper Yukon, Fairbanks, South East Fairbanks
804	Las Vegas	Nevada	Clark
805	San Bernardino	California	Riverside, San Bernardino
806	Fresno	California	Fresno
807	Portland	Oregon Washington	Clackamas, Multnomah, Washington, Yamhill Clark
808	Colorado Springs	Colorado	El Paso, Pueblo, Teller
809	San Jose	California	Santa Clara

AVERAGE NUMBER OF FACILITIES/SURVEYOR

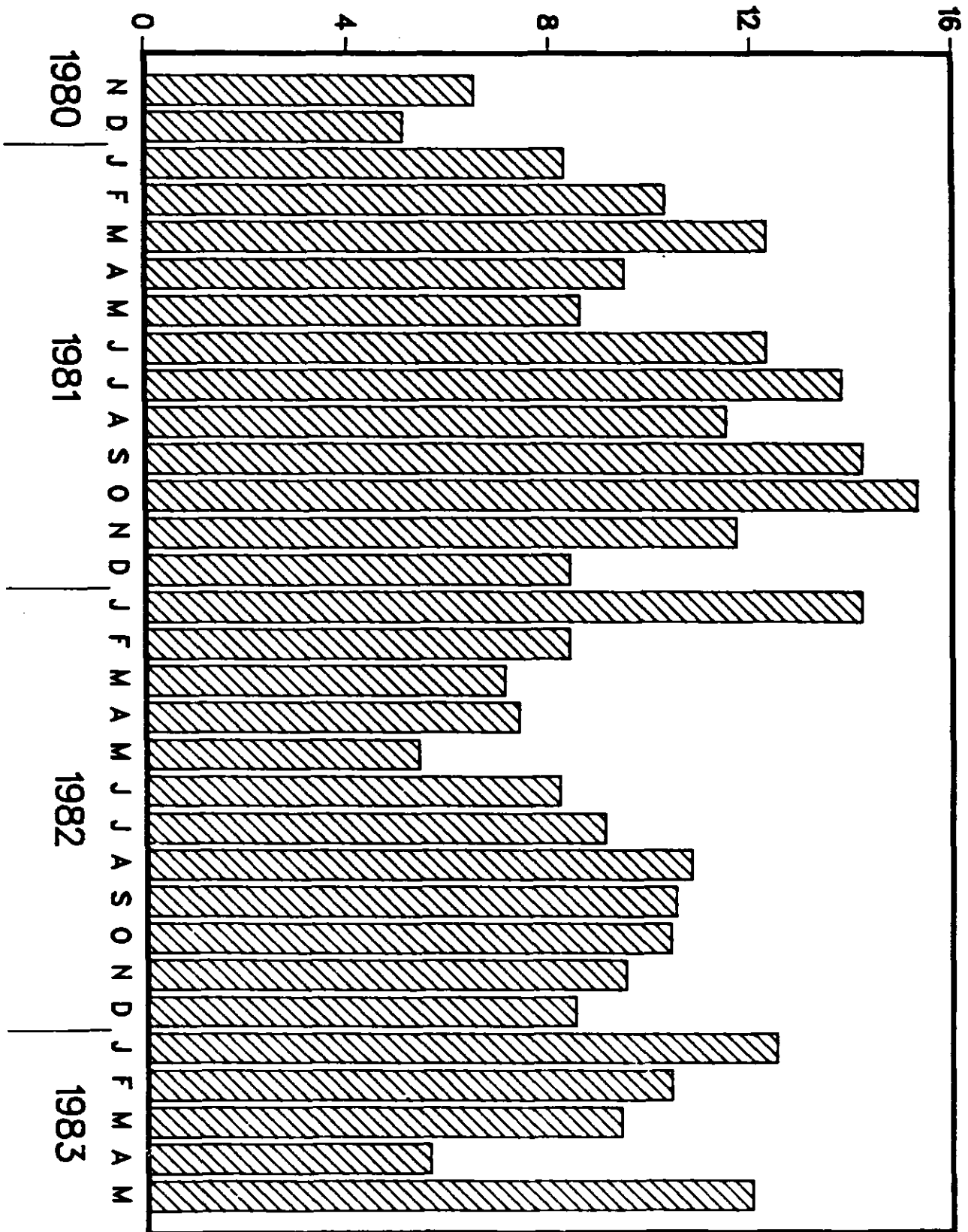
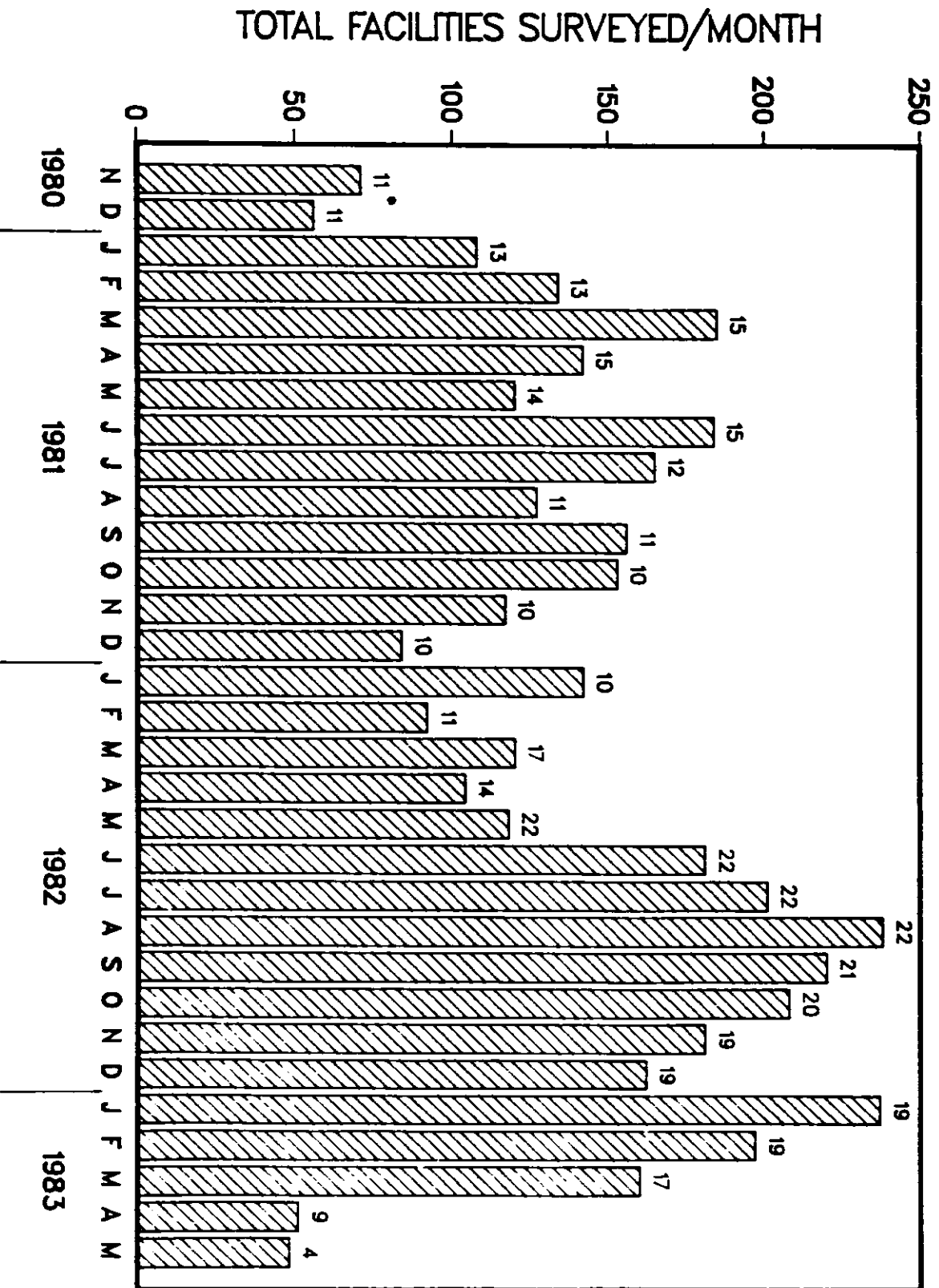


TABLE 4
AVERAGE NUMBER OF FACILITIES SURVEYED PER SURVEYOR

TABLE 5
TOTAL FACILITIES SURVEYED PER MONTH



* Number of Surveyors

**TABLE 6. AVERAGE TIME TO COMPLETE VARIOUS SURVEY
TASKS BY FACILITY SIZE**

Facility Size Range	Total Facilities Surveyed	Avg. Time to Conduct Survey (min.)	Avg. Time to Code Forms (min.)	Avg. Travel To and From Facility (min.)	Avg. Time Spent Waiting and discussing
8-19	924	69	60	89	13
20-49	956	83	83	91	14
50-99	732	107	117	94	15
100-249	787	144	171	96	18
250-499	425	208	250	99	19
500-999	251	329	397	117	19
1000-2499	238	501	639	136	27
2500-4999	117	790	881	193	27
5000-over	<u>60</u>	1395	1665	342	39
	4490				