UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Status of Public Well-Sample Repositories in the United States

By

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards.

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INTRODUCTION

This report is compiled from responses to a detailed questionnaire (appendix I) sent by the U.S. Geological Survey in late 1983 to publicly available, nonprofit, United States well-sample repositories. It addresses the general status of sample and core preservation in the United States through statistical summaries of the questionnaire responses. Although individual repositories are in a continuous state of evolution, these statistical compilations should retain their significance for a number of years, and be of value to those with an interest in the collection, preservation, curation, or utilization of subsurface material.

Data from the 93 questionnaire respondents (Schmoker and others, 1984a; appendix II) are grouped according to Federal, State and Municipal, and University facilities. All facilities are publicly available and nonprofit, but the nature of individual repositories and collections in each category is highly variable (Schmoker and others, 1984b).

ADMINISTRATION AND GEOGRAPHIC DISTRIBUTION

The distribution by category of administrating agency of the repositories of our sample set is shown in figure 1. The repository locations are plotted in figure 2.

There is at least one publicly available, nonprofit repository in 44 of the 50 states. We could not identify any qualifying repositories in five northeastern states (Maine, Connecticut, New Hampshire, New Jersey, and Vermont), and in

Wyoming. (The core collection formerly maintained by the Wyoming Oil and Gas Conservation Commission, and core samples from recent Wyoming drilling, are now curated at the U.S. Geological Survey facility near Denver, Colorado).

Samples and core from oil and gas wells represent a significant portion of all material curated nationwide (fig. 3), and statistics for the number of oil and gas wells drilled in each state are available (appendix III). However, there appears to be no correlation between areal density of repositories and amount of hydrocarbon drilling.

FACILITIES

Nationwide, 86 percent of repositories occupy less than 15,000 square feet of floor space, and the typical facility occupies 1,000-5,000 square feet (fig. 4). Lack of space is a commonly cited operating problem. The floor space of all facilities in our data set totals about 575,000 square feet (13.2 acres). At $30 per square foot, the replacement value of repository buildings would be roughly $17,250,000.

Concrete and masonry are the prevalent building materials used for repository construction (fig. 5). Most, but by no means all, facilities have basic amenities for user comfort---heat, air conditioning, restrooms, electricity, and telephones (fig. 6).

The majority of facilities have a separate examination room (fig. 7), which typically occupies 100-500 square feet and accommodates two-four people.

Most examination rooms (95 percent) are equipped with binocular microscopes; some have petrographic microscopes, testing chemicals, and so forth; and a few have photographic, thin section, and porosity-permeability testing equipment.

Considering building type, amenities, and examination space, we conclude that about 70 percent of the repositories in our sample set could be classified as generally adequate core and sample libraries, whereas 30 percent might best be described as storage sheds.

CHARACTERIZATION OF COLLECTIONS

The majority of samples in public repositories are from oil and gas tests (fig. 3). Research projects (both onshore and offshore) are a major source of material stored at Universities (49 percent) and Federal facilities (41 percent), but are a minor contributor (4 percent) to State and Municipal collections. The large amount of mining related core in the United States is in general not finding its way into public repositories.

The typical repository maintains core from 50-500 wells/holes (fig. 8), but has a limited collection of core chips (fig. 9). Core chips apparently are not a common or preferred sample-preservation technique. Most well-cutting collections of significant size are housed in State and Municipal facilities (fig. 10). The questionnaire-response rate associated with figures 8, 9, and 10 suggests that about one-fourth of the repositories of our sample set cannot estimate the size of their own collection.

The geographic extent of most core and sample collections is limited, with 61 percent representing only one state (fig. 11). The parochial nature of the majority of repositories can be understood in terms of political jurisdictions of funding agencies, but is unfortunate from a user's viewpoint in that subsurface geology rarely correlates with political boundaries.

A number of repositories are systematically accumulating new material, but a sizeable fraction of collections (43 percent) are growing at fewer than 20 new locations per year and thus seem more or less static (fig. 12). Some 12 percent of repositories are accepting no new material (fig. 13), citing lack of space as the major reason.

It is difficult to judge whether the collection growth rates summarized by figure 12 are sufficient in a nationwide sense to provide effectual preservation of samples and core of fundamental scientific importance. Such material has been lost in the past (Lonsdale, 1953), and our subjective judgment is that the size, staff, and funding of the present network of United States core and sample repositories are not adequate to prevent continued losses.

CURATION PRACTICES

The usefulness of any collection depends on knowing what it contains. Eighty-six percent of repositories have their collections catalogued in some manner (fig. 14), and of those, 43 percent make their catalogue available for general distribution (fig. 15).

Policy concerning confidentiality of material varies with the category of administrating agency (fig. 16). Most State and Municipal repositories (88 percent) will keep samples confidential for a limited period of time, as opposed to only 21 percent of Federal and 32 percent of University repositories. Many State facilities are required by law to maintain confidentiality of core from recent oil and gas tests.

Much core and sample material is irreplaceable, yet repositories are funded to function as libraries and not museums. Reflecting this fact, the majority of repositories will loan material to those with legitimate geologic interests (fig. 17), and will allow sampling of material under strict supervision and guidelines (fig. 18). A variety of reference materials that complement well samples are maintained at many facilities. For example, 81 percent of all repositories have well-log data, 53 percent have core analyses, and 33 percent have thin sections and core photographs.

Discarding unique material, either due to mishap or space/funding limitations, is acknowledged by 15 percent of respondents (fig. 19). This percentage is likely a minimum in view of the probable reluctance of curators to report such activities.

STAFFING, FUNDING, AND USAGE

Slightly more than one-half of all repositories have no full-time employees (fig. 20); another 27 percent have one full-time staff member, and

20 percent have two or more full-time employees. The distributions shown in figure 20 vary considerably by administrative category, but for many repositories, inadequate staffing sharply limits the services provided.

The principal source of repository funding is the administrating agency (fig. 21). University facilities generate significant funding from contracts, grants, and donations. Overall income from user fees is negligible (fig. 21).

Figures 22 and 23 summarize questionnaire responses on the "adequacy" and "reliability" of funding, and give a subjective picture of the general economic health of the United States network of core and sample repositories. The picture is rather unpromising, with core and sample libraries often viewed with apathy by administrating agencies. Fully 61 percent of facilities report marginally adequate or inadequate funding levels, with 89 percent of University repositories in these categories (fig. 22). Federal facilities as a group are better financed, in part because a number of Federal collections are directly tied to major construction projects. Thirty-four percent of repositories characterize the reliability of their funding as uncertain or very tenuous (fig. 23). For this group, long-range planning is impossible. About two-thirds of repositories report dependable or reasonably dependable funding, which, even if at an inadequate level, at least permits planning.

User fees are a possible supplementary funding source for hard-pressed repositories. Only 11 percent of repositories charge user fees (fig. 24), and for these, the user fees generate only a small part of their total budget. Significantly, 80 percent of the repositories charging user fees characterize their funding as marginally adequate or inadequate. These data indicate that user fees are an ineffective funding mechanism that does not solve chronic budget problems.

Levels of repository usage, measured as user-days per year, span several orders of magnitude (fig. 25). Our subjective observation is that the more adequate facilities tend to have the most usage. However, the cause and effect relationship between usage and type of collection, geographic location, and funding level is not clear. Usage by economic sector (fig. 26) strongly reflects the nature of the administrating agency, which in turn dictates the type of collection housed by a facility.

CONCLUSIONS

Repositories appear to fall into three basic categories. Approximately 50 percent of repositories sampled have no full-time staff, store a small number of samples, occupy a primitive building, are seldom utilized, and can be classified as little more than sample-storage sheds. About 30 percent of repositories sampled have a full-time staff member, occupy a decent building, have moderate usage, and can be classified as small but adequate core and sample libraries. Fewer than 20 percent of repositories sampled have two or more full-time staff members, store

large amounts of sample material, occupy a modern well-equipped building, have considerable usage, and can be classified as large full-time operations.

The long-range plans of most of the repositories surveyed were modest in scope, perhaps anticipating that the near and intermediate future might be a time of increasing pressure on Federal and State budgets, and of economic trauma in the energy and mineral industries. Such conditions would not bode well for core and sample repositories as a group, and it seems doubtful that the overall situation as depicted by the statistics of this report will improve much in the near term.

REFERENCES CITED

Lonsdale, J.T., 1953, On the preservation of well samples and cores: Shale Shaker, v. 3, no. 7, p. 4

Petroleum Independent, 1984, The oil & gas producing industry in your state, v. 54, no. 5, pp. 18-99.

Schmoker, J.W., Michalski, T.C. and Worl, P.B., 1984a, Addresses, telephone numbers, and brief descriptions of publicly available, nonprofit sample and core repositories of the United States: U.S. Geological Survey Open-File Report 84-333, 13 p.

Schmoker, J.W., Michalski, T.C., and Worl, P.B., 1984b, Nonprofit sample and core repositories open to the public in the United States: U.S. Geological Survey Circular 942, 102 p.

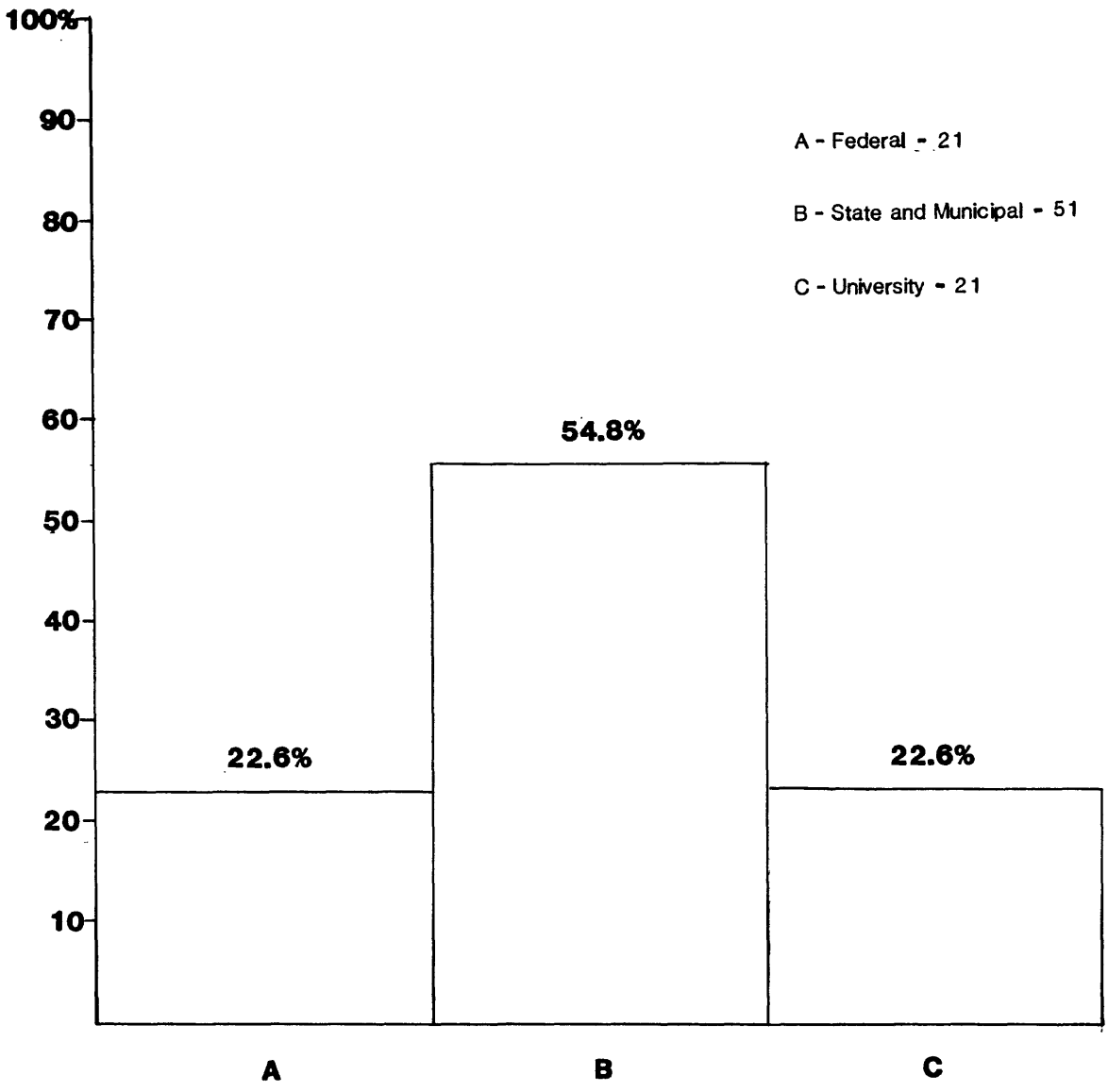


Figure 1. Type Of Administrating Agency

Figure 2. Location Of Public Well-Sample Repositories

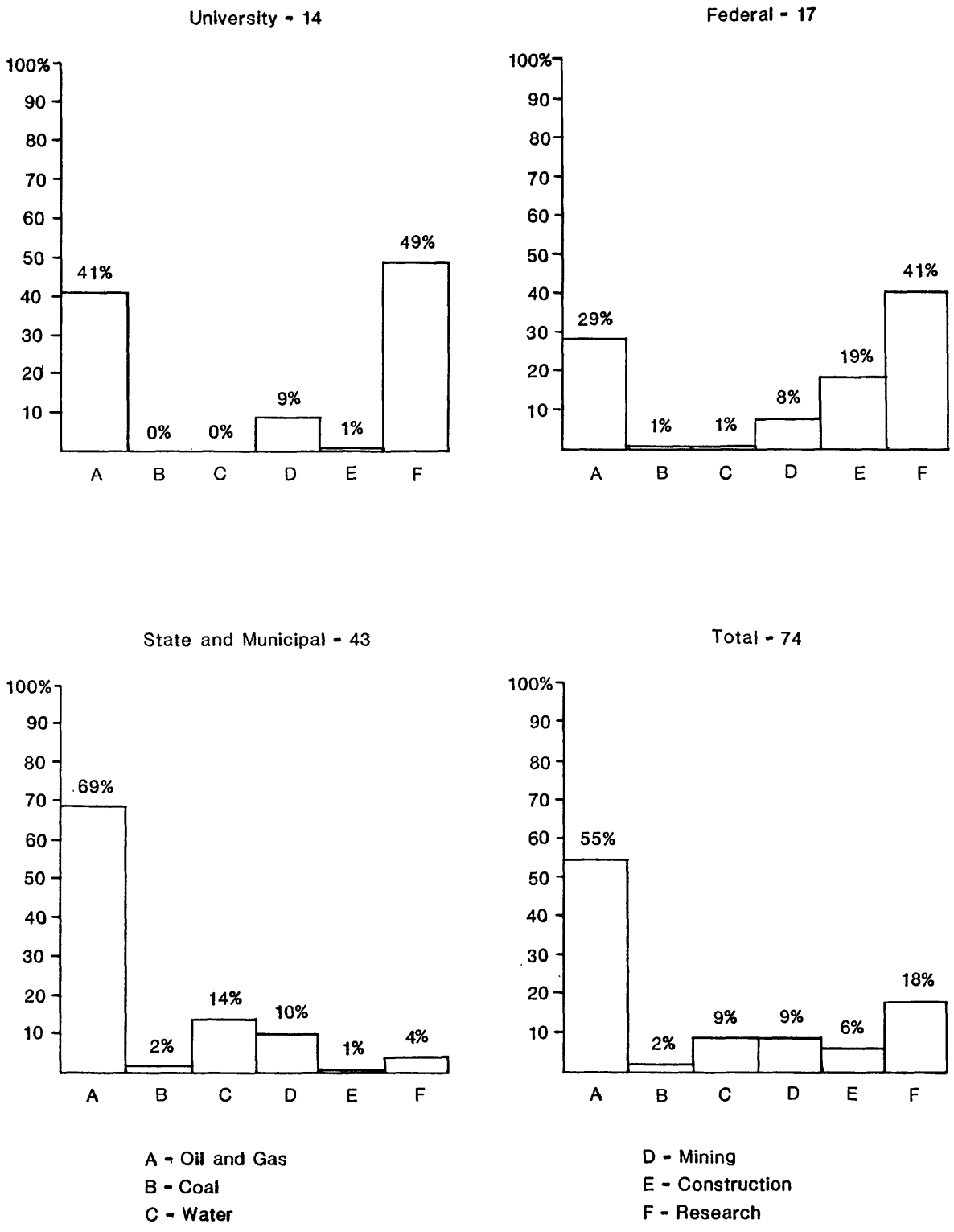


Figure 3. Type of Wells/Holes From Which Samples Originated

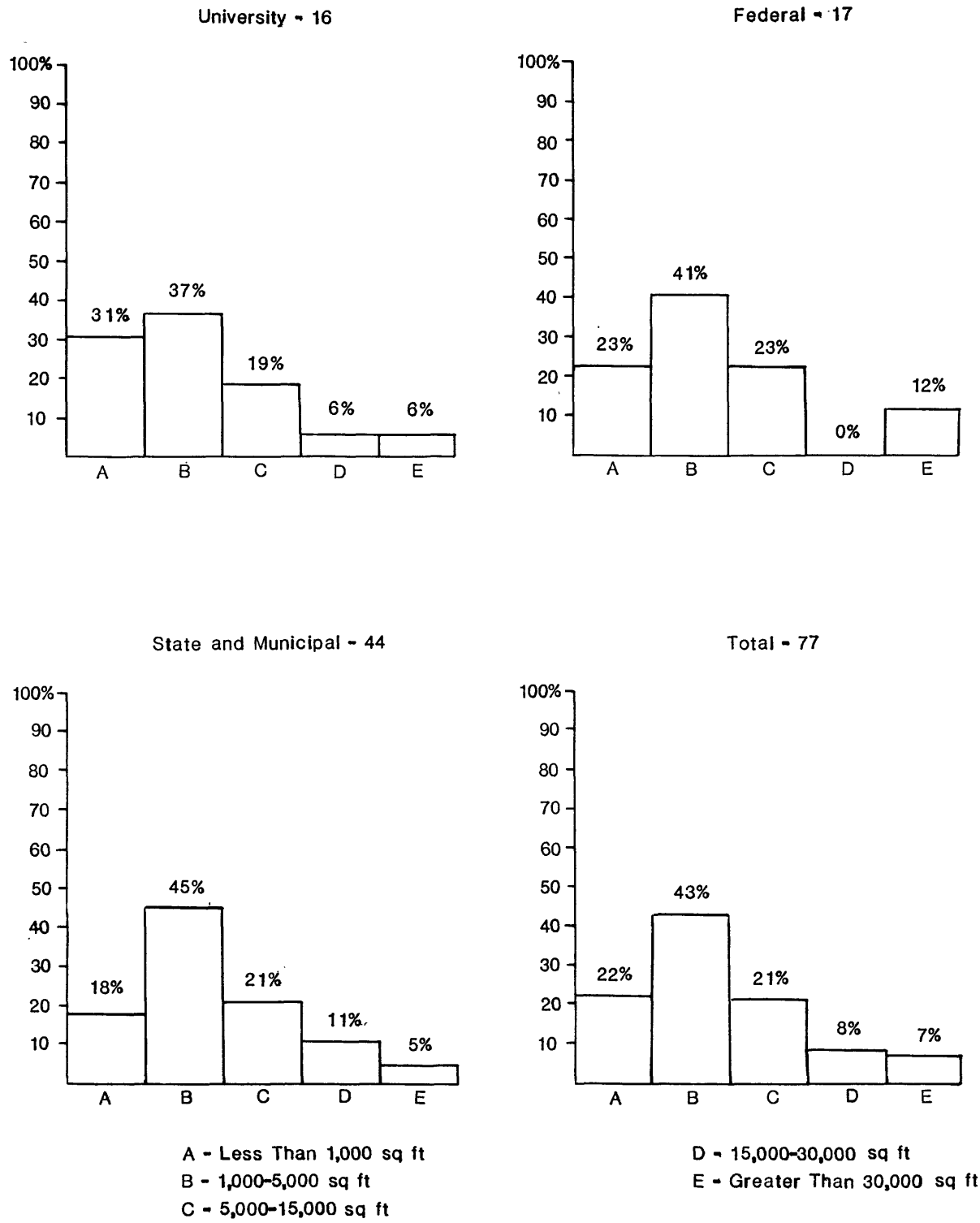


Figure 4. Total Floor Space

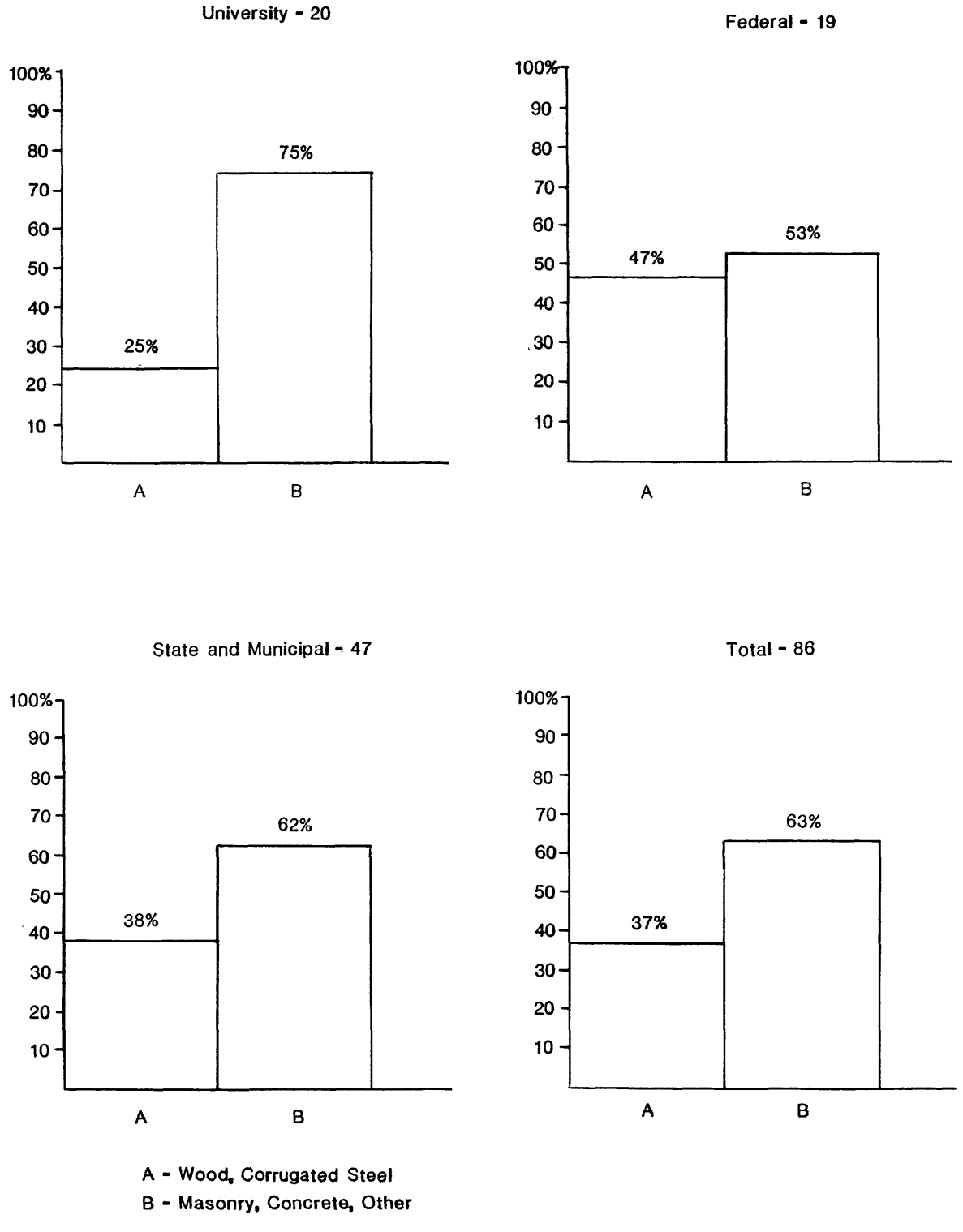


Figure 5. Building Type

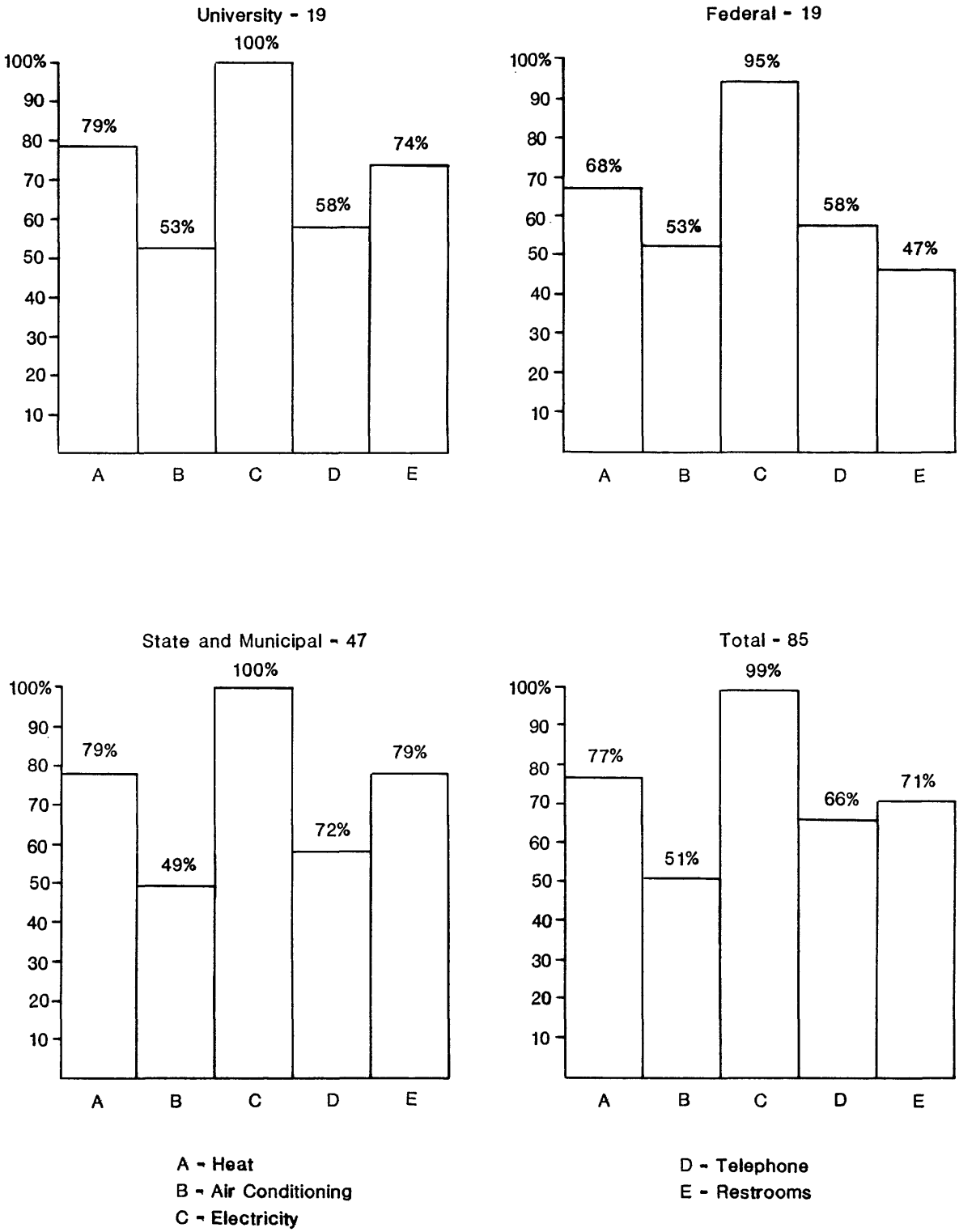


Figure 6. Amenities

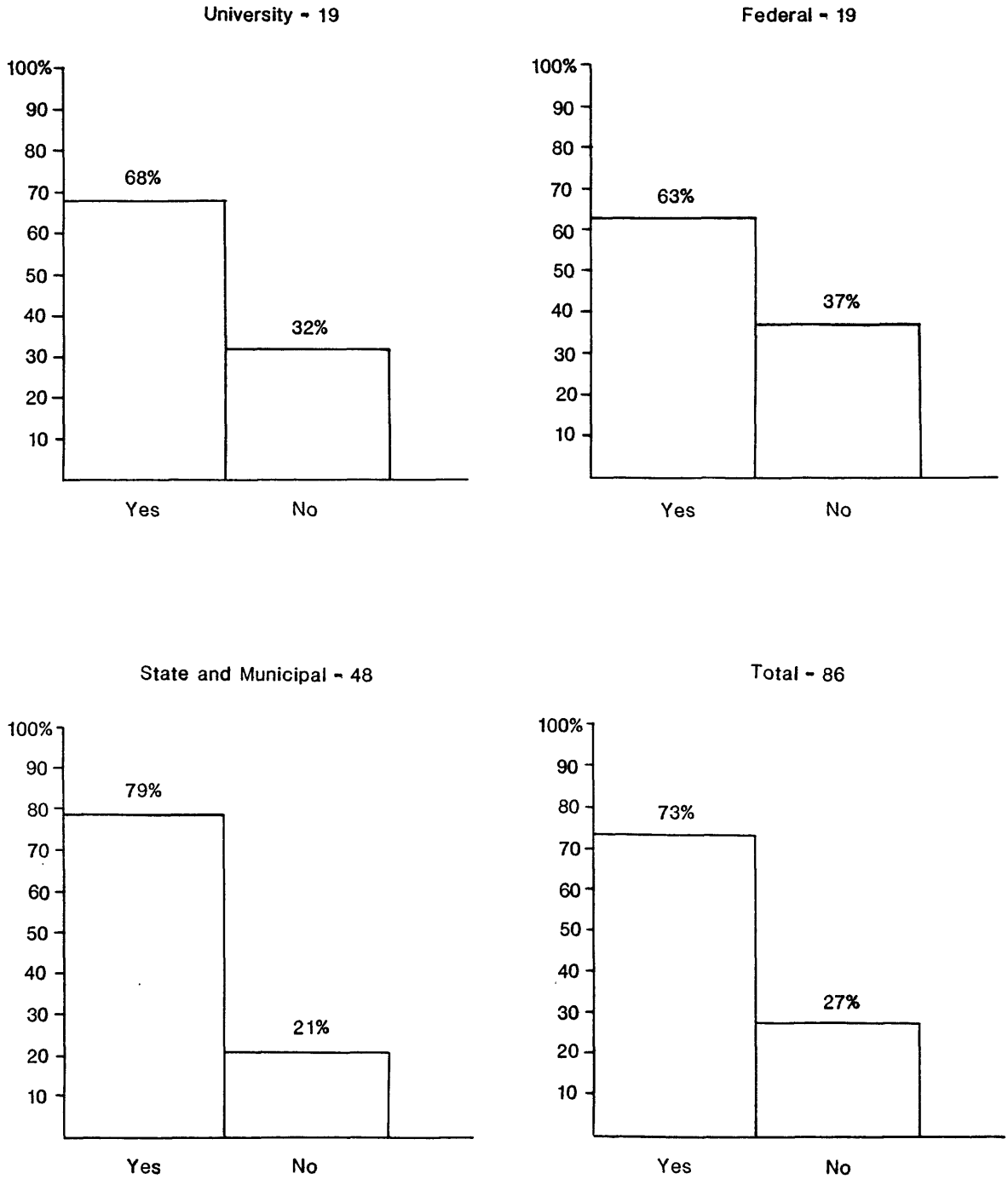


Figure 7. Response To The Question, "Is There An Examination Room?"

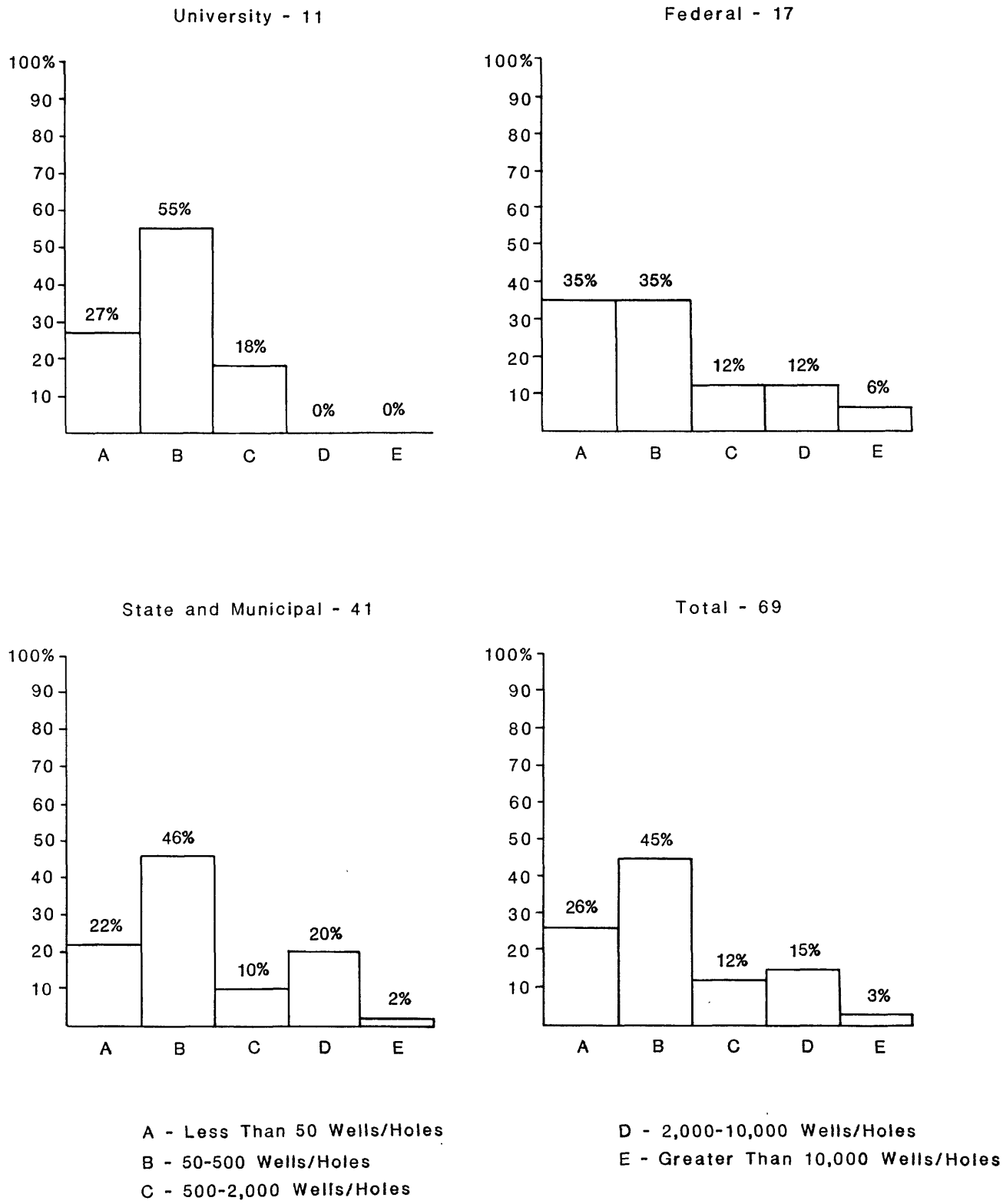


Figure 8. Number of Wells/Holes Represented By Core

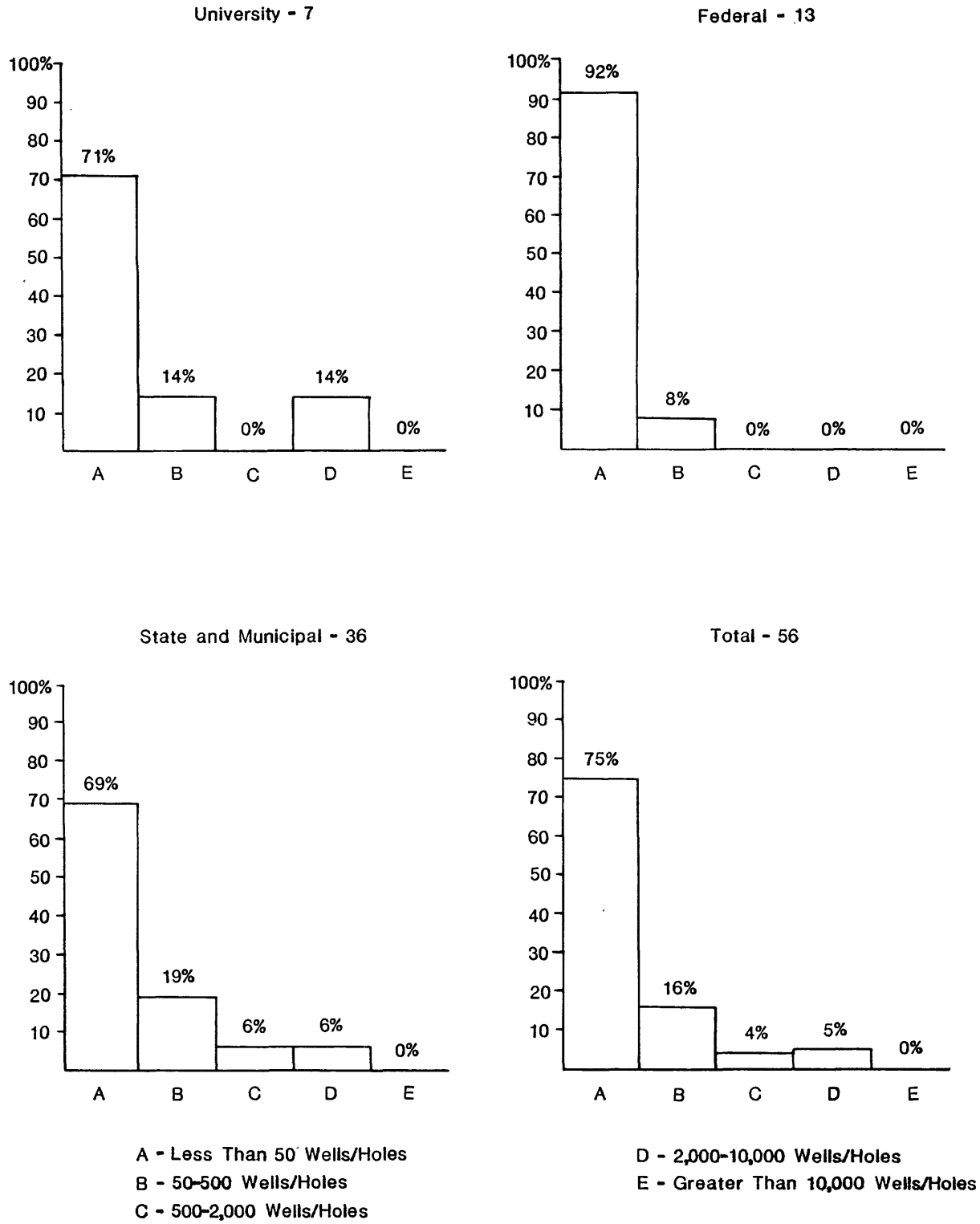
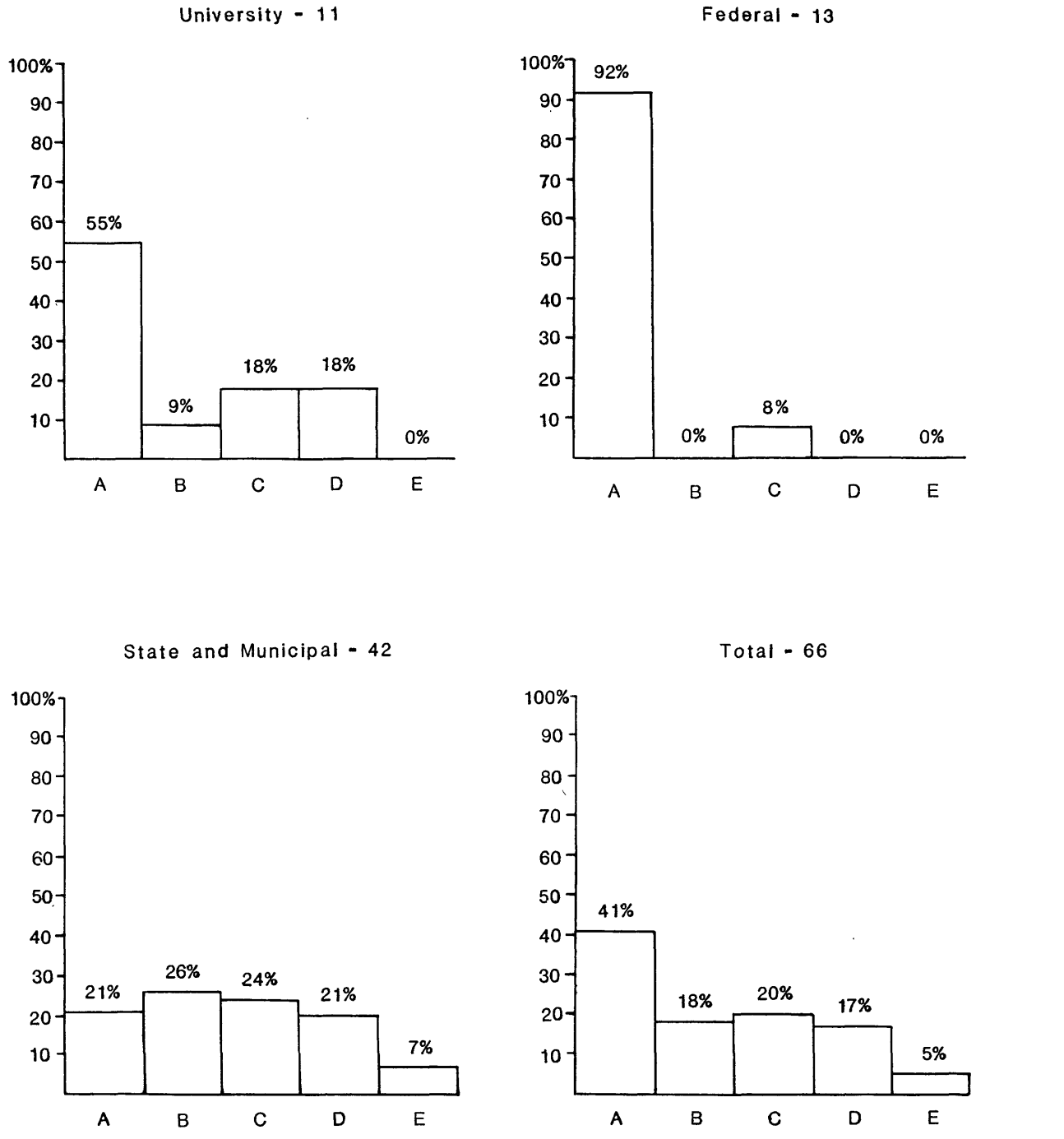


Figure 9. Number of Wells/Holes Represented By Core Chips



A - Less Than 500 Wells/Holes
B - 500-2,000 Wells/Holes
C - 2,000-10,000 Wells/Holes
D - 10,000-50,000 Wells/Holes
E - Greater Than 50,000 Wells/Holes

Figure 10. Number of Wells/Holes Represented By Cuttings

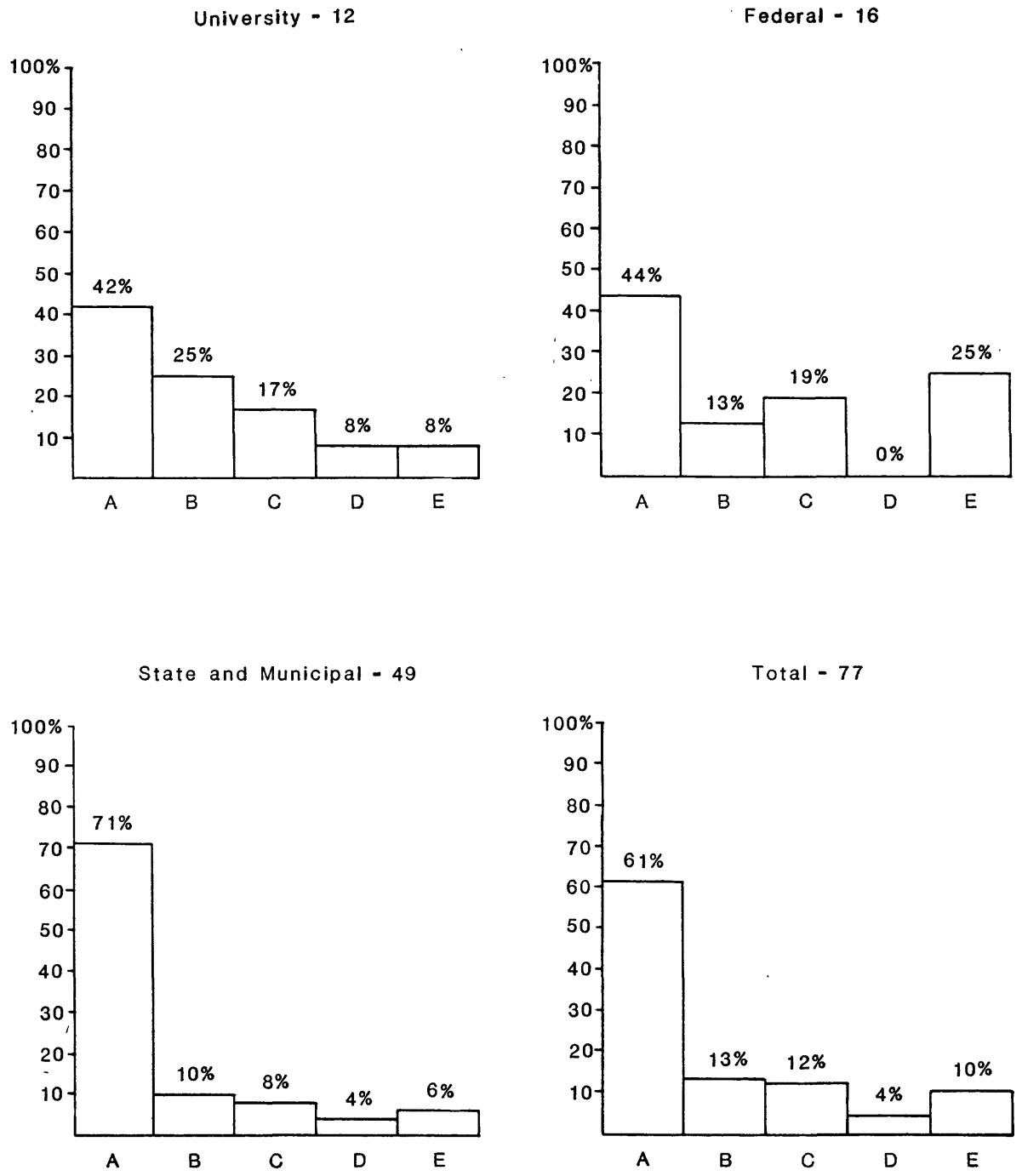
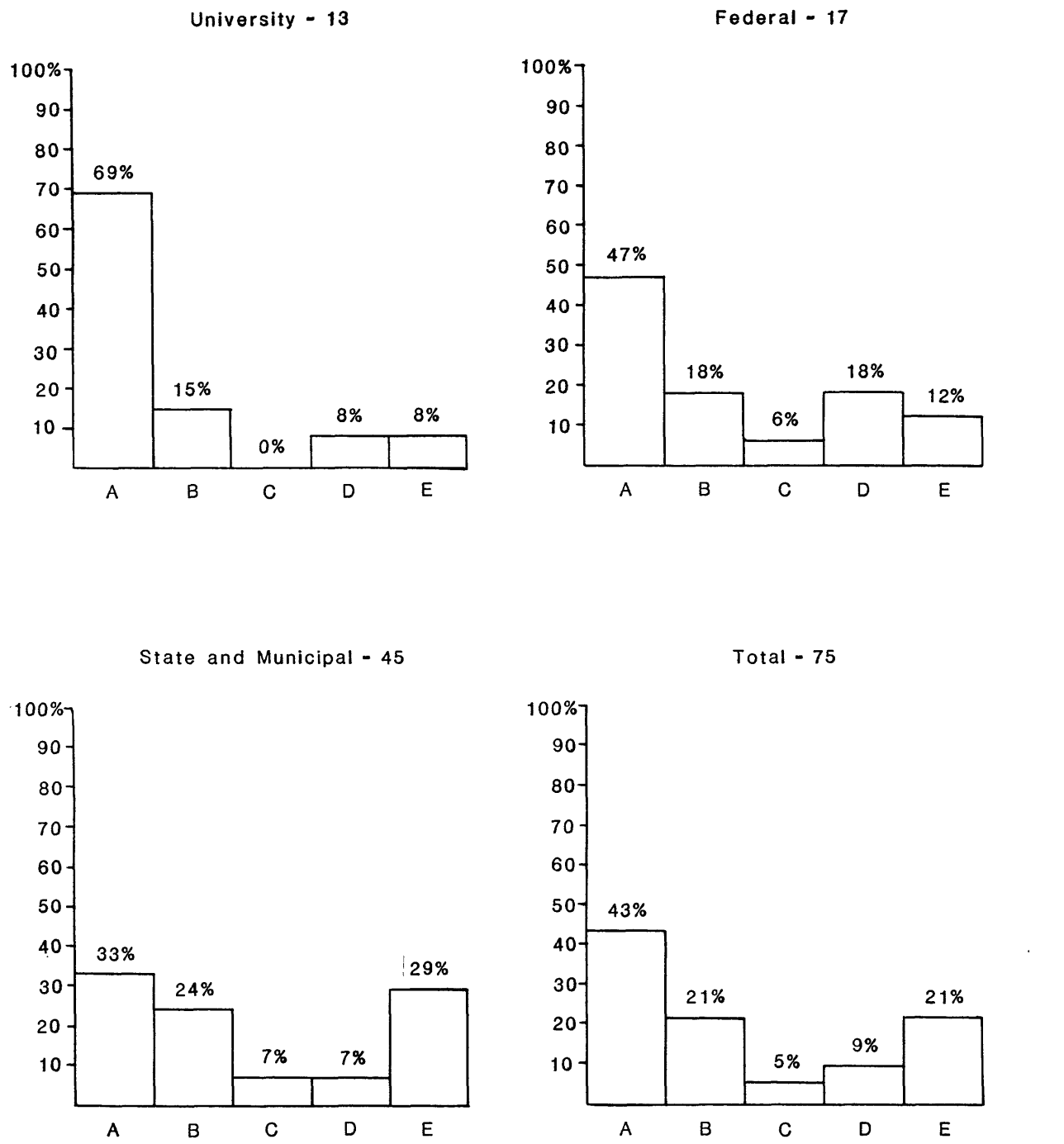


Figure 11. Number Of States Represented In A Repository's Collection



A - 0-20 Wells/Holes Per Year
B - 21-50 Wells/Holes Per Year
C - 51-100 Wells/Holes Per Year
D - 101-200 Wells/Holes Per Year
E - Greater Than 200 Wells/Holes Per Year

Figure 12. Collection Growth Rate

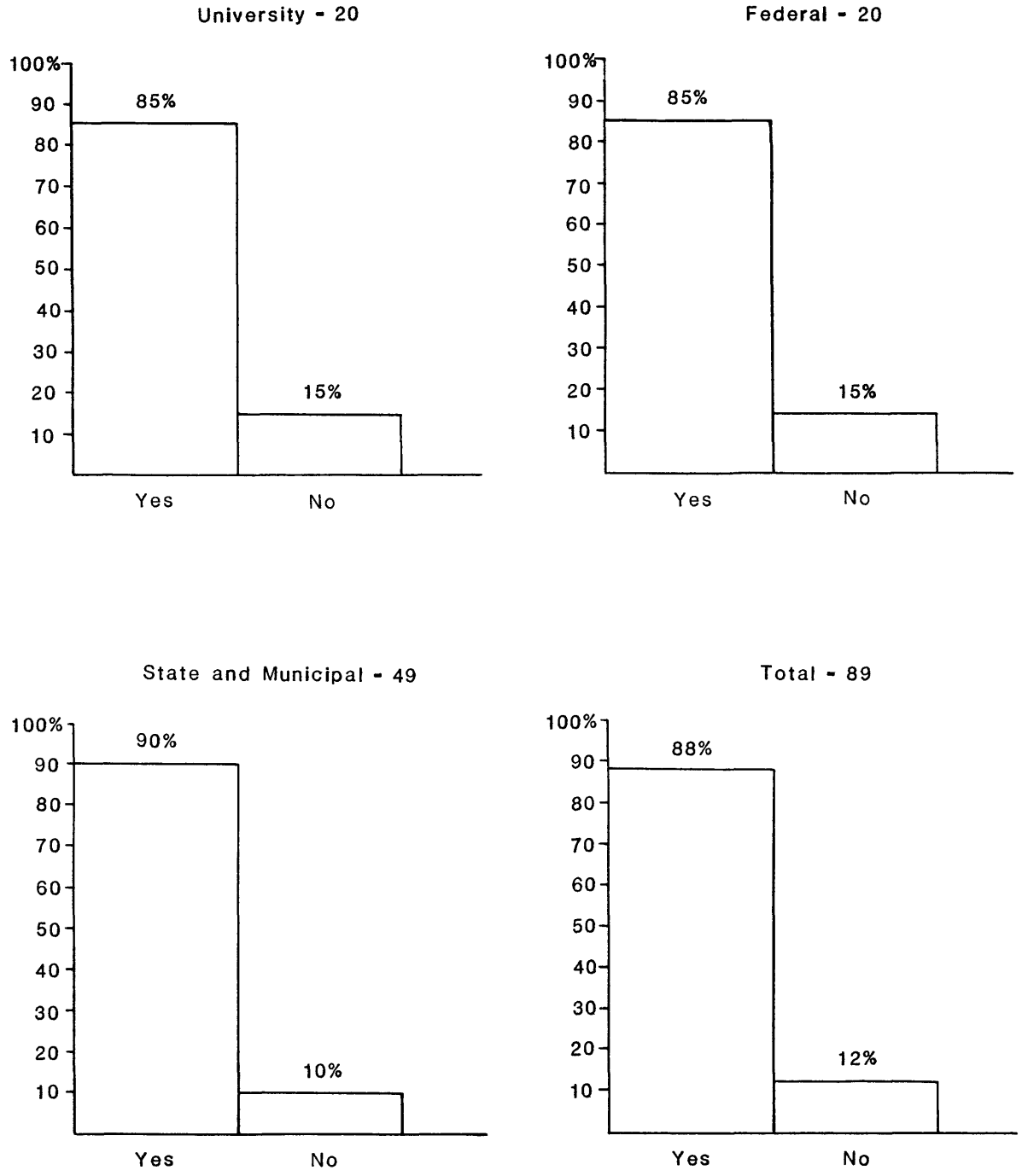


Figure 13. Response To The Question, "Is New Material Being Accepted?"

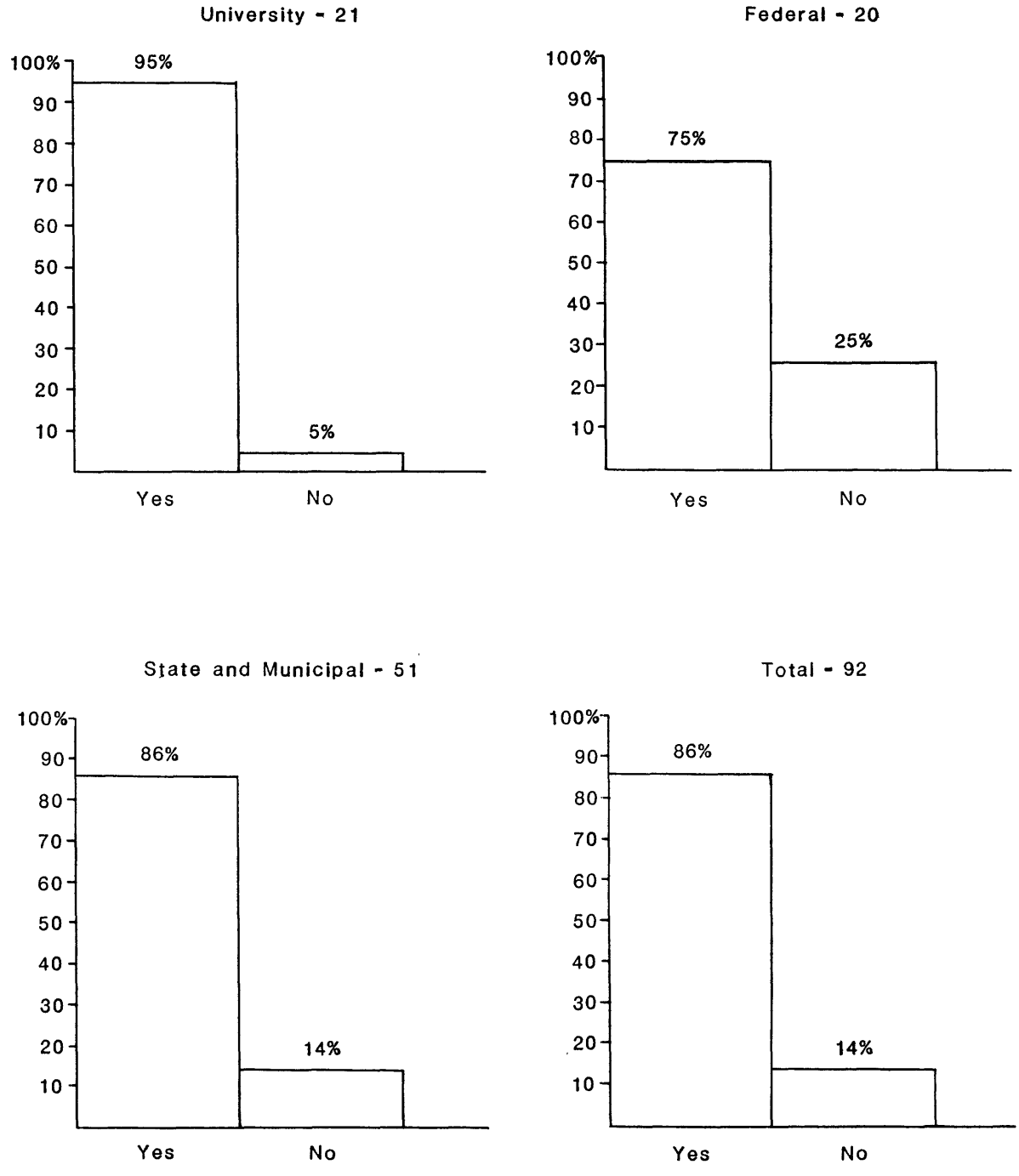


Figure 14. Response To The Question, "Is The Collection Catalogued?"

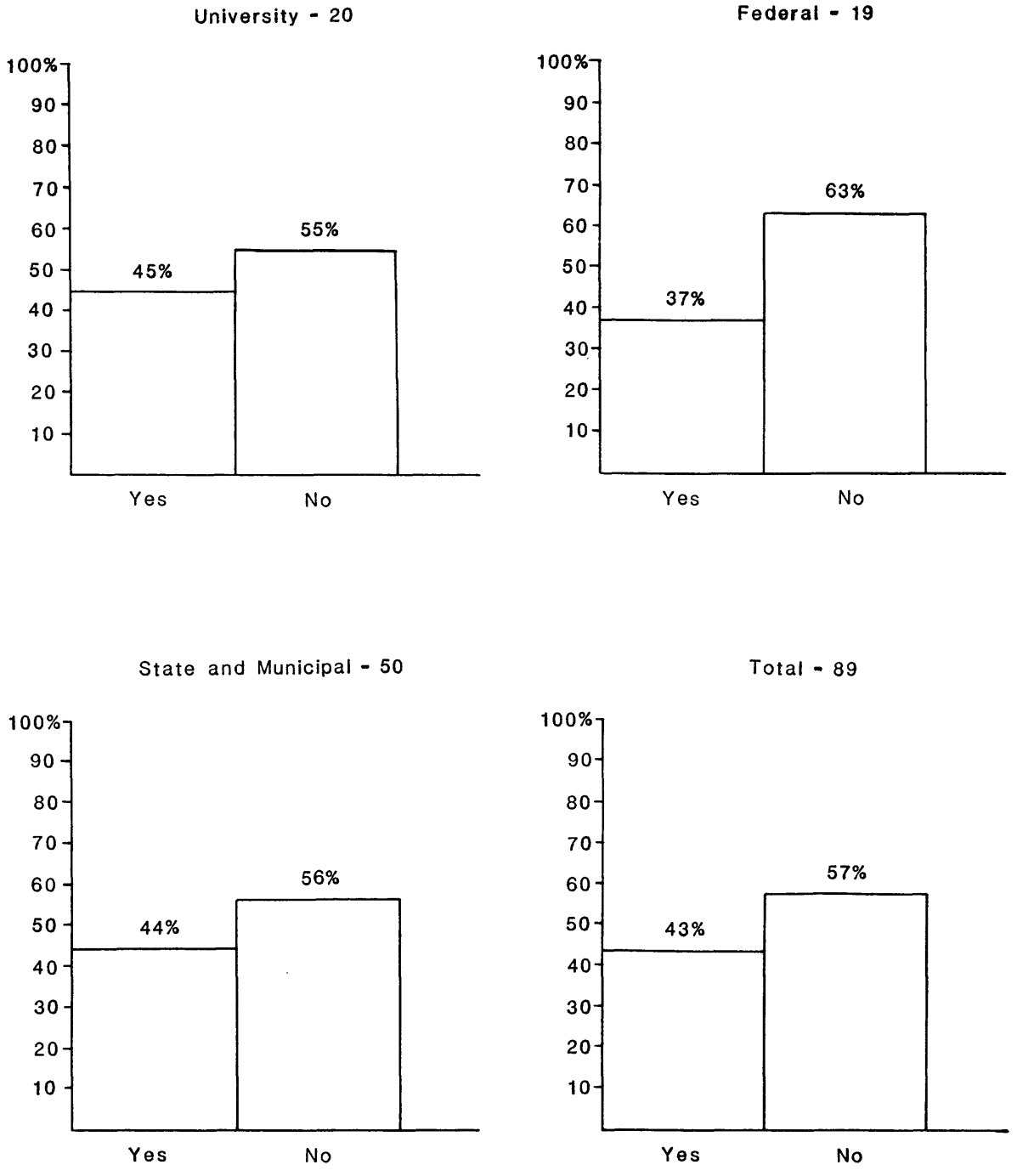


Figure 15. Response To The Question, "Is A Catalogue Available For Distribution?"

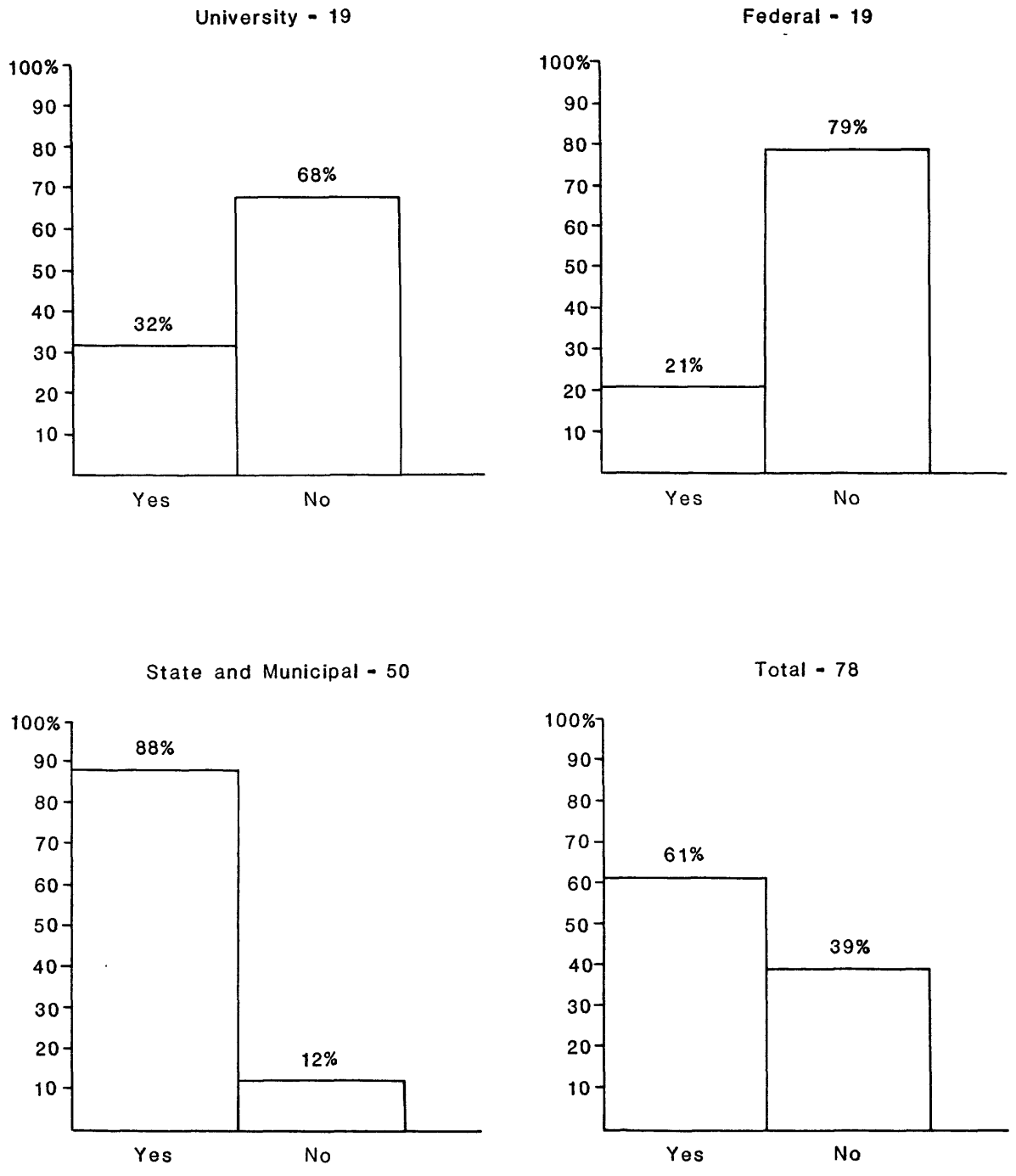


Figure 16. Response To The Question, "May Material Be Kept Confidential?"

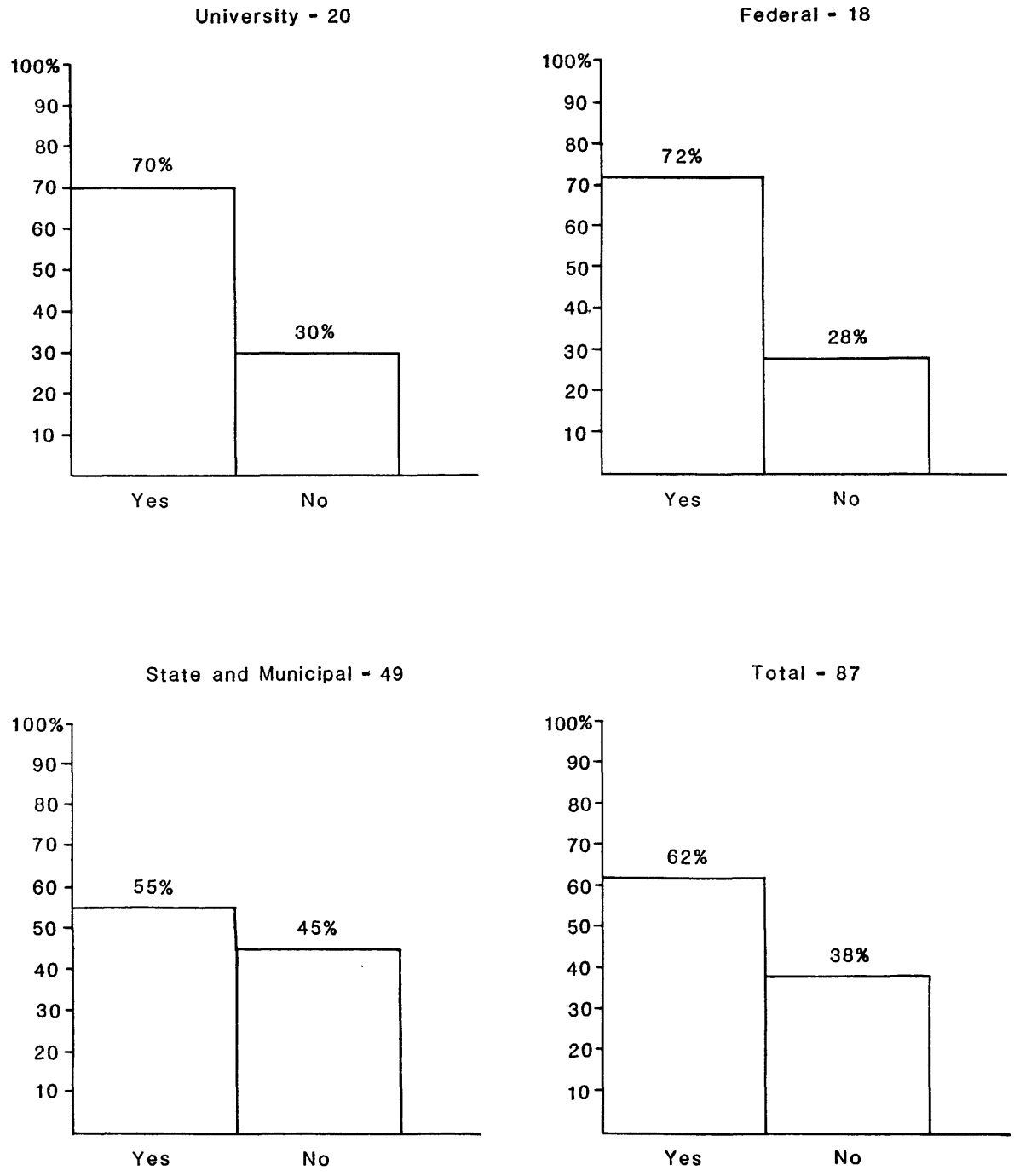


Figure 17. Response To The Question, "Is Material Loaned?"

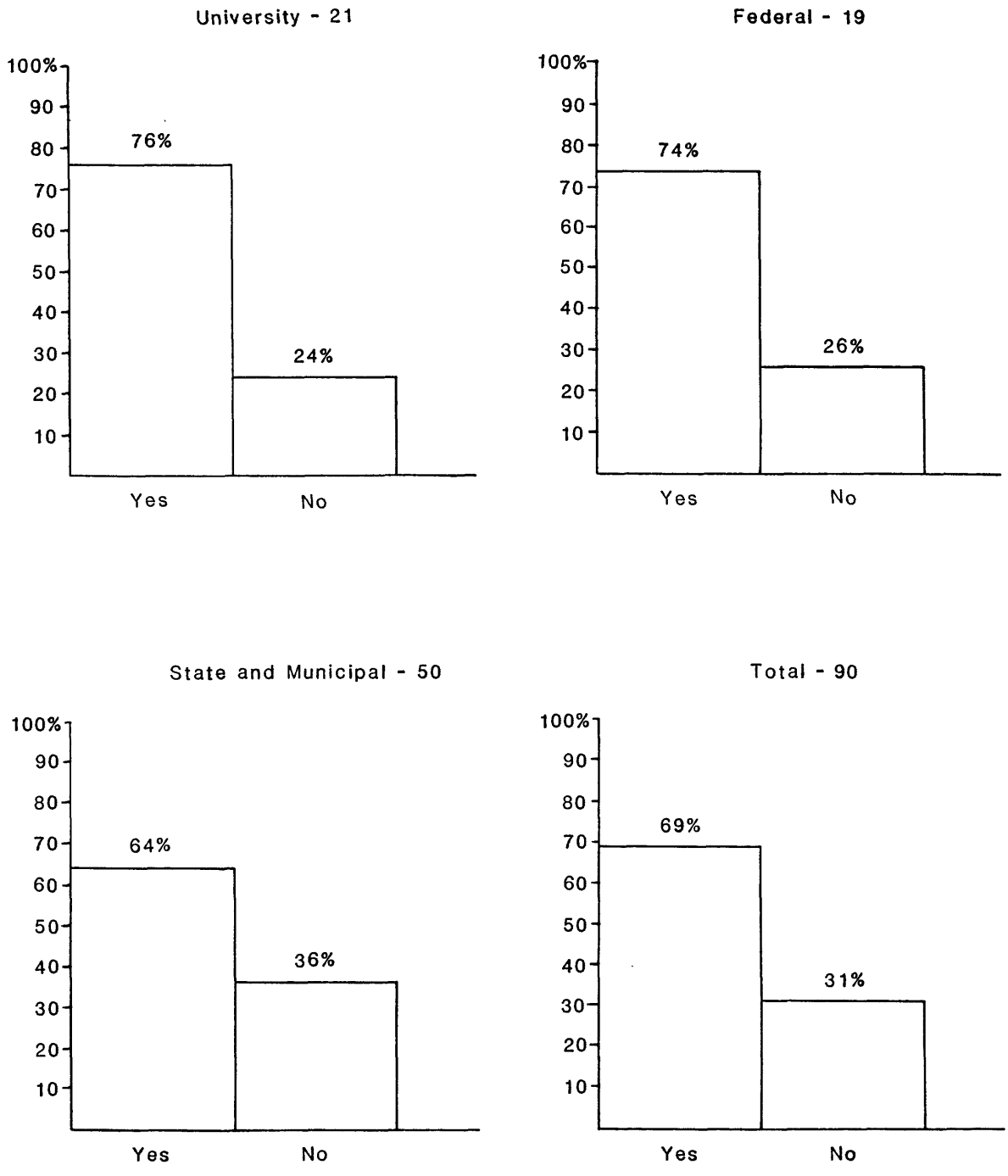


Figure 18. Response To The Question, "Is Sampling Of Material Allowed?"

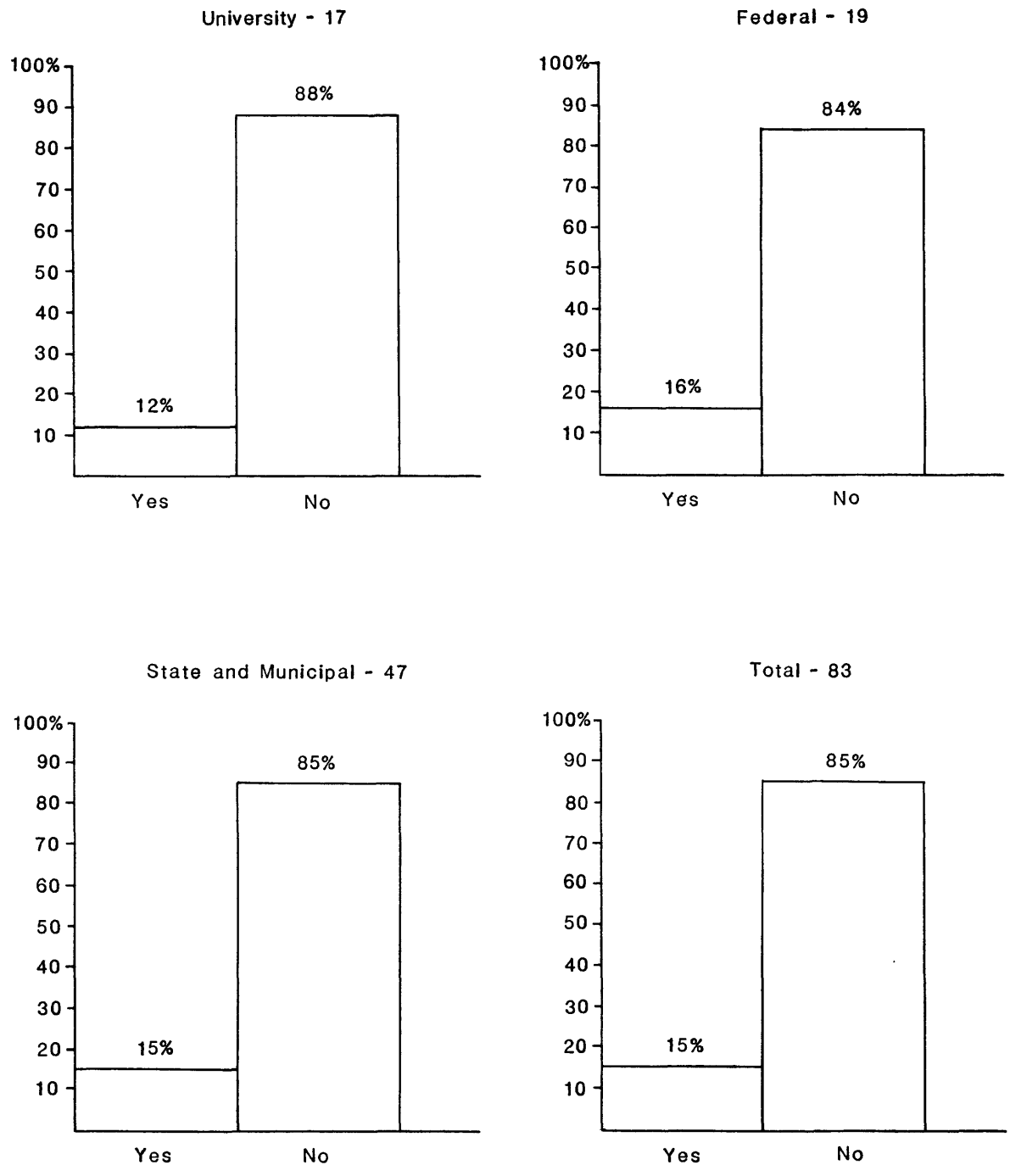
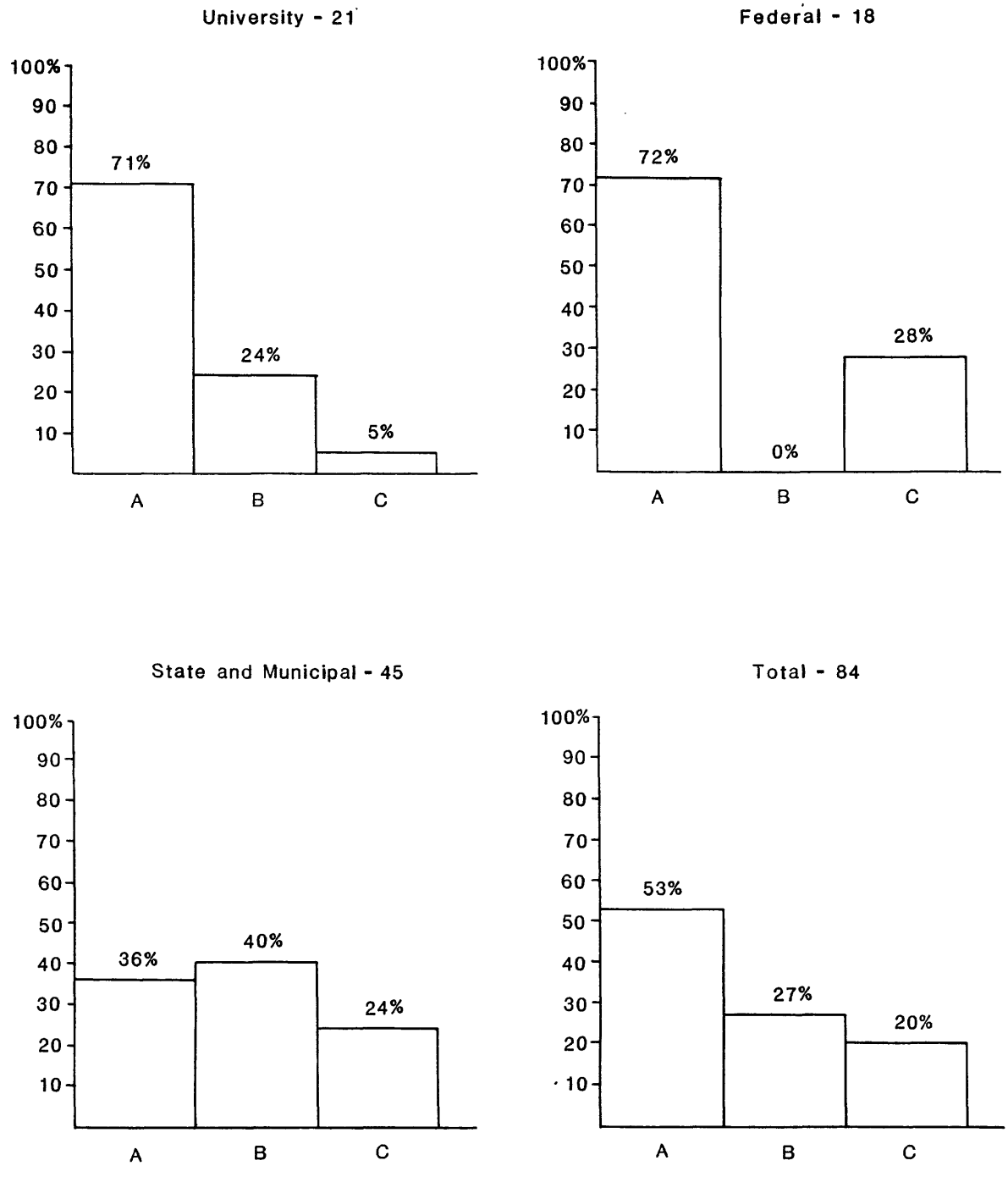


Figure 19. Response To The Question, "Has Unique Material Been Discarded?"

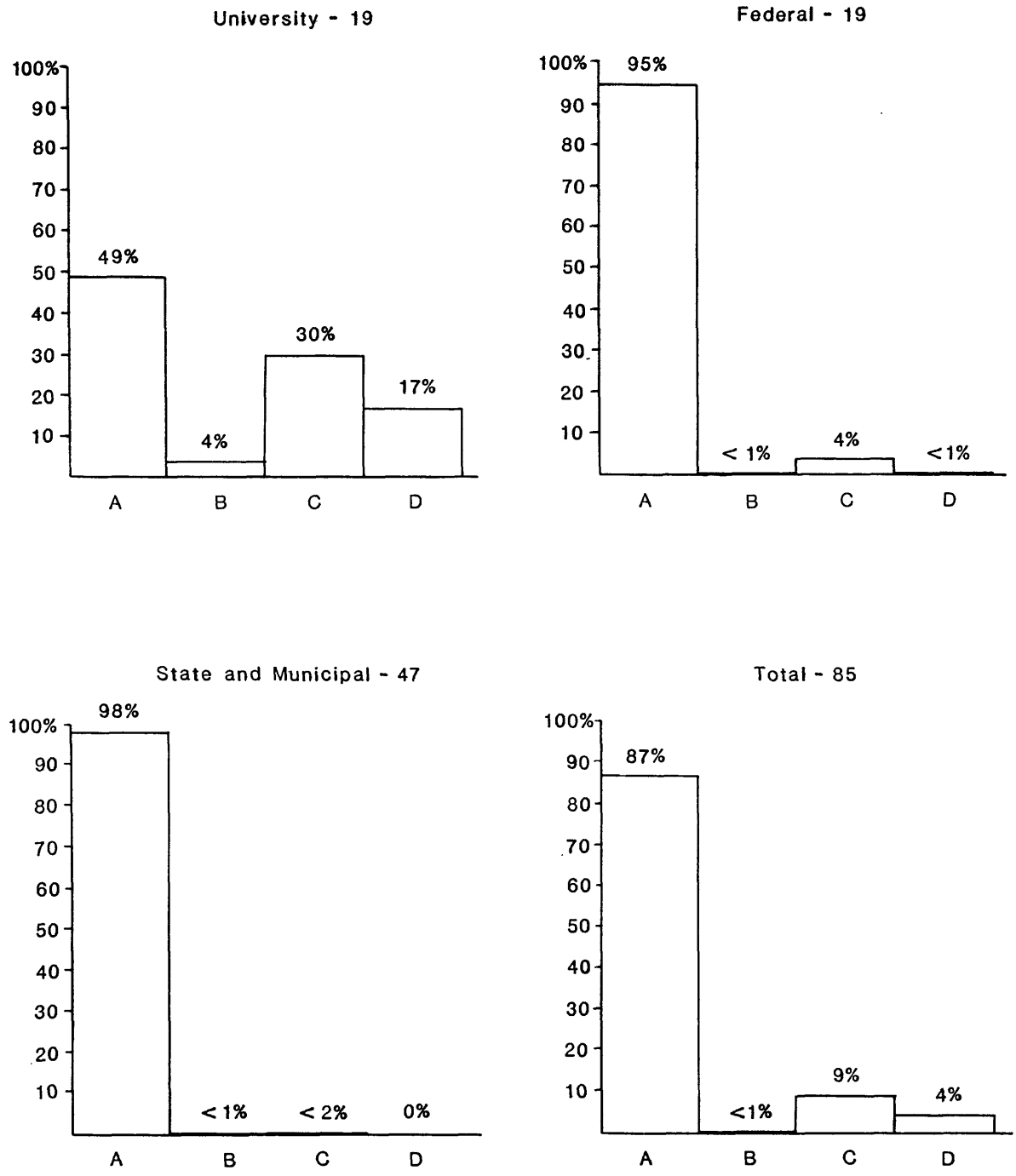


A - Zero Employees

B - 1 Employee

C - More Than 1 Employee

Figure 20. Number Of Full-Time Staff



A - Administrating Agency
B - User Fees
C - Grants, Gifts
D - Other

Figure 21. Source Of Funding

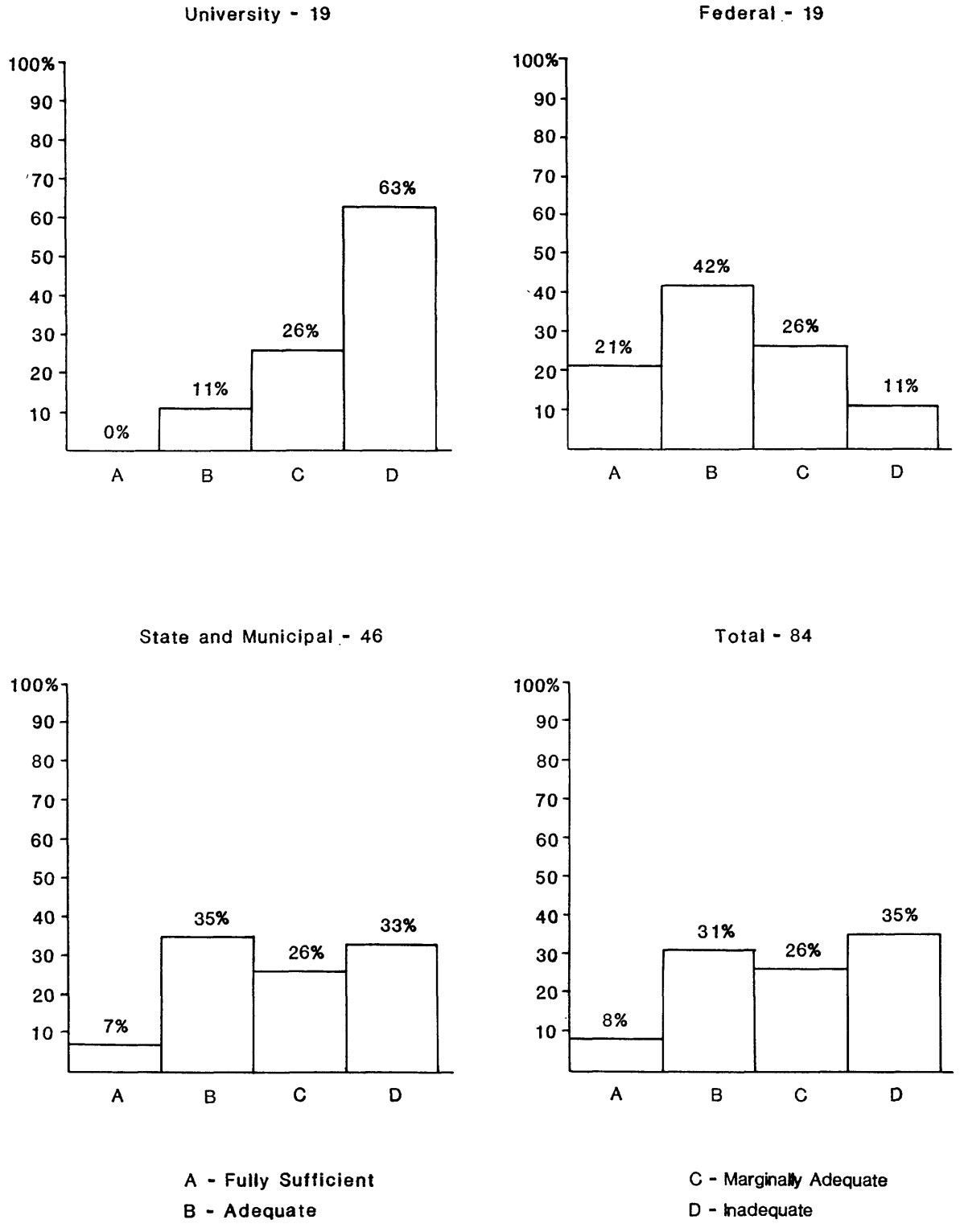


Figure 22. Adequacy Of Funding

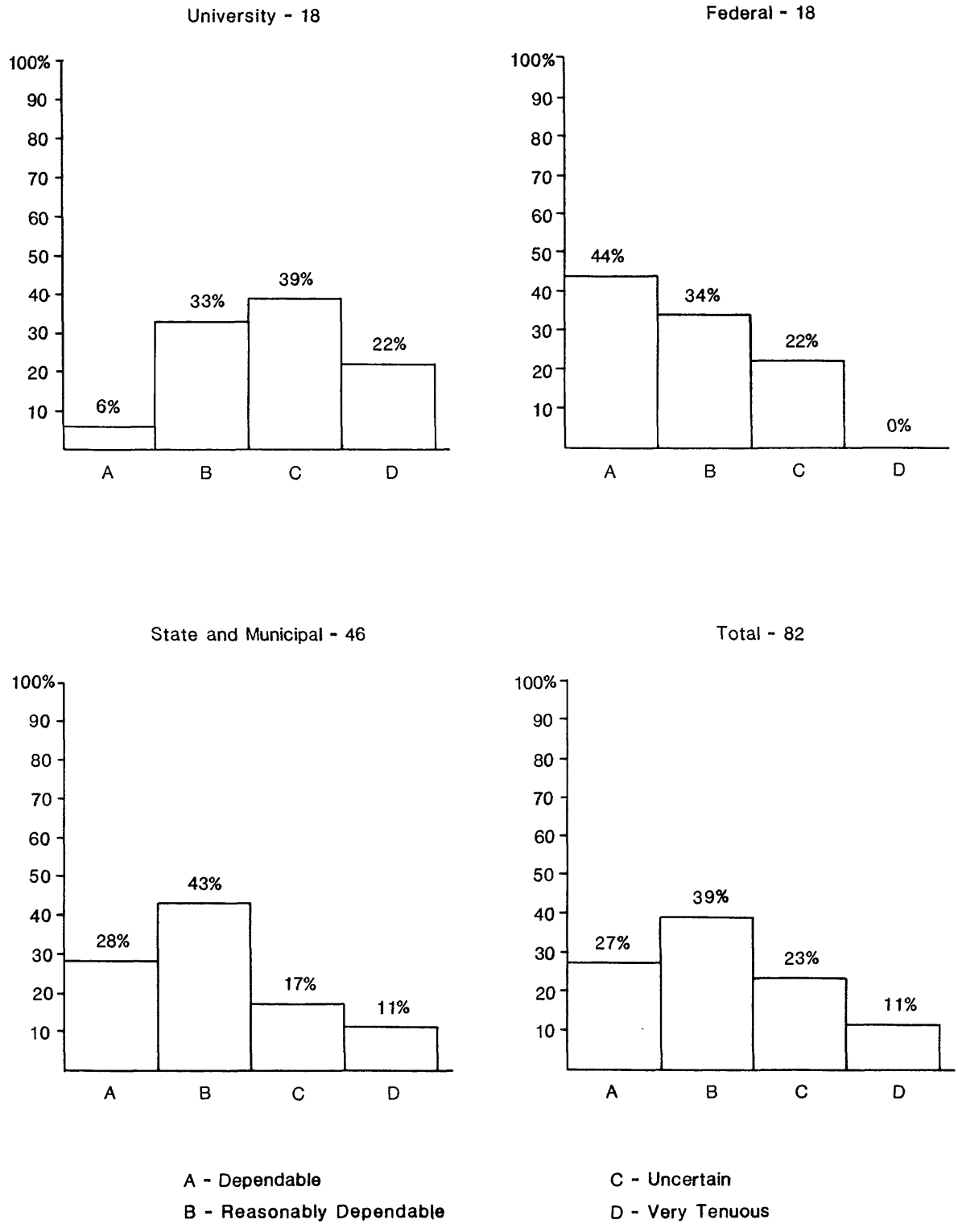


Figure 23. Reliabiiity Of Funding

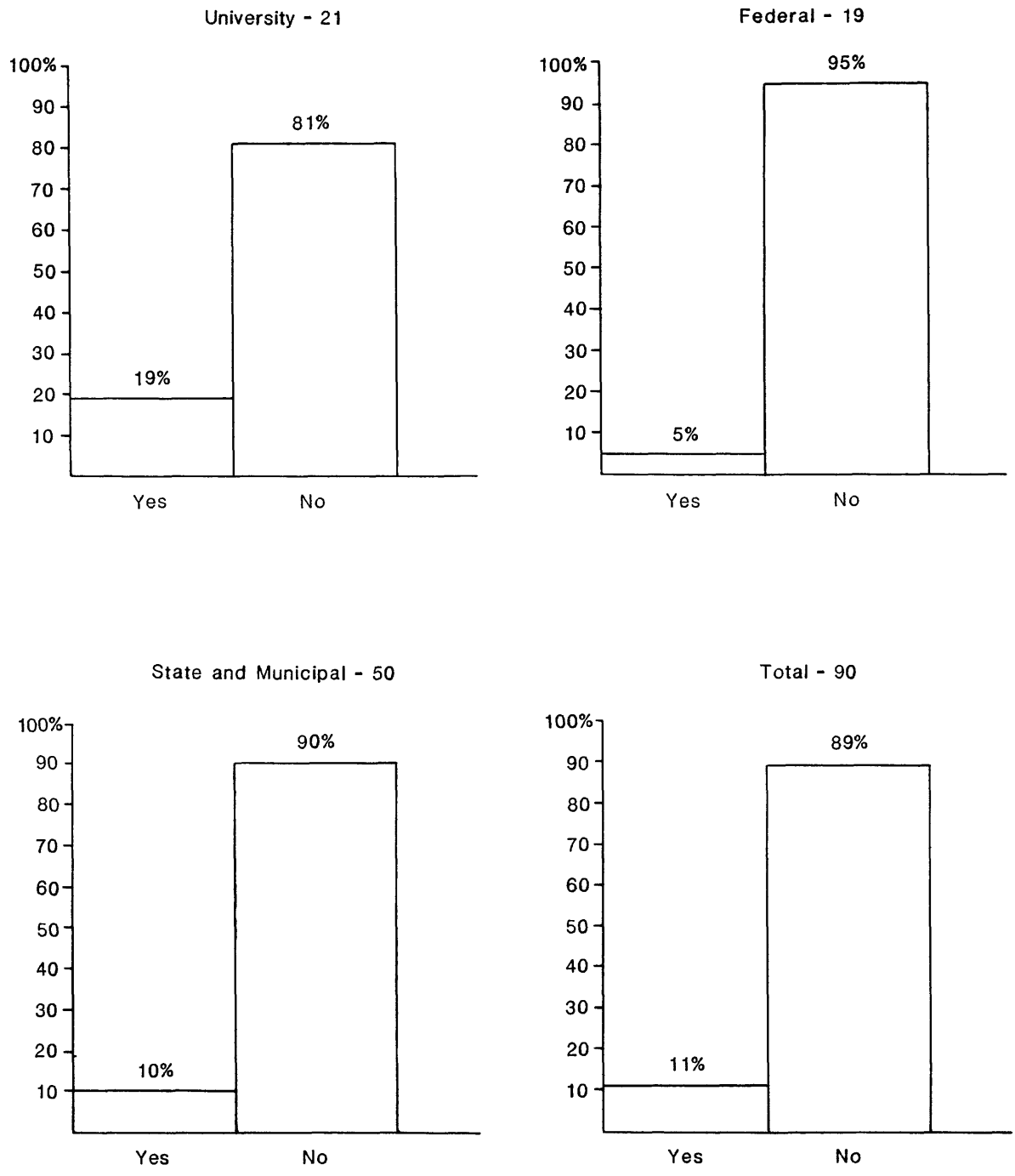


Figure 24. Response To The Question, "Are User Fees Charged?"

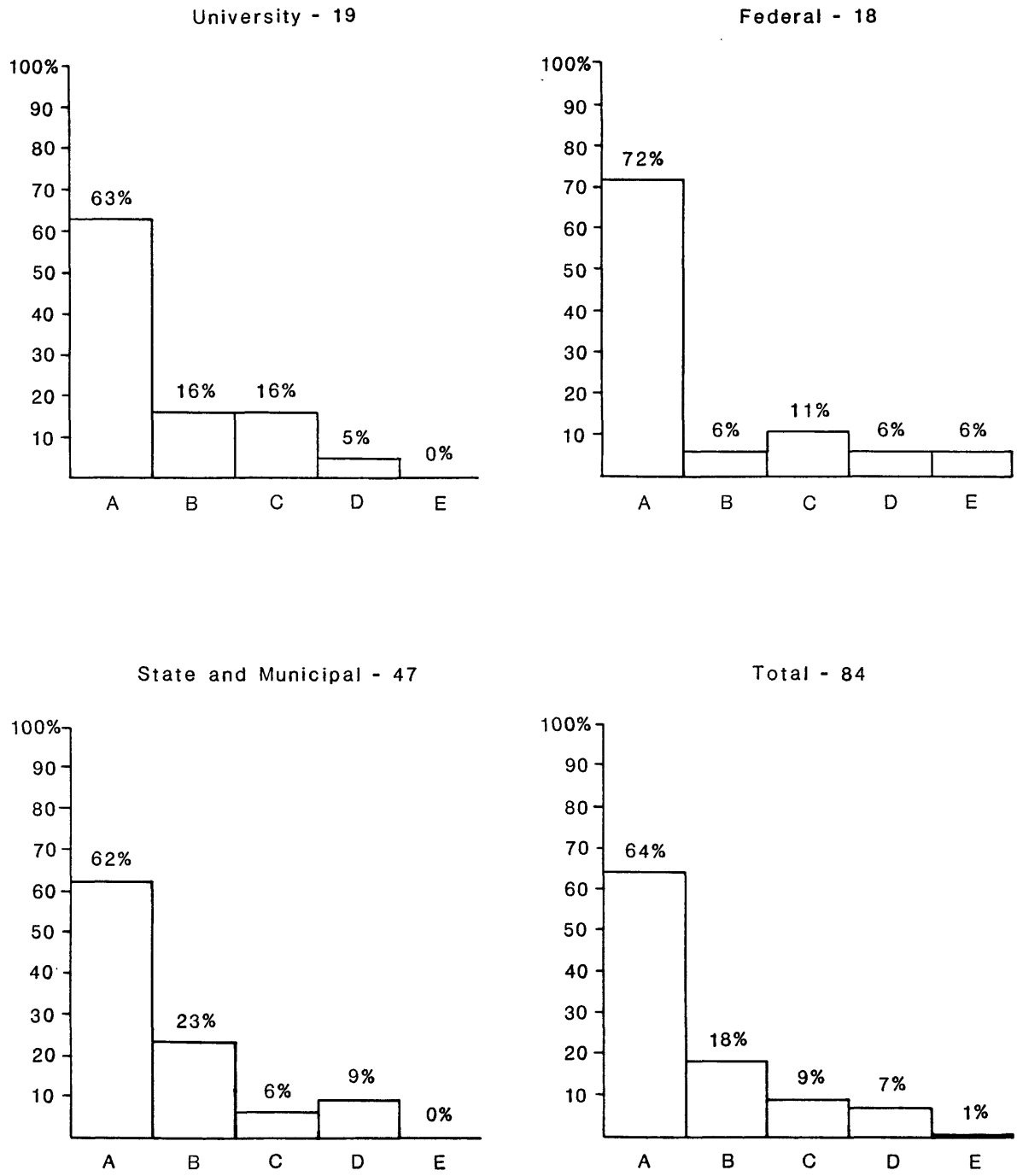


Figure 25. Number Of User Days Per Year

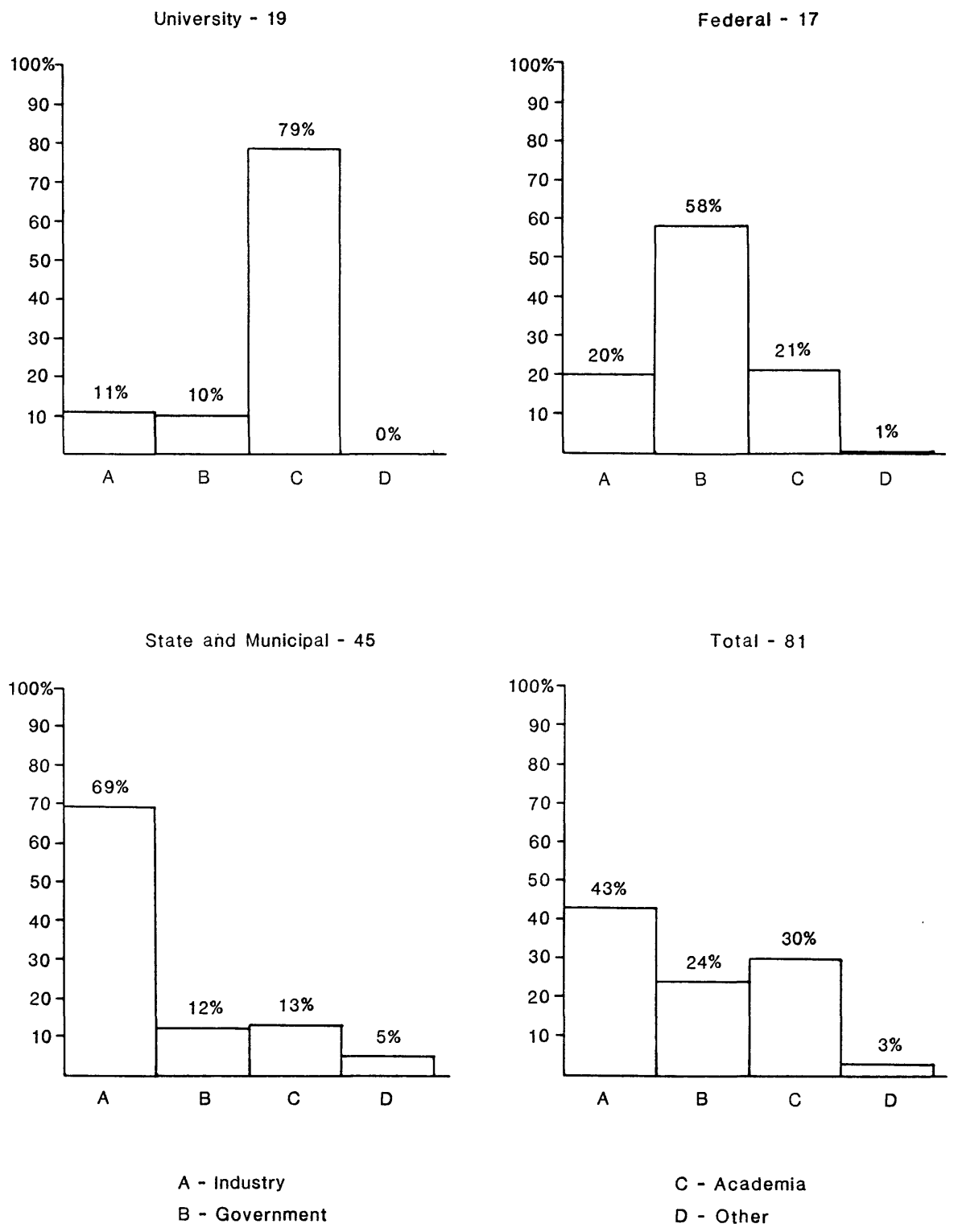


Figure 26. Usage By Economic Sector

APPENDIX I

Questionnaire Sent To Sample
And Core Repositories

Form prepared by:

Repository name:

Mailing address:

Telephone number: ____-_____

General location, street address (if different from above):

Is repository a non-profit, publicly-available facility? ___ Yes ___ No
If no, please stop and return questionnaire.

I. Policies of Use

1. Open to public: Times:_____ Days:_____

2. Do you have user fees? ____ Yes ____ No

3. Is advance notice or a reservation necessary for use? ____ Yes ____ No

4. Do you allow sampling of material? ____ Yes ____ No

5. Is material loaned? ____ Yes ____ No

6. Are user services provided, such as:

   a. Slabbing/trimming? ____ Yes ____ No

   b. Retrieving and putting back material? ____ Yes ____ No

   c. Other?_____

II. Collection Description

7. Location of wells (holes) by state:

	State	% of total wells (holes)
a.	_____	_____%
b.	_____	_____%
c.	_____	_____%
d.	_____	_____%
e.	_____	_____%
		100%

8. Wells (holes) and footage (thousands of ft) represented by core:

a. Number:

<50	50-500	500-2,000	2,000-10,000	>10,000
☐	☐	☐	☐	☐

b. Footage:

<2	2-20	20-100	100-500	>500
☐	☐	☐	☐	☐

c. Whole core (% of wells/holes): _____%

d. Slabbed core (% of wells/holes): _____%

9. Wells (holes) and footage (thousands of ft) represented by core chips:

a. Number:

<50	50-500	500-2,000	2,000-10,000	>10,000
☐	☐	☐	☐	☐

b. Footage:

<2	2-20	20-100	100-500	>500
☐	☐	☐	☐	☐

10. Wells (holes) and footage (thousands of ft) represented by cuttings:

a. Number:

<500	500-2,000	2,000-10,000	10,000-50,000	>50,000
☐	☐	☐	☐	☐

b. Footage:

<50	50-200	200-1,000	1,000-5,000	>5,000
☐	☐	☐	☐	☐

11. Purpose of wells (holes):

	% of total wells (holes)
a. Oil & gas	_____%
b. Coal	_____%
c. Water	_____%
d. Mining	_____%
e. Construction	_____%
f. Other (please describe)	_____%
	100%

12. Are cores photographed? ___ Yes ___ No

If yes, % of wells/holes: _____%

13. Do you have:

a. Logs? ____ Yes ____ No b. Core analyses? ____ Yes ____ No

c. Thin sections? ____ Yes ____ No d. Other?_____

III. Collection Catalogue

14. Is collection catalogued? ____Yes ____No

15. If yes, type of catalogue:

a. ___ Index cards
b. ___ Lists
c. ___ Microfilm/microfiche
d. ___ Computer data base
e. ___ Other (please describe)

16. If yes, information included in catalogue entry:

a. ___ Location
b. ___ Field
c. ___ Formation name
d. ___ Formation depth
e. ___ Formation age
f. ___ Cuttings, core, or core chips
g. ___ Footage represented
h. ___ Other (please describe)

17. If yes, is catalogue available for distribution? ____ Yes ____ No

18. Do you use a computer in managing your repository? ____ Yes ____ No
If yes, please describe briefly your applications:

IV. Facilities and Equipment

19. Size: a. Total floor space:_____ sq ft b. Ceiling height:_____ ft

20. Building type: a. ___ Wood b. ___ Masonry c. ___ Corrugated steel
d. ___ Concrete e. ___ Other (please describe)

21. Amenities: a. ___ Heat b. ___ Air conditioning c. ___ Lights
d. ___ Telephone e. ___ Restrooms f. ___ Electricity

22. Equipment available for users of facility:

a. ___ Binocular microscopes
b. ___ Petrographic microscopes
c. ___ Plugger
d. ___ Trim saw
e. ___ Testing chemicals
f. ___ Camera
g. ___ Thin-section equipment
h. ___ Porosity-permeability equipment
i. ___ Other (please describe)

23. Do you have an examination room? ___ Yes ___ No

a. If yes, floor space: _____ sq ft

b. If yes, user capacity: _____ number of persons

V. Curation Policy

24. Are you accepting new material? ___ Yes ___ No
Please explain:

25. Collection growth rate: _____ wells (holes)/year

26. Do you maintain confidentiality for some material? ___ Yes ___ No
If yes, please explain policy briefly:

*27. Have you discarded unique material? ____ Yes ____ No
If yes, please explain circumstances:

VI. Facility Usage

28. Number of user days/year (one user day = one person using facility for one day or part of one day):

<100	100-300	300-1,000	1,000-2,000	>2,000
☐	☐	☐	☐	☐

29. Usage by economic sector:

	% of user days
a. Industry	____%
b. Government	____%
c. Academia	____%
d. Other (please describe)	____%
	100%

*These questions will be treated statistically and will not be linked to individual respondents.

30. Are you getting tired of answering this questionnaire? If yes, PLEASE CARRY ON. YOU'RE ALMOST DONE.

VII. Repository Organization

31. Administered by what agency?

*32. Funding sources:

	% of total
a. Administering agency	_____%
b. User fees	_____%
c. Grants, gifts	_____%
d. Other (please describe)	_____%
	100%

*33. Would you characterize your funding level as:

a. ____ fully sufficient?
b. ____ adequate?
c. ____ marginally adequate?
d. ____ inadequate?

*34. Is your funding:

a. ____ dependable?
b. ____ reasonably dependable?
c. ____ uncertain?
d. ____ very tenuous?

35. Staffing (please report number of people):

	Curator	Clerical	Technician	Gen. Labor	
a.					Full time (employed)
b.					Part time (employed)
c.					Full time (vacancies)
d.					Part time (vacancies)

*36. If you wish, please explain the nature and politics of your funding and staffing situation:

VIII. General

37. What are your long-range plans for facility operation and development?

*38. If you wish, please describe the problems you face in operating your facility:

39. Please add any specific features of your facility or general comments you may have:

40. Do you have literature describing your facility? ____ Yes ____ No
If yes, please include a copy. Photographs for possible use in the directory would also be welcome.

41. If you are aware of any additional non-profit, publicly-available repositories in your state that are not included on attached list, please give names and addresses here:

APPENDIX II

United States Public Well-Sample Repositories

Federal

1. U.S. Geological Survey
   Branch of Alaskan Geology
   Anchorage, Alaska

2. U.S. Army Corps of Engineers
   Geotechnical Branch
   Little Rock, Arkansas

3. Scripps Institution of Oceanography
   Deep Sea Drilling Project
   University of California
   La Jolla, California

4. U.S. Geological Survey
   Branch of Oil & Gas Resources
   Core Library
   Arvada, Colorado

5. Antarctic Marine Geology Research Facility and Core Library
   Florida State University
   Tallahassee, Florida

6. U.S. Geological Survey
   Water Resources Division
   Tampa, Florida

7. U.S. Army Corps of Engineers
   Geotechnical Branch
   Rock Island, Illinois

8. U.S. Geological Survey
   Water Resources Division
   Sand Sample Library
   Baton Rouge, Louisiana

9. U.S. Department of Energy
   Salt Dome Core Storage
   Louisiana State University
   Baton Rouge, Louisiana

10. U.S. Department of Agriculture
    Soil Conservation Service
    Amherst, Massachusetts

11. U.S. Geological Survey
    Branch of Atlantic Marine Geology
    Woods Hole, Massachusetts

12. U.S. Bureau of Mines
    Twin Cities Core Storage Library
    Minneapolis, Minnesota

13. U.S. Army Corps of Engineers
    St. Paul District
    St. Paul, Minnesota

14. U.S. Geological Survey
    Nevada Test Site
    Mercury, Nevada

15. U.S. Department of Energy
    Waste Isolation Pilot Project
    Carlsbad, New Mexico

16. Lamont-Doherty Geological Observatory
    Deep-Sea Sample Repository
    Palisades, New York

17. Office of Surface Mining
    Technical Services Division
    Lake Lynn Core Library
    Pittsburgh, Pennsylvania

18. U.S. Army Corps of Engineers
    Geotechnical Branch
    Pittsburgh, Pennsylvania

19. U.S. Army Corps of Engineers
    Geology Section
    Nashville, Tennessee

20. U.S. Army Corps of Engineers
    Geotechnical Engineering Section
    Norfolk, Virginia

21. U.S. Department of Energy
    Rockwell Hanford Operations
    Basalt Waste Isolation Project
    Richland, Washington

University

1. California Well Sample Repository
   University of California at
   Bakersfield
   Bakersfield, California

2. University of California
   Department of Geology & Geophysics
   Berkeley, California

3. Colorado School of Mines
   Department of Geology
   Golden, Colorado

4. University of Miami
   Miami, Florida

5. University of Hawaii
   Hawaii Institute of Geophysics
   Honolulu, Hawaii

6. Weston Observatory
   Weston, Massachusetts

7. Woods Hole Oceanographic Institute
   Sea Floor Samples Laboratory
   Woods Hole, Massachusetts

8. University of Michigan
   Department of Geological Sciences
   Ann Arbor, Michigan

9. Wayne State University
   Geology Department
   Detroit, Michigan

10. Michigan State University
    Department of Geological Sciences
    East Lansing, Michigan

11. Western Michigan University
    Department of Geology
    Kalamazoo, Michigan

12. Central Michigan University
    Geology Department
    Mount Pleasant, Michigan

13. University of Montana
    Geology Department
    Missoula, Montana

14. University of Toledo
    Department of Geology
    Subsurface Data Center
    Toledo, Ohio

15. Oregon State University
    College of Oceanography
    Marine Geological Sample Collection
    Corvallis, Oregon

16. University of Rhode Island
    Graduate School of Oceanography
    Quonset, Rhode Island

17. University of Texas at Austin
    Institute of Geophysics
    Austin, Texas

18. Texas A & M University
    Department of Geology
    College Station, Texas

19. University of Utah Research Institute
    Earth Science Laboratory
    Salt Lake City, Utah

20. University of Washington
    School of Oceanography
    Seattle, Washington

21. University of Wisconsin
    Geology Repository
    Madison, Wisconsin

State & Municipal

1. Alabama Geological Survey and State Oil & Gas Board
University, Alabama

2. Alaska Oil & Gas Conservation Commission
Anchorage, Alaska

3. Alaska Department of Natural Resources
Division of Geological & Geophysical Surveys
Anchorage, Alaska

4. Arizona Oil & Gas Conservation Commission
Phoenix, Arizona

5. Arizona Bureau of Geology & Mineral Technology
Tucson, Arizona

6. Arkansas Geological Commission
Little Rock, Arkansas

7. Delaware Geological Survey
University of Delaware
Newark, Delaware

8. Florida Geological Survey
Tallahassee, Florida

9. Georgia Geological Survey
Atlanta, Georgia

10. Hawaii Department of Land and Natural Resources
Honolulu, Hawaii

11. Honolulu Board of Water Supply
Honolulu, Hawaii

12. Idaho Geological Survey
University of Idaho
Moscow, Idaho

13. Illinois State Geological Survey
Champaign, Illinois

14. Indiana Geological Survey
Bloomington, Indiana

15. Iowa Geological Survey
Iowa City, Iowa

16. Kansas Geological Survey
Lawrence, Kansas

17. Kansas Geological Survey
Wichita Well Sample Library
Wichita, Kansas

18. Kentucky Geological Survey
Lexington, Kentucky

19. Louisiana Geological Survey
Baton Rouge, Louisiana

20. Maryland Geological Survey
Baltimore, Maryland

21. Metropolitan District Commission
Water Division
Belchertown, Massachusetts

22. Massachusetts Department of Public Works
Research & Material Division
Wellesley Hills, Massachusetts

23. Michigan Department of Natural Resources
Geological Survey
Lansing, Michigan

24. Michigan Department of Natural Resources
Geological Survey
Marquette, Michigan

25. Minnesota Department of Natural Resources
Minerals Division Drill Core Library
Hibbing, Minnesota

26. Minnesota Geological Survey
St. Paul, Minnesota

27. Mississippi Department of Natural Resources
Jackson, Mississippi

28. Missouri Geological Survey
Core and Sample Library
Rolla, Missouri

State & Municipal (continued)

29. Montana Board of Oil & Gas Conservation
Billings, Montana

30. Montana Bureau of Mines and Geology
Montana College of Mineral Science & Technology
Butte, Montana

31. Nebraska Geological Survey
University of Nebraska
Lincoln, Nebraska

32. Nevada Bureau of Mines & Geology
University of Nevada
Reno, Nevada

33. New Mexico Bureau of Mines and Mineral Resources
Socorro, New Mexico

34. New York State Geological Survey
Albany, New York

35. North Carolina Geological Survey
Raleigh, North Carolina

36. North Dakota Geological Survey
Wilson Laird Core & Sample Library
Grand Forks, North Dakota

37. Ohio Department of Natural Resources
Division of Geological Survey
Subsurface Geology Section
Columbus, Ohio

38. Ohio Department of Natural Resources
Division of Geological Survey
Regional Geology Section
Columbus, Ohio

39. Oklahoma Geological Survey
Core and Sample Library
Norman, Oklahoma

40. Oregon Department of Geology & Mineral Industries
Well Sample Collection
Portland, Oregon

41. Academy of Natural Sciences of Philadelphia
Philadelphia, Pennsylvania

42. Pennsylvania Geological Survey
Pittsburgh, Pennsylvania

43. South Carolina Geological Survey
Columbia, South Carolina

44. South Dakota Geological Survey
Science Center
Vermillion, South Dakota

45. Tennessee Division of Geology
Nashville, Tennessee

46. Texas Bureau of Economic Geology
Well Sample Library
Austin, Texas

47. Utah Geological & Mineral Survey
Salt Lake City, Utah

48. Virginia Division of Mineral Resources
Charlottesville, Virginia

49. Washington Department of Natural Resources
Geology & Earth Resources Division
Olympia, Washington

50. West Virginia Geological Survey
Sample Library
Morgantown, West Virginia

51. Wisconsin Geological & Natural History Survey
Sample Repository
Madison, Wisconsin

APPENIDX III

Oil and Gas Drilling by State (Petroleum Independent, 1984)

State	Total number of wells drilled as of 12/31/83
Alabama	3,571
Alaska	1,798
Arizona	472
Arkansas	31,346
California	128,993
Colorado	33,831
Florida	915
Illinois	122,427
Indiana	62,969
Kansas	218,677
Kentucky	93,700
Louisiana	166,154
Maryland	119
Michigan	33,467
Mississippi	21,709
Missouri	1,889
Montana	27,056
Nebraska	16,312
Nevada	291
New Mexico	56,097
New York	13,565
North Dakota	9,377
Ohio	152,484
Oklahoma	366,135
Oregon	292
Pennsylvania	312,158
South Dakota	1,032
Tennessee	5,249
Texas	781,349
Utah	7,347
Virginia	540
West Virginia	109,165
Wyoming	46,859
Total	2,827,345