

Technical Report
Comparability of the 2000 and 1990 Census Occupation Codes

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1. Introduction

This report documents procedures developed at the Mumford Center to compare the percent of the labor force in management, professional, and related occupations in 1990 and 2000. The comparability of occupational classifications across censuses is important for analyzing long-term trends in employment and other characteristics of workers. Unfortunately, Census 2000 uses different occupational codes than did the 1990 Census, and the changes had the net effect of counting more detailed occupations as management/professional. We cannot simply compare the percent of persons in this category in 2000 with the percent reported in 1990 without adjustments.

Census occupational codes in 1990 were based on the 1980 Standard Occupational Classification (1980 SOC) system that organized occupations into a hierarchical structure wherein knowledge, skill level, and the experience considered necessary for new entrants to an occupation determined an occupation's place in the classification system. In contrast, Census 2000 occupational codes are based on the 1998 Standard Occupational Classification (1998 SOC) coding structures in which occupations are grouped according to "job families." The general concept behind job families is to combine people who work together producing the same kinds of goods and services regardless of their skill level. For example, doctors, nurses, and

health technicians are all members of a job family (SOC User Guide, 2001). This conceptual change makes it more difficult to identify the highly qualified occupations that were traditionally placed in the management/professional category at the top of the job hierarchy.

In addition to these changes in classification structure, the 1998 SOC has more professional, technical, and service occupations and fewer production and administrative support occupations than the 1980 SOC, reflecting advances in information technology, the shifts to a service-oriented economy, and increasing concern for the environment (BLS Report 929, 1999). Added and deleted occupations make it more complicated in many cases to know what occupation in one year is the equivalent of an occupation in the other year.

This report describes a “crosswalk” for those occupations placed at the upper end of the occupational hierarchy in 1990: management, professional, and related occupations. Using this crosswalk, analysts will know which detailed occupation categories in 1990 and 2000 can be combined together to create a consistent management/professional category. The complete crosswalk is provided in Appendix 2.

2. The Standard Occupational Classification Systems

The Standard Occupational Classification System (SOC) was devised in 1977, and revised and reissued in 1980, to link occupational data collected through different systems to a single standard system. Despite agreements to maintain and update the original system, the original system was not revised after 1980 until the Office of Management and Budget chartered the SOC Committee in 1994. In 1998 OMB issued the revised SOC. In the 1998 SOC, there are four levels of aggregation: 1) major group; 2) minor group; 3) broad occupation; and 4) detailed occupation. Each level in this hierarchy is designated by a six-digit code. The first two digits of

the 1998 SOC code represent the major group; the third digit represents the minor group; the fourth and fifth digits represent the broad occupation; and the sixth digit represents the detailed occupation. Major group codes end with 0000 (e.g., 19-0000 Life, Physical, and Social Science Occupations), minor groups end with 000 (e.g., 19-1000 Life Scientists), broad occupations end with 0 (e.g., 19-1010 Agricultural and Food Scientists), and detailed occupations end with a nonzero digit (e.g., 19-1011 Animal Scientists). The 1998 SOC contains 822 detailed occupations, aggregated into 452 broad occupations. These broad occupations are grouped into 98 minor groups that are grouped into the 23 major groups. For users wanting less detail in data tabulations, the Standard Occupational Classification Revision Policy Committee (SOCRPC) suggests combining the 23 major groups into 11 “intermediate-level aggregations,” or even 6 “high-level aggregations” (SOC Federal Register Notice, 1999). These three levels of aggregation for the 1998 SOC are presented in Table 1.

Table 1. Structure of Standard Occupation Classification (SOC) 1998 with Equivalent Census 2000 Codes

SOC code	23 Major Groups	11 Intermediate-Level Aggregations	6 High-level Aggregations	Census 2000 Codes Equiv.
11-0000	Management Occupations	Management, Business, and Financial Occupations	Management, Professional, and Related Occupations	001-296
13-0000	Business and Financial Operations Occupations			
15-0000	Computer and Mathematical Occupations	Professional and Related Occupations		
17-0000	Architecture and Engineering Occupations			
19-0000	Life, Physical, and Social Science Occupations			
21-0000	Community and Social Services Occupations			
23-0000	Legal Occupations			
25-0000	Education, Training, and Library Occupations			
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations			
29-0000	Healthcare Practitioner and Technical Occupations			
31-0000	Healthcare Support Occupations	Service Occupations	Service Occupations	300-465
33-0000	Protective Service Occupations			
35-0000	Food Preparation and Serving Related Occupations			
37-0000	Building and Grounds Cleaning, and Maintenance Occupations			
39-0000	Personal Care and Service Occupations			
41-0000	Sales and Related Occupations	Sales and Related Occupations	Sales and Office Occupations	470-593
43-0000	Office and Administrative Support Occupations	Office and Administrative Support Occupations		
45-0000	Farming, Fishing, and Forestry Occupations	Farming, Fishing, and Forestry Occupations	Natural Resources, Construction, and Maintenance Occupations	600-762
47-0000	Construction and Extraction Occupations	Construction and Extraction Occupations		
49-0000	Installation, Maintenance, and Repair Occupations	Installation, Maintenance, and Repair Occupations		
51-0000	Production Occupations	Production Occupations	Production, Transportation, and Material Moving Occupations	770-975
53-0000	Transportation and Material Moving Occupations	Transportation and Material Moving Occupations		
55-0000	Military Specific Occupations	Military Specific Occupations	Military Specific Occupations	980-983

Note that codes 11-0000 through 29-0000 represent the occupations that Census 2000 has treated as managerial/professional. In contrast, the 1980 SOC included 664 unit groups (comparable to detailed occupations in the 1998 SOC), 223 minor groups (comparable to broad occupations in the 1998 SOC), 60 major groups (comparable to minor groups in the 1998 SOC), and 22 divisions (comparable to major groups in the 1998 SOC). The structure of the 1980 SOC is presented in Table 2.

3. Reconfiguration of the 1980 Standard Occupational Classification

Although historical comparability was recognized as important for analyzing long-term trends in employment and other characteristics of workers, such comparability was not the primary consideration in the development of the 1998 SOC. Nevertheless many analysts will want to make comparisons across years, and they need to know how to link the 1998 SOC “Management, Professional, and Related Occupations” (SOC codes 11-0000 to 29-0000) shown in Table 1 and the 1980 SOC “Managerial and Professional Specialty Occupations” (SOC codes 1100-1499 to 3200-3400) shown in Table 2.

Table 2. Structure of Standard Occupation Classification (SOC) 1980 with Equivalent Census 1990 Codes

SOC code	22 Divisions	7 Summary Occupational Groups	Census 1990 Codes Equiv.		
1100-1499	Executive, Administrative, and Managerial Occupations	Managerial and Professional Specialty Occupations	000-199		
1600	Engineers, Surveyors, and Architects				
1700-1899	Natural Scientist and Mathematicians				
1900-2199	Social Scientists, Social Workers Religious Workers, and Lawyers				
2200-2599	Teachers, Librarians and Counselors				
2600-2899	Health Diagnosing and Treating Practitioners				
2900-3040	Registered Nurses, Pharmacists, Dietitians, Therapist, and Physician's Assistants				
3200-3400	Writers, Artist, Entertainers, and Athletes				
3600-3690	Health Technologists and Technicians			Technical, Sales, and Administrative Support Occupations	203-389
3700-3990	Technologists and Technicians, Except Health				
4000-4490	Marketing and Sales Occupations				
4500-4799	Administrative Support Occupations, Including Clerical				
5000-5269	Service Occupations	Service Occupations	403-469		
5500-5840	Agricultural, Forestry, and Fishing Occupations	Agricultural, Forestry, and Fishing Occupations	473-499		
6000-6179	Mechanics and Repairers	Precision Production, Craft, and Repair Occupations	503-699		
6300-6560	Construction and Extractive Occupations				
6700-6960	Precision Production Occupations				
7100-7870	Production Working Occupations	Operators, Fabricators, and Laborers	703-889		
8100-8319	Transportation and Material Moving Occupations				
8500-8769	Handlers, Equipment Cleaners, Helpers, and Laborers				
9100	Military Occupations	Military Occupations	903-905		
9900	Miscellaneous Occupations	-	-		

There are two kinds of changes that we have to take into account. In the updating of the 1980 SOC system, some occupations became obsolete, some were redefined, and some occupations newly emerged. These occupations are identified in Appendix 1 of this report. The listing of comparable managerial/professional categories for 1990 and 2000 in Appendix 2 reflects these changes.

In addition, some occupations have been “upgraded” or “downgraded.”

Occupations Upgraded:

“020 Farm, Ranch, and Other Agricultural Managers” are found in the major group of “Management Occupations (11-0000)” in the Census 2000 along with “021 Farmers and Ranchers.”

“101 Computer Programmers” are moved from “Technical, Sales, and Administrative Support Occupations” in the Census 1990 to “Management, Professional and Related Occupations” in 2000 along with various technicians in engineering, science, and health related fields.

Occupations Downgraded:

“035 Construction Inspectors” were categorized as one of “Management and Professional Specialty Occupations (003-199)” in the 1990 Census. They are no longer in the comparable category in the Census 2000.

In such cases, we would like to adjust the 1990 managerial/professional category to make it comparable to 2000. Table 3 lists situations where we wished to add or remove some specific occupations from the 1990 Census category of “Managerial and Professional Specialty Occupations (003-199)” to match the Census 2000 category of “Management, Professional, and Related Occupations (001-354).”

In some of these cases there is no problem. All the occupations in the 1990 Census major occupation groups, “Health Technologists and Technicians (203-208),” “Engineering and Related Technologists and Technicians (213-218),” “Science Technicians (223-225),” and “Farm Operators and Managers (473-476)” were exactly matched with equivalent occupations in the Census 2000 coding of “Management, Professional, and Related Occupations.”

Table 3. Re-configuration of the Census 1990 occupation codes to match the Census 2000 definitions

1990 occupation(s) to be removed	1990 Major group containing occupation(s)	Other occupations in this major group in 1990
035 Construction inspectors	Management Related Occupations (024-037)	024 Underwriters 025 Other financial officers 026 Management analysts 027 Personnel, training, and labor relations specialists 028 Purchasing agents and buyers, farm products 029 Buyers, wholesale and retail trade, except farm products 033 Purchasing agents and buyers, n.e.c. 036 Inspectors and compliance officers, except construction 037 Management related occupations, n.e.c.
1990 occupation(s) to be added	1990 Major group containing occupation(s)	Other occupations in this major group in 1990
203 Clinical laboratory technologists and technicians 204 Dental hygienists 205 Health record technologists and technicians 206 Radiologic technicians 207 Licensed practical nurses 208 Health technologists and technicians, n.e.c.	Health Technologists and Technicians (203-208)	None
213 Electrical and electronic technicians 214 Industrial engineering technicians 215 Mechanical engineering technicians 216 Engineering technicians, n.e.c. 217 Drafting occupations 218 Surveying and mapping technicians	Engineering and Related Technologists and Technicians (213-218)	None
223 Biological technicians 224 Chemical technicians 225 Science technicians n.e.c.	Science Technicians (223-225)	None
228 Broadcast equipment operators 229 Computer programmers 234 Legal assistants	Technicians, Except Health, Engineering, and Science (228-235)	226 Airplane pilots and navigators 227 Air traffic controllers 233 Tool programmers, numerical control 235 Technician, n.e.c.
375 Insurance adjusters, examiners, and investigators 376 Investigators and adjusters, except insurance	Adjusters and Investigators (375-378)	377 Eligibility clerks, social welfare 378 Bill and account collectors
387 Teachers' aides	Miscellaneous Administrative Support Occupations (379-389)	379 General office clerks 383 Bank tellers 384 Proofreaders 385 Data-entry keyers 386 Statistical clerks 389 Administrative support occupations, n.e.c.
473 Farmers, except horticultural 474 Horticultural specialty farmers 475 Managers, farms, except horticultural 476 Managers, horticultural specialty farms	Farm Operators and Managers (473-476)	None

But we have four problematic sets of occupation groups, where we do not have a unique occupational code for every occupation. If we wish to add a single occupation (or remove one), we sometimes have to add or remove a larger group of occupations. One such case is related to the category (in 2000) of “035 Construction Inspectors.” This occupation was not separately identified in 1990, but was listed among several “Management Related Occupations”– hence it was considered managerial/professional in 1990. But in Census 2000 it is found in another

occupation aggregation (“Natural Resources, Construction, and Maintenance Occupations”), which is not treated as managerial/professional in 2000. Therefore, to bring 1990 into conformity with 2000 we would have to remove the entire set of “Management Related Occupations” in order to take out “Construction Inspectors.” This means we would now be misclassifying the other specific occupations that were in this 1990 category (underwriters, etc.).

The 1990 Census major occupation groups of “Technicians, Except Health, Engineering, and Science,” “Adjusters and Investigators,” and “Miscellaneous Administrative Support Occupations” present a different problem. In these cases, it would be desirable to add “228 Broadcast Equipment Operators,” “229 Computer Programmers,” “234 Legal Assistants,” “375 Insurance Adjusters, Examiners, and Investigators,” “376 Investigators and Adjusters, Except Insurance,” and “387 Teachers' Aides” into the managerial/professional category, because this is how they were treated in 2000. But if we did so, we would also have to add many other occupations that were not treated as managerial/professional in 2000. We cannot explain why computer programmers and teacher’s aides should be classed managerial/professional in 2000, while airplane pilots and statistical clerks are not. That is a decision made in the 1998 revision of the SOC. Our problem is that some of these occupations were not separately identified in the 1990 census; if we want to add one occupation, we must add several.

Here is the decision rule that we followed in these problematic cases. We compared the number of persons in occupations that would be correctly removed or added to the number of persons in occupations (in the same aggregate 1990 category) that would be incorrectly removed or added as a result. If the number of persons misallocated was smaller than the number of occupational incumbents correctly reallocated, we performed the reallocation. Else we did not.

Table 4. Major occupation groups in question and count of person in each occupation in 1990

		Management Related Occupations (024-037)					
		Occupation(s) to be removed	N	Other occupations also be removed	N		
Major groups to be removed	035 Construction inspectors		78,806	024 Underwriters	74,593		
				025 Other financial officers	762,601		
				026 Management analysts	337,400		
				027 Personnel, training, and labor relations specialists	640,717		
				028 Purchasing agents and buyers, farm products	20,710		
				029 Buyers, wholesale and retail trade, exc. Farm products	262,257		
				033 Purchasing agents and buyers, n.e.c.	280,447		
				034 Business and promotion agents	42,527		
				036 Inspectors and compliance officers, exc. construction	191,485		
				037 Management related occupations, n.e.c.	422,945		
		78,806		3,035,682			
Technicians, Except Health, Engineering, and Science (228-235)							
		Occupation(s) to be added	N	Other occupations also be added	N		
Major groups to be added		228 Broadcast equipment operators	91,377	226 Airplane pilots and navigators	173,700		
		229 Computer programmers	719,533	227 Air traffic controllers	61,148		
		234 Legal assistants	302,093	233 Tool programmers, numerical control	3,947		
				235 Technician, n.e.c.	607,063		
			1,113,003		845,858		
		Adjusters and Investigators (375-378)					
				Occupation(s) to be added	N	Other occupations also be added	N
		Major groups to be added		375 Insurance adjusters, examiners, and investigators	380,075	377 Eligibility clerks, social welfare	56,699
				376 Investigators and adjusters, exc. insurance	659,999	378 Bill and account collectors	187,170
					----- 1,040,074		243,869
Miscellaneous Administrative Support Occupations (379-389)							
		Occupation(s) to be added	N	Other occupations also be added	N		
Major groups to be added	387 Teachers' aides		341,485	379 General office clerks	1,938,483		
				383 Bank tellers	624,766		
				384 Proofreaders	39,906		
				385 Data-entry keyers	765,104		
				386 Statistical clerks	178,168		
				389 Administrative support occupations, n.e.c.	815,910		
				----- 341,485		4,362,337	

Source: The 1990 PUMS data weighted by person weights

Table 4 shows the number of persons in each of the occupations in the aggregated occupational groups in question. These detailed occupation categories, fortunately, are separately identified in the 1990 PUMS microdata file, which allows us to count them. The first two columns show occupations that we wish to remove or add to match the Census 2000 definition of “Management, Professional, and Related Occupations,” and the number of people in them in 1990. The last two columns show occupations that are in the same category (in the 1990 Summary File data) and the number of people in them that would, therefore, be incorrectly removed or added.

Applying our decision rule, we did not remove “035 Construction Inspectors,” thereby retaining all other “Management Related Occupations.” We did not add “387 Teacher’s aides,” so that we will not have to add additional occupations enumerated in “Miscellaneous Administrative Support Occupations (379-389).” On the other hand, our decision rule led us to add “Technicians, Except Health, Engineering, and Science (228-235)” and “Adjusters and Investigators (375-378).”

In short, having considered all occupational changes, our crosswalk adjusts the “Managerial and Professional Specialty Occupations (003-199)” in the 1990 Census to the Census 2000 coding of “Management, Professional, and Related Occupations” by adding the following major occupation groups identified in Summary File data products:

- Health Technologists and Technicians (203-208)
- Engineering and Related Technologists and Technicians (213-218)
- Science Technicians (223-225)
- Technicians, Except Health, Engineering, and Science (228-235)
- Adjusters and Investigators (375-378)

- Farm Operators and Managers (473-476)

Our reconfiguration expands coverage of occupations classified as “Managerial and Professional Specialty Occupations” in the 1990 Census, including technical occupations, farmer managers, and investigators.

4. Conclusion

As noted above, a detailed occupational crosswalk that matches managerial/professional occupations in the 1990 Census to their Census 2000 counterparts is given in Appendix 2. The inclusion of the six occupational groups named above is necessary to bring the 1990 classification as close as possible to the managerial/professional classification in the Census 2000 when using Summary File data products. Without this reconfiguration, the percent change in this occupational classification is artificially inflated. Table 5 quantifies the impact of our reconfiguration.

Based on labor force counts for the 331 U.S. metro areas given in the SF3 census data files, Table 5 shows the 1990 unadjusted and reconfigured percentages, the Census 2000 percentage, and the percent change before and after the reconfiguration for the 331 U.S. metro areas. Table 5 shows that just over a quarter of the labor force was classified as “Managerial and Professional Specialty Occupations” in the 1990 Census. Following our reconfiguration, the percentage in managerial/professional (referred to as “Percent Professional” in the table) occupations increases to over 31 percent. When compared to the 32.4 percent identified as “Management, Professional, and Related Occupations” in 2000, the apparent 26.6 percent increase (percent change = $[(32.4-25.6)/25.6]*100$) is only slightly over four percent following our reconfiguration.

Table 5. Percent of Management, Professional, and Related Occupations in 1990 and 2000 Metro Areas

Percent Professional In 1990	Percent Professional In 1990 After Reconfiguration	Percent Professional In 2000	Percent Change Between 1990 and 2000 Before Reconfiguration	Percent Change Between 1990 and 2000 After Reconfiguration
25.6%	31.1%	32.4%	26.6%	4.2%

Our tabulations also reveal that a comparison of the percent change in managerial/professional occupations between 1990 and 2000 without reconfiguration yields an increase in every U.S. metropolitan region. Following our reconfiguration, however, we find that 57 metro areas (over seventeen percent of the 331 total metro areas) actually experienced a decline at the top of their occupational hierarchy. In other words, the apparent significant upgrading of the American occupational structure between 1990 and 2000 is more artifactual than real. Reports of percent change in managerial/professional occupations based on unadjusted 1990 counts are inflated; in some metro regions, this change is at least ten percentage points higher than the “real” change.

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Appendix 1. Detailed changes in the occupational categories between Census 1990 and Census 2000.

Occupations That Disappeared:

“005 Administrators and Officials in Public Administrations” and “006 Administrators in Protective Services” in the Census 1990 are no longer found in the 2000 Census occupations. These public administrators are classified as diverse managers in the new SOC on the basis of the work they perform, rather than a public/ business sector division.

Occupations That Were Redefined:

“004 Chief Executives and General Administrators” are redefined as “Chief Executives” in the Census 2000. This again reflects the new SOC classification of occupations on the basis of work performed rather than a public/ business sector division.

“013 Marketing, Advertising, and Public Relations Managers” are divided into three individual manager categories (“Advertising and Promotions Managers”, “Marketing and Sales Managers”, and “Public Relations Managers”) in the Census 2000.

“017 Food Serving and Lodging Establishment Managers” in the Census 1990 are divided into two separate manager categories (“Food Service Managers” and “Lodging Managers”).

“Postsecondary Teachers (113-154),” which were separated by subjects they taught in the Census 1990, are consolidated into one occupation in the Census 2000.

“046 Mining Engineers” are redefined as “Mining and Geological Engineers, including Mining Safety Engineers” in the Census 2000.

“056 Industrial Engineers” are redefined as “Industrial Engineers, including Health and Safety Engineers.”

“199 Athletes” in the Census 1990 are now in the new SOC categorization of “Athletes, Coaches, Umpires, and Related Workers.”

Newly Identified Occupations:

001-043 Management Occupations (11-0000)

010 Administrative Services Managers (11-3011): Plan, direct, or coordinate supportive services of an organization, such as record keeping, mail distribution, telephone operator/receptionist, and other office support services. May oversee facilities planning and maintenance and custodial operations. Exclude "Purchasing Managers" (11-3061).

011 Computer and information system managers (11-3021): Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming. Exclude "Computer Specialists" (15-1011 through 15-1099).

014 Industrial production managers (11-3051): Plan, direct, or coordinate the work activities and resources necessary for manufacturing products in accordance with cost, quality, and quantity specifications.

016 Transportation, storage, and distribution managers (11-3071): Plan, direct, or coordinate transportation, storage, or distribution activities in accordance with governmental policies and regulations. Include logistics managers.

020 Farm, ranch, and other agricultural managers (11-9011)*¹: On a paid basis, manage farms, ranches, aquacultural operations, greenhouses, nurseries, timber tracts, cotton gins, packinghouses, or other agricultural establishments for employers. Carry out production, financial, and marketing decisions relating to the managed operations following guidelines from the owner. May contract tenant farmers or producers to carry out the day-to-day activities of the managed operation. May supervise planting, cultivating, harvesting, and marketing activities. May prepare cost, production, and other records. May perform physical work and operate machinery.

021 Farmers and ranchers (11-9012)*: On an ownership or rental basis, operate farms, ranches, greenhouses, nurseries, timber tracts, or other agricultural production establishments, which produce crops, horticultural specialties, livestock, poultry, finfish, shellfish, or animal specialties. Include operators of cotton gins, packinghouses, and other post-harvest operations. May plant, cultivate, harvest, perform post-harvest activities, and market crops and livestock; may hire, train, and supervise farm workers or supervise a farm labor contractor; may prepare cost, production, and other records. May maintain and operate machinery and perform physical work.

022 Construction managers (11-9021): Plan, direct, coordinate, or budget, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, and implementation. Include specialized construction fields, such as carpentry or plumbing. Include general superintendents, project managers, and constructors who manage, coordinate, and supervise the construction process.

030 Engineering managers (11-9041): Plan, direct, or coordinate activities in such fields as architecture and engineering or research and development in these fields. Exclude "Natural Sciences Managers" (11-9121).

033 Gaming managers (11-9071): Plan, organize, direct, control, or coordinate gaming operations in a casino. Formulate gaming policies for their area of responsibility.

036 Natural Sciences managers (11-9121): Plan, direct, or coordinate activities in such fields as life sciences, physical sciences, mathematics, statistics, and research and development in these fields. Excluding "Engineering Managers" (11-9041) and "Computer and Information Systems Managers" (11-3021).

050-095 Business and Financial Operations Occupations (13-0000)

050 Agents and business managers of artists and athletes 13-1011: Represent and promote artists, performers, and athletes to prospective employers. May handle contract negotiation and other business matters for clients.

054 Claims Adjusters, Appraisers, Examiners, and Investigators (13-1030)*:

- Claims Adjusters, Examiners, and Investigators (13-1031): Review settled claims to determine that payments and settlements have been made in accordance with company practices and procedures, ensuring that proper methods have been followed. Report overpayments, underpayments, and other irregularities. Confer with legal counsel on claims requiring litigation.

- Insurance Appraisers, Auto Damage (13-1032): Appraise automobile or other vehicle damage to determine cost of repair for insurance claim settlement and seek agreement with automotive

¹ Occupations with asterisk (*) indicate that corresponding, or comparable occupations were found in Census 1990 categories, but they were not categorized as "Managerial and Professional Specialty Occupations (003-199)" previously.

repair shop on cost of repair. Prepare insurance forms to indicate repair cost or cost estimates and recommendations.

060 Cost Estimators (13-1051): Prepare cost estimates for product manufacturing, construction projects, or services to aid management in bidding on or determining price of product or service. May specialize according to particular service performed or type of product manufactured.

070 Logisticians (13-1081): Analyze and coordinate the logistical functions of a firm or organization. Being Responsible for the entire life cycle of a product, including acquisition, distribution, internal allocation, delivery, and final disposal of resources.

072 Meeting and convention planners (13-1121): Coordinate activities of staff and convention personnel to make arrangements for group meetings and conventions.

081 Appraisers and assessors of real estate (13-2021): Appraise real property to determine its fair value. May assess taxes in accordance with prescribed schedules.

082 Budget analysts (13-2031): Examine budget estimates for completeness, accuracy, and conformance with procedures and regulations. Analyze budgeting and accounting reports for the purpose of maintaining expenditure controls.

083 Credit analysts (13-2041): Analyze current credit data and financial statements of individuals or firms to determine the degree of risk involved in extending credit or lending money. Prepare reports with this credit information for use in decision-making.

084 Financial analysts (13-2051): Conduct quantitative analyses of information affecting investment programs of public or private institutions.

085 Personal financial advisors (13-2052): Advise clients on financial plans utilizing knowledge of tax and investment strategies, securities, insurance, pension plans, and real estate. Duties include assessing clients' assets, liabilities, cash flow, insurance coverage, tax status, and financial objectives to establish investment strategies.

090 Financial examiners (13-2061): Enforce or ensure compliance with laws and regulations governing financial and securities institutions and financial and real estate transactions. May examine, verify correctness of, or establish authenticity of records.

091 Loan counselors and officers (13-2070):

- Loan Counselors (13-2071): Provide guidance to prospective loan applicants who have problems qualifying for traditional loans. Guidance may include determining the best type of loan and explaining loan requirements or restrictions. Evaluate, authorize, or recommend approval of commercial, real estate, or credit loans.

- Loan Officers (13-2072): Advise borrowers on financial status and methods of payments. Include mortgage loan officers and agents, collection analysts, loan servicing officers, and loan underwriters.

093 Tax examiners, collectors, and revenue agents (13-2081): Determine tax liability or collect taxes from individuals or business firms according to prescribed laws and regulations.

094 Tax preparers (13-2082): Prepare tax returns for individuals or small businesses but do not have the background or responsibilities of an accredited or certified public accountant.

100-124 Computer and Mathematical Occupations (15-0000)

101 Computer programmers (15-1021)*: Convert project specifications and statements of problems and procedures to detailed logical flow charts for coding into computer language. Develop and write computer programs to store, locate, and retrieve specific documents, data, and information. May program web sites.

102 Computer software engineers (15-1030):

- Computer Software Engineers, Applications (15-1031): Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. Exclude "Computer Hardware Engineers" (17-2061).

- Computer Software Engineers, Systems Software (15-1032): Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. Apply principles and techniques of computer science, engineering, and mathematical analysis.

104 Computer support specialists (15-1041): Provide technical assistance to computer system users. Answer questions or resolve computer problems for clients in person, via telephone or from remote location. May provide assistance concerning the use of computer hardware and software, including printing, installation, word-processing, electronic mail, and operating systems. Excluding "Network and Computer Systems Administrators" (15-1071).

106 Database administrators (15-1061): Coordinate changes to computer databases, test and implement the database applying knowledge of database management systems. May plan, coordinate, and implement security measures to safeguard computer databases.

110 Network and computer systems administrators (15-1071): Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet system or a segment of a network system. Maintain network hardware and software. Monitor network to ensure network availability to all system users and perform necessary maintenance to support network availability. May supervise other network support and client server specialists and plan, coordinate, and implement network security measures. Exclude "Computer Support Specialists" (15-1041).

130-156 Architecture and Engineering Occupations (17-0000)

134 Biomedical engineers (17-2031): Apply knowledge of engineering, biology, and biomechanical principles to the design, development, and evaluation of biological and health systems and products, such as artificial organs, prostheses, instrumentation, medical information systems, and health management and care delivery systems.

140 Computer hardware engineers (17-2061): Research, design, develop, and test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components. Exclude "Computer Software Engineers, Applications" (15-1031) and "Computer Software Engineers, Systems Software" (15-1032).

142 Environmental engineers (17-2070):

- Electrical Engineers (17-2071): Design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use. Exclude "Computer Hardware Engineers" (17-2061).

- Electronics Engineers, Except Computer (17-2072): Research, design, develop, and test electronic components and systems for commercial, industrial, military, or scientific use utilizing knowledge of electronic theory and materials properties. Design electronic circuits and components for use in fields such as telecommunications, aerospace guidance and propulsion

control, acoustics, or instruments and controls. Exclude "Computer Hardware Engineers" (17-2061).

154 Drafters (17-3010)*:

- Architectural and Civil Drafters (17-3011): Prepare detailed drawings of architectural and structural features of buildings or drawings and topographical relief maps used in civil engineering projects, such as highways, bridges, and public works. Utilize knowledge of building materials, engineering practices, and mathematics to complete drawings.
- Electrical and Electronics Drafters (17-3012): Prepare wiring diagrams, circuit board assembly diagrams, and layout drawings used for manufacture, installation, and repair of electrical equipment in factories, power plants, and buildings.
- Mechanical Drafters (17-3013): Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.
- Drafters, All Other (17-3019): All drafters not listed separately.

155 Engineering Technicians, Except Drafters (17-3020)*:

- Aerospace Engineering and Operations Technicians (17-3021): Operate, install, calibrate, and maintain integrated computer/communications systems consoles, simulators, and other data acquisition, test, and measurement instruments and equipment to launch, track, position, and evaluate air and space vehicles. May record and interpret test data.
- Civil Engineering Technicians (17-3022): Apply theory and principles of civil engineering in planning, designing, and overseeing construction and maintenance of structures and facilities under the direction of engineering staff or physical scientists.
- Electrical and Electronic Engineering Technicians (17-3023): Apply electrical and electronic theory and related knowledge, usually under the direction of engineering staff, to design, build, repair, calibrate, and modify electrical components, circuitry, controls, and machinery for subsequent evaluation and use by engineering staff in making engineering design decisions. Exclude "Broadcast Technicians" (27-4012).
- Electro-Mechanical Technicians (17-3024): Operate, test, and maintain unmanned, automated, servo-mechanical, or electromechanical equipment. May operate unmanned submarines, aircraft, or other equipment at worksites, such as oil rigs, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.
- Environmental Engineering Technicians (17-3025): Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental pollution, including waste treatment and site remediation. May assist in the development of environmental pollution remediation devices under direction of engineer.
- Industrial Engineering Technicians (17-3026): Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May study and record time, motion, method, and speed involved in performance of production, maintenance, clerical, and other worker operations for such purposes as establishing standard production rates or improving efficiency.
- Mechanical Engineering Technicians (17-3027): Apply theory and principles of mechanical engineering to modify, develop, and test machinery and equipment under direction of engineering staff or physical scientists.
- Engineering Technicians, Except Drafters, All other (17-3029): All engineering technicians, except drafters, not listed separately.

156 Surveying and Mapping Technicians (17-3031)*: Perform surveying and mapping duties, usually under the direction of a surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. May verify accuracy and completeness of topographical maps. Exclude "Surveyors" (17-1022), "Cartographers and Photogrammetrists" (17-1021), and "Geoscientists, Except Hydrologists and Geographers" (19-2042).

160-196 Life, Physical, and Social Science Occupations (19-0000)

181 Market and survey researchers (19-3020):

- Market Research Analysts (19-3021): Research market conditions in local, regional, or national areas to determine potential sales of a product or service. May gather information on competitors, prices, sales, and methods of marketing and distribution. May use survey results to create a marketing campaign based on regional preferences and buying habits.

- Survey Researchers (19-3022): Design or conduct surveys. May supervise interviewers who conduct the survey in person or over the telephone. May present survey results to client. Exclude "Statisticians" (15-2041), "Economists" (19-3011), and "Market Research Analysts" (19-3021).

190 Agricultural and Food Science Technicians (19-4011): Work with agricultural scientists in food, fiber, and animal research, production, and processing; assist with animal breeding and nutrition work; under supervision, conduct tests and experiments to improve yield and quality of crops or to increase the resistance of plants and animals to disease or insects. Include technicians who assist food scientists or food technologists in the research, development, production technology, quality control, packaging, processing, and use of foods.

191 Biological Technicians (19-4021): Assist biological and medical scientists in laboratories. Set up, operate, and maintain laboratory instruments and equipment, monitor experiments, make observations, and calculate and record results. May analyze organic substances, such as blood, food, and drugs.

192 Chemical Technicians (19-4031)*: Conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for purposes, such as research and development of new products or processes, quality control, maintenance of environmental standards, and other work involving experimental, theoretical, or practical application of chemistry and related sciences.

193 Geological and Petroleum Technicians (19-4041): Assist scientists in the use of electrical, sonic, or nuclear measuring instruments in both laboratory and production activities to obtain data indicating potential sources of metallic ore, gas, or petroleum. Analyze mud and drill cuttings. Chart pressure, temperature, and other characteristics of wells or bore holes. Investigate and collect information leading to the possible discovery of new oil fields.

194 Nuclear Technicians (19-4051): Assist scientists in both laboratory and production activities by performing technical tasks involving nuclear physics, primarily in operation, maintenance, production, and quality control support activities.

196 Other Life, Physical, and Social Science Technicians*:

- Social Science Research Assistants (19-4061): Assist social scientists in laboratory, survey, and other social research. May perform publication activities, laboratory analysis, quality control, or data management. Normally these individuals work under the direct supervision of a social

scientist and assist in those activities, which are more routine. Excluding "Graduate Teaching Assistants" (25-1191) who both teach and do research.

- Environmental Science and Protection Technicians, Including Health (19-4091): Performs laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health. Under direction of an environmental scientist or specialist, may collect samples of gases, soil, water, and other materials for testing and take corrective actions as assigned.

- Forensic Science Technicians (19-4092): Collect, identify, classify, and analyze physical evidence related to criminal investigations. Perform tests on weapons or substances, such as fiber, hair, and tissue to determine significance to investigation. May testify as expert witnesses on evidence or crime laboratory techniques. May serve as specialists in area of expertise, such as ballistics, fingerprinting, handwriting, or biochemistry.

- Forest and Conservation Technicians (19-4093): Compile data pertaining to size, content, condition, and other characteristics of forest tracts, under direction of foresters; train and lead forest workers in forest propagation, fire prevention and suppression. May assist conservation scientists in managing, improving, and protecting rangelands and wildlife habitats, and help provide technical assistance regarding the conservation of soil, water, and related natural resources.

- Life, Physical, and Social Science Technicians, All Other (19-4099): All life, physical, and social science technicians not listed separately.

200-206 Community and Social Services Occupations (21-0000)

205 Directors, Religious Activities and Education (21-2021): Direct and coordinate activities of a denominational group to meet religious needs of students. Plan, direct, or coordinate church school programs designed to promote religious education among church membership. May provide counseling and guidance relative to marital, health, financial, and religious problems.

210-215 Legal Occupations (23-0000)

214 Paralegals and Legal Assistants (23-2011)*: Assist lawyers by researching legal precedent, investigating facts, or preparing legal documents. Conduct research to support a legal proceeding, to formulate a defense, or to initiate legal action.

215 Miscellaneous Legal Support Workers (23-2090):

- Court Reporters (23-2091): Use verbatim methods and equipment to capture, store, retrieve, and transcribe pretrial and trial proceedings or other information. Include stenocaptioners who operate computerized stenographic captioning equipment to provide captions of live or prerecorded broadcasts for hearing-impaired viewers.

- Law Clerks (23-2092): Assist lawyers or judges by researching or preparing legal documents. May meet with clients or assist lawyers and judges in court. Excluding "Lawyers" (23-1011) and "Paralegals and Legal Assistants" (23-2011).

- Title Examiners, Abstractors, and Searchers (23-2093): Search real estate records, examine titles, or summarize pertinent legal or insurance details for a variety of purposes. May compile lists of mortgages, contracts, and other instruments pertaining to titles by searching public and private records for law firms, real estate agencies, or title insurance companies.

- Legal Support Workers, All Other (23-2099): All legal support workers not listed separately.

220-255 Education, Training, and Library Occupations (25-0000)

244 Library Technicians (25-4031): Assist librarians by helping readers in the use of library catalogs, databases, and indexes to locate books and other materials; and by answering questions that require only brief consultation of standard reference. Compile records; sort and shelve books; remove or repair damaged books; register patrons; check materials in and out of the circulation process. Replace materials in shelving area (stacks) or files. Include bookmobile drivers who operate bookmobiles or light trucks that pull trailers to specific locations on a predetermined schedule and assist with providing services in mobile libraries. Excluding "Library assistants, Clerical" (43-4121).

254 Teacher Assistants (25-9041)*: Perform duties that are instructional in nature or deliver direct services to students or parents. Serve in a position for which a teacher or another professional has ultimate responsibility for the design and implementation of educational programs and services.

255 Other Education, Training, and Library Workers:

- Audio-Visual Collections Specialists (25-9011): Prepare, plan, and operate audio-visual teaching aids for use in education. May record, catalogue, and file audio-visual materials.

- Farm and Home Management Advisors (25-9021): Advise, instruct, and assist individuals and families engaged in agriculture, agricultural-related processes, or home economics activities. Demonstrate procedures and apply research findings to solve problems; instruct and train in product development, sales, and the utilization of machinery and equipment to promote general welfare. Include county agricultural agents, feed and farm management advisers, home economists, and extension service advisers.

- Instructional Coordinators (25-9031): Develop instructional material, coordinate educational content, and incorporate current technology in specialized fields that provide guidelines to educators and instructors for developing curricula and conducting courses. Include educational consultants and specialists, and instructional material directors.

- Education, Training, and Library Workers, All Other (25-9099): All education, training, and library workers not listed separately.

260-296 Arts, Design, Entertainment, Sports, and Media Occupations (27-0000)

286 Miscellaneous media and communication workers (27-3090):

- Interpreters and Translators (27-3091): Translate or interpret written, oral, or sign language text into another language for others.

- Media and Communication Workers, All Other (27-3099): All media and communication workers not listed separately.

290 Broadcast and sound engineering technicians and radio operators (27-4010)*:

- Audio and Video Equipment Technicians (27-4011): Set up or set up and operate audio and video equipment including microphones, sound speakers, video screens, projectors, video monitors, recording equipment, connecting wires and cables, sound and mixing boards, and related electronic equipment for concerts, sports events, meetings and conventions, presentations, and news conferences. May also set up and operate associated spotlights and other custom lighting systems. Exclude "Sound Engineering Technicians" (27-4014).

- Broadcast Technicians (27-4012): Set up, operate, and maintain the electronic equipment used to transmit radio and television programs. Control audio equipment to regulate volume level and quality of sound during radio and television broadcasts. Operate radio transmitter to broadcast radio and television programs.

- Radio Operators (27-4013): Receive and transmit communications using radiotelegraph or radiotelephone equipment in accordance with government regulations. May repair equipment.
- Sound Engineering Technicians (27-4014): Operate machines and equipment to record, synchronize, mix, or reproduce music, voices, or sound effects in sporting arenas, theater productions, recording studios, or movie and video productions.

292 Television, video, and motion picture camera operators and editors (27-4030)*:

- Camera Operators, Television, Video, and Motion Picture (27-4031): Operate television, video, or motion picture camera to photograph images or scenes for various purposes, such as TV broadcasts, advertising, video production, or motion pictures.
- Film and Video Editors (27-4032): Operate television, video, or motion picture camera to photograph images or scenes for various purposes, such as TV broadcasts, advertising, video production, or motion pictures.

296 Media and communication equipment workers, all other (27-4099): All media and communication equipment workers not listed separately.

300-354 Healthcare Practitioners and Technical Occupations (29-0000)

300 Chiropractors (29-1011): Adjust spinal column and other articulations of the body to correct abnormalities of the human body caused by interference with the nervous system. Examine patient to determine nature and extent of disorder. Manipulate spine or other involved area. May utilize supplementary measures, such as exercise, rest, water, light, heat, and nutritional therapy.

314 Audiologists (29-1121): Assess and treat persons with hearing and related disorders. May fit hearing aids and provide auditory training. May perform research related to hearing problems.

320 Radiation therapists (29-1124): Provide radiation therapy to patients as prescribed by a radiologist according to established practices and standards. Duties may include reviewing prescription and diagnosis; acting as liaison with physician and supportive care personnel; preparing equipment, such as immobilization, treatment, and protection devices; and maintaining records, reports, and files. May assist in dosimetry procedures and tumor localization.

321 Recreational therapists (29-1125): Plan, direct, or coordinate medically approved recreation programs for patients in hospitals, nursing homes, or other institutions. Activities include sports, trips, dramatics, social activities, and arts and crafts. May assess a patient condition and recommend appropriate recreational activity.

330 Clinical Laboratory Technologists and Technicians (29-2010)*:

- Medical and Clinical Laboratory Technologists (29-2011): Perform complex medical laboratory tests for diagnosis, treatment, and prevention of disease. May train or supervise staff.
- Medical and Clinical Laboratory Technicians (29-2012): Perform routine medical laboratory tests for the diagnosis, treatment, and prevention of disease. May work under the supervision of a medical technologist.

331 Dental Hygienists (29-2021)*: Clean teeth and examine oral areas, head, and neck for signs of oral disease. May educate patients on oral hygiene, take and develop X-rays, or apply fluoride or sealants.

332 Diagnostic Related Technologists and Technicians (29-2030):

- Cardiovascular Technologists and Technicians (29-2031): Conduct tests on pulmonary or cardiovascular systems of patients for diagnostic purposes. May conduct or assist in electrocardiograms, cardiac catheterizations, pulmonary-functions, lung capacity, and similar tests. Include vascular technologists.

- Diagnostic Medical Sonographers (29-2032): Produce ultrasonic recordings of internal organs for use by physicians.
- Nuclear Medicine Technologists (29-2033): Prepare, administer, and measure radioactive isotopes in therapeutic, diagnostic, and tracer studies utilizing a variety of radioisotope equipment. Prepare stock solutions of radioactive materials and calculate doses to be administered by radiologists. Subjecting patients to radiation. Execute blood volume, red cell survival, and fat absorption studies following standard laboratory techniques.
- Radiologic Technologists and Technicians (29-2034): Take X-rays and CAT scans or administer non-radioactive materials into patient's blood stream for diagnostic purposes. Include technologists who specialize in other modalities, such as computed tomography and magnetic resonance. Include workers whose primary duties are to demonstrate portions of the human body on X-ray film or fluoroscopic screen.
- 340 Emergency Medical Technicians and Paramedics (29-2041): Assess injuries, administer emergency medical care, and extricate trapped individuals. Transport injured or sick persons to medical facilities.
- 350 Licensed Practical and Licensed Vocational Nurses (29-2061)*: Care for ill, injured, convalescent, or disabled persons in hospitals, nursing homes, clinics, private homes, group homes, and similar institutions. May work under the supervision of a registered nurse. Licensing required.
- 351 Medical Records and Health Information Technicians (29-2071)*: Compile, process, and maintain medical records of hospital and clinic patients in a manner consistent with medical, administrative, ethical, legal, and regulatory requirements of the health care system. Process, maintain, compile, and report patient information for health requirements and standards.
- 352 Opticians, Dispensing (29-2081): Design, measure, fit, and adapt lenses and frames for client according to written optical prescription or specification. Assist client with selecting frames. Measure customer for size of eyeglasses and coordinate frames with facial and eye measurements and optical prescription. Prepare work order for optical laboratory containing instructions for grinding and mounting lenses in frames. Verify exactness of finished lens spectacles. Adjust frame and lens position to fit client. May shape or reshape frames. Include contact lens opticians.
- 353 Miscellaneous Health Technologists and Technicians (29-2090)*:
 - Orthotists and Prosthetists (29-2091): Assist patients with disabling conditions of limbs and spine or with partial or total absence of limb by fitting and preparing orthopedic braces or prostheses.
 - Health Technologists and Technicians, All Other (29-2099): All health technologists and technicians not listed separately.
- 354 Other Healthcare Practitioners and Technical Occupations (29-9000):
 - Occupational Health and Safety Specialists (29-9011): Review, evaluate, and analyze work environments and design programs and procedures to control, eliminate, and prevent disease or injury caused by chemical, physical, and biological agents or ergonomic factors. May conduct inspections and enforce adherence to laws and regulations governing the health and safety of individuals. May be employed in the public or private sector. Include environmental protection officers.
 - Occupational Health and Safety Technicians (29-9012): Collect data on work environments for analysis by occupational health and safety specialists. Implement and conduct evaluation of programs designed to limit chemical, physical, biological, and ergonomic risks to workers.

- Athletic Trainers (29-9091): Evaluate, advise, and treat athletes to assist recovery from injury, avoid injury, or maintain peak physical fitness.
- Healthcare Practitioners and Technical Workers, All Other (29-9099): All healthcare practitioners and technical workers not listed separately.

Appendix 2. Crosswalk of “Management, Professional, and Related Occupations” in the Census 2000 (001-354)² to the Census 1990 Occupation Codes

Census 2000 Occupation Codes		Corresponding Census 1990 Occupation Codes	
Code	Occupation Description	Code	Occupation Description
001	Chief executives	004	Chief executives and general administrators, public administrations
002	General and operations managers		
003	Legislators	003	Legislators
004	Advertising and promotions managers		
005	Marketing and sales managers	013	Managers, marketing, advertising, and public relations
006	Public relations managers		
010	Administrative services managers	N/A	
011	Computer and information system managers	N/A	
012	Financial managers	007	Financial managers
013	Human resources managers	008	Personnel and labor relations managers
014	Industrial production managers	N/A	
015	Purchasing managers	009	Purchasing managers
016	Transportation, storage, and distribution managers	N/A	
020	Farm, ranch, and other agricultural managers	475	Managers, farms, except horticultural
		476	Managers, horticultural specialty farms
021	Farmers and ranchers	473	Farmers, except horticultural
		474	Horticultural specialty farmers
022	Construction managers	N/A	
023	Education administrators	014	Administrators, education and related fields
030	Engineering managers	N/A	
031	Food service managers	017	Managers, food serving and lodging establishments
032	Funeral directors	019	Funeral directors
033	Gaming managers	N/A	
034	Lodging managers	017	Managers, food serving and lodging establishments
035	Medical and health services managers	015	Managers, medicine and health
036	Natural science managers	N/A	
040	Postmasters and mail superintendents	016	Postmasters and mail superintendents
041	Properties, real estates, and community association managers	018	Managers, properties and real estates
042	Social and community service managers	021	Managers, service organizations, n.e.c.
043	Managers, all other	022	Managers and administrators, n.e.c.
050	Agents and business managers of artists and athletes	034	Business promotion agents
051	Purchasing agents and buyers, farm products	028	Purchasing agents and buyers, farm products
052	Buyers, wholesale and retail trade except farm products	029	Buyers, wholesale and retail trade except farm products
053	Purchasing agents, all other	033	Purchasing agents and buyers, n.e.c.
054	Claims adjusters, appraisers, examiners, and investigators	375	Insurance adjusters, examiners, and investigators
		376	Investigators and adjusters, except insurance
056	Compliance officers, except agriculture, construction, health and safety, and transport	036	Inspectors and compliances officers, except constructions
060	Cost estimators	N/A	
062	Human resources, training, and labor relations specialists	027	Personnel, training, and labor relations specialists
070	Logisticians	N/A	
071	Management analysts	026	Management analysts
072	Meeting and convention planners	N/A	
073	Other business operations specialists	037	Management related occupations, n.e.c.
080	Accountants and auditors	023	Accountants and auditors

² For the structure of the 1998 SOC aggregation, link to <http://www.bls.gov/opub/rtaw/pdf/rtaw2001.pdf>, and see page 113.

081	Appraisers and assessors of real estate		
082	Budget analysts		
083	Credit analysts	N/A	
084	Financial analysts		
085	Personal financial advisors		
086	Insurance Underwriter	024	Underwriter
090	Financial examiners		
091	Loan counselors and officers	N/A	
093	Tax examiners, collectors, and revenue agents		
094	Tax prepares		
095	Financial specialists, all other	025	Other financial officers
100	Computer scientists and system analysts	064	Computer system analysts and scientists
101	Computer programmers	229	Computer programmers
102	Computer software engineers		
104	Computer support specialists		
106	Database administrators	N/A	
110	Network and computer systems administrators		
111	Network systems and data communication analysts	065	Operations and systems researchers and analysts
120	Actuaries	066	Actuaries
121	Mathematicians	068	Mathematical scientists n.e.c.
122	Operation research analysts	065	Operations and systems researchers and analysts
123	Statisticians	067	Statisticians
124	Miscellaneous mathematical science occupations	068	Mathematical scientists n.e.c.
130	Architects, except naval	043	Architects
131	Surveyors, cartographers, and phtogrammetrists	063	Surveyors and mapping scientists
132	Aerospace engineers	044	Aerospace engineers
133	Agricultural engineers	054	Agricultural engineers
134	Biomedical engineers	N/A	
135	Chemical engineers	048	Chemical engineers
136	Civil engineers	053	Civil engineers
140	Computer hardware engineers	N/A	
141	Electrical and electronics engineers	055	Electrical and electronics engineers
142	Environmental engineers	N/A	
143	Industrial engineers, including health and safety	056	Industrial engineers
144	Marine engineers and naval architects	058	Marine and naval architects
145	Materials engineers	045	Metallurgical and materials engineers
146	Mechanical engineers	057	Mechanical engineers
150	Mining and geological engineers, including mining safety	046	Mining engineers
151	Nuclear engineers	049	Nuclear engineers
152	Petroleum engineers	047	Petroleum engineers
153	Engineers, all other	059	Engineers, n.e.c.
154	Drafters	217	Drafting occupations
155	Engineering technicians, except drafters	216	Engineering technicians, n.e.c.
156	Surveying and mapping technicians	218	Surveying and mapping technicians
160	Agricultural and food scientists	077	Agricultural and food scientists
161	Biological scientists	078	Biological and life scientists
164	Conservation scientists and foresters	079	Forestry and conservation scientists
165	Medical scientists	083	Medical scientists
170	Astronomers and physicists	072	Physicists and astronomers
171	Atmospheric and space scientists	074	Atmospheric and space scientists
172	Chemists and material scientists	073	Chemists except biochemists
174	Environmental scientists and geoscientists	075	Geologists and geodesists
176	Physical scientists, all other	076	Physical scientists, n.e.c.

180	Economists	166	Economists
181	Market and survey researchers	N/A	
182	Psychologists	167	Psychologists
183	Sociologists	168	Sociologists
184	Urban and regional planners	173	Urban planners
186	Miscellaneous social scientists and related workers	169	Social scientists, n.e.c.
190	Agricultural and food science technicians	N/A	
191	Biological technicians	223	Biological technicians
192	Chemical technicians	224	Chemical technicians
193	Geological and petroleum technicians	N/A	
194	Nuclear technicians	N/A	
196	Other life, physical, and social science technicians	225	Science technicians n.e.c.
200	Counselors	163	Counselors, educational and vocational
201	Social workers	174	Social workers
202	Miscellaneous community and social service specialists	175	Recreation workers
204	Clergy	176	Clergy
205	Directors, religious activities and education	N/A	
206	Religious workers, all other	177	Religious workers, n.e.c.
210	Lawyers	178	Lawyers
211	Judges, magistrates, and other judicial workers	179	Judges
214	Paralegal and legal assistants	234	Legal assistants
215	Miscellaneous legal support workers	N/A	
220	Postsecondary teachers	113 -154	Teachers, postsecondary
230	Preschool and kindergarten teachers	155	Teachers, pre-kindergarten and kindergarten
231	Elementary and middle school teachers	156	Teachers, elementary school
232	Secondary school teachers	157	Teachers, secondary school
233	Special education teachers	158	Teachers, special education
234	Other teachers and instructors	159	Teachers, n.e.c.
240	Archivists, curators, and museum technicians	165	Archivists and curators
243	Librarians	164	Librarians
244	Library technicians	N/A	
254	Teachers assistants	387	Teachers' aides
255	Other education, training, and library workers	N/A	
260	Artists and related workers	188	Painters, sculptors, craft-artists, and artist printmakers
263	Designers	185	Designers
270	Actors	187	Actors and directors
271	Producers and directors		
272	Athletes, coaches, umpires, and related workers	199	Athletes
274	Dancers and choreographers	193	Dancers
275	Musicians, singers, and related workers	186	Musicians and composers
276	Entertainers and performers, sports and related workers, all other	194	Artists, performers, and related workers, n.e.c.
280	Announcers	198	Announcers
281	News analysts, reporters, and correspondents	195	Editors and reporters
282	Public relations specialists	197	Public relations specialists
283	Editors	195	Editors and reporters
284	Technical writers	184	Technical writers
285	Writers and authors	183	Authors
286	Miscellaneous media and communication workers	N/A	
290	Broadcast and sound engineering technicians and radio operators	228	Broadcast equipment operators
291	Photographers	189	Photographers

292	Television, video, and motion picture camera operators and editors	228	Broadcast equipment operators
296	Media and communication equipment workers, all other	N/A	
300	Chiropractors	N/A	
301	Dentists	085	Dentists
303	Dietitians and nutritionists	097	Dietitians
304	Optometrists	087	Optometrists
305	Pharmacists	096	Pharmacists
306	Physicians and surgeons	084	Physicians
311	Physician assistants	106	Physician's assistants
312	Podiatrists	088	Podiatrists
313	Registered nurses	095	Registered nurses
314	Audiologists	N/A	
315	Occupational therapists	099	Occupational therapists
316	Physical therapists	103	Physical therapists
320	Radiation therapists	N/A	
321	Recreational therapists	N/A	
322	Respiratory therapists	098	Respiratory therapists
323	Speech-language pathologists	104	Speech therapists
324	Therapists, all other	105	Therapists, n.e.c.
325	Veterinarians	086	Veterinarians
326	Health diagnosing and treating practitioners, all other	089	Health diagnosing practitioners, n.e.c.
330	Clinical laboratory technologists and technicians	203	Clinical laboratory technologists and technicians
331	Dental hygienists	204	Dental hygienists
332	Diagnostics related technologists and technicians	N/A	
340	Emergency medical technicians and paramedics	N/A	
341	Health diagnosing and treating practitioners support technicians	N/A	
350	Licensed practical and vocational nurses	207	Licensed practical nurses
351	Medical records and health information technicians	205	Health record technologists and technicians
352	Optical, dispensing	N/A	
353	Miscellaneous health technologists and technicians	208	Health technologists and technicians, n.e.c.
354	Other healthcare practitioners and technical occupations	N/A	