6-2001

Documentation for the 2001 Rank Ordering of Michigan's CTE Programs

Kristine Heffel
W.E. Upjohn Institute for Employment Research

Documentation for the 2001 Rank Ordering Of Michigan's CTE Programs

Kristine Heffel

June 2001

W.E. Upjohn Institute for Employment Research
300 S. Westnedge Avenue
Kalamazoo, MI 49007

Contents of Documentation

Introduction

This document describes the data used and steps taken to calculate the CIP program rankings. There are three main sections to the documentation. The first section contains information about the sources of data. Most of the data used were downloaded from the Internet and websites are provided for all files. Brief descriptions of the data sets and the fields used from each are also given.

The second section describes the process of creating a crosswalk between the CIP codes and three different occupational coding systems: OES codes, SOC codes, and CPS (Census) codes. This crosswalk provides a list of occupations from each coding system that correspond to each CIP code. The purpose of the crosswalk is to link economic data from sources using the different occupational coding systems to appropriate CIP codes.

The third section describes the process of calculating the rankings using Microsoft Access and the Access database created, CIPRanking2001_Upjohn. CIPRanking2001_Upjohn.mdb contains all of the data files and the occupational crosswalk file mentioned above, as well as an interactive form created to automate the ranking process. Descriptions of the fields found in each table are provided in this section of the documentation, followed by more detailed information about the interactive form and how the rankings are calculated.

To calculate the rankings using the interactive form, a user opens the Access database CIPRanking2001_Upjohn and clicks on 'Forms' (under Objects at the left of the screen). The user then loads the interactive form by double clicking on CIPrankform. Once the form is loaded, the user selects the desired wage and placement data to use in the rankings from the drop-down menu options. Clicking the 'Run CIP Ranking' button will initiate the program to calculate the rankings using the selections made by the user. The results are listed in the CIP Rank Results window. These results can be printed using the 'Print Rank Table' button at the right - note only the rankings shown in the results window can be printed. The user can also change the selections in the drop-down menus and run different sets of rankings, however, without having to reload the form each time.

1.0 Data Sources

1.1 Files used

CIP-OES-SOC-CPS Crosswalk:

- OESXCIP.exe file (ftp://ftp.xwalkcenter.org/download/xwalks)
- OCOES00.xls file (ftp://ftp.xwalkcenter.org/download/soc2000)
- O*NET 3.0 Database files (http://www.onetcenter.org/product/database.html) (onetsoc_job_zones file)
- XWALKV43.mdb (ftp://ftp.xwalkcenter.org/download/xwalks)

Openings Data:

- State of Michigan LMI occupational projections data (http://www.michlmi.org)

Wage Data:

- BLS Occupational Employment Statistics program National and State wages (http://stats.bls.gov/oeshome.htm)
- Current Population Survey data from CD-Rom formatted by Unicon[1]
- Census of Agriculture (1997 data for State of Michigan) (http://www.nass.usda.gov/census/census97/volume1/vol1pubs.htm)

Placement Data:

- Provided by MDCD (VEDS)

1.2 OES Openings Data

OES projected openings data were taken from the State of Michigan LMI website at http://www.michlmi.org. (To get to the projections data, click on the 'Occupation' tab near the top of the page, and then click 'Forecasts', and 'Statewide'.) The number of projected openings used in the rankings comes from the Total column under the heading 'Annual Average Openings', which include openings due to growth and replacements.

Fields Used:	OES Code	Occupational Employment Statistics classification code
	Occupation	Title corresponding to OES code
	Total	Total annual average openings

1.3 SOC Wage Data

SOC wage data were taken from the US Bureau of Labor Statistics Occupational Employment Statistics website at http://stats.bls.gov/oeshome.htm. (To download data files, click on 'Download OES Estimates', and '1999 National Estimates' or '1999 State Estimates'.) The estimates files are downloaded as zipped Excel files containing wage and employment estimates for the nation and for all of the states. For 1999, the state estimates have been divided alphabetically by state name into 2 Excel files and Michigan is included in the first file. The National estimates include wages for the 10^{th}, 25^{th}, 75^{th}, and 90^{th} percentiles in addition to the mean and median, while the state level estimates include only the mean and median wages. Employment and wage estimates are not available for the 'All Other' occupations in

[1] Unicon Research Corporation is a private sector firm that prepares the CPS data on CD-Rom in a Windows accessible format. The original CPS data are not changed.

the 1999 data. (Questions about the OES program and data or the SOC coding system can be directed to staff of the OES program at 202-691-6569.)

Fields Used:

National data -	Occ_code	SOC (Standard Occupational Classification) code
	Occ_title	SOC title for the occupation
	Tot_emp	Total employment for the occupation nationally
	H_mean	Hourly mean wage for the occupation nationally
	A_mean	Annual mean wage for the occupation nationally
	H_median	Hourly median wage for the occupation nationally
	A_median	Annual median wage for the occupation nationally
	H_wpct10	Hourly 10th percentile wage for the occupation nationally
	A_wpct10	Annual 10th percentile wage for the occupation nationally
	Annual	Flag indicating that only annual wage estimates are released for the occupation (possible entries are TRUE or blank)
	Year	Year of data
State data -	Occ_code	SOC (Standard Occupational Classification) code
	Occ_title	SOC title for the occupation
	Tot_emp	Total employment for the occupation in Michigan
	H_mean	Hourly mean wage for the occupation in Michigan
	A_mean	Annual mean wage for the occupation in Michigan
	H_median	Hourly median wage for the occupation in Michigan
	A_median	Annual median wage for the occupation in Michigan
	Annual	Flag indicating that only annual wage estimates are released for the occupation (possible entries are TRUE or blank)
	Year	Year of data
	St	Two digit state abbreviation (state file only)

1.4 CPS Wage Data

CPS data for the year 2000 were taken from the outgoing rotation group of the Current Population Survey. (CD-Rom compiled by Unicon.) Fields containing the occupation, weekly earnings, earnings weight, and age (only records with age from 18 through 35) were selected from the data disk. The Unicon formatting does not include decimal places in the wages or weights. According to the Unicon documentation, the data user must make the following adjustments to the data: Weekly earnings have to be divided by 100 to adjust for 2 implied decimal places, and the earnings weights have to be divided by 12,000 to adjust for 4 implied decimal places and 12 months of collected data. In addition, data records for those with the labor force classification of 'not in the labor force' (mlr = 7) were removed. Any remaining records with weekly earnings or occupations of '-1' were also excluded. (A '-1' earnings or occupation indicates that the field was left blank by the respondent. For example, the respondent is unemployed and has no occupation or wage earnings.) Using the remaining data, the weighted mean, weighted median, and sum of weights were calculated for each occupation code. These are the CPS wage and weight values used in the rankings.

Fields Used:	Age (selected 18-35)	Limits records to persons from age 18 through 35
	Mlr	Monthly labor force recode (used to remove records classified as 'not in the labor force', mlr = 7)
	Ernwgt	Earnings weight
	Ernwk	Weekly earnings
	Occ	CPS (Census) occupation code

1.5 Census of Agriculture Data

Census of Agriculture data were taken from the National Agricultural Statistics Service website at http://www.nass.usda.gov/census/census97/volume1/vol1pubs.htm. (To download report for Michigan in .pdf format, click on 'Michigan' in the third section of the table under the heading 'State and County Geographic Area Series'.) The Census of Agriculture is taken every 5 years, in years ending in '2' or '7', so the most recent data are from the 1997 Census. These data are used to supplement the wages collected by the Occupational Employment Statistics Program, since farmers are not surveyed by OES. Data used come from the downloaded report, Chapter 1, Table 4 'Net Cash Return from Agricultural Sales' and Table 5 'Government Payments and Other Farm-Related Income'. All data come from the column for 'All Farms' for the year 1997.

Data Used:

Table 4	Net Cash return from agricultural sales for the farm unit, farms – used as the number of farmers in the state (denominator)
	Net Cash return from agricultural sales, Average per farm, dollars – used as a portion of calculated farm income
Table 5	Government payments, Average per farm, dollars – used as a portion of calculated farm income

1.6 CIP Placement Data

Placement data by CIP code for the year 2000 were collected and provided by MDCD based on surveys of 1999 program completers.

Fields Used:	CIP code	Code from CTE program
	Complete	Number of students completing the CTE program
	Returned	Number of students returning the survey
	Related	Number of survey respondents reporting placement in a related field or educational program
	Totplace	Number of survey respondents reporting placement in any field or educational program

1.7 O*NET Job Zones

Job zones for the SOC coded occupations were obtained from the O*NET online website at http://online.onetcenter.org/. (To download the database files, click on 'Online Resources', then click on 'Occupational Information Network (O*NET)' and select 'O*NET 3.0 Database', click on 'O*NET 3.0 Database' and select 'Download: O*NET 3.0 Database Files - v.3'). The job zone information by O*NET-SOC code is found in the file onetsoc_job_zones. The fields contained in this file are the O*NET-SOC code and job zone. The O*NET-SOC code varies slightly from the SOC code, in that the O*NET-SOC classification adds a 2-digit decimal extension to the standard SOC code. An extension of .00 means that the O*NET-SOC code is the same as the SOC code, however extensions of .01, .02, etc. mean that the SOC code has been subdivided into smaller 'sub-occupations' for the purposes of O*NET. In order to obtain the SOC codes, an additional field was added to the O*NET database file and the left 7-digits of the O*NET-SOC code (those before the .xx extension) were copied to the new field. This field represents the standard SOC code. Because of the O*NET use of decimal extensions, the same 7-digit SOC code can have more than one O*NET-SOC job zone if the occupation had extensions with different job zone levels. Also job zones are not provided for all SOC occupations - most notably the 'All Other' occupations have no job zones given.

Fields Used:	SOC code	(created) Left 7 digits of O*NET-SOC code
	O*NET-SOC code	Standard Occupational Classification system code with added 2-digit extension specified by O*NET
	Job Zone	Indication of experience/education/training level needed for an occupation

2.0 Crosswalk Documentation

To create the crosswalk between CIP, OES, SOC, and CPS (Census) codes, the OESXCIP and SOCOES00 crosswalk files were merged by the OES code, creating a crosswalk between the CIP, OES, and SOC coding systems. The SOC job zones were then merged using the SOC code. Note that some SOC codes have more than one job zone listed, while others have no job zone, including the 'All Other' occupations. After review of the OES and SOC occupations in each CIP code, the CPS (Census) codes were added, as discussed in section 2.2 below.

2.1 Creating the CIP–OES–SOC crosswalk

There were four steps involved in creating the final CIP–OES–SOC crosswalk, with each step creating a new 'version' of the crosswalk. First the complete CIP–OES–SOC crosswalk created above was limited to CTE CIP codes provided by MDCD. The second version further limits the crosswalk to those occupations in either job zone 2 or job zone 3. The third version includes other modifications as specified below. Additions and exclusions recommended by MDCD were incorporated into the final version of the crosswalk. Each version is described in more detail below.

Version 1 of crosswalk:

Limits the complete CIP-OES-SOC crosswalk to the applicable CIP codes, as listed on the June 2000 document 'Michigan Department of Career Development 2000-2001 Added Cost Approved Secondary Vocational Education Programs', excluding CIP code 19.0101. CIP code 13.0101 Education, General was added to the crosswalk, even though it was not included on the June 2000 list. CIP code 52.9999 (Business Services and Technology) was divided into 4 subgroups according to clusters provided by MDCD.

The subgroups of CIP code 52.9999 are denoted by the letter A, B, C, or D following the CIP code, as Feinstein had done in the 1997 version of the rankings. For the 2001 rankings, these letters were assigned in the order that the clusters appeared in the document from MDCD. That is, the letter A was assigned to the first cluster used as a subgroup of CIP 52.9999 (cluster 5), the letter B was assigned to the next cluster used as a subgroup (cluster 6), and so on. Because of this, the letters assigned to the 2001 subgroups may not correspond to the same subgroup in the 1997 version of the rankings. Since the subgroups do not appear in the OES-CIP crosswalk, the primary and related CIP codes listed for the appropriate clusters were used to create the crosswalk for the subgroups of CIP 52.9999, per MDCD instructions. The OES occupations listed for each of the primary and related CIP codes were assigned to the designated CIP subgroup. Any CIP codes that appeared on the list of programs provided by MDCD were not included in the primary and related CIP codes for the subgroups. The subgroup assignments, clusters used, and primary and related CIP codes are listed in the table below.

CIP Subgroup	Cluster	Primary and Related CIP Codes
52.9999A	Information Technology Services (cluster 5)	11.0101-11.9999, 15.0301, 15.0402, 47.0104, 52.1201-52.1205, 10.0101-10.0199, 14.1001, 25.0101-25.9999
52.9999B	Wholesale/Retail Sales and Services (cluster 6)	52.1401, 08.0101-08.0899, 08.1203-08.9999, 12.0301, 20.0502
52.9999C	Financial Services (cluster 7)	08.0101, 52.0803, 52.0802, 52.0804, 52.0899, 52.0807, 52.0805
52.9999D	Business and Administrative Services (cluster 9)	52.0201, 52.0301-52.0399, 52.0401-52.0499, 52.1001-52.1099

Since the OESXCIP file is based on the 1990 CIP codes, a few of the current CIP codes are not included or the titles have changed. Some additional CIP codes contain only one OES occupation code, often an 'All Other' occupation. For these CIP codes, listed in the table below, additional OES occupations were added from CIP codes in the same section of the OESXCIP crosswalk. For example, CIP code 20.0499 (Hospitality and Food Services) in the OESXCIP crosswalk contained only OES occupation code 65099 (All Other Food Service Workers), as noted in the 'Reason' column of the table below. Since this single occupation did not include many occupations that could be trained in this program, the OES occupations from CIP codes 20.0401 through 20.0409 in the OESXCIP crosswalk were also added to CIP code 20.0499, as noted in the 'Modification' column of the table. The following table lists the CIP codes that were modified in the first version of the crosswalk, the modification that was made, and the reason that OES occupations from other CIP codes were used.

CIP code	CIP title	Modification	Reason
02.9999	Agriscience and Natural Resources Education	Added OES codes from all CIP codes beginning with 02. (02.0101 to 02.0501)	CIP 02.9999 contained only OES code 24305
20.0499	Hospitality and Food Services	Added OES codes from all CIP codes beginning with 20.04 (20.0401 to 20.0409)	CIP 20.0499 contained only OES code 65099
43.9999	Public Safety/Protective Services	Added OES codes from all CIP codes beginning with 43. (43.0107 to 43.0299)	CIP 43.9999 contained only OES code 63099
46.9900	Construction Trades	Included OES codes from all CIP codes beginning with 46. (46.0301 to 46.9999)	Not in crosswalk
47.0399	Industrial Equipment Maintenance and Repair	Added OES codes from all CIP codes beginning with 47.03 (47.0302 to 47.0303)	CIP 47.0399 contained only OES codes 85117, 85119, 87921
47.0699	Mechanics Cluster	Included OES codes from all CIP codes beginning with 47.06 (47.0603 to 47.0611)	Not in crosswalk
51.9999	Health	Added OES codes from all CIP codes beginning with 51. (51.0101 to 51.3099)	CIP 51.9999 contained only OES code 32999
52.9999	Business Services and Technology	Used primary and related CIP codes from appropriate proposed clusters (5, 6, 7, and 9) as listed above to create 4 BST divisions.	CIP 52.9999 contained only OES code 19999

Version 2 of crosswalk:

The intent of this version is to limit the occupations in version 1 of the crosswalk to only those in job zone 2 or job zone 3. Occupations with more than one job zone are included as long as either job zone 2 or job zone 3 are included, as are occupations that have no job zone given in the O*NET file.

Version 3 of crosswalk:

Includes modifications made to version 2 of the crosswalk based on a review of OES and SOC occupations. Modifications were made for the following reasons:

Occupations Added	**Modification Code**
Occupation not job zone 2 or 3, but appropriate for CIP	1
CIP program title changed/expanded from 1990 CIP title	2
Additional OES occupation related to CIP category	3
Addition of related technicians/technologists	4

Occupations Deleted

Occupation inappropriate to program (often: SOC occupation from crosswalk not appropriate or no job zone available, but likely too high)	99

Final Version of CIP–OES–SOC crosswalk:

The final version of the crosswalk was created from crosswalk version 3 with additional changes recommended by MDCD, including program consultant suggestions. All changes made to version 2 of the crosswalk to create the final version are listed in Appendix A, with the reason for change noted according to the codes in the tables above. Changes recommended by the program consultants and MDCD are marked as 'Add' or 'Delete' followed by '(MDCD)' to distinguish those changes from changes made by the Upjohn Institute. Changes made by the Upjohn Institute based on occupations that were included in the 1997 rankings have the note '(in 1997 version)'. Some occupations that MDCD recommended excluding have not been deleted from the crosswalk, but contain a 'No' in the 'Include' column at the far right. These occupations seem appropriate for the CIP and were left in the crosswalk in case MDCD chooses to include them in future rankings. These occupations have not been used in calculating in the rankings.

2.2 Adding Census codes to the CIP-OES-SOC crosswalk

A list of Census occupation codes matched to OES codes was obtained using the XWALKV43.mdb file from the National Crosswalk Service Center website (ftp://ftp.xwalkcenter.org/download/xwalks). The fields containing the Census codes, Census titles, OES codes, and OES titles were taken from the database and a query was run to delete duplicate records (those having the same OES and Census codes). This list was then joined by OES code with version 3 of the crosswalk.

In many cases, multiple Census codes matched an OES code. Some of these matches were not appropriate and were deleted from the OES-Census code crosswalk. OES codes that did not appear in the OES-Census crosswalk were added along with the appropriate Census code(s). These additions and deletions were made to the complete OES-Census crosswalk. Changes to the CIP–OES–SOC–Census crosswalk were made if a Census occupation was not appropriate for a specific CIP. Appendix B provides a list of OES-Census occupation code pairs that were added to or deleted from the OES-Census crosswalk or from a specific CIP where the Census occupation seemed inappropriate. Only the Census code-OES code pairs listed in the table were changed. If the OES code matched to only one Census code and the Census occupation seemed inappropriate, only the Census code was deleted–an OES code was never eliminated from the crosswalk. The CIP codes listed in Appendix B are those affected by the addition or deletion of an OES-Census pair.

2.3 Adding Census of Agriculture Data

Since farmers are not covered in the Occupational Employment Statistics program survey, the Census of Agriculture data are being used to provide a wage for farmers. In order to combine the wage and employment figures for farmers calculated from Census of Agriculture data with the other SOC data, the code 99-9999 was created. This code was added to the crosswalk under CIP 02.9999 with the OES and CPS (Census) codes left blank. This procedure allows the data for farmers to be incorporated into the average wage for CIP 02.9999 in the same manner as other SOC codes.

2.4 Adding LMI OES codes

The projected openings produced by the State of Michigan LMI program include occupation codes that differ from the OES codes used by the BLS Occupational Employment Statistics program, as found in the 1998 OES dictionary (http://stats.bls.gov/oes/oes_dl.htm), and in the SOCOES00 crosswalk. Some of the codes used in the LMI projections have the same or a similar title to the BLS OES codes, while other LMI codes appear to be combinations of several BLS OES codes. Since the OES codes in the crosswalk are BLS OES codes from the SOCOES00 crosswalk, the LMI OES codes need to be added into the crosswalk where appropriate. The table in Appendix C shows the relationship between LMI codes and BLS OES codes based on occupation titles.

In order to include openings data from occupations where the LMI codes were different from the OES codes in the crosswalk, the LMI codes were added to the CIP codes in the crosswalk that already contained the related BLS OES codes listed in Appendix C. Since 1996–2006 openings data were not available for these BLS OES codes, adding the LMI code to the crosswalk does not result in double counting the openings for that occupation. Appendix D contains a list of CIP codes and the LMI codes that were added to the crosswalk in order to capture the openings data for 'missing' OES occupations. In cases where an LMI code includes multiple OES codes (indicated by the type 'Rollup' in Appendix C), the 1998 National OES employment estimates were used to assign the proportion of the LMI occupation that belonged in each CIP based on the OES occupations included in the CIP. (The 1998 National OES employment estimates are available for download at http://stats.bls.gov/oes/oes_dl.htm.)

For example, CIP code 02.9999 (Agriscience and Natural Resources Education) includes the following OES occupations in the final crosswalk: Biological, Agricultural, and Food Technicians and Technologists, Except Health (OES code 24502); Chemical Technicians and Technologists, Except Health (OES code 24505); Petroleum Technicians and Technologists (OES code 24511); and All Other Physical and Life Science Technicians and Technologists (OES code 24599). In the Michigan LMI projections, these four occupations are combined with Nuclear Technicians and Technologists (OES code 24508) and Mathematical Technicians (OES code 25323) to form the occupation Science/Mathematics Techns (LMI code 24501). Because not all of the combined occupations are included in the original crosswalk for CIP 02.9999, only the share of openings from the combined LMI occupation that represents the occupations in the crosswalk should be included in the CIP. Using the 1998 National OES estimates, the following employment estimates are obtained:

OES/LMI code	OES/LMI Title	1998 National OES employment	Share of employment
24502	Biological, Agricultural, and Food Technicians and Technologists	40,480	0.176
24505	Chemical Technicians and Technologists	76,210	0.331
24508	Nuclear Technicians and Technologists	3,550	0.015
24511	Petroleum Technicians and Technologists	8,020	0.035
24599	All Other Physical and Life Science Technicians and Technologists	99,710	0.433
25323	Mathematical Technicians	2,530	0.011
24501 (LMI code)	Science/Mathematics Techns	230,500	

Dividing the employment for each OES occupation by the total employment for all OES occupations included in the combined LMI occupation gives the share of employment for each individual OES code. When more than two OES codes are included in an LMI code, there may be multiple OES codes in the crosswalk for a CIP, and their shares of employment are simply added together to calculate the total share of openings to include in that CIP. In the above example, CIP 02.9999 receives 97.5 percent of the openings for LMI code 24501 (reflecting the 0.975 share obtained by adding the shares of the 4 individual occupations included in the crosswalk). If a CIP contains all occupations included in the LMI rollup, the total share of employment will be 1. LMI codes that match directly to OES occupations also have a share of 1.

2.5 Format of Final Crosswalk

Following is an example of the CIP–OES–CPS–SOC crosswalk and a description of the fields included. The occupation codes from this final crosswalk were used as the foundation of the Access Database to combine data from various sources (each corresponding to a different occupational classification code) and calculate the rankings by CIP code.

CIP code	CIP title	OES code	OES title	OES share	Census code	Census title	SOC code	SOC title	Job zone
01.0201	Agricultural Mechanics	85132	Maintenance Repairers, General Utility	1	547	Specified Mechanics And Repairers, N.E.C.	49-9042	Maintenance and Repair Workers, General	3
01.0201	Agricultural Mechanics	85321	Farm Equipment Mechanics	1	517	Farm Equipment Mechanics	49-3041	Farm Equipment Mechanics	3
01.0201	Agricultural Mechanics	85328	Small Engine Specialists	1	509	Small Engine Repairers	49-3053	Outdoor Power Equipment and Other Small Engine Mechanics	3

Crosswalk fields and description:

CIP code:	CIP program code
CIP title:	CIP program name
OES code:	Occupational Employment Statistics occupation code (also includes State of Michigan LMI OES codes)
OES title:	Occupational Employment Statistics occupation title
OES share:	Share of LMI OES occupation openings that are included in the CIP
Census code:	Current Population Survey (Census) occupation code
Census title:	Current Population Survey (Census) occupation title
SOC code:	Standard Occupational Classification code
SOC title:	Standard Occupational Classification title for the occupation
Job zone:	Job zone or zones that apply to the 7-digit SOC code

3.0 Access Database (CIPRanking2001_Upjohn.mdb)

3.1 Overview of CIPRanking2001_Upjohn.mdb

The Access database named CIPRanking2001_Upjohn.mdb contains data tables and an interactive form named CIPrankform that is used to calculate the final rankings. The data tables are described below followed by more detailed notes about the table or specific fields. After the table descriptions is a list of tables generated by CIPrankform. These are preliminary tables used to manipulate the data in the process of calculating the CIP rankings, so no detail about the tables is provided with this list. Following this is a discussion of the ranking process and the interactive form, CIPrankform. Additional technical detail about the form and the tables generated by the form is provided in Appendix E.

To use the interactive form, a user opens CIPRanking2001_Upjohn.mdb in Access and clicks on 'Forms' (under Objects at the left of the screen). The user loads the interactive form by double clicking on CIPrankform. Once the form is loaded, the user selects the desired wage and placement data to use in the rankings. Clicking the 'Run CIP Ranking' button will calculate the rankings using the selections made above and output the list to the CIP Rank Results window. The user then has the option to print the rank table - only the rankings shown in the results window can be printed. The user can also change the selections in the drop-down menus and run the rankings again using different wage or placement options.

3.2 Data Tables: Descriptions and Notes

The CIPRanking2001_Upjohn database contains the tables described below. Following the brief description of each table are a listing of the fields included in that table (field name, type, size, and description) and additional notes about the table.

CIP: CIP program codes and titles.

Field Name	Type	Size	Description
CIPcode	Text	8	CIP program code – Format: 00.00000, extra digit is for subgroup of CIP 52.9999
CIPpgm	Text	150	CIP program title
ShortCIP	Text	7	CIP code (no extra digit for CIP 52.9999 subgroups) – Format: 00.0000
CIPshare	Number	Single	Percentage of CIP placements that correspond to the CIP code. (Should be 1 except for CIP 52.9999 subgroups in the current rankings)
Combine	Text	8	For programs that are combined in the rankings, indicates which program a CIP code is combined into. Only the CIP being combined has a code in this field – Format: 00.00000
CIPnotes	Memo		General notes, changes to CIP code or program, etc.

Notes:

- The notation used for the subgroups of CIP code 52.9999 has been changed in the Access database from a letter to a numerical value. That is, instead of 52.9999A, 52.9999B, 52.9999C, and 52.9999D as the subgroups appear in the crosswalk (discussed in section 2.1 above), CIP codes of 52.99991, 52.99992, 52.99993, and 52.99994 have been used in the Access database.

The ordering of the subgroups remains the same so 52.9999A and 52.99991 both represent Information Technology Services, 52.9999B and 52.9999B both represent Wholesale/Retail Sales and Services, etc. This change allows the full subgroup codes to be entered in the 'CIPcode' column (which allows only numerical values, not alphabetical characters) instead of creating a separate column to identify the subgroups. Use of a single column for the CIP code is much easier for linking tables together to perform queries within the CIPrankform.

- The 'shortCIP' field is used for CIP code 52.9999, since it has been divided into four subgroups coded 52.9999x. Since placements are all included under the code 52.9999, the 'shortCIP' field allows placement data to be linked with each of the subgroup 52.9999x codes (using just the 52.9999) and then divided according to the share of employment in each subgroup. All CIP codes except 52.9999 are the same in both the 'CIPcode' and the 'shortCIP' fields.

- The 'CIPshare' field is used for CIP code 52.9999x, since placement data are provided as a whole for CIP 52.9999 and must be divided between the subgroups. Shares for all CIP codes except 52.9999 are equal to 1. For the current rankings, the shares for CIP 52.9999 were calculated as follows: The occupations and employment found in each CIP subgroup were obtained using the crosswalk and 1999 SOC national employment data. Then total employment for each subgroup was calculated by adding the individual occupation employment figures. The employment for CIP codes 52.99991, 52.99993, and 52.99994 was added together, and shares calculated for those 3 CIP codes (dividing each CIP subgroup employment by the sum of employment for all 3 subgroups). The employment from CIP52.99992 was not included because this CIP was assigned the placement data from CIP 08.0708. [Note: These calculations can be modified so that CIP 52.99992 is included in the share calculation. See Appendix E for more detail.]

- The 'Combine' field is only used for CIP codes that are included with another code. For example: CIP 01.0401 is included with 02.9999, so CIP 01.0401 has 02.9999 in the combine field, and the combine field for 02.9999 is blank. Only the CIP code being combined into another CIP has a code in the combine field so that a combined CIP code can be created by replacing the original CIP code with the value in the 'combine' field. (This allows codes to be combined or separated easily–see Appendix E for more detail.) The following CIP codes are combined together:

  01.0401 (combined into 02.9999)
  43.0107 (combined into 43.9999)
  47.0608 (combined into 49.0101)
  47.0683 (combined into 47.0603)
  47.0684 (combined into 47.0604)
  47.0685 (combined into 47.0605)
  50.0599 (combined into 09.0701)
  08.0708 (becomes 52.99992)

CIPplacement: Placement data by CIP code

Field Name	Type	Size	Description
PlaceID	AutoNumber		Identification number for unique CIP code within the table; automatically assigned by Access.
CIPcode	Text	7	CIP program code – Format: 00.0000 (CIP 52.9999 has one set of combined placement numbers so the extra digit for the subgroup is not needed)
Complete	Number	Single	Number of students completing a CIP program
Returned	Number	Single	Number of students returning the placement survey
Related	Number	Single	Number of students returning the survey that were placed in a related job or further education
Totplace	Number	Single	Number of students returning the survey that had been placed in any job or further education
Placeyr	Text	4	Year of placement data

Notes:

- The formula to calculate Percent Related Placements in the placement queries is 'Related'/'Totplace'. Percent related placements was not included as a field in the table because in order to combine CIP codes, the raw numbers have to be combined first and then the percentage related placement rate calculated, rather than using the percentages given for individual CIP codes. This calculation is done in the form, and the percentages are recalculated when the form is opened so that any changes in which CIP codes are combined will automatically be updated.

- Placement data for CIP 52.9999 is not divided between the subgroups. For details on how placements were allocated by subgroup, see the notes for the 'CIP share' field following the CIP table description above. [If placement data becomes available for the subgroups of CIP 52.9999, the CIP code field will need to be adjusted to length 8 to accommodate the longer CIP codes 52.9999x and the CIP shares will need to be adjusted. See Appendix E for further information.]

CPS: Current Population Survey (Census) occupational codes and titles

Field Name	Type	Size	Description
Censuscode	Text	3	Current Population Survey occupation code (Census code) – Format: 000
Censustitle	Text	150	Current Population Survey occupation title
CPSnotes	Memo		Notes or comments regarding CPS code/title information

CPS1835wage: Current Population Survey national weekly earnings for 18-35 year olds, by Census occupation code.

Field Name	Type	Size	Description
CPSwgID	AutoNumber		Identification number for unique CPS code within the table; automatically assigned by Access.
Censuscode	Text	3	Current Population Survey occupation code (Census code) – Format: 000
Meanwkly	Number	Double	Mean weekly earnings (national for ages 18-35)
Medianwkly	Number	Double	Median weekly earnings (national for ages 18-35)
Earnwgt	Number	Double	Earnings weighting factor
CPSYear	Text	4	Year of CPS wage data

CrossRef: Master crosswalk between OES codes, SOC codes, and CPS codes for each CIP code. This is the final version of the crosswalk discussed in section 2.1 above, excluding the various occupation titles.

Field Name	Type	Size	Description
CrossID	AutoNumber		Identification number for unique combination of CIP-OES-CPS-SOC codes within the table; automatically assigned by Access.
CIPcode	Text	8	CIP program code, used for placement data – Format: 00.00000, extra digit is for subgroup of CIP 52.9999
CIPcomb	Text	8	Combined CIP program code using CIP codes listed in 'Combine' field of CIP table – Format: 00.00000
OEScode	Text	5	Occupational Employment Statistics occupation code, used for openings data – Format: 00000
OESshare	Number	Double	Share of employment assigned to an OES code
CPScode	Text	3	Current Population Survey occupation code (Census code), used for wage data – Format: 000
SOCcode	Text	7	Standard Occupational Classification system occupation code, used for wage data – Format: 00-0000
Include	Text	2	'No' indicates occupations is not included in the rankings per MDCD recommendation
CrossNotes	Memo		Notes or comments on crosswalk (changes, additions)

Notes:

- The 'CIPcomb' field is created from the 'Combine' field in the CIP table (see Notes after the CIP table description) and assigns the 'combine' CIP code to CIP codes that have a value in the 'combine' field. CIP codes that do not have a value in the 'combine' field are assigned their original CIP code in the 'CIPcomb' field. For example: CIP 01.0401 is included with 02.9999, so the 'CIPcomb' field for CIP code 01.0401 would contain 02.9999. The CIP codes that have been combined are: 01.0401 into 02.9999, 43.0708 into 43.9999, 47.0608 into 49.0101, 47.0683 into 47.0603, 47.0684 into 47.0604, 47.0685 into 47.0605, 50.0599 into 09.0701, and 08.0708 becomes 52.99992. This field is updated automatically when the rank form is opened.

- The 'OESshare' field contains the percentage share of employment assigned to the OES occupations that are combined in the State of Michigan LMI openings projections. This field is used to allocate openings data based on the occupations present in the crosswalk for a given CIP.

The shares are calculated using 1998 national employment data by OES code. More detail about calculating OES shares is provided in section 2.4 of this documentation.

- The 'Include' field contains the flag 'No' for occupations that MDCD wanted to exclude from the rankings. Rather than delete occupations that semed appropriate in a given CIP code and might be added back into the crosswalk in the future, these occupations were flagged as 'No' and excluded from the rankings. (To include any of these occupations in future rankings, delete the 'No' from the 'Include' field.)

OES: List of Occupational Employment Statistics (OES) codes and titles, including additional codes from State LMI openings data.

Field Name	Type	Size	Description
OEScode	Text	5	Occupational Employment Statistics occupation code – Format: 00000
OEStitle	Text	150	Occupational Employment Statistics occupation title
OESnotes	Memo		Notes/comments about OES code and title list. (Occupation codes from the State of Michigan LMI OES openings not found in the BLS OES dictionary are noted 'LMI' in this field)

Notes:

- The State of Michigan LMI program uses some OES-based codes that are not found in the BLS OES Dictionary of Occupations. Some of these codes are older OES codes that have been replaced since the 1996-2006 projections were made, and other codes are combinations of two or more OES codes. Because the available LMI openings data used different codes than those already in the crosswalk, the LMI OES codes were added to the crosswalk. Documentation of LMI openings codes that are different from OES codes can be found in section 2.4 above and in Appendix C.

OESopenings: State of Michigan LMI projected openings data by OES occupation code.

Field Name	Type	Size	Description
OESid	AutoNumber		Unique identification number for OES code within the table; automatically assigned by Access.
OEScode	Text	5	Occupational Employment Statistics occupation code – Format: 00000
AvgOpen	Number	Long Integer	Total Annual Average Openings from State of Michigan LMI data (includes both occupation growth and replacement)
TimeFrame	Text	11	Range of years for the State of Michigan LMI OES openings projections – Format: 0000 - 0000

SOC: Standard Occupational Classification (SOC) codes and titles.

Field Name	Type	Size	Description
SOCcode	Text	7	Standard Occupational Classification system occupation code–Format: 00-0000
SOCtitle	Text	150	Standard Occupational Classification system occupation title
Mod	Yes/No		Indicates whether SOC code has been modified–checked box (yes) indicates a modification
OrigSOC	Text	7	Original SOC code, for use when code has been modified–format: 00-0000
Moddate	Text	4	Year of modification to SOC–Format: 0000
SOCNotes	Memo		Notes or comments about SOC occupation or changes

Notes:

- Changes and modifications to the SOC codes and structure are listed on the SOC website at http://stats.bls.gov/soc/soc_home.htm. The modifications listed on the web page (last modified Sept 15, 2000) related to code changes for Mathematical Technicians, Farm Labor Contractors, and Other Fishing, Farming, and Forestry workers have already been incorporated into the crosswalk. (If modifications are made to SOC codes, the modified SOC codes will need to be added to the CrossRef table for the appropriate CIP codes.)

- The 'SOC' code 99–9999 was created for Census of Agriculture data for Michigan farmers. This code is not in the current SOC structure and there is little chance of it becoming an official SOC occupation, so there should not be any problem with the use of this code for Census of Agriculture data.

SOCagcensus: Census of Agriculture data for the State of Michigan, under the created SOC code 99–9999 to incorporate an approximated wage for farmers into the SOC data.

Field Name	Type	Size	Description
SOCcode	Text	7	Standard Occupational Classification system occupation code (Code 99-9999 created for Ag Census data)
Farms	Number	Long Integer	Number of farms from table 4 of 1997 Census of Agriculture–State Data for Michigan
Annual	Number	Long Integer	Net cash return from agricultural sales for the farm unit (average per farm) from table 4 of 1997 Census of Agriculture–State Data for Michigan.
Govt	Number	Long Integer	Government Payments (average per farm) from table 5 of 1997 Census of Agriculture–State Data for Michigan
Flag	Text	2	'AG' to distinguish Agricultural Census data from SOC data when appended together into the combined wage table
Year	Text	4	Year of SOC data to be combined with
Agdate	Text	4	Year of Agricultural Census data

Notes:

- The Census of Agriculture data for Michigan were taken from the file ac97ami.pdf (downloaded from the Census of Agriculture website mentioned earlier). Since the report is a .pdf file, the appropriate numbers were input by hand into the SOCagcensus table.

- The hourly wage from the Census of Agriculture data was calculated as follows: Hourly wage is the sum of 'Annual' and 'Govt' divided by 2000. Both the mean and median hourly wages have been given the same value, since only the average per farm values are available from the Census of Agriculture. The 10th percentile wage was not estimated. These estimated hourly wages were then appended into the SOCwgcombined table.

SOCwgcombined: Combined wage data from SOCwgMI and SOCwgUS files by SOC code.

Field Name	Type	Size	Description
SOCcode	Text	7	Standard Occupational Classification system occupation code–Format: 00–0000
TotEmp	Number	Long Integer	Total employment for the occupation (National employment figures)
Mean	Currency		Hourly mean wage for the occupation (National or State of Michigan data–indicated by flag field)
Median	Currency		Hourly median wage for the occupation (National or State of Michigan data–indicated by flag field)
Pct10	Currency		Hourly 10th percentile wage for the occupation (National wage data)
Annual	Text	4	'TRUE' indicates that only annual wages are released for that occupation. If blank, both hourly and annual wages are released.
Flag	Text	2	'MI' indicates that mean and median wages are State of Michigan data, 'US' indicates that wages are National, and 'AG' indicates data from the Census of Agriculture
Year	Text	4	Year of SOC wage and employment data–Format: 0000
SOCwgnotes	Memo		Notes or comments about SOC wages, calculations, etc. Contains comment about calculation of hourly wages from annual wage for occupations with TRUE in the annual field

Notes:

- The combined wage table was created because some occupations are not available at the statewide level because that occupation is not practiced or has very low employment within the state or because releasing the data would violate confidentiality. To combine all of the hourly wages into a single table, a new table containing the national level employment and hourly wage data was created. Then the mean and median hourly wage fields were updated with Michigan data for all occupations where they are available. Census of Agriculture data (SOC code 99–9999) were appended to the file also. The flag field indicates whether the mean and median are National (US), Michigan (MI), or Census of Agriculture (AG) data.

- Except for the Census of Agriculture (SOC code 99–9999) data, total employment data in this file are always the SOC National estimates.

- The percentile wage data are only released at the national level, so the 10th percentile wages are always National data.

- The 'Annual' field indicates the type of wages released for an occupation. 'TRUE' in this field indicates that only annual wages are released for the occupation, while no entry (blank field)

indicates that both hourly and annual wages are available. Rather than exclude the occupations that have no hourly wages released, hourly wages for those occupations were calculated by dividing the annual wage by 2000 (estimated hours). Examples of occupations that only have annual wages are Teachers, Pilots, Flight Attendants, Actors, Musicians, and Athletes.

- The 'Flag' field contains 'US', 'MI', or 'AG' indicating the source of mean and median wage data. [Note: The employment and 10th percentile wage data are always National (US) estimates.]

SOCwgMI: Wage data for the State of Michigan by SOC code

Field Name	Type	Size	Description
MiwgID	AutoNumber		Unique identification number for SOC code within the table; automatically assigned by Access.
SOCcode	Text	7	Standard Occupational Classification system occupation code – Format: 00-0000
TotEmp	Number	Long Integer	Total employment estimate for the occupation, state level data for Michigan
Hmean	Currency		Hourly mean wage estimate for the occupation, Michigan data
Hmedian	Currency		Hourly median wage estimate for the occupation, Michigan data
Amean	Number	Long Integer	Annual mean wage estimate for the occupation, Michigan data
Amedian	Number	Long Integer	Annual median wage estimate for the occupation, Michigan data
Annual	Text	4	'TRUE' indicates that only annual wages are released for the occupation. If blank, both hourly and annual wages are released.
Year	Text	4	Year of wage and employment estimates – Format: 0000
Flag	Text	2	'MI' for state level data
Miwgnotes	Memo		Notes or comments about wage or employment data

Notes:

- For the occupations that have no hourly wages released (the 'Annual' field is 'TRUE'), estimates of hourly wages are calculated as annual wage divided by 2000. This is done before Michigan wages are added to the SOCwgcombined table (discussed above).

SOCwgUS: Wage data for the United States by SOC code

Field Name	Type	Size	Description
UswgID	AutoNumber		Unique identification number for SOC code within the table; automatically assigned by Access.
SOCcode	Text	7	Standard Occupational Classification system occupation code–Format: 00–0000
TotEmp	Number	Long Integer	Total employment estimate for the occupation, national level data
Hmean	Currency		Hourly mean wage estimate for the occupation, national data
Hmedian	Currency		Hourly median wage estimate for the occupation, national data
H10th	Currency		Hourly 10th percentile wage estimate for the occupation, national data
Amean	Number	Long Integer	Annual mean wage estimate for the occupation, national data
Amedian	Number	Long Integer	Annual median wage estimate for the occupation, national data
A10th	Number	Long Integer	Annual 10th percentile wage estimate for the occupation, national data
Annual	Text	4	'TRUE' indicates that only annual wages are released for the occupation. If blank, both hourly and annual wages are released.
Year	Text	4	Year of wage and employment estimates–Format: 0000
Flag	Text	2	'US' for national level data
Uswgnotes	Memo		Notes or comments about wage or employment data

Notes:

- For the occupations that have no hourly wages released ('Annual' field is TRUE), estimates of hourly wages are calculated as annual wage divided by 2000. This is done as the first step of creating the SOCwgcombined table, discussed above.

SOCzones: SOC codes and checked boxes indicating their O*NET-SOC job zones

Field Name	Type	Size	Description
SOCcode	Text	7	Standard Occupational Classification system occupation code–Format: 00–0000
Zone1	Yes/No		Yes (checked box) indicates the occupation was assigned a job zone of 1
Zone2	Yes/No		Yes (checked box) indicates the occupation was assigned a job zone of 2
Zone3	Yes/No		Yes (checked box) indicates the occupation was assigned a job zone of 3
Zone4	Yes/No		Yes (checked box) indicates the occupation was assigned a job zone of 4
Zone5	Yes/No		Yes (checked box) indicates the occupation was assigned a job zone of 5

Notes:

- Job zones are assigned by O*NET-SOC codes, which are the standard 7-digit SOC codes with a 2-digit decimal extension. The decimal extension allows O*NET to subdivide occupations or provide additional detail for an occupation. For example, the SOC occupation 23-2093 Title Examiners, Abstractors, and Searchers is divided into two O*NET-SOC codes with different job zones: 23-2093.01 Title Searchers (job zone 2) and 23-2093.02 Title Examiners and Abstractors (job zone 3). Since the job zones are assigned at the more detailed level, when only the standard 7-digit SOC code is used, some occupations have more than one job zone assigned. In the example above, the SOC code 23-2093 would have both job zone 2 and job zone 3. Each SOC code–job zone combination has a separate line in the table, so some occupations occur more than once depending on the number of job zones.

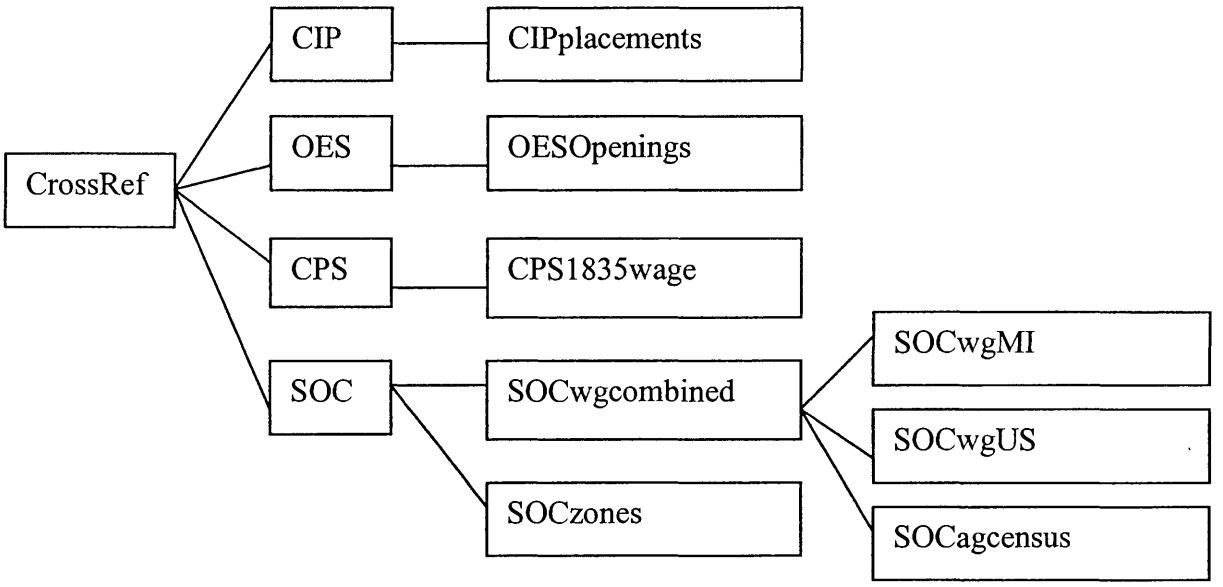
Additional Tables used or created in the Form

The tables **Nameplacements** and **Namewages** are lists used in the drop-down selection menus of the CIPrankform.

The following tables are created when the interactive form (CIPrankform) in the Access database CIPranking2001_Upjohn is loaded and used to run the CIP rankings. These tables are the intermediate steps used to manipulate the data described in the master tables above in order to calculate the rankings by CIP code. To distinguish them from the data tables, the prefix 'tbl' was used as the beginning of the table name. These tables will be generated each time the form is used. (More information about where in the form code these tables are created can be found in Appendix E.)

TblCIPplace	TblCIPshare1	TblCIPshare2
TblCIPshare3	TblCIPshare4	TblQCIP4
TblQCIP5	TblQCPS1	TblQCPS2
TblQCPS3	TblQOES1	TblQOES2
TblQSOC1	TblQSOC2	TblQSOCemp
TblRankAll	TblRankCPS	TblRankFinal
TblRankOpen	TblRankPlace	TblRankSOC
TblSOCaghr	TblSOCmihr	

3.3 Table Relationships



3.4 Generating the CIP rankings

The CIP rankings for each data component (wages, openings, and placements) are generated through a series of Access queries using the table relationships pictured above. In general, each set of queries performs the following steps: First, the CrossRef table is joined to the appropriate set of tables in the next two columns of the chart above. The query then eliminates duplicates of the individual codes corresponding to each CIP. Then the data are aggregated by CIP, and finally ranks are assigned to each of the individual components of the final rank. The sum rank is obtained by calculating the sum of the three component ranks (one wage component, one placement component, and the openings component) and the final rank is assigned based on the resulting sum ranks, with the smallest sum rank having the final rank of 1, the second smallest sum rank having the final rank of 2, and so on. In the case where two or more CIP codes have the same sum rank, the final rank is determined by placement rank then openings rank. That is, if two CIP codes have the same sum rank, the CIP code with the higher placement rank (the smaller number) will be assigned the higher (smaller number) final rank. If both the sum rank and placement rank were the same, then the openings rank would determine which CIP code was assigned the higher final rank. The queries used to calculate these ranks have been automated into the Access form CIPrankform. A more detailed description of CIPrankform and the queries used for each component follows.

3.5 Ranking Form

The form 'CIPrankform' is the interactive user interface to the queries that generate the CIP rankings. Users select the individual components to include in the final rank and the form runs the necessary queries and outputs the component ranks and final CIP rank. Component selections made by the user are the type and year of wage data (SOC mean, SOC median, SOC 10^{th} percentile, CPS mean, or CPS median), the type and year of placement data (number of related placements or percent related placements), and the year (range) of openings data. While there is only one choice for the year at this point, this feature will allow the user to append new data to the tables and still use the form to compute the CIP ranks. It will also allow rankings from a previous year to be re-created, as long as the data remain

in the database tables. After selecting the data to be used in the rankings, the user clicks on the 'Run CIP Ranking' button. This runs the individual queries described above, ranks the results, and displays the ranks in the output window. After the CIP ranking has been run, the 'print' button becomes available, and the user can print the underlying table shown in the output window. The queries for each component run by the form are discussed below. More detailed information about queries run in the form, along with notes indicating how or where the user can change certain aspects of the queries can be found in Appendix E.

3.6 Component Ranking Queries

After the user clicks on the 'Run CIP Ranking' button on the form, the component ranking queries run according to the selections made by the user. Each component has a set of queries, described below, that creates a table with one value per CIP code, adds a column to contain the component rank, and ranks the component. After each component is assigned a rank value, the sum rank and final rank ordering are created in a separate table and displayed in the form output window. The placement and openings queries are always run, while the user selection of CPS or SOC wages determines which wage component query the form will run. For the current year, CIP code 48.0506 is excluded from the ranking as directed by MDCD, however the Visual Basic code of the form can be changed to include 48.0506 in the rankings or exclude a different CIP code. (See Appendix E for details.)

For the placement data, the sum of related placements and total placements by combined CIP code are calculated. After this, the percent related placements are calculated as the related placements divided by the total placements. The year of data selected by the user is then queried into a new table and two new columns are added for the rank of related placements and the rank of percent related placements. The related placements and percent related placements fields are each sorted in descending order and ranked, giving the data for the placement component, as selected by the user. CIP codes with the same number of related placements or same percent related placements are assigned the same rank.

The openings component is calculated in much the same way. First the query eliminates duplicate OES codes within each CIP code and excludes occupations with 'No' in the 'Include' column. Then the sum of the openings field is calculated, grouped by CIP code and the timeframe of the projections. Based on the timeframe selected by the user, the total openings for that particular year are selected into a new table for ranking. A new column is added to the table to contain the openings ranks, the openings are sorted in descending order, and the rank is assigned. CIP codes with the same number of openings are assigned the same rank.

The wage type selected by the user determines which wage query runs in the form. If the user selects any of the SOC wages, only the SOC wage queries will run. Likewise, if either of the CPS wages is selected, only the CPS wage queries will run. Both queries are very similar, but each is described separately below.

SOC Wage Data: First, duplicate SOC records are removed from each combined CIP code and the SOC occupations with 'No' in the 'Include' field are removed, creating a new table of occupations to use in the wage calculation. Then the employment shares of each occupation within a CIP are calculated by adding the total employment in each CIP code (occupations assigned to multiple CIP codes are included in the total employment for each separate CIP code). The employment share for each occupation is calculated by dividing the SOC occupation employment by the total employment for the CIP code. This share is multiplied by each of the three SOC wages: mean, median, and 10^{th} percentile. Each type of wage is then added by CIP code and year, resulting in the average wage for each CIP code. The result would be the same if the employment and wage were multiplied together, added over the CIP, and divided by the total employment, as long as there are no missing wage values. Because no 10^{th} percentile wage was

calculated for the Census of Agriculture data, the employment share method was used to calculate average wages for each CIP code. The year of data selected by the user is then queried out for ranking. Three new columns are added to the table, one for the ranking of each type of wage. Each type of wage is sorted in descending order and ranks are assigned. CIP codes with the same wage amount are assigned the same rank.

CPS Wage Data: First, duplicate CPS records are removed from each combined CIP code and the occupations with 'No' in the 'Include' field are removed, creating a new table of occupations to use in the wage calculation. Then the weighted average wage for each CIP is calculated by multiplying the wage and weight for each CPS occupation, summing the weight and weighted wage by CIP code and year, and dividing by the summed weight. The year of data selected by the user is then queried out for ranking. Two new columns are added to the table, one for the ranking of each type of wage. Each type of wage is sorted in descending order and ranks are assigned. CIP codes with the same number of openings are assigned the same rank.

3.7 Calculation of final ranks

After each component of the CIP rankings is assigned an individual rank, the components selected by the user are selected. The rankings from these three components are summed together to create the sum rank. The CIP codes are then sorted in ascending order by the sum rank, then by the placement rank, followed by the openings rank, and the final rank is assigned. This assigns the highest final rank to the program with the smallest sum rank. If there are multiple programs with the same sum rank, their order in the final rank is determined by their placement rank, followed by their openings rank.

Appendix A: Modifications to version 2 of the CIP – OES – SOC crosswalk, by CIP code
(Refer to page 9 for the list of modification codes.)

CIP code	OES code	SOC code(s)	Modification code	Include?
01.0201	85328	49-3051	99	
01.0401	89899	51-9199	99 (SOC too broad)	
01.0401	*Entire CIP deleted by consultant recommendation, occupations included in CIP 02.9999*			
02.9999	15031	11-9011	1 (in 1997 version)	
02.9999	15031	11-9012	99 (SOC crosswalk)	
02.9999	15032	37-1012	3 (in 1997 version)	
02.9999	24502	19-4021	Delete (MDCD)	
02.9999	24511	19-4041	4	
02.9999	32951	29-2056, 31-9096	4	
02.9999	34038	27-1023	3 (from CIP 01.0401)	
02.9999	65023	51-3021	3 (in 1997 version)	
02.9999	67008	37-2021	3 (in 1997 version)	
02.9999	71002	11-9012	3 (in 1997 version)	
02.9999	71005	11-9012	3 (in 1997 version)	
02.9999	72008	45-1011	3 (in 1997 version)	
02.9999	73002	45-4029	3 (in 1997 version)	
02.9999	73005	45-4029	3 (in 1997 version)	
02.9999	73008	45-4022	3 (in 1997 version)	
02.9999	73011	45-4022	3 (in 1997 version)	
02.9999	73099	45-4029	3 (in 1997 version)	
02.9999	74002		3 (in 1997 version)	
02.9999	75005	45-2011	3 (in 1997 version)	
02.9999	75015		3 (in 1997 version)	
02.9999	77011	45-3021	3 (in 1997 version)	
02.9999	79002	19-4093	3 (in 1997 version)	
02.9999	79008	45-4023	3 (in 1997 version)	
02.9999	79011	45-2041	Add (MDCD)	
02.9999	79015	45-2021	3 (in 1997 version)	
02.9999	79016	39-2011	3 (in 1997 version)	
02.9999	79017	31-9096	3 (in 1997 version)	
02.9999	79021	45-2091	3 (in 1997 version)	
02.9999	79033	37-3013	3 (in 1997 version)	
02.9999	79036	37-3012	3 (in 1997 version)	
02.9999	79041	37-3011, 45-2092, 47-4091	1	
02.9999	79806	29-2056, 31-9096	3 (in 1997 version)	
02.9999	79999	37-3019, 45-1012, 45-2099, 45-3021	3 (in 1997 version)	
02.9999	83002	51-9061	3 (in 1997 version)	
02.9999	83005	51-9061	3 (in 1997 version)	
02.9999	83099	51-9061	3 (in 1997 version)	
02.9999	85328	49-3053	Add (MDCD)	
02.9999	89802	51-3021, 51-3023	3 (from CIP 01.0401)	
02.9999	89805	51-3011	3 (from CIP 01.0401)	
02.9999		99-9999	*Add Ag Census data*	
09.0701	34002	27-3043	99	
09.0701	34028	27-4011, 27-4012	4, 1 (in 1997version)	
09.0701	34035	27-1012, 27-1014, 27-1019	3 (in 1997 version)	

Appendix A: (Continued)

CIP code	OES code	SOC code(s)	Modification code	Include?
09.0701	34047	27-2042	3 (in 1997 version)	
09.0701	34051	37-2042	3 (in 1997 version)	
09.0701	34056	27-2012	99	
09.0701	39999	27-4014	4 (SOC technician)	
09.0701	68005	39-5091	3	
12.0403	68002	39-5011	2 (in 1997 version)	
13.0101	31314	25-3099	delete [MDCD]	
13.0101	31317	39-9031	delete [MDCD]	
13.0101	31321	39-9031	delete [MDCD]	
15.0607	22599	17-3025, 17-3029, 19-4041, 19-4091	99	
15.0607	25111	51-4012	3 (in 1997 version)	
15.0607	81008	51-1011	3 (in 1997 version)	
15.0607	83002	51-9061	3 (in 1997 version)	
15.0607	83005	51-9061	3 (in 1997 version)	
15.0607	83099	51-9061	3 (in 1997 version)	
15.0607	85132	49-9042	3 (in 1997 version)	
15.0607	91108	51-4032	3	
15.0607	91111	51-4035	3	
15.0607	91117	51-4031, 51-4032, 51-4033, 51-4034, 51-4035	3	
15.0607	91302	51-4031	3	
15.0607	91305	51-4031	3	
15.0607	91308	51-4031	3	
15.0607	91311	51-4021	3	
15.0607	91314	51-4023	3	
15.0607	91317	51-4022	3	
15.0607	91502	51-4011, 51-4012, 51-4072	3 (in 1997 version)	
15.0607	91905	51-4072	3 (in 1997 version)	
15.0607	91917	51-4193	3 (in 1997 version)	
15.0607	91921	51-4193	3 (in 1997 version)	
15.0607	91923	51-4193	3 (in 1997 version)	
15.0607	91926	51-4193	3 (in 1997 version)	
15.0607	91928	51-4191	3 (in 1997 version)	
15.0607	91932	51-4191	3 (in 1997 version)	
15.0607	91938	51-4191	3 (in 1997 version)	
15.0607	92197	51-4199	3 (in 1997 version)	
15.0607	92198	51-4199	3 (in 1997 version)	
15.0607	92951	51-9121	3 (in 1997 version)	
15.0607	92953	51-9121	3 (in 1997 version)	
15.0607	93944	51-4199	3 (in 1997 version)	
15.0699	22508	17-3026	4	
15.0699	22511	17-3024	Add (MDCD)	No
15.0699	22511	17-3027	Add (MDCD)	
15.0699	22599	17-3024	Add (MDCD)	No
15.0699	24505	19-4031	Add (MDCD)	
15.0699	24511	19-4041	Add (MDCD)	
15.0699	25104	15-1041	Add (MDCD)	
15.0699	58008	43-5061	3	

Appendix A: (Continued)

CIP code	OES code	SOC code(s)	Modification code	Include?
15.0699	85112	49-9041	3	
15.0699	85113	49-9041	3	
15.0699	85116	49-9041	3	
15.0699	85117	49-9041	3	
20.0299	68035	39-9021	2	
20.0299	62041		3 (in 1997 version)	
20.0301	34038	27-1023, 27-1029	99	
20.0301	85956	49-9093, 51-6051	Add (MDCD)	
20.0301	89508	51-6093	Add (MDCD)	
20.0301	89521	51-6011	3	
20.0301	92717	51-6031	Add (MDCD)	
20.0301	92721	51-6031	Add (MDCD)	
20.0301	93921	51-6021	3	
20.0301	93923	51-6051	Add (MDCD)	
20.0301	93999	51-5011, 51-9199	99	
20.0499	15026	11-9051	1 (in 1997 version)	
20.0499	43021	41-3041	2 (in 1997 version)	
20.0499	53802	43-4181	2 (in 1997 version)	
20.0499	53805	43-4181	2 (in 1997 version)	
20.0499	53808	43-4081	2 (in 1997 version)	
20.0499	61099	33-1011, 33-1099, 37-1012	2	
20.0499	65002	35-9031	2 (in 1997 version)	
20.0499	65021	51-3011	2 (in 1997 version)	
20.0499	65026	35-2014, 35-2019	2 (in 1997 version)	
20.0499	65032	35-2011	2 (in 1997 version)	
20.0499	68026	39-6031	2 (in 1997 version)	
20.0499	69999	31-9011, 39-3012	2 (in 1997 version)	
20.0501	87108	47-2081	3	
20.0501	87111	47-2082	3	
20.0501	87402	47-2141, 47-2142	3	
20.0601	85132	49-9042	3	
43.0107	63038	33-3052	3 (in 1997 version)	
43.0107	63041	33-3031	3 (in 1997 version)	
43.9999	32508	29-2041	3	
43.9999	58002	43-5031	3	
43.9999	63038	33-3052	3 (in 1997 version)	
43.9999	63041	33-3031	3 (in 1997 version)	
46.0301	85714	49-2092	3	
46.0301	85726	49-2022	3 (in 1997 version)	
46.0301	85728	49-2093, 49-2096	3	
46.0301	87202	47-2111, 49-2098	3 (in 1997 version)	
46.9900	81005	47-1011	3 (in 1997 version)	
46.9900	85714	49-2092	99	
46.9900	85728	49-2093, 49-2096	99	
46.9900	85999	49-2011, 49-9092, 49-9099	99	
46.9900	87102	47-2031, 47-2072, 47-2081	3 (in 1997 version)	
46.9900	87105	47-2081	3 (in 1997 version)	
46.9900	87121	47-2031	3 (in 1997 version)	

Appendix A: (Continued)

CIP code	OES code	SOC code(s)	Modification code	Include?
46.9900	87302	47-2021, 47-4091	3 (in 1997 version)	
46.9900	87308	47-2044	3 (in 1997 version)	
46.9900	87314	47-2171	3 (in 1997 version)	
46.9900	87702	47-2061	3 (in 1997 version)	
46.9900	87705	47-2072	3 (in 1997 version)	
46.9900	87708	47-2071	3 (in 1997 version)	
46.9900	87805	47-2211	3 (in 1997 version)	
46.9900	87817	47-4031	3 (in 1997 version)	
46.9900	89132	47-2211	3 (in 1997 version)	
46.9900	97923	53-7032	3 (in 1997 version)	
46.9900	97938	47-2073	3 (in 1997 version)	
46.9900	97944	53-7021	3 (in 1997 version)	
46.9900	97956	47-2073	3 (in 1997 version)	
46.9900	98311	47-3011	4 (in 1997 version)	
46.9900	98312	47-3012	4 (in 1997 version)	
46.9900	98313	47-3013	4 (in 1997 version)	
46.9900	98314	47-3014	4 (in 1997 version)	
46.9900	98315	47-3015	4 (in 1997 version)	
46.9900	98316	47-3016	4 (in 1997 version)	
46.9900	98319	47-3019	4 (in 1997 version)	
46.9999	85132	49-9042	3 (in 1997 version)	
47.0101	22505	17-3023, 17-3024	4, 1 (in 1997 version)	No
47.0101	85705	49-2011	Add (MDCD)	
47.0101	85726	49-2022	Add (MDCD)	
47.0101	85502	49-2022	Add (MDCD)	
47.0101	85505	49-2022	Add (MDCD)	
47.0101	85508	49-2022	Add (MDCD)	
47.0101	85599	49-2022	Add (MDCD)	
47.0101	85728	49-2093	3 (in 1997 version)	
47.0101	85728	49-2096	Add (MDCD)	
47.0101	85905	49-9069	3 (in 1997 version)	
47.0101	85926	49-2011	Add (MDCD)	
47.0101	85947	49-9091	3 (in 1997 version)	
47.0101	85999	49-2011	Add (MDCD)	
47.0101	85999	49-9099	3 (in 1997 version)	
47.0101	93114	51-2022, 51-4012	3 (in 1997 version)	
47.0199	22505	17-3023, 17-3024	4, 1 (in 1997 version)	No
47.0199	22511	17-3024, 17-3027	4, 1	No
47.0199	93111	51-2023	3 (in 1997 version)	
47.0199	93114	51-2022, 51-4012	3 (in 1997 version)	
47.0399	83008	53-6051	99	
47.0399	85116	49-3051, 49-9041, 49-9092	3 (in 1997 version)	
47.0399	85118	49-9041	3 (in 1997 version)	
47.0399	85132	49-9042	3 (in 1997 version)	
47.0401	85323	49-3011	3	
47.0606	85308	49-3052	3 (in 1997 version)	
47.0699	85116	49-3051, 49-9041	3	
47.0699	85951	49-3091	99	

Appendix A: (Continued)

CIP code	OES code	SOC code(s)	Modification code	Include?
47.9999	81011	51-1011, 53-1031	3	
47.9999	83008	53-6051	3	
47.9999	97102	53-3032, 53-3033	3	
47.9999	97105	53-3033	3	
47.9999	97108	53-3021	3	
47.9999	97111	53-3022	3	
47.9999	97199	53-3099	3	
47.9999	97308	53-4013	3	
47.9999	97311	53-4012	3	
47.9999	97314	53-4041	3	
47.9999	97317	53-4021	3	
47.9999	97399	53-4099	3	
47.9999	97502	53-5021	3	
47.9999	97505	53-5021	3	
47.9999	97508	53-5021	3	
47.9999	97511	53-5022	3	
47.9999	97514	53-5011	3	
47.9999	97517	53-5011	3	
47.9999	97802	53-6011	3	
47.9999	97899	53-6051, 53-6099	3	
48.0101	22508	17-3026	4 (in 1997 version)	
48.0101	22514	17-3013	Add (MDCD)	
48.0101	22517	17-3019	3 (in 1997 version)	
48.0101	22521	17-3031	4 (in 1997 version)	
48.0199	22508	17-3026	4 (in 1997 version)	
48.0199	22514	17-3013	Add (MDCD)	No
48.0199	22517	17-3019	3 (in 1997 version)	
48.0199	22599	17-3025, 17-3029, 19-4091	4 (in 1997 version)	
48.0199	34038	27-1021	Add (MDCD)	
48.0199	34038	27-1022, 27-1023, 27-1029	3 (in 1997 version)	
48.0201	34023	27-4021	3 (in 1997 version)	
48.0201	34038	27-1021, 27-1024	Add (MDCD)	
48.0201	34041	27-1025	Add (MDCD)	
48.0201	56021	43-9021	99	
48.0201	89128	51-9194	99	
48.0201	89702	51-5022	3 (in 1997 version)	
48.0201	89706	51-5022	3 (in 1997 version)	
48.0201	89914	51-9131	3 (in 1997 version)	
48.0201	92510	51-5023	3 (in 1997 version)	
48.0201	92512	51-5023	3 (in 1997 version)	
48.0201	92515	51-5023	3 (in 1997 version)	
48.0201	92519	51-5023	3 (in 1997 version)	
48.0201	92524	51-5023	3 (in 1997 version)	
48.0201	92525	51-5011	3 (in 1997 version)	
48.0201	92541	51-5022	3 (in 1997 version)	
48.0201	92543	51-5023	3 (in 1997 version)	
48.0201	92545	51-5022	3 (in 1997 version)	
48.0201	92546	51-5011	3 (in 1997 version)	

Appendix A: (Continued)

CIP code	OES code	SOC code(s)	Modification code	Include?
48.0201	92549	51-5011, 51-5022	3 (in 1997 version)	
48.0201	92908	51-9132	3 (in 1997 version)	
48.0299	34023	27-4021	3 (in 1997 version)	
48.0299	34035	27-1014	3	
48.0299	34038	27-1021, 27-1024	Add (MDCD)	
48.0299	34041	27-1025	Add (MDCD)	
48.0299	89702	51-5022	3 (in 1997 version)	
48.0299	89706	51-5022	3 (in 1997 version)	
48.0299	89712	51-5022	3 (in 1997 version)	
48.0299	89713	51-5022	3 (in 1997 version)	
48.0299	89715	51-5022	3 (in 1997 version)	
48.0299	89717	51-5022	3 (in 1997 version)	
48.0299	89718	51-5022	3 (in 1997 version)	
48.0299	89719	51-5022	3 (in 1997 version)	
48.0299	92510	51-5023	3 (in 1997 version)	
48.0299	92512	51-5023	3 (in 1997 version)	
48.0299	92515	51-5023	3 (in 1997 version)	
48.0299	92519	51-5023	3 (in 1997 version)	
48.0299	92522	51-5023	3 (in 1997 version)	
48.0299	92529	51-5023	3 (in 1997 version)	
48.0299	92541	51-5022	3 (in 1997 version)	
48.0299	92543	51-5023	3 (in 1997 version)	
48.0299	92545	51-5022	3 (in 1997 version)	
48.0299	92546	51-5011	3 (in 1997 version)	
48.0299	92908	51-9132	3 (in 1997 version)	
48.0299	93951	51-9194	99	
48.0503	89128	51-9194	3 (in 1997 version)	
48.0503	89199	51-4199, 51-9199	3 (in 1997 version)	
48.0503	91102	51-4031	3 (in 1997 version)	
48.0503	91105	51-4034	3 (in 1997 version)	
48.0503	91108	51-4032	3 (in 1997 version)	
48.0503	91111	51-4035	3 (in 1997 version)	
48.0503	91114	51-4033	3 (in 1997 version)	
48.0503	91302	51-4031	3 (in 1997 version)	
48.0503	91305	51-4031	3 (in 1997 version)	
48.0503	91308	51-4031	3 (in 1997 version)	
48.0503	91311	51-4021	3 (in 1997 version)	
48.0503	91314	51-4023	3 (in 1997 version)	
48.0503	91317	51-4022	3 (in 1997 version)	
48.0503	91505	51-4081	3 (in 1997 version)	
48.0506	87805	47-2211	3	
48.0508	91705	51-4122	3 (in 1997 version)	
48.0701	89305	51-7099	3 (in 1997 version)	
48.0701	89308	51-7011, 51-7042, 51-7099	3 (in 1997 version)	
48.0701	89311	51-7011	3 (in 1997 version)	
48.0701	89314	51-7021	3 (in 1997 version)	
48.0701	92302	51-7041	3 (in 1997 version)	
48.0701	92305	51-7041	3 (in 1997 version)	

Appendix A: (Continued)

CIP code	OES code	SOC code(s)	Modification code	Include?
48.0701	92308	51-7041	3 (in 1997 version)	
48.0701	92314	51-7042	3 (in 1997 version)	
48.9999	25111	51-4012	3 (in 1997 version)	
48.9999	81008	51-1011	3 (in 1997 version)	
48.9999	83002	51-9061	3 (in 1997 version)	
48.9999	83005	51-9061	3 (in 1997 version)	
48.9999	83099	51-9061	3 (in 1997 version)	
48.9999	85132	49-9042	3 (in 1997 version)	
48.9999	87202	47-2011, 49-2098	3 (in 1997 version)	
48.9999	89132	47-2211	3 (in 1997 version)	
48.9999	91502	51-4011, 51-4012	3 (in 1997 version)	
48.9999	91902	51-4072	3 (in 1997 version)	
48.9999	91905	51-4072	3 (in 1997 version)	
48.9999	91908	51-4072	3 (in 1997 version)	
48.9999	91911	51-4072	3 (in 1997 version)	
48.9999	91914	51-4071, 51-4072	3 (in 1997 version)	
48.9999	91917	51-4193	3 (in 1997 version)	
48.9999	91921	51-4193	3 (in 1997 version)	
48.9999	91923	51-4193	3 (in 1997 version)	
48.9999	91926	51-4193	3 (in 1997 version)	
48.9999	91928	51-4191	3 (in 1997 version)	
48.9999	91932	51-4191	3 (in 1997 version)	
48.9999	91935	51-4051	3 (in 1997 version)	
48.9999	91938	51-4191	3 (in 1997 version)	
48.9999	92197	51-4199	3 (in 1997 version)	
48.9999	92198	51-4199	3 (in 1997 version)	
48.9999	92914	51-9196	3 (in 1997 version)	
48.9999	92951	51-9121	3 (in 1997 version)	
48.9999	92953	51-9121	3 (in 1997 version)	
48.9999	92968	51-9041	3 (in 1997 version)	
48.9999	92971	51-9041	3 (in 1997 version)	
48.9999	93105	49-2011, 51-2031	3 (in 1997 version)	
48.9999	93117	51-2093	3 (in 1997 version)	
48.9999	93197	51-2099	3 (in 1997 version)	
48.9999	93902	51-2031	3 (in 1997 version)	
48.9999	93905	51-2022, 51-2031	3 (in 1997 version)	
48.9999	93911	47-2121, 51-2099	3 (in 1997 version)	
48.9999	93944	51-4199, 51-9195	3 (in 1997 version)	
48.9999	93951	51-9194	3 (in 1997 version)	
48.9999	93956	51-2091, 51-2092, 51-2099	3 (in 1997 version)	
48.9999	93999	51-5011, 51-9199	3 (in 1997 version)	
49.0101	31299	25-1199	99	
49.0101	39002	53-2022	3	
49.0101	68026	39-6031	3	
49.0101	81017	53-1011	3	
50.0599	34002	27-3043	99	
50.0599	34056	27-2012	99	
50.0599	39999	27-4014	4 (SOC technician)	

Appendix A: (Continued)

CIP code	OES code	SOC code(s)	Modification code	Include?
50.0599	34035	27-1012, 27-1019	3 (in 1997 version)	
50.0599	34047	27-2042	3 (in 1997 version)	
50.0599	34051	27-2042	3 (in 1997 version)	
50.0599	68005	39-5091	3	
51.9999	24308	19-1029	99	
51.9999	24505	19-4031, 19-4091	99 (OES: except health)	
51.9999	24599	19-4091, 19-4099	4	
51.9999	27108	19-3039	99	
51.9999	27302	21-1015	99	
51.9999	27308	21-1013, 21-1015, 21-1019, 21-1099	99	
51.9999	32102	29-1069	99	
51.9999	32105	29-1029	99	
51.9999	32199	29-1199	99	
51.9999	32302	29-1126		No
51.9999	32317	29-1125	Add (MDCD)	
51.9999	32502	29-1111	Add (MDCD)	
51.9999	32514	29-2081	Add (MDCD)	No
51.9999	32523	29-2051	Add (MDCD)	
51.9999	32902	29-2011	Add (MDCD)	
51.9999	32919	29-2034	Add (MDCD)	
51.9999	32919	29-2032	3	
51.9999	32999	29-9010	Add (MDCD)	
51.9999	34035	27-1012, 27-1013, 27-1014, 27-1019	99	
51.9999	55105	43-6013		No
51.9999	55302	23-2091	99	
51.9999	55302	31-9094		No
51.9999	55302	43-9199	99 (SOC too broad)	
52.9999A	22126	15-1031, 15-1032, 15-2061	99	
52.9999A	22129	15-1031, 15-1032, 15-2061	99	
52.9999A	22599	17-3025, 19-4041, 19-4091	99	
52.9999A	25102	15-1081	1 (in 1997 version)	
52.9999A	25103	15-1061	1	
52.9999A	25104	15-1041, 15-1071	1	
52.9999A	25105	15-1021	1 (in 1997 version)	
52.9999A	25108	15-1021	1 (in 1997 version)	
52.9999A	25199	15-1071, 15-1081	1	
52.9999A	93905	51-2031	99	
52.9999B	13011	11-2031	99	
52.9999B	19999	11-9012, 11-9071, 11-9199, 41-9022	99	
52.9999B	34038	27-1022, 27-1023, 27-1029	99	
52.9999B	39008	27-4013	99	
52.9999B	43002	41-3021	3	
52.9999B	43008	41-9022	3	
52.9999B	43014	41-3031	3	
52.9999B	43021	41-3041	3	
52.9999B	49034	41-9011	1	No
52.9999B	55323	43-4151	3	

Appendix A: (Continued)

CIP code	OES code	SOC code(s)	Modification code	Include?
52.9999B	*Occupations included in primary/related CIP codes 47.0101-47.9999 for this Cluster were mainly production and repair occupations that did not seem appropriate for this CIP and were not included in the crosswalk.*			
52.9999C	53108	43-9071	1	No
52.9999C	53114	43-4041	1 (in 1997 version)	No
52.9999C	53117	43-4041	1 (in 1997 version)	No
52.9999C	53121	43-4041	1 (in 1997 version)	No
52.9999C	53128	43-4011	3 (in 1997 version)	
52.9999D	13005	11-3049	99	
52.9999D	13011	11-2031	99	
52.9999D	15023	11-9199	99	
52.9999D	19999	41-9022	99	
52.9999D	21999	13-1011, 13-1061, 13-1081, 13-1199	99	
52.9999D	25102	15-1051, 15-1081	Add (MDCD)	
52.9999D	25105	15-1021	Add (MDCD)	
52.9999D	25108	15-1021	Add (MDCD)	
52.9999D	25199	15-1081	Add (MDCD)	
52.9999D	55305	43-4171	1 (in 1997 version)	No
52.9999D	55321	43-4071	1 (in 1997 version)	No
52.9999D	55326	43-3061	1 (in 1997 version)	No
52.9999D	55332	43-4111	1 (in 1997 version)	No
52.9999D	55347	43-9061	1 (in 1997 version)	No
52.9999D	57102	43-2011	1 (in 1997 version)	No
52.9999D	58017	43-5111	1 (in 1997 version)	No
52.9999D	58028	43-5071	1	No

Appendix B: Changes to the OES - Census Code Crosswalk, by Census code

(See end of table for reason codes.)

Census code	Census title	OES code	OES title	CIP code(s)	Change and reason code
006	Administrators, Protective Service	31317	Instructors, Nonvocational Education	13.0101	Deleted – 1
015	Managers, Medicine and Health	32999	All other Health professionals, paraprofessionals	51.9999	Deleted – 1
022	Managers and Administrators NEC	21511	Personnel, training, and labor relations specialists	52.9999D	Deleted – 1
022	Managers and Administrators NEC	34056	Producers, Directors, Actors	09.0701 50.0599	Deleted – 1
022	Managers and Administrators NEC	61099	All Other supervisors and Managers/supervisors service workers	20.0499	Deleted – 1
034	Business and promotions Agents	39999	Other Professional, Paraprofessional	51.9999	Deleted – 2
037	Management Related Occupations NEC	43002	Sales Agents/Placers, insurance	52.9999C	Deleted – 1
037	Management Related Occupations NEC	39999	Other Professional, Paraprofessional	09.0701 50.0599	Deleted – 2
045	Metallurgical and materials engineers	22599	All other engineering technicians and technologists	15.0607 15.0699	Deleted – 1
153	Teachers, Postsecondary NEC	31308	Teachers, Secondary School	13.0101	Deleted – 2
153	Teachers, Postsecondary NEC	31314	Teachers and Instructors, Vocational	13.0101	Deleted – 2
153	Teachers, Postsecondary NEC	31399	All other Teachers and Instructors	13.0101	Deleted – 2
194	Artists, Performers and related workers	31508	Audio-visual specialists	13.0101	Deleted – 1
194	Artists, Performers and related workers	39999	Other Professional, Paraprofessional	51.9999	Deleted – 2
194	Artists, Performers and related workers	79016	Animal Breeders and Trainers	02.9999	Deleted – 1
216	Engineering Technicians NEC	89399	All other precision Woodworkers	48.0701	Deleted – 1
223	Biological Technicians	24502	Biological, Agricultural, and Food Technicians	02.9999	Deleted – (not trained for per MDCD)
225	Science technicians NEC	22599	All other engineering technicians	52.9999A	Deleted – 1
285	Sales support occupations NEC	32514	Opticians	51.9999	Deleted – 1

Appendix B: (Continued)

Census code	Census title	OES code	OES title	CIP code(s)	Change and reason code
337	Bookkeepers, Accounting, and auditing clerks	53911	Proofreaders and copy markers	48.0201	Deleted – 1
376	Investigators and adjusters, except insurance	53302	Insurance adjusters, examiners, and investigators	52.9999C	Deleted – 1
418	Police and detectives, Public Service	31517	Instructional Coordinators	13.0101	Deleted – 1
406	Child care workers, private household	62041	Child care workers, private household	20.0299	Added
444	Misc Food Preparation occupations	85947	Coin and vending machine repair	47.0101 47.0199	Deleted – 1
473	Farmers, except horticultural	71002	Farm Operators	02.9999	Added
474	Horticultural specialty farmers	71002	Farm Operators	02.9999	Added
475	Managers, farms, except horticultural	71005	Farm Managers	02.9999	Added
476	Managers, horticultural specialty farms	71005	Farm Managers	02.9999	Added
477	Supervisors, farm workers	72008	Supervisors, farm workers	02.9999	Added
479	Farm workers	74002	Farm workers, exc. Agric. Services	02.9999	Added
485	Supervisors, related agricultural occupations	75015	Supervisors, Related agricultural occupations	02.9999	Added
488	Graders and sorters, agricultural products	83002	Production inspectors, testers, graders	48.0503 48.0506	Deleted – 2
489	Inspectors, Agricultural products	75005	Inspectors, Agricultural production	02.9999	Added
499	Hunters and Trappers	77011	Hunters and trappers	02.9999	Added
505	Automobile mechanics	85119	All other industrial machinery maintenance mechanics	47.0399	Deleted – 1
523	Electronic Repairers, Communications	83002	Inspectors, Testers and Graders	02.9999 15.0607 48.0503 48.0506	Deleted – 1
547	Specified Mechanics and Repairers NEC	85956	Menders, garments, linens, and related	20.0301	Deleted – 1
585	Plumbers, Pipefitters	85928	Mechanical control and valve installers	47.0399 47.0401	Deleted – 1
613	Supervisors, extractive occupations	81011	First line supervisors, transportation/moving machines	47.9999	Deleted – 2
617	Mining occupations NEC	87899	All other construction trades workers	46.9900 46.9999	Deleted – 1

Appendix B: (Continued)

Census code	Census title	OES code	OES title	CIP code(s)	Change and reason code
628	Supervisors, production occupations	72002	First-Line Supervisors and managers/supervisors agriculture	02.9999	Deleted – 2
628	Supervisors, production occupations	81011	First line supervisors, transportation/moving machines	47.9999	Deleted – 2
628	Supervisors, production occupations	81017	First line supervisors, helpers and laborers	49.0101	Deleted – 2
647	Precious stones and metals workers (jewelers)	93197	All other precision assemblers	48.0506 48.9999	Deleted – 2
684	Miscellaneous Precision Workers, NEC	83002	Inspectors, Testers, and Graders	02.9999	Deleted – 2
684	Miscellaneous Precision Workers, NEC	89808	Food Batchmakers	02.9999	Deleted – 1
693	Adjusters and Calibrators	34023	Photographers	48.0299	Deleted – 1
703	Lathe and Turning machine set-up operators	85302	Automotive mechanics	47.0604 47.0699	Deleted – 1
715	Misc Metal, Plastic, Stone Workers	83005	Production Inspectors, Testers, Graders	02.9999 20.0301 48.0503	Deleted – 1
734	Printing machine operators	92510	Printing press setters	48.0201 48.0299	Added
768	Crushing and Grinding Machine operators	85112	Machinery Maintenance Mechanics, Textiles	47.0399	Deleted – 1
774	Photographic Process Machine Operators	34035	Artists and Commercial Artists	09.0701	Deleted – 1

Reason codes: 1 – Match between OES and Census codes was not appropriate
2 – Census occupation did not belong in CIP

Appendix C: Crosswalk between BLS OES occupations and LMI OES occupations

Michigan LMI openings data		Type	BLS OES National Data	
Code	Title		Code	Title
22310	Survey/Map Scientists, Techs	Rollup	22311	Surveyors and Mapping Scientists
			22521	Surveying and Mapping Technicians
22512	Drafters	Match	22514	Drafters
24501	Science/Mathematics Techns	Rollup	24502	Biological, Agricultural, and Food Technicians and technologists, Except Health
			24505	Chemical Technicians and Technologists, Except Health
			24508	Nuclear Technicians and Technologists
			24511	Petroleum Technicians and Technologists
			24599	All Other Physical and Life Science Technicians and Technologists
			25323	Mathematical Technicians
25106	Computer Programmers	Match	25105	Computer Programmers
25196	Computer Scientists NEC	Match	25199	All Other Computer Scientists
32398	Therapists NEC	Match	32399	All Other Therapists
32910	Clinical Lab Tech	Rollup	32902	Medical and Clinical Laboratory Technologists
			32905	Medical and Clinical Laboratory Technicians
32916	Radiologic Technols/Techs	Match	32919	Radiologic Technicians and Technologists
32995	Health Prof & Parapro, NEC	Match	32999	All Other Health Professionals, Paraprofessionals, and Technicians
34010	Radio/TV Announcers, Newscstrs	Rollup	34014	Broadcast News Analysts
			34017	Announcers, Radio and Television
34050	Musicians	Rollup	34047	Music Directors, Singers, Composers, and Related Workers
			34051	Musicians, Instrumental
35199	Engineering Techns, NEC	Match	22599	All Other Engineering and Related Technicians and Technologists
49995	Sales & Related Workers, NEC	Match	49999	All Other Sales and Related Workers
53810	Reserv, Ticket Agts, Travel Clks	Rollup	53802	Travel Clerks
			53805	Reservation and Transportation Ticket Agents
53904	Teacher Aides/Education Assts	Match	53905	Teacher Aides and Educational Assistants, Clerical
55198	Secretaries, Except Legal and Medical	Match	55108	Secretaries, Except Legal and Medical
55398	Typists/Word Processors	Match	55307	Typists, Including Word Processors
56200	Duplicating/Mail/Other Oprs	Rollup	56005	Duplicating Machine Operators
			56008	Mail Machine Operators, Preparation and Handling
			56099	All Other Office Machine Operators

Appendix C: (Continued)

Michigan LMI openings data		Type	BLS OES National Data	
Code	**Title**		**Code**	**Title**
58097	Stock Clerks	Rollup	49021	Stock Clerks – Sales Floor
			58023	Stock Clerks – Stockroom, Warehouse, or Storage Yard
58098	Material Recording Wkrs, NEC	Match	58099	All Other Material Recording, Scheduling, and Distributing Workers
59998	Clerical/Admin Wkrs, NEC	Match	59999	All Other Clerical and Administrative Support Workers
63001	Fire Inspection Occupations	Rollup	63002	Fire Inspectors
			63005	Forest Fire Inspectors and Prevention Specialists
63009	Police Detectives/Investigators	Rollup	63011	Police Detectives
			63028	Criminal Investigators, Public Service
63097	Protective Service Workers, NEC	Match	63099	All Other Protective Service Workers
67001	Janitors & cleaners, Inc Maid	Rollup	67002	Maids and Housekeeping cleaners
			67005	Janitors and cleaners, except Maids and Housekeeping cleaners
67098	Cleaning/Bldg Serv Wkrs, NEC	Match	67099	All Other Cleaning and Building Service Workers
69998	Service Workers, NEC	Match	69999	All Other Service Workers
71000	Farm Operators & Managers	Rollup	71001	Farm Managers
			71002	Farmers
			71005	Farm Managers
72000	First-Line Supervisors Agricultural and related workers	Match	72002	First-Line Supervisors and Managers/Supervisors - Agricultural, Forestry, Fishing, and Related Workers
73098	Timber Cutting Workers, NEC	Match	73099	All Other Timber Cutting and Related Logging Workers
77005	Fishers/Hunters/Trappers	Rollup	77008	Fishers
			77011	Hunters and Trappers
79005	Nursery Workers	OES chg	79041	Combined into 79041 in 1995
79012	Animal Breeders and Trainers	OES chg	79015	Split into two occupations in 1992, Animal
			79016	Breeders (79015) and Animal Trainers (79016)
79030	Gardenrs & Grndskprs, ex farm	OES chg	79041	Combined into 79041 in 1995
79998	Agric, Forest, Fishing, NEC	Match	79999	All Other Agricultural, Forestry, Fishing, and Related Workers

Appendix C: (Continued)

Michigan LMI openings data		Type	BLS OES National Data	
Code	**Title**		**Code**	**Title**
81000	First-Line Supervisors and Managers/Supervisors - Production, Construction, Maintenance, Etc	Rollup	81002	First-Line Supervisors and Managers/Supervisors–Mechanics, Installers, and Repairers
			81005	First-Line Supervisors and Managers/Supervisors–Construction Trades and Extraction
			81008	First-Line Supervisors and Managers/Supervisors–Production and Operating workers
			81011	First-Line Supervisors and Managers/Supervisors–Transportation and Material-moving workers
			81017	First-Line Supervisors and Managers/Supervisors–Helpers, Laborers, and Material Moving workers
			81099	All Other First-Line Supervisors and Managers/Supervisors–Production, Construction
83000	Inspectors and related Occupations	Rollup	83002	Precision Inspectors, Testers, and Graders
			83005	Production Inspectors, Testers, Graders, Sorters, Samplers, and Weighers
			83008	Transportation Inspectors
			83099	All Other Inspectors, Testers, and related workers
85109	Industrial Machinery Mechanics	Rollup	85112	Machinery Maintenance Mechanics, Textile Machines
			85113	Machinery Maintenance Mechanics, Sewing Machines
			85116	Machinery Maintenance Mechanics, Marine Equipment
			85117	Underground Mine Machinery Mechanics
			85118	Machinery Maintenance Mechanics, Water or Power Generation Plant
			85119	All Other Machinery Maintenance Mechanics
85597	Communic Eqp Mech/Inst/Rpr NEC	Match	85599	All Other Communications Equipment Mechanics, Installers, and Repairers
85710	Home Appl, Power Tool Rprs	Match	85711	Electric Home Appliance and Power Tool Repairers
85720	Electric & Electronic Rprs, NEC	Match	85799	All Other Electrical and Electronic Equipment Mechanics, Installers, and Repairers
85995	Mechanics, Installers, Rprs NEC	Match	85999	All Other Mechanics, Installers, and Repairers
87110	Carpenters	Match	87102	Carpenters
87120	Drywall Installers & Finishers	Match	87108	Drywall Installers
87310	Bricklayers & Stone Masons	Rollup	87302	Brickmasons
			87305	Stonemasons
87510	Pipelayers & Fitters	Rollup	87505	Pipelaying Fitters
			87508	Pipelayers
87320	Structural/Reinforc Metal Wkrs	Rollup	87314	Reinforcing Metal Workers
			87814	Structural Metal Workers

Appendix C: (Continued)

Michigan LMI openings data		Type	BLS OES National Data	
Code	Title		Code	Title
87823	Sheet Metal Wkrs, Duct Instlrs	Rollup	89132	Sheet Metal Workers
			87805	Sheet Metal Duct Installers
87898	Construction Trades Workers	Match	87899	All Other Construction Trades Workers
89195	Precision Metal Wkrs	Match	89199	All Other Precision Metal Workers
89395	Precision Woodworkers	Match	89399	All Other Precision Woodworkers
89598	Precision Textile Wkrs, NEC	Match	89599	All Other Precision Textile, Apparel, and Furnishings Workers
89716	Printing Wkrs, Prec, NEC	Match	89799	All Other Precision Printing Workers
89803	Butchers and Meatcutters, Prec	Match	65023	Butchers and Meat Cutters
89998	Precision Workers, NEC	Match	89999	All Other Precision Workers
91510	Combin Mach Tool Setrs/Oprs	Rollup	91505	Combination Machine Tool Setters and Set-Up Operators, Metal and Plastic
			91508	Combination Machine Tool Operators and Tenders, Metal and Plastic
91710	Soldering & Brazing Mach Ops	Rollup	91708	Soldering and Brazing Machine Setters and Set-Up Operators
			91711	Soldering and Brazing Machine Operators and Tenders
91750	Welding Machine Setrs/Oprs/Tndrs	Rollup	91702	Welding Machine Setters and Set-Up Operators
			91705	Welding Machine Operators and Tenders
91910	Met Mold Mach Ops/Tndrs/Sttrs	Rollup	91908	Metal Molding, Coremaking, and Casting Machine Setters and Set-Up Operators
			91911	Metal Molding, Coremaking, and Casting Machine Operators and Tenders
91920	Electrolytic Plating Mach Oprs	Rollup	91917	Electrolytic Plating and Coating Machine Setters and set-Up Operators, Metal and Plastic
			91921	Electrolytic Plating and Coating Machine Operators and Tenders Metal and Plastic
91950	Plast/Mold Mach Oprs/Tndrs	Rollup	91902	Plastic Molding and Casting Machine Setters and Set-up Operators
			91905	Plastic Molding and Casting Machine Operators and Tenders
92101	Metal/Plastic Settrs/Oprs NEC	Rollup	92197	All Other Metal and Plastic Machine Setters and Set-Up Operators
			92198	All Other Metal and Plastic Machine Operators and Tenders
92310	Woodworking Machine Op/Set	Rollup	92311	Woodworking Machine Setters and Set-Up Operators, Except Sawing
			92314	Woodworking Machine Operators and Tenders, Except Sawing
92540	Bindery Machine Op/Set	Rollup	92525	Bindery Machine Setters and Set-Up Operators
			92546	Bindery Machine Operators and Tenders

Appendix C: (Continued)

Michigan LMI openings data		Type	BLS OES National Data	
Code	**Title**		**Code**	**Title**
92542	Printing Press Mach Set/Ops/Tdnrs	Rollup	92510	Printing Press Machine Setters and Set-Up Operators
			92543	Printing Press Machine Operators and Tenders
92599	Printing, Binding, Rel, NEC	Match	92549	All Other Printing, Binding, and Related Machine Operators
92960	Coat/Paint Ops/Tndrs/Sttrs	Rollup	92951	Coating, Painting, and Spraying Machine Setters and Set-up Operators
			92953	Coating, Painting, and Spraying Machine Operators and Tenders
92970	Extrud/Form Mach Setrs/Oprs	Rollup	92968	Extruding, Forming, Pressing, and Compacting Machine Setters and Set-up Operators
			92971	Extruding, Forming, Pressing, and Compacting Machine Operators and Tenders
92999	Machine Opr/Tndr/Sttrs, NEC	Rollup	92997	All Other Machine Setters and Set-up Operators
			92998	All Other Machine Operators and Tenders
93196	Precision Assemblers, All Other	Match	93197	All Other Precision Assemblers
93996	Hand Workers, NEC	Match	93999	All Other Hand Workers
97001, 97101	Truck Drivers, Light/Heavy	Rollup	97102	Truck Drivers, Heavy or Tractor Trailer
			97105	Truck Drivers, Light, Include delivery or route workers
97504	Marine Oilers, Able Seamen	Rollup	97514	Able Seamen
			97517	Ordinary Seamen and Marine Oilers
97510	Captains & Pilots, Ship	Rollup	97502	Captains, Water Vessels
			97508	Pilots, Ship
98310	Construction Trades Helpers	Rollup	98311	Helpers, Brick and Stonemasons and Hard Tile Setters
			98312	Helpers, Carpenters and Related Workers
			98313	Helpers, Electricians and Power-Line Transmission Installers
			98314	Helpers, Painters, Paperhangers, Plasterers, and Stucco Masons
			98315	Helpers, Plumbers, Pipefitters, and Steamfitters
			98316	Helpers, Roofers
			98319	Helpers, All Other Construction Trades Workers

Appendix D: List of LMI OES Codes and Shares Added to Crosswalk, by CIP code
(All occupations that do not have a share listed have a share of 1.)

CIPcode	CIPtitle	LMI OES code	Share
02.9999	Agriscience And Natural Resources Education	24501	0.975
02.9999	Agriscience And Natural Resources Education	71000	
02.9999	Agriscience And Natural Resources Education	72000	
02.9999	Agriscience And Natural Resources Education	73098	
02.9999	Agriscience And Natural Resources Education	77005	
02.9999	Agriscience And Natural Resources Education	79005	
02.9999	Agriscience And Natural Resources Education	79012	
02.9999	Agriscience And Natural Resources Education	79030	
02.9999	Agriscience And Natural Resources Education	79998	
02.9999	Agriscience And Natural Resources Education	83000	0.971
02.9999	Agriscience And Natural Resources Education	89803	
09.0701	Radio And Television	34010	0.89
09.0701	Radio And Television	34050	
13.0101	Education, General	53904	
15.0607	Plastics	81000	0.315
15.0607	Plastics	83000	0.971
15.0607	Plastics	91920	
15.0607	Plastics	91950	
15.0607	Plastics	92101	
15.0607	Plastics	92960	
15.0699	Industrial Production Technologies/Technicians, Other	24501	0.366
15.0699	Industrial Production Technologies/Technicians, Other	35199	
15.0699	Industrial Production Technologies/Technicians, Other	83000	0.643
15.0699	Industrial Production Technologies/Technicians, Other	85109	0.319
20.0301	Clothing And Textiles Production And Services	83000	0.643
20.0301	Clothing And Textiles Production And Services	89598	
20.0499	Hospitality And Food Services	53810	
20.0499	Hospitality And Food Services	69998	
20.0501	Commercial Painting/Interior Treatment Serv.	87120	
20.0601	Building & Home Maintenance And Services	67001	
20.0601	Building & Home Maintenance And Services	67098	
43.0107	Law Enforcement	63009	
43.9999	Public Safety/Protective Services	63001	
43.9999	Public Safety/Protective Services	63009	
43.9999	Public Safety/Protective Services	63097	
46.0301	Electric And Power Transmission Installer	85720	
46.9900	Construction Trades	81000	0.182
46.9900	Construction Trades	87110	
46.9900	Construction Trades	87120	
46.9900	Construction Trades	87310	0.867
46.9900	Construction Trades	87320	

Appendix D: (Continued)

CIPcode	CIPtitle	LMI OES code	Share
46.9900	Construction Trades	87510	
46.9900	Construction Trades	87823	
46.9900	Construction Trades	87898	
46.9900	Construction Trades	98310	
46.9999	Construction/Building Maintenance	87120	
46.9999	Construction/Building Maintenance	87320	0.731
46.9999	Construction/Building Maintenance	87898	
47.0101	Electrical And Electronics Repair	85597	
47.0101	Electrical And Electronics Repair	85710	
47.0101	Electrical And Electronics Repair	85720	
47.0101	Electrical And Electronics Repair	85995	
47.0106	Major Appliance Repair	85710	
47.0199	Electromechanical Technology	85710	
47.0199	Electromechanical Technology	85720	
47.0201	Heating, Air Conditioning & Refrigeration	87823	0.211
47.0399	Industrial Equipment Maintenance & Repair	85109	
47.0399	Industrial Equipment Maintenance & Repair	92999	0.199
47.0401	Hydraulics & Pneumatics	83000	0.218
47.0408	Watch Repair	89998	
47.0699	Mechanics Cluster	85109	0.07
47.9999	Transportation Services And Technology	81000	0.075
47.9999	Transportation Services And Technology	83000	0.028
47.9999	Transportation Services And Technology	97001	
47.9999	Transportation Services And Technology	97101	
47.9999	Transportation Services And Technology	97504	
47.9999	Transportation Services And Technology	97510	
48.0101	Drafting	22310	0.605
48.0101	Drafting	22512	
48.0101	Drafting	35199	
48.0199	Drafting And Design Technology	22512	
48.0199	Drafting And Design Technology	35199	
48.0201	Graphics And Printing Communications	89716	
48.0201	Graphics And Printing Communications	92540	
48.0201	Graphics And Printing Communications	92542	
48.0201	Graphics And Printing Communications	92599	
48.0299	Visual Imaging Technology	89716	
48.0299	Visual Imaging Technology	92540	
48.0299	Visual Imaging Technology	92542	
48.0299	Visual Imaging Technology	92599	
48.0503	Machine Tool Operation/Machine Shop	83000	0.861
48.0503	Machine Tool Operation/Machine Shop	89195	
48.0503	Machine Tool Operation/Machine Shop	91510	
48.0503	Machine Tool Operation/Machine Shop	92101	
48.0506	Sheet Metal	83000	0.971

Appendix D: (Continued)

CIPcode	CIPtitle	LMI OES code	Share
48.0506	Sheet Metal	87823	
48.0506	Sheet Metal	89195	
48.0506	Sheet Metal	92101	0.631
48.0506	Sheet Metal	93196	
48.0508	Welding, Brazing & Soldering	91710	
48.0508	Welding, Brazing & Soldering	91750	
48.0701	Woodworking & Furniture Making	89395	
48.0701	Woodworking & Furniture Making	92310	
48.9999	Manufacturing Technology	81000	0.315
48.9999	Manufacturing Technology	83000	0.971
48.9999	Manufacturing Technology	87823	0.789
48.9999	Manufacturing Technology	91910	
48.9999	Manufacturing Technology	91920	
48.9999	Manufacturing Technology	91950	
48.9999	Manufacturing Technology	92101	
48.9999	Manufacturing Technology	92960	
48.9999	Manufacturing Technology	92970	
48.9999	Manufacturing Technology	93196	
48.9999	Manufacturing Technology	93996	
49.0101	Air Transportation	81000	0.076
49.0306	Marine Mechanics	85109	0.07
49.0306	Marine Mechanics	97504	
50.0599	Dramatic/Theater Arts And Stagecraft, Other	34050	
51.9999	Health	32398	
51.9999	Health	32910	
51.9999	Health	32916	
51.9999	Health	32995	
52.9999A	Information Technology Services	25106	
52.9999A	Information Technology Services	25196	
52.9999A	Information Technology Services	35199	
52.9999B	Wholesale/Retail Sales and Services	49995	
52.9999B	Wholesale/Retail Sales and Services	58097	
52.9999B	Wholesale/Retail Sales and Services	58098	
52.9999D	Business and Administrative Services	55198	
52.9999D	Business and Administrative Services	55398	
52.9999D	Business and Administrative Services	58097	0.39
52.9999D	Business and Administrative Services	58098	
52.9999D	Business and Administrative Services	59998	

Appendix E: Access Database Technical Reference

This appendix contains additional detail about the queries run in CIPrankform, including where in the visual basic code the user can make changes to the queries as necessary. The first section of the appendix discusses queries that run as CIPrankform is loaded. These queries update fields in the data tables and create input tables for the component ranking queries. The second section of the appendix contains more detail about the intermediate tables produced in the ranking queries. The third section of the appendix contains details about changes that the user can make to the queries and rankings.

Queries run prior to ranking

A set of preliminary queries runs as CIPrankform is loaded, including updates to the combined CIP field, calculating the placement shares for the subgroups of CIP 52.9999, and creating the SOC combined hourly wage table. The first query updates the 'CIPcomb' field in the CrossRef table based on the values entered in the 'combine' field of the CIP table. If additional CIP codes should be combined or separated, the user only needs to change the 'combine' field of the CIP table. Changes to the 'combine' field will automatically be updated each time the form is opened. If changes to the 'combine' field are made while the form is open, the user should close and reopen the form to update the 'CIPcomb' field.

The second set of preliminary queries calculates CIP shares for the subgroups of CIP code 52.9999 in order to allocate placement data. These shares are based on the SOC national employment data in each subgroup. First the query calculates the employment in each subgroup, then totals the subgroup employment, and finally figures the percentage of total employment in each subgroup. These shares are then updated in the CIP table. Another query then creates the tblCIPplace table, containing total and related placements for each CIP code, using the CIP shares for CIP code 52.9999 to calculate the actual number of related placements that belong in each subgroup. The current calculation is based on 3 of the subgroups—CIP 52.9999B is excluded from the calculation because it is assigned the placement from CIP 08.0708. The Visual Basic code for the form can be changed in order to include all 4 subgroups in the calculation, or in the case that placement data is available at the subgroup level, as discussed below.

The last set of preliminary queries creates the SOC combined wage table, including U.S., Michigan, and Census of Agriculture hourly wage data. First, tables containing hourly wage data are created for the Michigan SOC data and for the Census of Agriculture data. In each of these tables, hourly wages are calculated for occupations where only annual wages are given based on 2,000 hours per year. Then a new combined wage table is created using the SOC national employment and hourly wages (calculated where necessary) and a flag of 'US'. The national mean and median wages are updated with Michigan mean and median wages where available and the flag for each of these occupations is updated to 'MI'. The Census of Agriculture data are appended to the end of the table with a flag of 'AG'. This table is used later in the wage component queries.

Creation of intermediate tables in CIPrankform

The tables listed on page 21 of this documentation are created in the queries run in CIPrankform. This section identifies which intermediate tables are created in each portion of the form and the information contained in each table.

The tables tblCIPshare1, tblCIPshare2, tblCIPshare3, tblCIPshare4, and tblCIPplace are generated in the preliminary query that calculates the CIP shares (the Private Sub PreCIPqueries section of the Visual Basic code). Table tblCIPshare1 contains the unique SOC occupations and employment figures for each

of the 52.9999 subgroups. Table tblCIPshare2 contains the sum of the employment for each of the 4 subgroups. Table tblCIPshare3 contains the total sum of employment for all subgroups (subgroup 52.99992 was excluded from this total). TblCIPshare4 contains the employment shares for the 3 subgroups in the total (excludes 52.99992). TblCIPplace contains CIP code, combined CIP code, program title, CIP share (from tblCIPshare4), total related placements (from CIPplacement), total placements (from CIPplacement), related placements (this field allocates the total related placements for CIP 52.9999 subgroups as total related placements times CIP share), and placement year. The tblCIPplace table is used as an input for the placement component rankings.

The tables tblSOCmihr and tblSOCaghr are generated by the preliminary query that creates the SOCwgcombined table (the Private Sub PreWagequeries section of the Visual Basic code). These tables contain the hourly mean and median wages (calculated where necessary) by SOC occupation code for Michigan and Census of Agriculture data respectively. Both tables are used as input for the SOCwgcombined table.

The tables tblQCIP4, tblQCIP5, and tblRankPlace are created in the queries for the placement and openings components (the Private Sub RunQueries section of the code). TblQCIP4 contains combined CIP code, placement year, related placements (allocated by share to CIP 52.9999 subgroups), total placements, and sum total related placements (not allocated by share to CIP 52.9999 subgroups, for calculating percent related placements). TblQCIP5 contains related and percent related placements by combined CIP code and year. The year selected by the user is then queried into tblRankPlace, where 2 columns are added for the related and percent related ranks. The ranks are calculated in the Private Sub RunRanks section of the code.

The tables tblQOES1, tblQOES2, and tblRankOpen are created in the queries for the placement and openings components (the Private Sub RunQueries section of the code). TblQOES1 contains the combined CIP code, unique OES codes, total average openings, OES share, timeframe, and openings (calculated as total average openings times OES share). TblQOES2 contains the sum of openings by combined CIP code and timeframe. The year selected by the user is then queried into tblRankOpen where a column is added for the openings rank. The ranks are calculated in the Private Sub RunRanks section of the code.

The tables tblQCPS1, tblQCPS2, tblQCPS3, and tblRankCPS are created in the queries for the CPS wage component, which runs only if a CPS wage is chosen (the Private Sub CPSqueries section of the code). TblQCPS1 contains the combined CIP code, unique Census code, earnings weight, mean weekly earnings, median weekly earnings, weighted mean weekly earnings (earnings weight times mean weekly earnings, weighted median weekly earnings (earnings weight times median weekly earnings, and year. TblQCPS2 contains the sum earnings weight, sum weighted mean weekly earnings, and sum weighted median weekly earnings by combined CIP code and year. TblQCPS3 contains the average mean and average median weekly earnings (calculated as sum weighted mean (or median) weekly earnings divided by sum earnings weight) by combined CIP code and year. The year selected by the user is queried into tblRankCPS where two columns are added for the mean and median CPS ranks. The ranks are calculated in the Private Sub RunCPSRanks section of the code.

The tables tblQSOC1, tblQSOCemp, tblQSOC2, and tblRankSOC are created in the queries for the SOC wage component, which runs only if an SOC wage is chosen (the Private Sub SOCqueries section of the code). TblQSOC1 contains combined CIP code, unique SOC code, occupation employment, mean wage, median wage, 10^{th} percentile wage, and year. TblQSOCemp contains the sum of SOC employment by combined CIP code and year. TblQSOC2 contains combined CIP code, unique SOC code, occupation share of employment (calculated as occupation employment divided by sum of CIP employment), mean

wage, median wage, 10th percentile wage, year, weighted mean wage (mean wage times occupation share of employment), weighted median wage (median wage times occupation share of employment), and weighted 10th percentile wage (10th percentile wage times occupation share of employment). TblRankSOC contains the average mean, median, and 10th percentile wages (sum of weighted mean, median or 10th percentile wages for CIP) by combined CIP code for the year selected by the user. Three columns are added for ranking the three types of wage. The ranks are calculated in the Private Sub RunSOCRanks section of the code.

The table tblRankAll is generated after the SOC or CPS wages are ranked (in either the Private Sub RunSOCRanks or Private Sub RunCPSRanks section). This table contains all of the possible fields from the rank tables containing placements (2 fields), openings (1 field), and wages (2 or 3 fields depending on whether CPS or SOC wages were chosen).

The table tblRankFinal is generated from tblRankAll by limiting the fields to only the three components selected by the user. This is the table that the user views in the form output window.

Making changes to the code of CIPrankform

This section identifies where in the Visual Basic code for CIPrankform the user can make various changes. These changes will not alter the primary data tables, but rather will change how the various shares are calculated or how data are combined in calculating the ranking components.

The only changes that the user should need to make to the primary data tables are to the 'combine' field of the CIP table and the 'Include' field of the CrossRef table. If additional CIP codes should be combined or separated, the user only needs to add or delete the CIP code in the 'combine' field of the CIP table. These changes will automatically be updated each time the form is opened. (If the form is open when these changes are made, the form should be closed and reopened in order to update the combined CIP code information.) If occupations that are currently excluded from the rankings should be included, the user only needs to delete the 'No' from the 'Include' column of the CrossRef table. On the other hand, if additional occupations should be excluded, 'No' should be entered in the 'Include' column.

Currently, the shares for dividing placement data among the subgroups of CIP 52.9999 exclude CIP 52.99992. To include all four subgroups in the shares calculation, the user needs to change the Visual Basic code in the section with the heading 'Private Sub PreCIPqueries' near the beginning of the code. The comments, which begin with a single quotation mark and two asterisks ('**), indicate where the user needs to make changes and what changes should be made.

In the case that placement data become available for each of the subgroups of CIP code 52.9999, calculating the shares in order to allocate placements is no longer necessary. The last portion of code in the 'Private Sub PreCIPqueries' section will assign the share of 1 to each subgroup if the user removes the single quote from the beginning of each line, as indicated in the comment. The rest of the code in this section does not need to be changed since the value of 1 will overwrite any shares calculated previously. Note that the 'CIPcode' column of the CIPplacement table will also need to have the size increased by 1 to allow for the extra digit in the CIP codes of the subgroups.

For each of the component calculations, CIP 48.0506 was excluded from the rankings per MDCD instructions. This CIP code can be added back into the rankings (or another CIP code can be excluded) by making changes as indicated by the comments in the code. In the section Private Sub RunQueries there are two places where this exclusion occurs–once in the placement rank calculation and once in the

openings rank calculation. Both the Private Sub SOCqueries section and the Private Sub CPSqueries section also have this exclusion (only one time in each section) near the end of the code for that section.