



HIGH-TECHNOLOGY REPORT

May 19, 2006

HIGHLIGHTS

- DESPITE HIGH-TECHNOLOGY EMPLOYMENT LOSSES IN BOTH THE NATIONAL AND STATE ECONOMIES, OKLAHOMA'S HIGH-TECHNOLOGY SECTOR (A 7.7% EMPLOYMENT LOSS) PERFORMED BETTER THAN THE NATIONAL HIGH-TECHNOLOGY SECTOR (A 9.5% EMPLOYMENT LOSS) BETWEEN 2000 AND 2005.
- IN 2005, HIGH-TECHNOLOGY INDUSTRIES ACCOUNTED FOR 7.6% OF OKLAHOMA'S AND 9.2% OF THE NATION'S TOTAL NON-FARM EMPLOYMENT.

High-technology industries are important to the state's economic development efforts since these industries not only create well-paying jobs, but they also employ an innovative and skilled workforce. Job creation through the growth, expansion and attraction of high-technology companies requires cooperation and coordination with educational institutions, including K-12 schools, CareerTech and Higher Education.

This report quantifies employment and wages in Oklahoma's high-technology industries in 2000 and 2005 and compares the state's high-technology industries with national data for the same time periods. For a comparison of the high-technology sector over the 1990-2003 time frame, as well as a policy discussion, please see Larkin Warner's and Robert Dauffenbach's "State Policy and Oklahoma High-Tech Economic Development" article in the [State Policy & Economic Development in Oklahoma: 2006](#) publication.

HIGH-TECHNOLOGY INDUSTRY IDENTIFICATION (METHODOLOGY)

Before progressing further, it should be noted that the method used to identify high-technology industries is the same method explained in Daniel Hecker's article "High-technology employment: a NAICS-based update". In his article, high-technology industries are those industries that "devote a 'high' proportion of expenditures on research & development (R&D) and employ a 'high' proportion of scientific, technical, and engineering personnel."¹

Since employment data is more current than expenditure data, Quarterly Census of Employment & Wages (QCEW) data from the Bureau of Labor Statistics and the Oklahoma Employment Security Commission are used to present information about the high-technology sector. Research & development expenditure data are avail-

able from the National Science Foundation; however, the most current data is from 2001-2002.

Returning to the occupational method for identifying high-tech(nology) industries, high-tech occupations are defined as scientists, mathematicians, engineers, technicians, computer scientists and drafters. These "technology-oriented" occupations are listed by their respective Standard Occupational Classification (SOC) in Exhibit 1.

EXHIBIT 1: HIGH TECH OCCUPATIONS BY SOC¹

SOC15-0000: Computer & Mathematical Scientists
SOC17-2000: Engineers
SOC17-3000: Drafters, Engineering & Mapping Tech.
SOC19-1000: Life Scientists
SOC19-2000: Physical Scientists
SOC19-4000: Life, Physical & Social Science Tech.
SOC11-3020: Computer & Info. Systems Managers
SOC11-9040: Engineering Managers
SOC11-9120: Natural Sciences Managers

Using the above occupational information, Daniel Hecker states "An industry is considered high-tech if employment in technology-oriented occupations accounted for a proportion of that industry's total employment that was at least twice the 4.9% average for all industries." Therefore a NAICS-based industry is considered high-tech if at least 9.8% of its total employment is accounted for by the technology-oriented occupations listed above. Using this method to measure high-tech industry employment in Oklahoma assumes that these industries in the state exhibit similar occupational proportions as the nation.

Other methods that have been used to identify high-technology industries involve subjective judgements regarding the products produced or the processes used in the

1. Daniel E. Hecker, "High-Technology employment: a NAICS based update", [Monthly Labor Review](#), Bureau of Labor Statistics, July, 2005, pages 57-72.

industry. One weakness with these subjective methods is that the products/processes that may have been leading-edge five years ago may no longer be on the leading edge today. However, the occupational proportion method to identify high-tech industries assumes that the occupational proportions in all of the industries have not changed greatly. It also assumes that no new industry exceeds the 9.8% threshold, and that an existing high-tech industry has not fallen below the 9.8% threshold.²

Forty-six NAICS-based industries, at the four-digit NAICS level, are classified as “High-Technology” industries using the occupational method described above. With so many industries classified as high-tech, Daniel Hecker further delineated the industries into three “levels” based upon the industry’s proportion of technology-oriented workers. Level 1 high-tech industries have employment proportions that exceed five times the national proportion for technology-oriented occupations. Therefore almost one-quarter (24.7%) of the occupations in Level 1 high-tech industries are technology-oriented, and are the highest of the high-technology industries. The proportion of technology-oriented occupations in Level 2 high-tech industries ranges from 14.8% to 24.7%, and the proportion in Level 3 high-technology industries ranges from 9.8% to 14.7% of total employment in the industry. It should be noted that throughout this report, whenever high-tech employment is discussed, it refers to all employment in high-tech industries and not just technology-oriented occupations in high-tech industries. At the four-digit NAICS level, fourteen industries are classified as Level 1, twelve industries are classified as Level 2 and twenty industries are classified as Level 3 high-tech.

The remainder of this report presents aggregated data. Detailed data and summary points begin on page 5, and a complete listing and description of the industries may be found in the Appendix.

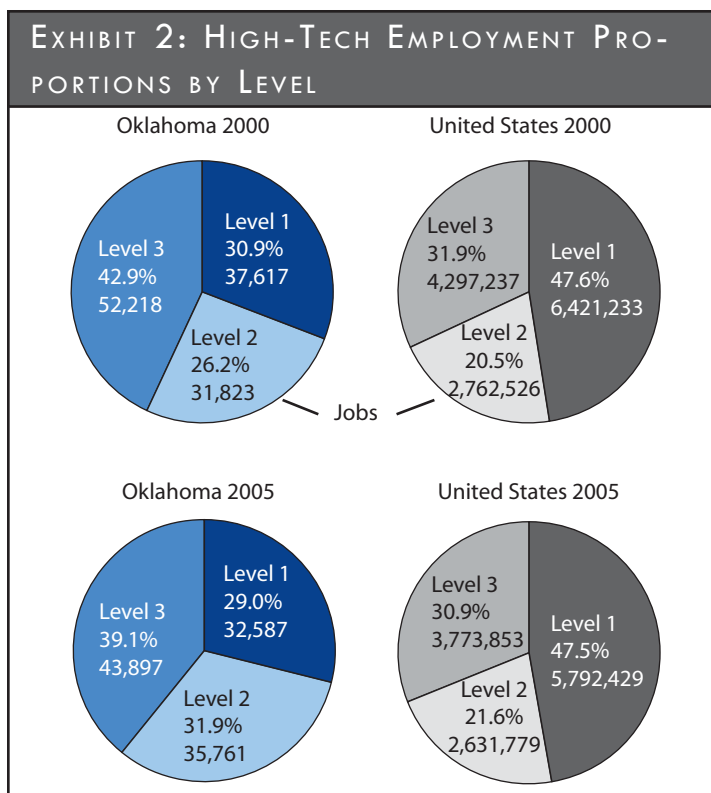
HIGH-TECHNOLOGY EMPLOYMENT & PROPORTIONS

U.S. high-technology industry employment totaled 13,480,996 jobs in 2000 and decreased 9.5% (or 1,282,935 jobs) to 12,198,061 jobs by 2005. As a proportion of total non-farm employment, national high-technology industries accounted for 10.3% of total non-

farm employment in 2000 and 9.2% in 2005.

A similar employment decrease occurred in Oklahoma’s high-tech industries over the same five year time frame. In 2000, employment in Oklahoma’s high-tech industries totaled 121,658 jobs and accounted for 8.4% of the state’s total non-farm employment. By 2005, Oklahoma’s high-tech employment decreased 7.7% (or 9,414 jobs) to 112,245 jobs. This employment decrease, coupled with an increase in total non-farm employment, caused high-tech’s share of total state employment to decrease to 7.6% of the state’s total non-farm employment.

The pie charts in Exhibit 2 relate high-tech employment proportions in 2000 (Q2) and 2005 (Q2) for both the national and state economies. Nationally, Level 1 high-tech employment accounts for nearly half of the nation’s total high-tech employment in 2000 and 2005. In Oklahoma, Level 3 high-tech employment accounts for the largest share of high-technology industry employment in both 2000 and 2005, however, as a share of total high-technology employment, Level 3 high-tech employment decreased from 42.9% to 39.1%.



Source: BLS & OES Quarterly Census of Employment & Wages Program.

2. Industries that many people consider as high-technology, such as biotechnology, nanotechnology and advanced materials, do not have a separate NAICS classification. Rather these industries are most likely contained within some other industry, such as the Scientific R&D Services (NAICS 5417) or Pharmaceutical & Medicine Manufacturing (NAICS 3254) industries.

The national employment proportions among the high-tech levels remained little changed over the five year time period. Combined employment in the high-tech industries decreased by nearly 1.3 million jobs in the five year time frame. Each of the three high-tech levels contributed to the total employment loss; however, these changes did not greatly alter the national proportions.

As opposed to the relative stability of the national employment proportions, Oklahoma's employment proportions changed noticeably. Within the state, Level 2 employment increased over the five years (3,938 jobs) and this contributed to a larger share of total high-tech industry employment in 2005 (31.9%) when compared to 2000 (26.2%). The largest level 2 high-tech employment gain (3,180 jobs) occurred in the Management, Technical Consulting Services industry (NAICS 5416) industry. Other Industries aggregated in the Level 2 grouping include Oil & Gas Extraction (NAICS 2111) and Electric Power Generation & Transmission (NAICS 2211).

TWO-DIGIT NAICS COMPARISON

In addition to the previously displayed employment proportions, which aggregated high-tech industries into three levels, the industry employment data may also be aggregated into two-digit NAICS. For example, NAICS 32, a general two-digit Manufacturing designation, includes Pharmaceutical & Medicine manufacturing (NAICS 3254 & Level 1 industry), Basic Chemical manufacturing (NAICS 3251 & Level 2 industry), Petroleum & Coal Products manufacturing (NAICS 3241 & Level 3 industry), as well as similar high-tech manufacturing industries beginning with the NAICS "32" two-digit designation.

Exhibit 3 relates the respective employment proportions for two-digit NAICS high-technology sectors in the state and nation in both 2000 and 2005. Within the data table, "D" denotes data that cannot be displayed so as to protect confidential information that may be used to identify a single employer. Exhibit 4 displays 2005 information as a 100% bar chart. As a note, the NAICS 55 sector only contains one four-digit NAICS industry (NAICS 5511 - Management of Companies & Enterprises). Therefore, with only one four-digit industry, 100% of the employment and wages in NAICS 55 are technology-oriented. Because there are many establishments within the

single NAICS 5511 industry (Management of Companies & Enterprises), data disclosure is not an issue.

To illustrate one example of high-tech and non high-tech data contained in Exhibits 3-5, there are five 4 digit NAICS industries included in the two-digit NAICS 21 (Mining) sector. Only one industry, NAICS 2111 (Oil & Gas Extraction) is classified as a high-technology industry. Other four-digit NAICS 21 industries that are not classified as high-technology include Coal Mining (NAICS 2121), Metal Ore Mining (NAICS 2122), Nonmetallic Mineral Mining & Quarrying (NAICS 2123) and Support Activities for Mining (2131).

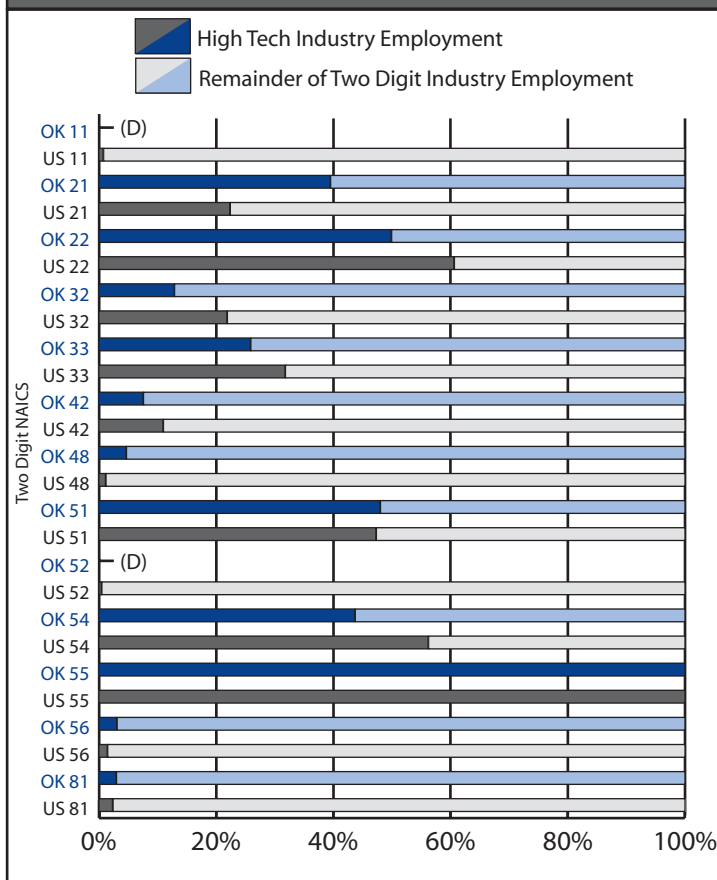
In 2000, more than half (51.8%) of all employment in Oklahoma's Mining sector (NAICS 21) occurred in the Oil & Gas Extraction industry. By 2005, the Oil & Gas Extraction industry accounted for 39.5% of all Mining sector employment. Although the proportion decreased over the five years, this does not necessarily indicate that employment decreased over the time frame in the high-tech NAICS 21 industry. In fact, employment in the four other NAICS 21 industries increased at a faster rate than in the high-tech NAICS 21 industry. Comparatively, the national employment proportion in high-tech NAICS 21

EXHIBIT 3: PROPORTION OF TWO-DIGIT NAICS INDUSTRY EMPLOYMENT CLASSIFIED AS HIGH TECH

Two-Digit NAICS	Oklahoma High Tech		U.S. High Tech	
	2000	2005	2000	2005
Ag, Forestry 11	(D)	(D)	0.9%	0.8%
Mining 21	51.8%	39.5%	24.0%	22.4%
Utilities 22	48.4%	49.9%	61.6%	60.6%
Manufacturing 32	16.6%	12.9%	20.9%	21.9%
Manufacturing 33	28.4%	25.9%	33.5%	31.8%
Wholesale Trade 42	6.8%	7.6%	12.0%	11.0%
Trans. & Whsg. 48	4.6%	4.7%	1.4%	1.2%
Information 51	54.5%	48.0%	52.4%	47.3%
Finance & Ins. 52	(D)	(D)	0.6%	0.5%
Prof. & Tech. 54	42.9%	43.7%	55.9%	56.2%
Management 55	100.0%	100.0%	100.0%	100.0%
Admin. & Sup. 56	3.4%	3.1%	1.2%	1.5%
Other Service 81	3.0%	3.0%	2.6%	2.4%

Source: BLS & OESC Quarterly Census of Employment & Wages Program. (D) Data not disclosable

EXHIBIT 4: 2005 HIGH TECH EMPLOYMENT PROPORTIONS BY TWO DIGIT NAICS



equalled 24.0% of total Mining employment in 2000, which was less than half of Oklahoma's 2000 proportion. Similar to the state's performance, employment in NAICS 2111 increased, but its proportion of NAICS 21 employment decreased to 22.4% since employment in the other four industries increased at a faster rate.

Whereas Exhibit 3 presented employment proportions, Exhibit 5 presents the proportion of wages earned in high-technology industries compared to its appropriate two-digit NAICS sector as a whole. When used in conjunction with Table 1, the wage information relates that, at the two-digit NAICS level, high-tech industries pay higher wages than the industries not classified as high-technology at both the state and national levels. For example in 2005, high-technology industries in the Information sector (NAICS 51) accounted for 48.0% of total NAICS 51 employment in Oklahoma and 47.3% of total NAICS 51 employment in the U.S. However, the high-technology Information sector industries accounted for 52.5% of total NAICS 51 wages in Oklahoma and 56.8% of total NAICS 51 wages in the U.S. Since the wage proportions are greater than the employment proportions, it can be inferred that wages are higher than average in the high-technology NAICS 51 industries when compared to the rest of the NAICS 51 industries.

EXHIBIT 5: PROPORTION OF TWO-DIGIT NAICS WAGES EARNED IN HIGH TECH INDUSTRIES

Two-Digit NAICS	Oklahoma High Tech		U.S. High Tech	
	2000	2005	2000	2005
Ag, Forestry 11	(D)	(D)	1.6%	1.5%
Mining 21	61.5%	50.0%	36.1%	35.7%
Utilities 22	55.4%	57.4%	68.1%	68.1%
Manufacturing 32	22.7%	16.1%	29.9%	33.2%
Manufacturing 33	33.9%	31.3%	43.2%	40.9%
Whlsle. Trade 42	8.1%	10.0%	17.3%	14.9%
Trans. & Whsg. 48	7.9%	7.1%	3.2%	2.4%
Information 51	64.1%	52.5%	64.4%	56.8%
Finance & Ins. 52	(D)	(D)	0.6%	0.6%
Prof. & Tech. 54	50.3%	49.9%	63.7%	63.0%
Management 55	100.0%	100.0%	100.0%	100.0%
Admin. & Sup. 56	4.4%	3.9%	1.9%	2.1%
Other Service 81	5.1%	4.9%	4.7%	4.2%

Source: BLS & OESC Quarterly Census of Employment & Wages Program. (D) Data not disclosable

As alluded to earlier, educational institutions play an important role in the state's economic development efforts to grow, expand and attract high-technology companies. Educational institutions not only provide workforce training for the state's current workforce, but also serve as a pipeline for the state's future workforce needs. Ultimately, these institutions supply a skilled labor force demanded by high-tech companies.

The remainder of the report (pages 5-10) provides summary points as well as the actual employment & wage data for each of the high-technology levels. Industry definitions may be found in the Appendix.

CONTACT INFORMATION

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LEVEL 1 HIGH-TECHNOLOGY HIGHLIGHTS

TOTAL LEVEL 1 HIGH-TECHNOLOGY PERFORMANCE

- COMPARED WITH A NATIONAL EMPLOYMENT DECREASE OF 9.8% (628,803 JOBS) BETWEEN 2000 (2Q) AND 2005 (2Q), OKLAHOMA'S LEVEL 1 HIGH-TECHNOLOGY EMPLOYMENT DECREASED 13.4% (5,030 JOBS) OVER THE SAME TIME PERIOD. (TABLE 1)

LOW PERFORMING INDUSTRIES

- OVER THE 2000 (2Q) TO 2005 (2Q) TIME FRAME, MUCH OF OKLAHOMA'S EMPLOYMENT LOSS IS ATTRIBUTED TO COMMUNICATIONS, SOFTWARE & INTERNET, AND COMPUTER PERIPHERAL INDUSTRIES INCLUDED AS LEVEL 1 HIGH-TECHNOLOGY INDUSTRIES. (TABLE 1)
- COMBINED JOB LOSSES TOTALED 6,238 JOBS IN THE STATE'S COMMUNICATIONS, SOFTWARE & INTERNET, AND COMPUTER PERIPHERAL INDUSTRIES, WHICH INCLUDES NAICS 3341, 3342, 3344, 5112, 5161, 5179, AND 5181. (TABLE 1)
- IN 2000, THE SEVEN INDUSTRIES MENTIONED ABOVE ACCOUNTED FOR 30.3% OF OKLAHOMA'S, AND 26.3% OF THE U.S., PROPORTION OF LEVEL 1 HIGH-TECH EMPLOYMENT. BY 2005, THE PROPORTIONS FELL TO 15.9% IN THE STATE AND 20.4% IN THE NATION. (TABLE 2)

HIGH PERFORMING INDUSTRIES

- DESPITE THE WEAKNESS OF THE PREVIOUSLY MENTIONED INDUSTRIES, THREE LEVEL 1 HIGH-TECH INDUSTRIES (NAVIGATIONAL, MEASURING & ELECTROMEDICAL MFG. NAICS 3345, DATA PROCESSING, HOSTING & RELATED SERVICES NAICS 5182, AND COMPUTER SYSTEMS DESIGN SERVICES NAICS 5415) POSTED JOB GROWTH IN OKLAHOMA TOTALING 423 JOBS WHILE THE NATION SUFFERED JOB LOSSES TOTALING 208,411 JOBS OVER THE SAME TIME PERIOD. (TABLE 1)
- AN ADDITIONAL HIGHLIGHT FOR THE STATE, OKLAHOMA'S JOB GROWTH RATES IN THE ARCHITECTURAL & ENGINEERING SERVICES INDUSTRY (10.5%) AND THE SCIENTIFIC RESEARCH & DEVELOPMENT INDUSTRY (28.1%) SURPASSED NATIONAL GROWTH RATES (6.1% AND 10.6%, RESPECTIVELY) BETWEEN 2000 AND 2005. (TABLE 1)
- JOB GROWTH IN THESE TWO INDUSTRIES (ARCHITECTURAL & ENGINEERING SERVICES AND SCIENTIFIC RESEARCH & DEVELOPMENT) TOTALED 1,596 JOBS IN OKLAHOMA AND 136,559 JOBS IN THE U.S. (TABLE 1)

LEVEL 1 HIGH-TECHNOLOGY WAGES

- AVERAGE ANNUALIZED WAGES IN OKLAHOMA'S LEVEL 1 HIGH-TECHNOLOGY SECTOR INCREASED \$4,223 (OR 9.6%) FROM \$44,135 IN 2000 TO \$48,358 IN 2005. COMPARABLY, NATIONAL WAGES INCREASED \$7,001 (OR 10.7%) FROM \$65,736 IN 2000 TO \$72,737 IN 2005. (TABLE 3)

TABLE 1: LEVEL 1 HIGH-TECHNOLOGY EMPLOYMENT

Industry	NAICS	Oklahoma Avg. Empl.		OK 2000-2005 Change		U.S. Avg. Employment		U.S. 2000-2005 Change	
		2000	2005	Amount	Percent	2000	2005	Amount	Percent
Pharmaceutical & Medicine Mftg.	3254	447	329	-119	-26.5%	272,109	287,143	15,034	5.5%
Computer & Peripheral Equipment Mftg.	3341	1,966	849	-1,117	-56.8%	284,583	205,055	-79,527	-27.9%
Communications Equipment Mftg.	3342	4,748	831	-3,917	-82.5%	242,904	146,555	-96,349	-39.7%
Semiconductor & Electronic Comp. Mftg.	3344	1,456	1,137	-319	-21.9%	661,741	446,647	-215,093	-32.5%
Navig., Measuring & Electromedical Mftg.	3345	2,121	2,268	147	6.9%	477,960	433,858	-44,102	-9.2%
Aerospace Product & Parts Mftg.	3364	4,590	3,925	-666	-14.5%	518,965	454,217	-64,748	-12.5%
Software Publishers	5112	903	626	-277	-30.7%	262,648	235,999	-26,650	-10.1%
Internet Publishing & Broadcasting	5161	128	90	-37	-29.2%	47,527	31,138	-16,389	-34.5%
Other Telecommunications	5179	288	86	-202	-70.1%	9,047	6,979	-2,068	-22.9%
Internet Service Providers & Web Portals	5181	1,920	1,551	-369	-19.2%	186,264	114,805	-71,460	-38.4%
Data Processing, Hosting, & Related Ser.	5182	1,539	1,588	48	3.1%	327,915	268,986	-58,930	-18.0%
Architectural & Engineering Services	5413	10,477	11,573	1,096	10.5%	1,283,176	1,361,677	78,502	6.1%
Computer Systems Design Services	5415	5,354	5,582	228	4.3%	1,297,287	1,191,908	-105,379	-8.1%
Scientific R&D Services	5417	1,681	2,153	473	28.1%	549,106	607,463	58,357	10.6%
Level 1 Total Employment		37,617	32,587	-5,030	-13.4%	6,421,233	5,792,429	-628,803	-9.8%

Source: Bureau of Labor Statistics & Oklahoma Employment Security Commission, QCEW data

TABLE 2: SELECTED PERCENTAGES OF LEVEL 1 HIGH-TECHNOLOGY EMPLOYMENT

Share of Level 1 High-Tech Employment				Industry	NAICS	Oklahoma's Share of Total U.S. Employment	
OK - 2000	OK - 2005	U.S. - 2000	U.S. - 2005			2000	2005
1.2%	1.0%	4.2%	5.0%	Pharmaceutical & Medicine Mftg.	3254	0.2%	0.1%
5.2%	2.6%	4.4%	3.5%	Computer & Peripheral Equipment Mftg.	3341	0.7%	0.4%
12.6%	2.5%	3.8%	2.5%	Communications Equipment Mftg.	3342	2.0%	0.6%
3.9%	3.5%	10.3%	7.7%	Semiconductor & Electronic Comp. Mftg.	3344	0.2%	0.3%
5.6%	7.0%	7.4%	7.5%	Navig., Measuring & Electromedical Mftg.	3345	0.4%	0.5%
12.2%	12.0%	8.1%	7.8%	Aerospace Product & Parts Mftg.	3364	0.9%	0.9%
2.4%	1.9%	4.1%	4.1%	Software Publishers	5112	0.3%	0.3%
0.3%	0.3%	0.7%	0.5%	Internet Publishing & Broadcasting	5161	0.3%	0.3%
0.8%	0.3%	0.1%	0.1%	Other Telecommunications	5179	3.2%	1.2%
5.1%	4.8%	2.9%	2.0%	Internet Service Providers & Web Portals	5181	1.0%	1.4%
4.1%	4.9%	5.1%	4.6%	Data Processing, Hosting, & Related Services	5182	0.5%	0.6%
27.9%	35.5%	20.0%	23.5%	Architectural & Engineering Services	5413	0.8%	0.8%
14.2%	17.1%	20.2%	20.6%	Computer Systems Design Services	5415	0.4%	0.5%
4.5%	6.6%	8.6%	10.5%	Scientific R&D Services	5417	0.3%	0.4%
100.0%	100.0%	100.0%	100.0%	Total Level 1 High-Technology		0.6%	0.6%

Source: Bureau of Labor Statistics & Oklahoma Employment Security Commission, QCEW data

TABLE 3: LEVEL 1 HIGH-TECHNOLOGY WAGES

Industry	NAICS	Oklahoma Avg. Wages		OK 2000-2005 Change		U.S. Avg. Wages		U.S. 2000-2005 Change	
		2000	2005	Amount	Percent	2000	2005	Amount	Percent
Pharmaceutical & Medicine Mftg.	3254	\$45,077	\$42,734	-\$2,343	-5.2%	\$65,373	\$85,494	\$20,121	30.8%
Computer & Peripheral Equipment Mftg.	3341	\$61,081	\$58,597	-\$2,484	-4.1%	\$97,773	\$93,808	-\$3,965	-4.1%
Communications Equipment Mftg.	3342	\$54,860	\$50,311	-\$4,548	-8.3%	\$65,142	\$75,279	\$10,137	15.6%
Semiconductor & Electronic Comp. Mftg.	3344	\$27,994	\$33,160	\$5,166	18.5%	\$65,025	\$65,566	\$541	0.8%
Navig., Measuring & Electromedical Mftg.	3345	\$37,213	\$43,967	\$6,754	18.1%	\$58,552	\$70,191	\$11,639	19.9%
Aerospace Product & Parts Mftg.	3364	\$41,346	\$54,460	\$13,114	31.7%	\$57,237	\$72,143	\$14,907	26.0%
Software Publishers	5112	\$49,166	\$52,518	\$3,352	6.8%	\$110,721	\$93,241	-\$17,480	-15.8%
Internet Publishing & Broadcasting	5161	\$36,173	\$41,702	\$5,529	15.3%	\$67,418	\$71,063	\$3,645	5.4%
Other Telecommunications	5179	\$50,787	\$50,754	-\$33	-0.1%	\$68,905	\$77,488	\$8,583	12.5%
Internet Service Providers & Web Portals	5181	\$31,145	\$39,230	\$8,085	26.0%	\$81,361	\$89,459	\$8,098	10.0%
Data Processing, Hosting, & Related Ser.	5182	\$38,519	\$35,953	-\$2,566	-6.7%	\$49,398	\$60,230	\$10,832	21.9%
Architectural & Engineering Services	5413	\$42,549	\$48,886	\$6,337	14.9%	\$51,372	\$60,570	\$9,198	17.9%
Computer Systems Design Services	5415	\$47,624	\$51,908	\$4,285	9.0%	\$72,551	\$77,594	\$5,043	7.0%
Scientific R&D Services	5417	\$39,615	\$48,608	\$8,993	22.7%	\$64,924	\$78,702	\$13,778	21.2%
Level 1 Weighted Average Wage		\$44,135	\$48,358	\$4,223	9.6%	\$65,736	\$72,737	\$7,001	10.7%

Source: Bureau of Labor Statistics & Oklahoma Employment Security Commission, QCEW data

Note: Annualized data.

LEVEL 2 HIGH-TECHNOLOGY HIGHLIGHTS

TOTAL LEVEL 2 HIGH-TECHNOLOGY PERFORMANCE

- COMPARED WITH A NATIONAL EMPLOYMENT DECREASE OF 4.7% (130,747 JOBS) BETWEEN 2000 (2Q) AND 2005 (2Q), OKLAHOMA'S LEVEL 2 HIGH-TECHNOLOGY EMPLOYMENT **INCREASED 12.4% (3,938 JOBS)** OVER THE SAME TIME PERIOD. (TABLE 4)

HIGH PERFORMING INDUSTRIES

- WHILE A PORTION OF OKLAHOMA'S LEVEL 2 HIGH-TECHNOLOGY EMPLOYMENT INCREASE IS ATTRIBUTABLE TO THE EXPANDING OIL & GAS INDUSTRY (562 JOB GAIN IN NAICS 2111) AND THE ELECTRIC POWER INDUSTRY (335 JOB GAIN IN NAICS 2211), MOST OF THE EMPLOYMENT GAIN OCCURRED IN THE STATE'S MANAGEMENT, SCIENTIFIC & TECHNICAL CONSULTING (3,180 JOB GAIN IN NAICS 5416) INDUSTRY. (TABLE 4)
- SEVEN OF THE STATE'S NINE (DISCLOSABLE) LEVEL 2 HIGH-TECH INDUSTRIES CREATED JOBS IN THE FIVE YEARS BETWEEN 2000 (2Q) AND 2005 (2Q). COMPARABLY, ONLY THREE OF THE NATION'S TWELVE LEVEL 2 HIGH-TECH INDUSTRIES MANAGED EMPLOYMENT GROWTH OVER THE SAME TIME PERIOD. (TABLE 4)

LEVEL 2 HIGH-TECHNOLOGY PROPORTIONS

- OKLAHOMA'S OIL & GAS EXTRACTION INDUSTRY ACCOUNTED FOR 42.0% OF THE STATE'S TOTAL LEVEL 2 HIGH-TECH EMPLOYMENT IN 2000. WHILE THE OIL & GAS EXTRACTION INDUSTRY CREATED JOBS BETWEEN 2000 AND 2005, THE INDUSTRY'S PROPORTION OF TOTAL LEVEL 2 HIGH-TECH EMPLOYMENT DECREASED TO 38.9% IN 2005. (TABLE 5)
- ALTHOUGH THE OIL & GAS EXTRACTION INDUSTRY ACCOUNTED FOR THE MAJORITY OF LEVEL 2 HIGH-TECH EMPLOYMENT IN OKLAHOMA, THE U.S. OIL & GAS EXTRACTION INDUSTRY ACCOUNTED FOR A MUCH LOWER PROPORTION OF TOTAL LEVEL 2 HIGH-TECH EMPLOYMENT IN 2000 AND 2005, 4.4% AND 4.7% RESPECTIVELY. (TABLE 5)
- OKLAHOMA'S OIL & GAS EXTRACTION INDUSTRY (NAICS 2111) ACCOUNTED FOR 11.0% OF NATION'S INDUSTRY EMPLOYMENT IN 2000 AND 11.2% OF THE NATION'S INDUSTRY EMPLOYMENT IN 2005. (TABLE 5)

LEVEL 2 HIGH-TECHNOLOGY WAGES

- AVERAGE ANNUALIZED WAGES IN OKLAHOMA'S LEVEL 2 HIGH-TECHNOLOGY SECTOR INCREASED \$8,704 (OR 17.5%) FROM \$49,857 IN 2000 TO \$58,861 IN 2005. COMPARABLY, NATIONAL WAGES INCREASED \$7,842 (OR 12.8%) FROM \$61,323 IN 2000 TO \$69,165 IN 2005. THEREFORE, BOTH IN ABSOLUTE AND PERCENTAGE TERMS, AVERAGE WAGE GROWTH IN OKLAHOMA'S LEVEL 2 HIGH-TECH SECTOR PERFORMED BETTER THAN THE U.S. LEVEL 2 HIGH-TECH SECTOR. (TABLE 6)
- IN 2005, AVERAGE ANNUALIZED WAGES IN OKLAHOMA'S LEVEL 2 HIGH-TECH SECTOR (\$58,561) WERE HIGHER THAN AVERAGE ANNUALIZED WAGES IN OKLAHOMA'S LEVEL 1 HIGH-TECH SECTOR (\$48,358). (TABLES 3 & 6).

TABLE 4: LEVEL 2 HIGH-TECHNOLOGY EMPLOYMENT

Industry	NAICS	Oklahoma Avg. Empl.		OK 2000-2005 Change		U.S. Avg. Employment		U.S. 2000-2005 Change	
		2000	2005	Amount	Percent	2000	2005	Amount	Percent
Timber Tract Operations	1131	(D)	(D)	-	-	8,673	7,591	-1,082	-12.5%
Forest Nurseries & Forest Products	1132	(D)	(D)	-	-	2,474	2,790	316	12.8%
Oil & Gas Extraction	2111	13,367	13,929	562	4.2%	121,775	124,383	2,608	2.1%
Electric Power Utilities	2211	6,927	7,262	335	4.8%	521,036	487,045	-33,991	-6.5%
Basic Chemical Mftg.	3251	871	588	-284	-32.6%	188,684	151,153	-37,530	-19.9%
Resin, Synthetic Rubber & Fibers Mftg.	3252	222	334	112	50.7%	135,637	106,998	-28,639	-21.1%
Industrial Machinery Mftg.	3332	299	562	263	87.8%	161,378	122,755	-38,624	-23.9%
Commercial & Service Machinery Mftg.	3333	2,127	1,297	-829	-39.0%	106,793	77,579	-29,214	-27.4%
Audio & Video Equipment Mftg.	3343	(D)	(D)	-	-	52,779	32,710	-20,070	-38.0%
Magnetic & Optical Media Mftg.	3346	177	245	69	38.9%	64,086	43,961	-20,125	-31.4%
Professional Equipment Wholesalers	4234	3,832	4,286	455	11.9%	689,156	634,972	-54,185	-7.9%
Mgmt., Scientific, & Technical Consulting	5416	3,774	6,954	3,180	84.3%	710,055	839,842	129,787	18.3%
Level 2 Total Employment		31,823	35,761	3,938	12.4%	2,762,526	2,631,779	-130,747	-4.7%

Source: Bureau of Labor Statistics & Oklahoma Employment Security Commission, QCEW data

(D) Data not disclosable

TABLE 5: SELECTED PERCENTAGES OF LEVEL 2 HIGH-TECHNOLOGY EMPLOYMENT

Share of Level 2 High-Tech Employment				Industry	NAICS	Oklahoma's Share of Total U.S. Employment	
OK - 2000	OK - 2005	U.S. - 2000	U.S. - 2005			2000	2005
(D)	(D)	0.3%	0.3%	Timber Tract Operations	1131	(D)	(D)
(D)	(D)	0.1%	0.1%	Forest Nurseries & Forest Products	1132	(D)	(D)
42.0%	38.9%	4.4%	4.7%	Oil & Gas Extraction	2111	11.0%	11.2%
21.8%	20.3%	18.9%	18.5%	Electric Power Utilities	2211	1.3%	1.5%
2.7%	1.6%	6.8%	5.7%	Basic Chemical Mftg.	3251	0.5%	0.4%
0.7%	0.9%	4.9%	4.1%	Resin, Synthetic Rubber & Fibers Mftg.	3252	0.2%	0.3%
0.9%	1.6%	5.8%	4.7%	Industrial Machinery Mftg.	3332	0.2%	0.5%
6.7%	3.6%	3.9%	2.9%	Commercial & Service Machinery Mftg.	3333	2.0%	1.7%
(D)	(D)	1.9%	1.2%	Audio & Video Equipment Mftg.	3343	(D)	(D)
0.6%	0.7%	2.3%	1.7%	Magnetic & Optical Media Mftg.	3346	0.3%	0.6%
12.0%	12.0%	24.9%	24.1%	Professional Equipment Wholesalers	4234	0.6%	0.7%
11.9%	19.4%	25.7%	31.9%	Mgmt., Scientific, & Technical Consulting	5416	0.5%	0.8%
100.0%	100.0%	100.0%	100.0%	Total Level 2 High-Technology		1.2%	1.4%

Source: Bureau of Labor Statistics & Oklahoma Employment Security Commission, QCEW data

(D) Data not disclosable

TABLE 6: LEVEL 2 HIGH-TECHNOLOGY WAGES

Industry	NAICS	Oklahoma Avg. Wages		OK 2000-2005 Change		U.S. Avg. Wages		U.S. 2000-2005 Change	
		2000	2005	Amount	Percent	2000	2005	Amount	Percent
Timber Tract Operations	1131	(D)	(D)	-	-	\$38,767	\$46,229	\$7,461	19.2%
Forest Nurseries & Forest Products	1132	(D)	(D)	-	-	\$19,214	\$23,628	\$4,414	23.0%
Oil & Gas Extraction	2111	\$59,372	\$73,452	\$14,079	23.7%	\$83,451	\$106,118	\$22,667	27.2%
Electric Power Utilities	2211	\$47,877	\$58,974	\$11,096	23.2%	\$60,755	\$73,113	\$12,358	20.3%
Basic Chemical Mftg.	3251	\$51,757	\$47,513	-\$4,244	-8.2%	\$61,602	\$73,752	\$12,150	19.7%
Resin, Synthetic Rubber & Fibers Mftg.	3252	\$34,136	\$42,765	\$8,629	25.3%	\$53,788	\$63,480	\$9,692	18.0%
Industrial Machinery Mftg.	3332	\$29,998	\$34,971	\$4,973	16.6%	\$56,478	\$55,406	-\$1,072	-1.9%
Commercial & Service Machinery Mftg.	3333	\$38,092	\$46,396	\$8,304	21.8%	\$42,239	\$50,451	\$8,213	19.4%
Audio & Video Equipment Mftg.	3343	(D)	(D)	-	-	\$45,520	\$64,978	\$19,457	42.7%
Magnetic & Optical Media Mftg.	3346	\$25,288	\$41,039	\$15,752	62.3%	\$59,862	\$61,539	\$1,677	2.8%
Professional Equipment Wholesalers	4234	\$40,985	\$53,308	\$12,323	30.1%	\$66,109	\$70,653	\$4,544	6.9%
Mgmt., Scientific, & Technical Consulting	5416	\$40,011	\$38,902	-\$1,108	-2.8%	\$60,366	\$64,837	\$4,471	7.4%
Level 2 Weighted Average Wage		\$49,857	\$58,561	\$8,704	17.5%	\$61,323	\$69,165	\$7,842	12.8%

Source: Bureau of Labor Statistics & Oklahoma Employment Security Commission, QCEW data

Note: Annualized data

(D) Data not disclosable

LEVEL 3 HIGH-TECHNOLOGY HIGHLIGHTS

TOTAL LEVEL 3 HIGH-TECHNOLOGY PERFORMANCE

• COMPARED WITH A NATIONAL EMPLOYMENT DECREASE OF 12.2% (523,384 JOBS) BETWEEN 2000 (2Q) AND 2005 (2Q), OKLAHOMA'S LEVEL 3 HIGH-TECHNOLOGY EMPLOYMENT DECREASED 15.9% (8,322 JOBS) OVER THE SAME TIME PERIOD. (TABLE 7)

LOW PERFORMING INDUSTRIES

• OKLAHOMA'S TELECOMMUNICATIONS RESELLERS INDUSTRY (NAICS 5173), PETROLEUM & COAL PRODUCTS MANUFACTURING INDUSTRY (NAICS 3241), AND WIRED TELECOMMUNICATIONS CARRIERS INDUSTRY (NAICS 5171) SUFFERED THE LARGEST FIVE YEAR JOB LOSSES WITH 2,455 JOBS LOST, 1,996 JOBS LOST, AND 1,672 JOBS LOST, RESPECTIVELY. (TABLE 7)

• NATIONALLY, THE LARGEST EMPLOYMENT LOSSES OCCURRED IN THE WIRED TELECOMMUNICATIONS CARRIERS INDUSTRY (216,928 JOBS LOST), THE OTHER GENERAL PURPOSE MACHINERY MANUFACTURING INDUSTRY (76,947 JOBS LOST), AND THE ELECTRICAL EQUIPMENT MANUFACTURING INDUSTRY (60,849 JOBS LOST). (TABLE 7)

LEVEL 3 HIGH-TECHNOLOGY PROPORTIONS

• THE THREE PIPELINE TRANSPORTATION INDUSTRIES (NAICS 4861, 4862, AND 4869) ACCOUNTED FOR ONLY 3.7% OF OKLAHOMA'S LEVEL 3 HIGH-TECH EMPLOYMENT IN 2005. HOWEVER, OKLAHOMA CLAIMED 4.2% OF TOTAL NATIONAL EMPLOYMENT IN THESE THREE INDUSTRIES IN 2005. (TABLE 8)

LEVEL 3 HIGH-TECHNOLOGY WAGES

• AVERAGE ANNUALIZED WAGES IN OKLAHOMA'S LEVEL 3 HIGH-TECHNOLOGY SECTOR INCREASED \$5,912 (OR 14.5%) FROM \$40,889 IN 2000 TO \$46,801 IN 2005. COMPARABLY, NATIONAL WAGES INCREASED \$10,189 (OR 17.7%) FROM \$57,433 IN 2000 TO \$67,622 IN 2005. (TABLE 9)

TABLE 7: LEVEL 3 HIGH-TECHNOLOGY EMPLOYMENT

Industry	NAICS	Oklahoma Avg. Empl.		OK 2000-2005 Change		U.S. Avg. Employment		U.S. 2000-2005 Change	
		2000	2005	Amount	Percent	2000	2005	Amount	Percent
Petroleum & Coal Products Mftg.	3241	4,092	2,096	-1,996	-48.8%	125,104	112,442	-12,662	-10.1%
Pesticide, Fertilizer & Ag Chemical Mftg.	3253	494	363	-131	-26.5%	48,961	41,861	-7,100	-14.5%
Paint, Coating, & Adhesive Mftg.	3255	607	532	-75	-12.4%	79,012	67,651	-11,361	-14.4%
Other Chemical Product Mftg.	3259	1,000	592	-408	-40.8%	127,737	105,559	-22,178	-17.4%
Engine, Turbine & Power Trans. Mftg.	3336	1,453	1,310	-143	-9.8%	115,087	96,686	-18,401	-16.0%
Other General Purpose Machinery Mftg.	3339	8,361	7,396	-965	-11.5%	344,006	267,059	-76,947	-22.4%
Electrical Equipment Mftg.	3353	1,659	1,438	-221	-13.3%	211,815	150,966	-60,849	-28.7%
Other Transportation Equipment Mftg.	3369	132	77	-55	-41.7%	42,288	39,184	-3,105	-7.3%
Pipeline Transportation of Crude Oil	4861	351	233	-118	-33.6%	7,813	6,911	-902	-11.5%
Pipeline Transportation of Natural Gas	4862	1,159	1,006	-153	-13.2%	34,123	27,276	-6,847	-20.1%
Other Pipeline Transportation	4869	383	416	33	8.6%	5,167	5,379	212	4.1%
Wired Telecommunications Carriers	5171	8,970	7,298	-1,672	-18.6%	727,427	510,499	-216,928	-29.8%
Wireless Telecom. (except Satellite)	5172	1,906	3,029	1,123	58.9%	184,186	191,004	6,818	3.7%
Telecommunications Resellers	5173	3,617	1,162	-2,455	-67.9%	194,592	136,042	-58,550	-30.1%
Satellite Telecommunications	5174	117	35	-82	-70.2%	21,664	16,292	-5,372	-24.8%
Monetary Authorities - Central Bank	5211	(D)	(D)	-	-	22,532	20,690	-1,842	-8.2%
Securities & Commodity Exchanges	5232	(D)	(D)	-	-	9,370	9,104	-266	-2.8%
Management of Companies & Enterprises	5511	13,333	12,443	-890	-6.7%	1,784,482	1,740,939	-43,543	-2.4%
Facilities Support Services	5612	3,192	3,199	6	0.2%	101,315	122,264	20,949	20.7%
Electronic & Precision Equipment Repair	8112	1,139	1,101	-38	-3.3%	110,557	106,046	-4,511	-4.1%
Level 3 Total Employment		52,218	43,897	-8,322	-15.9%	4,297,237	3,773,853	-523,384	-12.2%

Source: Bureau of Labor Statistics & Oklahoma Employment Security Commission, QCEW data

(D) Data not disclosable

TABLE 8: SELECTED PERCENTAGES OF LEVEL 3 HIGH-TECHNOLOGY EMPLOYMENT

Share of Level 3 High-Tech Employment				Industry	NAICS	Oklahoma's Share of Total U.S. Employment	
OK - 2000	OK - 2005	U.S. - 2000	U.S. - 2005			2000	2005
7.8%	4.8%	2.9%	3.0%	Petroleum & Coal Products Mftg.	3241	3.3%	1.9%
0.9%	0.8%	1.1%	1.1%	Pesticide, Fertilizer & Ag Chemical Mftg.	3253	1.0%	0.9%
1.2%	1.2%	1.8%	1.8%	Paint, Coating, & Adhesive Mftg.	3255	0.8%	0.8%
1.9%	1.3%	3.0%	2.8%	Other Chemical Product Mftg.	3259	0.8%	0.6%
2.8%	3.0%	2.7%	2.6%	Engine, Turbine & Power Trans. Mftg.	3336	1.3%	1.4%
16.0%	16.8%	8.0%	7.1%	Other General Purpose Machinery Mftg.	3339	2.4%	2.8%
3.2%	3.3%	4.9%	4.0%	Electrical Equipment Mftg.	3353	0.8%	1.0%
0.3%	0.2%	1.0%	1.0%	Other Transportation Equipment Mftg.	3369	0.3%	0.2%
0.7%	0.5%	0.2%	0.2%	Pipeline Transportation of Crude Oil	4861	4.5%	3.4%
2.2%	2.3%	0.8%	0.7%	Pipeline Transportation of Natural Gas	4862	3.4%	3.7%
0.7%	0.9%	0.1%	0.1%	Other Pipeline Transportation	4869	7.4%	7.7%
17.2%	16.6%	16.9%	13.5%	Wired Telecommunications Carriers	5171	1.2%	1.4%
3.7%	6.9%	4.3%	5.1%	Wireless Telecom. (except Satellite)	5172	1.0%	1.6%
6.9%	2.6%	4.5%	3.6%	Telecommunications Resellers	5173	1.9%	0.9%
0.2%	0.1%	0.5%	0.4%	Satellite Telecommunications	5174	0.5%	0.2%
25.5%	28.3%	41.5%	46.1%	Management of Companies & Enterprises	5511	0.7%	0.7%
6.1%	7.3%	2.4%	3.2%	Facilities Support Services	5612	3.2%	2.6%
2.2%	2.5%	2.6%	2.8%	Electronic & Precision Equipment Repair	8112	1.0%	1.0%
100.0%	100.0%	100.0%	100.0%	Total Level 3 High-Technology		1.2%	1.2%

TABLE 9: LEVEL 3 HIGH-TECHNOLOGY WAGES

Industry	NAICS	Oklahoma Avg. Wages		OK 2000-2005 Change		U.S. Avg. Wages		U.S. 2000-2005 Change	
		2000	2005	Amount	Percent	2000	2005	Amount	Percent
Petroleum & Coal Products Mftg.	3241	\$53,956	\$62,581	\$8,625	16.0%	\$60,831	\$76,642	\$15,811	26.0%
Pesticide, Fertilizer & Ag Chemical Mftg.	3253	\$46,331	\$52,476	\$6,144	13.3%	\$48,772	\$58,546	\$9,773	20.0%
Paint, Coating, & Adhesive Mftg.	3255	\$33,260	\$39,758	\$6,498	19.5%	\$45,913	\$51,999	\$6,087	13.3%
Other Chemical Product Mftg.	3259	\$39,056	\$44,306	\$5,251	13.4%	\$46,088	\$56,278	\$10,190	22.1%
Engine, Turbine & Power Trans. Mftg.	3336	\$34,542	\$42,755	\$8,213	23.8%	\$47,684	\$55,359	\$7,675	16.1%
Other General Purpose Machinery Mftg.	3339	\$38,220	\$48,605	\$10,385	27.2%	\$41,906	\$48,811	\$6,905	16.5%
Electrical Equipment Mftg.	3353	\$31,692	\$36,836	\$5,144	16.2%	\$39,581	\$47,606	\$8,025	20.3%
Other Transportation Equipment Mftg.	3369	\$18,579	\$33,881	\$15,302	82.4%	\$43,520	\$55,263	\$11,743	27.0%
Pipeline Transportation of Crude Oil	4861	\$55,260	\$72,050	\$16,790	30.4%	\$63,224	\$80,212	\$16,988	26.9%
Pipeline Transportation of Natural Gas	4862	\$51,755	\$55,827	\$4,072	7.9%	\$88,132	\$81,056	-\$7,076	-8.0%
Other Pipeline Transportation	4869	\$77,328	\$66,661	-\$10,667	-13.8%	\$61,493	\$70,823	\$9,330	15.2%
Wired Telecommunications Carriers	5171	\$48,398	\$48,572	\$174	0.4%	\$60,508	\$63,823	\$3,315	5.5%
Wireless Telecom. (except Satellite)	5172	\$34,684	\$34,343	-\$341	-1.0%	\$66,017	\$61,417	-\$4,599	-7.0%
Telecommunications Resellers	5173	\$34,028	\$41,236	\$7,208	21.2%	\$52,164	\$58,192	\$6,027	11.6%
Satellite Telecommunications	5174	\$44,198	\$34,301	-\$9,897	-22.4%	\$53,052	\$69,591	\$16,539	31.2%
Monetary Authorities - Central Bank	5211	(D)	(D)	-	-	\$46,407	\$60,676	\$14,269	30.7%
Securities & Commodity Exchanges	5232	(D)	(D)	-	-	\$80,084	\$98,174	\$18,091	22.6%
Management of Companies & Enterprises	5511	\$40,979	\$51,406	\$10,426	25.4%	\$65,167	\$79,714	\$14,547	22.3%
Facilities Support Services	5612	\$24,638	\$27,994	\$3,356	13.6%	\$33,965	\$39,257	\$5,292	15.6%
Electronic & Precision Equipment Repair	8112	\$32,458	\$36,148	\$3,690	11.4%	\$39,290	\$44,258	\$4,968	12.6%
Level 3 Weighted Average Wage		\$40,889	\$46,801	\$5,912	14.5%	\$57,433	\$67,622	\$10,189	17.7%

Source: Bureau of Labor Statistics & Oklahoma Employment Security Commission, QCEW data

Note: Annualized data

(D) Data not disclosable