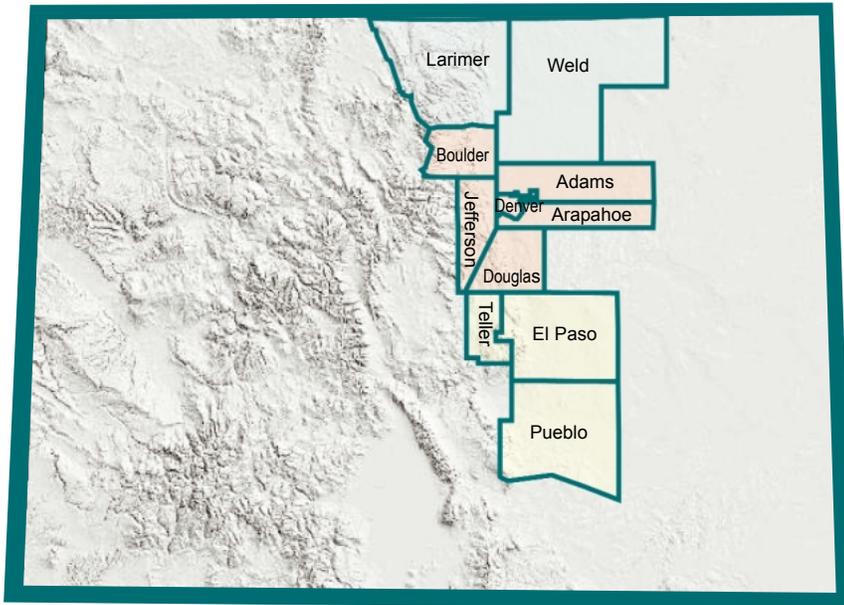




 **CDLE** *Special Report*  
COLORADO DEPARTMENT OF LABOR & EMPLOYMENT

# Colorado Front Range



## High-Tech *Job Vacancy Survey*

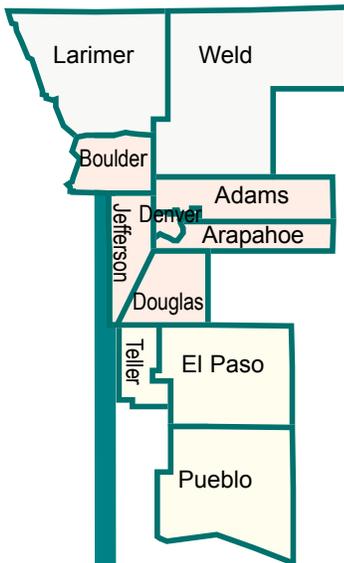
*Conducted*  
*June 21 - July 3, 2001*

*Re-test Conducted*  
*October 11 - 12, 2001*

COUNTIES  
Adams  
Arapahoe  
Boulder  
Denver  
Douglas  
El Paso  
Jefferson  
Larimer  
Pueblo  
Teller  
Weld

COLORADO   
**Institute of Technology**

*The Labor Market Information  
division of the Colorado  
Department of Labor and  
Employment produced this report  
in cooperation with the Colorado  
Institute of Technology.*



# High-Tech Job Vacancy Survey

*Conducted June 21 - July 3, 2001  
Re-test Conducted October 11 - 12, 2001*

## **State of Colorado**

Bill Owens, Governor

## **Colorado Department of Labor & Employment**

Vickie Armstrong, Executive Director  
Jeffrey M. Wells, Deputy Executive Director

Funding Provided in Part by  
The Colorado Workforce Development Council

October 2001



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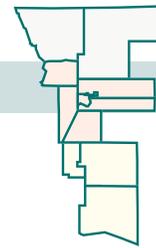
The office of Workforce Research and Analysis would like to extend sincerest gratitude to all the Front Range employers who participated in this study. The analysis provided in this document would not be possible without your help.

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# Introduction

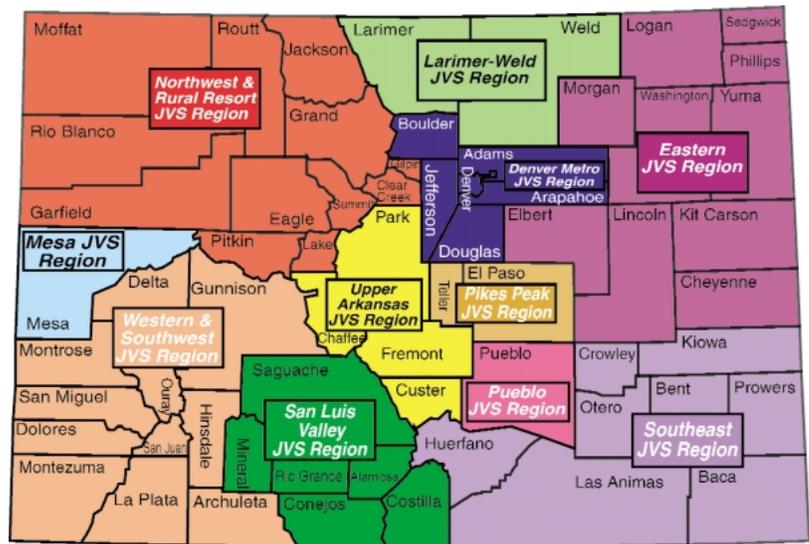
The unemployment rate, along with the level and growth rate of employment, has been used as an indicator of labor market conditions for decades. While this indicator provides information about changes in the demand for labor, it reveals nothing about the skills most sought after by employers. As such, individuals preparing themselves for the job market have done so with limited knowledge of what skills are necessary to successfully compete in the contemporary labor market.

The Job Vacancy Survey was initiated not only to measure demand for workers at a specific point in time, but also provide detailed information on the quality of employees demanded.

The Job Vacancy Survey was adopted by Colorado's Department of Labor and Employment through the Denver Metro pilot studies of September 1999 and April 2000, which were initiated by Arapahoe/Douglas Works! The popularity of the reports based on the survey data led the CDLE to expand its coverage to include the entire state of Colorado. Since the last Denver Metro JVS, the survey instrument was revised to eliminate ambiguity and enhanced to gather more specific information about job vacancies within the survey constraints.

This special industry-specific version of the Job Vacancy Survey was piloted with the intent of determining the feasibility of conducting a High-Tech survey on

**Colorado Job Vacancy Survey Regions**



an on-going basis. A subsequent re-test was conducted October 11-12, 2001, to assess any changes since the original survey. The findings of the re-test suggest that there have been no significant changes in the High-Tech sector within the scope of this survey since the original study.

The survey is funded by a grant from the U.S. Department of Labor's Employment and Training Administration. The JVS is produced by Labor Market Information's office of Workforce Research and Analysis.

**This publication is a product of the Colorado Department of Labor and Employment's Labor Market Information Section, Bill LaGrange-Director. This report was prepared by LMI's office of Workforce Research and Analysis. Members of this unit are:**

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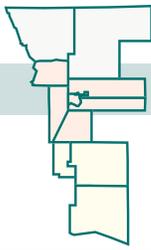
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## How to Use This Report

**W**ith the analysis of labor market conditions, many questions regarding labor demand and supply, as well as labor skills requirements, often arise.

- ◆ Is there a labor shortage in the region?
- ◆ If so, what types of labor are in short supply?
- ◆ Is there a shortage of skills?
- ◆ What skills are necessary to fill current vacancies?

The answers to these and similar questions are important in the decision-making processes of employers, job seekers, trainers and planning officials. While Labor Market Information has provided information on the local labor force supply, the Job Vacancy Survey will further complement this data by providing information about the demand for labor and offering a more complete picture of local labor markets.

### *Employers*

**T**he Job Vacancy Survey measures the area's current vacancies and provides information to employers who may be experiencing difficulty in filling positions due to

- ◆ worker shortage,
- ◆ an imbalance between job seekers' skills and employers' needs,
- ◆ compensation packages that are insufficient as a recruitment tool when compared to market standards.

This report identifies certain characteristics of current vacancies according to general categories. For example, upon review of the results, an employer observes a high percentage of vacancies in the region's firms requiring a specific level of education or experience. This observation might indicate that the labor force and/or its skills fall short of the market needs, thus calling for a decision to increase investment in training or import skilled workers. Delays in filling vacancies despite increases in wages and/or benefits

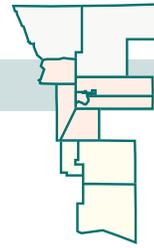
may be attributed to an overall shortage of applicants in the area. Similarly, if a low percentage of vacancies exist for a particular position with the same educational and/or experience requirement, but an employer is finding it difficult to fill, a comparison between the wages offered to the market average may indicate a need for an adjustment.

After a series of surveys from the same time of year have been conducted, current and prospective employers will be able to identify industries and/or occupations that may be consistently oversupplied, in equilibrium, or undersupplied. Employers that are relocating to the area can review the report and determine if the company's employment needs will be filled with minimum delay (current low vacancies). In addition, the Job Vacancy Survey results and Occupational Employment Statistics (OES) wage data (a measure of current wages being paid by occupation) can be used to develop a benchmark of wages to offer for the upcoming positions.

### *Job Seekers*

**F**or current job seekers, this report is a roadmap that can be used to determine where the best paying jobs are given their skills and level of education. The Job Vacancy Survey helps to illustrate the current supply/demand balance in the local job market and provides associated average wages. Job seekers can review Labor Market Information's occupational

projections in addition to the Job Vacancy Survey to see if current opportunities can contribute to long-term career goals. With information the report provides, job seekers can better tailor education and training efforts toward industries and occupations that lead to a more successful job match.



## Workforce Centers

Public officials, educational institutions, and government agencies can use the Job Vacancy Survey information to allocate resources more efficiently among education, training, and job placement programs. The survey provides short-term illumination of the area's current employment needs. Workforce Center representatives can direct job seekers toward high demand occupations in order to increase placement success, or in a direction that might better suit the needs of the applicants' career goals.

Workforce Center officials can also review the nature of job vacancies and decide where to focus placement efforts. Investments in the workforce can be directed toward occupations or industries that continuously contribute to the local economy or to those that show a chronic tendency toward undersupply.

Current vacancy conditions as presented by the Job Vacancy Survey, coupled with other Labor Market Information reports, can offer a better picture of seasonality and long-term trends that might affect

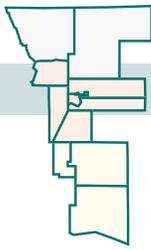
the provisions of future training programs. The Employment and Wage publication (ES-202 data) provides monthly county and statewide industry data on a quarterly basis. To prepare for the high demand of seasonal workers where vacancies persist, Workforce Centers and educators can offer training during the off-season as indicated by the quarterly data. Long-term industry trends in employment are also recorded on an annual basis in the same report for each county.

In addition, Labor Market Information provides statewide occupational projections available at <http://lmi.cdle.state.co.us/wra.home.htm>, which include projected employment growth, and identifies growing as well as declining occupations. This information, used with the Job Vacancy Survey's identification of current vacancies, can help Workforce Centers identify occupations in demand now as well as in the future. Workforce Centers can subsequently plan for future training programs in cooperation with businesses and educators.

## Economic Developers

For economic development professionals, this report is a tool that can be used to track the labor status of key industries and evaluate the area's economic growth and development potential. The survey results can help determine where labor bottlenecks may occur should current vacancies persist. Economic developers

can also generate a comprehensive picture of the region by determining where current labor demand stands today, as identified by the Job Vacancy Survey, and where the market, in general, is trending using Labor Market Information's employment projections.



## Caveats

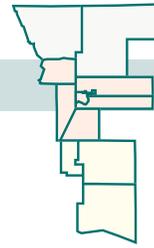
The Job Vacancy Survey statistics should be used as indicators, not actual values of the demand for workers. Figures from the survey should not be interpreted as annual vacancies; rather, they are estimates of openings at a point-in-time. Users should consider, when comparing the results of one survey to another, the effects seasonality and the business cycle will have on the data. For instance, a decrease in vacancies for construction workers from April to November would represent seasonal variations, not necessarily a long-term decrease in the demand for such workers.

The results of the survey are based only on the sample of responses collected from June 21st through July 3rd and should not be considered as necessarily portraying the exact distribution of job vacancies. If this report is continued after several years of Job Vacancy Survey data are available, patterns may begin to emerge that more accurately reflect changing labor market conditions. It should be recognized that the

survey identifies current vacancies only, and does not explain whether the vacancies are due to employment growth in the occupations or if they are due to job turnover. In addition, not all surveyed firms participated. However, the employers who did participate enabled the production of statistically reliable results.

Users should keep in mind that the authors of this report are not attempting to project the level of vacancies into the future. In addition, events that have occurred since the time period analyzed, such as plant closings or the migration of people in and out of the area, may have had an effect on the vacancy status of some occupations.

Given the caveats, appropriate application by the user is the most important element for making the information in this report a relevant tool in job vacancy analysis.



## Executive Summary

The Colorado Front Range High-Tech Job Vacancy Survey (JVS) was conducted between June 21st and July 3rd, 2001. Over the survey period randomly selected High-Tech employers from the 11 Front Range counties were contacted. Those responding comprise 10% of all Front Range High-Tech employers. They were asked if they were actively hiring at the time of the survey and a variety of questions about positions that they were seeking to fill.

High-Tech employers along the Front Range account for over 95% of all High-Tech employment in Colorado. A total of 976 employers, representing approximately 28% of the region's total High-Tech employment, responded to the survey. Out of these, 50 were large employers (250 or more employees), 827 were small to mid-sized (5-249 employees) and 99 were from the micro employers category (less than 5 employees). The effective response rate for this survey was 79%.

The major findings of the survey follow:

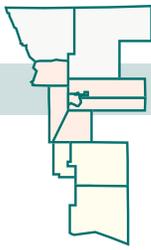
- ◆ It is estimated that a total of 3,500 jobs were open for hire by High-Tech employers in the Front Range during the survey period.
- ◆ Ninety-nine percent of the jobs are estimated to be full-time openings.
- ◆ Employers in the Denver Metro/Boulder area account for 80% of all vacancies.
- ◆ Nearly three-fourths of the estimated job openings are concentrated in non-manufacturing industries.
- ◆ The overall average wage for all vacancies was \$16.60 per hour.
- ◆ Wages offered to fill vacancies increase along with both education and experience requirements.
- ◆ Over half of the openings require at least some post-secondary education.
- ◆ Ninety percent of all openings require experience either within or related to the vacant occupation.
- ◆ According to employers' responses, 60% of job openings are either very difficult or somewhat difficult to fill.
- ◆ Responses concerning sign-on bonuses were not statistically sufficient to be reported.

A special re-test\* was conducted October 11th - 12th to verify the results of the original survey. The population for this study was the respondent pool from the

High-Tech survey conducted June 21st - July 3rd. The major findings of the re-test follow:

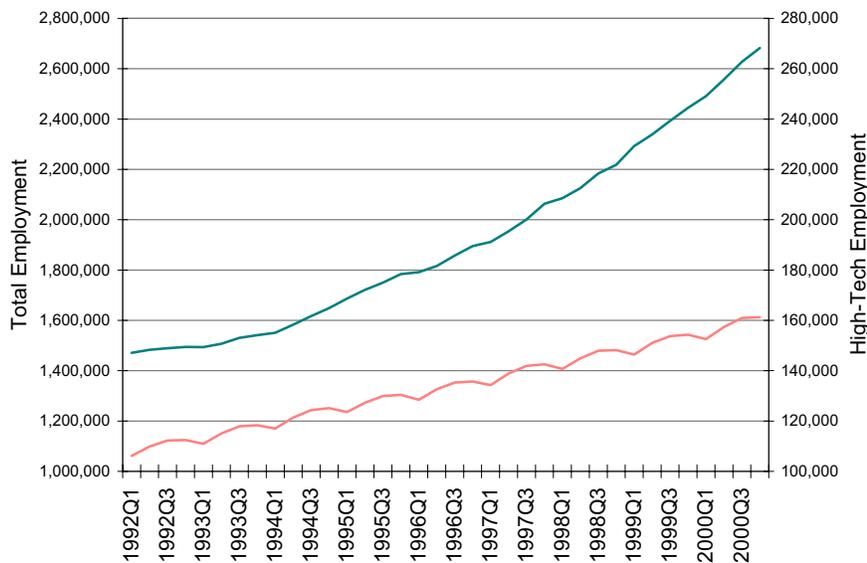
- ◆ There is no statistically significant difference in the employment level in the establishments, with a level of confidence greater than 99%.
- ◆ There is no statistically significant difference in the job vacancy rate, with a level of confidence greater than 99%.
- ◆ A response rate of 89% of contacted establishments was achieved.
- ◆ The 189 total complete responses were 27.5% of the respondents to the original study.

\*Compiled results of the re-test can be found on page 26 in the *Addendum*.



## High-Tech in Colorado's Front Range

**Figure 1: Historical Front Range Covered Employment**



Source: Colorado Employment and Wages (ES-202), 2001

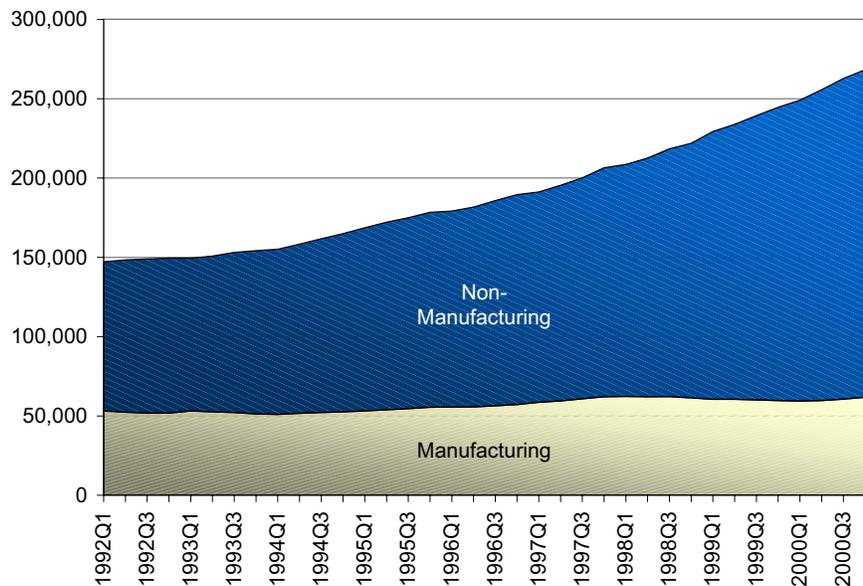
— Total — High-Tech

According to the US Census Bureau, the Colorado Front Range was home to over 3.5 million people at the turn of the century and, at the time of the survey, the area employed nearly 2 million individuals (Local Area Unemployment Statistics, June 2001). The nearly 10,000 High-Tech employers in the area account for approximately 17% of those workers or 95% of Colorado's total High-Tech employment.

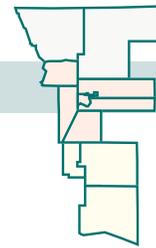
Throughout the last decade of the 21st century, the growth rate of High-Tech employment in the front range has outpaced that of the overall economy. High-Tech employment has also been more stable, displaying less seasonal fluctuation than the rest of the

economy. High-Tech employment in non-manufacturing industries, and particularly in the Services industry, has been the driving force in this growth.

**Figure 2: Historical High-Tech Covered Employment**



Source: Colorado Employment and Wages (ES-202), 2001



According to *Cyberstates 2001*, a report by the American Electronics Association, Colorado ranked #1 in the nation for concentration of High-Tech workers. A quick review of the State's largest employers reads like a who's who list of High-Tech employers in America. Companies such as Qwest Communications International, Lucent Technologies, AT&T Broadband, Lockheed-Martin and Hewlett Packard Company

illustrate the diversified nature of front range High-Tech employment. With legislation enacted in 1999 appropriating funds devoted to encouraging investment in state-of-the-art telecommunications across the state and one of the nation's most highly educated workforces, Colorado can expect to experience continued growth in this relatively new and exciting industry.

## The Job Vacancy Survey Sample

The premier Colorado Front Range High-Tech JVS was conducted June 21 - July 3. The survey instrument upon which the telephone questionnaire used for this study is based was tested in the Upper Arkansas Region in September, 2000, and is a revised version of the one used for the two Denver Metro pilot studies (see Appendix).

For the purpose of this report, High-Tech employers located in the Colorado front range counties are referred to as the "sample universe." Workers in the sample universe account for 17% of the region's total employment. Employers with at least 250 employees are referred to as "large employers." They account for about 40% of the employment in the sample universe. Firms employing from 5 to 249 individuals are

considered small to mid-size employers, and account for half sample universe employment. The remaining employment comes from firms with less than 5 employees, micro employers.

The list of industries considered High-Tech for this report is a combination of lists produced by the American Electronics Association and the Bureau of Labor Statistics. The Labor Market Information division of the Colorado Department of Labor and Employment in cooperation with the Colorado Institute of Technology analyzed Front range employment based on the AEA and BLS lists and developed the one used for this survey. The list also includes Computers, Peripherals & Software (5045) and Electronic Parts & Equipment (5046).

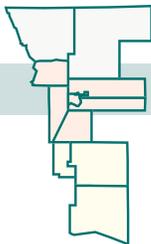
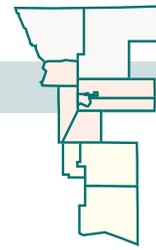


Table 1: High-Tech Industries

Colorado Institute of Technology High-tech Industry List			
Manufacturing		Non-manufacturing	
SIC	Title	SIC	Title
2833	Medicinals and botanicals	4812	Radiotelephone communications
2834	Pharmaceutical preparations	4813	Telephone communications, exc. radio
2835	Diagnostic substances	4822	Telegraph & other communications
2836	Biological products exc. diagnostic	4841	Cable and other pay TV services
3571	Electronic computers	4899	Communication services
3572	Computer storage devices	5045	Computers, peripherals & software
3575	Computer terminals	5065	Electronic parts and equipment
3577	Computer peripheral equipment	7371	Computer programming services
3578	Calculating and accounting equipment	7372	Prepackaged software
3579	Office machines	7373	Computer integrated systems design
3661	Telephone and telegraph apparatus	7374	Data processing and preparation
3663	Radio & TV communications equipment	7375	Information retrieval services
3669	Communications equipment	7376	Computer facilities management
3671	Electron tubes	7377	Computer rental & leasing
3672	Printed circuit boards	7378	Computer maintenance & repair
3674	Semiconductors and related devices	7379	Computer related services
3675	Electronic capacitors	8711	Engineering services
3676	Electronic resistors	8712	Architectural services
3677	Electronic coils and transformers	8713	Surveying services
3678	Electronic connectors	8731	Commercial physical research
3679	Electronic components	8732	Commercial nonphysical research
3761	Guided missiles and space vehicles	8733	Noncommercial research organizations
3764	Space propulsion units and parts	8734	Testing laboratories
3769	Space vehicle equipment	8741	Management services
3812	Search and navigation equipment	8742	Management consulting services
3821	Laboratory apparatus and furniture	8743	Public relations services
3822	Environmental controls	8744	Facilities support services
3823	Process control instruments	8748	Business consulting
3824	Fluid meters and counting devices		
3825	Instruments to measure electricity		
3826	Analytical instruments		
3827	Optical instruments and lenses		
3829	Measuring & controlling devices		
3844	X-ray apparatus and tubes		
3845	Electromedical equipment		
3861	Photographic equipment and supplies		



For the small to mid-size employers, the survey sample was stratified by manufacturing and non-manufacturing employers and by region. Attempts were made to contact a sufficient sample from each of the stratifications in order to provide statistically reliable results. Large employers were considered “certainty units” and attempts were made to contact each of these employers. Due to the large number of micro employers in the region, a representative sample of these employers was taken regardless of industry or region.

Over the survey period a total of 976 employers, approximately 10% of the sample universe, responded to the survey. Out of these, 50 were large employers and 99 were from the micro category. The remaining 827 respondents represent the various small to mid-size stratifications. The sample response requirements were achieved for all stratifications.

**Table 2: Front Range Regions**

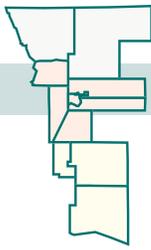
Code	County	Code	County
<b>Central</b>		<b>Northern</b>	
001	Adams	069	Larimer
005	Arapahoe	123	Weld
013	Boulder	<b>Southern</b>	
031	Denver	041	El Paso
035	Douglas	101	Pueblo
059	Jefferson	116	Teller

## The Survey Instrument

Employers were asked by telephone if they had job vacancies, or open positions, which they were actively seeking to fill. Firms actively recruiting were then asked to provide more detail about each position. Information on compensation offered, the education level and experience required, and the employer’s perceived difficulty in filling the vacancy as well as length of time the position had been open was collected.

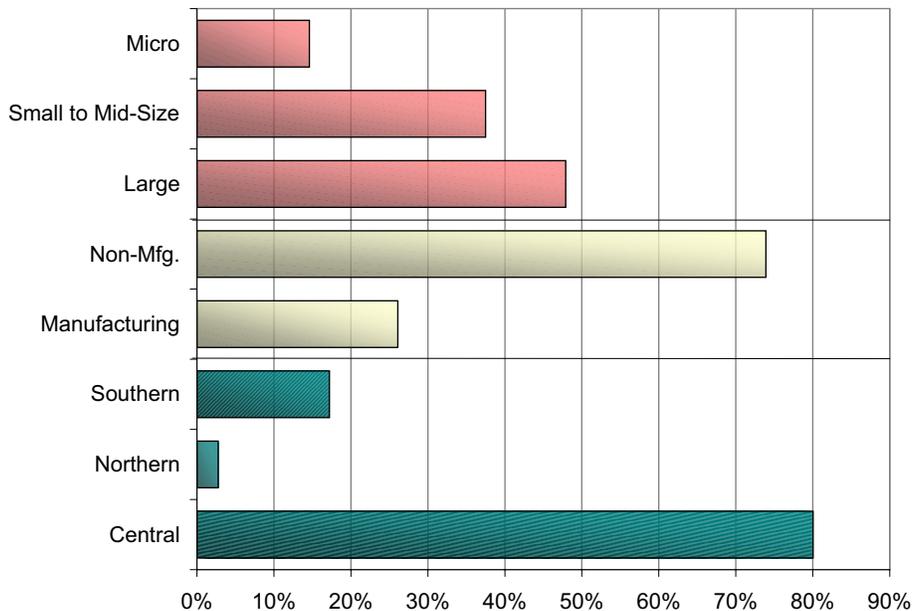
Whenever necessary, employers were contacted a second time to clarify responses.

Employers were also asked whether or not a sign-on bonus or health insurance was offered for the position. This information was collected in addition to the minimum and maximum wages offered to describe in more detail the compensation offered.



## Estimated Vacancies

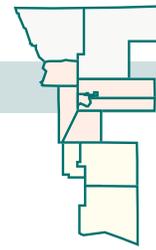
**Figure 3: Summary of Estimated Vacancies**



During the survey period, it is estimated that approximately 3,500 vacancies were open for immediate hire by Front Range High-Tech employers. Ninety-nine percent of those vacancies are estimated to be full-time openings.

The overall vacancy rate for all High-Tech employers was approximately 1.5%. Nearly three-quarters of

the vacancies came from non-manufacturing employers. The Denver Metro region accounted for 80% of estimated vacancies. At 48%, large employers constitute the largest share of vacancies by size division.

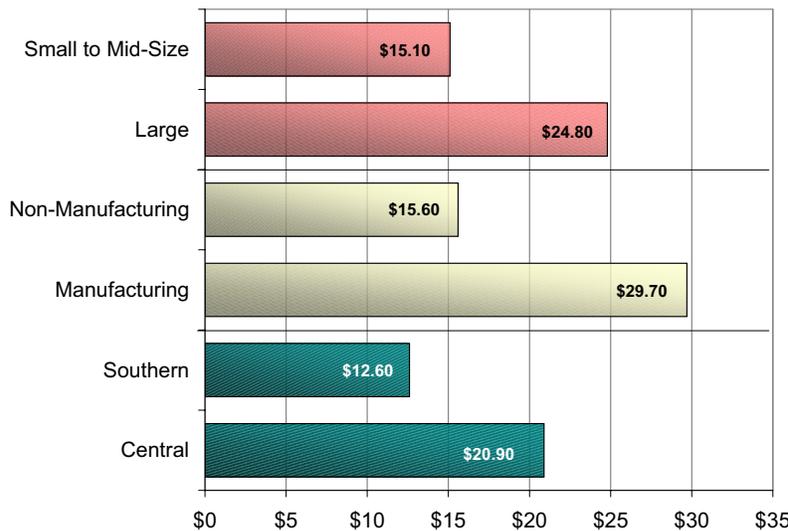


# Vacancies and Wages

Since wages offered may vary among occupations and employers as well as according to the applicants qualifications, employers were asked to provide the range of wages offered for the vacancies

and the average was calculated based on the mid-point of that range. The overall average wage offered for all vacancies was \$16.60 per hour.

**Figure 4: Average Wage by Region/Size/Industry**



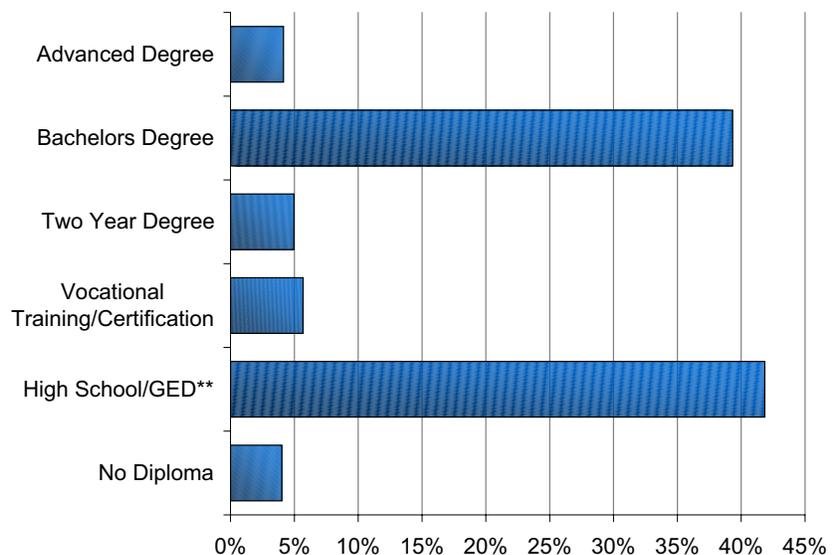
The wages offered to fill vacancies in the manufacturing industries were by far the highest reported. On average, large employers offered more than small to mid-sized. Employers in the Central Front Range reported higher wages than those in the Southern region. Insufficient wage data were available for both micro employers and the Northern region.

## Education and Experience

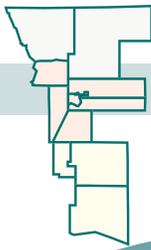
Employers were asked what level of education and/or experience was required of an applicant in order to be considered for a particular vacancy. It is important to point out that even though almost half of the vacancies required no post-secondary education to fill, these results are significantly influenced by one large employer. The majority of the remaining positions require some college education, par-

ticularly a Bachelor's degree. Vacancies in manufacturing firms required a higher education in general.

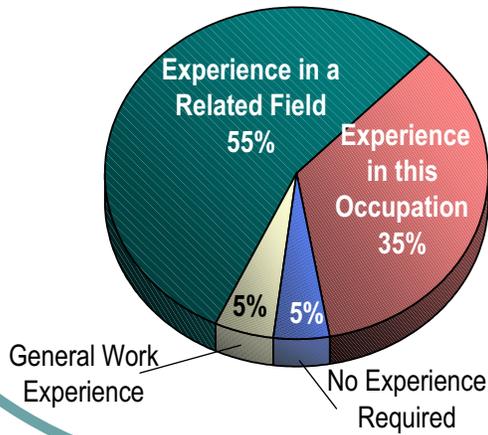
**Figure 5: Vacancies by Education**



\*\*Vacancies requiring a High School Diploma/GED are overwhelmingly represented by only one employer.



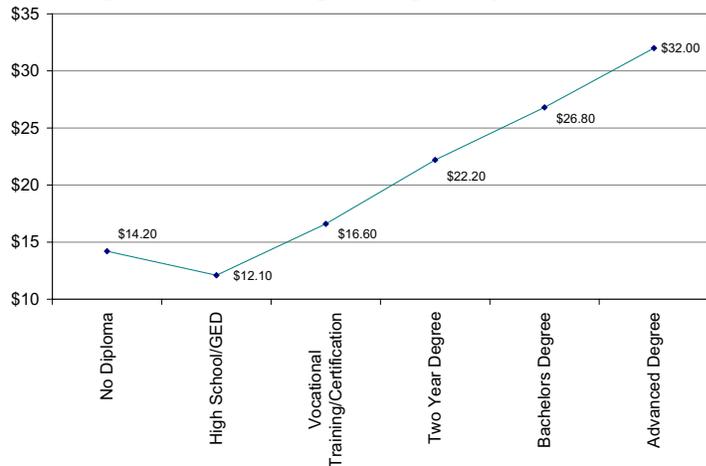
**Figure 6:  
Vacancies by Experience**



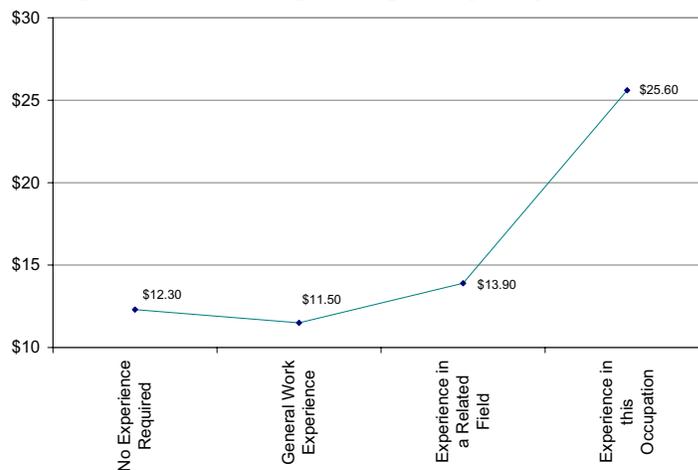
Employers reported that the majority of vacancies required experience in or related to the particular occupation to be filled. There was no significant difference between the experience requirements of employers in the manufacturing and non-manufacturing industries.

As expected, wages were found to increase both with increased education and experience required to fill the vacancies. Those vacancies not requiring any education or experience paid slightly higher on average than the lowest level required in either category. This should not be misinterpreted to suggest that employers do not pay more for educated and experienced employees, but may stem from that fact that while no education or experience is required, it may very well be desired.

**Figure 7: Average Wages by Education**



**Figure 8: Average Wages by Experience**



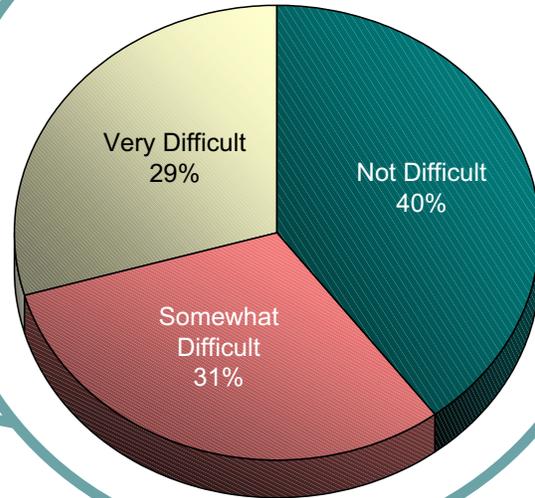


**Difficulty to Fill**

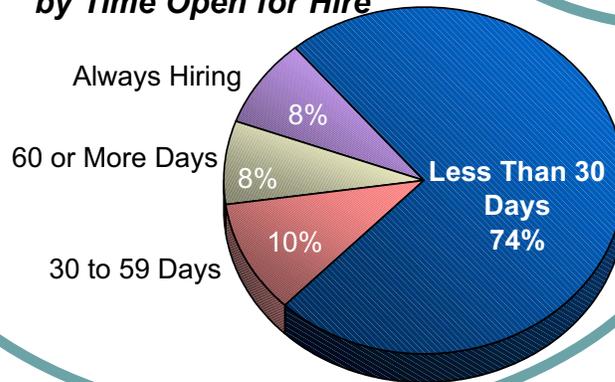
Because the response to the question, “Is this position difficult to fill?” is subjective, employers were also queried as to how long each position had been open at the time of the survey. This information may help gain additional insight into the challenges employers face in filling vacancies.

Survey results show that employers were fairly evenly split between experiencing some, much, and no difficulty in filling positions. That the majority of vacancies were open for a period less than 30 days illustrates the usefulness of this additional information regarding the difficulties employers face in filling vacancies.

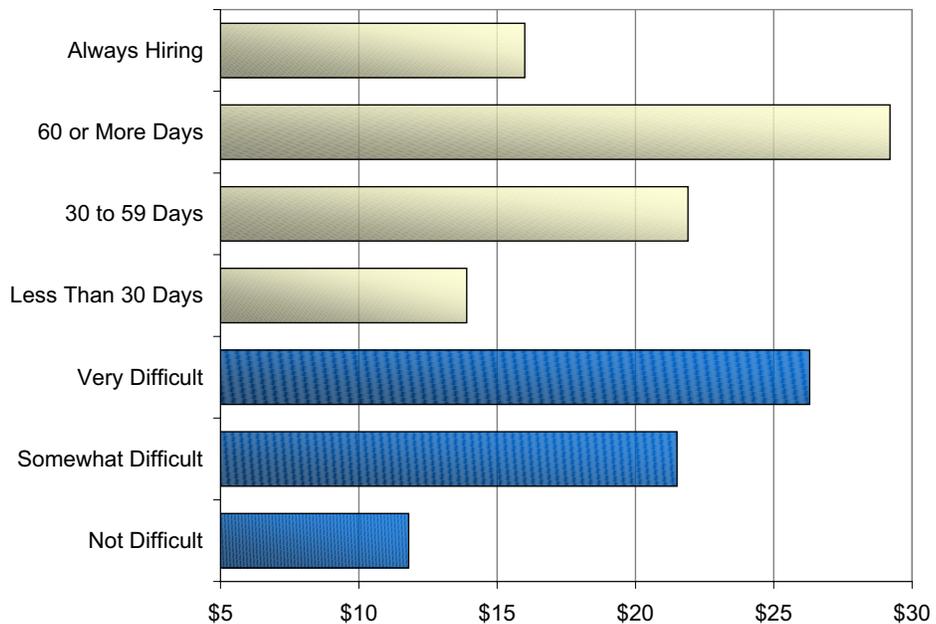
**Figure 9: Vacancies by Difficulty to Fill**

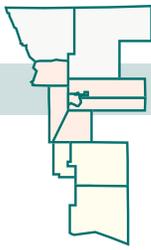


**Figure 10: Vacancies by Time Open for Hire**



**Figure 11: Average Wage by Difficulty to Fill/Time Open for Hire**





## ***Medical Insurance***

Approximately 95% of the vacancies reported by employers included some form of medical insurance. All of those employers offered to pay at least a portion of the insurance premium associated with the benefit and 18% offered to pay the entire premium.

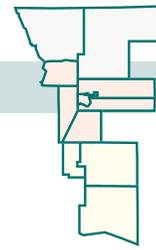
Survey results reveal a positive relationship between wage and medical insurance coverage

offered. As higher paying jobs require higher levels of education and experience, employers offer better medical insurance packages to attract qualified candidates. Businesses that paid the total cost of the medical insurance premium offered an average wage of \$22.80 per hour for the reported vacancies.

## ***Sign-on Bonus***

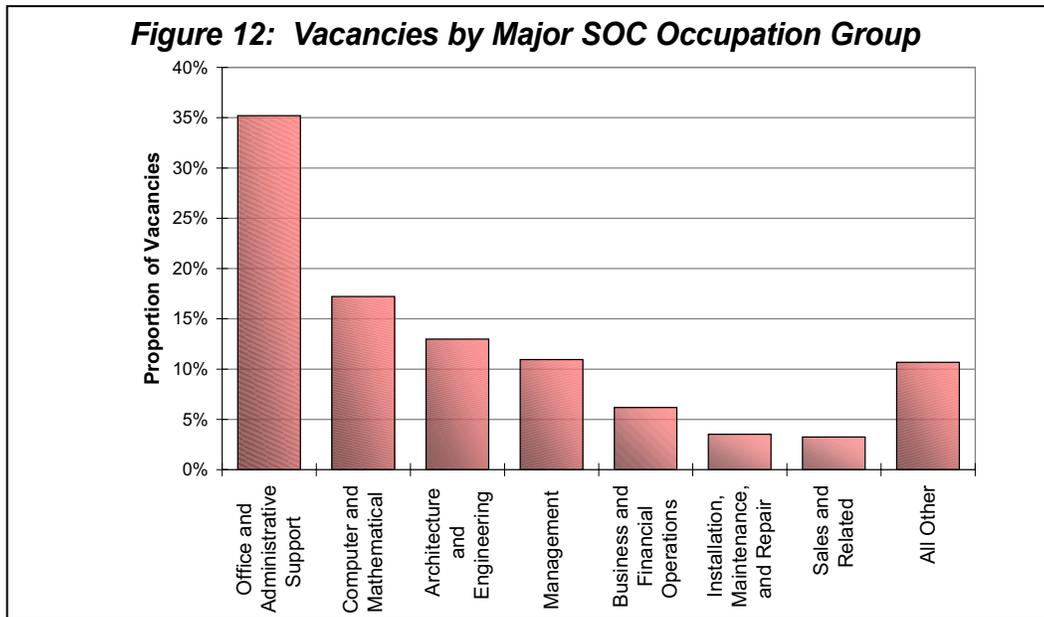
Employers were asked whether or not a sign-on bonus was used as a tool to help fill vacancies. Responses to this question were insufficient to reliably

convey any information on the subject. Future surveys may prove otherwise.



# Occupations

## Characteristics of Major SOC Occupation Groups



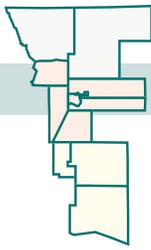
*\*\*The Office and Administrative Support category is overwhelmingly represented by only one employer.*

Because this report is based on a survey of businesses and not individuals, the information collected at the occupation level covers all categories of worker. Only firms considered to be High-Tech employers were contacted (see *Table 1*), but the vacancies reported come from all variety of occupations. Besides the Computer and Mathematical and Architecture and Engineering occupation groups

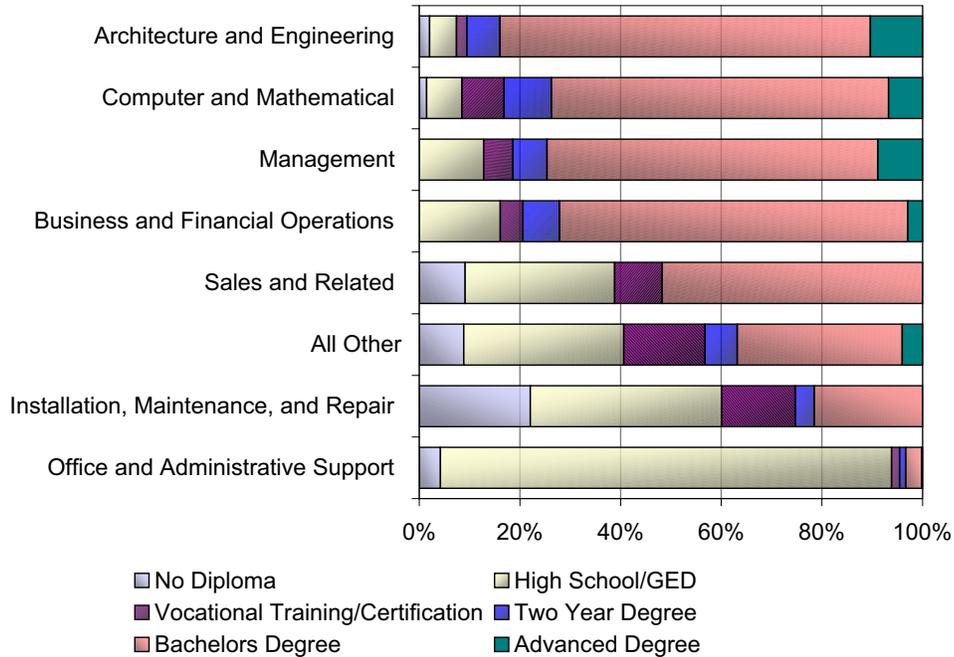
that would be expected to make up the majority of High-Tech jobs, employers require the same support personnel as the rest of the economy. The survey results reflect this with the presence of Office and Administrative Support, Management, Business and Financial Operations, and Sales and Related occupations accounting for more than half of all vacancies.

**Figure 13: Wages by Major SOC Occupation Group**





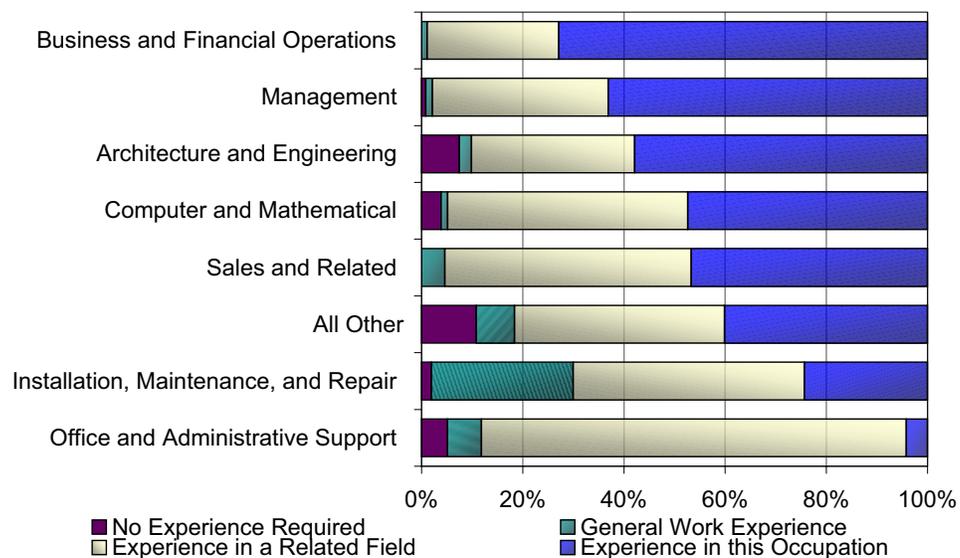
**Figure 14: Education Requirements by Major SOC Occupation Group**



The results of the survey show that those vacancies most often sought to fill are not necessarily offered the highest wages. This indicates that demand for workers can be explained by the investigation of other vacancy

characteristics. *Figures 14 and 15* show the education and experience requirements to fill the positions in the Major SOC Occupation Groups.

**Figure 15: Experience Requirements by Major SOC Occupation Group**



**Table 3: OES Wage Data**

SOC Code	Occupation Title	Estimated Number of Vacancies	Average Wage Offered (nearest dime)	Occupational Employment Statistics Wage Data (aged to 2000)							
				Average Wages			Percentile Distribution				
				Entry-Level	Overall	Experienced	10th	25th	50th	75th	90th
43-4051	Customer Service Representatives	233	\$11.00	\$9.25	\$12.82	\$14.59	\$8.82	\$9.92	\$11.90	\$14.81	\$18.96
11-1021	General and Operations Managers	161	-----	\$18.49	\$35.95	\$44.67	\$16.65	\$21.28	\$31.79	\$48.34	\$72.56
15-1031	Computer Software Engineers, Applications	141	\$25.90	\$23.77	\$33.08	\$37.74	\$22.77	\$26.09	\$32.19	\$39.78	\$45.24
15-1032	Computer Software Engineers, Systems Software	129	\$29.40	\$23.62	\$32.37	\$36.74	\$21.15	\$26.73	\$32.36	\$38.35	\$43.93
15-1051	Computer Systems Analysts	121	-----	\$20.11	\$29.72	\$34.52	\$18.11	\$22.95	\$29.93	\$35.68	\$42.85
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	95	-----	\$16.40	\$22.29	\$25.24	\$14.47	\$19.45	\$23.95	\$26.22	\$27.58
17-2141	Mechanical Engineers	93	\$29.00	\$19.73	\$28.50	\$32.89	\$18.31	\$21.34	\$27.90	\$36.67	\$43.85
15-1041	Computer Support Specialists	90	-----	\$12.22	\$16.68	\$18.91	\$11.61	\$13.63	\$15.99	\$19.05	\$23.30
15-1021	Computer Programmers	90	\$20.00	\$17.30	\$28.11	\$33.51	\$14.56	\$20.52	\$28.35	\$37.99	\$44.97
17-2199	Engineers, All Other	84	\$42.30	\$22.51	\$31.66	\$36.23	\$20.58	\$24.76	\$31.07	\$38.13	\$44.38
17-2072	Electronics Engineers, Except Computer	74	-----	\$24.13	\$33.23	\$37.78	\$21.82	\$27.23	\$33.01	\$39.84	\$45.05
41-2031	Retail Salespersons	71	-----	\$6.71	\$10.23	\$11.99	\$6.17	\$7.08	\$8.44	\$11.06	\$16.50
43-5081	Stock Clerks and Order Fillers	65	-----	\$7.32	\$11.17	\$13.09	\$6.69	\$7.96	\$10.10	\$13.91	\$17.47
11-2022	Sales Managers	63	\$22.80	\$22.94	\$39.02	\$47.05	\$20.29	\$26.46	\$35.26	\$49.93	\$72.56
15-1071	Network and Computer Systems Administrators	57	\$28.40	\$18.67	\$29.61	\$35.10	\$17.42	\$20.91	\$26.16	\$33.72	\$45.50
** 41-3099	Sales Representatives, Services, All Other	55	-----	-----	-----	-----	-----	-----	-----	-----	-----
* 17-1010	Architects, Except Naval	52	\$26.90	\$16.65	\$25.21	\$29.49	\$15.42	\$18.35	\$23.07	\$31.42	\$40.71
43-6011	Executive Secretaries and Administrative Assistants	51	-----	\$12.44	\$16.57	\$18.63	\$11.52	\$13.73	\$16.11	\$19.04	\$21.99
13-1111	Management Analysts	48	-----	\$18.78	\$33.93	\$41.49	\$16.18	\$21.65	\$29.68	\$41.53	\$68.22
15-1081	Network Systems and Data Communications Analysts	48	-----	\$20.13	\$29.30	\$33.90	\$18.28	\$22.17	\$28.06	\$35.48	\$43.05
19-4091	Environmental Science and Protection Technicians, Including Health	47	-----	\$13.54	\$19.09	\$21.86	\$11.89	\$15.09	\$18.31	\$22.77	\$27.05
43-4111	Interviewers, Except Eligibility and Loan	43	-----	\$7.75	\$10.14	\$11.33	\$7.13	\$8.02	\$9.44	\$11.97	\$14.22
47-4041	Hazardous Materials Removal Workers	43	-----	\$11.97	\$14.66	\$16.01	\$11.38	\$12.92	\$14.96	\$16.11	\$16.79
17-2051	Civil Engineers	36	-----	\$19.28	\$27.89	\$32.20	\$18.07	\$20.95	\$26.41	\$34.89	\$43.53
* 15-1030	Computer Software Engineers	35	\$27.40	\$23.71	\$32.81	\$37.37	\$22.16	\$26.33	\$32.25	\$39.24	\$44.75
* 49-2020	Radio and Telecommunications Equipment Installers and Repairers	33	-----	\$16.32	\$22.14	\$25.05	\$14.38	\$19.37	\$23.77	\$26.01	\$27.35
17-2061	Computer Hardware Engineers	33	-----	\$25.93	\$36.54	\$41.85	\$24.10	\$28.05	\$34.79	\$43.43	\$53.27
43-4171	Receptionists and Information Clerks	31	\$10.40	\$7.58	\$10.31	\$11.67	\$6.99	\$8.40	\$10.20	\$11.80	\$13.91
43-6014	Secretaries, Except Legal, Medical, and Executive	31	\$11.90	\$8.96	\$12.65	\$14.50	\$8.37	\$10.17	\$12.58	\$15.22	\$17.17

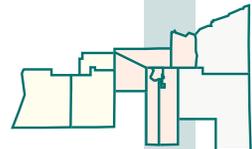


Table 3: OES Wage Data - Page 2

SOC Code	Occupation Title	Estimated Number of Vacancies	Average Wage Offered (nearest dime)	Occupational Employment Statistics Wage Data (aged to 2000)								
				Average Wages			Percentile Distribution					
				Entry-Level	Overall	Experienced	10th	25th	50th	75th	90th	
47-2061	Construction Laborers	30	\$15.30	\$8.24	\$11.11	\$12.54	\$7.60	\$9.00	\$10.89	\$13.10	\$15.37	
13-2011	Accountants and Auditors	30	-----	\$14.95	\$22.41	\$26.14	\$14.09	\$16.63	\$20.21	\$26.14	\$36.35	
13-2051	Financial Analysts	28	-----	\$18.38	\$31.11	\$37.46	\$17.86	\$20.20	\$24.75	\$33.36	\$72.56	
11-2021	Marketing Managers	27	-----	\$22.66	\$36.75	\$43.80	\$19.43	\$27.04	\$35.42	\$46.07	\$57.59	
* 17-2070	Electrical and Electronics Engineers	26	-----	\$22.14	\$30.74	\$35.04	\$20.23	\$24.07	\$30.64	\$36.72	\$42.77	
17-2071	Electrical Engineers	25	-----	\$21.06	\$29.38	\$33.55	\$19.37	\$22.35	\$29.36	\$35.03	\$41.53	
17-2011	Aerospace Engineers	25	-----	-----	-----	-----	-----	-----	-----	-----	-----	
15-1061	Database Administrators	23	-----	\$17.91	\$27.09	\$31.69	\$15.96	\$20.61	\$26.42	\$36.03	\$43.22	
11-9199	Managers, All Other	23	-----	\$20.15	\$32.02	\$37.95	\$18.15	\$23.44	\$31.34	\$40.20	\$49.17	
13-1081	Logisticians	23	-----	-----	-----	-----	-----	-----	-----	-----	-----	
51-2022	Electrical and Electronic Equipment Assemblers	22	-----	\$6.57	\$10.14	\$11.92	\$6.09	\$7.32	\$10.07	\$12.62	\$14.57	
13-1199	Business Operations Specialists, All Other	22	-----	\$15.33	\$23.24	\$27.19	\$13.88	\$17.32	\$22.17	\$27.98	\$34.33	
17-3023	Electrical and Electronic Engineering Technicians	22	-----	\$16.11	\$26.05	\$31.02	\$14.83	\$17.71	\$22.32	\$32.75	\$45.58	
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	21	-----	\$8.30	\$12.84	\$15.11	\$7.52	\$9.32	\$11.91	\$15.29	\$19.74	
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	20	-----	\$12.31	\$17.72	\$20.43	\$11.30	\$13.70	\$16.72	\$21.19	\$25.21	
17-3012	Electrical and Electronics Drafters	18	-----	\$13.60	\$19.03	\$21.75	\$12.46	\$14.52	\$17.47	\$24.32	\$26.99	
43-9061	Office Clerks, General	17	-----	\$8.50	\$11.39	\$12.83	\$7.70	\$9.28	\$10.79	\$13.23	\$16.34	
11-3061	Purchasing Managers	17	-----	\$16.13	\$27.25	\$32.82	\$14.25	\$18.67	\$25.43	\$36.24	\$45.34	
11-3011	Administrative Services Managers	16	-----	\$10.73	\$23.25	\$29.51	\$9.78	\$12.36	\$20.14	\$31.95	\$42.12	
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	16	-----	\$18.47	\$34.06	\$41.85	\$16.37	\$21.87	\$32.55	\$48.99	\$62.17	
11-3051	Industrial Production Managers	16	-----	\$19.32	\$30.79	\$36.52	\$17.04	\$22.02	\$30.20	\$40.73	\$49.51	
11-9041	Engineering Managers	15	-----	\$28.84	\$40.52	\$46.36	\$27.72	\$32.36	\$39.91	\$49.38	\$57.08	
27-1024	Graphic Designers	14	-----	\$11.41	\$17.97	\$21.24	\$10.20	\$12.91	\$17.08	\$22.36	\$27.02	
11-2031	Public Relations Managers	14	-----	\$14.82	\$27.39	\$33.66	\$12.35	\$17.83	\$23.12	\$33.52	\$53.30	
17-2112	Industrial Engineers	14	-----	\$19.02	\$26.73	\$30.57	\$18.21	\$20.89	\$25.68	\$31.94	\$37.99	
11-3040	Human Resources Managers	13	-----	\$19.03	\$30.11	\$35.65	\$17.36	\$21.52	\$29.02	\$39.59	\$47.55	
11-3021	Computer and Information Systems Managers	13	-----	\$27.52	\$40.84	\$47.50	\$25.31	\$31.99	\$40.39	\$50.03	\$59.09	
43-4151	Order Clerks	12	-----	\$9.13	\$12.94	\$14.84	\$8.69	\$10.04	\$12.34	\$15.43	\$18.34	
43-9011	Computer Operators	12	-----	\$11.49	\$15.27	\$17.16	\$10.82	\$12.52	\$14.77	\$17.41	\$20.44	
43-1011	First-Line Supervisors/Managers of Office and Administrative Support Workers	12	-----	\$12.15	\$18.41	\$21.53	\$11.35	\$13.78	\$17.26	\$21.26	\$27.03	

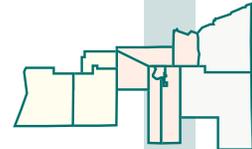
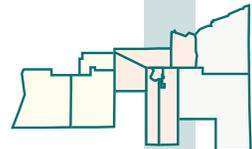


Table 3: OES Wage Data - Page 3

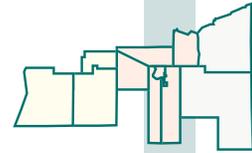
SOC Code	Occupation Title	Estimated Number of Vacancies	Average Wage Offered (nearest dime)	Occupational Employment Statistics Wage Data (aged to 2000)								
				Average Wages			Percentile Distribution					
				Entry-Level	Overall	Experienced	10th	25th	50th	75th	90th	
* 13-1020	Buyers and Purchasing Agents	12	-----	\$13.92	\$20.40	\$23.65	\$13.12	\$15.31	\$18.56	\$23.65	\$31.90	
19-1099	Life Scientists, All Other	12	-----	\$15.76	\$26.04	\$31.19	\$13.80	\$18.38	\$25.28	\$32.45	\$39.78	
13-1073	Training and Development Specialists	11	-----	\$13.04	\$19.60	\$22.89	\$11.79	\$14.48	\$18.44	\$23.82	\$28.99	
27-3042	Technical Writers	11	-----	\$17.00	\$22.85	\$25.77	\$15.56	\$18.01	\$22.30	\$26.57	\$31.21	
11-3031	Financial Managers	11	-----	\$22.15	\$35.11	\$41.59	\$20.31	\$25.27	\$32.57	\$42.86	\$57.44	
33-9032	Security Guards	10	-----	\$7.82	\$10.88	\$12.40	\$7.37	\$8.35	\$9.78	\$11.82	\$17.93	
43-3031	Bookkeeping, Accounting, and Auditing Clerks	10	-----	\$9.18	\$12.99	\$14.88	\$8.48	\$10.51	\$12.61	\$15.18	\$17.48	
11-9021	Construction Managers	10	-----	\$18.55	\$29.41	\$34.83	\$16.55	\$20.73	\$28.12	\$34.82	\$44.47	
** 25-9099	Education, Training, and Library Workers, All Other	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	

- \* OES wages for general occupations are reported as the weighted average of more specific occupations
- \*\* No OES wage data is available for "all other" occupations
- \*\*\* OES wages reported for Colorado statewide
- No wage data available



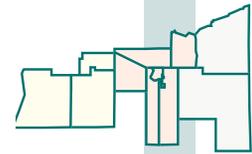
**Table 4: OES Wage Data - Occupations With Fewer Than 10 Vacancies**

SOC Code	Occupation Title	Occupational Employment Statistics Wage Data							
		Entry-Level	Average Wages (aged to 2000)		Percentile Distribution				
		Overall	Experienced	10th	25th	50th	75th	90th	
27-3010	Announcers	\$6.65	\$13.69	\$17.20	\$6.06	\$7.43	\$10.98	\$14.72	\$23.25
17-1022	Surveyors	\$13.61	\$18.68	\$21.20	\$12.42	\$14.71	\$17.88	\$22.07	\$26.52
19-3021	Market Research Analysts	\$16.69	\$26.49	\$31.38	\$15.11	\$18.29	\$24.51	\$31.56	\$36.29
29-1111	Registered Nurses	\$17.26	\$22.21	\$24.69	\$15.94	\$18.49	\$21.71	\$25.25	\$29.87
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers	\$24.82	\$34.96	\$40.03	\$23.50	\$27.38	\$32.31	\$43.39	\$54.35
* 51-2090	Miscellaneous Assemblers and Fabricators	\$7.30	\$9.90	\$11.21	\$7.03	\$7.91	\$9.47	\$11.55	\$13.63
43-9051	Mail Clerks and Mail Machine Operators, Except Postal Service	\$7.55	\$9.96	\$11.17	\$7.04	\$8.10	\$9.70	\$11.15	\$13.52
13-1072	Compensation, Benefits, and Job Analysis Specialists	\$14.72	\$23.83	\$28.38	\$13.70	\$16.40	\$19.83	\$25.08	\$35.53
13-1051	Cost Estimators	\$15.60	\$23.59	\$27.58	\$14.34	\$17.74	\$21.87	\$28.07	\$39.32
11-9033	Education Administrators, Postsecondary	\$16.74	\$26.90	\$31.98	\$15.21	\$18.02	\$21.61	\$32.67	\$44.38
11-2011	Advertising and Promotions Managers	\$17.09	\$31.58	\$38.83	\$14.96	\$20.28	\$29.55	\$40.54	\$56.96
* 19-1020	Biological Scientists	\$18.26	\$27.69	\$32.40	\$14.64	\$22.16	\$30.53	\$33.72	\$37.47
23-1011	Lawyers	\$28.92	\$41.22	\$47.38	\$24.64	\$35.55	\$40.92	\$47.16	\$63.51
17-2001	Engineers, Non R&D (SIC 822 Only)	-----	-----	-----	-----	-----	-----	-----	-----
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	\$13.69	\$20.16	\$23.40	\$12.38	\$15.43	\$19.50	\$24.17	\$28.94
15-1099	Computer Specialists, All Other	\$18.33	\$26.56	\$30.68	\$15.98	\$21.37	\$26.07	\$31.62	\$36.17
17-2131	Materials Engineers	\$20.66	\$29.37	\$33.73	\$19.29	\$22.83	\$29.60	\$37.61	\$44.01
17-2081	Environmental Engineers	\$22.18	\$30.31	\$34.37	\$20.12	\$24.70	\$30.47	\$34.89	\$41.56
** 43-4199	Information and Record Clerks, All Other	-----	-----	-----	-----	-----	-----	-----	-----
* 51-9190	Miscellaneous Production Workers	\$6.60	\$9.87	\$11.51	\$6.16	\$7.08	\$9.10	\$12.28	\$15.09
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	\$7.52	\$10.53	\$12.04	\$6.95	\$8.46	\$9.97	\$11.57	\$15.59
51-5023	Printing Machine Operators	\$9.59	\$14.66	\$17.19	\$8.97	\$10.68	\$13.91	\$18.19	\$21.94
41-9099	Sales and Related Workers, All Other	\$10.44	\$19.60	\$24.18	\$9.31	\$12.42	\$16.82	\$24.25	\$33.53
13-1041	Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation	\$13.45	\$22.38	\$26.85	\$12.86	\$16.37	\$21.50	\$27.75	\$33.61
* 13-1070	Human Resources, Training, and Labor Relations Specialists	\$13.81	\$20.64	\$24.05	\$12.82	\$15.09	\$18.14	\$23.72	\$31.28
47-4011	Construction and Building Inspectors	\$14.08	\$20.43	\$23.61	\$11.75	\$16.37	\$20.84	\$24.65	\$27.29
25-9031	Instructional Coordinators	\$14.62	\$28.07	\$34.79	\$12.82	\$16.99	\$23.99	\$40.85	\$50.46
17-1021	Cartographers and Photogrammetrists	-----	-----	-----	-----	-----	-----	-----	-----
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	\$6.49	\$8.69	\$9.80	\$6.05	\$6.87	\$8.25	\$10.06	\$12.21
41-9011	Demonstrators and Product Promoters	\$7.60	\$11.05	\$12.77	\$7.28	\$7.92	\$9.06	\$12.60	\$17.16



**Table 4: OES Wage Data - Occupations With Fewer Than 10 Vacancies – Page 2**

		Occupational Employment Statistics Wage Data							
		Average Wages (aged to 2000)			Percentile Distribution				
SOC Code	Occupation Title	Entry-Level	Overall	Experienced	10th	25th	50th	75th	90th
43-9021	Data Entry Keyers	\$8.00	\$10.45	\$11.68	\$7.38	\$8.67	\$10.16	\$11.86	\$13.97
* 49-9090	Miscellaneous Installation, Maintenance, and Repair Workers	\$8.73	\$12.60	\$14.54	\$8.05	\$9.48	\$12.09	\$14.77	\$18.18
* 37-1010	First-Line Supervisors/Managers, Building and Grounds Cleaning and Maintenance Workers	\$9.82	\$14.03	\$16.13	\$9.26	\$10.72	\$13.20	\$16.85	\$20.11
* 27-1010	Artists and Related Workers	\$10.05	\$17.02	\$20.51	\$9.28	\$11.20	\$16.08	\$21.72	\$27.09
27-1025	Interior Designers	\$10.66	\$17.17	\$20.42	\$8.83	\$12.72	\$16.51	\$20.21	\$26.39
27-1014	Multi-Media Artists and Animators	\$10.99	\$18.06	\$21.61	\$10.06	\$12.17	\$17.23	\$22.03	\$26.75
49-2021	Radio Mechanics	\$14.16	\$18.02	\$19.94	\$11.87	\$17.22	\$18.87	\$20.29	\$21.18
49-2099	Electrical and Electronic Equipment Mechanics, Installers, and Repairers, All Other (OES Only)	\$15.25	\$19.32	\$21.35	\$13.82	\$17.28	\$19.60	\$21.68	\$24.93
* 27-3040	Writers and Editors	\$15.70	\$21.81	\$24.86	\$14.32	\$16.93	\$20.96	\$25.75	\$31.00
49-1011	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	\$16.55	\$23.78	\$27.41	\$14.90	\$18.65	\$23.66	\$27.81	\$33.87
15-2041	Statisticians	\$20.74	\$27.81	\$31.34	\$18.64	\$22.86	\$26.57	\$33.57	\$40.99
41-9041	Telemarketers	\$6.38	\$8.79	\$9.99	\$5.99	\$6.96	\$8.21	\$10.31	\$12.70
31-1012	Nursing Aides, Orderlies, and Attendants	\$7.71	\$9.36	\$10.19	\$7.23	\$8.09	\$9.41	\$10.52	\$11.66
* 41-1010	First-Line Supervisors/Managers, Sales Workers	\$11.35	\$19.23	\$23.18	\$10.30	\$12.61	\$16.66	\$21.71	\$32.65
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	\$12.35	\$21.79	\$26.52	\$11.29	\$14.33	\$18.66	\$25.91	\$40.32
27-3041	Editors	\$13.43	\$20.89	\$24.62	\$12.24	\$14.81	\$19.42	\$26.25	\$32.67
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	\$13.87	\$19.75	\$22.68	\$12.71	\$15.31	\$18.57	\$23.13	\$27.76
13-1071	Employment, Recruitment, and Placement Specialists	\$14.13	\$20.24	\$23.30	\$13.37	\$15.09	\$17.18	\$23.08	\$31.56
19-1042	Medical Scientists, Except Epidemiologists	\$18.85	\$29.68	\$35.08	\$17.78	\$20.09	\$25.18	\$33.96	\$51.73
11-9111	Medical and Health Services Managers	\$18.87	\$30.33	\$36.06	\$16.05	\$22.26	\$27.31	\$37.00	\$48.67
** 17-3029	Engineering Technicians, Except Drafters, All Other	-----	-----	-----	-----	-----	-----	-----	-----
** 21-2099	Religious Workers, All Other	-----	-----	-----	-----	-----	-----	-----	-----
51-9011	Chemical Equipment Operators and Tenders	-----	-----	-----	-----	-----	-----	-----	-----
41-2021	Counter and Rental Clerks	\$6.15	\$8.60	\$9.83	\$5.95	\$6.56	\$7.82	\$9.55	\$12.49
43-4071	File Clerks	\$7.52	\$9.25	\$10.11	\$6.87	\$7.77	\$8.95	\$10.50	\$12.19
51-2023	Electromechanical Equipment Assemblers	\$7.81	\$9.64	\$10.55	\$7.53	\$8.31	\$9.48	\$10.57	\$11.74
49-9042	Maintenance and Repair Workers, General	\$8.50	\$12.76	\$14.89	\$7.62	\$9.65	\$11.90	\$15.48	\$19.36
43-3011	Bill and Account Collectors	\$9.33	\$12.58	\$14.21	\$8.91	\$10.47	\$12.13	\$14.16	\$17.34
43-9999	Secretaries, Administrative Assistants, and Other Office Support Workers, All Other (OES Only)	\$9.47	\$14.53	\$17.07	\$8.88	\$10.80	\$14.19	\$16.83	\$21.03



**Table 4: OES Wage Data - Occupations With Fewer Than 10 Vacancies – Page 3**

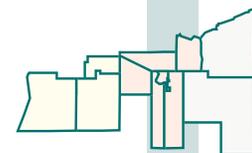
O*Net Code	O*Net Occupation Title	Occupational Employment Statistics Wage Data							
		Entry-Level	Average Wages (aged to 2000)		Percentile Distribution				
		Overall	Experienced	10th	25th	50th	75th	90th	
43-3021	Billing and Posting Clerks and Machine Operators	\$9.48	\$12.21	\$13.57	\$9.03	\$10.56	\$11.91	\$13.76	\$16.16
49-2097	Electronic Home Entertainment Equipment Installers and Repairers	\$10.87	\$14.11	\$15.73	\$9.58	\$11.84	\$13.28	\$17.07	\$20.27
43-3051	Payroll and Timekeeping Clerks	\$10.90	\$15.48	\$17.77	\$10.23	\$11.83	\$13.71	\$16.09	\$18.26
51-4041	Machinists	\$10.90	\$15.60	\$17.95	\$9.90	\$12.41	\$15.45	\$18.55	\$21.50
* 27-3090	Miscellaneous Media and Communication Workers	\$10.91	\$16.06	\$18.65	\$10.85	\$12.37	\$14.82	\$19.07	\$24.73
13-2041	Credit Analysts	\$13.72	\$21.44	\$25.29	\$12.74	\$15.11	\$19.48	\$24.45	\$32.51
13-2099	Financial Specialists, All Other	\$14.30	\$22.66	\$26.83	\$13.45	\$16.18	\$19.98	\$25.58	\$34.46
11-3071	Transportation, Storage, and Distribution Managers	\$19.56	\$28.95	\$33.65	\$17.95	\$21.79	\$26.66	\$34.52	\$43.91
15-2031	Operations Research Analysts	\$20.15	\$26.73	\$30.01	\$18.66	\$21.88	\$26.62	\$31.84	\$35.19
41-9031	Sales Engineers	\$20.60	\$32.98	\$39.16	\$18.39	\$24.01	\$31.80	\$42.29	\$55.50
* 11-2020	Marketing and Sales Managers	\$22.81	\$37.96	\$45.53	\$19.89	\$26.73	\$35.33	\$48.12	\$65.56
17-2041	Chemical Engineers	\$23.19	\$32.59	\$37.31	\$20.83	\$25.67	\$33.42	\$41.71	\$47.82
** 11-9039	Education Administrators, All Other	-----	-----	-----	-----	-----	-----	-----	-----
25-1124	Foreign Language and Literature Teachers, Postsecondary	-----	-----	-----	-----	-----	-----	-----	-----
33-9092	Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	-----	-----	-----	-----	-----	-----	-----	-----
** 43-9199	Office and Administrative Support Workers, All Other	-----	-----	-----	-----	-----	-----	-----	-----
53-3033	Truck Drivers, Light or Delivery Services	\$8.32	\$11.72	\$13.42	\$7.66	\$9.03	\$11.30	\$13.74	\$16.73
* 19-4090	Miscellaneous Life, Physical, and Social Science Technicians	\$10.00	\$16.83	\$20.25	\$8.73	\$11.73	\$15.24	\$20.48	\$27.83
53-1021	First-Line Supervisors/Managers of Helpers, Laborers, and Material Movers, Hand	\$11.10	\$17.91	\$21.31	\$10.17	\$12.59	\$17.00	\$21.63	\$27.45
53-3032	Truck Drivers, Heavy and Tractor-Trailer	\$11.50	\$15.63	\$17.69	\$10.91	\$12.41	\$14.81	\$17.48	\$21.05
47-2031	Carpenters	\$12.16	\$16.16	\$18.15	\$10.59	\$14.16	\$16.18	\$18.78	\$21.25
53-1031	First-Line Supervisors/Managers of Transportation and Material-Moving Machine and Vehicle Operators	\$13.22	\$20.81	\$24.61	\$11.82	\$14.81	\$19.10	\$24.98	\$32.19
13-1121	Meeting and Convention Planners	\$13.29	\$18.74	\$21.46	\$12.16	\$14.52	\$17.49	\$21.73	\$26.63
19-2031	Chemists	\$14.86	\$25.26	\$30.46	\$13.37	\$16.59	\$24.16	\$33.44	\$42.25
25-1021	Computer Science Teachers, Postsecondary	-----	-----	-----	-----	-----	-----	-----	-----

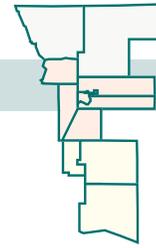
\* OES wages for general occupations are reported as the weighted average of more specific occupations

\*\* No OES wage data is available for "all other" occupations

\*\*\* OES wages reported for Colorado statewide

---- No wage data available





## Methodology

### Survey Instrument and Redesign

The Job Vacancy Survey was initiated in the Denver Metro area by Arapahoe/Douglas Works! through funding from the Employment and Training Administration in cooperation with Labor Market Information. The Denver Metro pilot studies were conducted along with pilot studies in five other metropolitan areas across the nation. Due to the success of the Denver Metro Job Vacancy Survey, the Colorado Department of Labor and Employment initiated a plan to expand the studies across the entire state.

After the first two Denver Metro pilot studies, the survey instrument was evaluated and redesigned. In choosing questions, considerations were made regarding various forms and gradations. Decisions were made to address the core of what was required in order to stay within the defined limits. Page one (Part A) of the survey was expanded not only to state the purpose of the survey, but also to collect employer information; verifying addresses, number of employees, and establishing contact names. Email and fax numbers were added to provide a means of contacting employers for notification of the availability of survey results. A review of page two (Part B) survey questions follows:

**A**—The “Job Title” section remained relatively the same, although a definition of Full- versus Part-time was included.

**B**—“Number of vacancies for which your firm is actively recruiting”: The objective was to get a measure of the job market from the employer’s point of view. A variant of this question was, “Number of vacancies that your firm currently has.” Actively recruiting was queried due to the possible presence of vacancies that were deliberately left vacant. Also revised was the query for Permanent vs. Temporary identification.

**C**—Wages/Salary: This question was revised to request the maximum and the minimum rates of

pay to evaluate variations in pay given different applicant qualifications.

**D**—“Is a sign-on bonus offered to the person hired to fill this vacancy?” In addition to noting whether or not a bonus is offered, the revised survey allows a dollar amount to be entered.

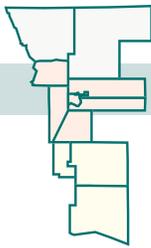
**E**—“Is medical insurance offered?” In addition, the revised survey prompted for the portion (if any) that the firm contributed. To better understand the relationship between types of positions, pay, vacancies, and the existence of medical insurance, it was important to note to what degree the firm contributes to the insurance premium.

**F**—“What is the typical education level required to fill this vacancy?” Examination of the nature of the job market and the needs of employers included the query of educational requirements.

**G**—“What is the typical type of experience required to qualify for this vacancy?” This also adds to the characteristics that employers are looking for in applicants. It was important to expand this question, allowing the firm to note the nature of the experience requested. During times of excess labor supply, qualifications demanded of applicants tend to increase. During periods of limited supply, the reverse tends to occur.

**H**—“How long has this vacancy been open?” This question was added to the revised survey to gauge the tightness of the labor market. It provides an objective measure that can be tracked and compared across time.

**I**—“How difficult is this vacancy to fill?” Questions H and I together help to evaluate the challenges employers face in the timely hiring of personnel and the degree to which the supply of labor falls short of demand.



## Survey Sample Methodology

This survey is designed to find frequency of job vacancies in High-Tech industries in the Colorado Front Range and characteristics of those vacancies. Firms were ordered into groups, or stratifications by employment size, industry, and geographical region and the resulting percentages of vacancies for each category were used to estimate total job vacancies for each group. The list of firms used for this survey, with their contact information, staff size and industry classification was obtained from the American Labor Market Information System (ALMIS) database.

The survey was conducted by telephone. In some cases copies of the survey form were faxed to employers upon request. A sample of the survey form can be found in the Appendix section of this report.

### Stratifications

For the purpose of this survey, the Colorado Front Range refers to the 11 counties adjacent to the foothills of Colorado's Rocky Mountains. These counties are divided into three regions: Larimer and Weld counties make up the Northern region, Adams, Arapahoe, Boulder, Denver, Douglas, and Jefferson counties constitute the Central region, and the Southern region consists of El Paso, Teller and Pueblo counties.

Employers with at least 250 employees are referred to as "large employers." They account for about 40% of the employment in the sample universe. Firms employing between 5 and 249 individuals are considered "small to mid-size employers," and account for nearly 50% of the sample universe employment. The remaining employment comes from firms employing less than 5 workers and are referred to as "micro employers." Due to the abundance of micro employers in the Colorado Front Range, a representative sample of these employers was gathered regardless of industry or geographic location. Attempts were made to contact all large employers.

The survey sample was then stratified into manufacturing and non-manufacturing industries as defined by the 1987 Standard Industrial Classification Manual as well as geographic location for small to mid-size employers. The various stratifications of small to mid-sized employers were randomized and a sample

<sup>1</sup>See *SOC Occupation Codes in Definitions Section*

of sufficient size to achieve a predictable level of accuracy for the estimates of job vacancies was taken.

## Data Editing

After data collection was completed, a few measures were taken to prepare data for analysis.

### Data Cleaning

Whenever necessary, data was modified to ensure consistency among vacancies. Follow up phone calls were made as required to verify and/or clarify responses.

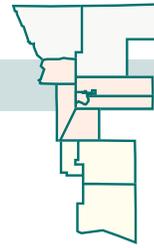
### Occupational Coding

Job title and descriptions were used to match the vacancy with the appropriate SOC occupational title.<sup>1</sup> In some cases a second interview with the employer was necessary to decide on a specific occupational title.

### Wage Conversion

Standard conversions were used to convert salaries into hourly wages: 2,080 hours for annual salaries, 173 hours for monthly salaries.

All wages below the minimum wage level were adjusted upwards to \$5.15 per hour. When necessary employers were contacted a second time for more information on questionable wages.



## Definitions

### Annual Salary

The monetary return for one year's work. The definition does not include benefits (e.g., insurance, retirement program, or stock plans).

### Average

The arithmetic average (also called the mean) for a group of items is defined as the sum of the values of the items divided by the number of items.

### Full-time and Part-time Employment

To be classified as full-time employment a position must require a minimum of 35 hours of work a week. Part-time employment refers to cases where a position requires less than 35 hours of work a week.

### Job Vacancy Rate

Is the number of openings in a specific occupation expressed as a share of total employment in that same occupation.

### Level of Education

Refers to completed programs of work. High school diplomas, associate, professional, vocational, bachelors, and graduate degrees all are examples of programs of work.

### Medical Insurance Premium

Refers to the monthly payments that a holder of an insurance policy pays in order to keep his/her policy current.

### Mid-Point

For the purpose of this survey, the Mid-Point refers to the wage halfway between the average minimum and average maximum wages as reported by survey respondents.

### Permanent and Temporary Employment

Employment is classified as permanent if it will be filled for more than six months. Temporary employment on the other hand refers to those positions which will be filled for six months or less.

### Sample Frame

The set of employers randomly chosen for the survey from the whole population of employers. Since vacancies and employment data were the central objectives of the survey, the sample frame was designed to allow necessary representation in those categories.

### Sign-on Bonus

An additional financial incentive offered by a firm to new employees in order to influence their decisions to agree to employment with that firm. The bonus, for purposes of this survey, is a monetary lump sum.

### SOC

The 1998 Standard Occupational Classification (SOC), with 822 detailed occupations, reflects the current occupational structure in the United States and was designed to provide a universal classification system. All federal agencies that collect occupational data will adhere to the new SOC. Information on the 1998 SOC, including its occupational structure, is available online.

Internet: [http://stats.bls.gov/soc/soc\\_home.htm](http://stats.bls.gov/soc/soc_home.htm).

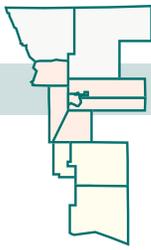
Source: *Occupational Outlook Handbook, 2000-01 Edition*, U.S. Department Of Labor, Bureau of Labor Statistics, January 2000.

### Vacancy

An established position that is currently unfilled for which the firm is actively recruiting to fill. The definition does not include positions that are anticipated, but not yet created.

### Wage

The monetary return per hour of work. The definition does not include benefits (e.g., insurance, retirement program, or stock plans).



## Addendum - Re-test Conducted October 11-12, 2001

A special re-test was conducted to verify the results of the original survey. The population for this study was the respondent pool from the

High-Tech survey conducted June 21st - July 3rd. The major findings of the re-test follow:

- ◆ There is no statistically significant difference in the employment level in the establishments, with a level of confidence greater than 99%.
- ◆ There is no statistically significant difference in the job vacancy rate, with a level of confidence greater than 99%.
- ◆ For firms of 5 or more employees, the total number of vacancies reported is 206 in this study and 228 in June, a vacancy rate of 1.42% vs. 1.44%, respectively.
- ◆ The total number of vacancies in firms with 100 or more employees is 168 in this study and 172 in June, a vacancy rate of 1.40% vs. 1.41%.
- ◆ The 189 total complete responses were 27.5% of the respondents to the original study
- ◆ The total employment of the 189 firms is reported as 14,547 in this study, and 15,819 in June, a difference of 1,272 and a mean difference of 6.7 per establishment.
- ◆ The total employment for firms of 100 or more employees is reported as 12,038 in this study, 12,212 in June, a difference of 174 and a mean difference of 7.6 per establishment.
- ◆ Of the firms contacted, 33 (17.5% of the total) reported having a layoff during the past three months affecting 273 employees; an average of 8.3 per firm reporting lay-offs.
- ◆ Only 7 firms surveyed with more than 99 employees reported layoffs affecting 191 employees, or 70% of all lay-offs reported. This amounts to an average 27.3 terminations by larger firms.
- ◆ The mean number of lay-offs in smaller firms reporting lay-offs is 3.15.
- ◆ The mean number of lay-offs for all the 189 respondents is 1.44.
- ◆ Employers with 5 or more employees were contacted for this survey.
- ◆ A response rate of 89% of contacted establishments was achieved.



## Appendix - Survey Instrument



### High -Tech Job Vacancy Survey

Survey ID: 492507011

Company ID: \_\_\_\_\_

#### Survey Instructions

- Please direct this survey to the manager or human resources professional responsible for hiring and recruitment at your business.
- Please **respond within three business days**. Your assistance will allow us to complete this survey in a timely manner.
- Return this survey by fax to (877) 222-0921. **This number is toll-free.**

For the purposes of this survey, a vacancy at your company is a job opening for which your firm is actively recruiting. Only provide information for job vacancies within the Front Range.

#### Part A: About Your Firm

1. Who may we contact regarding job vacancies at your location and at other Front Range area locations? \_\_\_\_\_
2. Contact's:
  - a. Job Title \_\_\_\_\_
  - b. Phone # \_\_\_\_\_
  - c. Fax # \_\_\_\_\_
  - d. E-Mail Address \_\_\_\_\_
3. Company Name: \_\_\_\_\_
4. Number of Employees working within the Front Range area: \_\_\_\_\_
5. Do you have any job vacancies for which your firm is actively recruiting?
 

Yes       No
6. Would you like to be notified when the survey results are released?
 

Yes       No

**If you answered yes to question number five, please complete the next page of this survey.** If you have more vacancies than will fit on the next page, please make copies before you begin filling out the form. Thank you very much for your participation in the survey. **We look forward to providing you with a final copy of the study.**

**Part B: About Your Vacancies, See next page ➡**

