



**ANNEXES
TO
MAIN REPORT**

FORT MONMOUTH
and its
**Fort Belvoir
C4ISR Elements**



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An Analysis of the Workforce Available to Support United States Military Bases in New Jersey

I. Executive Summary

New Jersey has unique access to a highly concentrated and skilled science and engineering (S&E) workforce¹ compared to other states and the nation as a whole. New Jersey also has a large base of scientific and technical firms that can act as contractors and/or supply skilled workers to military bases. Finally, New Jersey's educational infrastructure maintains a robust pipeline of future scientific and engineering workers. As a result, New Jersey is one of the nation's premier locations for research and development bases, such as Lakehurst Naval Air Station, Fort Monmouth and Picatinny Arsenal.

Ready access to skilled workers and contractors is key to the U.S. military's capacity to create the technology needed to equip soldiers and defend America. As the Department of Defense proceeds with the congressionally authorized Base Realignment and Closure (BRAC) process for 2005, officials must consider which states offer advantages in these areas.

A. Background

In the current round of BRAC, the Defense Department has emphasized that all military bases will be considered for closure, consolidation or realignment. The review will include research and development military bases in New Jersey, such as Fort Monmouth, Picatinny Arsenal and Lakehurst Naval Air Station, which specialize in developing high-tech innovations in communications, weapons and other technologies to support the U.S. military. Each base relies on a skilled scientific and engineering (S&E) workforce to support their operations.

The Governor's Commission To Support and Enhance New Jersey's Military and Coast Guard Installations asked the John J. Heldrich Center for Workforce Development to

¹ The National Science Foundation (NSF) defines the S&E workforce as those who are employed in the following types of jobs: mathematical, computer, life, physical and social scientists; engineers; and postsecondary teachers in any S&E degree field. The term is sometimes used more broadly in this document to include occupations captured in the North American Industry Classification System's (NAICS) Professional, Scientific and Technical industry category (NAICS code #54), which includes industry sectors that encompass the occupations above as well as others including architectural, photographers and other technical professions. For a full list of sectors included in this industry classification, see <http://www.census.gov/epcd/naics02/naicod02.htm#N54>. Where appropriate, specific NAICS sub codes are used to identify particular types of industry workers. Footnotes and in-text citations are used throughout this document to indicate relevant data sources and differing definitions of the S&E workforce.

prepare an analysis of the workforce available to support the three bases. This report focuses primarily on New Jersey's S&E workforce, although we indicate the importance of the labor force in a broader multi-state labor market. In addition, this study compared relevant New Jersey labor market characteristics to both national data and data from states that the Department of Defense may consider as alternative sites. The Governor's Commission identified the following as key competitor states: Massachusetts, Maryland, Ohio and Virginia.

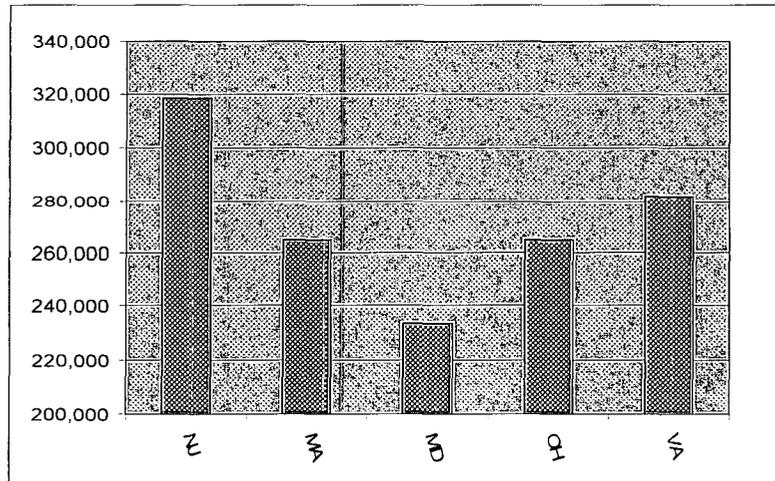
B. Major Findings

With nearly 10% of its workforce composed of S&E workers, New Jersey ranks in the nation's first quartile in terms of the size of its S&E workforce relative to the workforce as a whole (National Science Board 2004; figure based on 1999 data). In addition, New Jersey leads key competitor states in the following areas:

- **New Jersey has a larger number and concentration of S&E workers than any of the other comparison states.**

New Jersey has nearly 320,000 self-identified S&E workers², the highest total among the four primary competitor states (U.S. Census, 2000). When New York City and Philadelphia labor markets are considered, this total jumps to nearly 1 million workers (U.S. Census, 2000). Because New Jersey is a small state, many of these workers, including workers from the New York and Philadelphia labor market regions, live within commuting distance of at least one of the three military bases under study.

Chart I-1. Total Number of Self-Identified S&E Workers.³



Source: United States Census, 2000.

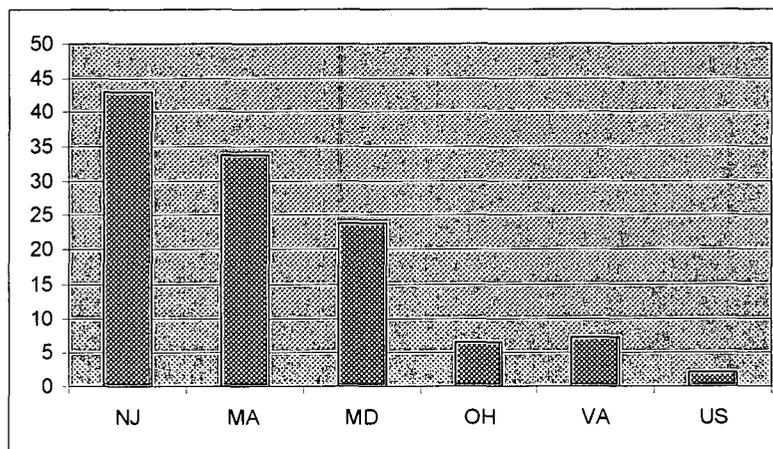
² Persons responding to the 2000 U.S. Census used industry-based categories derived from the North American Industry Classification System (NAICS) to self-identify the industry that they work within. Figures above include the total number who identified themselves as working within the Professional, Scientific, and Technical Industry. For a full list of sectors included in this NAICS category (NAICS 54), see <http://www.census.gov/epcd/naics02/naicod02.htm#N54>.

³ Ibid.

New Jersey also has over 5,000 recent S&E PhD. degree holders in the workforce, a number that is competitive with most comparison states. (Technology Administration, 2004; based on data from 1999-2000 school year.)

New Jersey's scientific workforce is significantly more concentrated than it is in comparison states, including Massachusetts. New Jersey has nearly 43 self-identified S&E workers per square mile, while Massachusetts has only 33 and other states have significantly less. Across the nation, the average is less than five of these workers per square mile.⁴

Chart I-2. Total Number of Self-Identified S&E Workers Per Square Mile of Land Area.



Source: Author's calculation based on United States Census 2000 data and state land area information.

- **New Jersey also has a high number and concentration of S&E firms, which can potentially supply contractors and/or civilian workers to support the state's military bases.**

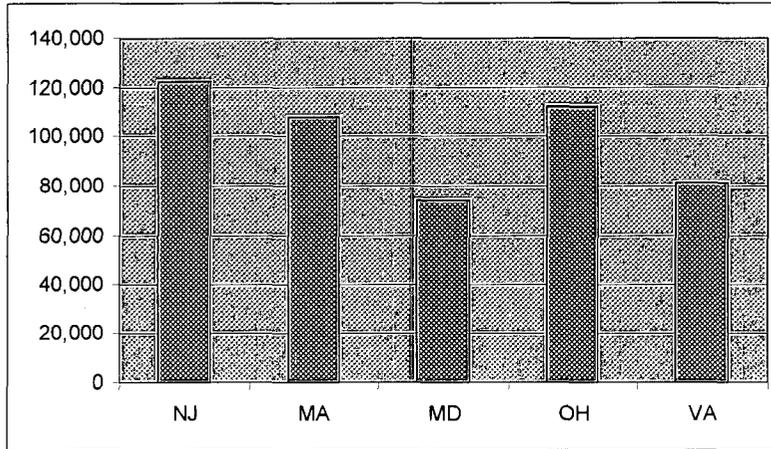
With over 122,000 S&E firms (U.S. Economic Census, 1997)⁵, New Jersey has more of these businesses than any of the comparison states. When the nearby New York City and Philadelphia regions are considered, the total number of firms rises to over 381,000.

⁴ Persons responding to the 2000 U.S. Census used industry-based categories derived from the North American Industry Classification System (NAICS) to self-identify the industry that they work within. Figures in this paragraph and the chart below were derived from the author's calculation of the total number who identified themselves as working within the Professional, Scientific, and Technical Industry divided by the total number of square land area miles in each state under study. For a full list of sectors included in the Professional, Scientific, and Technical Industry NAICS category (NAICS 54), see <http://www.census.gov/epcd/naics02/naicod02.htm#N54>.

⁵ This total includes both employer and non-employer firms and is based on the total number of Professional, Scientific and Technical firms, as defined by NAICS, included in the 1997 U.S. Economic Census and the Census Bureau's 1997 non-employer survey. The U.S. Census defines non-employer firms as those businesses that do not have any paid employees beyond the business proprietor. For a full list of sectors included in the Professional, Scientific, and Technical Industry NAICS category (NAICS 54), see <http://www.census.gov/epcd/naics02/naicod02.htm#N54>.

(U.S. Economic Census, 1997) In New Jersey alone, this amounts to about 3.5 firms per square mile of land area, the highest density of S&E firms among the comparison states.

Chart I-3. Total Number of S&E firms.⁶

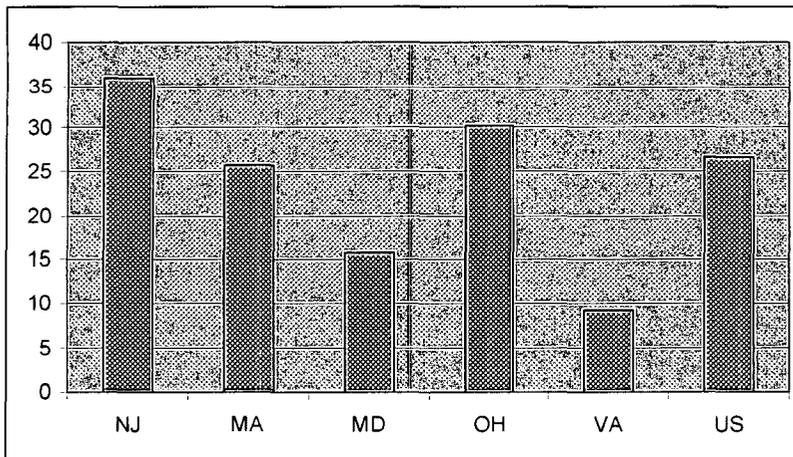


Source: United States Economic Census, 1997.

- **New Jersey supports a robust culture of scientific innovation.**

For each 1,000 people in S&E occupations in 1999, New Jersey produced over 36 patents. This ratio is higher than it was for any of the other comparison states and the nation as a whole (National Science Board, 2004).

Chart I-4. Number of Patents Awarded per 1,000 Individuals in S&E Occupations in 1999.



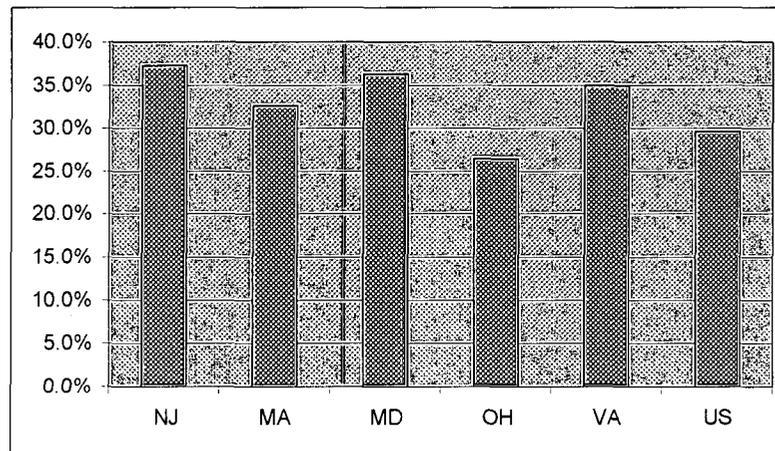
Source: National Science Board, Science and Engineering Indicators 2004.

⁶ Ibid.

- **New Jersey has a large number of S&E graduate students in the educational pipeline, ensuring a steady stream of skilled potential workers for military bases located in the state.**

New Jersey has 57 colleges and universities and over 150 non-degree institutions that support a diverse array of programs designed to prepare current and future workers to succeed in demanding S&E jobs. (National Center for Education Statistics, 2002; based on 2001-02 school year data.) In 2000, there were over 11,300 graduate students enrolled in such programs around the state. (Technology Administration, 2004) In addition, *over 35%* of all degrees conferred in New Jersey were S&E degrees, the highest share among the four comparison states and significantly above the average for the nation (National Science Board, 2004; based on 2000-01 school year data).

Chart I-5. Percentage of Science and Engineering degrees as a share of all degrees



Source: National Science Board, Science and Engineering Indicators 2004.

C. Conclusions

Due to its ability to provide a highly skilled and concentrated scientific and technical workforce, New Jersey is an ideal location for the U.S. military's research and development bases, including Fort Monmouth, Picatinny Arsenal and Lakehurst Naval Air Station. New Jersey and the surrounding New York and Philadelphia metropolitan areas offer the added advantage of a large, diverse base of scientific and technical firms that can potentially support base operations. In addition, the state's strong educational infrastructure can provide current and potential base employees with the cutting-edge technical skills needed to maintain and improve New Jersey's state-of-the-art military bases.

II. Introduction

Congress has authorized a Base Realignment and Closure (BRAC) process for 2005. Each round of BRAC results in the closure or realignment of selected military bases that support thousands of jobs and generate millions of dollars in economic activity for state economies.

In the current round of BRAC, the Defense Department has emphasized that all military bases will be considered for closure, consolidation or realignment. Although military importance and cost are likely to be crucial criteria for evaluating bases, other factors are likely to be weighed. An important consideration is the ability of the labor force in the surrounding community or state to support the vital mission of the bases. The availability and quality of the workforce are particularly important factors to consider when evaluating military research and development centers, such as the three bases in New Jersey: Fort Monmouth, Picatinny Arsenal and Lakehurst Naval Air Station.

Each of the three New Jersey bases specializes in developing high-tech innovations in communications, weapons and other technologies to support the U.S. military. To support this mission, each base relies on a highly skilled civilian workforce and a pool of contractors. Those workers tend to be well educated. For example, nearly 60 percent of the civilians employed at Fort Monmouth have earned a bachelor's degree or higher and about 20 percent have a master's degree or other advanced degree. The bases also tend to employ a large number of scientists and engineers who perform the highly technical work underlying the bases' mission. For example, about two-thirds of the civilian workforce at Picatinny Arsenal is scientists and engineers. Of course, the bases also employ a number of skilled non-technical workers as well.

The Governor's Commission To Support and Enhance New Jersey's Military and Coast Guard Installations asked the John J. Heldrich Center for Workforce Development to prepare an analysis of the workforce available to support the three bases. This report focuses primarily on New Jersey's scientific and engineering (S&E) workforce⁷—the pool of workers who can carry out the core mission of the military research and development centers. To determine the availability and quality of the S&E workforce, we examine:

- Educational attainment of the New Jersey workforce;
- Current supply of S&E workers in New Jersey;
- Current quantity and distribution of firms employing S&E workers; and
- Pipeline of future S&E workers and the educational infrastructure needed to support development of the S&E workforce.

⁷ The National Science Foundation (NSF) defines the S&E workforce as those who are employed in the following types of jobs: mathematical, computer, life, physical and social scientists; engineers; and postsecondary teachers in any S&E degree field. The term is sometimes used more broadly in this document to include occupations captured in the North American Industry Classification System's (NAICS) Professional, Scientific and Technical industry category (NAICS code #54), which includes industry sectors that encompass the occupations above as well as others including architectural, photographers and other technical professions. For a full list of sectors included in this industry classification, see <http://www.census.gov/epcd/naics02/naicod02.htm#N51>. Where appropriate, specific NAICS sub codes are used to identify particular types of industry workers. Footnotes and in-text citations are used throughout this document to indicate relevant data sources and differing definitions of the S&E workforce.



Drawing on a variety of statistical measures, the Heldrich Center's analysis focuses on the New Jersey workforce, although we indicate the importance of the labor force in a broader multi-state region. In addition, this study compared relevant New Jersey labor market characteristics to both national data and data from states that the Department of Defense may consider as alternative sites. The Governor's Commission identified the following as key competitor states: Massachusetts, Maryland, Ohio and Virginia.

III. Findings

Compared to other states, New Jersey has a multitude of workforce-related advantages that make it an ideal setting for research and development-oriented military bases. The following key findings, organized into four main categories, highlight these strengths:

A. General Educational Attainment in New Jersey

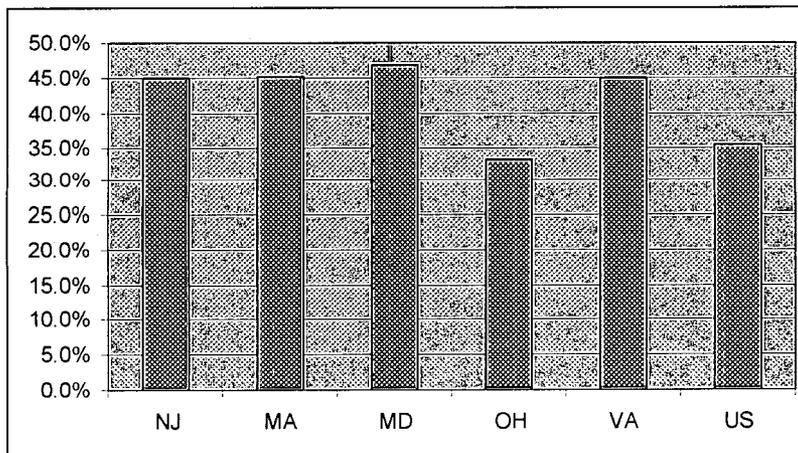
New Jersey has a highly educated workforce, displaying the state's general readiness to provide skilled workers for a variety of technical and non-technical jobs that may be available at military bases located in the state.

- **A very high percentage of New Jersey's workers hold at least a bachelor's degree.**

With over 45% of the state's workers holding at least a bachelor's degree (National Science Board, 2004; based on 2002 data), New Jersey's workforce is even better educated than its general population. New Jersey ranks among the top five states in the nation in this category (National Science Board, 2004; based on 2002 data)

New Jersey is also very competitive in this area with the comparison states chosen for this study. Only 33.5% of Ohio's workers have a bachelor's degree or higher, compared to 45% in Virginia, 45.3% in Massachusetts, and 46.8% in Maryland (National Science Board, 2004; based on 2002 data).

Chart II-1. Percentage of the Workforce with a Bachelor's Degree or Higher.



Source: National Science Board, Science and Engineering Indicators 2004.

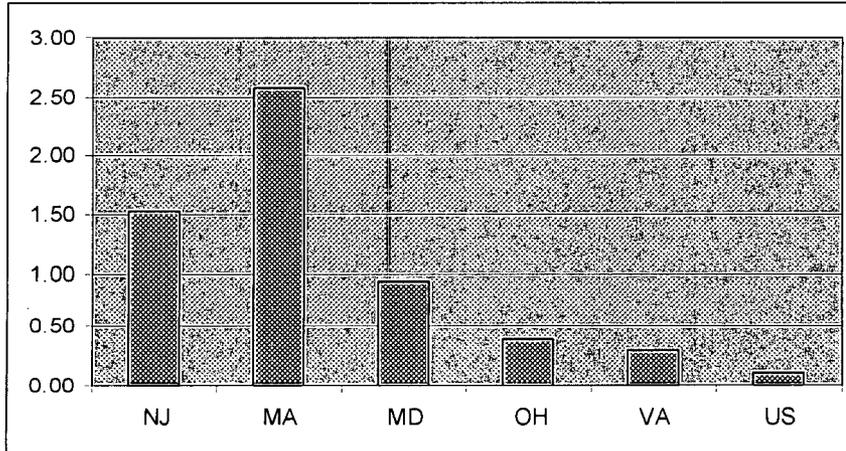
B. Educational Infrastructure and the S&E Educational Pipeline in New Jersey

Military bases need continuing access to both a highly skilled workforce and robust educational institutions that can prepare current and future workers. New Jersey has over 57 public and private colleges and 152 non-degree institutions (National Center for Education Statistics, 2002; based on 2001-02 school year data). Such variety of educational options in a small state helps to ensure that S&E workers can get the specialized education they need to succeed in the workforce. In addition, New Jersey has a robust workforce education pipeline and a strong educational infrastructure, as evidenced by the following:

- **New Jersey has a very high concentration of S&E graduate students.**

In 2001, New Jersey had over 11,000 students engaged in S&E graduate studies (Technology Administration, 2004). This equates to over 1.5 S&E graduate students per square mile of state land area, a concentration that is higher than that of three of the four comparison states and significantly higher than the nation as a whole. While Massachusetts has about 2.6 S&E graduate students per square mile, Maryland has only about 1, Ohio has .4, and Virginia has .3. Across the nation, there are only .12 S&E graduate students per square mile of land area.⁸

Chart II-2. Number of S&E Graduate Students Per Square Mile of State Land Area.⁹



Source: Author's calculation, based on National Science Board, Science and Engineering Indicators 2004 data and state land area information.

⁸ Figures based on authors calculation of the total number of graduate students enrolled in S&E programs throughout the state in 2001 according to the technology Administration and divided this number by the total number of square miles of land area in each state.

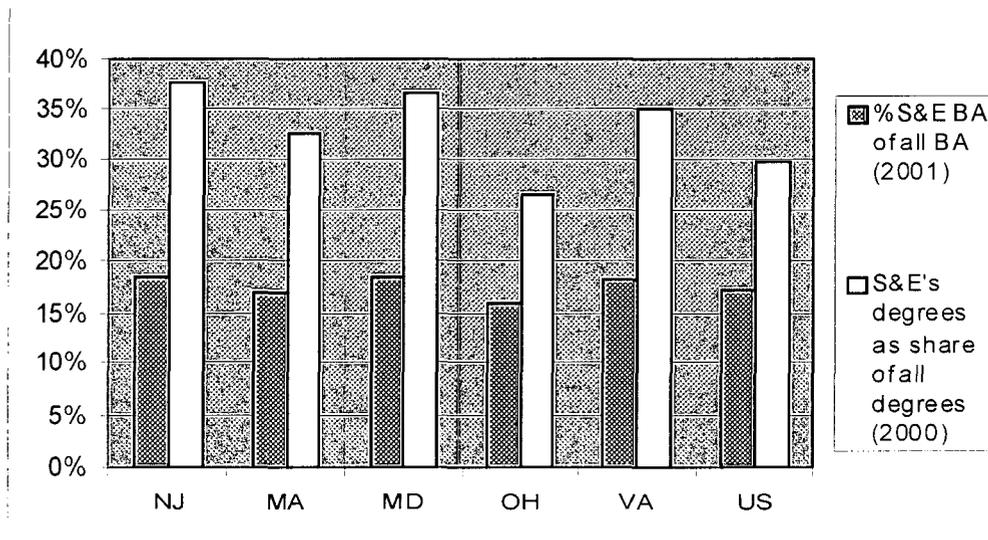
⁹ Ibid.

- **S&E degrees represent a greater proportion of all degrees issued in New Jersey than they do in the comparison states or the nation as a whole.**

In 2001, over 37.4% of all degrees awarded in New Jersey were S&E degrees (National Science Board, 2004). This proportion is higher than it was for the same period in all of the comparison states chosen for this study, as well as in the nation. In Maryland, S&E degrees accounted for 36.4% of all degrees awarded in 2001, while they represented 35% in Virginia, 32.6% in Massachusetts, 26.6% in Ohio and 29.7% in the United States as a whole (National Science Board, 2004).

S&E BA's in New Jersey made up 18.4 percent of all BA degrees awarded in 2001, exceeding Massachusetts (16.8%), Ohio (15.9%) and the United States as a whole (17.3%) and remaining competitive with Maryland (18.4%) and Virginia (18.3%) (Technology Administration, 2004).

Chart II-3. Percent of all Degrees and Bachelor Degrees awarded that are S&E degrees



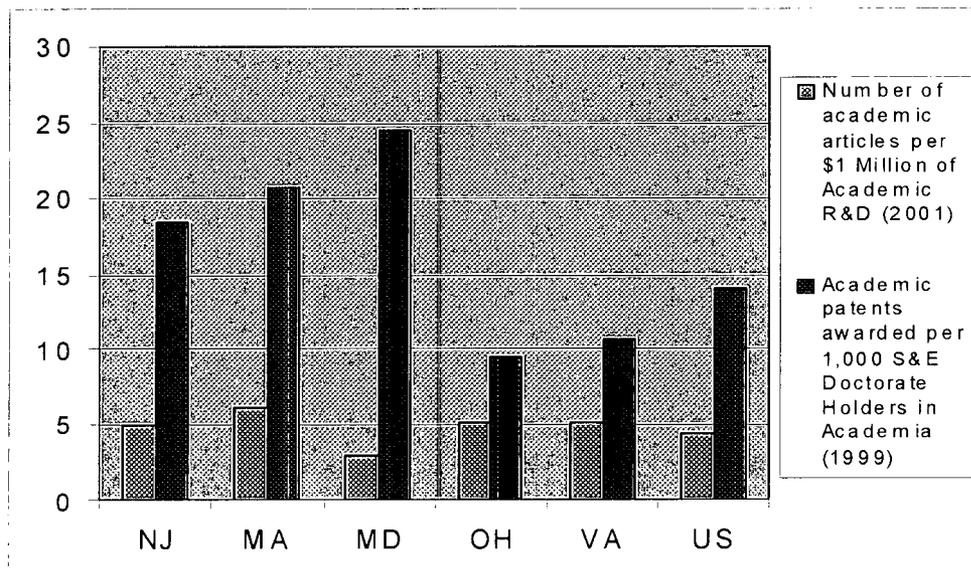
Sources: National Science Board, *Science and Engineering Indicators 2004* and the Technology Administration, *State Science and Technology Indicators Report, Fourth Edition, 2004*.

- **New Jersey has a robust educational infrastructure capable of supporting and nurturing growth in the S&E workforce.**

New Jersey makes a more significant investment into education than comparison states, contributing \$2,072 state and local funds per capita, compared to \$1,773 per capita in Maryland, \$1,715 in Virginia, \$1,702 in Ohio and \$1,693 in Massachusetts (National Center for Education Statistics, 2002; based on 2000-01 school year data). The national average per capita investment of state and local funds into education is \$1,772 (National Center for Education Statistics, 2002; based on 2000-01 school year data).

The prosperous production of patents and academic R&D articles in New Jersey is evidence that educational investment is paying off. For every \$1 million of academic R&D, New Jersey produced 5 academic articles in 2001 (National Science Board, 2004). The national average rests at 4.52 articles per \$1 million (National Science Board, 2004). New Jersey also exceeds the national average for receipt of academic patents with 18.4 per 1,000 S&E Doctorate holders in academia in 1999, compared with a national average of only 14 (National Science Board, 2004).

Chart II-4. Academic Articles per \$1 Million of Academic R&D funding and Academic Patents per 1,000 S&E Doctorate Holders in Academia.



Source: National Science Board, Science and Engineering Indicators 2004.

New Jersey also provides a competitive student to faculty ratio in its colleges at 13.4 students per faculty member, slightly below the national average of 14.5 and on par with Virginia (13.4), Ohio (15.5) and Maryland (12.6) and below Massachusetts' ratio of 18.3 (National Center for Education Statistics, 2002; based on 1999-2000 school year data).

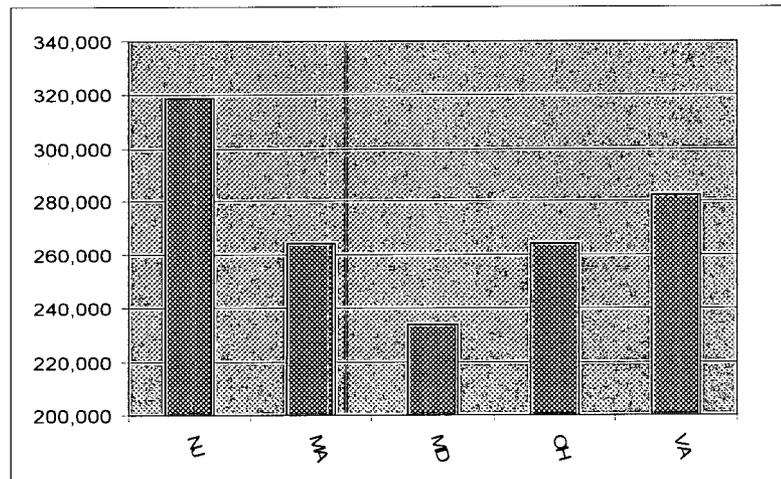
C. New Jersey's Science and Engineering Workforce

Military bases must rely on access to a skilled scientific workforce in order to continue to create cutting edge technology to defend the nation. New Jersey offers the following advantages in terms of its science and engineering (S&E) workforce characteristics:

- **New Jersey has a higher number of S&E workers than comparison states.**

New Jersey has nearly 320,000 self-identified S&E workers, the highest number among the four primary competitor states (U.S. Census, 2000).¹⁰ When New York City and Philadelphia labor markets are considered, this total jumps to nearly *1 million workers* (U.S. Census, 2000). Since New Jersey is a small state, many of these workers, including workers from the New York and Philadelphia labor market regions, live within commuting distance of at least one of the three military bases under study.

Chart II-5. Total Number of Self-Identified S&E Workers.¹¹



Source: United States Census, 2000

More specifically, New Jersey has a higher number of currently employed life and physical scientists (15,170) than any other state, as well as more computer specialists (106,300) than all other comparison states except Virginia (128,450) (Technology Administration, 2004; based on 2001 data). New Jersey also has nearly 31,000 employed engineers, a number that exceeds Maryland's total number of these workers (26,080) and is competitive with that of Massachusetts (39,850) (Technology Administration, 2004; based on 2001 data).

Overall, the high number of S&E workers found in New Jersey is impressive, especially considering that it has the smallest land area of any state considered in this study.

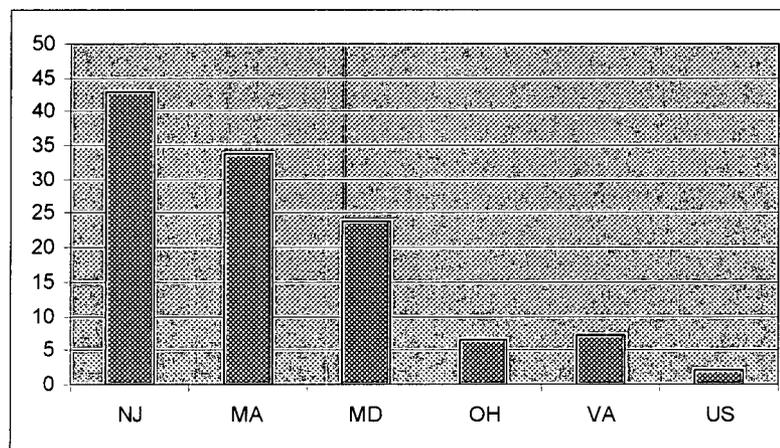
¹⁰ Persons responding to the 2000 U.S. Census used industry-based categories derived from the North American Industry Classification System (NAICS) to self-identify the industry that they work within. Figures above include the total number who identified themselves as working within the Professional, Scientific, and Technical Industry. For a full list of sectors included in this NAICS category (NAICS 54), see <http://www.census.gov/epcd/naics02/naicod02.htm#N51>.

¹¹ Ibid.

- **New Jersey has a higher concentration of S&E workers than other states and the nation as a whole.**

When the size of each state's land area is taken into account, New Jersey emerges as a clear leader in terms of the concentration of S&E workers. New Jersey's scientific workforce is significantly more concentrated than it is in comparison states, including Massachusetts. New Jersey has nearly 43 self-identified S&E workers per square mile of land area, while Massachusetts has only 33 and other states have significantly less (Maryland has 24, and Ohio and Virginia each have 7). Across the nation, the average is less than five of these workers per square mile.¹²

Chart II-6. Total Number of Self-Identified S&E Workers Per Square Mile of State Land Area.¹³



Source: Author's calculation based on United States Census 2000 Data and state Land area information.

When S&E worker data are examined closely, one finds that New Jersey also has a higher concentration of employed computer specialists and life and physical scientists than any of the comparison states and the nation as a whole. New Jersey has 14.3 employed computer specialists per square mile of state land area, compared to 13.1 in Massachusetts, 7.5 in Maryland, 3.2 in Virginia and 2.1 in Ohio. Similarly, New Jersey has an average of 2 employed life and physical scientists per square mile, compared to 1.7 in Massachusetts, 1 in Maryland, .2 in Virginia and .2 in Ohio. Nationwide, there are an average .7 computer specialists and .1 life and physical scientists per square mile.¹⁴

¹² The figures in this paragraph were derived by taking the total number of workers who identified themselves in the 2000 U.S. Census as workers in the Professional, Scientific and Technical Industry (NAICS code 54) and dividing this number by the total number of square land area miles in each state.

¹³ Ibid.

¹⁴ The figures in this paragraph were derived by taking the total number of these workers in 2001, as reported by the Technology Administration in its 2004 State Indicators report, and dividing this by the total number of square land area miles in each state.

New Jersey also significantly exceeds the nation and all other comparison states except Massachusetts with regard to its concentration of employed engineers. While Massachusetts has 5.1 employed engineers per square mile of land area, New Jersey has 4.1, significantly more than Maryland (2.7), Ohio (1.1) or Virginia (1).¹⁵

Overall, New Jersey's S&E workforce is significantly more concentrated than it is in comparison states, including Massachusetts.

- **New Jersey's S&E workforce is highly educated.**

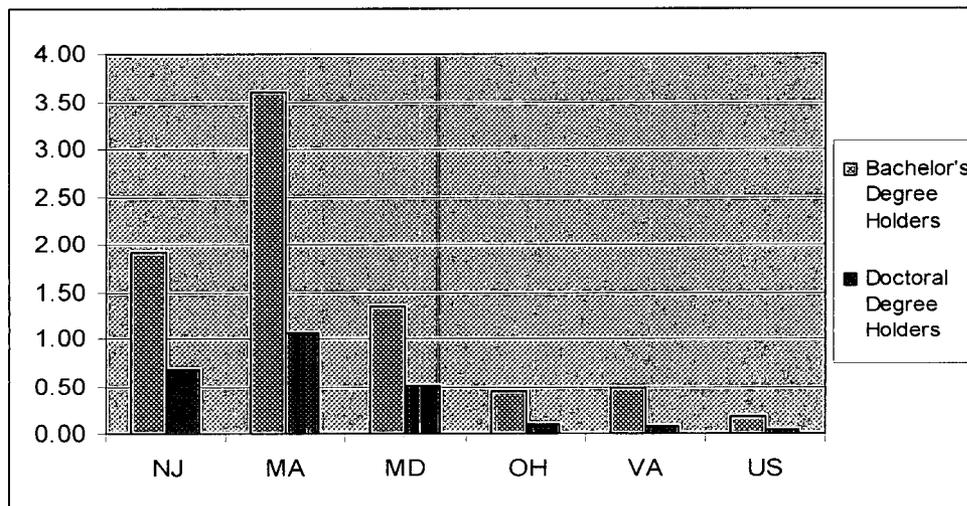
New Jersey has over 5,000 recent S&E PhD. degree holders in the workforce, a number that is competitive with most comparison states. (Technology Administration, 2004; based on 2001 data). New Jersey also exceeds the nation and several comparison states in terms of the share of S&E doctorate holders in the workforce. In New Jersey .55% of the workforce holds a doctorate in an S&E field (National Science Board, 2004; based on 2001 data). While the percentage is higher in Massachusetts (.89%) and Maryland (.83%), New Jersey's figure compares favorably to other states included in the study, as well as to the nation. In Virginia, .49% of the workforce holds a doctorate in an S&E field, while this figure is only .36 % in Ohio and .42% in the nation as a whole (National Science Board, 2004; based on 2001 data).

The concentration of recent S&E bachelor's and doctoral degree holders in New Jersey exceeds the concentration of these individuals in three of the four comparison states, as well as the nation as a whole. In 2001, New Jersey had 1.92 recent S&E Bachelors' degree holders per square mile of land area, compared with 3.6 in Massachusetts, 1.35 in Maryland, .48 in Virginia, .45 in Ohio and only .17 in the nation. New Jersey had .68 recent S&E doctoral degree holders per square mile of land area, compared to .04 on a national level, 1.07 in Massachusetts, .51 in Maryland, .1 in Ohio, and .08 in Virginia.¹⁶

¹⁵ The figures in this paragraph were derived by taking the total number of these workers, as reported by the Technology Administration in its 2004 State Indicators report, and dividing this by the total number of square land area miles in each state.

¹⁶ The figures in this paragraph were derived by taking the total number of S&E bachelor's and doctoral degree holders in 2001, as reported by the Technology Administration in 2004, and dividing this number by the total number of square land area miles in each state.

Chart II-7. The Number of Recent S&E Bachelor's and Doctoral Degree Holders per Square Mile of Land Area in 2001.



Source: Author's calculation, based on Technology Administration, State Science and Technology Indicators Report, Fourth Edition (2004) and state land area information.

D. New Jersey's Science and Engineering Firms

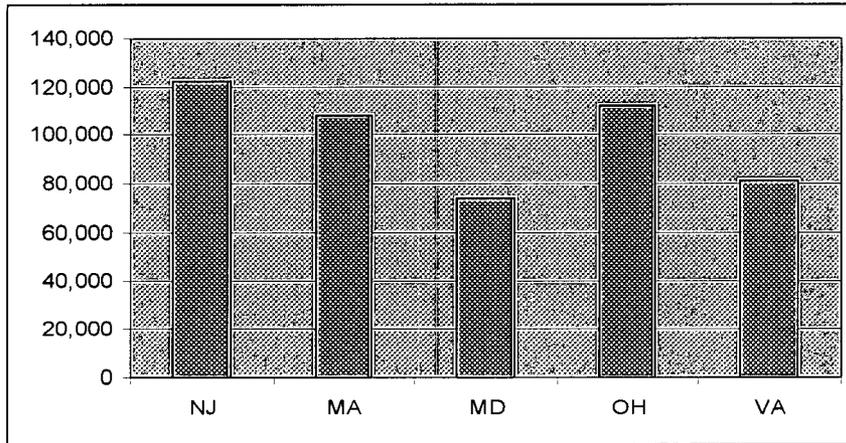
Increasingly, U.S. military bases must rely on private sector consultants and contractor firms to support their operations (Butz et. al., 2004). Access to a diverse base of skilled firms and contractors is key to the success of cutting-edge military projects. New Jersey's pool of employers and self-employed contractors offers the following advantages to research and development-oriented military bases:

- **NJ has a higher number of S&E firms than comparison states and the nation.**

With over 122,000 S&E firms¹⁷, New Jersey has more of these businesses than any of the comparison states. When the nearby New York City and Philadelphia regions are considered, the total number of firms rises to over 381,000 (U.S. Economic Census, 1997; U.S. Census Nonemployer Survey, 1997). By comparison, Maryland has only 74,197 S&E firms, Virginia has 81,275, and Massachusetts has 108,630. New Jersey's closest competitor in this area, Ohio, has only 112,658 S&E firms spread out over a much larger area than New Jersey (U.S. Economic Census, 1997; U.S. Census Nonemployer Survey, 1997).

¹⁷ This total includes both employer and non-employer firms and is based on the total number of Professional, Scientific and Technical firms, as defined by NAICS, included in the 1997 U.S. Economic Census and the Census Bureau's 1997 non-employer survey. The U.S. Census defines non-employer firms as those businesses that do not have any paid employees beyond the business proprietor.

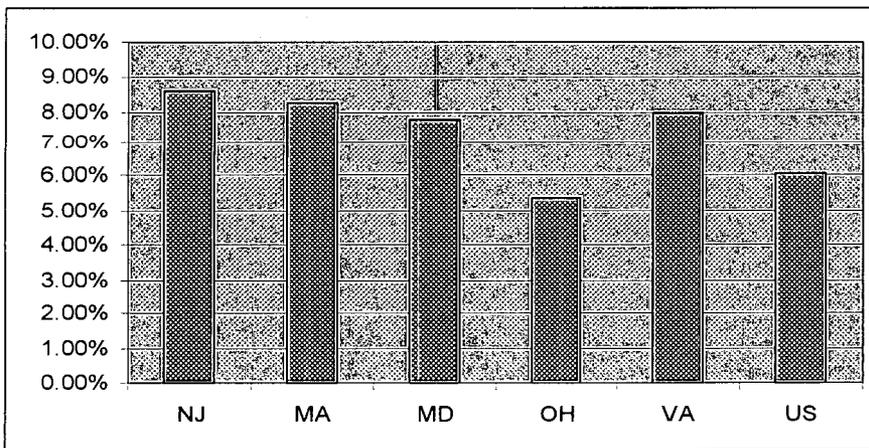
Chart II-8. Total Number of S&E firms.¹⁸



Source: United States Economic Census, 1997; United States Census Nonemployer Survey, 1997.

New Jersey also somewhat exceeds three of the four comparison states and greatly exceeds Ohio and the nation as a whole in terms of having the largest percentage of high tech firms as a share of all businesses. In New Jersey, high technology businesses account for 8.6% of all employer firms, compared to a rate of 8.28% in Massachusetts, 7.98% in Virginia, 7.81% in Maryland and only 5.38% in Ohio. The percentage of high tech firms as a share of all businesses is 6.05% across the nation (National Science Board, 2004; based on 2000 data).

Chart II-9. The Percentage of High Technology Firms As a Share of All Businesses in 2000.



Source: National Science Board, State Indicators Report, 2004.

More specifically, New Jersey emerges as a clear leader in terms of its number of computer systems design firms. New Jersey is home to 14,258 computer design employers, significantly more than Massachusetts (10,056), Ohio (8,746), Virginia

¹⁸ Ibid.

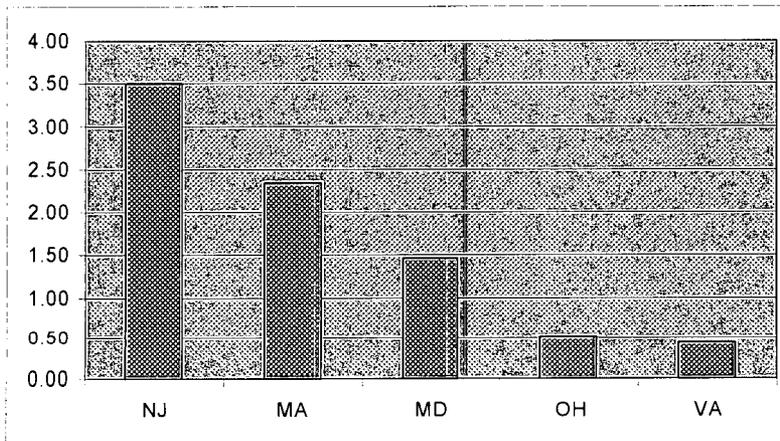
(8,704), and Maryland (7,644).¹⁹ Such firms, and the skilled technology workers they employ, can potentially assist military bases in New Jersey with important computer-based projects.

New Jersey is also prosperous with regard to the number of scientific research and development (R&D) firms in the state. The state supports 1,087 such firms. While Massachusetts has 1,662 R&D firms, New Jersey's total is competitive with Maryland (1,216 R&D firms) and somewhat in excess of the supply in Virginia (991 R&D firms) and Ohio (923 R&D firms).²⁰

- **S&E firms are also more highly concentrated in New Jersey than in comparison states or the nation as a whole.**

As a comparatively small state geographically, New Jersey offers the competitive combination of a large number of S&E firms in a condensed space. With a total of 3.5 firms per square mile, New Jersey not only has more firms than comparison states, it also has the highest density of firms. In Massachusetts, New Jersey's closest competitor, there are 2.34 firms per square mile while Maryland, Ohio and Virginia have a density range from 0.45 to 1.46 firms per square mile.²¹

Chart II-10. Number of S&E firms per Square Mile of State land Area.



Source: Author's calculation based on 1997 U.S. Economic Census and 1997 U.S. Census Nonemployer survey data, and state land area information.

¹⁹ Figures in this paragraph were derived by combining the total number of Computer Systems Design firms (NAICS code 5415) from the 1997 Economic Census with the total number from the Census Bureau's 1997 non-employer survey.

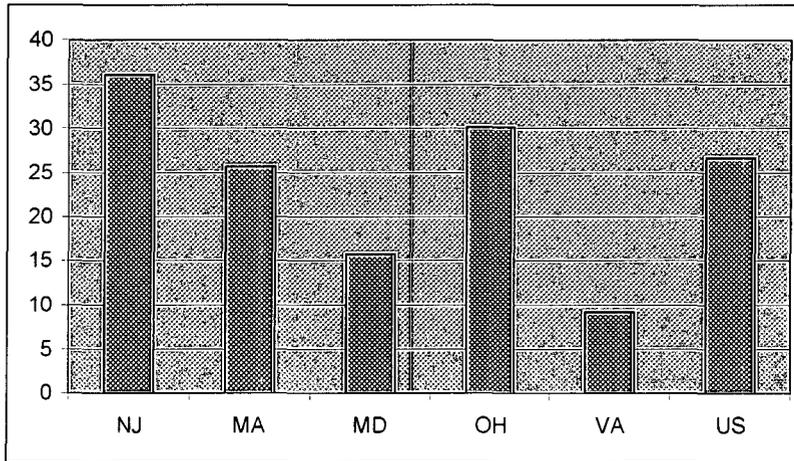
²⁰ Figures in this paragraph were derived by combining the total number of Research and Development firms (NAICS code 5417) from the 1997 Economic Census with the total number from the Census Bureau's 1997 non-employer survey.

²¹ The figures in this paragraph were derived by taking the total number of Professional, Scientific and technical firms (NAICS 54) firms included in 1997 the Economic Census and the Census Bureau's 1997 non-employer survey, and dividing this total by the total number of square land area miles in each state.

- **New Jersey's S&E firms are highly innovative compared to those in other states and the nation as a whole.**

New Jersey supports a culture of scientific innovation among its S&E firms. With over 36 patents awarded per 1,000 individuals in S&E occupations in 1999 (National Science Board, 2004), New Jersey far surpasses all of the comparison states chosen for this study, as well as the nation as a whole, in terms of its level of product innovation. Ohio, New Jersey's closest competitor in this area, was awarded only 30.1 patents per 1,000 S&E occupations, while Massachusetts earned only 25.7, Maryland was awarded 15.8, and Virginia achieved 9.3. Nationwide, an average of 26.7 patents were awarded per 1,000 persons in S&E occupations in 1999 (National Science Board, 2004).

Chart II-11. Number of Patents Awarded per 1,000 Individuals in S&E Occupations.



Source: National Science Board, *State Indicators Report, 2004*.

IV. Conclusions

Due to its ability to provide a highly skilled and concentrated scientific and technical workforce, New Jersey is an ideal location for the U.S. military's research and development bases, including Fort Monmouth, Picatinny Arsenal and Lakehurst Naval Air Station. Compared to other states examined in this study, New Jersey has a larger number of skilled S&E workers and firms per square mile, a higher concentration of high-tech firms as a share of all businesses and it issues a larger percentage of S&E degrees as a share of all degrees. New Jersey's S&E firms support a culture of scientific innovation and can offer a source for skilled contractors that can support base operations. In addition, the state's strong educational infrastructure is well poised to train current and potential base employees with the cutting edge technical skills they need to be successful.

When its proximity to the New York and Philadelphia regional labor markets is considered, New Jersey's workforce advantages are multiplied. Military bases in New Jersey have access to thousands of additional skilled S&E workers and firms in the highly populated areas surrounding the state, all of which are within commuting distance to at least one of the R&D bases under study. When all of these advantages are considered, New Jersey appears well situated to provide the diverse, skilled and accessible workforce needed to maintain and improve our country's premier state-of-the-art research and development military bases.

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Initial Analysis of the Workforce Available to Installations at Fort Monmouth, New Jersey and Aberdeen, Maryland with a Proposal for Additional Research

Last autumn, the Governor's Commission To Support and Enhance New Jersey's Military and Coast Guard Installations asked the John J. Heldrich Center for Workforce Development to prepare an analysis of the workforce available to support three military bases that focus on research and development. That report found that New Jersey has unique access to a highly concentrated and skilled science and engineering (S&E) workforce compared to other states and the nation as a whole. New Jersey also has a large base of scientific and technical firms that can act as contractors and/or supply skilled workers to military bases. Finally, New Jersey's educational infrastructure maintains a robust pipeline of future scientific and engineering workers.

In May 2005 the Defense Department released a list of military installations targeted for closure, consolidation or realignment. The Department's recommendation is to close Fort Monmouth, one of the research and development bases in New Jersey, and to consolidate similar research and development operations at an installation in Aberdeen, Maryland. In light of that recommendation, the Commission is now interested in a comparative analysis of the workforce available to Fort Monmouth and Aberdeen.

The Heldrich Center has conducted an initial analysis of the workforce available to the two sites, based on several indicators included in the original report. Our initial analysis is found below. In addition, we have proposed several areas for further investigation and a budget for the completed work and additional work.

Initial Findings on the Workforce Available to Fort Monmouth and Aberdeen

Preliminary data analysis demonstrates that the area surrounding Fort Monmouth in New Jersey has a clear advantage over the area surrounding the base in Aberdeen Maryland with regard to workforce quality.

- **The population residing near Fort Monmouth has higher educational attainment rates than the population residing near the base in Aberdeen, Maryland.**

A significantly larger percentage of the population over 25 years of age in Monmouth and Ocean county, New Jersey have earned a Bachelor's degree or higher (27%) than the same population in Harford and Cecil counties in Maryland (20%). When additional

counties surrounding the respective bases are considered¹, the pattern remains similar, with nearly 30% of the population 25 years or over having earned a Bachelor's degree or higher in the five county area surrounding Fort Monmouth, compared to less than 24% in the five county area surrounding the base in Aberdeen, Maryland. Table 1 provides a more detailed look at the differences in education attainment between the two areas.

Table 1. Educational Attainment for Population 25 or Over (2000)

	2 County Comparison		5 County Comparison	
	NEW JERSEY Monmouth and Ocean Counties	MARYLAND Harford and Cecil Counties	NEW JERSEY Surrounding 5 County Area*	MARYLAND Surrounding 5 County Area**
Percent of high school graduates or higher	85.5%	80.8%	84.9%	82.0%
Percent with a BA or higher	27.1%	20.4%	29.9%	23.6%
Percent with a graduate or professional degree	9.5%	7.6%	11.2%	9.1%

* Five county area in New Jersey includes Monmouth, Ocean, Mercer, Middlesex and Burlington counties.

** Five County Area in Maryland includes Harford, Cecil, Baltimore, Carroll and Kent

Source: *United States Census, 2000*

- **The area surrounding Fort Monmouth has a higher concentration of scientists and technical workers than does the area surrounding the base in Aberdeen, Maryland.**

Harford and Cecil counties in Maryland contain a scant 11.4 self-declared professional, scientific and technical industry workers per square mile compared to 34.4 such workers per square mile in Monmouth and Ocean counties in New Jersey. When the larger five county area surrounding the two bases is considered, this gap widens. Fewer than 20 professional, scientific and technical industry workers reside in the five counties closest to the base in Maryland. However, the closest five counties to Fort Monmouth contain more than double this number, or nearly 43 such workers per square mile. With regard to particular occupations, Monmouth and Ocean counties contain *more than three times* the number of computer and mathematical occupation workers per square mile (15.8) that Harford and Cecil counties have (5). Table 2 offers a more detailed analysis of the stark differences in the concentration of skilled workers in the areas surrounding the two bases.

¹ The five county area surrounding the base at Fort Monmouth, New Jersey includes Monmouth, Ocean, Mercer, Middlesex and Burlington counties. The five county area closest to the base in Maryland includes Harford, Cecil, Baltimore, Carroll and Kent counties. These two five-county areas comprise similar land areas. The five county area in New Jersey comprises 2,448 square miles, while the five county area in Maryland comprises 2,116 square miles.

Table 2. Number of Self-declared Scientific and Technical Workers Per Square Mile (2000)

	2 County Comparison		5 County Comparison	
	NEW JERSEY Monmouth and Ocean Counties	MARYLAND Harford and Cecil Counties	NEW JERSEY Surrounding 5 County Area*	MARYLAND Surrounding 5 County Area**
Number of Professional, Scientific and Technical Workers per square mile	34.4	11.6	42.8	19.8
Number of Computer and Mathematical occupation workers per square mile	15.8	5.0	23.5	9.5
Number of Architecture and Engineering occupation workers per square mile	9.9	5.7	11.4	7.0
Number of Life and Physical Science occupation workers per square mile	3.3	2.5	7.1	3.7

* Five county area in New Jersey includes Monmouth, Ocean, Mercer, Middlesex and Burlington counties.

** Five County Area in Maryland includes Harford, Cecil, Baltimore, Carroll and Kent

Source: United States Census, 2000

These statistics show that the base in Fort Monmouth, New Jersey clearly has access to a larger and more educated pool of skilled workers than does the base in Aberdeen, Maryland. When this fact is combined with the recent finding of the Fort Monmouth leadership that fewer than 15% of current civilian workers at the base are willing to move to Maryland, it becomes clear that the base in Maryland would have a much more difficult time locating the highly skilled and experienced workers. Such skilled workers are the backbone of a sophisticated military communications base. Without them, the quality and efficiency of operations at such a base are likely to be severely compromised.

Proposal for Additional Research

The Heldrich Center proposes to conduct additional research to understand how the workforce quality differs between the area surrounding the base at Fort Monmouth and a similar area surrounding the base in Aberdeen. As a next step, we propose to refine the choice of counties (in both states) to be used as the basis of comparison and finalize the initial observations included in this document. In addition, we will conduct additional research using Census data on the concentration of technical, computer and scientific related firms that could potentially provide skilled contractors or other types of support to the bases in New Jersey and Maryland. The concentration of firms is another indicator used in the original report the Commission requested.

Timeframe and Deliverables

The Heldrich Center will deliver a draft of the final report by Wednesday, June 22. A fully formatted, final full report will be delivered 7 business days following the receipt of comments from the Commission.

Project Budget

We request a total of \$1,500 to cover staff time in preparing the initial findings included in this document. If the Commission wishes to support the additional research (further refinement and finalization of the initial findings plus additional research on the concentration of firms in the two communities), we request an additional \$2,000. The total for the project (including the completed work and the additional work) would be \$3,500.



JOHN J. HELDRICH CENTER FOR
WORKFORCE DEVELOPMENT

**Fort Monmouth's Unique Access
to a Highly Skilled Workforce is
Critical to the Success of
Army Communications R&D**

Findings from an Analysis of the Proposed Move of
Army Field Communications (C4ISR) from
Fort Monmouth, NJ to
Aberdeen Proving Grounds, MD

Report prepared for the Governor's Commission to
Support and Enhance New Jersey's
Military and Coast Guard Installations

June 2005

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The preparation of this report in a compressed time frame required contributions from many individuals and state agencies. Pat Brannigan with the New Jersey Office of the Governor was instrumental in coordinating the flow of information from various agencies and providing input on the report. Admiral Paul Gaffney and the Governor's Commission to Support and Enhance New Jersey's Military and Coast Guard Installations also provided invaluable assistance. The following state agencies provided important data and evidence that was incorporated within the report and appendices:

- New Jersey Department of Labor and Workforce Development
- New Jersey Department of Education
- New Jersey Commerce, Economic Growth, and Tourism Commission
- New Jersey Commission on Higher Education
- New Jersey State Employment and Training Commission

In particular, the Heldrich Center would like to thank the following individuals at these agencies for their significant contributions: David Crane and Bill Saley from the New Jersey Department of Labor and Workforce Development provided critical assistance with accessing and preparing United States Census and other data; John Ehret and Dung Nuygen of the New Jersey Commerce, Economic Growth, and Tourism Commission also provided needed assistance in a variety of areas. Henry Plotkin and Diane Zompa of the New Jersey State Employment and Training Commission, as well as Jeanne Oswald and Kris Krishnan of the New Jersey Commission on Higher Education; Janet Share-Zatz of the New Jersey Department of Labor and Workforce Development; Joe Grossi of the New Jersey Commerce, Economic Growth, and Tourism Commission; Lori Thompson of the New Jersey Department of Education; and Michael Breton of Rutgers, The State University of New Jersey all provided important contributions to this effort.

Access to a Highly Skilled Workforce is Critical to Successful Army Communications R&D

EXECUTIVE SUMMARY

I. INTRODUCTION AND SUMMARY

Without Fort Monmouth's unique access to skilled workers, it would not be the powerhouse of technological innovation in Army field communications that it has become. The Fort performs much of the U.S. Army's Command and Control Communications, Computers, Intelligence, Sensors, and Reconnaissance (C4ISR) technology research and development. Its location in a densely populated area with highly educated and highly skilled scientific workers and contractors has allowed the base to attract "the best and the brightest" to its civilian workforce. Maintaining this access is vital to preserving and improving the U.S. military's high-tech communications research and development operations, especially as many military employees approach retirement age.

Compared to Aberdeen Proving Grounds (APG), where Pentagon officials have proposed to move C4ISR operations, the Fort Monmouth area has the following key advantages:¹

- It is home to more than **3 times** the number of highly educated persons and **up to 5 times** as many skilled workers in some specialized categories as the APG area.
- It offers much better access to skilled contractors and specialized equipment through a large number of specialized firms. Compared to the APG area, the counties closest to Fort Monmouth contain more than **6.5 times** the number of telecommunications firms and more than **19 times** the number of

professional, scientific, and technical industry firms, including nearly **15 times** the number of computer systems design firms.

Moving C4ISR operations to Aberdeen, Maryland **is likely to harm C4ISR operations** as a result of limited access to skilled workers and contractors because:

- The Department of Defense (DoD) estimates of the number of workers willing to move may be grossly inflated. DoD calculations, which estimate that 75-80% of civilian workers will move, are based on flawed calculations that are standardized for all bases included in the Base Realignment and Closure (BRAC) process, regardless of their function or location. Experts estimate that the actual percentage for the Fort Monmouth workforce willing to relocate could be 25% or fewer.
- As contractors compose nearly 40% of C4ISR workers at Fort Monmouth, DoD may be seriously underestimating the total number of skilled workers needed to implement these activities by not counting contractors in its calculations.
- At the same time, DoD estimates of the number of people who will retire may be much lower than many experts predict.
- Even if the number of current workers and contractors lost through a move is relatively low, the potential loss of institutional knowledge from even a few highly skilled, longtime workers could negatively affect C4ISR operations for years to come.

¹ For additional information on workforce and demographics, including analyses at various geographic levels, see Appendix A.

Due primarily to the reasons stated above, the costs to re-establish existing levels of C4ISR productivity at APG, in terms of both time and dollars, are likely to be much higher than DoD projected. In order to fill a large number of the nearly 4,000 skilled job openings that will be created by moving C4ISR operations to APG, the DoD will need to invest significantly in recruiting, hiring, and retaining new skilled workers from distant areas. In addition, training new workers in advanced technical skills, and obtaining the security clearances and acquisition certifications that are required for many workers, is likely to take anywhere from many months to many years. Finally, DoD estimates of other costs, such as utilities costs and the cost to move laboratory equipment, may not be accurate.

Even if Maryland builds additional roads, offers more training, and provides other benefits, it will take decades of continuous development for the Aberdeen area to offer similar levels of access to skilled workers and contractor firms, or to offer workers the amenities that are key to attracting and preserving the well-educated and highly specialized workforce that C4ISR operations require. As Aberdeen works to “catch up” in these areas, both America’s troops, who depend on the high efficiency operations at Fort Monmouth to equip them with needed technology, and America itself, will suffer the consequences.

In addition to the built-in workforce advantages that New Jersey offers for supporting effective C4ISR operations, the state is offering a variety of incentives to lower the current cost to DoD for operating the Fort Monmouth base, including:

- The development of an array of higher education and workforce development programs targeted to the unique skill needs of Fort Monmouth.
- An aggressive customized training and consulting program aimed at lowering the cost to Fort Monmouth of doing business with local contractors. The program would provide training to qualified base contractors and their employees, and provide firms with technical assistance on how to improve processes and lower the cost of doing business.

- Transportation improvements in areas surrounding Fort Monmouth to ensure continued access to the base.

For a full listing of incentives offered by New Jersey that are specifically designed to support Fort Monmouth, see Appendix B.

New Jersey also offers a robust array of educational programs, including unique educational partnerships with the base, that help to create a strong pipeline preparing skilled workers for jobs at Fort Monmouth. In addition, a variety of existing tax, utility, and other incentives can help to limit costs to the base either directly, or indirectly by reducing costs for firms that supply Fort Monmouth.

At a time when C4ISR technology is needed to fight the War on Terrorism and when scholars predict that other nations are making fast and steady gains in similar technology areas (Adams, 2004), the United States cannot afford to lose time, productivity, or efficiency by moving these sensitive operations to Aberdeen Proving Grounds.

II. BACKGROUND ON FORT MONMOUTH AND C4ISR ACTIVITIES

The skilled scientists and engineers that compose “Team C4ISR” perform R&D on high-tech tools that can locate enemy artillery and help prevent casualties from friendly fire; airborne radar imaging sensors that allow soldiers to track a variety of targets, including moving targets; electronic jamming devices that prevent roadside bombs from detonating; and a host of other tools that are needed on the battlefield. These tools, and the workforce that develops them, are critical to keeping soldiers safe and in helping America win the War on Terrorism.

While C4ISR activities form the core of operations at Fort Monmouth, the Fort also hosts other important military units and facilities that provide services to nearby military bases and the community at large. These units include

the 754th Explosive Ordnance Disposal, which provides emergency response to military and federal installations in the Northeast; the Defense Information Systems Agency; two organizations that foster cooperation among different military services; the United States Military Academy Preparatory School; and services such as a health clinic, a post office, and a commissary that serve several other military bases in New Jersey.

III. KEY FINDINGS

The largest proposed disruption to Fort Monmouth's operations will occur in the area of C4ISR operations. Therefore, this analysis focuses on the relative advantages of the Fort Monmouth area in comparison to the area surrounding Aberdeen Proving Grounds, where C4ISR operations are proposed to move. Important findings include:

1. Due to its unique access to a large number of highly skilled workers and contractors, Fort Monmouth is much better positioned than Aberdeen to handle C4ISR operations.

- Access to a highly skilled and well-educated civilian workforce and contractor base is critical to successful C4ISR operations.

Of the over 4,700 civilian C4ISR workers (4,212) and other tenant employees (521) at Fort Monmouth, 59% have at least a Bachelor's degree, while nearly 18% hold a graduate or professional degree. The largest portion of civilian workers at Fort Monmouth is composed of scientists and engineers (34%), nearly one-third of whom have a graduate degree (32%). In addition, almost one-quarter (23%) of civilian base employees are skilled logistics, equipment, or information technology specialists and nearly one-third (29%) are analysts. Finally, the base employs over 2,400 skilled contractors, most of whom are highly

educated scientists and engineers who are vital to C4ISR operations. Without these workers—both employees and contractors—the work of Team C4ISR will be severely compromised, ultimately affecting soldiers in the field.

In addition, as the points below demonstrate, the labor market area surrounding Fort Monmouth is much better equipped to fill the vital scientific and technical positions that maintaining and expanding C4ISR operations demands, especially when compared to the Aberdeen area. At Fort Monmouth, skilled workers are already in place, and the area provides abundant access to additional workers who may be needed to expand operations or to replace retiring workers.

Where possible, the remaining data in this section are derived from a 20-mile radius around each base,² as this best represents the roughly 30-40 minute commuting distance most residents in both areas are likely to travel to work according to the United States Census Bureau. Where 20-mile radius data are not available, researchers used data for the two-county area cited in DoD calculations, which represents where most current base employees live. Appendix A also includes analyses of all relevant data at the two-county level, as well as a wider area that includes counties from which at least 1% of the workforce in the target county commutes. However, the major trends remain consistent with those identified below even when wider labor market areas are considered.

- The Fort Monmouth area is home to more than 3 times the number of adults who have a four-year college degree or higher as the APG area.

As shown in Figure 1 and Map 1, nearly 191,000 adults aged 25 or older in the 20-mile area surrounding Fort Monmouth have at least a Bachelor's degree, compared to fewer than 61,000 in the 20-mile area surrounding APG. Similarly, nearly 68,000 people over 25 in the Fort Monmouth area have a graduate or professional degree, compared to only 21,000 in the APG region.

² The New Jersey Department of Labor and Workforce Development prepared the 20-mile radius analysis using current U.S. Decennial Census data.

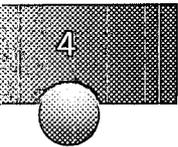
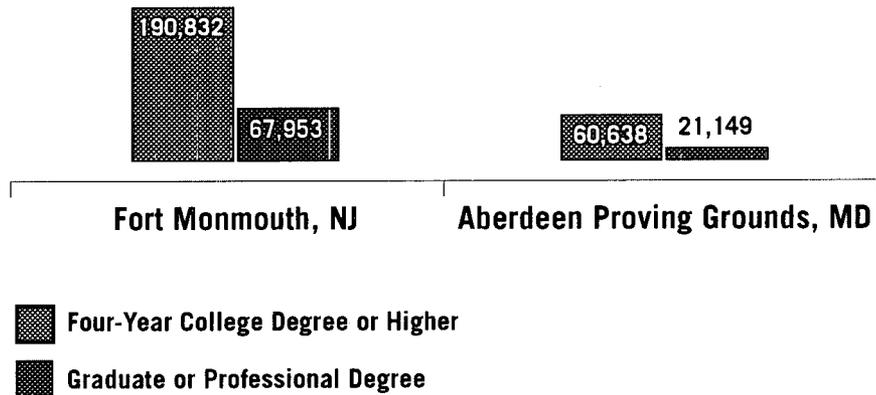


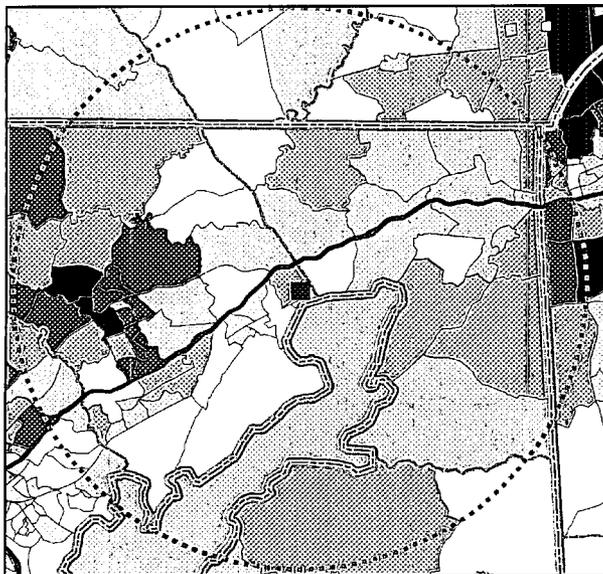
Figure 1. Number of Individuals Aged 25 or Older with a Four-Year Degree or Higher within a 20-mile Radius of the Bases



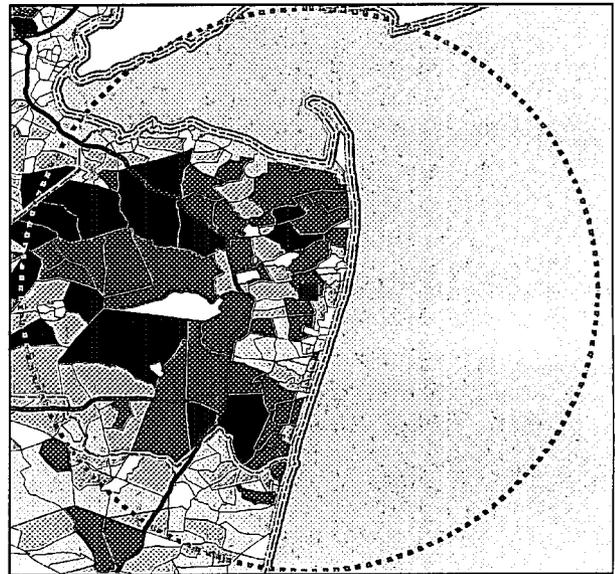
Source: United States Census Bureau, 2000 Decennial Census

Map 1. Number of Individuals Aged 25 or Older with a Four-Year Degree or Higher within a 20-mile Radius of the Bases

Aberdeen Proving Grounds



Fort Monmouth



Source: United States Census Bureau, 2000 Decennial Census

Population 25 Years and Over with Bachelors Degrees or Above

- less than 350
- 351 - 700
- 701 - 1200
- 1201 - 2000
- greater than 2000
- 20mi Radius
- Major Highways
- State Boundary
- County Boundary

1 inch equals 13.5 miles

- The Fort Monmouth area has up to **5 times** more skilled workers available in some specialized categories than the APG region.

The 20-mile area around Fort Monmouth has **more than 3 times** the number of professional, scientific, and technical industry workers than the same area around the base in Aberdeen (over 35,499 near Fort Monmouth vs. 11,129 near APG). In addition, the Fort Monmouth area has **more than 5 times** the number of information industry³ workers as the APG area (21,055 near Fort Monmouth vs. 4,139

near Aberdeen). Within these and other industries, the Fort Monmouth area has **more than 3.5 times** the number of computer and mathematical workers (17,531 near Fort Monmouth vs. 4,804 near Aberdeen), and **nearly twice** the number of architecture and engineering workers (9,611 near Fort Monmouth vs. 5,373 near Aberdeen). (See Figure 2 and Maps 2 and 3.)

As an indicator of the health of the recent science and engineering economy, Local Employment Dynamics data from the United States Census

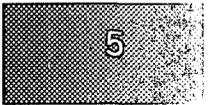
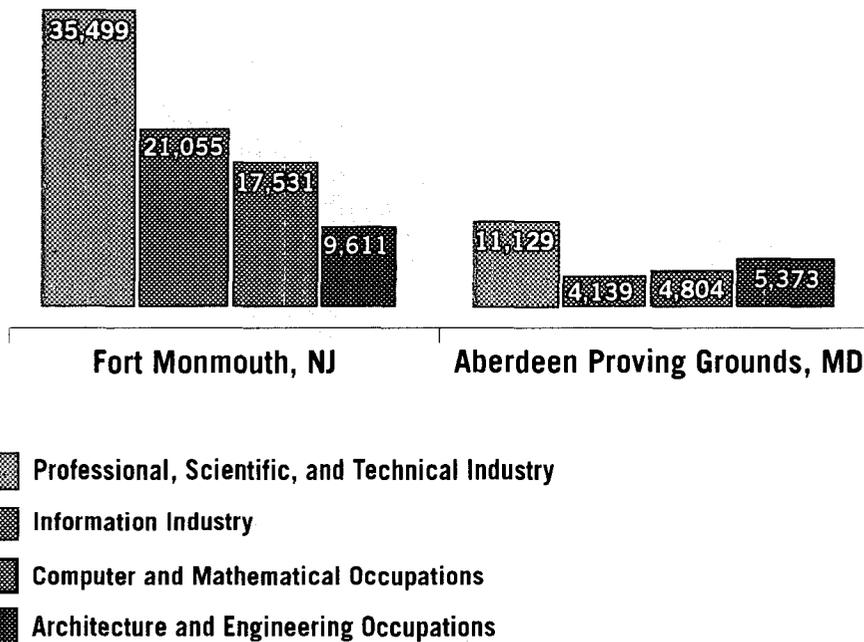


Figure 2. Employed Civilian Population (16 Years and Over) in Specialized Industries and Occupations within a 20-mile Radius of the Bases

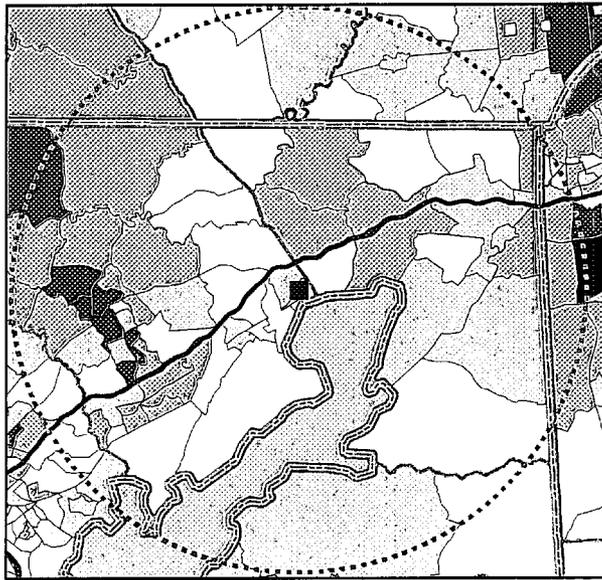


Source: United States Census Bureau, 2000 Decennial Census

³The information industry composes the telecommunications sector, as well as other types of information and communication-related sectors. However, specific data on workers in the telecommunications sector were not available from the United States Census Bureau.

Map 2. Employed Civilian Population (16 Years and Over) in Specialized Industries within a 20-mile Radius of the Bases

Aberdeen Proving Grounds



Fort Monmouth



Source: United States Census Bureau, 2000 Decennial Census

**Employed Civilian Population
16 Years and Over**

Population in Specialized Industries⁴

□ less than 175

□ 175 - 300

▒ 301 - 500

■ 501 - 750

■ greater than 750

⋯ 20mi Radius

— Major Highways

▭ State Boundary

▭ County Boundary

1 inch equals 13.5 miles

Bureau indicate that there were more than **20 times** the number of workers hired in 2003-2004 in the telecommunications sector and **more than twice** as many new hires in the same period in other relevant science and engineering sectors in Monmouth and Ocean Counties in New Jersey than in Harford and Cecil Counties in Maryland. In the telecommunications sector, Monmouth and Ocean Counties hired nearly 400 new workers, compared to fewer than 20 hires in this sector in Harford and Cecil Counties. Employers in Monmouth and Ocean Counties hired over 1,100 employees in 2004 in the Computer Systems Design and Related Services, Architectural, Engineering, and Related Services and Scientific Research and Development

Services sectors combined, compared to just over 500 new hires in these sectors in Harford and Cecil Counties (United States Census Bureau, 2005).

- **Fort Monmouth has much better access to the specialized firms that provide needed contractors, employees, and goods for C4ISR operations, including access to more than 19 times the number of professional, scientific, and technical industry firms than the APG area.**

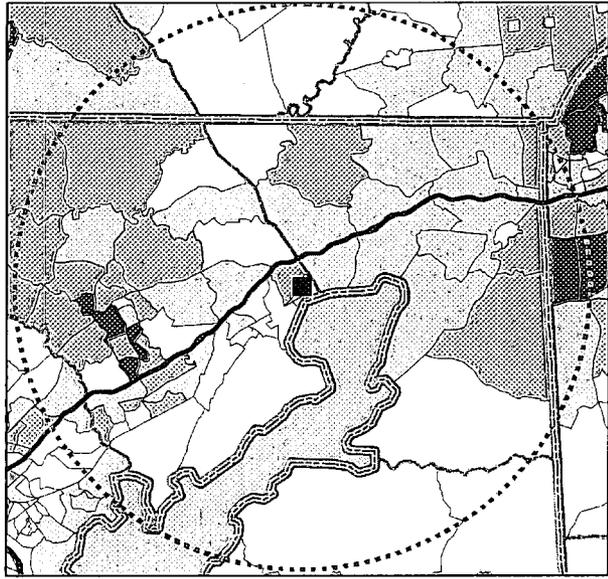
The two-county area⁵ surrounding Fort Monmouth contains significantly more specialized scientific, technical, and communications-oriented firms that can provide a vital source for base employees,

⁴ Specialized industries include the professional, scientific, and technical industry and the Information industry.

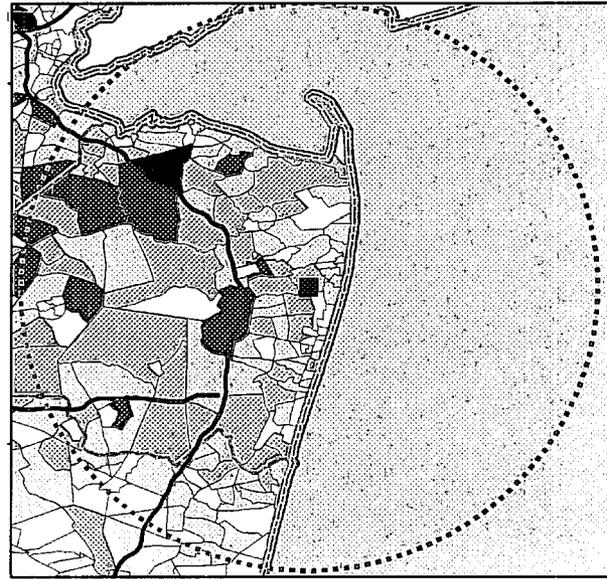
⁵ Information on firms was not available within a 20-mile radius of the two bases as the Maryland Department of Labor did not release the relevant data in time for the printing of this report.

Map 3. ^{DEN-11658} Employed Civilian Population (16 Years and Over) in Specialized Occupations within a 20-mile Radius of the Bases

Aberdeen Proving Grounds



Fort Monmouth



Source: United States Census Bureau, 2000 Decennial Census

**Employed Civilian Population
16 Years and Over**

Population in Specialized Occupations⁶

- less than 75
- 75 - 150
- 151 - 300
- 301 - 600
- greater than 600
- 20mi Radius
- Major Highways
- State Boundary
- County Boundary

1 inch equals 13.5 miles

contractors, and consultants. These firms can also supply needed goods and equipment to the base in a quick timeframe. The increased competition spurred by the high concentration of firms in a small area may also serve to lower the costs of goods provided to the base.

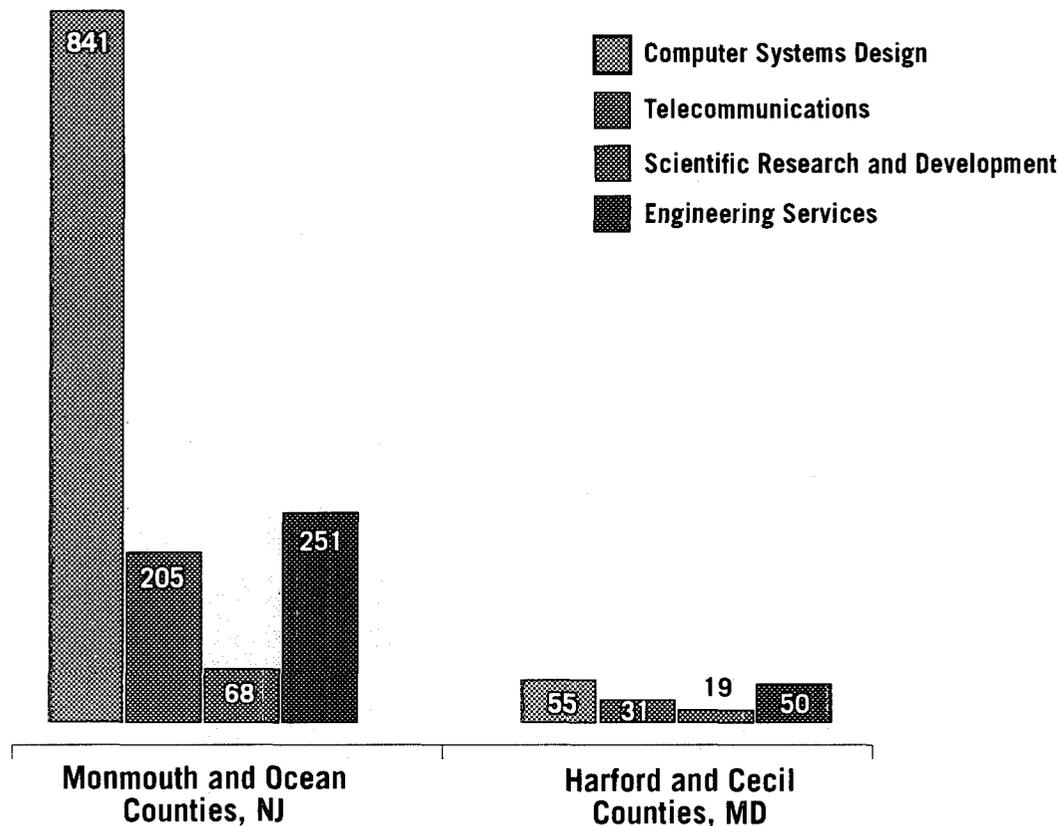
Monmouth and Ocean Counties have nearly 4,000 professional, scientific, and technical industry firms compared to under 200 in Harford and Cecil Counties, or only 5% of the number of firms in Monmouth and Ocean Counties.

Within this larger industry category, Monmouth and Ocean Counties have **over 15 times** the total number of computer systems design firms (841 vs. 55), **5 times** the total number of engineering services companies (251 vs. 50), and **over 3.5 times** the total number of scientific research and development firms (68 vs. 19) than Harford and Cecil Counties.⁷ When relevant firms in the information industry are considered, Monmouth and Ocean Counties offer access to **over 6.5 times** the total number of telecommunications firms as Harford and Cecil Counties (205 vs. 31). (See Figure 3.)

⁶ Specialized industries include computer and mathematical occupations, and architecture and engineering occupations.

⁷ Because Monmouth and Ocean Counties cover a larger land area than Harford and Cecil Counties (1,108 square miles vs. 788 square miles), some might argue that New Jersey simply has more firms because the area has more total available space. As a result, the Heldrich Center performed an analysis of the density of firms per square mile in the two areas. The results can be found in Appendix A. However, it is clear from this analysis that the trends between the two areas remain similar.

Figure 3. Total Number of Specialized Firms in Counties Surrounding Bases



Source: United States Census Bureau, 2002 Economic Census

2. Successful C4ISR operations are likely to be harmed by moving to APG due to a lack of access to skilled workers and contractors, as evidenced by the following:

- The Department of Defense grossly overestimated the number of workers willing to move from Fort Monmouth to APG.

If Fort Monmouth closes, nearly 4,000 new civilian jobs, many of them for skilled scientists and engineers, will need to be filled to staff C4ISR operations in Aberdeen, MD (United States Department of Defense, 2004). However, a much smaller percentage of the civilian workforce at Fort Monmouth is likely to move to APG than DoD has projected, making it much more likely that

operations will be negatively affected by the move to Aberdeen.

DoD (2004) has estimated that 75% to 80% of civilian workers will be willing to move to APG. However, this estimate is based on faulty formulas that make standard assumptions about how many workers will move and retire, regardless of the specifics of each base (Marshall, 2004). Such a broad-brush approach overlooks key variations that drastically affect the willingness of base workers to move to a new location. In the case of Fort Monmouth, the DoD's estimates are grossly flawed.

Some experts estimate that only about 25% of scientists and engineers moved during the previous BRAC round.

A study authored by a Naval laboratory expert and cited by the National Defense University estimated that, on average, only about 25% of scientists and engineers moved to a new location following the last BRAC process (Marshall, 2000). Among those who did move, many did not remain with the military, but moved into private sector jobs. One study of a site that attempted to move over 1,600 civilians from a Naval base in Pennsylvania to one in Maryland found that only 38% of those offered a transfer chose to move (Government Accounting Office, 1998).

Other research suggests that the percentage willing to move may be even lower.

Research demonstrates that highly skilled technical workers are less likely to move from suburban metropolitan areas to more rural settings than other types of workers (Herzog and Schlottman, 1991; Herzog, Schlottman, and Johnson, 1986; Malecki and Bradbury, 1992). Workers who have more job alternatives available in their present locations are also less likely to move (Arnold and Feldman, 1995), as are those who do not find the new locations to be attractive from a services and infrastructure perspective (Noe and Barber, 1993). In addition, about 35% of private sector employees who move with their companies leave the firms within three years (Oltman and Marinack, 1998).

One study of a government defense agency that moved from a northeastern metropolitan area to a rural area south of Washington, D.C. found that older workers—even those with long tenure at the agency—were less likely to move and many were willing to take early retirement or give up retirement benefits rather than move to a new location (Feldman and Bolino, 1998). The same study also found that workers who chose not to move cited reasons such as their attachments to their current locations and greater job availability in their present areas.

Other studies on corporate relocation have also found that older workers who have strong ties to their communities (Dunn, 1979), as well as married workers and those with children, are less likely to relocate with a company (Brett and Reilly, 1988; Munton, 1990). These data are significant

given that the average age of civilian workers at Fort Monmouth is 47 and the average tenure is over 19 years. While the number of base workers with children is unknown, it is certain that many have children, and even grandchildren, in the Fort Monmouth area that would keep them attached to their communities.

Fewer job opportunities in the APG area for employed spouses may further reduce base employees' willingness to move.

There will be an estimated total of 177,000 job openings in Monmouth and Ocean Counties alone over the 2002-2012 period (New Jersey Department of Labor and Workforce Development, 2004). This is nearly **4 times** the Maryland Department of Labor's (2004) estimate of approximately 48,000 total job openings expected over the same period in Harford and Cecil Counties. In addition, average annualized salaries are nearly \$3,000 higher in Monmouth and Ocean Counties compared to Harford and Cecil Counties (\$38,792 in Monmouth and Ocean vs. \$35,900 in Harford and Cecil).

Given the importance of job opportunities in workers' willingness to relocate, many Fort Monmouth workers whose spouses have lucrative jobs in the area and who feel that their job prospects would be more limited in the APG area, may be particularly unwilling to move. In fact, researchers found that a spouse's career has a large impact on a worker's willingness to relocate (Brett and Reilly, 1988).

These workers would stand to lose not only a portion of their own salaries, which would be lowered to adjust for a lower military pay scale in Maryland (United States Office of Personnel Management, 2005), but they would also lose a portion of their spouses' incomes as they look for new jobs in an area with lower salaries and fewer job prospects. In many cases, the salaries of base workers' spouses may be higher than their own, so any cut resulting from a move could drastically affect base workers' household income and their standard of living. Even if workers would otherwise consider a move, the negative impact on their spouses and overall income could tip the scales toward a decision not to relocate.

DGN-11658
The abundance of high-quality education and transportation in the Fort Monmouth area make it a more attractive place to live than the APG area.

The primary and secondary educational programs offered in Monmouth County showed significantly higher test scores, high school graduation rates, and curriculum standards than those in Harford County. Similar patterns were observed statewide. Additionally, many high schools in the Fort Monmouth area offer competitive career academies and other special programs. New Jersey's higher education institutions are also competitive with Maryland's and families near Fort Monmouth now have close-range access to degree programs at the state's premier academic institutions through the newly formed New Jersey Coastal Communiversity, an alliance of eight leading New Jersey colleges and universities, including Rutgers, The State University of New Jersey, the New Jersey Institute of Technology, and others.

Since many highly educated parents choose where to live based on school quality, these data are important to understanding the willingness of the Fort Monmouth workforce to move to APG. Additional data on how New Jersey grade schools and high schools compare to Maryland's schools can be found in Appendix C.

New Jersey also offers its citizens access to more airports than Maryland, as well as better road, bus, and rail access that enable base workers and their families to travel effectively and easily for work, school, and pleasure, as well as help to reduce traffic, congestion, and pollution. A recent article in the *Baltimore Sun* highlighted the lack of adequate mass transit available in the Aberdeen area, as well as how an influx of new workers will add to pollution levels and already clogged roads and trains (Wheeler, 2005).

Monmouth and Ocean Counties offer convenient access to the Garden State Parkway, which extends from the resort community of Cape May in the southern part of the state to the New York State Thruway in the north, and provides access to major roadways, including Interstate 95 (the New Jersey Turnpike), and Interstates 78 and 80. While base workers residing near APG have similar north-

south access to metropolitan areas like Baltimore and Washington, D.C., Maryland does not provide as much access to major roads and transportation infrastructure for people who live west and east of the base. By contrast, Monmouth County contains several major highways, such as Route 18 and Interstate 195, that offer quick access between Fort Monmouth and western and northwestern parts of the state. For more information on how New Jersey's transportation infrastructure compares to Maryland's, see Appendix D.

- **Contractors compose nearly 40% of C4ISR workers at Fort Monmouth, yet DoD's calculations do not take contractors into account. Therefore, DoD may be seriously underestimating the total number of skilled workers needed to adequately staff C4ISR operations.**

The DoD does not count contractors in its BRAC calculations because the number of these workers is difficult to estimate systematically for all bases (Marshall, 2004). However, Fort Monmouth employs more than 2,400 on-base contractors, many of whom are skilled scientists and engineers who perform vital C4ISR research and development (New Jersey Economics, 2005). Since this number amounts to approximately 40% of the over 6,600 C4ISR workers at Fort Monmouth (4,200 civilian employees plus 2,400 on-base contractors), and because only civilian **employees** are counted when calculating the number of people needed to staff base operations, DoD may be seriously underestimating the total number of people required to carry out C4ISR operations effectively. Additionally, many other local contractors provide goods and services to the base that are critical to C4ISR activities.

While the military plans to maintain current contracts with many contractor firms in New Jersey, many of these firms may be unwilling or unable to move significant portions of their businesses and employees to Aberdeen (Diamond and Willis, 2005). Among those that are willing to move, many will lose valuable skilled employees who have worked at Fort Monmouth for years, but who are unwilling to uproot their families and move to APG.

■ **Many more workers than DoD estimated may retire within the next 5 to 10 years.**

In addition to recruiting workers to replace individuals who remain in New Jersey, APG will likely need to recruit and hire a large number of new workers to replace retirees in the near to mid-term future. DoD estimates that only 6% of workers will retire rather than move to a receiving installation (United States Department of Defense, 2004). However, the Government Accounting Office (2001) estimates that about one-third of the current civilian defense workforce will be eligible to retire by 2006. At the same time, a report prepared for DoD predicts that more than half of the civilian workforce would be eligible to retire by 2005 (Acquisition 2005 Task Force, 2000). With the average age of the civilian workforce at Fort Monmouth being 47 years, it is possible that a significant portion of the workforce that does choose to move to Maryland could retire within the next 5 to 10 years.

■ **The loss of even a few key employees who do not move to APG can have damaging effects on C4ISR operations due to the loss of important institutional knowledge and informal networks that spur innovation.**

Losing key employees disrupts the informal ties that spur employee creativity and drive organizational outcomes. One key finding from the research literature is that informal collaborative networks, which are built among workers over long periods of time, are absolutely key to producing innovative R&D solutions (Kreiner and Schultz, 1993), a key component of successful C4ISR operations. Other indispensable components of innovation in R&D organizations are institution-specific knowledge and skills, also known as “tacit knowledge”, which build up over years of experience and are slow to disseminate to new employees (Rhyne et al., 1997).

Given that older workers with more tenure are less likely to move during a relocation and that the average age of Fort Monmouth’s civilian employees is 47 and the mean tenure is over 19 years, DoD is likely to lose a relatively high number of employees who have large amounts of tacit knowledge and who are key to the informal networks that make innovative R&D work possible. However, even if

these numbers are low, the literature is clear that loss of even a few important employees can cause disastrous disruptions in R&D productivity and innovation.

3. DoD cost and time estimates to relocate C4ISR operations to APG are likely too low.

■ **Because the workforce and firms are less specialized and concentrated in Maryland, the time and cost of recruiting and training the nearly 4,000 C4ISR employees and 2,400 contractors that may be needed at the new base is likely to be higher than DoD expects.**

The Center for Technology and National Security Policy at the National Defense University has warned that DoD planning estimates do not accurately reflect the amount of time, effort, and cost that is needed to replace the highly skilled workers who staff the nation’s defense laboratories (Marshall, 2004). Although specific estimates are difficult to determine, it is certain that the costs of recruitment are likely to be substantial, especially for the highly skilled jobs performed by scientists and engineers.

Most human resource experts believe that the cost of replacing workers rises dramatically as the level and complexity of the job increase. Cost factors that need to be considered include direct expenditures, such as advertising job openings, processing applications, conducting interviews and background checks, and orienting and training new employees. Other costs include disruptions and delays in completing projects as well as increased workloads for remaining employees.

Recruitment is likely to be complicated by the APG area’s limited access to skilled workers and contractors, as well as the expected retirement crunch affecting the federal workforce. Researchers at the RAND Corporation have stated that the large number of expected retirements among civilian defense workers over the next 5 to 10 years, coupled with bureaucratic federal hiring practices, is likely to make it more difficult and costly to find and hire qualified workers in a short time span (Asch, 2003). If many fewer employees move than DoD

expects, or those retire, the agency's severance, unemployment, and retirement costs are also likely to increase dramatically.

The need for nearly all C4ISR workers to gain security clearances and other types of certifications will add not only cost, but also time, to recruitment and hiring efforts. According to the Government Accounting Office (2004), by 2003, it took DoD an average of 375 days to process security clearances, a figure that rose significantly between 2001 and 2003. Recent reports suggest that a continued backlog of investigations results in waits of one to two years for workers seeking clearances. Such delays increase costs to the federal government and the time needed to complete sensitive, national security-related projects. In addition, several sources have noted a crisis shortage of military acquisition workers, who currently make up a large percentage of Fort Monmouth's civilian workforce and who require special certifications before they can begin working (Cahlink, 2001; Farrell, 2002; Gill, 2001).

- **DoD may have overestimated savings on reduced utilities costs, as the gap in rates has narrowed recently.**

While utility costs are currently higher in New Jersey than in Maryland, DoD estimates of total savings in this area may be inflated. A recent report compiled by the New Jersey Commerce, Economic Growth, and Tourism Commission (2005) that analyzed utility rates found that, in 2004, New Jersey narrowed the gap in commercial utility rates to just over .5 cents per kilowatt hour (9.02 cents in Maryland vs. 9.60 cents in New Jersey). The same report found that, depending upon the type of product usage, New Jersey's 2004 rate in two out of the three gas utility product categories were considerably less than Maryland's. In addition, DoD estimates may no longer be valid given recent volatility in the energy market. Other indicators also demonstrate that the gap in utility costs between New Jersey and Maryland are narrowing. For a detailed comparison of utility costs in New Jersey and Maryland, see Appendix D.

- **However, DoD may have underestimated costs for communications networking, renovating facilities, and moving laboratory equipment and supplies.**

A Government Accounting Office (1998) study found that the costs for communications networking, renovating facilities, and moving laboratory equipment and supplies were at least \$100 million greater than expected in a relocation of Naval Air Development Center operations from Warminster, Pennsylvania. This increase in costs drove up the estimated payback period from 9 years to 33 years.

4. New Jersey offers a variety of incentives and education advantages that make continued operation of the Fort Monmouth base a better choice for DoD.

- **Incentives offered by New Jersey will help the base to lower costs, as well as benefit base contractors and thus drive down their costs.**

Building on its proud and successful history of meeting the workforce needs of Fort Monmouth, New Jersey proposes to take the following steps that will reduce the labor costs of the base and base contractors:

- To ensure that Fort Monmouth continues to have a skilled civilian workforce, the New Jersey State Employment and Training Commission will undertake a Demand-side Skill Assessment Project to determine and then respond to the critical and emerging R&D skills that civilian workers at the base need to be successful. The state's research staff and content experts, together with a consortium of New Jersey's colleges and universities and representatives from the state's businesses that are home to world-class R&D programs, would partner with Fort Monmouth's technical, management, and human resources staff to fully explore the R&D function and skill requirements of the base.

This collaborative partnership would assess and monitor continually the current and emerging knowledge and skill needs of Fort Monmouth, guide the development of customized training programs, and facilitate the modification and development of related college courses and program curricula to meet the workforce needs of R&D business functions statewide and in particular those of Fort Monmouth.

• In an effort to reduce costs for contractors and other businesses that currently support Fort Monmouth, the New Jersey Department of Labor and Workforce Development (NJLWD) will implement an aggressive skills training program to improve worker productivity and enhance the competitiveness of existing contractors. Working in conjunction with the local community college, NJLWD will perform a worker skills assessment to determine what additional training will result in lowering the costs of contractors doing defense-related business at the base.

Training for this incentive program will be provided by the local community college and the New Jersey Manufacturing Extension Program (NJMEP). In addition, NJMEP will provide consulting to all approved contractors, not just manufacturing businesses, to help them find ways to eliminate waste in their business processing. Such services frequently result in productivity increases, improved processing and delivery time, better cash flow, reduced costs, and higher employee morale at the targeted firms.

In addition, the New Jersey Department of Transportation and its county/municipal partners have committed over \$325 million to support transportation improvements in areas surrounding military installations throughout the state, including Fort Monmouth. Another \$600 million is planned for military host counties, including Monmouth County, in 2005 and 2006.

For a full listing and more detailed explanation of the specific incentives that New Jersey is offering to support Fort Monmouth and its contractors, see

Appendix B. In addition to these incentives, New Jersey offers an array of standard tax and other incentives that many base contractors can use to help reduce their costs, which may reduce costs for Fort Monmouth. For a full listing of these tax and business incentives, see Appendix E.

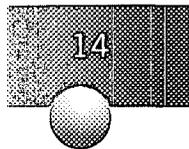
■ **New Jersey offers a robust educational pipeline to supply and support skilled workers at Fort Monmouth.**

From grade school through graduate education, New Jersey, and especially the institutions around Fort Monmouth, offer strong academic curricula, specialized programs, and unique partnerships with the base that serve to prepare new workers for the technical and scientific jobs at Fort Monmouth and support current base workers.

Grade schools and high schools near Fort Monmouth posted higher mathematics and language arts test scores for all grades tested, as well as higher high school graduation rates (88% in New Jersey vs. 82.6% in Maryland in 2000-2001). In addition, New Jersey schools cover a wider range of content than Maryland's schools, requiring students to show proficiency in nine core content areas compared to only four in Maryland. For more information on how New Jersey's elementary and secondary schools compare to Maryland's, see Appendix C.

New Jersey also has more public two-year colleges (19 vs. 16 in Maryland), as well as more non-degree institutions that offer postsecondary education (152 vs. 82) to support base employees and their families. Degree and certificate programs at colleges and universities such as Rutgers University, the New Jersey Institute of Technology, and the Stevens Institute of Technology offer a variety of special programs and research centers and many are accessible to residents in the Fort Monmouth area through the newly formed Coastal Community.

In addition, Monmouth University and Fort Monmouth collaborate on numerous programs, including science symposia for high school students.



Prestigious higher education institutions provide specialized resources that can support R&D at Fort Monmouth, as well as train new scientists and engineers.

Several of the state's most prestigious colleges and universities partner with Fort Monmouth to help foster a skilled workforce for the base and to provide vital R&D support. New Jersey is home to state-of-the-art research centers and specialized labs including the Princeton Institute for the Science and Technology of Materials (PRISM) and the Program in Integrative Information Computer and Application Sciences at Princeton University, the Center for Communications and Signal Processing Research at the New Jersey Institute of Technology, and the Center for Operations Research and the Logistics Initiative at Rutgers University. Many of these centers and labs are or have partnered with the military. For example, PRISM, a multidisciplinary research center at Princeton University in the general field of materials science through photonics, has provided Fort Monmouth with invaluable assistance in solving difficult technical issues. For additional information on the unique secondary and higher education programs that help to prepare future workers for Fort Monmouth and that support R&D work at the base, see Appendix C.

IV. CONCLUSIONS

Fort Monmouth offers the unique access to skilled workers and contractor firms that is needed to effectively carry out C4ISR operations. The 20-mile area surrounding Fort Monmouth is home to more

individuals with higher educational attainment than the comparable area surrounding APG. The Fort Monmouth area also boasts more professional, scientific, technical, information, computer, mathematics, architecture, and engineering workers and contractor firms than the APG region. Such resources allow Fort Monmouth to produce cutting-edge communications tools on demand as needed during a "hot" war, such as the War on Terrorism. Such access will also be instrumental to maintaining and enhancing C4ISR operations as new individuals replace retiring workers or the DoD needs to increase C4ISR capacity.

New Jersey's wealth of amenities; primary, secondary, and postsecondary educational opportunities; and mass transit options make the area a place for workers to build their lives and secure a prosperous future for themselves and their families. It also provides the best location for C4ISR operations to not only continue but to be nurtured and to evolve in response to the nation's ever-changing needs.

Clearly, the Department of Defense has overlooked key facts in its analysis regarding a move of C4ISR operations to Maryland. The DoD is likely to have a much more difficult time finding and replacing skilled workers than it expects, a fact that will have a significant effect on the cost and time to re-establish current levels of productivity.

America cannot afford such costs to its future security. America's citizens—the individuals who have helped build and sustain this nation's military strength, and the troops who risk their lives daily to protect the homeland—are best served by preserving the investment they have made in Fort Monmouth.

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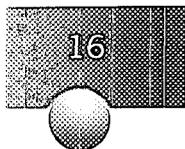
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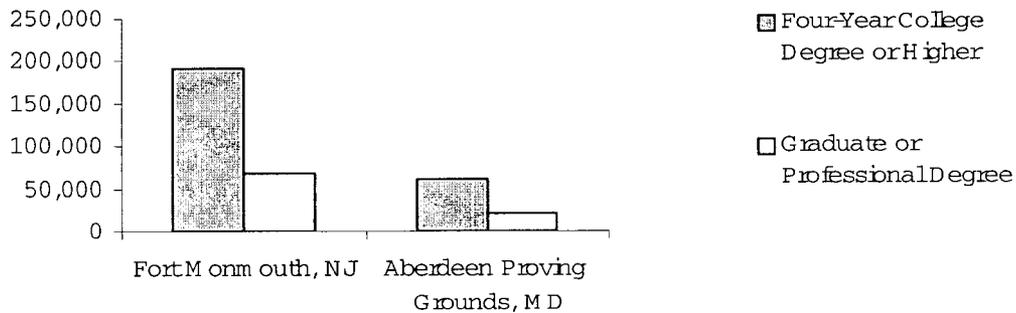
APPENDIX A. WORKFORCE AND DEMOGRAPHICS

Part I. 20-Mile Radius Comparison

Figures 1 and 2 compare the number of individuals with a college or advanced degree and the number of civilians employed in selected industries and occupations within a 20-mile radius of both Fort Monmouth and Aberdeen Proving Ground.

Figure 1. Number of Individuals Aged 25 or Older with a Four-Year Degree or Higher within a 20-mile Radius of the Bases

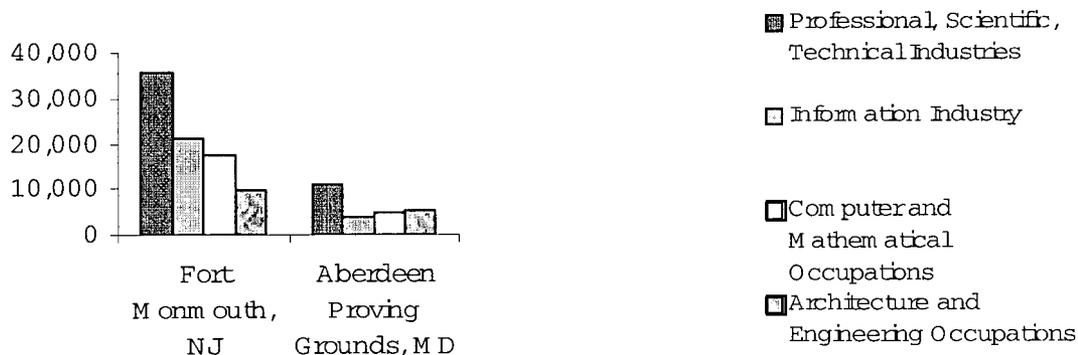
	Fort Monmouth, NJ	Aberdeen Proving Grounds, MD
Four-Year College Degree or Higher	190,832	60,638
Graduate or Professional Degree	67,953	21,149



Source: United States Census Bureau, 2000 Decennial Census

Figure 2. Employed Civilian Population (16 Years and Over) in Specialized Industries and Occupations within a 20-mile Radius of the Bases

	Fort Monmouth, NJ	Aberdeen Proving Grounds, MD
Professional, Scientific, Technical Industries	35,499	11,129
Information Industry	21,055	4,139
Computer and Mathematical Occupations	17,531	4,804
Architecture and Engineering Occupations	9,611	5,373



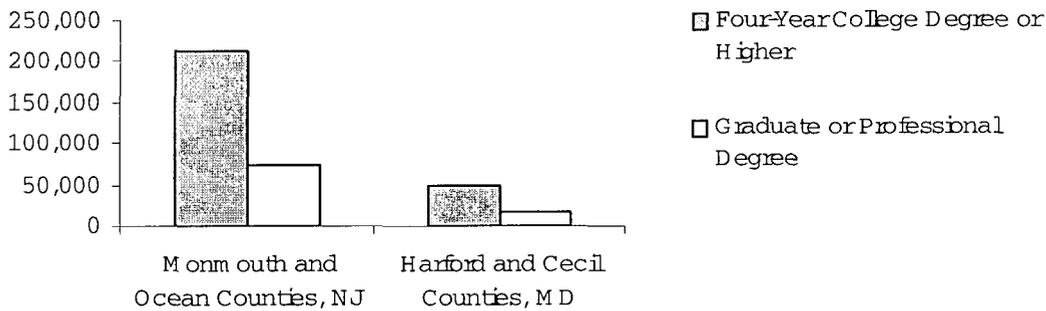
Source: United States Census Bureau, 2000 Decennial Census

Part II. County Comparison

Figures 1 and 2 compare the number of individuals with a college or advanced degree and the number of civilians employed in selected industries and occupations within the two counties surrounding Fort Monmouth and Aberdeen Proving Ground. Figures 3 and 4 expand the comparison to include the number and density of specialized and technical firms located in those same counties. Figure 5 compares the number of new hires in specialized industries in those same counties during 2003-2004.

Figure 1. Number of Individuals Aged 25 and Older with a Four-Year Degree in Counties Surrounding Bases

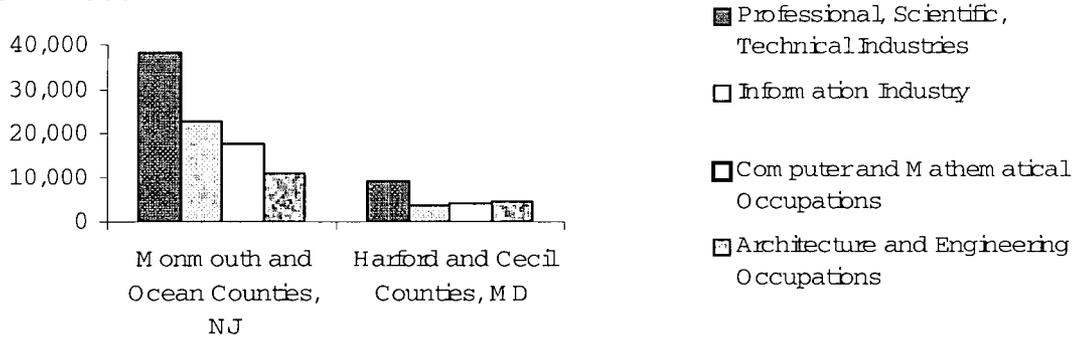
	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Four-Year College Degree or Higher	212,677	48,224
Graduate or Professional Degree	74,583	16,672



Source: United States Census Bureau, 2002 Economic Census

Figure 2. Employed Civilian Population (16 Years and Over) in Specialized Industries and Occupations in Counties Surrounding Bases

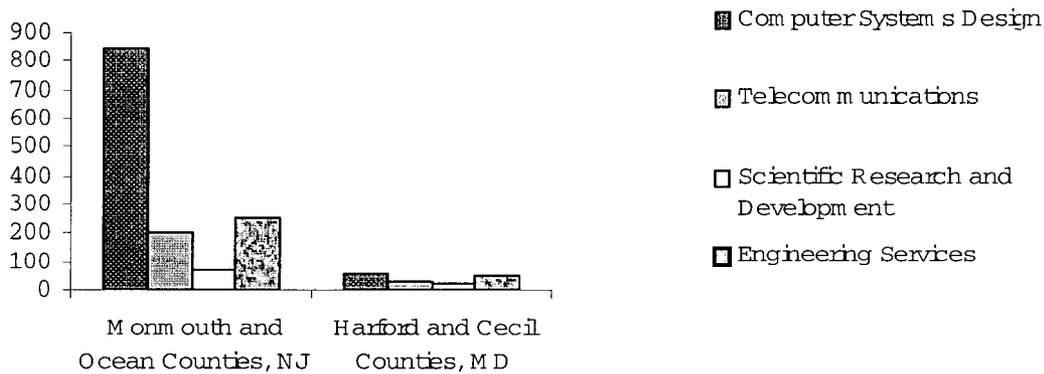
	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Professional, Scientific, Technical Industries	38,126	9,125
Information Industry	22,524	3,582
Computer and Mathematical Occupations	17,504	3,911
Architecture and Engineering Occupations	10,981	4,472



Source: United States Census Bureau, 2002 Economic Census

Figure 3. Total Number of Specialized Firms in Counties Surrounding Bases

	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Computer Systems Design	841	55
Telecommunications	205	31
Scientific Research and Development	68	19
Engineering Services	251	50

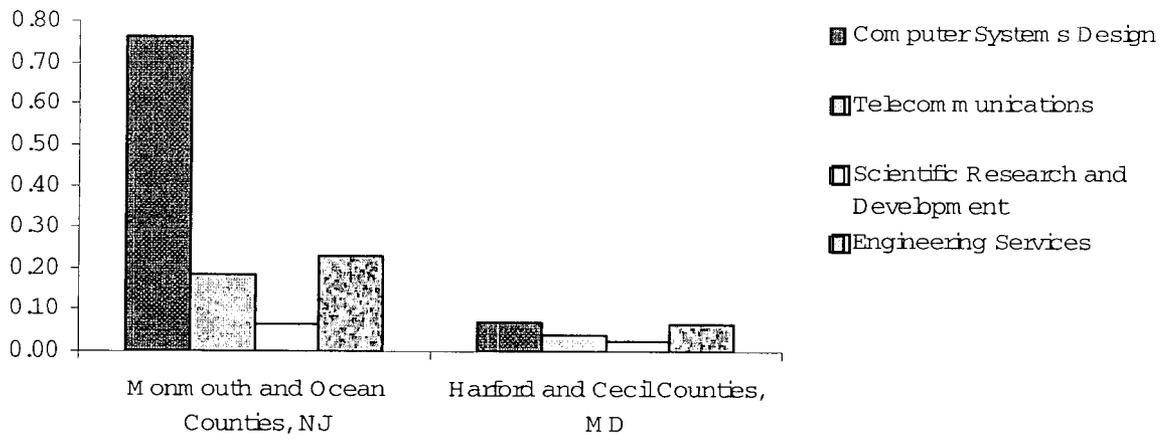


Source: United States Census Bureau, 2002 Economic Census

Figure 4. Density of Specialized Firms in Counties Surrounding Bases (per square mile)

	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Computer Systems Design	0.76	0.07
Telecommunications	0.19	0.04
Scientific Research and Development	0.06	0.02
Engineering Services	0.23	0.06

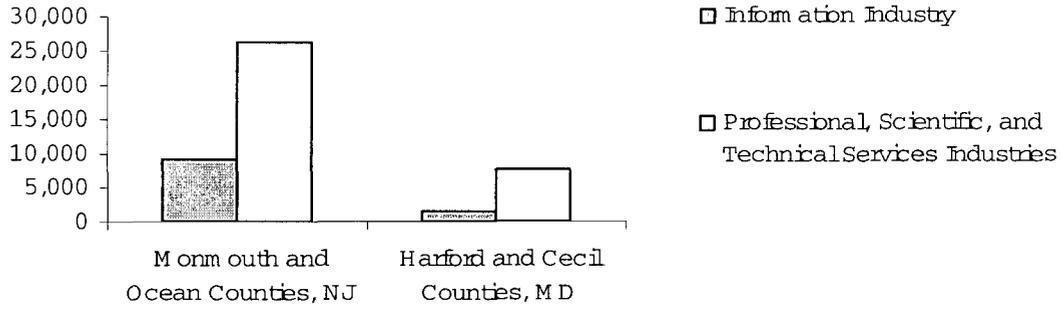
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Source: United States Census Bureau, 2002 Economic Census

Figure 5. Number of New Hires in Specialized Industries in the Counties Surrounding Bases, 2003-2004

	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Information Industry	9,185	1,330
Professional, Scientific, and Technical Services Industries	26,157	7,735



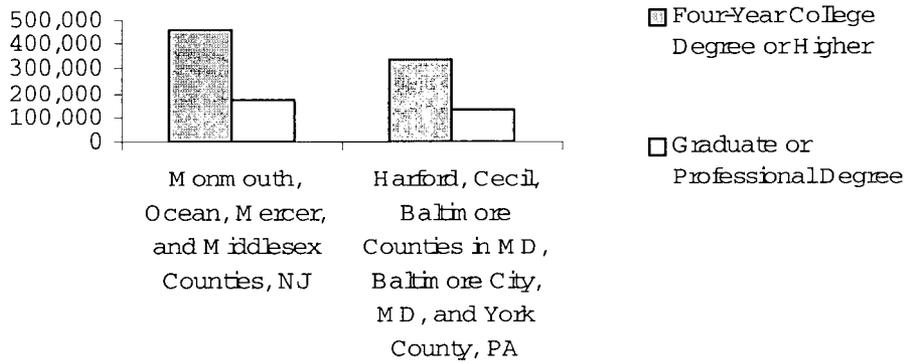
Source: United States Census Bureau, 2005 Longitudinal Employer-Household Dynamics

Part III. Regional Comparison

Figures 1 and 2 compare number of individuals with a college or advanced degree and the number of civilians employed in selected industries and occupations within counties comprising the larger region surrounding Fort Monmouth (Monmouth, Mercer and Middlesex Counties) and Aberdeen Proving Ground (Harford, Cecil, and Baltimore Counties, Baltimore City and York County, PA). Figures 3 and 4 expand the comparison to include the number and density of specialized and technical firms located in those same counties.

Figure 1. Number of Individuals Aged 25 and Older with a Four-Year Degree in Surrounding Labor Market of the Bases

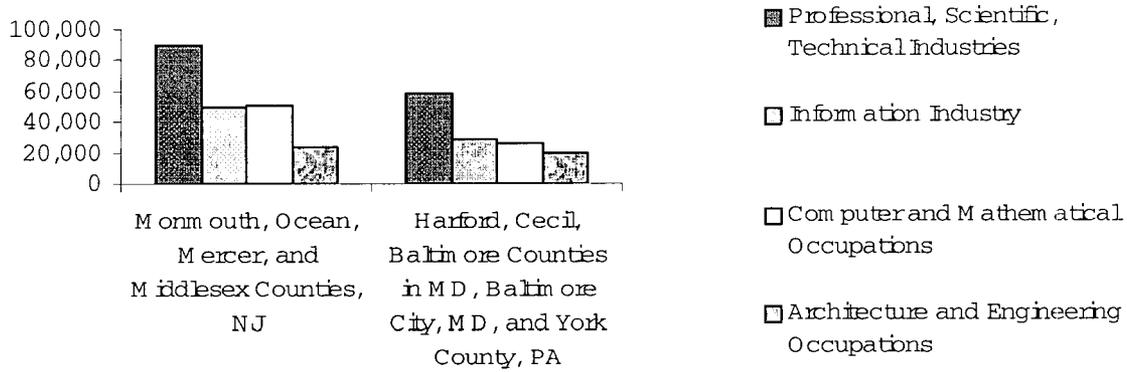
	Monmouth, Ocean, Mercer, and Middlesex Counties, NJ	Harford, Cecil, Baltimore Counties in MD, Baltimore City, MD, and York County, PA
Four-Year College Degree or Higher	456,716	332,493
Graduate or Professional Degree	173,192	132,413



Source: United States Census Bureau, 2002 Economic Census

Figure 2. Employed Civilian Population (16 Years and Over) in Specialized Industries and Occupations in Surrounding Labor Market of the Bases

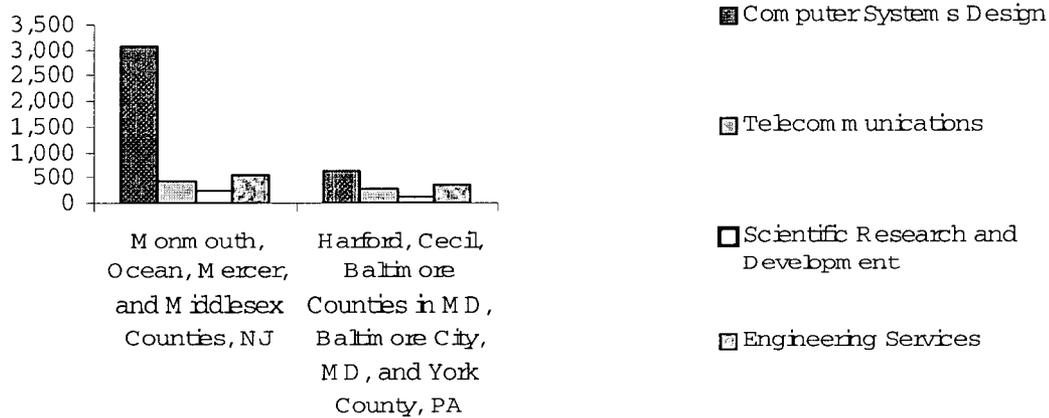
	Monmouth, Ocean, Mercer, and Middlesex Counties, NJ	Harford, Cecil, Baltimore Counties in MD, Baltimore City, MD, and York County, PA
Professional, Scientific, Technical Industries	89,275	58,793
Information Industry	49,651	28,539
Computer and Mathematical Occupations	50,876	26,271
Architecture and Engineering Occupations	22,959	20,039



Source: United States Census Bureau, 2002 Economic Census

Figure 3. Total Number of Professional, Scientific, and Technical Firms in Surrounding Labor Market of the Bases

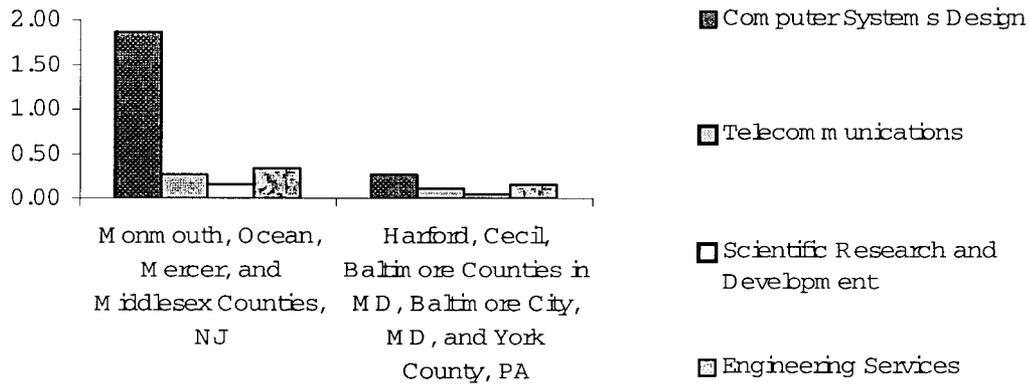
	Monmouth, Ocean, Mercer, and Middlesex Counties, NJ	Harford, Cecil, Baltimore Counties in MD, Baltimore City, MD, and York County, PA
Computer Systems Design	3,084	619
Telecommunications	433	285
Scientific Research and Development	239	111
Engineering Services	545	372



Source: United States Census Bureau, 2002 Economic Census

Figure 4. Density of Professional, Scientific, and Technical Firms in Counties in Surrounding Labor Market of the Bases (per square mile)

	Monmouth, Ocean, Mercer, and Middlesex Counties, NJ	Harford, Cecil, Baltimore Counties in MD, Baltimore City, MD, and York County, PA
Computer Systems Design	1.87	0.26
Telecommunications	0.26	0.12
Scientific Research and Development	0.15	0.05
Engineering Services	0.33	0.16



Source: United States Census Bureau, 2002 Economic Census

APPENDIX B. GOVERNOR'S OFFICE INCENTIVES

The New Jersey Office of the Governor proposes to make the following incentives available to Fort Monmouth to encourage the federal government to keep the installation's mission in New Jersey:

- The State will emphasize the value of the business-education collaborations involving Monmouth University, Brookdale Community College, Rutgers, The State University of New Jersey, Princeton University, the New Jersey Institute of Technology, Stevens Institute of Technology, and defense dependent contractors.
- The State has designated Fort Monmouth as a Homeland Defense Center of Excellence and is directing New Jersey universities and colleges to collaborate with the base on R&D projects.
- The State will pursue expanding the existing Innovation Zones to encompass the Fort Monmouth area.
- The State is supporting the location of the Port Authority of New York and New Jersey's Regional Information Joint Area Network at Fort Monmouth.
- The New Jersey Department of Health has committed to utilize Fort Monmouth as the site for its homeland security strategic medical stockpile.
- The New Jersey Department of Transportation and its county/municipal partners have committed over \$325 million to support transportation improvements in areas surrounding military installations throughout the state. Another \$600 million is planned for military host counties in 2005 and 2006.
- The New Jersey Department of Environmental Protection (NJDEP) has established a Base Commander's Committee under which Commanders from all military installations in New Jersey and representatives from DoD meet twice a year with the Commissioner and senior NJDEP staff to discuss issues and resolve problems. A Work Group that reports back to the Committee meets on a quarterly basis. This is a very successful problem-solving group.
- The NJDEP has expedited and given priority to processing permits to allow Fort Monmouth to establish a proposed methane gas pipeline and co-generation plant that will enable Fort Monmouth to dramatically reduce emissions from furnaces and reduce costs to heat the Fort buildings. The New Jersey Board of Public Utilities also is assisting with this project.
- The New Jersey Department of Transportation is investigating the role it might play in leveraging statewide "Dark Fiber" and wireless networks to enhance communications among federal military facilities. This would provide needed redundancies for military facilities. Dark Fiber is the unused fiber that has been laid along the Garden State Parkway, the New Jersey Turnpike, and other highway right-of-ways.
- The New Jersey Department of Transportation is investigating increased Park-and-Ride or Park-and-Train hubs that could serve military base commuter areas.
- The state Secretary of Commerce is developing an information program to assure quick and easy access to all Commerce programs for military contractors at New Jersey bases.

- To enhance communications between state and local entities and military facility commanders with regard to land use planning, the New Jersey state legislature amended state statutes in March 2005 to require all state and local governments to consult with Base Commanders and to review recommendations from Base Commanders on any land use actions that could have an impact on the mission or operations of a military installation (P.L. 2005, c. 41).
- In March 2005, the New Jersey state legislature amended state statutes to provide that dependent children whose parents or guardians have been transferred to a military installation in New Jersey will be considered a resident of the state for the purposes of qualifying for a state tuition aid grant. Under prior law, an individual must have had his or her primary residence in New Jersey for at least 12 months in order to be eligible for the award of a state tuition aid grant (P.L. 2005, c.60).
- In March 2005, the New Jersey state legislature amended the state statutes to dramatically expand and enhance the Council on Armed Services and Veterans Affairs to create a proactive ombudsman-like agency on behalf of active duty, reserve, and National Guard military (P.L. 2005, c. 40). The new Council will:
 1. Work with the public and private sectors to maximize the quality of life for all military personnel and their dependents by facilitating access to government services, educational institutions, recreation facilities, and job opportunities.
 2. Increase public awareness of and support for military missions performed in New Jersey and the significant economic impact they have on the state and its citizens and the need to sustain the military and Coast Guard presence in New Jersey.
 3. Work with state and local governments to improve the effectiveness of military installations by facilitating coordinated planning and expedited review of military and Coast Guard permits and other requests.
 4. Work with state and local governments to increase coordination and communication with military and Coast Guard installations in the development of policies to minimize encroachment around military and Coast Guard installations.
 5. Convene at least twice-a-year meetings with Base Commanders and the Council to review the status of issues, problems, and opportunities for New Jersey to support military and Coast Guard installations.
- The New Jersey state legislature passed and signed into law new statutes in order to promote better communication between state and local entities and military facility commanders with regard to land use planning issues. The legislation requires anyone seeking development and approval under the "Municipal Land Use Law" to provide notice to a military facility commander who registers with the municipality if the proposed development is within 3,000 feet of a military facility.
- Provide vital support to the civilian contractors and businesses surrounding Fort Monmouth.

1. Assess the composition of businesses and contractors to determine how training will increase productivity and enhance competitiveness through the use of the department's customized training program.
2. Review recruitment strategies with civilian contractors to ensure the best possible workers are screened and made available to these organizations through the state's One-Stop Career Centers.
3. Ensure that contractors are made aware of all available federal and state tax credit programs that could positively affect the bottom line of these businesses.
4. Offer free customized human resource workshops to all defense-related contractors to improve the functioning of their business processes.
5. Provide free worker training to all defense-related civilian employers who are recipients of state financing through the New Jersey Economic Development Authority, the New Jersey Commission on Science and Technology, or other area economic development agencies.
6. Provide no-cost occupational safety and health training to all interested contractors to improve safety in the workplace.
7. Develop a consortium of local contractors to initiate process improvements — such as ISO 9000, Lean Manufacturing, and Six Sigma — to help identify future markets for products and services.

APPENDIX C. EDUCATION

PART I. PRIMARY AND SECONDARY EDUCATION

A Preliminary Comparative Review

*Monmouth and Ocean Counties
New Jersey*



*Harford County
Maryland*



EDUCATION IN NEW JERSEY: AN ENVIRONMENT OF EXCELLENCE

New Jersey Department of Education
100 River View Plaza
PO Box 500
Trenton, NJ 08625-0500

June 2005

**EDUCATION IN NEW JERSEY – AN ENVIRONMENT OF
EXCELLENCE: A COMPARATIVE REVIEW
SUMMARY BULLETS**

- **CURRICULUM**: As a state, New Jersey provides for a well-rounded education for its public school students by establishing a rigorous and comprehensive set of Core Curriculum Content Standards in nine (9) different content areas. By comparison, Maryland has established Content Standards in only four (4) content areas. A broader conception of what constitutes core knowledge for students in grades pre-K or K-12 results in young people who are better prepared to pursue a variety of higher educational opportunities and career paths.
- **PROFICIENCY ASSESSMENT RESULTS/STATE LEVEL**: Student performance as a measure of proficiency on assessments in mathematics and language arts reveals New Jersey's comparative success over the national average and the nearby state of Maryland. For grades three, four, and eight, New Jersey students consistently outperformed Maryland students and the national average in both mathematics and language arts.
- **PROFICIENCY ASSESSMENT RESULTS/COUNTY LEVEL**: On the county level, New Jersey continues to consistently outperform Maryland on key assessments of language arts and mathematics proficiency. For example, on grade three, four, and eight proficiency assessments in reading and mathematics in 2004, Monmouth County, New Jersey students consistently outperformed their peers in Harford County, Maryland. The most noticeable differences are found in comparisons of grade eight language arts and mathematics, where Monmouth County students outperformed Harford County students by 15 and 21 percentage points, respectively. Additionally, grade eight Ocean County, NJ students outperformed their peers in Harford County in language arts and mathematics by 8 and 14 percentage points, respectively.
- **HIGH SCHOOL GRADUATION RATE**: Based on available data for the 2000-2001 school year, the New Jersey posted a higher over all high school graduation rate than did the State of Maryland, 88.0 percent versus 82.6 percent.
- **TEACHER QUALIFICATIONS**: Data for schools in Monmouth and Ocean Counties in New Jersey show that 10-18 percent more classes are taught by highly qualified teachers than in schools in Harford County, Maryland.
- **STUDENT-TEACHER RATIOS**: New Jersey, as a whole, as well as the individual counties of Monmouth and Ocean have class sizes that are significantly smaller than the national average, the state average for Maryland, and the average for Harford County in Maryland. Smaller class sizes allow for greater individual attention to students by teachers, which may contribute to New Jersey's successes in performance assessment outcomes over the average for schools in Maryland and the national average.
- **FINANCIAL INVESTMENT IN EDUCATION**: New Jersey makes a significant financial investment in its public education system. For example, in the 2001-2002 school year, New Jersey invested 37 percent more funds per student than did Maryland for the same time period. On a county level, Monmouth and Ocean Counties in New Jersey supported their

public schools with 30-32 percent more funding per student than did Harford County in Maryland.

- **SCHOOL CHOICE:** New Jersey offers its public school students and their parents greater choice in education through three key programs: charter schools, interdistrict public school choice, and county vocational-technical schools. The state's county vocational school system offers high quality career and technical education programs under 16 career clusters. The Monmouth County Vocational School offers 38 different, specific career/technical education programs; and, Ocean County Vocational School offers 45 such programs.

Maryland's charter school program is in its early stages, with only one charter school in place in Frederick County; and, the state does not offer an interdistrict public school choice program comparable to that offered in NJ. Maryland's career and technical education system offers programs in 10 career clusters, with the Harford County area served by Harford Technical High, which offers career-technical programs in only 19 areas.

- **STUDENT IMPACT – NEW JERSEY:** The Eatontown School District and Monmouth Regional High School District in Monmouth County, NJ serve large percentages of students, 17.5 percent and 22 percent, respectively, who are dependents of military or civilian personnel and for whom the districts receive federal Impact Aid. Additionally, the Eatontown School District currently has in place a number of partnership programs with Fort Monmouth.

**EDUCATION IN NEW JERSEY – AN ENVIRONMENT OF
EXCELLENCE: A COMPARATIVE REVIEW
SUPPORTING DOCUMENTATION**

CURRICULUM

- a. New Jersey has established a rigorous and comprehensive set of Core Curriculum Content Standards (CCCS) that guides the educational experience of all public school students in the state from grades pre-K through 12. The CCCS address the following nine (9) content areas:

1. Visual and Performing Arts
2. Comprehensive Health and Physical Education
3. Language Arts Literacy
4. Mathematics
5. Science
6. Social Studies
7. World Languages
8. Technology Literacy
9. Career Education and Consumer, Family, and Life Skills

(Source: New Jersey Department of Education, www.state.nj.us/njded/cccs/intro.htm)

- b. Maryland has established Content Standards that define what students in grades K through 12 should know and be able to do in only four (4) core content areas:

1. English/Language Arts
2. Mathematics

(Source: Maryland Department of Education, <http://mdk12.org/mspp/vsc/index.html>)

PROFICIENCY ASSESSMENT RESULTS – STATE COMPARISONS

Grade Four Reading*

Student performance outcomes, as measured by proficiency on assessments in mathematics and reading, reveal New Jersey's comparative success over the national average and over the nearby state of Maryland. In both mathematics and reading, New Jersey students in grades four and eight out-performed their peers in Maryland, as well as in the nation as a whole.

- a. In 2003, New Jersey's average scale score on reading proficiency assessments for fourth-grade students in New Jersey was 225, which was higher than that of the nation's public schools (216). Maryland's average score for the same was only 219, which was not considered significantly different from the national average.
- b. Of the 53 states and jurisdictions (e.g., the District of Columbia and the Department of Defense Dependent Schools) that participated in the 2003 fourth-grade assessment, students' average scale scores in New Jersey were higher than those in 34 jurisdictions. Maryland's average scale scores were higher than those in only 15 jurisdictions.
- c. The percentage of fourth-grade students in New Jersey who performed at or above the NAEP *Proficient* level was 39 percent in 2003, as compared to only 32 percent in Maryland, and 30 percent for the nation as a whole. (*Exhibit 1*)

Grade Eight Reading*

- d. In 2003, New Jersey's average scale score on reading proficiency assessments for eighth-grade students in New Jersey was 268, which was higher than that of the nation's public schools (261). Maryland's average score for the same was only 262, which was not considered significantly different from the national average.
- e. Of the 53 states and jurisdictions (e.g., the District of Columbia and the Department of Defense Dependent Schools) that participated in the 2003 eighth-grade assessment, students' average scale scores in New Jersey were higher than those in 26 jurisdictions. Maryland's average scale scores were higher than those in only 11 jurisdictions.
- f. The percentage of fourth-grade students in New Jersey who performed at or above the NAEP *Proficient* level was 37 percent in 2003, as compared to only 31 percent in Maryland, and 30 percent for the nation as a whole. (*Exhibit 2*)

Grade Four Mathematics**

- g. In 2003, New Jersey's average scale score on mathematics proficiency assessments for fourth-grade students in New Jersey was 239, which was higher than that of the nation's public schools (234). Maryland's average score for the same was only 233, which was not considered significantly different from the national average.

- h. Of the 53 states and jurisdictions (e.g., the District of Columbia and the Department of Defense Dependent Schools) that participated in the 2003 fourth-grade assessment, students' average scale scores in New Jersey were higher than those in 27 jurisdictions. Maryland's average scale scores were higher than those in only 13 jurisdictions.
- i. The percentage of fourth-grade students in New Jersey who performed at or above the NAEP *Proficient* level was 39 percent in 2003, as compared to only 31 percent in Maryland, and 32 percent for the nation as a whole. (*Exhibit 3*)

Grade Eight Mathematics**

- j. In 2003, New Jersey's average scale score on mathematics proficiency assessments for eighth-grade students in New Jersey was 281, which was higher than that of the nation's public schools (276). Maryland's average score for the same was only 278, which was not considered significantly different from the national average.
- k. Of the 53 states and jurisdictions (e.g., the District of Columbia and the Department of Defense Dependent Schools) that participated in the 2003 eighth-grade assessment, students' average scale scores in New Jersey were higher than those in 23 jurisdictions. Maryland's average scale scores were higher than those in only 17 jurisdictions.
- l. The percentage of eighth-grade students in New Jersey who performed at or above the NAEP *Proficient* level was 33 percent in 2003, as compared to only 30 percent in Maryland, and 27 percent for the nation as a whole. (*Exhibit 4*)

* *The National Assessment of Educational Progress (NAEP) assesses reading in two contexts described in the NAEP framework: reading for literary experience and reading to gain information. The NAEP reading scale ranges from 0 to 500.*

** *The National Assessment of Educational Progress (NAEP) assesses mathematics in five content areas: number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics and probability; and algebra and functions. The NAEP mathematics scale ranges from 0 to 500.*

(Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2003 Reading Assessments and 2003 Mathematics Assessments)

PROFICIENCY ASSESSMENT RESULTS – COUNTY COMPARISONS

On the county-level, New Jersey continues to consistently outperform Maryland on key assessments of reading and mathematics proficiency. (Monmouth County students outperformed Harford County students on all six of the proficiency assessments discussed below; and, Ocean County students outperformed Harford County students on four of those six assessments.)

- a. For 2004, the percentage of public school students in grade three in Monmouth County scoring at the proficient or advanced proficient levels for Language Arts Literacy/Reading was 85.1 percent; for Ocean County, it was 82.0 percent; and, for Harford County, it was 79.6 percent. (*Exhibit 5*)

DCN:11658

- b. For 2004, the percentage of public school students in grade three in Monmouth County scoring at the proficient or advanced proficient levels for Mathematics was 82.8 percent; for Ocean County, it was 79.5 percent; and, for Harford County, it was 81.1 percent. *(Exhibit 5)*
- c. For 2004, the percentage of public school students in grade four in Monmouth County scoring at the proficient or advanced proficient levels for Language Arts Literacy/Reading was 87.6 percent; for Ocean County, it was 85.6 percent; and, for Harford County, it was 82.1 percent. *(Exhibit 6)*
- d. For 2004, the percentage of public school students in grade four in Monmouth County scoring at the proficient or advanced proficient levels for Mathematics was 79.4 percent; for Ocean County, it was 74.9 percent; and, for Harford County, it was 79.1 percent. *(Exhibit 6)*
- e. For 2004, the percentage of public school students in grade eight in Monmouth County scoring at the proficient or advanced proficient levels for Language Arts Literacy/Reading was 81.3 percent; for Ocean County, it was 74.6 percent; and, for Harford County, it was 66.3 percent. *(Exhibit 7)*
- f. For 2004, the percentage of public school students in grade eight in Monmouth County scoring at the proficient or advanced proficient levels for Mathematics was 71.5 percent; for Ocean County, it was 64.0 percent; and, for Harford County, it was 50.6 percent. *(Exhibit 7)*

(Source for Monmouth County, NJ and Ocean County, NJ: Educational Testing Service – www.idmsweb.com. Source for Harford County, MD data: 2004 Maryland Report Card – www.mdreportcard.org)

HIGH SCHOOL GRADUATION RATES

- a. New Jersey was one of only 6 states that posted four-year graduation completion rates of higher than 85 percent for 9th grade public school students.
- b. Maryland's four-year graduation completion rate for 9th grade public school students was 82.6 percent for the same time period.

(Source: National Center for Educational Statistics (NCES), <http://nces.ed.gov/pubs2005/2005046.pdf>, 2000-2001)
(Exhibit 8)

TEACHER QUALIFICATIONS

- a. For 2004 in Monmouth County, NJ, 90 percent of all core subjects were taught by highly qualified teachers. For the same time period, 98.8 percent of all core subjects were taught by highly qualified teachers in Ocean County, NJ.
- b. For the same time period, 80.1 percent of classes in Harford County, MD were taught by highly qualified teachers.

(Source for Monmouth and Ocean Counties: 2004 New Jersey Department of Education Highly Qualified Teacher Survey – averaged for all districts in each county. Source for Harford County: Maryland Report Card (2004) - <http://www.mdreportcard.org/NHQclasses.asp?K=12AAAA>)
(Exhibit 9)

STUDENT TEACHER RATIOS

State Comparisons

- a. New Jersey's statewide average student/teacher ratio for the 2002-2003 school year was 12.8:1, which indicates an average class size in New Jersey that is considerably smaller than the national average of 15.9:1. This is a significant indicator given that smaller class sizes allow teachers to give more individual attention to students.
- b. Maryland's average student/teacher ratio for the same time period was 15.7:1, which was not considered significantly different from the national average.

(Source: National Center for Educational Statistics (NCES), Common Core Data – 2002-2003 school year)

(Exhibit 10)

County Comparisons

- a. Monmouth County, NJ has an average student/teacher ratio of 12.62:1, which indicates class sizes in that county are considerably smaller than the national average of 15.9:1 and even lower than the state average ratio of 12.8:1. Ocean County, NJ has an average student/teacher ratio of 14.13:1, which is also lower than the national average.
- b. Harford County, MD has an average student/teacher ratio of 15.73:1, which is not considered significantly different from the national average or the Maryland state average.

(Source: SchoolMatters, a public source for information and analysis about the nation's public schools – a product of Standard and Poor's)

(Exhibit 10)

FINANCIAL INVESTMENT IN EDUCATION IN NEW JERSEY AND MARYLAND

- a. New Jersey makes a substantial financial investment in public school students, having spent on average \$11,793 per student in the 2001-2002 school year. This financial investment is approximately 37 percent higher than that in Maryland, which spent on average \$8,692 per student for the same time period.

(Source: National Center for Educational Statistics (NCES), Common Core Data for 2001-2002 school year)

- b. The substantial investment in public education is reflected at the county level also, where spending for the 2002-2003 school year in Monmouth County, NJ was \$9,893 per student; and, in Ocean County, NJ, the figure was \$10,150 per student. This figure is 30-32 percent higher than that for Harford County, MD, where for the same time period, spending per pupil was \$6,920.

(Data for Monmouth Co. and Ocean Co., NJ were averaged for all districts in each county using data from the New Jersey Department of Education 2004 Comparative Spending Guide. Data for Harford Co., MD were obtained from the Harford County Public Schools Website at www.hcps.org/AboutUs/Facts/FactsStatistics.asp.)

(Exhibit 11)

SCHOOL CHOICE

Charter schools offer public school students and their parents an important and exciting way to make choices in education.

Charter Schools

a. New Jersey has a well-established charter schools program, with approved charter schools in 14 of the state's 21 counties, including three charter schools in Monmouth County. The following data summarizes New Jersey's charter schools program:

1. As of January 2005, there are 55 approved charter schools in New Jersey. Forty-nine are operating and three are scheduled to open in September 2005;
2. In September 2004, Princeton Charter School became the first charter school in New Jersey to achieve National Blue Ribbon School of Excellence status;
3. As of September 2004, New Jersey's charter schools are serving over 14,000 students in pre-kindergarten through grade 12;
4. All of New Jersey's charter schools are newly created. There are no charter schools that have been converted from other public schools;
5. The average enrollment in a charter school is 193 students;
6. The average class size of charter schools is 17 students;
7. The average school year for charter schools is 186 days;
8. The average length of the school day in charter schools is slightly over 7 hours; students are engaged in instruction for an average of slightly over 6 hours;
9. In 2004, four of the charter schools that opened in September 2000 were granted charter renewals for an additional five-year period.

(Source: New Jersey Department of Education, www.nj.gov/njded/chartsch/fact.shtml)

b. New Jersey received a rating of "B" (Strong) for its charter school law, and was ranked 17th out of 41 states with charter school laws (as of 2003). The list of criteria upon which the ranking was based was comprehensive and included such indicators as: number of schools allowed, guaranteed per pupil funding, fiscal autonomy, and legal operational autonomy.

(Source: The Center for Education Reform, www.edreform.com/_upload/ranking_chart.pdf)

c. Maryland has begun a charter schools program; state legislation was signed into law in May of 2003. The state currently has one charter school that opened in 2002 in Federick County; there are no charter schools currently located in Harford County.

(Source: Maryland Department of Education, www.marylandpublicschools.org/MSDE/programs/charter_schools/docs/Brief_Intro.htm)

d. Maryland received a rating of "D" (Weak) for its charter school law, and was ranked 37 out of 41 states with charter school laws (as of 2003).

(Source: The Center for Education Reform, www.edreform.com/_upload/ranking_chart.pdf)

Interdistrict Public School Choice

In addition to choice through charter schools, interdistrict public school choice options are offered to students and their parents in many states. Such options allow for allow choice of public schools across district boundaries.

- a. New Jersey currently offers a voluntary interdistrict public school choice program, with school districts in 16 of New Jersey's 21 counties choosing to participate in this program. Monmouth County and Ocean County have participating districts.

(Source: New Jersey Department of Education www.nj.gov/njded/choice/districts/index.html)

- b. New Jersey also offers comprehensive options in dual/concurrent enrollment that meet two or more of the following criteria: students pay minimal or no tuition and fees, both secondary and postsecondary credit is earned for postsecondary courses, and few course restrictions exist.

(Source: Education Commission of the States, May 2003, www.ecs.org/clearinghouse/13/75/1375.htm)

- c. Maryland does not currently have an interdistrict public school choice program, and offers only limited options for dual/concurrent enrollment, which meet one or more of the following criteria: students pay tuition costs of postsecondary classes, there are more academic credit restrictions, and there are stringent criteria on eligible courses.

(Source: Education Commission of the States, May 2003, www.ecs.org/clearinghouse/13/75/1375.htm)

Career and Technical Education

Vocational and technical education schools, also known as career and technical education schools, offer another important choice option for public school students.

- a. New Jersey has established a comprehensive system of county vocational-technical education school districts that offer career and technical education programs across 16 career clusters. Attendance at the county schools is offered free of charge to high school students/parents. Every student has a legal right to apply for admission; and, the local school district is required by law to pay tuition (if applicable) and provide transportation for students accepted at and attending county vocational-technical school districts. The requirements for admission to a county vocational-technical school vary by district/program. Rigorous programs, such as high-tech career academies and performing arts programs, are designed for highly talented students and admission can be extremely competitive. Each district develops its own admission criteria to ensure that student abilities and needs are well matched with program offerings, and that the county's overall population is well represented.

(Source: New Jersey Council on County Vocational-Technical Schools, www.njccvts.org)

- b. The Monmouth County Vocational School District in New Jersey offers 38 different and specific career and technical education programs; the Ocean County Vocational School District offers 45 such programs. The range of programs offered by these two districts includes, but is not limited to, such occupational areas as: medical laboratory technician, Cisco networking, computer systems networking and telecommunications, computer science, law enforcement, diesel engine mechanic, electrician, environmental sciences/studies, carpenter, radio/TV production and broadcasting, airframe mechanics and aircraft

DCN:11658

maintenance technology, commercial photography, culinary arts/chef training, electrical/electronic engineering technician, and graphic design/commercial art and illustration.

(Source: New Jersey Department of Education, www.state.nj.us/cgi-bin/education/voc/pubvoc.pl)

- c. The following four specialized career academies are also offered in Monmouth County: Allied Health and Science, Communications High School, High Technology High School, and Marine Academy of Science and Technology. Ocean County offers the following specialized career academy: Marine Academy of Technology and Environmental Science. (Career academies are small learning communities centered on a career theme. The academies exist in stand-alone facilities, a school-within-a-school, or on a local site in collaboration with a local school district. Career academies blend academic and technical/vocational studies in an integrated curriculum.)

(Source: New Jersey Council on County Vocational-Technical Schools, www.njccvts.org)

- d. Maryland provides for a statewide system of career and technology education. The system offers programs and services in 16 community colleges and 24 local school systems, including high schools and career centers. The state's career and technology programs fall under 10 career clusters.
- e. Harford County, Maryland students in grades 9 through 12 are served by the Harford Technical High School, which offers 19 technical programs. Students at the school may elect to study in technical fields that will prepare them for direct entry into the workforce, or as preparation for study at postsecondary institution or at a specific technical school.

(Source: Maryland Department of Education – www.marylandpublicschools.org and Harford Technical High School website - http://www.hcps.org/schools/highschools/content/HS_4.asp)
(Exhibit 12)

IMPACT ON KEY SCHOOL DISTRICTS IN MONMOUTH COUNTY, NJ

The Eatontown School District and Monmouth Regional High School District in Monmouth County, NJ serve a large percentage of students who are from families associated with the military base at Fort Monmouth.

- a. Of the approximately 1,311 students in the Eatontown School District, 229 students (or 17.5 percent of Eatontown's total student population) are dependents of military or civilian personnel for whom the district receives federal Impact Aid. The K-8 district receives approximately \$500,000.00 in federal aid per year which offsets the operating budget cost by .05 per \$100 for each tax paying household. This means that if families are forced to relocate due to the closing of Fort Monmouth, the district will have to rely upon the remaining taxpayers to make up the difference.

In addition to the impact on local tax payers, the district has formed several partnerships with Fort Monmouth. Partnerships include, for instance:

1. A Tutoring Program
2. Adopt a Grandparent (with retired military personnel)
3. Child care center located at Fort Monmouth utilized by students
4. Mentoring Program

DCN:11658

Also, the Eatontown School District shares the cost of busing with Fort Monmouth. Finally, Fort Monmouth has planned to implement a kindergarten program for the 05-06 school year. The district has been instrumental from a curricular standpoint, among other things, in assisting with the planning of this program.

(Source: Ms. Jean Hoover, Superintendent, Eatontown School District, 2005)

- b.** The student impact at the Monmouth Regional High School District would be even greater than at Eatontown. Monmouth Regional has a total student population of approximately 1,150, with 252 students, or 22 percent of the total student population, who are dependents of military or civilian personnel and for whom the district receives federal Impact Aid.

(Source: Board Office, Monmouth Regional High School District, 2005)

PART II. HIGHER EDUCATION

An Overview of Higher Education Programs in New Jersey That Provide a Pipeline of Skilled Workers for Fort Monmouth

Relevant Degree Programs in New Jersey

New Jersey's higher education institutions offer a range of science, technology and engineering degrees, including many that can help prepare future and current R&D workers for Fort Monmouth:

Networks/Telecommunications

- Devry University - BS Network & Communications Management
- Kean University - BS Telecommunications
- New Jersey Institute of Technology - MS Telecommunications
- Stevens Institute of Technology - MS Telecommunications

Electronics/Engineering

- College of New Jersey - BSEE Electrical Engineering
- Devry University - BSEET Electronics Engineering Technology
- Fairleigh Dickinson University - BS/MS Electrical Engineering
- Kean University - BS Electronics Technology
- Monmouth University - BS/MS Electronic Engineering
- New Jersey Institute of Technology - BS/MS/PhD Electrical Engineering
- Princeton University - BS/MA/MSE/PhD Electrical Engineering
- Rowan University - BS Electrical & Computer Engineering
- Rutgers, the State University of New Jersey - BS/MS/PhD Electrical & Computer Engineering
- Stevens Institute of Technology - BE/DE/ME/PhD Electrical Engineering

Operations Research/Civil Engineering

- New Jersey Institute of Technology - MS/PhD Civil Engineering (Transportation)
- Princeton University - BSE/MA/MSE/PhD Operations Research/Financial Engineering
- Rutgers, the State University of New Jersey - MS/PhD Operations Research
- Stevens Institute of Technology - MS/PhD - Operations Research

Other Academic Programs

In addition to four year and post-graduate degrees, New Jersey's community colleges offer civil engineering, technology/technician and other electronics programs.

Civil Engineering Technology/Technician

- Middlesex County College
- Ocean County College
- Mercer County Community College
- Gloucester County College
- Essex County College
- Union County College

- Brookdale Community College – AAS

Research Centers and Specialized Labs

In addition, New Jersey is home to a wealth of research center and laboratories, many of which work collaboratively with industry, government and the military.

Monmouth University

- Center for Rapid Response Database Systems

New Jersey Institute of Technology

- Center for Applied Mathematics and Statistics
- Center for Communications and signal Processing Research
- Center for Next Generation Video
- Cognitive & Decision Systems Group
- Cryptography & Telecommunications Laboratory
- Data and Knowledge Engineering Laboratory
- Hypermedia Information Systems Research
- New Jersey Center for Multimedia Research
- New Jersey Center for Pervasive Information Technology
- New Jersey Center for Wireless networking and Internet Security
- New Jersey Center for Wireless Telecommunications
- Software Engineering for Distributed Computing and Networking

Princeton University

- Center for Ultrafast Laser Applications
- Princeton Center for Complex Materials
- Princeton Institute for Computational Science and Engineering
- Princeton Institute for the Science and Technology of Materials
- Program in Integrative Information, Computer and Application Sciences
- Program in Applied and Computational Mathematics

Rutgers, The State University of New Jersey

- Center for Advanced Information Processing
- Center for Advanced Infrastructure and Transportation
- Center for Digital Signal Processing Research
- Center for Discrete Mathematics and Theoretical Computer Science
- Center for Information management, Integration, and Connectivity
- Center for Mathematical Sciences Research
- Center for Mathematics, Science and Computer Education
- Center for Nanomaterials Research
- Center for Operations Research
- Fiber Optic Materials Research Program
- Grant F. Walton Center for Remote Sensing and Spatial Analysis
- Laboratory for Computer Science Research
- Laboratory for Nanostructured Materials Research
- Laboratory for Surface Modifications
- Laboratory for Visiometrics and Modeling
- Logistics Initiative at Rutgers

- DCN:11658
- Microelectronics Research Laboratory
- Rutgers Center for Systems and Control

Stevens Institute of Technology

- Center for Environmental Systems
- Design and Manufacturing Institute
- The Highly Filled Materials Institute
- New Jersey Space Grant Consortium
- Micro-Chemical Systems

PRISM and Fort Monmouth Interactions

The Princeton Institute for the Science and Technology of Materials (PRISM) is a multidisciplinary research center at Princeton University in the general field of materials science through photonics with a special emphasis on the hard material-soft material interface. Its mission includes graduate and undergraduate education and research, which will have a long-term impact on society. Key elements of PRISM are the integration of the sciences and engineering, with work spanning from fundamental theory through applications, and the integration of our work with efforts outside Princeton, especially with industry and nearby federal labs.

PRISM was formed in November 2003, based on foundations of two related interdisciplinary centers at Princeton, the former Princeton Materials Institute (PMI) and the former Center for Photonics and Optoelectronic Materials (POEM), of which Ft. Monmouth was a charter member.

Research at PRISM is supported by a wide range of government agencies (State and Federal), industry, and foundations. Programs of special note at PRISM include the Princeton Center for Complex Materials (PCCM), funded by the National Science Foundation Materials Research Science and Engineering Center (NSF-MRSEC) program, and several multi-disciplinary Centers in emerging research fields, funded by the New Jersey Commission on Science and Technology (NJCST).

PRISM was founded not only to deepen our strengths in traditional areas of materials science and photonics, but especially to pursue emerging opportunities at the unique intersection between traditional fields. This intersection includes organic electronics, quantum information, broadband communications, materials and processes, and biomedical imaging, to name a few. These fields are based on our traditional strengths, and many involve interaction between the traditional "hard materials" communities, such as those from the fields of telecom, semiconductors and photonics, and the "soft materials" communities, such as those of organic materials, soft condensed material, biological materials, and genomics. This theme of the hard/soft interface runs throughout the most exciting programs which exist within PRISM, and it is a field which we expect to continue to grow in importance.

Among other things, PRISM is a meeting place to bring people together so that we can learn from one another and benefit from the talents of others. This mix includes scientists and engineers, students and experienced professionals from Princeton and from industry and government, and those who can relate our work to the larger society as a whole. At PRISM, we offer a formal education program for Princeton undergraduates in which they are integrated into the research program and a multidisciplinary program for graduate students in cooperation with academic departments. The compact size of Princeton University insures a close interaction

between scientists and engineers across academic boundaries. Those outside of Princeton, especially in local industry and nearby federal labs such as Ft. Monmouth, bring important long-term challenges to us and provide a path by which our discoveries and advances can be translated into practice to have a large impact on society. Such interaction is promoted by the advanced central facilities of PRISM, which are open to our industrial collaborators, our industrial affiliates programs, joint research programs, and our proximity to the local Route 1 corridor.

Over the past decade, Ft. Monmouth has played a both a seminal and sustaining role in key POEM and PRISM technologies with direct relevance and significance for military and homeland security applications. As an active collaborative partner, Ft. Monmouth has leveraged our efforts and interactions with companies such as Sensors Unlimited and Sarnoff (Princeton) for novel Infrared detectors, cameras, and systems, and Advanced Signal Processing, with AT&T, Lucent, Telcordia, Sun, NEC, Lockheed Martin, General Dynamics and L-3 Communications, as well as a host of communications start-ups for Terahertz Communications and Data Fusion. Also, PRISM is pursuing highly relevant technologies for conformal and disposable sensors using our pioneering technologies in organic electronics and nano-imprint technologies.

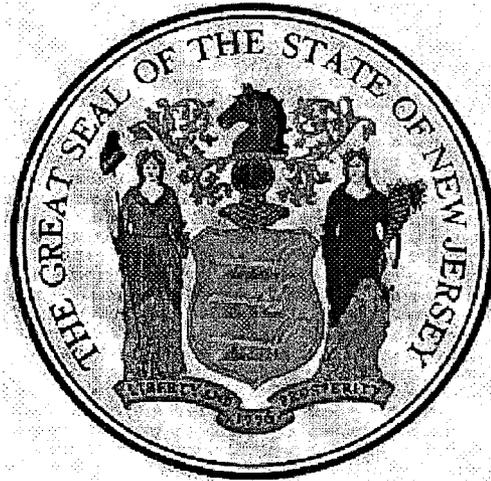
A summary of mutual areas of interest and collaboration with leading Princeton faculty (highlighted in orange) includes the following:

Areas of Mutual Interest and Collaboration

- Modeling & simulation (entire life cycle)
- Enterprise, Communication & network architectures
- System engineering
- Architecture Engineering
- High Performance Computing
- Visualization (terrain, high-end graphics)
- Optical beam steering
- Quantum Cascade lasers
- Antenna Materials (e.g. Metamaterials for RF)
- Femtosecond Spectroscopy (Terahertz Comms)
- Microsensors (e.g. Disposable Sensor work)
- Network Science (new mathematics for address large scale MANETs)
- On-The-Move satellite communications systems
- Advanced technologies for SATCOM antennas
- Antennas/antenna technology for terrestrial wideband communications networks
- Mobile ad-hoc networking of terrestrial and SATCOM communications systems

DCN 1058
**APPENDIX D. TRANSPORTATION, UTILITIES, AND
NEW JERSEY TAX AND BUSINESS INCENTIVES**

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New Jersey Commerce

Economic Growth

&

Tourism Commission

**FORT MONMOUTH
ANALYSIS REPORT:
Transportation, Utilities, and
State Incentive Programs**

**Department of Business & Economic Development
20 West State Street
Trenton, New Jersey 08625-0838**

**Virginia S. Bauer
CEO/Secretary**

Part I: TRANSPORTATION**Introduction:**

Monmouth County, NJ is situated in an advantageous location with access to large markets, suppliers, and transportation networks. Its all-inclusive transportation infrastructure is also great for moving people and cargo. This superb infrastructure helps offer an array of alternatives, which in turn can help reduce operating cost.

In summary:

- Monmouth's proximity to transportation systems of excellence is superior to what currently exist in Aberdeen.
- To duplicate Monmouth's infrastructure, it would probably:
 - Take decades.
 - Be cost prohibitive.

Airports:

Newark Liberty International Airport, one of the nations largest and busiest hubs, and Atlantic City International Airport, a rapidly growing regional airport, along with nearby hubs in New York and Pennsylvania, provide businesses that support the base with quick and easy access to the domestic and global markets.

Newark Liberty International Airport saw 31.9 million passengers in 2004, and the region's two other major hubs in 2004. In recent years, Newark has taken on a bigger role as a main international gateway.

New Jersey

Public use airports: 49

- 7 certificated for air carrier operations
- 5 Regional International Airports

Maryland

Public use airports: 35

- 4 certificated for air carrier operations
- 4 Regional International Airports

Rail:

Monmouth's nearby passenger and freight rail lines offer alternatives for logistics of moving people and/or cargo. New Jersey has more railroad tracks per square mile than any other state in the nation.

Passenger lines offer access to transportation networks that can move people effectively. It also provides alternative modes of transportation that alleviate traffic and congestion. Freight lines offer alternatives for the military base, as well as businesses supporting the base's activities, for reducing transportation cost.

New Jersey

1,582 miles of Class I railroad trackage. *Rail transit systems:*

- 3 commuter rail

Maryland

835 miles of Class I railroad trackage
Rail transit systems:

- 1 commuter rail

DCN:11658

- 2 heavy rail (subway)
- 1 light rail
- 1 heavy rail (subway)
- 1 light rail

Roads:

Monmouth County, along with the rest of the State, offers an interstate and highway network that is comprehensive and provides access to regional networks in the surrounding states.

There are currently 9 major transportation projects in the construction phase that are going on in Monmouth County and within close proximity to Fort Monmouth totaling over \$162.70 million. In addition, there are at least 29 projects in the design or planning phase that currently are projected to total of at least \$317.10 million, and when elevated to the construction phase, will have significantly higher investment totals. (Some estimated projects costs were unavailable for future projects due to confidentiality issues).

New Jersey

- 36,022 miles of public roads & highways
- 420 miles of Interstate

Maryland

- 30,494 miles of public roads & highways
- 481 miles of Interstate

Transportation Related Item: State Motor-Fuel Tax Rates (2003):

New Jersey

- Gasoline: 10.5 highways
- Diesel: 13.5

Maryland

- Gasoline: 23.5
- Diesel: 24.25

NOTE: According to the American Automobile Association, "the lowest gasoline prices in the nation can be found in the New Jersey. That's mostly due to its low gasoline tax rate (only Wyoming and Alaska tax their gasoline at a lower rate than New Jersey) and the state's many refineries and coastal ports, where oil tankers may dock. That means delivery costs are lower than in other states. According to the survey, unleaded fuel is averaging nationally \$2.06, whereas, New Jersey is averaging \$1.89/ gallon this week."
(SOURCE: Associated Press, March 11, 2005)

Ports:

Major ports on the Delaware and Hudson offers alternatives for send and receiving cargo.

The Port of NY/NJ is the third largest port complex in North America. The Port Authority facilities handled a record 3.15 million loaded containers in 2004, up 11.7 percent from 2003. Total cargo was 25.5 metric tons in 2004, valued at \$114.54 billion.

The Port of Camden had its second record-breaking year in a row in 2004. The port handled 283,529 containers totaling 3.43 million tons of cargo in 2004. The cargo involved almost every major commodity, including steel, cement and wood products.

PART II: UTILITIES

Introduction:

New Jersey has closed the gap in utility costs with Maryland. An annual survey released in May 2005 by NUS Consulting found that *"the largest price escalation over the past year occurred in Maryland as Baltimore Gas & Electric increased its electric pricing by a whopping 33.7 percent."*

While New Jersey's utility cost are generally high, there are areas were they have improved in comparison to Maryland. Also, New Jersey's well-established and maintained utility infrastructure offers easy access to residents and productive operations that cannot afford down time due to reliability problems.

Electric Utility Costs

Average cost to the customer per kilowatt-hour in cents						
	Residential		Commercial		Industrial	
Year	MD	NJ	MD	NJ	MD	NJ
2004	8.00	11.24	9.02	9.60	4.51	8.67
2003	7.73	10.69	6.95	9.25	4.89	7.47
2002	7.71	10.38	6.09	8.87	3.88	7.83
2001	7.70	10.24	6.42	9.19	4.41	8.27
2000	7.96	10.23	6.54	8.85	4.10	7.74
1999	8.39	11.40	6.82	9.74	4.26	7.69

Ft Monmouth's Annual Electrical Usage	
Year	* Usage in Kwh
2004	57,383,416

*estimated amount

Upon reviewing the above 'Electric Utility Costs' chart, New Jersey's 'residential' and 'Industrial' electrical costs tend to be higher than Maryland. However, New Jersey has closed the gap considerably in 2004.

This 'gap' closure was confirmed in a recently released annual survey by an independent consulting company, NUS Consulting. They found that New Jersey electric customers pay some of the highest electric prices in the country. However, they also found that *" the largest price escalation over the past year occurred in Maryland as Baltimore Gas & Electric increased its electric pricing by a whopping 33.7 percent."*

Gas Utility Costs

Average cost to the customer per Therm in cents						
	Residential		Commercial		Industrial	
Year	MD	NJ	MD	NJ	MD	NJ
2004	12.40	11.59	9.24	10.99	10.34	8.67
2003	11.01	8.51	8.12	8.74	9.57	7.29
2002	9.61	7.23	6.90	6.26	7.42	4.91
2001	11.66	7.63	10.15	7.91	9.07	6.69
2000	9.78	7.28	8.08	5.92	7.86	5.12
1999	8.41	7.46	6.94	3.99	5.69	3.14

Ft Monmouth's Annual Gas Usage	
Year	Usage in Therms
2004	2,900,000

In the area of gas utility costs, New Jersey's 2004 cost is lower than that of Maryland in 2 out of the 3 product categories.

Utility Incentive Programs:

Both New Jersey and Maryland offer limited utility incentive programs. The following are the incentives, other than special incentives offered in 'Enterprise Zones', that each state offers:

NEW JERSEY

New Jersey Natural Gas Company Economic Development Tariff

New Jersey Natural Gas Company (New Jersey Natural) serves the area where Ft. Monmouth is located. New Jersey Natural offers an economic development tariff to commercial and industrial customers that meet the following criteria:

1. For new customers, the building receiving service under New Jersey Natural's economic development tariff must be newly constructed or have been vacant for at least 12 months.

For existing customers, must have been a New Jersey Natural customer for more than once year, and the space utilized for operations must have expanded by more than 5,000 square feet. Gas used in excess of the previous 12 months usage, will be subject to an Economic Development Credit.

Existing occupants that (a) converts to natural gas and (b) expands space utilized for its operations by more than 5,000 square feet would be eligible for the credit. The occupant must provide its energy usage for the previous twelve (12) months at the time of the application for gas service. This usage will serve as the basis for the "base period's" energy usage. New Jersey Natural will use the occupant's energy usage to calculate the BTUs used in excess of the base period. This excess gas usage would be eligible for the ED credit.

2. The customer must be adding or relocating at least two new jobs to New Jersey Natural's service territory.
3. The customer must apply for Economic Development Service upon the initial application for gas service.
4. The customer must execute a Service Agreement.
5. The building receiving service under New Jersey Natural's Economic Development tariff must be located within a community, in New Jersey Natural's service territory, with a ranking of 150 or less on the 1996 Municipal Distress Index compiled by the New Jersey State Planning Commission.

The Economic Development Tariff states that New Jersey Natural Gas reserves the right to offer its Economic Development tariff rates to customers located in areas of other communities that demonstrate characteristics warranting economic development.

Customers who are eligible for the Economic Development Tariff, will pay the same rates as New Jersey Natural's General Service Classification, except that High Load Factor (e.g., high stable gas usage) customers will receive a credit of \$0.1000 per therm for gas in excess of the previous 12 months gas usage. Low Load Factor Customers (e.g., low gas usage or

DCN11658 whose gas usage varies widely during a 12 month period) will be credited \$0.1175 per therm for eligible gas use.

Incentive Utility Rates

New Jersey's major utility companies provide a number of incentives, including flex rates, energy credits and rate discounts or waivers, for businesses that build or expand facilities and create jobs in New Jersey. Some programs encourage the utilization of vacant industrial and commercial real estate. Electric credits are provided to firms that occupy a minimum amount of vacant space as designated by the utility. Other programs apply "off peak employment" credits to help companies starting or resuming a second or third shift during off peak hours.

MARYLAND

Maryland Small Business Development Financing Authority (MSBDF) Contract Financing Program

This program provides financial assistance to eligible businesses in the form of a direct loan or the guarantee of loans made by a financial institution. MSBDF provides financing of up to \$500,000.

Funds may be used for working capital required to begin, continue and complete government or public utility contracts, or for the acquisition of machinery or equipment to perform contracts. Pre-award lines of credit can also be established. The loan term is the duration of the contract. The maximum interest rate for guaranteed loans is prime plus 2%.

PART III. NEW JERSEY TAX AND BUSINESS INCENTIVES

Introduction:

New Jersey offers a variety of incentive programs designed to help businesses expand, relocate, or retain jobs in the state. Unlike most states, New Jersey can provide a custom-designed package of incentives and tax advantages tailored to a specific business. In addition to tax credits, the programs include financial incentives, such as grants and other financial support, human resource assistance including help finding qualified employees, business advice, technical and site selection assistance, industry-specific programs, and aid in complying with state regulations.

The major tax and financial incentive programs are:

- Business Employment Incentive Program
- Business Retention & Relocation Allocation Grant
- Enterprise Zone Program
- Customized Training Grants Program
- Small High-Tech Companies Credit
- Utility Incentive Programs.

GENERAL FINANCIAL INCENTIVES

Business Employment Incentive Program (BEIP)

The BEIP grant enables the New Jersey Economic Development Authority (EDA) to provide grants, which may be in the form of direct payments, to businesses that are expanding or relocating operations in New Jersey and will create new jobs. Grants may range between 10% and 80% of the total amount of New Jersey state income taxes withheld by the business during each year of the term for the new employees hired. Grant assistance from this and other programs may not exceed 80% of a business' withholdings unless approved by the New Jersey State Treasurer. BEIP grant may be for a maximum term of up to 10 years.

Official guidelines for the program focus on three criteria that were defined in the original legislation to determine company eligibility:

- **Job Creation:** Any company that applies for a BEIP grant must create net new jobs in the State. In the base year, the company must create at least 75 new jobs in a non-targeted municipality (suburban) or at least 25 new jobs in a targeted area (urban). EDA is directed to give greater consideration to positions that average 1.5 times the minimum wage during the grant agreement. In all instances, a company must commit to maintain employment for 1.5 times the term of the grant.
- **Company Economic Viability:** Any company that receives a grant from the BEIP must be economically viable.
- **Material Factor:** The provision of a grant from the BEIP must be a material factor in a company's decision to expand and/or relocate operations in New Jersey. If the company has executed a written commitment to expand and/or relocate without the grant, it will be deemed ineligible for assistance.

Annual receipt of the BEIP grant is subject to appropriation from the General Fund to the EDA. In addition, there is an annual servicing fee of 1.5% of the grant disbursement with a minimum of \$1,500. No grant funds will be disbursed in any year until the Treasurer certifies that the amount of withholdings received from the business for the new employees at least equals the grant amount. All BEIP grants are subject to EDA Board of Directors approval.

Point-of-purchase retail facilities are ineligible for the BEIP grant. Businesses receiving relocation grants are not eligible unless approved by the State Treasurer.

The Business Retention and Relocation Assistance Act:

This law, approved on June 30, 2004, contains six business incentives, four of which are housed and administered by the Commission. Of the four, three are new incentives; 1.) The Sales and Use Tax Exemption Program, 2.) The Energy Sales Tax Exemption Program for retail energy sales to manufacturers located in Urban Enterprise Zones (UEZ) and 3.) Business Retention and Relocation Assistance Grant Tax Credit Transfer Program. The fourth, The Business Retention and Relocation Assistance Grant Program (BRRAG), is a revision of said program.

The other two incentives in the bill are revisions to existing incentives. The NJ Emerging Technology and Biotechnology Financial Assistance Program (a.k.a the Bio-Tech Tax Credit Transfer Program) was increased to \$60 million per year from \$40 million per year. The Manufacturing Equipment Tax Credit program was modified to provide small manufacturers, with 50 or fewer employees and net income of less than \$5 million, a 4% tax credit based on the value of the equipment purchased. The credit was previously 2% for all manufacturers regardless of size. A summary of the four Commission incentives follows:

- The purpose of this grant program is to encourage economic development and job creation and to preserve jobs that currently exist in New Jersey but which are in danger of being relocated to premises outside of the State.
- The program is available to businesses that relocate a minimum of 250 retained full-time jobs from one or more locations within this State to a new business location or locations in this State.
- Grants of up to \$1,500 per job retained are payable as a grant of tax credits against a business' tax liability.
- Businesses are required to retain the relocation project jobs for a five-year period pursuant to a Project Agreement with the Commission.

BRRAG Tax Credit Transfer Program

- ✓ Allows businesses with unused BRRAG tax credits to sell those credits to offset the costs incurred by the relocating business.
- ✓ Unused tax credits must be sold for at least 75 percent of their value.

Sales and Use Tax Exemption Program

- ✓ This program is designed to be used in combination with the BRAG program. It provides sales tax exemption for the purchases of "eligible property" similar to the UEZ program.
- ✓ Businesses that have 1,000 or more employees and relocate 500 or more to a new location or life sciences and manufacturing companies relocating 250 employees to a new location are eligible.
- ✓ Businesses are required to retain the relocation project jobs for a five-year period pursuant to a Project Agreement with the Commission.

Energy Sales Tax Exemption for Manufacturers

- ✓ This UEZ program provides for a sales and use tax exemption for final sales of electricity and natural gas and their transport sales tax exemption for retail energy purchases for eligible manufacturers located within an UEZ.
- ✓ To be eligible, manufacturers must be located in a UEZ with 500 or more employees, half of which, must be directly employed in the manufacturing process or be a vertically integrated combination of businesses manufacturing a single product, that employ at least 500 people, half of which, must be directly employed in a manufacturing process.
- ✓ Manufacturers must have UEZ certification.

Assistance for Small Businesses and Businesses Owned by Minorities and Women

The EDA Commercial Lending Division administers the following programs designed to assist small, minority and women owned businesses:

Financing programs: Under this program, loans may be made for up to 15 years for real estate, 10 years for fixed assets and five years for working capital. Loan guarantees are also available for up to 10 years for fixed assets and working capital. The program is open to businesses that have been certified by the New Jersey Commerce and Economic Growth Commission as small, minority owned or women owned. Most of the funds are targeted to businesses located in or serving Atlantic City, but limited funds are available for businesses in other areas.

Contractors assistance program: Under this program, funds are used to provide loans and guarantee performance bonds for eligible contractors. The program is open to small contracting businesses certified as minority or women business enterprises by the New Jersey Commerce and Economic Growth Commission, primarily in the Atlantic City area.

Statewide Loan Pool for Business

Through an arrangement between the EDA and New Jersey banks, this program provides loans from \$50,000 up to \$5 million for fixed assets and up to \$500,000 for working capital. The EDA may provide up to 25% of the financing with a maximum of \$500,000. The EDA may also guarantee up to 30% of the bank portion.

To be eligible, a business must (1) either create or maintain jobs; (2) be located in a financially targeted municipality; or (3) represent a targeted industry such as manufacturing, industrial, agricultural or one of the other sectors targeted for assistance by the EDA. EDA assistance usually will not exceed \$35,000 per job created or maintained. Businesses should contact the Department of Client Promotion for more information.

Other Business Loans and Loan Guarantees

In addition to the statewide loan pool for business, the EDA also administers other loan guarantee and direct loan programs. Guarantees of conventional loans of up to \$1 million for working capital and guarantees of conventional loans or bond issues for fixed assets of up to \$2 million are available. Preference is given to businesses that:

- Are job intensive
- Will create or maintain tax ratables

DCN:11658

- Are located in an economically distressed area; or
- Represent an important economic sector of the state.

Direct loans are available to businesses that are unable to get sufficient bank credit on their own or through the statewide loan pool or EDA guarantees. Loans are made for up to \$750,000 for fixed assets and up to \$500,000 for working capital for up to 10 years. Preference is given to job intensive businesses located in economically targeted areas or representing targeted business sectors.

Bond Financing

A wide variety of businesses are eligible for bond financing including:

- Manufacturing
- Warehousing/distribution
- Office
- Commercial/retail; and
- Service companies.

Bonds are issued to provide long-term loans at below market interest rates for:

- Real estate acquisition
- Equipment and machinery
- Building construction; and
- Renovations.

Minimum loan size is approximately \$1 million and the maximum tax-exempt amount for manufacturers is \$10 million. Businesses should contact the EDA Investment Banking Division for more information.

Fund for Community Economic Development

This program makes loans and loan guarantees to urban based community organizations that in turn make loans for real estate development projects to microenterprises and small businesses that may not qualify for traditional bank financing.

Local Development Financing Fund

This program makes loans from \$50,000 to \$2 million for fixed assets and is open to commercial and industrial projects located in Urban Aid communities. Requests for financial assistance must be sponsored by a municipality. Financing is generally limited to 25% of the project costs, and there is a required public/private dollar match.

Export Financing

This program can provide a one-year revolving line of credit of up to \$1 million to businesses that need financing to enter the export market or expand export sales. Funds can be used to buy raw materials, pay production costs and ship products. The borrowing is repaid when the account receivable is collected. Generally, the borrower must have either an irrevocable letter of credit from the purchaser or insurance acceptable to the EDA to collateralize borrowings under the line

of credit. In addition, the line of credit is available only if at least 50% of the costs of the goods or services being financed, other than raw materials, is added in New Jersey.

Hazardous Discharge Site Remediation Loan and Grant Program

This program provides qualified businesses with loans of up to \$1 million for up to 10 years for on site investigation and cleanup. The interest rate is the Federal Discount Rate at approval or closing of contaminated sites, whichever is lower, with a minimum of 5%. Loan guarantees are also available. The program is available to:

- Businesses that are required to perform remediation activities due to a closure or transfer of operations and do not have a funding source
- Persons who have discharged or are responsible for a hazardous substance and do not have a funding source; and
- Persons who use innovative technology for remedial activities, have assets less than \$2 million, and do not have a funding source.

Petroleum Underground Storage Tank Remediation, Upgrade, & Closure Program

This program is available to businesses that (1) own or operate fewer than 10 petroleum underground storage tanks in New Jersey; (2) have a net worth of less than \$2 million; and (3) cannot obtain a commercial loan for the costs associated with the upgrade, closure and remediation of discharges from underground storage tanks. Qualifying businesses may receive loans of up to \$1 million per facility for up to 10 years.

Remediation of Sites Contaminated by Hazardous Waste

The State Treasurer and the New Jersey Commerce and Economic Growth Commission are authorized to enter into redevelopment agreements with developers who agree to remediate sites contaminated by hazardous waste and clear, develop or rehabilitate structures on those sites. Under the terms of such an agreement, the state will reimburse the developer up to 75% of the costs of remediation. The state may enter into an agreement only if the Treasurer finds that the tax revenues to be realized from the redevelopment project will exceed the amounts paid to the developer.

Incentive Utility Rates

New Jersey's major utility companies provide a number of incentives, including flex rates, energy credits and rate discounts or waivers, for businesses that build or expand facilities and create jobs in New Jersey. Some programs encourage the utilization of vacant industrial and commercial real estate. Electric credits are provided to firms that occupy a minimum amount of vacant space as designated by the utility. Other programs apply "off peak employment" credits to help companies starting or resuming a second or third shift during off peak hours.

Urban Centers Small Loans

This program helps provide low interest loans ranging from \$5,000 to \$50,000 for up to 10 years. Loans are available to retail and commercial businesses located in the commercial districts of targeted municipalities. Proceeds must be used primarily for renovations, although a portion can be applied to fixed assets or for working capital.

Real Estate Development Programs

The EDA Real Estate Development Division offers a full range of real estate development services, from assembling land and structuring financing to overseeing building construction. This approach produces considerable financing advantages and cost benefits that make it easier for companies to locate and stay in New Jersey. The Division assists creditworthy companies that need facilities for manufacturing, distribution or research and developers of mixed-use projects involving office, retail or hotel uses.

Joint ventures with developers and other private entities will be considered for development projects that offer significant economic benefits for a region.

Programs Administered by the New Jersey Redevelopment Authority (NJRA)

The New Jersey Redevelopment Authority (NJRA) focuses on investing in neighborhood based redevelopment projects. The Authority offers low and no interest loans, equity investments, loan guarantees and technical assistance to eligible businesses and municipalities. It partners with community-based organizations, developers and businesses to formulate and develop redevelopment projects to increase economic opportunities in 67 eligible communities.

Sustainable Development Low Interest Loans

A business located in or planning to locate in New Jersey for the purpose of engaging in environmentally sustainable actions is eligible to apply for a low interest loan. To receive a loan, the applicant must be engaged in the prevention of pollution, the conservation of resources or the production of recyclable goods and services from renewable sources with minimal to zero emissions. Loans may be used to expand sales or to purchase fixed assets that expand the sustainable actions of a current business. The maximum loan amount is \$250,000.

Technology Business Tax Certificate Program

This program allows new or expanding technology and biotechnology businesses to sell their unused net operating loss carryforwards and unused R&D tax credit carryforwards to any corporate taxpayer in the state for at least 75% of the value of the tax benefits. The funds obtained can be used for working capital, equipment, facilities or other business expenses.

To qualify, the technology or biotechnology business must have no more than 225 employees of whom at least 75% and based in New Jersey, and meet other criteria. This competitive program awards \$40 million in tax certificates annually. Applications are due by June 30th each year and approvals are made early in the fall. Each company has a lifetime cap to sell no more than \$10 million of tax benefits to a buying business.

New Jersey Seed Capital Program

Through this program, the EDA makes low-interest loans of up to \$250,000 for working capital to cover salaries and inventory and up to \$500,000 for fixed assets. The loans are available to enable emerging high-tech businesses to bring their products to market. Funding may be secured as a single loan or in tiered increments based on specific goals set and met by borrowers.

Loans are available to qualified applicants for up to five years. Eligible companies are technology businesses that have risked their own capital to develop new technologies and need

additional funds to bring their products to market. Businesses should meet most of the following requirements:

- Have a technology that exhibits a strong likelihood of commercialization
- Have a formal business plan
- Have a strong management team
- Operate within an emerging technology sector
- Be located in an established business/incubator location
- Have begun product testing
- Have received funding/technical assistance from the Commission on Science and Technology; and
- Demonstrate the ability to raise capital through investors.

New Jersey Technology Funding Program

Through this program, EDA participates with commercial banks to make term loans from \$100,000 to \$5 million. EDA's direct participation may be up to \$500,000 for working capital and up to \$500,000 for fixed assets at a below-market rate. EDA will also consider up to a 50% guarantee on the bank's portion of the loan.

Eligible companies include second stage technology enterprises that meet the majority of the following:

- Has received venture capital, other venture financing and/or is raising funds through an IPO or private placement
- Has received or is close to obtaining regulatory approval (if applicable)
- Has licensing arrangements with or is selling to established companies
- Has historical financial statements showing limited cash flow/profitability
- Has reasonable forecasts of profits/cash flow; and
- Has a detailed business plan.

Technology Transfer & Commercialization Program: This program, administered by the Commission on Science & Technology, is a funding source for small technology companies to conduct product or process development projects with a near-term commercial outcome. Loans range from \$50,000 to \$250,000. Companies are required to repay only the principal. Companies must be New Jersey based or plan to relocate to New Jersey.

Local Development Financing Fund for Commercial/Industry Projects: Eligible projects are commercial and industrial projects located in Urban Aid communities. The municipality must sponsor the request for financial assistance. Loans ranging from \$50,000 to \$2 million may be made for fixed assets. Financing is in the form of a permanent subordinated mortgage loan made at half of the Federal Discount Rate at the time of approval or 3%, whichever is greater. There is a required minimum 1:1 public/private dollar match but generally the financing is limited to no more than 25% of the project costs.

JOBS TRAINING PROGRAM

Customized Training Program

DCN:11658

Customized training grants are matching grants awarded to New Jersey businesses to provide training to the company's workforce in skills specifically needed to increase productivity and marketability. The grants, awarded through the Department of Labor, are funded through the Workforce Development Partnership Program. To be eligible for a grant, an employer must be seeking to create, upgrade, or retain jobs in a labor demand occupation for its workers. Grants are available to businesses relocating to New Jersey as well as to businesses already operating there, and grants may be used for either on-the-job or classroom based training. While manufacturing remains a targeted industry for assistance through Customized Training, other industry sectors that demonstrate significant job growth or are facing critical retention issues will be considered. Applicants may select a third party training vendor such as New Jersey community colleges, four-year colleges/universities, county vocational schools, or private training organizations.

TAX INCENTIVES

TAX CREDITS

High Technology Business Credit

An investment tax credit of up to \$500,000 per year was allowed certain small New Jersey-based high technology businesses with gross receipts from start up activities under \$1 million for tax years beginning on or after January 1, 1999. The legislation governing this tax credit expired for privilege periods beginning on and after July 1, 2001. Any unused credit may be carried over for 15 years following a credit's tax year, but not to a tax year during which a corporate acquisition, with respect to which a taxpayer was a target corporation, occurred or during which the taxpayer was a party to a merger or a consolidation.

New Employees in Qualified Projects

A business subject to the corporation business tax conducted at a location within a project associated with the New Jersey Urban Development Corporation is entitled to a credit for each new employee at that location who is a resident of the municipality in which the project is located and who, immediately prior to employment by the taxpayer, was unemployed for at least 90 days or was dependent upon public assistance as the primary source of income. The business located within a project must consist primarily of manufacturing or other business that is not retail sales or warehousing oriented.

An annual credit of \$1,500 is allowed for each new employee. The credit is continued into the second year only if the taxpayer remains qualified.

Credit for Certain Child Care Programs

The neighborhood and business child care credit was available to taxpayers who were members of a small to medium business child care consortium during a three-year demonstration program (taxable periods ending on or after July 31, 1999, and before July 1, 2002) and who made expenditures for child care center physical plant or facilities owned or operated by the consortium or by a contracted sponsoring organization. The expenditures had to be made on or after the designation of the consortium and before the expiration of the demonstration program. The credit was also available to taxpayers who made contributions to a sponsor of a neighborhood-based childcare center that was awarded a program grant. To qualify, the

contribution had to be made on or after the awarding of the grant and before the expiration of the demonstration program.

Smart Moves for Business Program

A taxpayer that has registered with the New Jersey Department of Transportation and that has an authorized report/plan to provide commuter transportation benefits to employees may claim a credit against the entire net income component of the corporation business (income) tax based on the direct expenditures attributed to the report/plan. The employer may only claim a credit for providing commuter transportation benefits if those benefits are provided in addition to and not in lieu of compensation. This credit was formerly known as the Employer Trip Reduction Plan/Rideshare Tax Credit.

The amount of the credit is 10% of the cost of implementing and operating the report/plan during the reporting period with a per-employee ceiling that is adjusted for inflation annually. The maximum per employee amount of credit for employers who provide a commuter transportation benefit to employees is \$124 for 2003. The limit amount for 2002 was \$120.

The credit may be taken for expenditures made after January 1, 1994. The total amount of the credit allowed for an accounting or privilege period may not exceed 50% of the tax liability and may not reduce the amount of tax liability to less than the statutory minimum.

New Jobs Investment

A credit is allowed against the entire net income component of the corporation business (income) tax to taxpayers making qualified investments in new or expanded business facilities that result in new jobs in New Jersey, provided the number and compensation of the new jobs meet minimum requirements. Investments that qualify for the credit must be placed in service or use during tax years beginning after July 7, 1993. The credit is allowed against the portion of the corporation business tax attributable to and a direct consequence of the investment.

To qualify for the credit, the investment of small or mid-size business taxpayers must result in the creation of at least five new jobs. The investment of other taxpayers must result in the creation of at least 50 new jobs. The resulting new jobs must have a minimum median annual compensation of \$35,000 for tax years beginning in 2004. The minimum median annual compensation amount was \$34,200 for tax years beginning in 2003.

The maximum credit allowed is equal to the amount of the taxpayer's qualified investment multiplied by the taxpayer's new jobs factor. A taxpayer's qualified investment is determined on the basis of all or a portion of the cost of the property placed into service, depending up the recovery period for the property under the IRC §168, as follows:

- 3-year recovery period, qualified investment is 35% of cost
- 5-year recovery period, qualified investment is 70% of cost; and
- 7-year recovery period, qualified investment is 100% of cost

Aggregate annual credit. The credit is taken over a five-year period, at the rate of 1/5 of the total credit each year, beginning with the year in which the property was placed in service. The credit is allowed only against the portion of the taxpayer's corporation business (income) tax liability that is attributable to and the direct result of the taxpayer's qualified investment. The credit may

not reduce corporation business tax liability by more than 50% of that portion of the tax, and may not reduce the tax below the minimum tax.

Certification required. With the corporation business tax return for the year in which qualified property is placed into service, taxpayers must submit a report and certification of the estimated number of new jobs reasonably projected to be created by it in New Jersey within the first three years in which the qualified property is in use. With the corporation business tax return for the third year in which qualified property is in service, taxpayers must certify the actual number of new jobs created in New Jersey. If the actual number of new jobs would result in a higher or lower new jobs factor, the credit must be re-determined for the first two years and amended returns must be filed for those years. Penalty and interest for failure to pay tax when due applies to any additional tax due as a result of this re-determination.

Disposition of property. If any property for which a credit has been allowed is disposed of before the end of its recovery period, or otherwise ceases to be used in a new or expanded business facility (unless damaged or destroyed by fire, flood, storm, or other casualty) during the period for which the credit is allowed, the unused portion of the credit for the property is forfeited. In addition, the percentage of cost of the property allowed as qualified investment is re-determined at the percentage of cost allowable for the actual period of time in which the property was put to use.

Property tax offset. Some or all of the credit remaining after application against corporation business tax may be refunded to the taxpayer as a partial offset against property taxes. The excess credit is refunded to the taxpayer to the extent it does not exceed 50% of the sum of: (1) the property taxes the taxpayer actually paid; and (2) the taxpayer's implicit property taxes (equal to 15% of rent or lease payments for property subject to the property tax). No carryforward or carryback is allowed for any unused credit that remains after the allowable application against the corporation business tax and the property tax.

No credit is allowed for property that qualifies for the manufacturing equipment tax credit or the employment investment tax credit. Any allowable urban enterprise zone employees tax credit, urban enterprise zone investment tax credit, or redevelopment authority project tax credit is required to be applied against the amount of the corporation business tax not apportioned to the qualified investment of the new jobs investment tax credit. Any excess of those credits may be applied against the amount of the corporate business tax apportioned to the qualified investment that is not offset by the amount of annual new jobs investment credit for the year.

If a taxpayer is entitled to other economic incentive credits, each credit must be applied in a specified order.

DCN:11658
Manufacturing Equipment Investment Tax Credit

A credit is allowed against the entire net income component of the corporation business (income) tax for investment in qualified equipment.

Manufacturing equipment credit: The manufacturing equipment credit is equal to 2% of the investment credit base of qualified machinery acquired by purchase or lease and placed in service in the tax year, up to a maximum credit of \$1 million.

Qualified equipment. Machinery, apparatus or equipment acquired by purchase or lease for use or consumption by the taxpayer directly and primarily in the production of tangible personal property by manufacturing, processing, assembling or refining with a useful life of four or more years and placed in service in New Jersey. Property that the taxpayer contracts or agrees to lease or rent to another person or licenses to another person to use does not qualify. Lease renewals, subleases, or assignments do not qualify.

Applicable to taxable years beginning after 2001, the manufacturing equipment tax credit is extended to electric energy and thermal energy production. Machinery, apparatus, or equipment acquired by purchase for use or consumption directly and primarily in the generation of electricity to the point of connection to the grid, or in the generation of thermal energy, having a useful life of four or more years, and placed in service in New Jersey, is now included in the definition of "qualified equipment" for purposes of claiming the credit.

The amount of the credit that cannot be applied for the tax year due to the applicable limitations may be carried over to the seven tax years following a credit's tax year. However, a taxpayer may not carry over any amount of unused credit to a tax year during which a corporate acquisition, with respect to which a corporate acquisition, with respect to which a taxpayer was a target corporation, occurred or during which the taxpayer was a party to a merger or consolidation.

Credit attributable to property that is disposed of or ceases to be qualified equipment prior to the end of its categorized useful life must be calculated based on the following: for three-year property, the number of months of qualified use divided by 36; and for all other property, the number of months of qualified use divided by 60. Additionally, except when the property is damaged or destroyed by fire, flood, storm, or other casualty, or is stolen, the taxpayer must re-determine the amount of the credit allowed for the tax year of the credit by reducing the investment credit base by the cost of the amount of the disposed or disqualified equipment. If the re-determination of the credit results in an increase in tax liability for any period in which the credit was applied, the amount of unpaid liability must be considered a deficiency and the taxpayer must file an amended return.

The credit allowable for any given year is limited to 50% of the taxpayer's total liability, not to exceed an amount that would reduce the total tax liability below the statutory minimum. Taxpayers qualifying for the investment tax credit for equipment are also allowed a credit against tax determined on the basis of the increase in employment by the taxpayer in the two tax years following the investment. The manufacturing equipment is first applied against the tax, then the employment credit.

Research Activities Credit

A credit against the entire net income component of the corporation business tax is allowed for qualifying research activities performed in New Jersey. In addition, corporations are eligible for

DCN:11658

a basic research credit if its payments in cash to a qualified university or scientific research organization under a written contract exceed a base period amount (based on the corporation's general university giving and certain other maintenance-of-effort levels for the three preceding years).

The credit amount is equal to 10% of the excess of the qualified research expenses for the tax year over the base amount, plus 10% of basic research payments, as determined under IRC Sec. 41.

As a result of enactment of the Business Tax Reform Act of 2002, applicable to privilege periods beginning after 2001, when calculating entire net income for corporation business tax purposes, no deduction is allowed for research and experimental expenditures to the extent those expenditures are qualified research expenses or basic research payments for which an amount of the New Jersey increased research activities credit is claimed, unless those research and experimental expenditures are also used to compute a federal credit claimed pursuant to IRC Sec. 41.

Research activities credits are applied in the order of the credit's tax years. The credit may not exceed 50% of the tax otherwise due and may not reduce tax below the minimum tax.

Corporation business tax benefit certificate transfer program: New or expanding emerging technology and biotechnology companies in New Jersey with unused research and development tax credits (otherwise allowable but which cannot be applied due to statutory limitations) and unused net operating loss (NOL) carryovers may surrender those tax benefits to other New Jersey corporation business taxpayers for use against New Jersey corporation business (income) tax in exchange for private financial assistance under the corporation business tax benefit certificate transfer program, established by the New Jersey Economic Development Authority within the Emerging Technology and Biotechnology Financial Assistance Program, and applicable to tax years beginning on or after January 1, 1999.

The taxpayer receiving the corporation business tax benefit certificate must, in exchange, provide private assistance in the amount of at least 75% of the amount of the surrendered tax benefit to the new or expanding emerging company. The private financial assistance must be used to fund expenses incurred in connection with the operation of the new or expanding emerging technology or biotechnology company, such as the construction, acquisition, and development of real estate, materials, start-up, tenant fit-out, working capital, salaries, and research and development expenditures.

A taxpayer that acquires a corporation business tax benefit certificate must enter into a written agreement with the new or expanding emerging technology or biotechnology company concerning the terms and conditions of the private financial assistance. Further, a taxpayer that has acquired a corporation business tax benefit certificate that includes the right to an NOL carryover deduction or the right to a research and development tax credit carryover must attach that certificate to any return the taxpayer is required to file.

Excess credit may be carried over to the seven accounting years following the credit's tax year.

A taxpayer that has been allowed a research and development credit for the fiscal or calendar accounting period (tax year) in which the qualified research expenses have been incurred, and basic research payments have been made, for research conducted in New Jersey in the fields of advanced computing, advanced materials, biotechnology, electronic device technology,

DCN:11658

environmental technology, and medical device technology, are allowed to carry over the amount of the tax year credit that could not be applied for the tax year to each of the 15 tax years following the credit's tax year.

No recycling equipment credit, new jobs investment credit or manufacturing equipment and employment investment tax credit may be allowed for any property for which the research activities credit is allowed or that is included in the calculation of the research activities credit.

Credit for Effluent-Treating Equipment

A credit against the entire net income component of the corporation business (income) tax is available for purchases of equipment used exclusively to treat effluent from a primary wastewater treatment facility that would have otherwise been discharged into New Jersey waters for subsequent reuse in an industrial process or conveyance equipment used exclusively to transport effluent to the treatment facility or to transport the treated effluent to its reuse site. In addition, the equipment must be used exclusively in New Jersey.

The credit amount equals 50% of the equipment cost, less the amount of any loan received from the State Recycling Fund, and excluding the amount of sales and use tax paid on the equipment, provided that the Commissioner of the New Jersey Department of Environmental Protection has issued a determination that the operation of the system of equipment and the reuse of wastewater effluent that results are or will be beneficial to the environment.

The amount of the credit claimed in the year of purchase and in subsequent years cannot exceed 20% of the amount of the total credit allowable, cannot exceed 50% of the taxpayer's tax liability together with any other credits, and cannot reduce the amount of tax liability to less than the minimum tax.

Any unused credit may be carried forward to future tax years.

To qualify for the credit, a taxpayer must file a written application for a determination by the Commissioner of the Department of Environmental Protection that the equipment purchased qualified for the credit and is or will be in its operation, considered in conjunction with the reuse of the further treated wastewater effluent that results from that operation, beneficial to the environment.

If a purchaser of qualified equipment is a partnership, limited liability company, or other person classified as a partnership for federal income tax purposes and not subject to the corporation business (income) tax, a portion of the amount of the credit otherwise allowed to the purchaser is allowed to each owner of that purchaser that is subject to the tax in proportion to the owner's share of the income of the purchaser.

Urban Enterprise Zone Investment Credit

The urban enterprise zone investment tax credit is allowed against the entire net income component of the corporation business (income) tax to a taxpayer that is an approved qualified business under the New Jersey Urban Enterprise Zone Act and that has made an investment or other expenditure in an urban enterprise zone. The investment must have been authorized by the Urban Enterprise Zone Authority and approved by the municipal government.

DCN:11658

The one-time credit equals 8% of each new investment made in the enterprise zone under an agreement approved by the New Jersey Urban Enterprise Zone Authority.

Enterprise Zone Credit for Qualified Wages

A credit is available against the entire net income component of the corporation business (income) tax to corporations actively conducting business from a location within a designated enterprise zone for certain new, full-time, permanent employees.

A one-time credit of \$1,500 is allowed for each new full-time, permanent employee employed at the enterprise zone location who is a resident of a qualifying municipality in which a designated enterprise zone is located and who immediately prior to employment by the taxpayer was unemployed for at least 90 days, or was dependent upon public assistance as the primary source of income.

A one-time credit of \$500 is allowed for each new full-time, permanent employee employed at the enterprise zone location who is a resident of a qualifying municipality in which a designated enterprise zone is located, who does not meet the requirement for the \$1,500 credit, and who was not employed at a location within the qualifying municipality immediately prior to employment by the taxpayer.

Redevelopment Authority Projects; Job Creation/Hiring

A business subject to the corporation business tax and conducted at a location within a project associated with the New Jersey Urban Development Corporation is entitled to a credit against the entire net income component of the tax for each new employee at that location who is a resident of the municipality in which the project is located and who, immediately prior to employment by the taxpayer, was unemployed for at least 90 days or was dependent upon public assistance as the primary source of income. The project must be located in a qualified municipality and the business must consist primarily of manufacturing or other business that is not retail or warehousing oriented.

Any specific work or improvement, including lands, buildings, improvements, real and personal property or interest therein, acquired, owned, constructed, reconstructed, rehabilitated or improved by the New Jersey Urban Development Corporation or for the corporation under an agreement constitutes a project for purposes of the credit. This credit was formerly known as the Urban Development Project Employees Tax Credit.

A credit of \$1,500 for each of two years is allowed for each new employee.

The credit is allowed only for new employees who were employed by the taxpayer for at least six consecutive months during the year in which the taxpayer qualifies for the credit and may be carried over to a second year if the qualification continues.

Municipal Rehabilitation and Economic Recovery; Job Creation/Hiring

Beginning June 30, 2002, a taxpayer with a business located in a qualified municipality under the Municipal Rehabilitation and Economic Recovery Act that is not receiving a benefit under the New Jersey Urban Enterprise Zone Act is eligible for a credit against the entire net income component of the corporation business (income) tax equal to \$2,500 for each new full-time position at the location in credit year one and \$1,250 for credit year two.

DCN:11658

A "qualified municipality" is one that has been subject to the supervision of a financial review board and the Local Financial Aid Board, and that is dependent on state aid and other state revenues for not less than 55% of their total budget according to the municipal budget adopted most recently to June 30, 2002. The City of Camden is currently the only municipality qualified under the Recovery Act.

A refund for the first year credit is permitted under certain circumstances. A five-year carryover period is allowed.

Employment Investment

Taxpayers allowed the credit for investment in qualified manufacturing equipment are allowed an additional credit determined on the basis of the increase in employment by the taxpayer in the two tax years following the investment.

Applicable to taxable years beginning after 2001, the manufacturing equipment tax credit is extended to electric energy and thermal energy production. Machinery, apparatus, or equipment acquired by purchase for use or consumption directly and primarily in the generation of electricity to the point of connection to the grid, or in the generation of thermal energy, having a useful life of four or more years, and placed in service in New Jersey, is now included in the definition of "qualified equipment" for purposes of claiming credit.

The credit amount is equal to 3% of the investment credit base on which the manufacturing equipment credit was calculated. However, for each of the two tax years succeeding the investment, this credit is limited to \$1,000 multiplied by the number of new employees.

Manufacturing investment and employment investment credits combined may not exceed 50% of the tax otherwise due for any tax year, and may not reduce tax liability below the minimum tax.

The amount of the credit that cannot be applied for the tax year due to the applicable limitations may be carried over to the seven tax years following a credit's tax year. However, a taxpayer may not carry over any amount of unused credit to a tax year during which a corporate acquisition, with respect to which a taxpayer was a target corporation, occurred or during which the taxpayer was a party to a merger or a consolidation.

The manufacturing equipment investment credit is first applied against the tax, then the employment investment credit. Employment investment credits are applied in the order of the manufacturing equipment credits to which they relate.

Contaminated Site Remediation Costs

Effective for costs incurred in privilege periods beginning after 2003 and before 2007, a credit against New Jersey corporation business (income) tax is available for qualified environmental remediation costs.

The credit is equal to 100% of the certified eligible costs of remediation of a contaminated site performed during privilege periods beginning after 2003 and before 2007.

The credit may not exceed 50% of the tax otherwise due and may not reduce a taxpayer's liability below the statutory minimum amount due. The priority of the credit will be determined by the Director of the Division of Taxation of the Department of the Treasury, and the credit must be applied in the order of the credit's privilege periods. The amount of the credit, when taken

DCN:11658

together with any property tax exemption amount available to the taxpayer under the Environmental Opportunity Zone Act and any other state, local, or federal remediation tax incentive, may not exceed 100% of the total remediation cost incurred.

Unused credits may be carried forward for the five privilege periods following the credit's privilege period, but no credit may be carried forward to a privilege period in which a corporate acquisition occurs involving the taxpayer as the target corporation.

To be eligible for the credit, a taxpayer must receive certification both from the Department of Environmental Protection and the Director of the Division of Taxation.

The legislation also requires the Director of the Division of Taxation to establish a benefit certificate transfer program for fiscal years 2005 through 2007 that will allow taxpayers performing eligible remediation in New Jersey to transfer credits for use by unaffiliated corporation business (income) taxpayers. For purposes of determining whether a corporation receiving surrendered benefits is affiliated with the surrendering corporation, the test is whether the same entity directly or indirectly owns or controls 5% or more of the voting rights, or 5% or more of the value of all classes of stock, of both corporations.

The director may authorize the transfer of no more than \$12 million of tax benefits in each of the indicated fiscal years, and the maximum amount of tax benefits that a corporation may be allowed to surrender under the transfer program for the entire three-year period may not exceed \$4 million.

Applications for the transfer program must be received on or before February 1, 2005, and each February 1 thereafter. No taxpayer liable for contamination of any site under the New Jersey Spill Compensation and Control Act may acquire a surrendered tax benefit under the program.

Neighborhood Revitalization

A business entity that has provided funding for a qualified project that is part of the neighborhood revitalization plan of a state-approved nonprofit organization is eligible for a certificate for a neighborhood revitalization state tax credit that may be applied by the entity as a credit against tax imposed on business related income, other than gross (personal) income tax, and including the entire net income component of the corporation business (income) tax, the insurance premiums tax, and the marine insurance company tax, the utility excise tax, and the petroleum products gross receipts tax.

A credit may be granted in an amount up to 50% of the approved assistance provided to a nonprofit organization to implement a qualified neighborhood preservation and revitalization project. A business entity's credit may not exceed \$500,000 for any taxable year, or the total amount of tax otherwise payable by the business entity for the taxable year, whichever is less, and may not exceed limitations placed on the amounts of credits or carryforward credits allowed, if any, under the relevant statute concerning the tax for which the credit is being claimed. Credit is not allowed for activities for which the business entity is receiving credit under any other provision against any tax on business related income, other than the New Jersey gross (personal) income tax.

Total tax credits certified for all qualified projects proposed in a fiscal year may not exceed \$10 million. Effective May 1, 2003, the total of all assistance approved on behalf of a nonprofit organization per project may not exceed \$1 million.

In order for an entity to be eligible for the credit, the nonprofit organization that is the recipient of the entity's funding must receive approval for its neighborhood preservation and revitalization plan from the New Jersey Department of Community Affairs. In addition, the nonprofit organization must submit for approval a proposed project that defines the elements of the plan to be implemented with the funds provided. Two or more nonprofit organizations may submit a joint plan. Effective May 1, 2003, an eligible neighborhood may be located in more than one municipality.

Municipal Rehabilitation and Economic Recovery Rebate

Businesses that locate or expand in a qualified municipality under the Municipal Rehabilitation and Economic Recovery Act during a rehabilitation and recovery period are eligible to receive a corporation business tax rebate in an amount up to 75% of an incentive payment paid to the state by the taxpayer. Currently, only the City of Camden is a qualified municipality. The taxpayer must apply for the rebate within two years of deposit of the incentive payment and must establish that the monies will be used for business relocation or expansion property. The rebate is forfeited if the taxpayer does not establish eligibility within the two-year period.

Aircraft Carriers Credit

The Business Tax Reform Act of 2002 enacted a credit against the alternative minimum assessment for aircraft carriers. Applicable to privilege periods that begin after 2001, an air carrier that contributes more than 25% of the total amortization for capital improvement projects at Newark International Airport paid by air carriers to the Port Authority of New York and New Jersey through rates and charges for a privilege period is allowed a credit against the alternative minimum assessment (AMA) in an amount equal to 50% of the portion of the total amortization for capital improvements at Newark International Airport paid by the air carrier to the Port Authority of New York and New Jersey through rates and charges for the privilege period. However, the amount of the credit applied against the AMA for a privilege period may not exceed 50% of the AMA otherwise due and cannot reduce the AMA to an amount less than the statutory minimum.

HMO Assistance Fund

A member organization of the New Jersey Insolvent Health Maintenance Organization Assistance Association is allowed a credit against the entire net income component of the corporation business (income) tax for an assessment made by the Association for which a certificate of contribution has been issued.

The credit is equal to 50% of the assessment. One-fifth of the credit amount may be applied against the entire net income component of the corporation business (income) tax for each of the five privilege periods beginning on or after the third calendar year commencing after the assessment was paid. However, no member organization may reduce their tax liability by more than 20% of the amount (determined without regard to any other credits allowed pursuant to law) otherwise due for a privilege period. If a member organization ceases to do business in New Jersey, any credit amounts not yet applied against its liability may be applied against its liability for tax imposed for the privilege period that it ceases to do business in New Jersey.

Credits for Corporation Income or Corporation Business Tax Improperly Paid

DCN:11658

A taxpayer who has paid corporation business (income) tax for a calendar or fiscal year for which it was not properly subject to tax under the Corporation Business Tax Act may offset the amount of tax paid against the tax due under the Corporation Income Tax Act. A taxpayer who has paid corporation income tax for a calendar or fiscal year for which it was properly subject to tax under the Corporation Business Tax Act may offset the amount of corporation income tax paid against the tax due under the Corporation Business Act. The corporation income tax was repealed by Ch. 40 (A.B. 2501), Laws 2002, applicable to privilege periods beginning after 2001.

Film Production Financial Assistance

The New Jersey Film Production Assistance Act authorizes the Economic Development Authority (EDA) to identify New Jersey corporation business (income) tax credits or low-interest loans that may be available from the state, federal government agencies, or private organizations to promote the planning and development of film projects in New Jersey. The program is available beginning September 15, 2003 and for the following five years. The EDA may use funds available for the program to give financial assistance to eligible film production companies.

SALES & USE

New Jersey imposes a sales and use tax of 6% on tangible personal property and covered services. Some retail sales in Salem County and in enterprise zones are taxed at a reduced rate of 3%. Some cities are authorized to impose a tax up to 2% on tourism related retail receipts, and Atlantic City imposes a luxury tax of 9% on some sales. The maximum tax on sales that are subject to both the state sales tax and the Atlantic City tax is 12%.

Manufacturing

The following are exempt from sales and use tax:

- Sales of machinery, apparatus, or equipment for use or consumption directly and primarily in the production of tangible personal property by manufacturing, processing, assembling, or refining
- Imprinting services, such as engraving and etching services to printing machinery used to produce patterned textiles and wall and floor coverings
- The use of property by the purchaser for conversion into articles produced for sale, or distribution as samples
- Sales of materials, such as chemicals and catalysts, that are used to induce or cause a refining or chemical process, are exempt from tax when the materials are an integral or essential part of the processing operation, but do not become part of the finished product; and
- The services of producing, fabricating, processing, printing, or imprinting tangible personal property delivered to a location outside of New Jersey for use outside the state.

The exemption does not apply if the use of the property is merely incidental to the above activities, nor does the exemption apply to motor vehicles, parts with a useful life of one year or less, natural gas distributed through a pipeline, electricity, utility service, and tools and supplies used in conjunction with the machinery, apparatus, or equipment.

Machinery, apparatus, or equipment is directly used in production only when used to initiate, sustain, or terminate the transformation of raw materials into finished products. To determine

whether there is direct use, the following factors are considered:

- the physical proximity of the property to the production process
- the proximity of time the property is used to the time other property is used before and after it in the production process
- the active causal relationship between the use of the property and the production of the finished product

When a single unit of machinery, apparatus, or equipment is put to use in two different activities, only one of which is a "direct use", the property is not exempt from tax unless used more than 50% of the time directly in manufacturing, processing, assembling, or refining operations, except in those cases where the machinery, apparatus, or equipment is rented, leased, or used by persons other than the purchaser.

Definitions: "Assembling" means the collecting or gathering together of the parts of a product, and placing them in their proper relation to each other.

"Manufacturing or processing" means the performance of operations to place items of tangible personal property in a form, composition, or character different from that in which it was acquired. The change must be substantial and must result in a transformation into a different or substantially more usable product.

"Machinery, apparatus or equipment" means any complex, mechanical, electrical, or electronic device that is adapted to the accomplishment of a production process, and that is designed to be used and is used in manufacturing, converting, processing, fabricating, assembling, or refining tangible personal property for sale.

"Refining," means the making fine or pure or partially free from extraneous or undesirable matter.

Research and Development

Sales of tangible personal property purchased for use or consumption directly and exclusively in research and development in the experimental or laboratory sense are exempt from tax. The exemption does not apply to property for use in ordinary testing or inspection of materials or products for quality control, efficiency or consumer surveys, management studies, advertising, promotions or research in connection with literary, historical or similar projects.

The following tangible personal property would be considered directly and exclusively in research and development:

- the materials worked on
- the machinery, equipment, or apparatus used to conduct the research and development work; and
- any supplies used or consumed in connection with the research and development activity.

The exemption does not extend to the installation, maintenance, or repair of research and development equipment.

Computer Software

DCN:11658

Software that meets certain criteria is considered intangible personal property and not subject to sales tax. To be considered nontaxable "software", one of the following elements must be present: (1) preparation or selection of the customer's use requires an analysis of the program for the customer's requirements by the vendor; or (2) the program requires adaptation by the vendor, to be used in a specific environment, a particular make and model of computer utilizing a specified output device.

Maintenance contracts for nontaxable software are considered to be nontaxable services. Where taxable and nontaxable services are not separately stated, the entire invoice is subject to tax.

Advertising

Receipts from sales of advertising and promotional materials are exempt from tax if they are for out-of-state distribution by a New Jersey advertising or promotional firm to out-of-state recipients. The exemption includes, but is not limited to, receipts from the preparation and maintenance of mailing lists, addressing, separating, folding, inserting, sorting and packaging advertising or promotional materials, and transporting to the point of shipment by the mail service or other carrier. Also exempt are receipts from the sale of advertising to be published in a newspaper.

The use of property that is converted into or becomes a part of a product produced for market sampling by the purchaser is exempt from tax.

Packaging

Wrapping paper, twine, bags, cartons, tape, rope, labels, non-returnable containers, reusable milk containers, and all other wrapping supplies are exempt from sales and use tax if their use is incidental to the delivery of tangible personal property.

Delivery/Installation Charges

Installation of property that becomes a capital improvement to real property is exempt from sales and use tax. The following factors are considered in determining whether an installation of tangible personal property results in a capital improvement: (1) whether the improvement results in an increase in the capital value of the realty; and (2) whether the improvement results in a significant increase in the useful life of the property. Charges for the transportation/delivery of property are exempt from tax.

Agriculture

Receipts from sales of tangible personal property for use and consumption directly and primarily in the production, handling or preservation for sale of tangible personal property on farms is exempt from tax. The exemption applies to stock, dairy, poultry, fruit and fur bearing animals, as well as to truck farms, ranches and orchards. The exemption does not apply to automobiles, energy, materials used for manure handling equipment, or materials used to construct a building or structure other than a silo, greenhouse, or grain bin.

Sales of production and conservation services to a farmer for use and consumption directly and primarily in the production, handling, or preservation for sale of agricultural or horticultural commodities at the farmer's farming enterprise are also exempt.

DCN:11658

Property must be "directly" used in production in order to qualify for the exemption. The following factors are important in determining if property is directly used:

- the physical proximity of the property to the production process
- the proximity of the time and use of the property to the time of use of other property used before and after it in the production process
- the active causal relationship between the use of the property and the production of a farm product.

Farmers may issue an exemption certificate (ST-7) to the supplier when purchasing exempt tangible personal property. Blanket exemption certificates may be given to the vendor to cover additional purchases of the same types of tangible personal property.

The exemption for sales of tangible personal property for use and consumption directly and primarily in producing farm products for sale applies to nurseries, greenhouses, and other similar structures used primarily for the raising of agricultural or horticultural commodities, as well as to orchards.

Sales of containers for use in a farming enterprise are exempt from sales and use tax.

Energy Conservation Equipment

Sales of solar energy devices or systems designed to provide heating or cooling, or electrical or mechanical power from solar-generated energy are exempt if they meet standards for qualification established by the Director of the Division of Solar Energy Planning and Conservation of the Department of Energy. The exemption extends to devices for storing the energy.

The purchaser of the system issues to the vendor an exempt-use certificate (Form ST-4), showing that the purchase qualifies for exemption.

Motion Pictures

Receipts from the sale of tangible personal property for use or consumption directly or primarily in the production of film or video for sale are exempt from sales and use tax. The exemption applies to all tangible personal property including motor vehicles, replacement parts without regard to useful life, tools, and supplies but does not apply to property when the use is incidental to film or video production. Receipts from installing, maintaining, servicing, or repairing tangible personal property that is directly used or consumed in the production of film or video for sale are also exempt.

The term "film or video" means motion pictures, including feature films, shorts, and documentaries, television films or episodes, similar film and video productions, whether for broadcast, cable closed circuit or unit distribution and whether in the form of film, tape, or other analog or digital medium. It does not include any film or video that is produced by or on behalf of a corporation or other person for its own internal use for advertising, educational, training or similar purposes.

Recycling Equipment

Receipts from sales of recycling equipment are exempt from sales and use taxes. "Recycling equipment," means any equipment that is used exclusively in the recycling of solid waste. The term "recycling equipment" does not include conventional motor vehicles or any equipment used in a process after the first marketable product is produced or, in the case of recycling iron or steel, any equipment used to reduce the waste to molten state and in any process thereafter.

Effluent-Treatment Equipment

Receipts from sales of equipment used exclusively to treat effluent from a primary wastewater treatment facility that would otherwise have been discharged into New Jersey waters for subsequent reuse in an industrial process or conveyance equipment used to transport effluent to the treatment facility or to transport the treated effluent to the reuse site are exempt from New Jersey sales and use tax. To be eligible for the exemption, the Commissioner of the New Jersey Department of Environmental Protection must have determined that the operation of the system in which the equipment is used and the reuse of the resulting wastewater effluent are or will be beneficial to the environment. The equipment vendor will charge and collect the sales and use tax due on the purchase, and the tax will be refunded to the purchaser by the filing of a claim for refund within three years of the date of purchase. A copy of the determination of environmental benefit must accompany the refund claim.

PROPERTY

Real and business personal property is taxed at the local level unless specifically exempted. New Jersey does not tax intangible property.

Environmental Opportunity Zones

Municipalities are authorized to grant, by ordinance, ten-year property tax exemptions for environmental opportunity zones. In order to be designated an environmental opportunity zone, real property must be vacant or underutilized and be in need of remediation due to a discharge or threatened discharge of a contaminant.

A municipality may designate, by ordinance, one or more qualified real properties as an environmental opportunity zone. Once it does so, it shall provide for exemptions of real property taxes for those zones. The exemption period may be extended to 15 years if the property is to be remediated with a limited restricted use remedial action or an unrestricted use remedial action.

The property owner must enter into a memorandum of agreement or administrative consent order with the Department of Environmental Protection to perform the remediation. Once remediation is complete, the environmental opportunity zone must be used for a commercial, industrial, residential or other productive purpose during the time period for which the real property tax exemption is granted.

Payment of in-lieu taxes is required. No in-lieu payment is due in the first year following the execution of a memorandum of agreement or administrative consent order. In the second through ninth tax years, payments are made as a percent of the taxes otherwise due beginning with 10% in the second year and increasing by an additional 10% each year until the ninth year when the required payment is 90% of the tax otherwise due. In the tenth year, the required payment is 100% of the tax otherwise due. The tax otherwise due is determined by using the assessed valuation of the environmental zone at the time of the approval by the assessor of the exemption, regardless of any improvement made to the property thereafter. Payments are made in quarterly

DCN:11658

installments according to the same schedule as real property taxes. The property tax exemption shall end if the difference between the real property taxes otherwise due and payments made in lieu of those taxes equals the total remediation cost for the qualified property.

Application for a tax exemption must be made to the tax assessor and approved by the governing body by resolution or ordinance as required by the enabling ordinance.

Manufacturing and Industrial Property

Machinery and equipment are exempt from local property taxes, to the extent they do not constitute real property. Real property does not include machinery, apparatus or equipment, which is used or held for use in business and is neither a structure nor machinery, apparatus or equipment the primary purpose of which is to enable a structure to support, shelter, contain, enclose or house persons or property.

Neighborhood Rehabilitation Projects

Municipalities may provide, by ordinance, property tax exemptions and/or abatements for certain improvements and conversions of residential, industrial, and commercial structures in residential neighborhoods that have been declared to be in need of rehabilitation.

Municipal ordinances may permit a five-year property tax exemption of up to 30% of the assessed valuation of construction of new dwellings and/or conversions of buildings and structures (including unutilized public buildings) to dwelling use. In addition, some portion of the assessed property value receiving such exemption as it existed immediately prior to the construction or conversion may be abated for up to five years. The annual amount of the abatement granted may not exceed 30% of the total cost of the construction or conversion alteration, and the total amount of abatements granted to any single property may not exceed the total cost of the construction or conversion alteration.

In addition, cities in which residential neighborhoods have been declared to be in need of rehabilitation may regard the first \$5,000, \$15,000 or \$25,000, as specified by general ordinance, in home improvements per dwelling unit over 20 years old as not increasing the value of the property for five years.

The five-year property tax abatement for improvements or conversion alterations to multiple dwellings may not exceed an annual amount equal to 30% of the total cost of the improvement or conversion alteration. Also, the total amount of abatements granted to any single property may not exceed the total cost of the improvement or conversion alteration.

Improvements to commercial and industrial structures: If a municipal ordinance provides for the exemption of improvements to commercial or industrial structures, the municipality may regard up to the assessor's full and true value of the improvements or conversions as not increasing the value of the property for a period of five years, even though the value of the property to which the improvements or conversion alterations are made is increased. During the exemption period, the assessment on the property may not be less than the assessment existing immediately prior to the improvements.

In addition, municipalities may provide, by ordinance, for tax agreements for the exemption and abatement from property taxation for construction of commercial or industrial structures, and/or multiple dwellings. All tax agreements must be applied for, and granted on, a project basis.

DCN:11658

Applications for property tax exemptions or abatements must be filed with the local tax assessor within 30 days, including Saturday and Sunday, following completion of the improvement, conversion alteration, or construction.

Facilities containing a licensed gambling casino are ineligible for the property tax exemption and/or abatement.

Agricultural Exemptions and Deductions

Land at least five acres in area that is actively devoted to agriculture or horticulture may be assessed at less than full market value.

Commercially planted growing crops, trees, shrubs, and vines are exempt from property tax while in the ground, and any assessment of the value of real property must be made without regard to any increase in value due to their presence.

The amount of any personal property tax assessed on cattle must be reduced by the value of cattle that were included in the assessment but which later were slaughtered.

Fire Suppression Systems

Automatic fire suppression systems are exempt from property tax, and any increase in the assessed value of real property attributable to such systems may not be taxed. Any system designed and equipped to detect a fire, activate an alarm, and suppress or control a fire without the need for human intervention is an automatic fire suppression system.

Pollution Control Facilities

Any equipment, facility or device used primarily for the purpose of abating or preventing pollution of the atmosphere or waters of New Jersey and certified as a pollution abatement facility by the State Commissioner of Health is exempt. Such equipment must be designed primarily for the purpose of pollution control and reasonably adequate for its purpose.

Aircraft

All aircraft are exempt from any tax imposed on personal property, whether local or state.

Landfill Reclamation Improvement Districts

A municipality that has created a landfill reclamation improvement district may provide for tax abatements, payments in lieu of property taxes, and special assessments within the district. The franchise assessment is only applicable within the territorial limits of the district. A landfill reclamation improvement district may be designated only for a tract of land that has a minimum of 150 acres, at least 100 acres of which were formerly or are presently used as a landfill that has been delineated a redevelopment area or an area in need of redevelopment.

Redevelopment Areas

A municipality that has designated a redevelopment area and has issued bonds that would be secured by payments in lieu of taxes under a tax abatement agreement, special assessments on property benefiting from the improvements provided, or both, may provide for abatement from

DCN:11658

New Jersey property tax and for payments in lieu of property taxes under the Long-Term Tax Exemption Law or the Five-Year Exemption and Abatement Law. However, certain provisions establishing a minimum or maximum annual service charge and requiring staged increases in annual service charges over the term of the exemption period do not apply to redevelopment projects financed with bonds. In addition, the municipality is authorized to levy one or more special assessments within the redevelopment area.

ENTERPRISE ZONE INCENTIVES

New Jersey has urban enterprise zones that provide significant incentives and benefits to businesses that locate within the zone. Currently, qualified businesses in these zones may be eligible for the urban enterprise zone employees tax credit or the urban enterprise zone investment tax credit.

The zones are in designated portions of the following municipalities: Asbury Park-Long Branch joint zone, Bayonne City, Bridgeton, Camden, Carteret, East Orange, Elizabeth, Guttenberg, Hillside, Irvington, Jersey City, Kearney, Lakewood, Mount Holly, New Brunswick, Newark, North Bergen, Orange, Passaic, Paterson, Pemberton Township, Perth Amboy, Phillipsburg, Plainfield, Pleasantville, Roselle Borough, Trenton, Union City, Vineland-Millville joint zone, and West New York. A joint municipal urban enterprise zone was designated for North Wildwood City, Wildwood City, Wildwood Crest Borough, and West Wildwood Borough.

To participate in the UEZ program, a business must apply to the local UEZ Authority to become a "qualified business." Exemption certificates are issued by the Division of Taxation, effective on the date of certification. Once a business is certified as a qualified business, the certification must be renewed annually. There are no retroactive tax benefits for a qualified business after it is certified. All benefits are effective only from the date of certification.

To be certified the business must:

- Create new employment in the municipality containing the zone, and not create unemployment elsewhere in the state (including that municipality)
- Be engaged in the active conduct of a trade or business in a UEZ
- Must have at least 25% of its new full-time employees employed at a business location in the zone, hired during its first or second year in the program, meeting one or more of the following criteria: (1) residents of any zone; or (2) unemployed for at least six months prior to being hired and residing in New Jersey, or recipients of New Jersey public assistance programs for at least six months prior to being hired; or (3) determined to be economically disadvantaged by the Federal Jobs Training Partnership Act.

There are two alternatives the Authority may use to certify a business that does not meet the above criteria. These alternatives are:

- If a zone business agrees to meet the 25% criteria during its first two years of certification and if the Authority determines that an applicant is unable in good faith to meet the 25% requirement, the Authority may reduce the requirement below 25% for that business, conditioned upon the agreement of the business to implement and/or sponsor certain specified training and job programs for a period of at least five years.
- A zone business may be qualified, even though it is unable to increase its full-time permanent employment, if the business has fewer than 50 employees and was in business in the zone at

DCN:11658

least one year prior to designation of the zone. This business may be certified for one year by entering into an agreement with the zone city to make an expenditure, approved by the Authority, which contributes substantially to the economic attractiveness of the zone. The expenditures must be at least \$5,000 for a business with 10 or fewer employees, with an additional \$500 per employee up to the maximum of 49.

- Each UEZ provides significant incentives and benefits to qualified businesses located within their borders. Benefits include reduced sales tax (3% versus 6%), sales tax exemptions, unemployment-insurance benefits, and corporation business tax credits for the hiring of certain designated employee groups. Each local UEZ authority can authorize funds for: worker training, equipment financing, construction and permanent financing, and legal and ancillary costs.

Employee Tax Credits

A credit is available against the entire net income component of the corporation business (income) tax to corporations actively conducting business from a location within a designated enterprise zone for certain new, full-time, permanent employees.

A one-time credit of \$1,500 is allowed for each new full-time, permanent employee employed at the enterprise zone location who is a resident of a qualifying municipality in which a designated enterprise zone is located and who immediately prior to employment by the taxpayer was unemployed for at least 90 days, or was dependent upon public assistance as the primary source of income.

A one-time credit of \$500 is allowed for each new full-time, permanent employee employed at the enterprise zone location who is a resident of a qualifying municipality in which a designated enterprise zone is located, who does not meet the requirements for the \$1,500 credit, and who was not employed at a location within the qualifying municipality immediately prior to employment by the taxpayer.

Business Qualifications. The credit is available only to businesses consisting primarily of manufacturing or that are not retail sales or warehousing oriented. In addition, an eligible taxpayer must be a certified qualified business under the New Jersey Urban Enterprise Zones Act.

Employee qualifications. The credit is allowed only for new employees who have been employed by the taxpayer for at least six continuous months during the tax year for which the tax credit is claimed. A newly employed employee is not considered to be a new full-time permanent employee for purposes of the credit unless the total number of full-time permanent employees employed by the taxpayer in the enterprise zone during any prior calendar year exceeds the greatest number of full-time permanent employees employed in the enterprise zone during any prior calendar year during the period following the designation of the enterprise zone.

An enterprise zone employee tax credit may not reduce a taxpayer's corporation business tax liability in any tax year by more than 50% of the tax otherwise due, but a credit unused in a tax year may be carried forward by the taxpayer to the next tax year.

The enterprise zone employee credit is allowed in the tax year immediately following the tax year in which the new full-time, permanent employee was first employed by the taxpayer, and may be claimed in any tax year of a 20-year period from the date of designation of the enterprise

DCN:11658

zone, or of a period of 20 tax years from the date within that designation period upon which the taxpayer was first subject to the corporation business tax.

The urban enterprise zone employees tax credit cannot be claimed in the same year that an urban enterprise zone investment tax credit is claimed regardless of whether the credits were earned for the tax year or carried forward from a previous year.

Sales and Use Tax Exemptions

Retail sales of tangible personal property and sales of services to a qualified business for the exclusive use or consumption of such business within an UEZ are exempt from sales and use tax.

The purchase exemption can apply to:

- Office and business equipment and supplies
- Furnishings and trade fixtures
- Purchase or rental of non-mobile telecommunications equipment, and repair and maintenance of the equipment, qualify for exemption - if, on the billings, such charges are stated separately from the charges for the telecommunications services
- Repair or construction materials (whether purchased by the qualified business or a contractor)
- Purchase, rental and use of non-conventional vehicles used exclusively at the place of business in the zone
- Parts and repairs for such vehicles
- Repairs
- Janitorial and maintenance services of all kinds
- Cleaning of uniforms, etc., if the apparel or linens will be used only at the place of business in the zone
- Advertising if it is used exclusively at the place of business in the zone (this includes handbills, flyers, sales catalogs, etc., for distribution at the zone place)
- Charges for the repair of machinery or equipment of a qualified business made at locations outside a zone provided that the machinery or equipment will then be used exclusively at the zone location.

The exemption only applies to taxes imposed by the Sales and Use Tax Act, on "tangible personal property" and "services", which do not include:

- Prepared foods and beverages, rooms or admissions
- Petroleum products gross receipts or fuel taxes
- Alcoholic beverages, etc., and cigarettes
- Direct mail service charges and advertising published in a newspaper, magazine, yellow pages, etc., or advertising by radio or television
- Repairs of motor vehicles
- Telecommunications services, such as telephone, computer, fax, "beeper" and alarm security telecommunications services.

Partial Sales Tax Exemptions

The UEZ Program offers a partial sales tax exemption for certain retail sales made by certified vendors to purchasers for the use or consumption of such business outside of an UEZ. In order

DCN:11658

for a certified vendor to offer the 3% sales tax rate to a purchaser who makes an in-person purchase at a vendor's place of business in a zone it is required that the purchaser accept delivery at the vendor's place of business in the zone or that the vendor deliver the goods to the purchaser from the vendor's business location in the zone. All sales made by a qualified and certified vendor must be made from his place of business within an enterprise zone, that is, either the purchaser must accept delivery at the vendor's place of business within an enterprise zone, or the vendor must deliver the tangible personal property from its place of business within an enterprise zone. Only receipts from sales which originate and are completed by the purchaser in person at the vendor's place of business within an enterprise zone qualify for the reduced rate of sales tax; provided, however, that after a sale has been completed within an enterprise zone, the vendor may deliver the tangible personal property to the purchaser at a location outside an enterprise zone.

Landfill Reclamation Cost Reimbursement

Fifty percent of the sales tax generated by businesses located on a municipal solid waste landfill that has been cleaned up (in accordance with a redevelopment agreement) will be used to reimburse the developer of the site for 75% of the costs of closure and remediation of the landfill. The site cannot be used primarily for the purpose of catalogue or mail order sales and items subject to sales tax must be regularly exhibited and offered for retail sale at the location.

Any developer may enter into a redevelopment agreement negotiated with the Commissioner of the New Jersey Commerce, Economic Growth & Tourism Commission in consultation with the State Treasurer. The agreement must take the following into consideration:

- the economic feasibility of the development
- the extent of economic and related social distress in the municipality and the area affected by the redevelopment project
- the degree to which the redevelopment project will advance state, regional and local development strategies
- the likelihood that the redevelopment project will be capable of repaying the closure and remediation costs
- the relationship of the redevelopment project to a comprehensive local development strategy, including other major projects undertaken within the municipality; and
- the degree to which the redevelopment project enhances and promotes job creation and economic development.

Eligible municipal solid waste landfill sites are limited to landfills that ceased operation prior to January 1, 1982, and received for disposal household solid waste and at least one of the following:

- commercial solid waste
- industrial solid waste; and
- hazardous waste material.

The Municipal Landfill Closure and Remediation Fund will be credited with one-half of all sales and use taxes payable by any persons required to collect the tax at the site of the redevelopment project, until the amount credited equals 75% of the cost of the closure and remediation costs actually and reasonably incurred by the developer. Each developer will have a special account

DCN:11658

within the Fund. The developer will be entitled to receive periodic payments from the Fund within 15 days of receipt by the State of the taxes.

To remain entitled to reimbursement, the developer is required to perform and complete all closure and remediation activities during the closure and post-closure periods that are required pursuant to a memorandum of agreement with the Commissioner of Environmental Protection to ensure the environmentally sound and proper closure or remediation of the landfill.

Property Tax Abatements

Municipalities, in which an urban enterprise zone or part of an urban enterprise zone has been designated, may grant tax abatements for up to five years for qualified residential property. "Qualified residential property" includes any building used, or to be used or held for use, as a home or residence, including certain accessory buildings, condominiums, cooperatives and horizontal property regimes. However, any building for which a certificate of occupancy for the construction, conversion, rehabilitation or renovation was issued on or before 30 months prior to December 27, 1989, is ineligible.

Approved abatements are evidenced by financial agreements that require the applicant to make payments in lieu of real property taxes to the municipality. Such payments are computed as 2% of the cost of improvements or conversion alterations, or as a portion of real property taxes as follows:

Tax year after completion ... Payment in lieu of taxes due

- 1st year ... No payment
- 2nd year ... 20% of taxes otherwise due
- In the 3rd year ... 40% of taxes otherwise due
- In the 4th year ... 60% of taxes otherwise due
- In the 5th year ... 80% of taxes otherwise due
- In the 6th and subsequent years ... 100% of equalized taxes otherwise due

If the owner does not occupy the property, the above is increased by 1% (amounts are prorated for cooperatives). The amount of "taxes otherwise due" refers to taxes assessed on the abated structure, improvement or conversion alteration. Municipalities may charge an annual administration fee, not exceeding 1% of the in lieu payment. All payments are due in quarterly installments according to the same schedule as real property taxes.

In addition to payments required in lieu of taxes, all real property taxes assessed and levied against the land on which the qualified residential property is situated must be paid.

Enterprise Zone Investment Credit

The urban enterprise zone investment tax credit is allowed against the entire net income component of the corporation business (income) tax to a taxpayer that is an approved qualified business under the New Jersey Urban Enterprise Zone Act and that has made an investment or other expenditure in an urban enterprise zone. The investment must have been authorized by the Urban Enterprise Zone Authority and approved by the municipal government.

DCN:11658

The one-time credit equals 8% of each new investment made in the enterprise zone under an agreement approved by the New Jersey Urban Enterprise Zone Authority.

The credit is available only to businesses consisting primarily of manufacturing or that are not retail sales or warehousing oriented. In addition, an eligible taxpayer must be a certified qualified business under the New Jersey Urban Enterprise Zones Act.

An enterprise zone investment tax credit may not reduce a taxpayer's corporation business tax liability in any tax year by more than 50% of the tax otherwise due, but credits unused in a tax year may be carried forward by the taxpayer to the next tax year.

The enterprise zone investment credit may be claimed in any tax year of a 20-year period from the date of designation of the enterprise zone, or of a period of 20 tax years from the date within that designation period upon which the taxpayer was first subject to the corporation business tax.

A taxpayer cannot claim both an urban enterprise zone investment tax credit in the same year regardless of whether the credits were earned for the tax year or carried forward from a previous year.

UTILITY INCENTIVE PROGRAMS

Both New Jersey and Maryland offer limited utility incentive programs. The following are the incentives, other than special incentives offered in 'Enterprise Zones', that each state offers:

New Jersey Natural Gas Company Economic Development Tariff

New Jersey Natural Gas Company (New Jersey Natural) serves the area where Ft. Monmouth is located. New Jersey Natural offers an economic development tariff to commercial and industrial customers that meet the following criteria:

1. For new customers, the building receiving service under New Jersey Natural's economic development tariff must be newly constructed or have been vacant for at least 12 months.

For existing customers, must have been a New Jersey Natural customer for more than once year, and the space utilized for operations must have expanded by more than 5,000 square feet. Gas used in excess of the previous 12 months usage, will be subject to an Economic Development Credit.

Existing occupants that (a) converts to natural gas and (b) expands space utilized for its operations by more than 5,000 square feet would be eligible for the credit. The occupant must provide its energy usage for the previous twelve (12) months at the time of the application for gas service. This usage will serve as the basis for the "base period's" energy usage. New Jersey Natural will use the occupant's energy usage to calculate the BTUs used in excess of the base period. This excess gas usage would be eligible for the ED credit.

2. The customer must be adding or relocating at least two new jobs to New Jersey Natural's service territory.
3. The customer must apply for Economic Development Service upon the initial application for gas service.
4. The customer must execute a Service Agreement.
5. The building receiving service under New Jersey Natural's Economic Development tariff must be located within a community, in New Jersey Natural's service territory, with a ranking of 150 or less on the 1996 Municipal Distress Index compiled by the New Jersey State Planning Commission.

The Economic Development Tariff states that New Jersey Natural reserves the right of offer its Economic Development tariff rates to customers located in areas of other communities, which demonstrate the characteristics warranting economic development.

Customers', who are eligible for the Economic Development Tariff, will pay the same rates as New Jersey Natural's General Service Classification, except that High Load Factor (e.g., high stable gas usage) customers will receive a credit of \$0.1000 per therm for gas in excess of the previous 12 months gas usage. Low Load Factor Customers (e.g., low gas usage or customers whose gas usage varies widely during a 12 month period) will be credited \$0.1175 per therm for eligible gas use.

Incentive Utility Rates

New Jersey's major utility companies provide a number of incentives, including flex rates, energy credits and rate discounts or waivers, for businesses that build or expand facilities and create jobs in New Jersey. Some programs encourage the utilization of vacant industrial and commercial real estate. Electric credits are provided to firms that occupy a minimum amount of vacant space as designated by the utility. Other programs apply "off peak employment" credits to help companies starting or resuming a second or third shift during off peak hours.



New Jersey Science & Engineering Hires in 2004

Findings:

- ◆ 23,742 new hires for science and engineer related occupations per quarter from 2/2003 to the first quarter of 2004.
- ◆ New hires for science and engineer related occupations accounted for 5% of total state new hires (464,548).
- ◆ 11,743 jobs created for science and engineer related occupations.
- ◆ Job creation for science and engineer related occupations accounted for 6.5 % of total state job creation (181,273).
- ◆ 11,545 Science & Engineer Degrees/Awards conferred in FY2004.
- ◆ Science & Engineer Degrees/Awards accounted for 18.8% of total State Degrees/Awards conferred in FY2004 (61,428).
- ◆ Computer Systems Design and Related Services industry ranked 1st in terms of new hires for science and engineer related occupations (5,805).
- ◆ Architectural and Engineering industry ranked 2nd in terms of new hires for science and engineer related occupations (4,598).
- ◆ Telecommunications industry ranked 3rd in terms of new hires for science and engineer related occupations (4,546).
- ◆ Management, Scientific, and Technical Consulting Services industry ranked 4th in terms of new hires for science and engineer related occupations (4,064).

Methodology & Assumptions:

- ◆ We used the total number of new hires in targeted industries as an indicator of new hires for science and engineer related occupations in 2004.
- ◆ We selected criteria for targeted industries based on profiling the Ft. Monmouth science and engineering workforce and its contract firms, as well as literature review of the National Science Foundation on Science and Engineering Indicators in 2004.
- ◆ In an effort to better understanding a supply and demand relationship between a highly skilled labor market and Science and Engineer Degree related occupations, we included the total number of jobs created in targeted industries and the total number of Science and Engineer Degrees/Awards conferred in FY2004. *(11,743 Jobs Created vs. 11,545 Science & Engineer Degrees/Awards)*

Obstacles We Are Facing:

- ◆ No tracking and detailed data available at the level of occupations.
- ◆ Being unable to determine an absolute number of new hires for Science & Engineer Degrees in 2004.

(Source: 2004 Local Employment Dynamics, US Census and New Jersey Commission on Higher Education)

Air Traffic Considerations
at
McGUIRE AFB,
FORT DIX,
LAKEHURST NAVAL AIR
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New Jersey



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Edmund Spring is a retired FAA executive who has a long history in dealing with air traffic in the New Jersey area. He has worked as a controller at Atlantic City Tower, been the Chief (Air Traffic Manager) of Philadelphia International Tower and Tracon, and of Washington Center. He was also the manager of the FAA Eastern Region's air traffic division having overall responsibility for air traffic operations in the seven state area including New Jersey. Mr. Spring also holds a commercial airplane pilot rating and learned to fly in New Jersey area. He has first hand experience flying the system discussed in this document.

EXECUTIVE SUMMARY

The military air traffic that flows on a daily basis in and out of the McGuire Air Force Base has little, if any, negative impact on the overall air traffic control (ATC) infrastructure that surrounds it. The controllers and air crews, by virtue of their experience and familiarity with the local environment, have developed procedures that are safe, orderly, and efficient. These procedures are constantly being improved, just as they are in any Federal Aviation Administration air traffic control operation. The cooperation between the McGuire ATC facility and the adjacent major FAA ATC facilities is apparent at all levels. The very existence of the McGuire RAPCON is essential to good airspace management in the region.

As has been the case for many years, McGuire AFB is located in one of the most complex ATC environments in the world. The numerous major airports serving the heavily populated "Megopolis" from Washington, DC to Boston are some of the busiest in the country. Ironically, the presence of this high volume complex of airways and airports does not have any adverse impact on the McGuire/Lakehurst/Fort Dix mission.

The McGuire RAPCON facility has established itself as an integral part of the team that manages this airspace in the northeast corridor. Other team members are the Philadelphia TRACON, the New York TRACON, the Atlantic City TRACON, the New York Air Route Traffic Control Center, and the Washington ARTCC. The McGuire RAPCON in particular, relieves the NY TRACON and PHL TRACON of the burden of communicating with and controlling instrument and visual air traffic arriving and departing at the multitude of general aviation airports within its airspace. It handles large numbers of over flights traversing the area between PHL and NY that would otherwise have to be controlled by the FAA facilities. None of the adjacent FAA facilities currently has the capability to control this traffic. They lack the physical plants and/or the staffing that such a workload would require. FAA interest in acquiring this workload is nonexistent. The FAA is also concerned about who would control and coordinate military training missions utilizing the special use airspace within the McGuire area. These gunnery and bombing ranges (R5001 and R5002) are currently controlled by the McGuire RAPCON.

Historically, because it is one of their busiest domestic ATC facilities, the USAF has used the McGuire RAPCON as a training experience for controllers before they are deployed to busy overseas locations. This experience is enhanced by virtue of the McGuire RAPCON having the latest state of the art terminal equipment available today (STARS).

The McGuire RAPCON and airfield are underutilized in comparison to their potential capacities. The air traffic could readily be doubled or tripled without additional staffing or resources. This potential for expanded operations is a great asset.

AIR TRAFFIC CONSIDERATIONS

at

McGUIRE AIR FORCE BASE, FORT DIX, LAKEHURST NAVAL AIR ENGINEERING STATION, NEW JERSEY

Background

Location. McGuire AFB is located beneath a high density air traffic corridor between Philadelphia and New York City near Wrightstown, New Jersey (see Attachment 1).

Airspace Boundaries. The airspace designated to the air traffic control facility (RAPCON) at McGuire is bounded by airspace designated to the Philadelphia, New York and Atlantic City TRACONS, by the New York and Washington ARTCCs (see Attachment 1). The upper limit of McGuire's airspace varies from 2000 to 8000 feet above sea level. The majority of it is from the surface to the upper limit. The exceptions are some "shelves" and single altitude routes that serve specific operational requirements.

Equipment. McGuire RAPCON has recently been equipped with the newest terminal automation system currently being installed (over a period of several years) at all FAA terminal radar facilities. It is known by the acronym "STARS" (Standard Terminal Automation Radar System). This was achieved under a joint use procurement involving FAA/DOT/DOD. It is an indication of the high regard this facility is held in the aviation and ATC community. The facility is very clearly "state of the art".

NOTE: Two STARS displays are "slaved" over to the controllers at NAES Lakehurst for use by the Navy controllers.

Staffing. There are approximately 70 controllers and supervisors assigned to the RAPCON and Tower. The facility military staffing is augmented by a cadre of civilian air traffic controllers who bring stability and continuity to the ATC operation. The military personnel that rotate through on assignment are supported by the presence of these full time permanent personnel. Because of its busy and diverse operation, McGuire RAPCON has historically been a training ground for the USAF to prepare ATC personnel for deployment to overseas assignments that take them to busy military ATC facilities around the world.

Operations. The McGuire RAPCON averages over 10,000 operations a month. This includes a mix of civil and military traffic. McGuire AFB is one of 14 airports the RAPCON has responsibility for within its airspace boundaries. The bulk of these are general aviation fields that do not individually generate a high traffic volume. Taken collectively, they represent a significant workload for controllers.

NOTE: It is important to be aware that the New York TRACON is physically unable to install any additional radar positions to assume this traffic. The New York ARTCC also has topped out the number of sectors they can install in their system. Philadelphia has the floor space, but not the radar displays nor the controllers, to take on the additional responsibility of controlling this traffic. The Atlantic City TRACON has limited floor space and would need additional displays and staff. This may be a moot point, because none of the scenarios discussed with me by the FAA envisions designating the McGuire airspace to Atlantic City.

During the course of this study, I contacted the FAA Integrated Control Complex planning office in Melville, L.I., N.Y. They are in the third year of developing a master plan that would integrate the New York ARTCC and New York TRACON into a NY Integrated Control Complex. This complex would house the combined operations of both of these high density ATC facilities into one building. This plan is at least five years away from fruition. I was informed by their staff that incorporating the McGuire ATC operation into this complex is not even a consideration. They would be severely impacted by such a requirement. In my professional opinion, this complex will not come about without serious reorganization of the FAA Air Traffic Organization at a national level.

A unique feature of the McGuire ATC operation is that it is subject to dramatic ebbs and flows. While on a wartime surge level such as was presented by Desert Shield, and more recent deployments in support of activity in Iraq, the traffic count actually went down because the Military Airlift Command (MAC) was conducting fewer training flights in favor of increased operational missions. Civilian charter operations in support of MAC are also sharply increased at these times. Much like a fire department, they must be trained and qualified to handle the greatest demand.

Other considerations. Because it is obviously located directly within the most complex and highest density airspace, it would appear to the casual observer that McGuire AFB adds to this complexity. On the contrary, McGuire RAPCON provides significant assistance in managing this airspace while it accommodates the demands of the primary

military aircraft as they go about the business of supporting our national defense as an integral member of an ATC team that includes the surrounding FAA ATC facilities.

The close proximity of the McGuire RAPCON has created a situation that requires them to adjust operational procedures in direct support of the adjacent FAA facilities. The ebb and flow of air traffic at these extremely busy facilities creates the necessity of adjusting in support of these demands. The McGuire RAPCON has historically achieved this highest level of cooperation. As the former Air Traffic Manager of the Philadelphia TRACON and Washington ARTCC, I can personally attest to this spirit of cooperation and accommodation.

As an example of this; Philadelphia controllers are frequently desirous, during busy periods, of extending the downwind leg when they are vectoring aircraft on approach to runway 27. They are not able to extend this traffic pattern without the cooperation of the McGuire RAPCON. The two facilities have signed a letter of agreement that established a "shelf" at 5000 feet out of the McGuire airspace area east of Philadelphia that is made available upon request to the controllers at Philadelphia.

Discussions with FAA management and procedures personnel indicated there is no substantial operational impact to the overall ATC operation with the replacement of the C-141 fleet with C-17s. The KC10 flights are also an integral part of the McGuire operation and impose no burden. The planned introduction of several C-130 aircraft into the mix at McGuire is not seen as an undo burden. Basing the NJANG F-16s currently at Atlantic City to McGuire AFB would also have minimal impact to ingress and egress of the airspace. They would be easily accommodated under current procedures.

The McGuire ATC operation itself is capable of considerable expansion without additional staffing or equipment. The runway configuration and radar and communications capability at McGuire AFB is not near its utilization capacity. I would suggest they could triple the operational air traffic count within current resources.

Navy Lakehurst and Fort Dix aviation traffic is minimal and not seen as a significant factor in ATC IFR operations. They come under the category of the other satellite airports controlled by the McGuire RAPCON. Some of this comfort level may be because of the McGuire controller's history of dealing routinely with such traffic on a daily basis. FAA controllers would have to adapt to this unique environment.

An example of the unique requirements within the McGuire RAPCON airspace is the planned introduction of an Assault Landing Zone practice area with a 3500 foot landing strip at NAES Lakehurst. This area will accommodate extensive C-17 and C-130 training within the confines of the McGuire RAPCON airspace with no impact on, or interference from, adjacent FAA ATC facilities.

This type of training in the Charleston, SC area currently requires the C-17s based there to fly to an area over 100 miles away (Columbia, SC) for the same purposes. That does impact adjacent FAA ATC facilities, including Jacksonville Center.

At Lakehurst, because of the traffic surges anticipated to be created by the Assault Landing Zone activity, some USAF controllers from the McGuire RAPCON will supplement the Navy controller staff during these operations as they take place periodically around the clock. These are the kinds of operations the FAA wants to stay away from. They would be hard pressed to support such activities.

Conclusion. The McGuire/Fort Dix/Lakehurst military complex is geographically ideally situated for its many missions. It affords the long range aircraft it serves to cross the Atlantic without necessarily having to refuel. It is reasonably close to major populations, yet remotely located enough so as not to inflict excessive noise and other inconveniences. The results of my study into the air traffic control implications are clearly supportive of not only the contribution made by the existence of the McGuire RAPCON, but the severe consequences on regional airspace management if it were to be removed.

The very fact the facility is located in the middle of such a complex airspace environment has made it an essential ingredient in the mix. The negative implications for the FAA air traffic community are such that the FAA would be forced to invest significant resources to fill any void created by the absence of this USAF RAPCON. They currently do not have these resources and the aviation community in the area would suffer greatly in the interim.

At the same time, it should be recognized that all this complexity and congestion does not have an adverse impact on the military missions served by the facility. The situation is entirely self supporting as it exists. The evolution of this fact belies the reasonable assumption that it would be a bad location to choose if you were starting from scratch. The McGuire military air traffic control mission has been folded into the local civilian air traffic environment in a seamless quilt. Any disruption of the current setup would have a severe negative impact on air traffic control in the New Jersey area.

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Discussions with FAA personnel at the Potomac TRACON and contract personnel at the airport traffic control tower at Phillips Army Airfield have confirmed the following facts:

The FAA is concerned about any shifting of air traffic operations that has the potential to increase the workload of the ATC staff in the Chesapeake Sector. They are very heavily burdened with existing operations. Part of this is traffic volume; part is generated by the proximity of the ADIZ, Camp David, and other restricted airspace that creates a “choke point” effect on available airspace.

Any increase in helicopter operations is not appreciated as their current situation finds that they are forced to scramble on military helicopters more than any other type intruders.

The airport traffic control tower at Phillips Army Airfield is a contractor run VFR tower. It is in operation from 6:00 AM to 9:00 PM Monday through Friday.

The close proximity of a live firing range 1200 feet to the south and east of runway 17 – 35 has the effect of cutting the control zone to almost one half of its designated size. This airspace is not available to ATC operations unless the controlling military authority turns it over to the Potomac TRACON. This does not happen often, and the tower is not informed when it does happen. They find out when an IFR arrival is routed through the airspace by the TRACON.

The impact of additional UAV operations appears to be of no consequence at Aberdeen. Current traffic is extremely light and is worked around UAV testing that is restricted to designated areas in the vicinity of the airfield. This has been part of the operation for several years.

Night operations at Phillips Field are restricted to VFR because of obstructions in the shielded area interfering with the final approach course. These are large parked aircraft used for R & D purposes. Another problem effecting IFR operations is the lack of dedicated electronics maintenance at the field. The VOR is currently inoperative. Maintenance personnel are occasionally made available from Davidson Field at Fort Belvoir, but not on a regular basis. While these conditions exist, night operations are VFR only.