Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

88-BWI-21

MAR 24 1988

Those on Attached List

Ladies and Gentlemen:

DISTRIBUTION OF BASALT WASTE ISOLATION PROJECT REPORT, "PROJECT CHARACTERISTICS SOCIOECONOMIC MONITORING REPORT" MARCH 1988

We have prepared the enclosed "Project Characteristics Socioeconomic Monitoring Report" in response to requests from local government representatives for socioeconomic impact data for their downside planning efforts. The project's characteristics data was compiled as part of our BWIP socioeconomic monitoring program. We hope this will serve local community planning needs.

Our socioeconomic program has received cooperation and assistance from local community agencies in providing data for the BWIP Environmental Assessment and the BWIP Community Profile Reports released last November. We would like to thank you for efforts in providing data.

Please direct any questions you may have to Ms. Pat Turner of my staff at (509) 376-4101.

Sincerely,

John H. Anttonen, Assistant Manager
for Research and Projects

Enclosure

1/1

101
NH02-1/1

Mr. Walter Titus
Prosser City Superintendent
Prosser City Hall
P. O. Box 271
Prosser, WA 99350

Mr. Lane Bray, Council Member
Richland City Hall
P. O. Box 190
Richland, WA 99352

Mr. Neil Shulman, City Manager
Richland City Hall
P. O. Box 190
Richland, WA 99352

Mr. Robert Leedy, Director
City of Richland Community Development
Richland City Hall
P. O. Box 190
Richland, WA 99352

Mr. Ron Musson
Director of Support Services
City of Richland
P. O. Box 190
Richland, WA 99352

Ms. Gretchen Conner
Assistant Finance Director
City of Richland
P. O. Box 190
Richland, WA 99352

Mr. Jim Ball, Executive Director
United Way
207 N. Dennis
Kennewick, WA 99336

Mr. John Nolan, Board President
United Way
Westinghouse Hanford Company
P. O. Box 1970
Richland, WA 99352

Mr. Joseph Chiara, Manager
Benton Rural Electric Association
6102 West Van Giesen
West Richland, WA 99352

Mr. Leo Fancey, City Manager
Sunnyside City Hall
818 Edison Avenue
Sunnyside, WA 98944

Mr. Matt Ballou, City Councilman
4078 King Drive
West Richland, WA 99352

Mr. L. Roy Bunnell, Chairman
Board of Trustees
Mid-Columbia Library
405 S. Dayton
Kennewick, WA 99336

Ms. Shirley C. Tucker, Library Director
4101 Bombing Range Road
Route 4, Box 9533
West Richland, WA 99352

Mr. Gerard Fisher, Administrator
Prosser Memorial Hospital
823 Memorial Street
Prosser, WA 99350

Mr. Lyman Nelson
Benton County Fire District No. 4
P. O. Box 4248
West Richland, WA 99352

Mr. Ken Miller
Franklin County Courthouse
1015 N. 5th Street
Pasco, WA 99301

Mr. Jim Vetrano, Finance Director
Ben Franklin Transit
1000 Columbia Drive SE
Richland, WA 99352

Mr. John Walker, Business Manager
Kennewick School District
200 S. Dayton
Kennewick, WA 99336

Mr. Rod Hahn, Superintendent
Finley School District
Rt. 2, Box 2670
Kennewick, WA 99337

Dr. Larry Nyland, Superintendent
Pasco School District
1004 N. 16th Street
Pasco, WA 99301

Ms. Valora Loveland
County Treasurer
Franklin County Courthouse
1015 N. 5th Street
Pasco, WA 99301

Ms. Janet Paetel
Finance Manager, City of Kennewick
Kennewick City Hall
P. O. Box 6108
Kennewick, WA 99336

Mr Joe Painter, City Manager
Kennewick City Hall
P. O. Box 6108
Kennewick, WA 99336

Mr. Brad Fisher, Mayor
Kennewick City Hall
P. O. Box 6108
Kennewick, WA 99336

Mr. Bob Noland
Director of Support Services
City of Kennewick
P. O. Box 6108
Kennewick, WA 99336

Ms. Jo Balfour
City Clerk
Mabton Town Hall
P. O. Box 655
Mabton, WA 98935

Mr. Gary Crutchfield
City Manager
Pasco City Hall
P. O. Box 293
Pasco, WA 99301

Mr. Jerry Conner
Finance Director
City of Pasco
P. O. Box 293
Pasco, WA 99301

Mr. Dan Underwood
Assistant Finance Director
City of Pasco
P. O. Box 293
Pasco, WA 99301

Ms. Marge Chow, Superintendent/
Mr. Gary Ubanks, Business Manager
Richland School District
615 Snow Avenue
Richland, WA 99352

Mr. Jerry Hansen, Superintendent
c/o Mr. H. Jerome
Kiona-Benton School District
P. O. Box 488
Benton City, WA 99320

Mr. Larry Sappington, Superintendent
Burbank School District
P. O. Box 8
Burbank, WA 99323

Mr. Terry Husseman, Program Director
High-Level Nuclear Waste
Management Office
Washington State Department of Ecology
MS PV-11
Olympia, WA 98504

Mr. Jerry Parker
Washington State Department of Ecology
MS PV-11
Olympia, WA 98504

Mr. Don Provost
Washington State Department of Ecology
MS PV-11
Olympia, WA 98504

Mr. Russell Jim, Program Manager
Nuclear Waste Operations Office
Yakima Indian Nation
P. O. Box 151
Toppenish, WA 98948

Mr. William H. Burke, Director
Nuclear Waste Study Program
Confederated Tribes of the
Umatilla Indian Reservation
P. O. Box 638
Pendleton, OR 97801

Mr. Ronald Halfmoon, Program Manager
Nuclear Waste Program
Nez Perce Tribe
P. O. Box 305
Lapwai, ID 83540

Mr. Keith Sedore, Director
Energy Services Department
City of Richland
505 Swift Boulevard
Richland, WA 99352

Mr. Kenneth R. Engstrom, Manager
Public Utility District No. 1
of Franklin County
P. O. Box 2407
Pasco, WA 99301

Mr. Bruce Yamauchi, Consumer Representative
Cascade Natural Gas Company
200 North Union Street
Kennewick, WA 99336

Mr. Don Morton, Executive Director
Benton-Franklin Governmental Conference
1622 Terminal Drive
Richland, WA 99352

Mr. Sam Volpentest, Executive Director
Tri-Cities Industrial Development
Council (TRIDEC)
901 North Colorado
Kennewick, WA 99336

Ms. Jan Larsen, Executive Director
Tri-Cities Visitors and Convention Bureau
6951 W. Grandridge Boulevard
Kennewick, WA 99336

Mr. Dean Shau, Labor Market Economist
Washington State Employment
Security Department
3900 W. Court Street
Pasco, WA 99301

Mr. Jim Sewell, Grandview City Supervisor
Grandview City Hall
207 W. 2nd Street
Grandview, WA 98930

Mr. Lee Kraft, Benton City Manager
Benton City Hall
P. O. Box 70
Benton City, WA 99320

Ms. Gayle Morrison, Executive Director
Pasco Chamber of Commerce
P. O. Box 550
Pasco, WA 99301

Ms. Carol Mageehon, Executive Director
Richland Chamber of Commerce
P. O. Box 637
Richland, WA 99352

Mr. Marv Kinney, Administrative Assistant
to the City Manager
City of Kennewick
210 West 6th Avenue
Kennewick, WA 99336

Mr. Bill Davis, Economic Development
Coordinator
City of Richland
505 Swift Boulevard
Richland, WA 99352

Mr. Ralph Menaco, City Administrator
City of West Richland
3805 West Van Giesen
West Richland, WA 99352

Mr. Ron Jones, Benton County
Commissioner
2602 South Zillah
Kennewick, WA 99337

Mr. Jay Holman, Manager
Port of Benton
2952 George Washington Way
Richland, WA 99352

Ms. Sue Watkins, Manager
Port of Kennewick
One Clover Island
Kennewick, WA 99336

Mr. Paul Vick, Manager
Port of Pasco
P. O. Box 769
Pasco, WA 99301

Mr. Donald R. Clayhold
Benton County PUD No. 1
P. O. Box 6270
Kennewick, WA 99336

Mr. Claude Oliver
Benton County Treasurer
302 S. Reed
Kennewick, WA 99336

Mr. F. R. Cook, On-Site Representative
U. S. Nuclear Regulatory Commission
1955 Jadwin Avenue
Richland, WA 99352

Dr. A. Alkezweeny, On-Site
Tribal Representative
1933 Jadwin Avenue, Suite 135
Richland, WA 99352

Mr. John Poyner, Mayor
City of Richland
P. O. Box 190
Richland, WA 99352

Mr. Ed Hendler, Mayor
City of Pasco
P. O. Box 293
Pasco, WA 99301

Ms. Clara M. Wright, Mayor
Benton City
P. O. Box 70
Benton City, WA 99320

Ms. Mary Lou Blazek
Hanford Program Coordinator
Siting and Regulation Division
Oregon Department of Energy
625 Marion Street NE
Salem, OR 97310

Mr. Ron Kelso
General Accounting Office, Fed/176
P. O. Box 321
Richland, WA 99352

Stephen H. Kale, Associate
Director
Office of Geologic Repositories
Office of Civilian Radioactive
Waste Management, RW-20

Gerald J. Parker, Director
Siting, Licensing and Quality
Assurance Division, RW-20

Ralph Stein, Director
Engineering and Geotechnology
Division, RW-23

Mr. John J. Linehan, Acting Chief
Operations Branch
Division of High-Level Waste
Management
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Dan Silver
Washington State Institute for
Public Policy
Science and Technology Project
The Evergreen State College
3164 Seminar Bldg.
Olympia, WA 98505

Working Draft

Project Characteristics Socioeconomic Monitoring Report

March 1988

U.S. Department of Energy
Richland Operations Office
Basalt Waste Isolation Division
Licensing, Environmental and Safety Branch
Richland, Washington

PROJECT CHARACTERISTICS SOCIOECONOMIC MONITORING REPORT

E. A. Friedli
Battelle Human Affairs Research Centers
D. I. Herborn
Westinghouse Hanford Company
K. M. Tomlinson
Westinghouse Hanford Company

Prepared for the U.S. Department of Energy
under Contract DE-AC06-76 RLO 1830

SUMMARY

This monitoring report has been prepared to show compliance with provisions of the Nuclear Waste Policy Act of 1982 (NWPA) and to provide local and state government agencies with information concerning the Basalt Waste Isolation Program (BWIP). This report contains data for the time period May 26, 1986 to February 1988. The data include employment figures, salaries, project purchases, taxes and fees paid, worker survey results, and project closedown personal interview summaries. This information has become particularly important since the decision in December 1987 to stop all BWIP activities except those for site reclamation. The Nuclear Waste Policy Amendments Act of 1987 requires nonreclamation work at the Hanford Site to stop as of March 22, 1988.

BWIP site characterization began in May 1986; however, prior to that time there was a substantial work force that had been doing preliminary studies and preparing the Environmental Assessment. Between May 1986 and September 1987 the work force expanded from 578 to 789 direct BWIP workers with a decrease to 694 as of December 1987. *Direct* workers are those whose responsibilities are directly tied to BWIP. *Indirect* workers are those who have non-BWIP responsibilities as well as BWIP responsibilities. When both the directs and indirects are combined and computed into full time equivalents the work force changed from 798 to 1,240 to 1,145 workers. Approximately 1,145 jobs will be eliminated with the closure of BWIP. The workers in those jobs accounted for an average of $3.1 million in salaries each month. In addition, the project was responsible for purchases averaging approximately $2.1 million per month. About one-quarter of that amount was spent within the State of Washington. Taxes and fees paid by the various contractors averaged approximately $45,000 per month.

The average BWIP worker has been with the same employer about 5 years and has been working on BWIP activities for about 1 year. Typical BWIP workers own their own homes in Richland and have lived there over 10 years. They drive alone to work and chose to live in Richland because it was close to their place of work. Typical BWIP workers live with their family of 2 to 4 people. The average BWIP worker is a white male between 30 and 39 years of age. Of course, the "average or typical BWIP worker" is only an interesting statistical entity that may or may not reflect the characteristics of any real worker. The information based on this statistical entity is included here to highlight major findings from the worker survey. The survey results indicate where impacts may be expected to occur and what they may be, given the types of workers.

The abrupt termination of the program came as a surprise to the U. S. Department of Energy (DOE), state and local officials, and to the BWIP work force. The results of informal interviews with a

sample of workers indicate a general feeling of unsettled optimism. Most of the people interviewed felt they would be able to find employment within a reasonable amount of time although only one-fifth of those interviewed had firm offers. Most people expressed a desire to stay in the Tri-Cities but realized they would have to move. Economic diversification was seen as a false hope because it is probably not feasible in time to help the BWIP work force. Retraining was not seen as a realistic option because the BWIP work force is highly trained and does not lend itself to retraining. The major concern was over loss of equity because of home ownership. About one-quarter of those interviewed indicated they would probably have to default on their home loans. Everyone who owned a home that said they would have to leave the area said they would take large economic loss. Estimates of these losses ranged from $10,000 to $75,000.

CONTENTS

FIGURES

TABLES

Page

1.0 INTRODUCTION

1.1 Background

This chapter describes the background, purpose, and approach taken by the DOE in developing a BWIP socioeconomic monitoring project. This report provides a summary of BWIP project activity data, cost and employment data, worker survey results, and a synthesis of a series of project closeout interviews. The beginning of site characterization through project closeout is covered in this report. These socioeconomic data have been gathered to assist planners in local government agencies and to document compliance with the NWPA.

The DOE Office of Civilian Radioactive Waste Management is responsible for implementing the NWPA, which requires that the DOE develop the first geologic repository for permanent disposal of spent nuclear fuel and high-level radioactive waste. The NWPA specifies a process for selecting a repository site that involves the participation of states, Affected Indian Tribes, and the public. DOE identified nine potentially acceptable sites for the repository in February 1983. The suitability of these sites for a repository was evaluated in accordance with DOE's siting guidelines (10 CFR 960). The results of those evaluations were reported in draft Environmental Assessments (EAs) issued for public review and comment in December 1984, and the final EAs prepared for the five sites nominated for site characterization. The final EAs were issued in May 1986 and incorporated responses to public comments made on the draft EAs.

The Secretary of Energy then recommended to the President three suitable sites for characterization as candidate repository sites: Yucca Mountain Site, Nevada; Deaf Smith County Site, Texas; and the Hanford Site, Washington. On May 28, 1986, the President approved characterization at these three sites, formally initiating the characterization phase, which was expected to last about 7 years.

On December 22, 1987 the President signed into law the Nuclear Waste Policy Amendments Act of 1987 (NWPAA). Under the provisions of the NWPAA, site characterization activities at the Hanford and Deaf Smith County Sites are to cease within 90 days of enactment while continuing at the Yucca Mountain site. Site characterization activities for BWIP closeout by March 22, 1988 except for reclamation activities as mandated by NWPAA. Closeo it will result in an abrupt termination of employment for a sizeable local work force.

1.2 Purpose of Monitoring During Site Characterization

A monitoring effort at the Hanford Site was undertaken during the time of site characterization 1) in response to a BWIP Environmental Assessment commitment to address uncertainties in the socioeconomic forecasts and 2) to document compliance with Section 113(a) of the NWPA to minimize significant adverse impact during site characterization. As a result of the abrupt termination of BWIP, the DOE has had requests from local government agencies for project data to assist them in their planning efforts. The data in this report were originally collected for the monitoring activity but are also designed to answer the needs of local government agencies.

1.3 Overview of the Study Area

The BWIP Reference Repository Location (RRL) is located within the DOE-controlled Hanford Site in south-central Washington. The approximately 560 square-mile Hanford Site is institutionally controlled. Since 1943, it has been restricted to projects directly associated with nuclear activities. As shown in Figure 1.1, the Hanford Site extends into Benton, Franklin, and Grant counties and is near the communities of Richland, Kennewick, Pasco, West Richland, and Benton City. During the 1970s, the Richland-Kennewick-Pasco MSA[a] was one of the most rapidly growing metropolitan areas in the nation. The termination of the Washington Public Power Supply System nuclear power plant, WNP-4, and the mothballing of WNP-1 in 1982 abruptly reversed this growth and initiated a period of employment and population decline that continued through the mid-1980s.

Since 1970 the economy of the MSA has been dominated by three primary influences: 1) nuclear weapons-grade fuel manufacturing by the DOE and its contractors; 2) construction of nuclear power plants by the Washington Public Power Supply System (the Supply System) at the Hanford Site between 1973 and 1983, and 3) agriculture. These three activities have directly employed about 40 percent of the employed labor force in the MSA, and have supported additional workers through local purchases of goods and services. The comparatively high salaries and wages paid by the DOE, the Supply System, and their contractors enhanced the income of many families in the MSA. Between 1981 and 1983, however, the Supply System completed one nuclear power plant (WNP-2) and halted construction on two additional units (WNP-1 and WNP-4) being built on the Hanford Site. The resulting loss of about 10,000

[a] MSAs, metropolitan statistical areas, are urbanized areas that constitute integrated economic areas MSAs are used by the U.S Department of Commerce Bureau of the Census, as geographic reporting units for a variety of social and economic data The Metropolitan Statistical Area is composed of Benton and Franklin Counties.

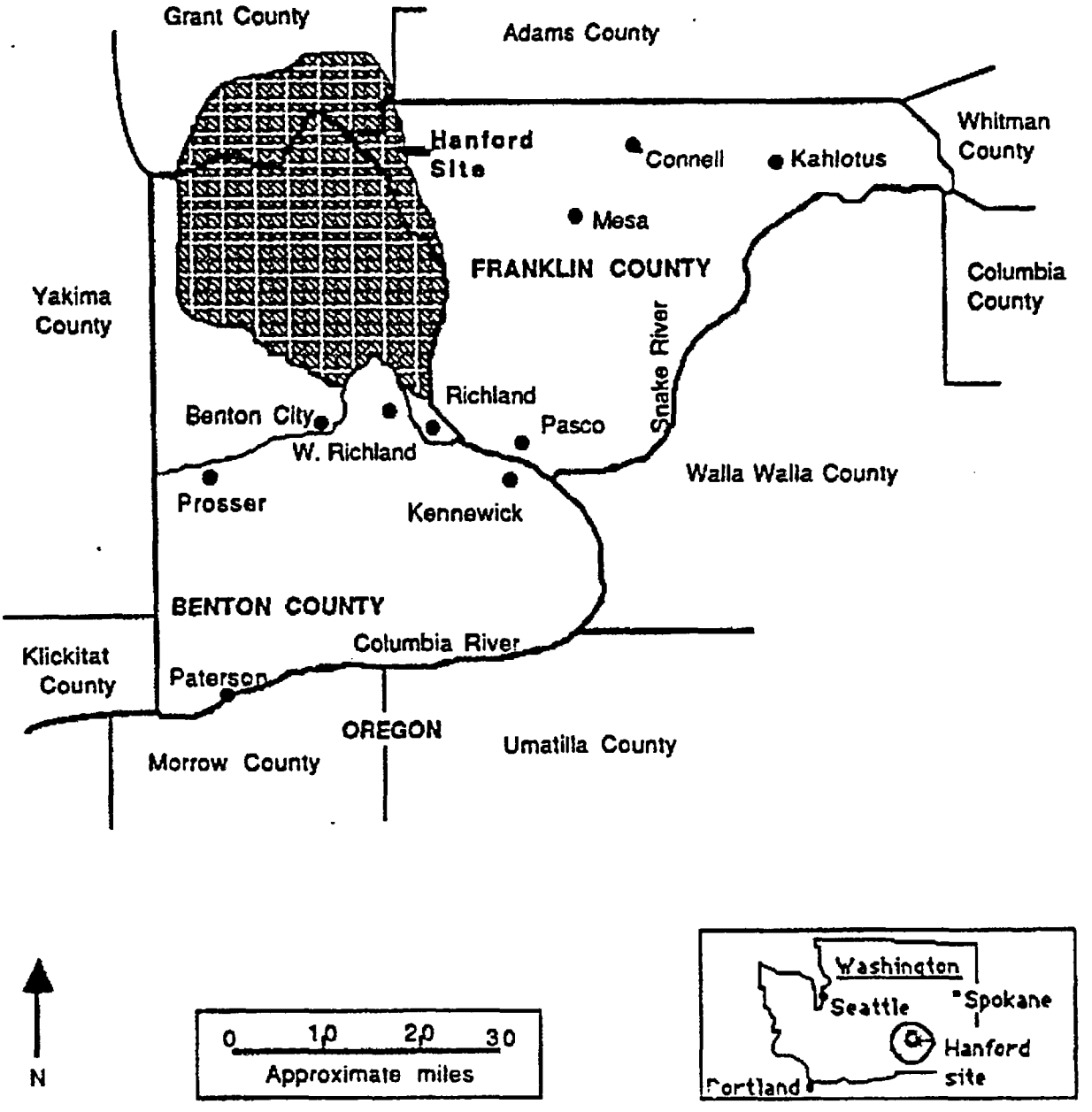

FIGURE 1.1. Map of Benton and Franklin Counties, Washington

jobs, along with a downturn in the agricultural economy, was largely responsible for a local recession that lasted from 1982 through 1984. Average annual employment of MSA residents fell from 75,900 people in 1981 to 59,400 in 1984 before gradually rising to 62,100 in 1986. Had it not been for increasing employment by the DOE and its contractors on other projects, the local recession probably would have been sharper and more prolonged. Similar concerns have recently arisen because of the BWIP closeout

and the February 1988 announcement regarding severe cutbacks in DOE nuclear weapons-grade material production.

Population in the Richland-Kennewick-Pasco MSA has exhibited similar fluctuation. The MSA's total population grew from 93,356 people in 1970 to 147,900 in 1982, stimulated largely by increasing employment opportunities. The decrease in employment opportunities between 1981 and 1984 led to an out-migration of workers and their families. By 1986 the total population had fallen to 139,300. Although the MSA's population increased slightly in 1987 to 139,600 due to natural increase (births minus deaths), out-migration continued in 1987 despite growth in employment.

1.4 Organization of the Monitoring Report

This report is organized into five major sections and three appendices. Section 2.0 provides a discussion of major BWIP activities that have been underway since the beginning of site characterization as well as a background discussion on the procedures and policies affecting the stop work authorization. Section 3.0 presents project characteristics data including total employment by occupation, contractor and residential location, material purchases, and taxes paid through site characterization to date. Appendix A contains additional detailed information relating to those data. Section 4.0 describes the work force in detail focusing on such items as migration, place of residence, demographics, and household composition. Section 5.0 contains a synthesis of interviews held with BWIP workers about their experiences related to the project closeout. Appendix B contains a sample copy of the BWIP worker survey. Appendix C provides a description of the QA procedures that were used in administering the worker survey.

2.0 MAJOR WORK ACTIVITIES

2.1 Background of the Basalt Waste Isolation Project

The geologic repository can be conceptually viewed as a large underground mine with a complex of tunnels occupying approximately 2,000 acres at a depth between 1,000 and 4,000 feet below the ground surface. The NWPA authorize this facility to contain approximately 70,000 metric tons of uranium (MTU). The nuclear waste that would be placed in the repository would principally be intact spent nuclear fuel from commercial power reactors. About 75 percent of the spent fuel that will be generated through the year 2020 would be scheduled for emplacement in this repository. This nuclear waste is estimated to be 60,000 MTU. The remainder of the waste authorized by the NWPA for this repository would consist of defense and other commercial high-level waste that would be solidified into borosilicate glass and clad by metal before acceptance at the repository.

Site characterization, which began on May 28, 1986, is a program of studies directed at obtaining the geoscience data necessary to determine the suitability of the Hanford site for development as a geologic repository. Planned Hanford Site characterization activities included: laboratory investigations, surface-based geoscience data collection, borehole drilling studies, and studies conducted in the proposed "host rock" by means of an exploratory shaft facility.

Early site work, which started in 1976, supported the selection of the Hanford Site for characterization and culminated in the issuance of the BWIP EA in 1986. This effort was done under controls commensurate with the requirements of a research and development program.

With Presidential approval in early 1986 of BWIP as a candidate site, there was a transition of BWIP management processes and procedures consistent with the NWPA and the NRC requirements for a licensed repository facility, and the requirements of a DOE Major System Acquisition project. In order to satisfy those requirements, it was determined that the following type of management and technical prerequisites must be in place for the conduct of subsequent BWIP activities: management and technical procedures to control the work; quality assurance requirements and programs; personnel training, qualification and certification; and equipment and facility records.

To accomplish this goal, the BWIP was organized with an Integrating Contractor [i.e., Westinghouse Hanford Company (WHC)], a Support Services Contractor [i.e., MAC Technical Services (MACTEC)], and various participating contractors. The participating contractors include Pacific Northwest

Laboratory (PNL) for the research and development work, Morrison-Knudsen Company (M-K) for the construction activities, and Kaiser Engineers/Parsons Brinkerhoff (KE/PB) for the engineering activities.

2.2 Stop Work Order

On May 1, 1986, a general Stop Work Order (SWO) was issued by the Integrating Contractor at the request of DOE. This SWO resulted from an assessment of the ongoing work and a review of previous audit findings. It was determined that the proper controls were not in place to continue with site characterization activities. The SWO allowed the following categories of activities to continue:

1. All activities, including procurements, that support upgrading the BWIP management, operating, or quality assurance program. These activities included implementing the steps of the September 1986 recovery plan for lifting the SWO.

2. Data gathering activities that were currently in progress and for which interruption could result in loss of significant information.

3. Site Characterization Plan (SCP) preparation

4. All activities that support existing safety or maintenance programs.

5 All strictly administrative activities (e.g., planning, budgeting, staffing, reporting, etc.)

6. Activities that are essential for the project to continue or that are imprudent to stop because of cost considerations.

Activities performed by the participating contractors and subcontractors to the Integrating Contractor were not included in the SWO because the results of audits and surveillances indicated that adequate controls were in place to manage this work.

The lifting of the SWO was a two-step process A partial lifting occurred on June 10, 1987, when the DOE Richland Operations Office (DOE/RL) was satisfied that the Integrating Contractor had established a management control system that was adequate to control technical work This step allowed the Integrating Contractor to proceed with the work initiation process under controlled conditions of DOE/RL work release approval and implementation auditing The final lifting of the SWO was on

December 17, 1987, when DOE/RL was given assurance that the Integrating Contractor's management control systems and work implementation processes were satisfactory.

During this SWO recovery process WHC, in joint venture with Boeing Computer Services Richland, replaced Rockwell Hanford Operations as the Integrating Contractor. This was a result of consolidation of the total Hanford Operations by DOE/RL. The transition of WHC to the role of the Integrating Contractor was effected during the period January through June 1987, at which time WHC assumed the responsibility for BWIP.

In summary, a major work effort at BWIP during this period has been implementation of the steps necessary to lift the SWO issued on May 1, 1986. The ultimate objective of this effort was to establish management systems and disciplines necessary to produce and obtain data to meet all regulatory and technical requirements, and to perform work in such a manner that the results obtained could be used in a license application for the facility.

2.3 Pre-Exploratory Shaft Hydrologic Testing

In addition to restart activities, a major ongoing work activity that was exempted from the SWO has been the development of the Pre-Exploratory Shaft Hydrologic Testing Program. The purpose of this specific hydrologic testing program was to establish the hydrologic baseline for the BWIP. This program was to provide monitoring at selected basalt horizons, provide access to measure water levels and install instruments, and provided access to obtain water samples. Included in the work scope was the design of drill holes DC-23, DC-24, DC-25, DC-32, and DC-33. In order to support this construction and testing program, considerable training, procurement, study and test plan development, and drilling and testing procedure preparation activities were required.

2.4 Site Characterization Plan Preparation

The work activity with the highest priority since the issuance of the final EA has been the preparation of the BWIP Site Characterization Plan (SCP). The NWPA requires the DOE to prepare an SCP before proceeding to sink exploratory shafts at any candidate site for a geologic repository. The SCP is also required by the NRC licensing requirements contained in 10CFR Part 60, which apply to geologic disposal of high-level radioactive wastes. The BWIP SCP, in its present form, consists of approximately 6,000 pages of documentation describing the present state of knowledge about the site at Hanford, Washington. It also presents the program plan for data collection and analysis to provide the information

needed for site selection and licensing. The BWIP SCP, if completed, would have accomplished the following:

1. establish what is known about the site on the basis of BWIP exploration activities completed to date

2. describe the issues that DOE has identified at the site in light of results of investigations to date (i.e., questions that must be answered or resolved to assess site suitability)

3. describe the detailed plans to obtain data to be used to resolve the issues identified.

With regard to the SCP, site characterization means the program of exploration and research, both in the laboratory and in the field, that would be undertaken to establish geologic conditions and the ranges of those site parameters relevant to the requirements of 10CFR Part 60. Specifically, this program included such activities as borings, surface excavations, excavation of exploratory shafts, underground lateral excavations and borings, and in-situ testing at depth.

2.5 Conceptual Design

Another work activity performed during this period related to SCP activities is the development and reporting of the repository and waste package conceptual designs. In addition, planning tasks were accomplished that were necessary for initiation of advanced conceptual design work activities.

3.0 PROJECT CHARACTERISTIC DATA

3.1 Background

To study the socioeconomic factors of the BWIP program, project characteristic data for DOE/RL and all contractor personnel working in the Hanford area have been gathered. These data should support analysis by the State of Washington and local communities. These data include employment totals by job category, income totals by job category (when available), project expenditures, and information on taxes and miscellaneous fees paid by BWIP contractors. This information has been gathered from DOE/RL and all contractors with personnel whose place-of-work is in the Hanford area. Information on KE/PB, which performs most of its activities in the Oakland, California area, will not be represented in this report.

The information compiled covers the time period after the commencement of site characterization activities, June 1, 1986 through December 1987.

In this section of the report and in Appendix A, separate tables have been provided for each contractor and DOE/RL to report contractor level data. A summary table (Table 3.1) describes the project characteristic data for the BWIP in toto. The tables in Appendix A provide individual contractor summaries.

3.2 Employment

A particular focus of the monitoring program is upon employment for site characterization activities on a place-of-work basis. Within this report, employment information is presented in terms of full-time equivalent (FTE) employees working on the BWIP. At the beginning of site characterization there were almost 600 persons working in some capacity on the program (Table 3.1). That number includes *direct workers*, who work solely on BWIP and *indirect workers*, who have other responsibilities within the contractor corporate structure including some related to BWIP. Those directly working on BWIP accounted for 578 FTE's in June of 1986. At the end of Fiscal Year (FY) 1987 the work force peaked at 789 direct workers and 1,240 total (FTE) employees (Figure 3.1). Since that time there has been a steady decrease in employment levels, which will become a dramatic decrease as close out activities come to an end in March 1988.

TABLE 3.1. BWIP Totals: Staff, Salaries, and Materials/Services: June 1, 1986 to December 1987

	1986 J	J	A	S	O	N	D
STAFFING LEVELS (Direct)							
Management	65.0	67.0	69.0	71.0	73.2	76.3	76.2
Clerical	95.0	97.0	95.0	96.0	106.9	107.2	108.6
Scientist/Engineer	294.0	292.0	297.0	298.0	331.3	331.3	329.7
Administrative	65.0	65.0	69.0	75.0	86.0	93.3	94.0
Technician	65.0	65.0	61.0	65.0	63.1	60.1	60.6
Union/Skilled Crafts	1.0	1.0	1.0	1.0	1.0	2.9	1.6
Totals	578.0	580.0	592.0	593.0	659.5	676.4	668.5
STAFFING LEVELS							
Direct and WHC Indirect	798.0	802.6	816.0	818.0	961.6	979.4	965.5
SALARIES (Direct only)							
Management	$32,770	$32,193	$33,714	$33,294	$35,161	$37,313	$34,389
Clerical	$13,923	$12,171	$14,429	$13,806	$16,158	$18,232	$15,858
Scientist/Engineer	$134,863	$128,487	$160,731	$143,243	$188,112	$198,380	$186,184
Administrative	$44,785	$43,068	$47,492	$48,250	$50,498	$56,347	$48,454
Technician	$13,453	$11,843	$16,536	$15,156	$17,891	$23,770	$15,846
Union/Skilled Crafts	$2,042	$1,776	$2,526	$2,316	$2,008	$3,731	$2,967
M-K	$106,700	$89,915	$85,594	$112,168	$96,587	$88,252	$127,670
WHC	$2,354,000	$2,053,000	$3,185,000	$2,774,100	$1,888,000	$2,585,000	$1,877,000
Totals	$2,701,701	$2,369,355	$3,536,022	$3,140,396	$2,271,416	$3,007,015	$2,378,316
MATERIALS/SERVICES	$2,020,448	$2,200,638	$828,131	$3,834,827	$824,318	$487,772	$1,184,151
TAXES/FEES	$42,913	$42,304	$36,593	$34,926	$45,682	$38,068	$61,360

	1987 J	F	M	A	M	J
STAFFING LEVELS (Direct)						
Management	77.3	78.3	80.3	87.3	88.3	91.3
Clerical	107.2	105.2	110.2	118.3	122.5	131.2
Scientist/Engineer	324.4	318.4	316.3	317.8	314.4	321.0
Administrative	101.3	103.3	103.3	110.4	127.6	141.2
Technician	59.4	67.4	68.4	67.5	67.5	66.3
Union/Skilled Crafts	1.8	1.8	1.9	3.5	2.9	2.8
Totals	[illegible]	686.5	688.4	701.0	713.8	743.9
STAFFING LEVELS						
Direct and WHC Indirect	975.5	974.6	977.4	1048.0	1071.5	1121.8
SALARIES (Direct only)						
Management	$40,467	$40,467	$42,723	$44,288	$60,074	$53,724
Clerical	$18,041	$18,041	$21,250	$19,964	$26,018	$25,161
Scientist/Engineer	$181,383	$181,303	$214,824	$211,836	$238,001	$233,850
Administrative	$66,736	$66,736	$41,867	$101,737	$132,543	$139,063
Technician	$19,680	$19,680	$25,814	$20,968	$26,014	$20,447
Union/Skilled Crafts	$3,089	$3,689	$4,062	$3,289	$4,062	$3,208
M-K	$139,919	$120,146	$148,782	$123,486	$122,968	$160,583
WHC	$2,276,100	$2,566,600	$2,720,800	$2,479,400	$3,380,900	$2,443,100
Totals	$2,733,424	$2,993,861	$3,240,202	$3,048,628	$3,993,388	$3,140,407
MATERIALS/SERVICES	$2,130,188	$2,197,868	$1,617,734	$1,674,348	$2,494,348	$2,134,418
TAXES/FEES	$43,637	$34,917	$43,174	$47,256	$42,600	$43,936

	1987 J	A	S	O	N	D
STAFFING LEVELS (Direct)						
Management	90.2	93.3	93.9	93.2	84.2	84.2
Clerical	130.9	134.0	115.1	112.2	115.7	110.5
Scientist/Engineer	330.6	334.5	363.3	334.0	306.2	300.4
Administrative	160.8	163.6	163.5	155.7	155.7	145.0
Technician	63.0	53.2	54.1	42.8	47.9	44.1
Union/Skilled Crafts	3.8	3.9	7.2	4.4	3.6	3.5
Totals	788.7	783.9	788.1	742.4	719.4	693.7
STAFFING LEVELS						
Direct and WHC Indirect	1178.7	1203.9	1240.1	1183.4	1170.6	1144.7
SALARIES (Direct only)						
Management	$92,690	$96,418	$93,079	$87,163	$87,400	$87,205
Clerical	$23,670	$30,126	$31,279	$24,682	$27,414	$25,137
Scientist/Engineer	$254,850	$310,983	$364,330	$372,627	$307,484	$276,322
Administrative	$207,292	$220,211	$224,337	$207,131	$212,526	$206,374
Technician	$17,635	$25,048	$61,997	$18,331	$24,838	$19,386
Union/Skilled Crafts	$2,768	$3,931	$8,487	$1,396	$1,894	$1,479
M-K	$125,133	$120,568	$148,646	$120,720	$121,853	$142,693
WHC	$2,190,600	$3,078,600	$2,471,700	$1,833,000	$2,639,000	$1,986,000
Totals	$2,914,878	$3,884,793	$3,406,874	$3,025,178	$3,432,900	$3,222,320
MATERIALS/SERVICES	$2,422,016	$2,874,210	$7,112,811	$1,965,131	$1,172,711	$600,866
TAXES/FEES	$45,966	$48,634	$70,019	$38,040	$41,138	$34,632

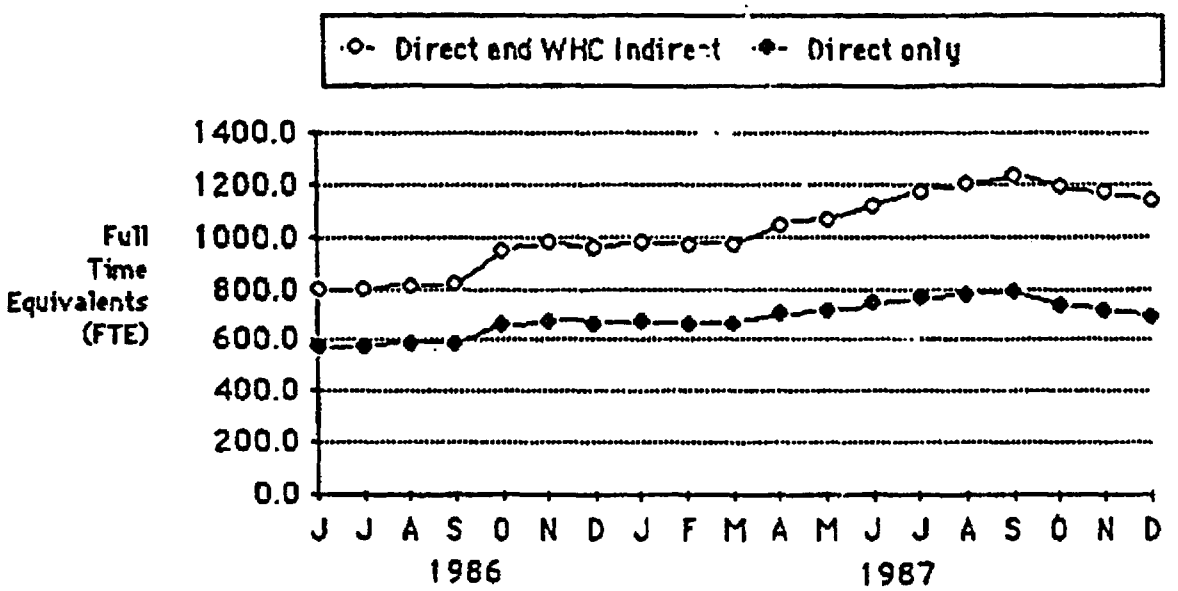

FIGURE 3.1. BWIP Employment June 1986 to December 1987

The employment data totals have been divided into the following six categories: management, clerical, scientist/engineer, administrative, technician, and union/skilled crafts (Table 3.2). Although these categories fit the overall project tasks, consistency among the contractors in reporting data was difficult to maintain. For instance, M-K job classifications include professional and technical categories. After discussions with M-K personnel, it was concluded that both of these categories are most appropriate in the administrative category.

TABLE 3.2. Occupational Distribution of BWIP Work Force
June 1986 to December 1987 (direct workers only)

Job Category	Monthly Average FTE	Percentage of Total
Management	81.5	12%
Clerical	111.2	16%
Scientist/Engineer	318 1	46%
Administrative	115.6	17%
Technician	55.4	8%
Union/Skilled Crafts	2.8	0%
Totals	684.7	100%

An average of the number of employees within each job category was calculated for the site characterization period. Both total employees and the percentage of the total each job category represents are presented in Table 3.2. It is evident that the BWIP work force is highly educated with almost half the employees being scientists or engineers. This reflects the research nature of the BWIP. Technicians and skilled crafts were utilized only slightly on BWIP during this time period.

3.3 Salary Expenditures

This report details a breakdown of salary information for BWIP employees sorted by job category (Table 3.3). The breakdown of salary information by job category for M-K and WHC employees working on BWIP were unavailable for this report. This income information does not include benefits. Salary expenditures for the BWIP work force have fluctuated over the course of site characterization as different types of employees did different types of activities (Figure 3.2). The monthly salary expenditures have been approximately $3.1 million, ranging from $2.27 million in October 1986 to $3.99 million in May 1987.

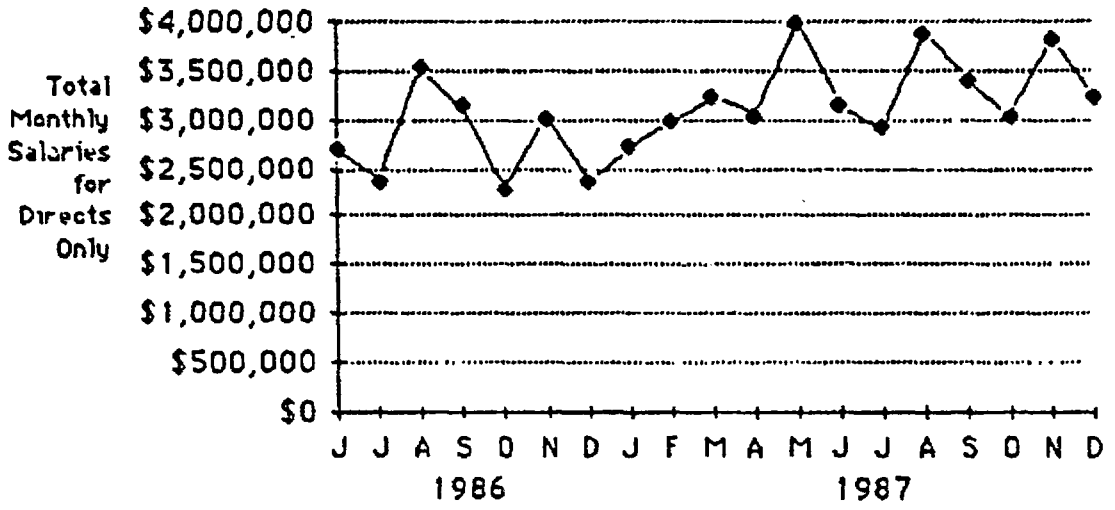

FIGURE 3.2. Total Monthly Salary Expenditures June 1986 to December 1987 (directs only)

The average monthly salary for each job category for workers on BWIP is shown in Table 3.3. As stated above, the breakdown was not available for M-K and WHC, so the table represents DOE/RL, MACTEC, and PNL personnel only. Management and scientists and engineers are, not surprisingly, the

highest paid occupation classes in the work force. This indicates again the highly skilled nature of the BWIP workers.

TABLE 3.3. Average Salary Distribution of BWIP Work Force

Job Category	BWIP Average Salary Per Month*
Management	$4,917
Clerical	1,691
Scientist/Engineer	4,263
Administrative	3,891
Technician	3,268
Union/Skilled Crafts	4,317

*Based on data from PNL, MACTEC and DOE/RL only

3.4 Materials and Services Expenditures

Expenditures for such items as materials and services that have been used on the BWIP are reported in Table 3.1. This information has been obtained from the procurement/contracting offices of each of the project employers, and may be used to determine the extent of the local and regional economic effects (e.g., increased business activity and employment) due to site characterization activities. For the purposes of this report, DOE/RL and each of the contractors has only reported the total costs of the materials and services purchased for the BWIP. Expenditures for materials and supplies have fluctuated during the project with peak expenditures at the end of FY 1986 and FY 1987 (Figure 3.3).

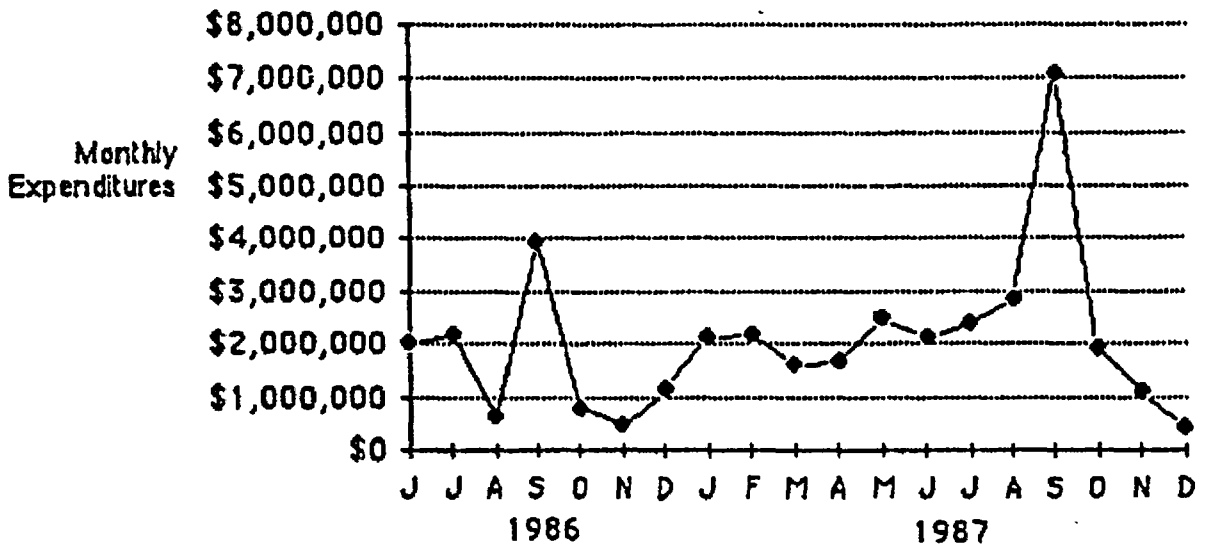

FIGURE 3.3. Total BWIP Materials and Services Purchases June 1986 to December 1987

Expenditure data are also broken down by geographic location of the vender from which the material or service was purchased (Table 3.4). These data pertain only to WHC purchases. The data are provided by purchase order plus changes to the cost after the purchase order was issued and the final cost of the material or service. The largest proportion of purchases were made from vendors outside the State of Washington (Figure 3 4). During FY 1987 about one quarter, or over $4 million, of all purchases were made from vendors in the Sate of Washington. Between October 1987 and January 1988, in-state purchases have far exceeded out-of-state purchases. In January 1988, after the BWIP shutdown decision, many purchases were cancelled. Those cancellations primarily affected out-of-state vendors

TABLE 3.4. WHC BWIP Expenditures by Location of Vendor June 1986 to January 1988

	May-Sept. '86			FY '87			Oct '87- Jan '8	
	Purchase Order	Changes	TOTAL	Purchase Order	Changes	TOTAL	Purchase Order	Changes
Richland								
• PO Contracts & Services	40,611 76	32,593 88	73,205 63	330,043 01	714,031 05	1,044,074.06	364,476.73	788,529.13
• Office and Shop Supplies; maintenance & Safety Equipment	34,600.38	-178.90	34,421.48	36,833 31	27 85	36,861 17	995 75	
• Direct & Applied Materials	14,028.16	-175.00	13,853 16	134,902.46	76,115 85	211,018.31	23,398.52	880.76
• Other	38,648.61	-600 27	38,348.34	63,072.63	125.00	63,197 63		
Total Richland	128,888.90	31,739.71	159,828 61	555,751 61	790,299 76	1,345,051 37	418,870.00	789,409.89
Kennewick								
• PO Contracts & Services	16,888.87	-38,733.68	-21,874.81	184,756 83	40,905 37	225,662.20	311,103.80	83,788.11
• Office and Shop Supplies; maintenance & Safety Equipment	23,365.54	779.80	24,145.34	53,441 68	-107 68	53,333.84	4,846.16	-1,698.60
• Direct & Applied Materials	23,163.16	-400 00	22,763 16	79,608 61	581 84	80,181.85	18,276 53	492 44
• Other	51,262.00	-375.00	50,887 00	51,258.00	67 15	51,325.15	6,165 00	
Total Kennewick	114,679.51	-38,728 88	75,941 43	369,066 63	41,416 81	410,482 84	340,391.46	81,981 95
Pasco								
• PO Contracts & Services	3,271.00	4,919.64	8,190 64	36,693 85	90 00	36,983 85	663.46	-3,244 80
• Office and Shop Supplies; maintenance & Safety Equipment	13,951.38	110.67	14,072.06	29,616 00	-610 30	29,005 70	3,899.80	
• Direct & Applied Materials	6,845 92	211 94	7,057 86	46,557 76	0 00	46,557 76	11,656 16	137 16
• Other	6,321.67	-986.00	5,335 67	42,029 60	500 00	42,529 60		
Total Pasco	33,400.26	4,256.25	37,656 53	156,896 87	-20 30	156,076 37	16,619 14	-3,107.32
Indian Reservation								
• PO Contracts/Services			0 00			0 00		
• Office and Shop Supplies; maintenance & Safety Equipment	88 00		88 00	711 00		711 00		
Total Reservation	88.00	0 00	88 00	711 00	0 00	711 00	0 00	0.00
Washington (Remain)								
• PO Contracts & Services	128,682.13	92,360 86	222,343 00	498,761 16	381,468 96	878,190 12	155,884 65	-277,479 91
• Office and Shop Supplies; maintenance & Safety Equipment	76,762.86	1,148 35	77,911 31	894,886 74	-761,977 72	132,861 02	14,422 02	-20,879 91
• Direct & Applied Materials	85,820 34	2,186.00	88,006 34	232,905 52	-1,875 76	231,030 03	126,699 65	-1,218.51
• Other	106,971.55	620 00	107,591 55	902,110 02	3,732.44	905,842.46	9,001.00	-437,936 84
Total Washington (Remain)	499,836.88	96,314.31	505,852.29	2,526,845 74	378,632 11	2,147,853 63	305,102.62	-737,614 27
World (Remain)								
• PO Contracts & Services	697,846 46	-270,240 16	427,706 30	8,073,680 67	3,822,312.48	11,895,993 08	436,616 68	-752,112 05
• Office and Shop Supplies; maintenance & Safety Equipment	231,824 67	-3,683 66	228,240 99	176,966 82	-229 86	176,736 96	13,884 03	-241 .4
• Direct & Applied Materials	203,063 88	2,915,488.23	3,118,553 11	545,324 92	-11,129 31	534,195.61	152,187 77	-4,786 60
• Other	337,663.00	1,036 66	338,699 66	488,676 48		488,676 48	302,025 40	-242,125 87
Total World (Remain)	1,470,487 44	2,642,502 84	4,113,990 06	9,286,650 79	3,810,953 32	12,897,804 11	904,313 18	-989,276.56
Total								
• PO Contracts & Services	888,671 24	-176,099 59	709,571 65	9,122,975 42	4,758,827 57	13,881,803 29	1,297,642 74	-151,116 32
• Office and Shop Supplies; maintenance & Safety Equipment	380,713.34	-1,823 16	378,890 18	1,194,437 92	762 697 07	431,539 85	37,747.48	22,929 48
• Direct & Applied Materials	342,941 40	2 917,312 17	3,260,253 57	1,038,300 97	63,662 89	1,102,983 26	331,515 83	-4,502 13
• Other	543,957 13	-204 88	543 752 84	1,535,146 33	4,424 58	1,542,572 92	317,190 40	-680,064 81
Grand Total	2,156,283 11	2,736,184 53	4,892,467 64	12,894 881 84	4,064,017 46	16,958,878 32	1,984,296 42	-555,605 41

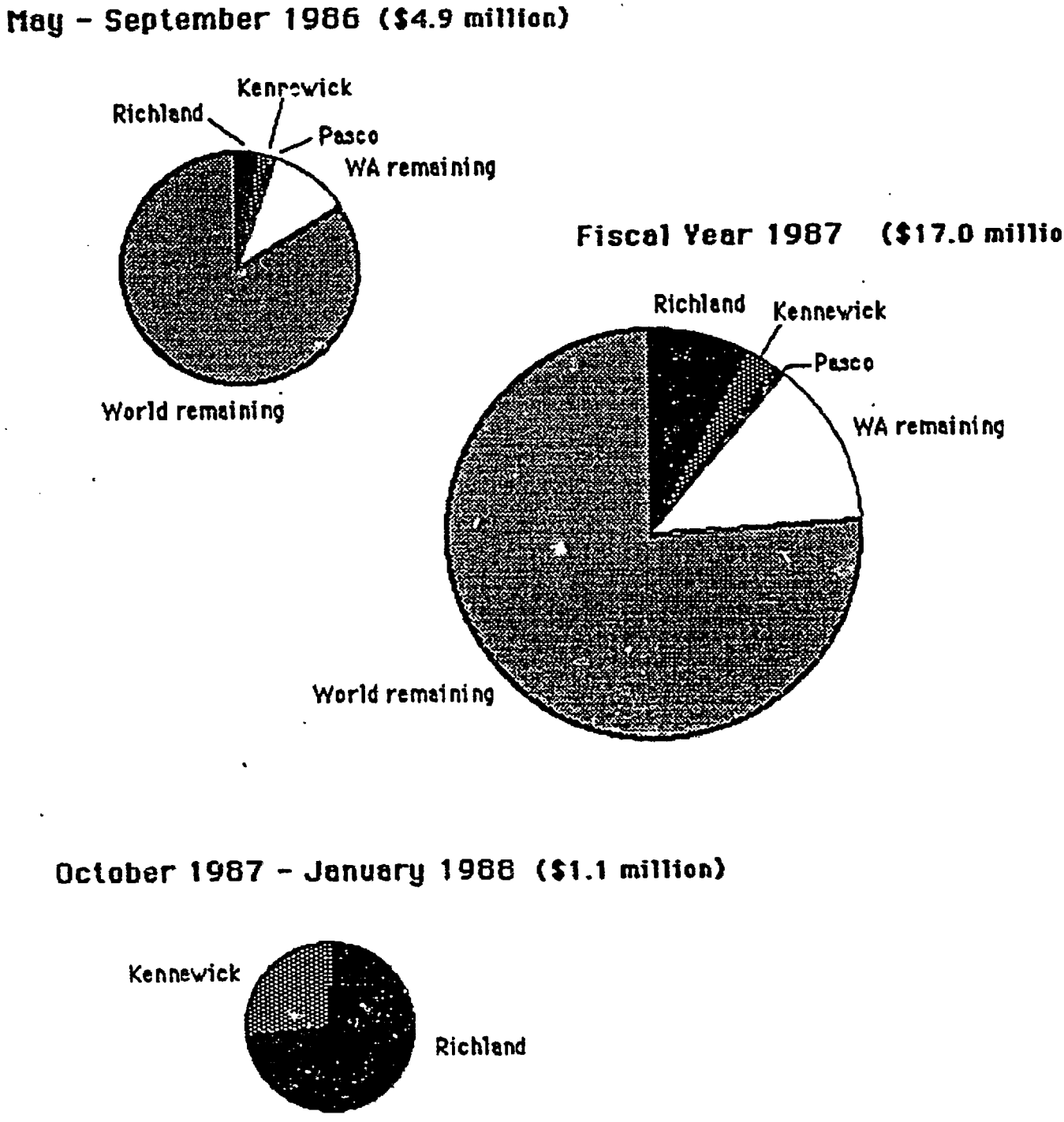

FIGURE 3.4. BWIP WHC Expenditures by Location of Vendor June 1986 to January 1988

3.5 Taxes and Miscellaneous Fees

The DOE contractors on the Hanford Site pay business and occupation taxes[a] and sales and use taxes as required by the State of Washington, in addition to miscellaneous fees. Taxes and miscellaneous fees attributed to BWIP and paid by the major project participants working on BWIP are summarized in Table 3.1 and provided in more detail in Table 3.5.

Although no sales tax related to BWIP is paid, use tax is paid on fixed equipment at the time of purchase. For movable equipment, use tax is paid on monthly depreciation over the life of the equipment on those items costing over $5,000 that have been capitalized[b].

All property on the Hanford site is owned by the federal government and thus exempt from personal and real property taxes. In addition, all vehicles on the Hanford site are owned by the federal government and thus are exempt from county licensing regulations.

MAC Technical Services (MACTEC) does not pay either B&O or sales and use tax for its activities on BWIP. Thus, only miscellaneous fees such as tax registration and industrial insurance deposit, which are paid at the beginning of the contract only, and industrial and unemployment insurance, which are paid quarterly, have been reported.

The average monthly payments in taxes have equalled approximately $45,000. This has fluctuated depending on the date particular taxes or fees were due (Figure 3.5).

[a] Business and occupation (B&O) tax is calculated as a percentage of total contractor net reimbursable expenditures or comparable equivalent of gross revenue. Consequently, B&O tax related to BWIP activity is estimated by multiplying the ratio of BWIP program costs to total contractor program costs by the total B&O tax paid for the period.

[b] BWIP use tax is estimated by multiplying the ratio of BWIP use tax depreciation base to total contractor use tax depreciation base by the amount of use tax paid on depreciable items. Expensed items are assumed consumed in research and development activity, and consequently are exempt from use tax under RCW 82.12.0265

TABLE 3.5: BWIP Taxes and Fees Paid by Major BWIP Contractors June 1986 to December 1987

	1986						
	June	July	August	September	October	November	December
BUSINESS AND OCCUPATION TAX							
MACTEC	0	0	0	0	0	0	0
M-K	$1,311	$1,103	$924	$1,678	$866	$1,095	$1,650
PNL	$1,620	$1,397	$1,984	$1,822	$2,591	$3,442	$2,295
WHC	$32,445	$33,906	$26,485	$29,083	$36,231	$28,502	$42,254
Totals	$42,369	$43,440	$38,102	$44,631	$29,996	$40,782	$51,367
SALES AND USE TAX							
MACTEC	0	0	0	0	0	0	0
M-K	$64	$47	$17	$6	$148	$9	($57)
PNL	$3,987	$2,237	$1,528	$2,649	$2,166	$2,109	$1,476
WHC	$3,481	$3,516	$3,655	$3,688	$3,679	$3,701	$3,742
Totals	$7,534	$5,800	$5,200	$6,343	$5,994	$5,818	$5,161
MISCELLANEOUS FEES							
MACTEC							
Tax Registration (one time fee)							
Industrial Insurance Deposit (one time fee)							
Industrial Insurance Payment (quarterly)							
Unemployment Insurance (quarterly)							
TOTAL TAXES/FEES	$42,913	$42,206	$36,593	$38,826	$45,682	$38,058	$51,360

	1987					
	January	February	March	April	May	June
BUSINESS AND OCCUPATION TAX	0	0	0	0	0	0
MACTEC	$1,691	$1,526	$1,635	$1,891	$1,355	$2,241
M-K	$2,850	$2,850	$3,738	$3,035	$3,738	$2,961
PNL	$32,665	$27,778	$31,801	$35,593	$31,217	$40,808
WHC	$43,300	$38,999	$48,488	$48,713	$46,206	$55,110
Totals						
SALES AND USE TAX	0	0	0	0	0	0
MACTEC	$70	$19	$156	$56	$345	$224
M-K	$2,372	$1,672	$1,857	$2,577	$1,946	$2,972
PNL	$3,989	$3,972	$3,977	$3,963	$3,999	$3,963
WHC	$6,431	$5,863	$6,000	$6,595	$6,290	$7,159
Totals						
MISCELLANEOUS FEES						
MACTEC					$15	
Tax Registration (one time fee)					$168	
Industrial Insurance Deposit (one time fee)						$396
Industrial Insurance Payment (quarterly)						$10,371
Unemployment Insurance (quarterly)						
TOTAL TAXES/FEES	$43,637	$38,017	$43,174	$47,298	$42,600	$63,936

	1987					
	July	August	September	October	November	December
BUSINESS AND OCCUPATION TAX						
MACTEC	0	0	0	0	0	0
M-K	$1,521	$1,914	$4,156	$758	$1,170	$1,539
PNL	$2,554	$3,627	$7,263	$1,723	$2,747	$2,626
WHC	$35,264	$34,552	$37,777	$25,570	$26,931	$31,714
Totals	$47,060	$52,812	$60,930	$28,051	$30,848	$35,881
SALES AND USE TAX						
MACTEC	0	0	0	0	0	0
M-K	$10	$11	$15	$495	$1,005	$40
PNL	$2,398	$2,022	$5,695	$3,497	$3,271	$4,010
WHC	$4,238	$4,368	$4,506	$5,997	$6,014	$6,016
Totals	$6,646	$6,401	$10,216	$9,989	$10,290	$10,066
MISCELLANEOUS FEES						
MACTEC						
Tax Registration (one time fee						
Industrial Insurance Deposit (one time fee)						
Industrial Insurance Payment (quarterly)		$763			$845	
Unemployment Insurance (quarterly)		$9,644			$2,840	
TOTAL TAXES/FEES	$45,985	$46,534	$70,019	$38,040	$41,138	$34,637

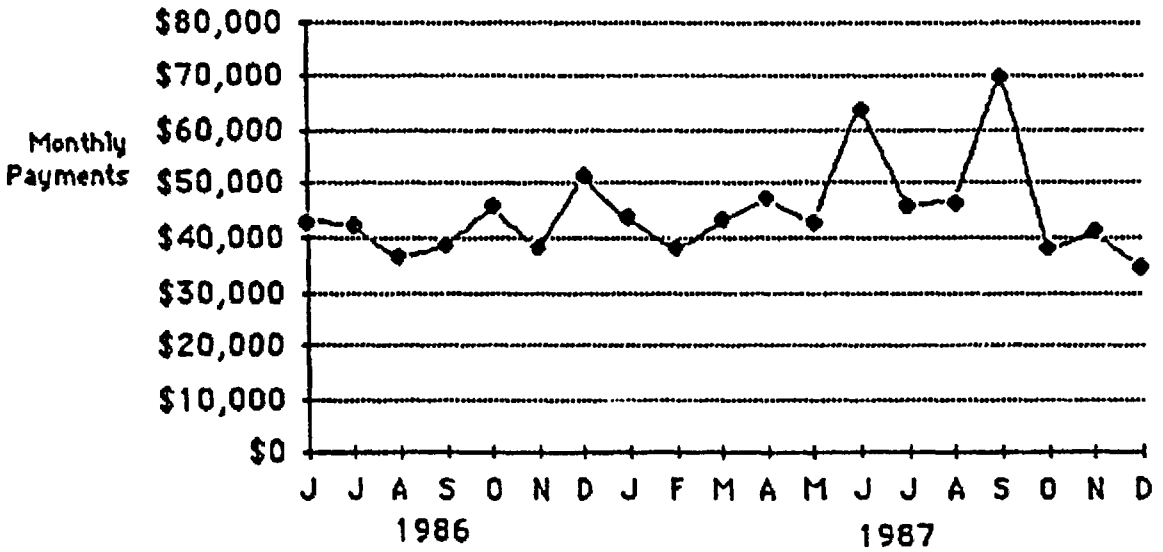

FIGURE 3.5. BWIP Taxes and Fees Paid by Major BWIP Contractors June 1986 to December 1987

4.0 WORK FORCE SURVEY PROFILE

4.1 Background

The following profile data were collected through the BWIP worker survey of August 1987. The purpose of profiling the work force was to gain a better understanding of the potential impacts of BWIP on the state and local area. Certain attributes of the work force may have special implications for the types of impacts that may occur. Such attributes include housing preferences, school age children, and residential location. This section of the report is organized so that various topics can be addressed using the appropriate questions from the worker survey (see Appendix B for an example of the survey form).

The important topics covered in this section include employment, migration status, place of residence, transportation to work, housing type, household structure, and basic demographic data. This information is presented primarily in tables. A brief description of each table is presented. Some of the tables are necessarily detailed so that this report is as useful as possible to a wide variety of readers. It is hoped that the narrative is helpful in clarifying the tabular data.

Generally, it will be noted that the average BWIP worker has been with the same employer about five years and has been working on BWIP activities for about one year. The average BWIP worker owns his or her own home in Richland and has lived there over ten years. He or she drives alone to work and chose Richland because of its closeness to their place of work. The average BWIP worker lives with their family of two to four people. The average BWIP worker is a white male between 30 and 39 years of age. Of course, the "average BWIP worker" is only an interesting statistical entity that may or may not reflect the characteristics of any real worker, and is included here only to highlight the major findings from the worker survey.

4.2 Survey Implementation

Survey participants included workers funded by BWIP and working in Benton county. The DOE-RL, (WHC, and each of the major project participants (MACTEC, M-K, and PNL) were asked to identify the appropriate workers in the study area who could participate in the survey.

At MACTEC and M-K the persons being funded by BWIP and working in the study area were part of a dedicated work force and thus easily identified. Identifying appropriate staff at DOE-

RL, WHC, and PNL was somewhat problematic. At WHC, persons doing general and administrative tasks, are in a corporate overhead function supporting all of WHC and are identified as indirect workers. Indirect workers were not identified or surveyed. At DOE-RL and PNL, special computer runs were used to identify people to survey. The computer runs extracted people who had charged to a BWIP account number during FY 87. At DOE-RL, this resulted in a comprehensive list of those persons needing to be surveyed. At PNL, persons doing general tasks, including BWIP work, were not identified by the special computer run because they charge to general overhead accounts rather than charging to specific account numbers. Those PNL employees charging to overhead accounts but doing a large portion of their work for BWIP were identified by project managers and were surveyed. The total FTE survey population is less than the total FTE employment figures presented in Section 3.1 due to the fact that most indirect overhead personnel were not surveyed.

A pretest of the worker survey was conducted with 20 BWIP workers. The survey form was also reviewed and approved by the Tri-City Building Trades Council. Additional comments were given at meetings with local communities and affected parties. The final survey form evolved from comments made through these forums.

The worker survey was conducted during the last two weeks of August 1987. At DOE-RL, MACTEC, MK, and WHC, the surveys were delivered to worker survey facilitators on August 12, 1987, and most were collected from the facilitators on on August 18, 1987. Facilitators were persons designated by each organization to assist with the distribution and collection of the survey forms. Additional survey forms were collected from DOE-RL, WHC, and MACTEC through August 31, 1987. Survey forms were distributed at PNL on August 26, 1987, and collected on August 31, 1987.

The overall response rate for the worker survey was 85 percent. A total of 1,630 survey forms were distributed and 1,391 were returned. Non-respondents include those people who were on vacation or sick leave during the survey period, were on business-related travel, neglected to return the form, or simply did not choose to participate for personal reasons. The large response represents the majority of the BWIP work force and allows for reasonable conclusions to be drawn about the workers.

Each returned survey form was reviewed by technical staff and checked for consistency in identifying the employer, for the proper number of responses on multiple choice questions, and

that information was given in appropriate time periods (e.g., years, months). The data from each survey form was entered into the data base twice, by a different data entry person each time. A program was prepared to compare the data records for duplicate entries and to identify discrepancies. Each discrepancy was resolved by consulting the original survey form and correcting the data file.

4.3 Employment

Table 4.1 summarizes the responses received from each contractor broken down by the amount of time spent on BWIP. Boeing Computer Services (BCS) is not classified as a major project participant but functions as a subcontractor to WHC; however, BCS is identified separately because of their large staff size. One of the major procedural issues associated with the work force was identifying persons assigned part-time to BWIP and allocating the appropriate weight to those persons. As shown in Table 4.1, PNL has a large number of workers who have performed BWIP activities but for very small amounts of time. Only 42 of the 428 PNL respondents were dedicated over 90 percent of the time. This indicates the nature of the PNL work force. A large number of scientists perform one or two specialized tasks and that is their only association with BWIP. At WHC, on the other hand, a large dedicated work force exists. The other major contractors also have essentially dedicated work forces. The dedicated work force is of primary concern because it is those people whose livelihood is most dependent on BWIP, and it is through those people that BWIP's impacts may be passed to the communities. Workers who are not dedicated to BWIP gain their livelihood from other sources and are not as fully dependent upon BWIP.

As has been discussed, 1,391 survey responses were received out of 1,690 distributed. The 1,391 responses are representative of 915 full-time persons when part-time people are appropriately weighted. Of those 915, 93 percent (FTE) spend more than 90 percent of their time on BWIP. Most of the following tables present data broken down by percent of time spent on BWIP activities. The breakdown by level of dedication to BWIP is presented so that any important unique characteristics of the non-dedicated workers may be identified. In order to identify more detailed characteristics about the work force, some tables are presented for only the dedicated workers.

TABLE 4.1. Employer, by Time Spent on BWIP[a]

Employer	Missing or don't know	PERCENT OF WORK TIME ON BWIP ACTIVITIES 0-50%	51-89%	90-100%	TOTAL	FTE	% Total FTE
DOE-RL	7	23	2	33	65	38.17	4.2
Westinghouse Hanford Co.	50	12	7	549	618	553.85	60.5
Pacific Northwest Lab.	166	200	20	42	428	89.96	9.8
Boeing Computer Services	8	0	3	99	110	100.80	11.0
MAC Technical Services Co.	3	2	0	56	61	56.10	6.1
Morrison Knudsen	18	3	2	41	64	42.81	4.7
Other	9	2	2	32	45	33.68	3.7
TOTAL	261	242	36	852	1,391		
FTE		40.34	26.64	848.38		915.36	
% of total FTE		4.41	2.91	92.68			

[a]Question 3 by Question 17a.
FTE means full-time equivalent.
Compiled from BWIP worker survey August, 1987.

The worker survey also requested information about the respondent's occupation. Each respondent was asked to name his or her occupation, which resulted in a variety of responses and posed difficulties for categorizing those responses. To categorize those responses, keywords from the responses were used and the list of occupations in Table 4.2 developed. This table is not presented to discuss the number of people in each occupation but rather to present the broad range of occupational types working on BWIP.

TABLE 4.2. Job Title (Occupation or Craft), by Percent of Time Spent on BWIP[a]

Job title	PERCENT OF WORK TIME ON BWIP ACTIVITIES: Missing or don't know #	Missing or don't know %	0-50% #	0-50% %	51-89% #	51-89% %	90-100% #	90-100% %	Total #	Total %
Management										
Not specified	6	2.3	7	2.9	0	0.0	64	7.5	77	5.5
Construction	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Activity	0	0.0	0	0.0	1	2.8	6	0.7	7	0.5
Configuration	0	0.0	0	0.0	0	0.0	5	0.6	5	0.4
Eng./construct.	0	0.0	0	0.0	0	0.0	8	0.9	8	0.6
Major subcontract.	1	0.4	0	0.0	0	0.0	2	0.2	3	0.2
Project/program	2	0.8	2	0.8	0	0.0	20	2.3	24	1.7
Quality assurance	1	0.4	3	1.2	0	0.0	3	0.4	7	0.5
Section	0	0.0	6	2.5	0	0.0	7	0.8	13	0.9
Temporary	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Total	10	3.8	18	7.4	1	2.8	117	13.7	146	10.5
Clerical										
Not specified	11	4.2	3	1.2	1	2.8	5	0.6	20	1.4
Clerk	17	6.5	5	2.1	0	0.0	61	7.2	83	6.0
Corresp./library	1	0.4	0	0.0	0	0.0	1	0.1	2	0.1
Data/computer	3	1.1	0	0.0	0	0.0	2	0.2	5	0.4
Secretary/recept.	37	14.2	23	9.5	1	2.8	32	3.8	93	6.7
Editor	5	1.9	8	3.7	0	0.0	11	1.3	24	1.8
Analyst	2	0.8	1	0.4	0	0.0	27	3.2	30	2.2
Maintenance	2	0.8	2	0.8	0	0.0	2	0.2	6	0.4
Temporary	1	0.4	0	0.0	0	0.0	6	0.7	7	0.5
Total	79	30.3	42	17.4	2	5.6	147	17.3	270	19.5
Scientist										
Not specified	13	5.0	30	12.4	9	25.0	57	6.7	109	7.8
Chemist	1	0.4	4	1.7	0	0.0	10	1.2	15	1.1
Geologist	0	0.0	1	0.4	1	2.8	23	2.7	25	1.8
Hydrologist	1	0.4	2	0.8	1	2.8	6	0.7	10	0.7
Geophysicist	0	0.0	1	0.4	0	0.0	5	0.6	6	0.4
Hydrochemist	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Climatologist	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Seismologist	0	0.0	0	0.0	0	0.0	2	0.2	2	0.1
Computer	0	0.0	0	0.0	0	0.0	7	0.8	7	0.5
Temporary	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Total	15	5.7	38	15.7	11	30.6	113	13.3	177	12.7

TABLE 4.2 (continued).

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Job title	Missing or don't know #	Missing or don't know %	0-50% #	0-50% %	51-89% #	51-89% %	90-100% #	90-100% %	Total #	Total %
Engineer										
Not specified	26	10.0	39	16.1	5	13.9	159	18.7	229	16.5
Quality Assurance	5	1.9	7	2.9	3	8.3	31	3.6	46	3.3
Drilling	0	0.0	0	0.0	0	0.0	3	0.4	3	0.2
Geologist	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Project/program	1	0.4	1	0.4	0	0.0	8	0.9	10	0.7
Mech./elect.	2	0.8	3	1.2	0	0.0	3	0.4	8	0.6
Industrial	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Chemical	1	0.4	1	0.4	0	0.0	0	0.0	2	0.1
Civil/construct.	1	0.4	0	0.0	0	0.0	3	0.4	4	0.3
Temporary	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Total	36	13.8	51	21.1	8	22.2	210	24.6	305	21.9
Administrative/support										
Not specified	0	0.0	1	0.4	0	0.0	5	0.6	6	0.4
Coordinator	7	2.7	3	1.2	1	2.8	34	4.0	45	3.2
Quality assurance	0	0.0	2	0.8	0	0.0	5	0.6	7	0.5
Subcontractor/consult.	5	1.9	1	0.4	1	2.8	23	2.7	30	2.2
Supervisor	3	1.1	1	0.4	0	0.0	0	0.0	4	0.3
Fin./budg./acc./plan.	4	1.5	21	8.7	2	5.6	48	5.6	75	5.4
Attorney	1	0.4	2	0.8	1	2.8	1	0.1	5	0.4
Training/Secretary	2	0.8	0	0.0	0	0.0	12	1.4	14	1.0
PR/Labor relations	1	0.4	2	0.8	0	0.0	5	0 6	8	0.6
Total	23	8.8	33	13.6	5	3.9	133	15.6	194	13.9
Technicians/specialists										
Not specified	33	12.6	37	15.3	7	19.4	46	5.4	122	8.8
Computer	2	0.8	1	0 4	1	2.8	25	2.9	29	2.1
Drafter/designer	8	3.1	2	0.8	0	0.0	5	0.6	15	1.1
Driller/roughneck	16	6.1	3	1.2	0	0.0	7	0.8	26	1.9
Electrician/Carpent.	26	10.0	8	3.3	0	0.0	4	0.5	38	2.7
Engineer aide	3	1.1	1	0.4	0	0.0	12	1 4	16	1.2
Hydrology/chemist	2	0.8	3	1.2	0	0.0	4	0.5	9	0.6
Systems analyst	1	0.4	0	0.0	0	0 0	10	1.2	11	0.8
Temporary	2	0 8	0	0.0	1	2.8	3	0.4	6	0.4
Total	93	35.6	55	22.7	9	25 0	116	13.6	272	19.6
Not specified	5	1.9	5	2.1	0	0.0	16	1.9	26	1.9
Total	261		242		36		852		1,391	

[a]Questio.. · by Question 17a.
Compiled from BWIP worker survey August, 1987

One issue the survey was designed to address is worker stability. Table 4.3 indicates that the BWIP work force is moderately stable, with over 44 percent of the workers having worked for their present employer for over 5 years. The dedicated workers, however, appear to be somewhat less stable, with only 38 percent having worked for their present employer for 5 or more years. Thirty-two percent of the dedicated workers have worked for their present employer for less than 2 years while 26 percent of all workers have worked for their present employer less than 2 years. The information presented in Table 4.3 indicates that, to a certain extent, long-time employees are asked to perform BWIP tasks but are not being overwhelmingly shifted to dedicated BWIP status. In general, BWIP workers are being drawn about evenly from new and long-term staff but slightly more from new staff.

TABLE 4.3. How long have you worked for this employer?[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Time worked for current employer	Missing or don't know		0-50%		51-89%		90-100%		Total	
	#	%	#	%	#	%	#	%	#	%
Less than 1 yr	24	9.2	6	2.5	7	19.4	119	14.0	156	11.2
1 yr - less than 2 yrs	23	8.8	27	11.2	3	8.3	157	18.4	210	15.1
2 yrs - less than 5 yrs	82	31.4	52	21.5	8	22.2	239	28.1	381	27.4
5 yrs - less than 10 yrs	47	18 0	59	24.4	6	16.7	186	21.8	298	21.4
10 yrs and over	80	30.7	92	38.0	11	30.6	139	16.3	322	23.1
Not specified	5	1.9	6	2 5	1	2.8	12	1 4	24	1.7
Total	261		242		36		852		1,391	

[a]Question 4 by Question 17a
Compiled from BWIP worker survey August, 1987

The BWIP work force has been building since the late 1970s and through the early 1980s. As shown in Table 4.1, slightly over one-quarter of the work force began on BWIP activities before 1[illegible]. Approximately two-thirds of the work force began BWIP activities during or after 1985. Activity related to the BWIP program has been gradually increasing for approximately a decade. With the preparation of the Environmental Assessment and the formal beginning of site characterization, the program rapidly developed to its current staffing level.

TABLE 4.4. When did you start working on BWIP activities?[a]

Year started working on BWIP activities	Missing or don't know		PERCENT OF WORK TIME ON BWIP ACTIVITIES 0-50%		51-89%		90-100%		Total	
	#	%	#	%	#	%	#	%	#	%
1976	1	0.4	1	0.4	0	0.0	1	0.1	3	0.2
1977	1	0.4	1	0.4	0	0.0	16	1.9	18	1.3
1978	1	0.4	3	1.2	0	0.0	23	2.7	27	1.9
1979	2	0.8	2	0.8	0	0.0	13	1.5	17	1.2
1980	2	0.8	6	2.5	2	5.6	23	2.7	33	2.4
1981	4	1.5	6	2.5	1	2.8	17	2.0	28	2.0
1982	10	3.8	7	2.9	2	5.6	30	3.5	49	3.5
1983	12	4.6	17	7.0	2	5.6	50	5.9	81	5.8
1984	10	3.8	20	8.3	4	11.1	75	8.8	109	7.8
1985	45	17.2	43	17.8	7	19.4	156	18.3	251	18.0
1986	40	15.3	62	25.6	5	13.9	218	25.6	325	23.4
1987	58	22.2	44	18.2	12	33.3	211	24.8	325	23.4
Not specified	75	28.7	30	12.4	1	2.8	19	2.2	125	9.0
Total	261		242		36		852		1,391	

[a]Question 17 by Question 17a.
Compiled from BWIP worker survey August, 1987.

4.4 Migration Status

An influx of workers and their families can have an effect on a community. The survey attempted to identify the migration status of the BWIP workers by asking respondents if they moved to work at their present job. The responses to the survey question may or may not reflect whether the worker moved to work at their BWIP job. Indeed, many of the respondents give a moving date that is earlier than the date they specify they started on BWIP activities Difficulty in interpreting the results arises because some respondents may have been thinking of their BWIP activities and others may not have been. Clearly, many respondents do not equate their present job with their BWIP activities. As has already been shown, this is a reasonable view by the worker, as many of them held their present job before starting on BWIP activities and spend relatively small portions of time on BWIP.

It is possible to obtain a crude estimate of migration status by identifying those individuals who stated they moved to work at their job after they began on BWIP activities (Table 4 5). Of the 464 persons in the dedicated work force that state they moved to their present community to work

at this job, 288 moved after they started on BWIP. This indicates that 34 percent of dedicated BWIP staff are possible in-migrants due to BWIP.

TABLE 4.5. Did you move from another community to work at this job?[a]

Moved to work at present job	PERCENT OF WORK TIME ON BWIP ACTIVITIES									
	Missing or don't know		0-50%		51-89%		90-100%		Total	
	#	%	#	%	#	%	#	%	#	%
Yes	86	33.0	120	49.6	13	36.1	464	54.5	683	49.1
No	171	65.5	117	48.3	23	63.9	388	45.5	699	50.3
not specified	4	1.5	5	2.1	0	0	0	0	9	.6
Total	261		242		36		852		1,391	

[a]Question 5 by Question 17a.
Compiled from BWIP worker survey August, 1987.

4.5 Place of Residence

Table 4.6 indicates that over 90 percent of the BWIP work force resides in Benton County. Over 82 percent of the BWIP work force resides in the cities of Richland and Kennewick, which represents a relatively high degree of concentration in the two largest cities in the area. Pasco, West Richland, and Benton City also have a fairly large number of BWIP workers. Caution should be used in the interpretation of city residence data. It is likely that some residents have postal addresses in a given municipality but do not live within its formal boundaries. Those people may still refer to themselves as living in that municipality. Those respondents who state their city of residence is Richland, Kennewick, Pasco, West Richland, or Benton City account for 96.4 percent of the BWIP work force. When Prosser and Burbank are added, 98 percent of the work force is accounted for. Clearly, these seven jurisdictions constitute the primary areas for potential BWIP worker-caused impacts during site characterization.

TABLE 4.6. Where do you live during the work week?[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Work week place of residence	Missing or don't know #	%	0-50% #	%	51-89% #	%	90-100% #	%	Total #	%
Adams County	0	0.0	0	0.0	0	0.0	3	0.4	3	0.2
Othello	0	0.0	0	0.0	0	0.0	3	0.4	3	0.2
Benton County	230	88.1	220	91.0	30	83.3	796	93.4	1,276	91.7
Richland	121	46.4	134	55.4	24	66.7	474	55.6	753	54.1
Kennewick	83	31.8	62	25.6	6	16.7	238	27.9	389	28.0
West Richland	20	7.7	17	7.0	0	0.0	49	5.8	86	6.2
Benton City	6	2.3	5	2.1	0	0.0	25	3.1	36	2.7
Prosser	0	0.0	0	0.0	0	0.0	8	0.9	8	0.6
Other	0	0.0	2	0.8	0	0.0	2	0.2	4	0.3
Franklin County	14	5.4	10	4.1	4	11.1	34	4.0	62	4.4
Pasco	14	5.4	9	3.7	4	11.1	34	4.0	61	4.4
Mesa	0	0.0	1	0.4	0	0.0	0	0.0	1	0.1
Grant County	1	0.4	1	0.4	1	2.8	1	0.1	4	0.3
Mattawa	0	0.0	0	0.0	1	2.8	1	0.1	2	0.1
Moses Lake	1	0.4	1	0.4	0	0.0	0	0.0	2	0.1
King County	0	0.0	0	0.0	1	2.8	1	0.1	1	0.1
Seattle	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Walla Walla County	1	0.4	1	0.4	0	0.0	6	0.7	8	0.6
Burbank	1	0.4	0	0.0	0	0.0	6	0.7	7	0.5
Walla Walla	0	0.0	1	0.4	0	0.0	0	0.0	1	0.1
Yakima County	6	2.3	4	1.7	1	2.8	7	0.8	18	1.3
Yakima	2	0.8	0	0.0	0	0.0	2	0.2	4	0.3
Sunnyside	1	0.4	2	0.8	1	2.8	2	0.2	6	0.4
Grandview	2	0.8	2	0.8	0	0.0	1	0.1	5	0.4
Selah	0	0.0	0	0.0	0	0.0	2	0.2	2	0.1
Wapato	1	0.4	0	0.0	0	0.0	0	0.0	1	0.1
Other (non-Washington)	9	3.5	6	2.5	0	0.0	4	0.4	19	1.4
Total	261		242		36		852		1,391	

[a]Question 6 by Question 17a.
Compiled from BWIP worker survey August, 1987.

As shown in Table 4.7, the BWIP work force appears to be relatively stable, with over half having lived in the same city or town for over 5 years. Although 8.3 percent have moved into their

city or town in the past 12 months, over 26 percent have moved into their city or town in the past 24 months. It is not clear to what extent this movement is tied to BWIP employment.

TABLE 4.7. How long have you lived in that city or town?[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Length of time lived in present city or town	Missing or don't know		0-50%		51-89%		90-100		Total	
	#	%	#	%	#	%	#	%	#	%
Less than 6 months	17	6.5	5	2.1	4	11.1	79	9.3	105	7.5
7-11 months	1	0.4	0	0.0	1	2.8	9	1.1	11	0.8
1 to 2 years	28	10.7	35	14.5	4	11.1	180	21.1	247	17.8
Over 2 years - 5 years	36	13.8	27	11.2	4	11.1	133	15.6	200	14.4
Over 5 years - 10 years	53	20.3	54	22.3	8	22.2	231	27.1	346	24.9
More than 10 years	120	46.0	113	46.7	13	36.1	212	24.9	458	32.9
Not specified	6	2.3	8	3.3	2	5.6	8	0.9	24	1.7
Total	261		242		36		852		1,391	

[a]Question 7 by Question 17a.
Compiled from BWIP worker survey August, 1987.

Table 4.8 shows that most BWIP workers are permanent residents of their city or town. Approximately 4 percent, however, do not live in their stated place of work seven days a week. This indicates that some workers maintain apartments, houses, or other lodging arrangements for those times that they are in the area working on BWIP, while maintaining a permanent residence elsewhere.

TABLE 4.8. Do you live there full-time (seven days a week)?[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Full-time resident in present city or town	Missing or don't know		0-50%		51-89%		90-100%		Total	
	#	%	#	%	#	%	#	%	#	%
Yes	249	95.4	235	97.1	32	88 9	809	95.0	1,325	95.3
No	10	3.8	3	1.2	4	11.1	40	4.7	57	4.1
Not specified	2	0.8	4	1 7	0	0.0	3	0.4	9	0.6
Total	261		242		36		852		1,391	

[a]Question 8 by Question 17a
Compiled from BWIP worker survey August, 1987

Potential impacts on the local educational system are indicated by identifying the school districts within which workers and their families reside and the number of school age children they have. This indicates potential impacts on the local educational system. As shown in Table 4.9, the number of school children of BWIP workers is highest in Richland and Kennewick, with 759 students having parents working on BWIP.

TABLE 4.9. What school district is your household located in?[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

School District	0-50% # Workers	0-50% total # Students	51-89% # Workers	51-89% total # Students	90-100% # Workers	90-100% total # Students	Missing or Don't Know # Workers	Missing or Don't Know total # Students	Total # Workers	Total total # Students
Burbank	0	0	0	0	6	10	1	2	7	12
K-6	0	0	0	0	3	7	1	2	4	9
7 to 8	0	0	0	0	3	3	0	0	3	3
9 to 12	0	0	0	0	0	0	0	0	0	0
Finley	0	0	0	0	1	1	1	1	2	2
K-6	0	0	0	0	1	1	1	1	2	2
7 to 8	0	0	0	0	0	0	0	0	0	0
9 to 12	0	0	0	0	0	0	0	0	0	0
Kennewick38	53	5	9	151	191	35	44	229	297	
K-6	18	29	4	8	63	90	14	16	99	143
7 to 8	10	12	1	1	37	38	6	7	54	58
9 to 12	10	12	0	0	51	63	15	21	76	96
Kiona/Benton City	4	5	0	0	4	5	3	3	11	13
K-6	1	2	0	0	2	3	1	1	4	6
7 to 8	1	1	0	0	0	0	1	1	2	2
9 to 12	2	2	0	0	2	2	1	1	5	5
Pasco	2	3	1	2	14	21	4	4	21	30
K-6	1	1	0	0	5	10	1	1	7	12
7 to 8	0	0	0	0	2	2	1	1	3	3
9 to 12	1	2	1	2	7	9	2	2	11	15
Prosser	0	0	0	0	3	6	0	0	3	6
K-6	0	0	0	0	2	5	0	0	2	5
7 to 8	0	0	0	0	1	1	0	0	1	1
9 to 12	0	0	0	0	0	0	0	0	0	0
Richland	74	95	8	9	206	273	49	67	337	444
K-6	31	43	3	4	93	140	26	39	153	226
7 to 8	18	19	1	1	38	39	5	5	62	64
9 to 12	25	33	4	4	75	94	18	23	122	154
TOTAL	118	156	14	20	385	507	99	121	601	804

[a]Question 12 by Question 17a
Compiled from BWIP worker survey August 1987

It has been shown that the majority of the workers reside in Richland and Kennewick. Table 4.10 shows that the primary reason given by the survey respondents for selecting their place of residence is its proximity to their place of work. This explains the preference for Richland. Neighborhood characteristics and housing features are secondary. Nightlife and community services were the least likely reasons for selecting a place of residence.

TABLE 4.10. What are the two most important reasons why you chose your local place of residence?[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Reason for choosing residence	Missing or don't know		0-50%		51-89%		90-100%		Total	
	#	%	#	%	#	%	#	%	#	%
Community services	0	0.0	1	0.2	0	0.0	3	0.2	4	0.2
Nightlife	0	0.0	2	0.5	1	1.6	4	0.3	7	0.3
Shopping	4	0.9	1	0.2	0	0.0	18	1.2	23	1.0
Recreational opportunities	8	1.9	12	2.8	2	3.3	20	1.3	42	1.7
Close to spouse's work site	21	4.9	17	4.0	0	0.0	51	3.4	89	3.7
Availability of housing	21	4.9	25	5.8	1	1.6	104	6.9	151	6.2
Good school system	38	8.9	42	9.8	6	9.8	148	9.9	234	9.7
Cost of housing	64	15.0	59	13.7	5	8.2	203	13.5	331	13.7
Desired housing features	61	14.3	67	15.6	11	18 0	241	16.1	380	15.7
Good neighborhood	69	16.2	75	17.4	9	14.8	254	16.9	407	16.8
Close to work site	98	23.0	100	23.3	16	26.2	321	21.4	535	22.1
Other	43	10.0	29	6.7	10	16.4	132	8.8	214	8.9
Total*	427		430		61		1499		2,417	

[a]Question 16 by Question 17a. *Respondents were asked to select two; this table reflects both selections.
Compiled from BWIP worker survey August, 1987

Table 4 11 indicates that Richland is most often selected as a place of residence for dedicated workers because of its proximity to the place of work. This is also the most often cited reason for workers living in West Richland. Kennewick is selected primarily for housing characteristics (cost and desired features) and neighborhood characteristics. Benton City and Pasco are also selected because of the housing characteristics that meet the needs and desires of the workers.

TABLE 4.11. What are the two most important reasons why you chose your local place of residence?[a] (For BWIP-Dedicated Workers)

Reason for current place of residence	PLACE OF RESIDENCE							
	Richland	Kennewick	West Richland	Benton City	Pasco	Prosser	Burbank	Total
Community services	1	1	1	0	0	0	0	3
Nightlife	1	1	0	1	0	0	0	3
Shopping	9	9	0	0	0	0	0	18
Recreational opportunities	10	6	0	0	1	0	1	18
Close to spouse's work site	23	14	5	2	2	1	2	49
Availability of housing	44	40	5	3	8	0	0	100
Good school system	85	40	6	1	8	3	3	146
Cost of housing	81	81	14	7	13	3	0	199
Desired housing features	119	84	14	11	8	0	1	237
Good neighborhood	145	81	12	4	8	2	1	253
Close to work site	277	16	22	4	1	1	0	321
Other	53	41	7	8	8	4	3	124
Total	848	414	86	41	57	14	11	1,471

[a]Question 16 by Question 6. Includes only workers who spend 90 percent or more of their time on BWIP activities. Compiled from BWIP worker survey August, 1987.

4.6 Transportation to Work

Table 4.12 shows that most of the BWIP work force drives to work alone. Some workers combine walking, biking, and driving, or take a company- or DOE-sponsored bus. Public transportation is used by less than 2 percent of workers and carpools are used by about 15 percent of the workers.

Regardless of place of residence, driving alone is the preferred mode of transportation to work for dedicated BWIP workers, as shown in Table 4.13.

TABLE 4.12. How do you usually get to and from work?[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Mode of transportation to work	Missing or don't know #	Missing or don't know %	0-50% #	0-50% %	51-89% #	51-89% %	90-100% #	90-100% %	Total #	Total %
Drive Alone	189	72.4	183	75.6	29	80.6	645	75.7	1,046	75.3
Carpool	55	21.1	37	15.3	4	11.1	107	12.6	203	14.6
Public Transport	2	0.8	2	0.8	1	2.8	18	2.1	23	1.7
Other/Not specified 1	5	5.7	20	8.3	2	5.6	82	9.6	119	8.5
Drive/Carpool	2	0.8	2	0.8	1	2.8	10	1.2	15	1.1
Drive/Bicycle	1	0.4	1	0.4		0.0	7	0.8	9	0.6
Drive/Hanford Bus		0.0		0.0		0.0	1	0.1	1	0.1
Drive/Walk		0.0		0.0		0.0	5	0.6	5	0.4
Drive/Public Transportation	2	0.8	2	0.8		0.0	6	0.7	10	0.6
Drive/DOE Bus		0.0		0.0		0.0	2	0.2	2	0.1
Drive/Walk/Bicycle		0.0		0.0		0.0	2	0.2	2	0.1
Carpool/Bicycle		0.0		0.0		0.0	1	0.1	1	0.1
Bicycle	2	0.8	5	2.1		0.0	7	0.8	14	1.0
Bus		0.0		0.0		0.0	2	0.2	2	0.1
Company bus		0.0	2	0.8		0.0	3	0.4	5	0.4
DOE Bus		0.0		0.0	1	2.8	3	0.4	4	0.0
Vanpool		0.0		0.0		0.0	7	0.8	7	0.4
Walk	1	0.4	1	0.4		0 0	8	0.9	10	0.7
Hanford Bus	1	0.4		0.0		0.0	14	1.6	15	1.1
Total	261		242		36		852		1,391	

[a]Question 15 by Question 17a.
Compiled from BWIP worker survey August, 1987.

TABLE 4.13 How do you usually get to and from work?[a] (FOR BWIP-Dedicated Workers)

PLACE OF RESIDENCE

Transportation to work	Richland	Kennewick	West Richland	Benton City	Pasco	Prosser	Burbank	Total
Drive Alone	363	175	44	18	27	5	6	638
Carpool	41	37	3	7	6	3	0	97
Public Transport	12	4	1	0	1	0	0	18
Other	57	22	1	0	0	0	0	80
Not specified	1	0	0	0	0	0	0	1
Total	474	238	[illegible]	25	34	8	6	834

[a]Question 15 by Question 6 Includes only workers who spend 90 percent or more of their time on BWIP activities
Compiled from BWIP worker survey August, 1987

4.7 Housing Type

Table 4.14 indicates that two-thirds of the BWIP workers own their place of residence and over 61 percent own their own home. Others own a mobile home/trailer, townhouse, or duplex. Less than 30 percent of the workers rent their housing, primarily apartments and houses. The dedicated BWIP workers are slightly less inclined to own their housing, with 63 percent owning and 34 percent renting. Those workers who are less tied to BWIP are much more likely to own their housing.

TABLE 4.14. During the work week, what type of housing do you live in?[a]

Housing type	Missing or don't know		PERCENT OF WORK TIME ON BWIP ACTIVITIES 0-50%		51-89%		90-100%		Total	
	#	%	#	%	#	%	#	%	#	%
Owned	176	67.4	194	80.2	24	66.7	540	63.4	934	67.1
Apartment	1	0.4	0	0 0	0	0.0	1	0.1	2	0.1
House	155	59.4	183	75 6	21	58.3	497	58.3	856	61.5
Town house	0	0.0	0	0.0	0	0.0	6	0.7	6	0.4
Duplex	2	0.8	1	0.4	0	0.0	0	0.0	3	0.2
Mobile home/trailer	16	6.1	10	4.1	3	8.3	34	4.0	63	4.5
Other	2	0.8	0	0.0	0	0.0	2	0.2	4	0.3
Rented	72	27.6	42	17.4	9	25.0	293	34.4	416	29.9
Apartment	29	11 1	16	6 6	5	13.9	128	15 0	178	12.8
House	23	8 8	16	6 6	2	5.6	117	13.7	158	11.4
Townhouse	3	1.1	1	0.4	0	0.0	7	0 8	11	0.8
Duplex	12	4.6	4	1.7	0	0 0	32	3.8	48	3.5
Mobile home/trailer	1	0 4	1	0.4	0	0.0	5	0 6	7	0.5
Other	4	1.5	4	1 7	2	5.6	4	0 5	14	1.0
Not specified	13	5.0	6	2 5	3	8.3	19	2.2	41	2.9
Total	261		242		36		852		1,391	

[a]Questions 9 and 11 by Question 17a.
Compiled from BWIP worker survey August, 1987.

Workers living in Richland are more likely to rent their housing than workers living in Kennewick (Table 4.15). Only 54 percent of the dedicated workers living in Richland own their housing. This is much lower than the 63 percent overall ownership rate. In Kennewick, however, over 77 percent of the dedicated workers own their residence.

TABLE 4.15. During the work week, what type of housing do you live in?[a]
(For BWIP-Dedicated Workers)

Housing type	PLACE OF RESIDENCE							
	Richland	Kennewick	West Richland	Benton City	Pasco	Prosser	Burbank	Total
Own								
Apartment	1	0	0	0	0	0	0	1
House	243	170	30	16	20	3	4	486
Town House	3	3	0	0	0	0	0	6
Duplex	0	0	0	0	0	0	0	0
Mobile home	8	12	3	2	2	3	1	31
Other	0	0	0	1	0	0	1	2
Rent								
Apartment	107	18	1	0	2	0	0	128
House	64	27	13	4	8	0	0	116
Town House	7	0	0	0	0	0	0	7
Duplex	26	4	1	0	1	0	0	32
Mobile home	2	0	0	1	0	2	0	5
Other	4	0	0	0	0	0	0	4
Not specified	9	4	1	1	1	0	0	16
Total	474	238	49	25	34	8	6	834

[a]Questions 9 and 10 by Question 6. Includes only workers who spend 90 percent or more of their time on BWIP activities.
Compiled from BWIP worker survey August, 1987.

4.8 Household Structure

Table 4.16 includes number of people living in the household, relationships of those in the household, employment status of people in the household, and ages of those in the household. It is evident that the majority of the BWIP workers live in a family household. Over three-quarters of the respondents state they live with their family. Only 17 percent state that they live alone. Two-thirds of the respondents live in two-, three-, or four-person households. Families of two to four people seem to predominate the household structure of BWIP workers. The work force is fairly evenly split between one- and two-worker families. Forty-five percent of the respondents are the only employed person in the household, while 43 percent have another household member employed. Only one-fifth of the work force does not have children.

TABLE 4.16. Household Characteristics[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Household characteristics	Missing or don't know #	%	0-50% #	%	51-89% #	%	90-100% #	%	Total #	%
Respondents live with										
Alone	36	13.8	23	9.5	10	27.8	167	19.6	236	17.0
Roommate(s)	13	5.0	11	4.5	2	5.6	37	4.3	63	4.5
Family	204	78.2	204	84.3	24	66.7	645	75.7	1,077	77.4
Not specified	8	3.1	4	1.7	0	0.0	3	0.4	15	1.1
Total	261		242		36		852		1,391	
Total number in household										
One	36	13.8	23	9.5	7	19.4	166	19.5	232	16.7
Two	67	25.7	72	29.8	11	30.6	244	28.6	394	28.3
Three	55	21.1	46	19.0	2	5.6	125	14.7	228	16.4
Four	54	20.7	59	24.4	7	19.4	183	21.5	303	21.8
Five	18	6.9	18	7.4	2	5.6	84	9.9	122	8.8
Six or more	18	6.9	16	6.6	3	8.3	31	3.6	68	4.9
Not specified	13	5.0	8	3.3	4	11.1	19	2.2	44	3.2
Total	261		242		36		852		1,391	
Number of people in household employed										
One	95	36.4	89	36.8	21	58.3	423	49.6	628	45.1
Two	116	44.4	131	54.1	8	22.2	348	40.8	603	43.4
Three	29	11.1	13	5.4	3	8.3	46	5.4	91	6.5
Four or more	9	3.4	3	1.2	0	0.0	19	2.2	31	2.2
Not specified	12	4.6	6	2.5	4	11.1	16	1.9	38	2.7
Total	261		242		36		852		1,391	
Number of households with children										
Pre-school	46	17.6	37	15.3	5	13.9	92	10.8	180	12.9
K-6	60	23.0	59	24.4	8	22.2	191	22.4	318	22.9
Grades 7-8	20	7.7	31	12.8	2	5.6	90	10.6	143	10.3
Grades 9-12	45	17.2	41	16.9	5	13.9	141	16.5	232	16.7
College/vo-tech	45	17.2	42	17.4	3	8.3	139	16.3	229	16.5
No children in school	45	17.2	32	13.2	13	36.1	199	23.4	289	20.8
Total	261		242		36		852		1,391	

[a]Questions 11, 12, and 13 by Question 17a.
Compiled from BWIP worker survey August, 1987.

It is interesting to note that workers living in Richland are slightly more likely to live alone than workers living in Kennewick (Table 4.17). This is consistent with the earlier finding that workers living in Richland are more likely to be renters

TABLE 4.17. Household Characteristics[a] (FOR BWIP-Dedicated Workers)

Household characteristics	PLACE OF RESIDENCE							
	Richland	Kennewick	West Richland	Benton City	Pasco	Prosser	Burbank	Total
Respondents lives with								
Alone	131	22	10	1	2	0	0	166
Roommate(s)	19	7	3	5	2	0	0	36
Family	322	209	36	18	30	8	6	629
Not specified	2	0	0	1	0	0	0	3
Total	474	238	49	25	34	8	6	834
Number in household								
One	128	23	10	2	2	0	0	165
Two	142	63	12	13	6	5	1	242
Three	51	47	8	2	10	1	0	119
Four	88	59	13	6	8	1	2	177
Five	41	31	3	0	6	0	1	82
Six or more	11	13	2	1	1	1	1	30
Not specified	13	2	1	1	1	0	1	19
Total	474	238	49	25	34	8	6	834
Number of people in household employed								
One	272	93	24	8	13	2	2	414
Two	160	117	22	15	18	5	4	341
Three	22	16	2	1	3	1	0	45
Four or more	13	5	1	0	0	0	0	19
Not specified	7	7	0	1	0	0	0	15
Total	474	238	49	25	34	8	6	834

[a]Questions 11, 12, and 13 by Question 6. Includes only workers who spend 90 percent or more of their time on BWIP activities.
Compiled from BWIP worker survey August, 1987.

4.9 Basic Demographic Data (age, sex, and race/ethnicity)

As was stated in the introduction to this section, the average BWIP worker (as a statistical entity) is a white male over 30 years of age. The survey results presented in Table 4.18 indicate that two-thirds of the BWIP work force are male and one-third are female. Ninety-two percent of the respondents stated they are white. The other 8 percent are divided among black, hispanic, American Indian, and other. The "other" category includes primarily asian/oriental (13) and American Indians (13) who checked the "other" category and gave a tribal name. Almost 80 percent of the BWIP work force is over the age of 30 One-third are between 30 and 39 one-quarter between 40 and 49, and one-fifth are 50 or over

TABLE 4.18. Demographics[a]

PERCENT OF WORK TIME ON BWIP ACTIVITIES

Demographic characteristics	Missing or don't know		0-50%		51-89%		90-100%		Total	
	#	%	#	%	#	%	#	%	#	%
Sex										
Male	135	51.7	165	68.2	22	61.1	575	67.5	897	64.5
Female	115	44.1	70	28.9	14	38.9	272	31.9	471	33.9
Not specified	11	4.2	7	2.9	0	0.0	5	0.6	23	1.7
Total	261		242		36		852		1,391	
Race/ethnicity										
White	229	87.7	227	93.8	34	94.4	793	93.1	1,283	92.2
Black	4	1.5	1	0.4	0	0.0	15	1.8	20	1.4
Hispanic	10	3.8	1	0.4	0	0.0	8	0.9	19	1.4
American Indian	1	0.4	2	0.8	0	0.0	4	0.5	7	0.5
Other	4	1.5	6	2.5	1	2.8	21	2.5	32	2.3
Not specified	13	5.0	5	2.1	1	2.8	11	1.3	30	2.2
Total	261		242		36		852		1,391	
Age										
Over 50 yrs	44	16.9	52	21.5	10	27.8	178	20.9	284	20.4
40 - 49 yrs	57	21.8	58	24.0	3	8.3	231	27.1	349	25.1
30 - 39 yrs	77	29.5	97	40.1	19	52.8	277	32.5	470	33.8
20 - 29 yrs	55	21.1	28	11.6	3	8.3	133	15.6	219	15.7
Less than 20 yrs	11	4.2	2	0.8	1	2.8	11	1.3	25	1.8
Not specified	17	6.5	5	2.1	0	0.0	22	2.6	44	3.2
Total	261		242		36		852		1,391	

[a]Questions 18, 19, and 20 by Question 17a.
Compiled from BWIP worker survey August, 1987.

5.0 PROJECT SHUTDOWN PERSONAL INTERVIEWS

5.1 Background

In December 1987 the NWPAA was enacted, effectively terminating BWIP activities. Although the national program had been embroiled in controversy since before site characterization began, termination came as a surprise to most state and local politicians, DOE staff, and the BWIP work force. The termination of the project requires that all activities, except reclamation of areas disturbed by site characterization, be terminated by 22 March 1988. In order to monitor the work force and to be able to provide local agencies with better information for their planning purposes, interviews of a sample of workers were conducted

The interviews were conducted during the week of February 15, 1988. It is important to note that the interviews were affected to some extent by the announcement that week that the DOE plutonium production N-Reactor, which was shut down for major safety repairs in January 1986, would not be restarted. In February 1988, the N-Reactor employed over 6,000 workers in the Tri-Cities area. The interviews demonstrated that the disappointment of the BWIP shutdown was heightened by the N-Reactor announcement.

Thirty-nine interviews were conducted with volunteers from DOE-RL, WHC, and MACTEC. The interviews were arranged by asking for volunteers from the work force. The interviewees were told that the interviews were completely confidential. In order to identify the range of issues and concerns of the sample of workers, the format of the interviews was kept informal.

The volunteers included a range of people, including managers (32%), clerks and secretaries (9%), scientists and engineers (21%), coordinators, analysts, and consultants (35%). Some people's jobs were being terminated on February 29, 1988 and others at the end of the fiscal year (September 30, 1988). Half of the people interviewed have lived in the Tri-Cites for 10 years or more, the others had moved into the area more recently.

This section is arranged around the themes that emerged from those interviews. Given the nature of the interviews and the way the interviewees were selected, it is not possible to make statistically based inferences about the entire BWIP work force. Most of the themes discussed in this section were repeated by the majority of those who were interviewed Those themes include job search patterns, desires to stay

in the Tri-Cities area, Tri-Cities economic diversification and the future, retraining programs, home-ownership, and social problems.

5.2 Job Search Patterns

Westinghouse Hanford Company instituted a placement service almost immediately after the shut-down was announced. Most of the people stated they were actively looking for employment and had used those job placement services. That service was generally given high marks for its usefulness and appreciation was expressed for WHC providing the service. Those people who had previously been through similar situations felt these services were of exceptional quality. Among the few critical remarks offered were complaints about the inconvenience of the location of the service and that the service seemed to favor engineers over scientists. Most of the people looking for employment had attended the career seminars and had included a one-page resume in a resume book compiled by WHC for prospective employers. Many of the people felt the resume book was essentially useless because of its size. One person, however, had received a contact because of that book. Boeing Computer Services Richland was criticized by several people for not being supportive and for not helping to identify options within the company.

The preferred and most successful mode of job search was through personal contact and networking. All but a handful of individuals were relying on this mode of job search. Each of the seven people who stated they have firm job offers had received them through networking. On-site networking was utilized by about half of the job searchers, and primarily by managers. Some managers and most scientists have networked in the west or nationwide.

Of those persons not yet looking, many were simply delaying the inevitable and realized it. Most of those persons' jobs will not be terminated until the end of the fiscal year. Some did indicate they intend to start searching in the next month. Three of the people that were not actively looking stated they intend to retire although they would prefer to work a few more years.

All but two or three people were very optimistic about being able to find employment. Two indicated they would be returning to school and two others stated they would be making a career change but gave no details about what that entailed. Many people also realized that they would have to move from the Tri-Cities for those jobs and possibly take a pay cut. Future employment, although posing an immediate problem did not appear to be a long-term issue for most of those interviewed.

5.3 Desires to Stay in the Tri-Cities

Most of those people interviewed expressed a desire to remain in the Tri-Cities area. Generally the area is appreciated and liked. People stated reasons such as school age children, other family, friends, and the environment as desirable features of the area. Others stated it would simply be more convenient to stay in the area. One-third of those interviewed expressed a desire to leave the area. These included primarily people who had been there a short time and had no family ties, and younger people who had grown-up in the area and expressed a need to move on. Most people, however, stated that they would have to leave the area regardless of their preference otherwise. Only a few people with extended family ties seemed to be disappointed. A few people stated that, with current economic climate and the current level of "Hanford-bashing" by outsiders, the Tri-Cities would become less of a dynamic and interesting place to live.

Generally, people want to stay in the Tri-Cities but pragmatically realize they will have to leave to find employment. People did not seem to be terribly upset by this state of affairs but seemed disappointed. Those who had the strongest desires to stay said they will stay and make adjustments. Two-thirds, however, said they would be leaving.

5.4 Tri-Cities Economic Diversification and the Future

Each of the people were asked about the prospects for economic diversification in the Tri-Cities area. Predictions were evenly divided between diversification and continuing to focus heavily on DOE-related activities. The key sentiment expressed was that diversification certainly won't happen soon enough to be of help to the BWIP workers, and will probably not happen soon enough to help the N-Reactor workers. Those people who said that the area would diversify gave times ranging from 2 years to 15 years. They felt that the primary impetus for diversification should come from the state. Some respondents felt that recent state moves towards helping the Tri-Cities is too little and too late. They said that local governments should take an active role but don't have the expertise to manage a major diversification effort. Several people stated that the DOE and federal government does have some responsibility in assisting with diversification efforts. Many people said that if diversification does come it will aid only the local merchants because most of the people affected by BWIP and N-Reactor will be gone Government agencies were criticized for not making stronger moves towards diversification earlier.

Those who are pessimistic about the diversification possibilities of the Tri-Cities felt very strongly about it. Three primary reasons were given. 1) there is no reason for business to exist in the Tri-Cities

except for Hanford, 2) the work force was too educated and specialized, and 3) no business will move in and pay the wages to which the Tri-Cities has become accustomed. These people appear to feel quite strongly that the Tri-Cities is too specialized and that the people have dedicated themselves to professions that don't allow for diversification. Recent statements and state moves toward: 'iding diversification assistance are seen primarily as political rhetoric. A few people indicated their feelings that these moves were only to placate the Tri-Cities after all the Hanford-bashing from state and congressional politicians.

5.5 Retraining Programs

Programs for retraining workers affected by BWIP were seen as having little potential value. Any programs for retraining would come too late and the BWIP workers were too specialized and educated for retraining. Most people felt they would be able to find jobs in their vocational area of interest and would not be interested in retraining. A few of the people who were tied to the Tri-Cities because of family or other ties, primarily secretaries, indicated they may use a retraining program. A few of the people who indicated they were interested in a career change said they may use retraining but felt they were interested in more substantial re-education than would be provided.

Some people did say they would like to see retraining programs, largely for the benefit of N-Reactor workers, rather than their own participation. They seemed to feel that N-Reactor personnel would be more receptive to retraining than BWIP workers.

5.6 Home Ownership

This was the area of major concern for the people interviewed. The people that were committed to staying or who rented housing said so with a sigh of relief. Those who expected to be leaving the area reported that home ownership was a significant problem and indicated they would be losing a lot of money. Estimates of dollar losses on homes ranged from $10,000 to $75,000. Half of those who expected to leave the area, (a quarter of the people interviewed) said they would default on their home loans Half of those people said they would try to negotiate with the bank and half said they would just stop making payments and leave. Clearly no one wanted to do this Home owners and a few renters and stayers said that if the government were sincere about helping them and the Tri-Cities it should provide some program to help with this loss.

5.7 Social Problems

Few social problems were addressed by the people interviewed. Personal financial and employment problems were most important. One person indicated a need for expanded social programs such as suicide prevention and personal counseling. Another person mentioned that a major concern was how their colleagues would be dealing with self esteem. Only a few people indicated their plans to collect unemployment although numerous comments were made about the inadequacies of unemployment to meet mortgage payments. Some people were genuinely concerned about school closures and the general disruption to the lives of their children. Such concern extended not only to those who would be moving their children, but those whose children would see their friends and friends' families going through difficult times. Clearly most people were optimistic that they would rebound and many felt they would be better off, although most realized there was going to be a longer period of uncertainty for themselves and their families.

6.0 BIBLIOGRAPHY

Battelle Human Affairs Research Centers 1987a. Documentation of Primary Data Collection. SMP-101. Seattle, WA: Battelle Human Affairs Research Centers.

Battelle Human Affairs Research Centers 1987b. Documentation of Secondary (Documentary) Data Collection. SMP-102. Seattle, WA: Battelle Human Affairs Research Centers.

Battelle Pacific Northwest Laboratories 1985. Quality Assurance Manual for License-Related Programs. PNL-MA-60. Richland, WA: Battelle Pacific Northwest Laboratories.

Nuclear Waste Policy Act of 1982. 42 U.S.C. §111(b)(1) 1982.

Privacy Act of 1974. 5 U.S.C. §552a.

U.S. Department of Energy 1987. Working Draft. BWIP Site Characterization Direct Work Force Survey Design. January, 1987. Richland, WA: U.S. Department of Energy.

U.S. Department of Energy 1986. Environmental Assessment, Reference Repository Location, Hanford Site, Washington. DOE/RW-0070. Vols. 1-3. January, 1987. Washington, DC: U.S. Department of Energy.

APPENDIX A

BWIP PROJECT DATA FOR EACH MAJOR CONTRACTOR

ECT CHARACTERISTIC DATA

	1986						
	J	J	A	S	O	N	D
LEVELS							
nt	50	52	54	56	57	62	69
	87	88	86	86	90	82	84
/Engineer	274	272	277	276	280	266	283
ative	46	44	46	51	53	60	66
n	55	56	61	66	56	66	63
Allied Crafts	0	0	0	0	0	0	0
ls	611	611	524	524	541	552	546
& DIRECT	731	733	748	758	833	866	848
m	$2 364 000	$2,053,000	$3,186 800	$2 774,100	$1,898,000	$2,880,000	$1,977,000
/SERVICES	$1 810,900	$1 805 500	$211,500	$3,523,500	$600,000	$234,000	$992,000

	1987											
	J	F	M	A	M	J	J	A	S	O	N	D
LEVELS												
nt	60	61	62	61	63	63	63	66	67	67	62	62
	92	90	96	90	104	140	119	110	90	90	92	90
/Engineer	278	271	288	263	260	281	282	286	264	266	232	231
ative	62	63	52	67	69	70	84	83	88	83	82	80
n	51	49	46	48	49	46	45	46	37	37	49	33
Allied Crafts	0	0	0	0	0	0	0	0	0	0	0	0
ls	549	534	534	535	543	581	581	579	547	543	506	501
& DIRECT	848	842	846	886	901	838	871	898	888	994	965	952
m	$2,275,100	$2,560,000	$2,720,000	$2,479,000	$3,300,000	$2,483,100	$2,190,800	$3,070,500	$3,471,706	$1,833,000	$2,530,000	$1,096,000
/SERVICES	$1,875,290	$1,852,800	$1,232,900	$1,420,000	$2,222,290	$1,890,200	$2,191,800	$2,504,000	$8,440,800	$1,866,282	$1,827,595	$360,232

LE A 2
P PROJECT CHARACTERISTIC DATA
-RL

				1996								1997							
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
FFING LEVELS																			
nagement	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	8
erical	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
cientist/Engineer	20	20	20	20	20	20	20	22	22	22	22	22	22	22	22	22	22	22	22
dministrative	8	8	8	8	8	8	8	10	10	10	10	10	10	10	10	10	10	10	10
chnician	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
nion/Skilled Crafts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	40	40	40	40	40	40	45	45	45	45	45	45	45	45	45	45	45	45
ARIES																			
nagement	$28,572	$28,572	$28,572	$28,572	$28,572	$28,572	$28,572	$33,230	$33,230	$33,230	$33,230	$33,230	$33,230	$33,230	$33,230	$33,230	$33,230	$33,230	$33,230
erical	$6,800	$6,800	$6,800	$6,800	$6,800	$6,800	$6,800	$7,748	$7,748	$7,748	$7,748	$7,748	$7,748	$7,748	$7,748	$7,748	$7,748	$7,748	$7,748
cientist/Engineer	$68,005	$68,805	$68,805	$68,005	$68,805	$68,805	$68,805	$74,136	$74,136	$74,136	$74,136	$74,136	$74,136	$74,136	$74,136	$74,136	$74,136	$74,136	$74,136
dministrative	$32,642	$32,642	$32,642	$32,642	$32,642	$32,642	$32,642	$36,092	$36,092	$36,092	$36,092	$36,092	$36,092	$36,092	$36,092	$36,092	$36,092	$36,092	$36,092
chnician	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
nion/Skilled Crafts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Totals	$136,019	$136,819	$136,819	$136,019	$136,819	$136,819	$136,819	$151,206	$151,206	$151,206	$151,206	$151,206	$151,206	$151,206	$151,206	$151,206	$151,206	$151,206	$151,206
TERIALS/SERVICES	$62,528	$62,528	$62,528	$62,528	$62,528	$59,684	$59,684	$59,684	$59,684	$59,684	$59,684	$59,684	$59,684	$59,684	$59,684	$59,684	$38,219	$38,219	$38,219

A 3

ROJECT CHARACTERISTIC DATA

				1996							1997							
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
NG LEVELS																			
gement					1 2	1 3	1 2	1 3	1 3	1.3	1.3	1 3	1.3	1.2	1.3	0 8	0.2	0 2	0 2
cal					6 0	6 2	5.6	6 2	6.2	6 2	6 3	6 5	6 2	5 9	6 0	7.1	4.2	5.7	4 5
rical/Engineer					25 9	26 3	23 7	26.4	26 4	26 9	28 6	27 4	26 0	25 0	25.5	40.3	23 0	31 2	24.4
inistrative					7 0	7 6	6 6	7 3	7 3	7 3	7 4	7 6	7.2	6.8	7.0	10.5	5.7	7 7	6 0
rician					8 1	5.1	7 6	8.4	8.4	8 4	8.5	8.8	8.3	8.0	8 2	19.1	5.8	7.9	6.1
n/Skilled Crafts					0.9	0 9	0 8	0 9	0 9	0 9	0.9	0 9	0.9	0.8	0.9	2.2	0.4	0 6	0 5
Totals	0	0	0	0	48 5	50 4	45 5	50 5	50 5	50 4	51 0	52 5	48 9	47.7	48 9	80 1	39.4	53.4	41 7
IES																			
gement	$4,198	$3 621	$5,142	$4,722	$6,579	$8,741	$5,827	$7,237	$7,237	$9,493	$7,707	$9,493	$7,516	$8,485	$9,141	$6,874	$948	$1,285	$1,004
cal	$8,228	$5 371	$7,629	$7,006	$9,356	$12,432	$8,288	$10,293	$10,293	$13,502	$10,962	$13,502	$10,695	$9,224	$13,101	$14,254	$7,687	$10,389	$9,112
rical/Engineer	$66,878	$57,682	$81,926	$75,238	$97,307	$129,545	$88,383	$107,257	$107,257	$140,669	$114,222	$140,668	$111,496	$96,114	$136,509	$191,946	$98,143	$132,980	$103,839
inistrative	$12,123	$10,456	$14,850	$13,638	$17,857	$23,725	$15,518	$19,643	$19,643	$25,765	$20,918	$25,765	$20,406	$17,602	$25,000	$32,404	$15,198	$20,593	$16,060
rician	$13,493	$11 643	$16,536	$15,188	$17,891	$23,770	$15,846	$19,580	$19,580	$25,814	$20,959	$25,814	$20,447	$17,635	$25,048	$61,997	$18,331	$24,838	$19,395
n/Skilled Crafts	$2,062	$1,778	$2,526	$2,319	$2,008	$3,731	$2,587	$3,089	$3,089	$4,052	$3,288	$4,052	$3,209	$2,766	$3,931	$8,487	$1,398	$1,894	$1,479
Totals	$104 988	$90 551	$128,609	$118,109	$152,000	$201,944	$134,827	$167,199	$167,199	$219,314	$178,056	$219,314	$173,714	$149,829	$212,800	$315,062	$141,885	$191,980	$149,909
RIALS/SERVICES	$82 060	$53 527	$76,023	$69,618	$116,567	$154,655	$103,244	$128,222	$128,222	$168,169	$136,549	$180,188	$133,218	$114,900	$163,192	$555,993	$25,162	$44,933	$35,086

E A 4
PROJECT CHARACTERISTIC DATA
EC

	1996										1997								
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
FING LEVELS																			
agement											3	3	5	5	5	5	5	5	5
nical											1	3	5	5	7	7	7	7	7
ientist/Engineer											6	6	12	21	23	23	23	23	23
ministrative											11	17	29	38	39	37	37	37	35
hnician											0	0	0	0	0	0	0	0	0
on/Skilled Crafts											0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0	0	0	28	34	46	73	74	72	72	72	74
RIES																			
agement											$47,351	$47,351	$52,975	$52,975	$52,975	$52,975	$52,975	$52,975	$52,975
nical											$1,256	$3,768	$6,696	$6,696	$9,277	$9,277	$9,277	$9,277	$9,277
ientist/Engineer											$23,177	$23,177	$47,878	$84,640	$100,348	$100,348	$100,348	$100,348	$100,348
ministrative											$44,727	$70,706	$83,453	$153,588	$159,118	$155,841	$155,841	$155,841	$154,202
hnician											$0	$0	$0	$0	$0	$0	$0	$0	$0
on/Skilled Crafts											$0	$0	$0	$0	$0	$0	$0	$0	$0
Totals	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$116,511	$145,002	$190,804	$297,911	$321,719	$318,441	$318,441	$318,441	$316,802
RIALS SERVICES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

E A S
PROJECT CHARACTERISTIC DATA

	1986 J	J	A	S	O	N	D	1987 J	F	M	A	M	J	J	A	S	O	N	D
ING LEVELS																			
agement	8	8	8	8	8	8	8	9	9	9	8	8	10	9	9	9	8	9	7
ical	3	4	4	4	4	4	4	4	4	4	5	4	5	5	6	6	6	6	4
ntist/Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
nistrative	15	16	15	16	17	20	22	22	23	23	24	24	25	25	24	21	20	18	18
nician	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
or/Skilled Crafts	1	1	1	1	1	2	1	1	1	1	3	2	2	3	3	5	4	3	3
otals	27	29	28	29	30	34	35	36	37	37	41	38	42	42	42	41	38	37	32
SES																			
Totals	$106,700	$89,015	$85,594	$112,168	$95,597	$99,252	$127,870	$139,919	$120,148	$148,782	$123,455	$122,966	$150,583	$125,193	$120,568	$148,665	$120,720	$121,853	$142,693
RIALS/SERVICES	$278,980	$278,980	$278,980	$279,980	$45,223	$45,223	$45,223	$62,962	$62,962	$62,962	$57,316	$57,316	$57,316	$62,534	$62,534	$62,534	$61,468	$61,964	$58,319

NOTE M-K Job Categories "Professional" and "Technical" have been included in "Administrative"

APPENDIX B

WORKER SURVEY

OMB:1910-1100

BWIP WORKER SURVEY

The Department of Energy needs your help in conducting this survey of the Basalt Waste Isolation Project (BWIP) work force. Your responses will be of great help to DOE and local planners for social and economic monitoring activities. Your answers will be kept completely confidential. Please complete this form right away and return it to the person who handed it to you. This form has been approved by the Tri-City Building Trades Council. Thank you for your assistance!

1 Today's date. ________________

2 Job Title (occupation or craft): ________________________________

3 Employer: ________________________________

4. How long have you worked for this employer*? ________ (number of years)
(* consider RHO/Westinghouse to be the same employer *)

5 Did you move from another community to work at this job?

☐ no

☐ yes, I moved from ________________ (City or town) ______ (State) ________ (Zip Code)

└──▶ When? ______ year

6 Where do you live during the work week? ________________ (City or town) ______ (State) ________ (Zip Code)

7. How long have you lived in that city or town? ________ years

8 Do you live there full-time (7 days a week)?

☐ yes

☐ no, when not working I live in. ________________ (City or town) ______ (State) ________ (Zip Code)

9. During the work week, do you live in:

☐ an apartment
☐ a house
☐ a town house
☐ a duplex
☐ a mobile home/trailer
☐ a boarding room
☐ other (______________)

10 Do you own or rent this housing? ☐ own ☐ rent

PLEASE TURN OVER AND COMPLETE THE OTHER SIDE

11. Do you live in this housing: ☐ by yourself ☐ with roommate(s) ☐ with your family

12. How many people live in this household (including yourself)? _____people

How many are children in pre school ? _____

How many are children in grade school (grades K-6)? _____

How many are children in middle school (grades 7-8)? _____

How many are children in high school (grades 9-12)? _____

How many are children in college, vo-tech, etc. ? _____

12a Which school district do you live in?_____

13. How many people in this household are employed (including yourself)?_____people

14. Over the last five years, has your family lived in the Tri-City area while you worked elsewhere? ☐ no, no family ☐ no ☐ yes

15. How do you usually get to and from work?

☐ Drive alone
☐ Carpool with ___ ___ people (including yourself)
☐ Public transportation
☐ Other _____

16 Check the two most important reasons why you chose your local place of residence:

☐ Close to your work site	☐ Good school system	☐ Shopping
☐ Close to spouse's work site	☐ Good neighborhood	☐ Nightlife
☐ Cost of housing	☐ Recreational opportunities	☐ Community services
☐ Availability of housing	☐ Desired housing features	☐ Other _____

17. When did you start working on BWIP activities ? _____ (month/year)

17a What percentage of your work time is spent on BWIP activities? ____% ___ Don't know

18. What is your year of birth? ____

19. Are you: ☐ Male ☐ Female

20. Are you: (CHECK ALL THAT APPLY) ☐ White ☐ Black ☐ Hispanic ☐ American Indian _____ (tribe) ☐ Other _____

APPENDIX C

QUALITY ASSURANCE CONTEXT OF WORKER SURVEY

The Quality Assurance Program of Battelle's Pacific Northwest Laboratories ensures that researchers conduct activities in a planned and controlled manner and verify the quality of their results. Quality assurance for the data reported here is guided by PNL-MA-60, Quality Assurance Manual for License-Related Programs (Battelle 1985). PNL-MA-60 is designed to satisfy the requirements of NQA-1-1983, 10 CFR 50 Appendix B, and DOE-RL Order 5700.1A, Quality Assurance.

QA Plan ED-29 specifies which elements of PNL-MA-60 must be implemented for the Basalt Waste Isolation Environmental and Socioeconomic Program. Technical procedures for guiding data collection tasks for the Basalt Waste Isolation Environmental and Socioeconomic Program are prepared in accordance with PNL Administrative Procedure (PAP) 501, Preparation, Review and Approval of Procedures (PNL-MA-60, Procedures for License-Related Programs, Vol. I).

The data reported in this profile report were collected in accordance with Technical Procedures SMP-101 and SMP-102 for documenting the collection of primary and secondary data, respectively (Battelle 1987a, 1987b). SMP-101, Documentation of Primary Data Collection, is designed to ensure that sound social science practices are used in the collection of data from individual respondents, through direct observations, or from primary historical records, and that methods for data collection have been documented. SMP-102, Documentation of Secondary (Documentary) Data Collection, is designed to ensure that complete and accurate attribution is made for all secondary data cited in any project report.

Data traceability is provided through the application of procedures spelled out in SMP-101 and SMP-102. Reference to the source and origin of all data, whether collected from primary or secondary sources, will be provided by the BWIP database management system. This system will support the cataloging, cross referencing, and retrieval of full citations for all data elements from a central point.