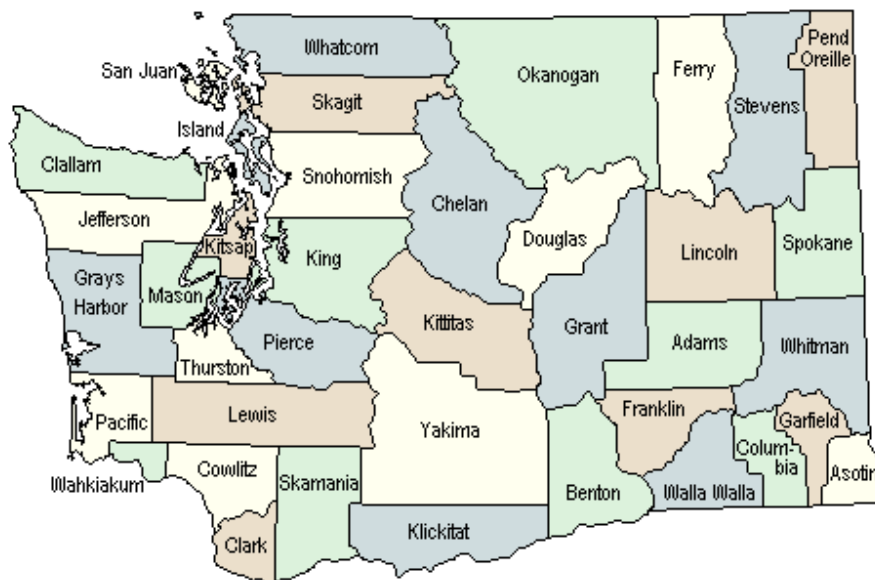


SECTION 1
EXECUTIVE SUMMARY

NORTHWEST WASHINGTON STATE LABOR SURVEY

1.0 Executive Summary

The following 2006 Labor Survey was conducted by Jacobs for the BP Cherry Point Refinery to understand the forecast craft availability in the state of Washington, with the focus on the counties of Whatcom, Skagit, Snohomish, King and Pierce. BP is making this survey available to the NWCCC.



The markets researched were in the areas of commercial / light industrial, heavy industrial / refining, turnarounds and maintenance, with the specific interest being the demand on the area's labor force from 2006 through 2011.

The information provided is based on research and contacts made with trade unions, contractors, contractor associations, government organizations, universities and owners. (Acknowledgements can be found in section 5.0 of this survey.) In conducting the research, it was found that some of the heavy industrial / refining owners were reluctant to disclose specifics of their unannounced future expansions, which leaves some uncertainty in the roll-up of the labor demand. The survey does indicate a significant growth in the markets over the next five (5) years in the areas of new commercial, infrastructure and refinery expansions. This projected growth in capital investment (indicated to be in the 10-15 billion dollar range) will cause a substantial increase in the labor demand as these projects move into their respective construction phases.



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This survey presents data collected from the following selected trades and the graphs shown later in this report include both union and non-union forces combined:

- § Carpenters and concrete masons
- § Iron workers
- § Pipe fitters / welders and plumbers
- § Laborers
- § Millwrights
- § Boilermakers
- § Electrician and instrument fitters
- § Operating Engineers
- § Insulators and painters

Areas of specific interest in the survey sent to the building trades and local contractors were:

- § Total number of members
- § Percent of journeymen vs. apprentice in their organizations
- § Average age of the force
- § Current training programs offered
- § Percent of the organization currently employed
- § Growth rate of membership over the last two years

1.1 Observations

- § The announced growth in all of the markets surveyed, indicates a significant upswing in the demand for labor in these five counties that will out pace the current available experienced work force.
- § The survey indicates that over the last several years, construction productivity has been good and met expectations of both budget and schedule.
- § The local contracting community, along with the trade unions will have to expand their apprenticeship programs to meet demand.
- § Demand for laborers, carpenters, masons, pipe welders, operators and E/I craftsmen exceeds the availability in every sector.

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- § Travelers will have to be used to supplement the area work force, driving up concerns in safety, and increasing the demand on local housing.
- § Wages in almost every area of the country are increasing.
- § The average age of the work force continues to creep upwards and the hiring of new apprentices into the business is declining in both the union and non-union sectors.

1.2 Risk Assessment

Schedule Implication

Section 2.0 identifies planned projects in the area, which will be in direct competition for the available labor force. The workload for the period of interest, 2006 – 2011, is considerably higher than the typical load in recent years.

- § Risk – Many owners and organizations surveyed plan concurrent expansions in the same time frame, and this will cause extensive draws on the labor force. Project delays may occur as draws from the available labor force do not meet the call.
- § Mitigation – The mitigation of this risk is not a simple task. It is recommended that currently scheduled activities be analyzed to assure workarounds are in place as certain craft calls may fall short in meeting the need to expend man-hours required to meet schedules. Project teams need to consider extended work hours as required, to meet short falls in manpower requirements. Certain activities in schedules may need to be revisited to assure that the actual start or finish does not create another activity slip which becomes an additional critical path. Consider moving engineering and procurement activities forward to build float in the construction schedule. Identify the latest finish date acceptable to meet a successful startup. Work with the other owners and contractors to understand their current project status and future labor requirements and analyze the effect on future project performance.
- § Mitigation – Although a bit more radical, a more general mitigation would be to attempt some level of coordination among projects in the region to try to better balance the peaks and valleys of labor demand. If an owner had some flexibility in scheduling projects, they might avoid the peak demands in the labor roll-up.



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Execution and Cost Implications

The projected labor shortages cited above will have to be mitigated through conscious adjustments in execution of construction projects. While these mitigations should yield positive results, most have implications of increasing the associated costs of the project.

§ Risk – Due to demand, a shortfall of qualified craft will be experienced.

§ Mitigation – It is recommended that the project teams explore the following:

- Extend schedules
- Break out specialty scopes to be executed by subcontractors known to travel with their own labor.
- Increase man-hours (50, 60, 70 hour weeks).
- Increase per diem rates to attract more qualified travelers.
- Consider signing National Agreements with the local trade unions. The National Construction Agreement (administered by the North American Contractors Association) promotes efficiency of construction operations on all projects covered by the agreement and provides for peaceful settlement of labor disputes without strikes or lock-outs and is recognized by all members of the national trade unions. The intent is to bring a common agreement where all local unions support each other and share in the common goal of working together, providing manpower needs from all available areas within their ranks and supporting the owners in their need to execute their projects in a timely manner. It is the intent of all parties that the agreement be utilized as a common construction agreement throughout all of the United States.
- Owners, contractors and local trades must come together to develop a “Master Plan” which will attract and hire more people into the industry. Training will be required at all levels to assure a safe, productive workforce. The research indicates that current training programs available are adequate to provide this training. The reluctance as always is the understanding of the actual need for the workers and the expense associated with hiring and training the employee.
- Owners should consider supplementing training costs.



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Productivity

As previously noted, the productivity experienced over the last few years has met expectations. With the amount of increased work planned and possible shortages of experienced labor, maintaining the current productivities is a concern.

- § Risk – Inexperienced workers and the need for extended work weeks to meet schedule shortfalls will affect productivities in a negative way.
- § Mitigation – Supplementing the workforce with experienced travelers will reduce the risk. Selected overtime with experienced workers will reduce the risk. CII identifies the effect of long scheduled periods of overtime and the loss of productivity in the work force. Graphs which show the effect of long and extended work hours can be found in Section 4 of this survey. The introduction of additional newly hired and trained employees will reduce the risk in time. “Lessons Learned” indicate a downward trend in the beginning but the trend tends to move on an upward swing as time passes. Histograms indicate that a 50 hour work week is the optimum schedule to satisfy project end date requirements (50 hour weeks have been proved to hold experienced labor on a project) and usually productivities are met later in the schedule.

Quality

The survey indicates a concern that quality may be an issue due to shortages in the crafts and the need to introduce new employees with minimal levels of training and experience.

- § Risk – Contractors have stated that only about half of the welders in the area can produce quality welds that will pass QC on the first test.
- § Mitigation – Training, along with stricter certifications for welders must be implemented. Packaging and subcontracting the work to known contractors with a backlog of quality welders will reduce the risk.
- § Risk – New employees will have to be introduced into the workforce to meet the overall manpower requirements. These new employees do not have the experience levels of the other workers.
- § Mitigation – Several programs have been implemented in the past which have brought very positive results. New workers should be assigned to an



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experienced worker who is willing to mentor the new employee. It is proven that although training qualifies the employee to perform the task, experience brings efficiency and quality to their work. Additional supervision and non-manual quality control persons may have to be added to the projects. Continuous, on the job training will be essential at all levels of the organization, to assure a 100% quality is delivered to the project.

Safety

The need to extend work hours to satisfy schedule requirements along with the introduction of new and inexperienced craft raises the concern for “Safety in the Workplace.”

- § Risk – Extended hours, over long periods of time increases the probability of a safety incident.

- § Mitigation – The project should analyze the schedules and only introduce overtime in the actual areas of the project where it is needed. New project work should not exceed a 50 hour week. Only turnarounds should be scheduled beyond the 50 hour maximum.

- § Risk – Inexperienced craft will increase the probability of a safety incident.

- § Mitigation – Training, training, training. On past projects, success has been achieved by introducing the “Buddy System.” Planning, planning, planning. Forward planning and using checklists along the way, provides the employee the time to visualize the task and the hazards associated. Many hazards can be engineered away before the work begins.

1.3 Conclusion

The current work force in this area migrates from industrial to commercial projects as the demand arises and the wage rates increase. With the amount of work projected over the next five years, labor availability will be a continuous risk. Drawing on and holding an experienced work force will be the issue. An aged work force exists, with the average age increasing each year due to the low numbers of apprentice entering the force. The hiring and training of new and younger members will be the challenge.

It is recommended that the data presented in this survey be shared with owners and contractors to start mitigations which will bring about a successful execution of all of the commercial and industrial projects planned respectively by each group.