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Puget Sound Energy
Gas Safety Audit
Section 6 - Service Provider Contracts

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6.1 Introduction

6.1.1 Objective and Scope

The objective of this task was to review service provider contracts entered into by Puget Sound Energy (PSE) to determine how PSE's outsourcing philosophy, contract awards, the contract terms and the behaviors generated by the contract terms impact on PSE's mandated gas safety programs and obligations. The review involved an examination of PSE's outsourcing and more specifically the three outsourced activities where the service provider (SP) concept has been applied: construction, facility locating and leak surveying. Each of the three outsource activities is then broken down into areas, which were identified by Jacobs to be the main areas where problems had either arisen, or to be areas of potential concern. Our findings are listed under the following headings:

PSE Outsourcing

- The PSE Outsourcing Model
- Contract Awards
- The Outsourcing in Action

Construction Service Provider Contracts

- The Contract Design
- Contract Behaviors and Service Provider Management
- Quality Control/Quality Assurance Programs
- Contractor Management, Metrics and Incentives
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Facility Locating Service Provider Contracts

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- Contractor Management and Metrics
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6.1.2 Background

At the end of the 1990s PSE, in anticipation of what they believed was to be an industry-wide move to full de-regulation, began a process designed to find ways to get cost out of the utility business. The preferred route was to become an asset manager, rather than a wholly integrated traditional utility. The decision was to outsource[1].

Every utility is expected to extend its service to meet the needs of a growing population and provide energy in a reliable, safe, and timely fashion. To maintain these necessary high standards of service quality and safety, utility managers have traditionally opted for the control of an in-house workforce. As a result, many utilities did not have to rely on others to provide support to its staff or rely on others to meet its customers' needs.

In anticipation of regulatory reform, and often in the context of restructuring, many regulated distribution utilities developed strategies to shift risk, reduce costs, and refocus attention on core functions. Essential distribution utility functions including: system planning, the construction, operation, and maintenance of the distribution pipeline systems, the connection of new residential, commercial, and industrial customers, and the monitoring and emergency response and restoration of the distribution system and documentation are the tasks a utility and its in-house workforce traditionally performed. Utility management decisions to outsource raise questions about the relationships between the distribution utility and its employees, the external service providers, the regulators and the ultimate customer. This section focuses on the relationship between the gas distribution utility, its service providers (SPs) and the often reactive nature of its relationship with the regulator. This relationship results from primarily responding to pressure from the regulator regarding network management issues rather than assuming direct responsibility ahead of the regulator's intervention. This can be seen from the comparatively large number of settlement agreements between PSE and the UTC relating to network management issues.

Outsourcing can be defined as creating a long-term, results-oriented relationship with an external service provider for activities traditionally performed within the utility. Usually, the term "outsourcing" applies to a complete business process, or processes, where some degree of management control and risk is shared with the service provider. This compares and contrasts with the relatively straightforward procurement of goods or services, or traditional construction contracting, where support is rendered, but where the company continues to assume the majority of the risks and takes management responsibility for the requested service.

[1] 'Distribution Outsourcing – Puget Sound Energy's Experience', by George Stockton – January 2002 published by Montgomery Research Inc.

For outsourcing to be successful, there needs to be available a pool of service providers, skilled in the management of the processes, and in the management of the risks that are assumed, and those that are shared with the utility. For a utility to create a successful outsourcing project it needs to have a clear definition of the relationship being sought, of the roles each party is to perform and clear statements as to the expectations and deliverables at the core of the contract.

The business benefits that can be achieved through outsourcing are well documented and have been proven by past experience, though past experience has also shown that the Utility needs to retain a clear understanding of its overall responsibilities, to ensure the performance of its obligations, especially in system, employee and public safety terms, as well as to fully enable the realization of these benefits. These benefits include:

- Cost savings, which are typically achieved by lower labor costs, increased productivity, and economies of scale.
- Performance improvement, which is generally delivered through the use of technologies and business processes, that may be better than those employed by the utility, and where the service provider can invest in and focus on functions core to its business but not core to the utility.
- Increased flexibility/scalability, which is provided through contract terms that support different levels of business activity, allowing costs to fluctuate with changing volumes of work.
- Ready access to innovation and best practice, which is made available by the service provider, whose primary responsibility is to support the specific utility business functions it manages. This focus allows them to build expertise and access a broader market of clients, enabling them to identify and leverage good ideas from a wide base of exposure.
- Access to a labor force, supplied by a service provider who focuses on specific functions, hires resources specifically for these functions, and provides greater career development opportunities associated with the performance of a specific type of work, which may lead to enhanced process efficiencies and other related benefits to the utility.

These benefits need to be balanced against risks to the business, which includes the potential for:

- Negative impact on customer service levels
- A negative impact on system safety
- Impact on system reliability

These risks are dependent on the degree to which PSE ensures its own commitment to safety is integrated into the practices of its SPs. Reducing the potential risks requires that the SPs are cognizant of UTC codes and PSE gas operating standards. Successful risk reduction can only be accomplished through a comprehensive program that monitors SP accountability, as well as providing meaningful incentives and corrective actions.

6.2 PSE Outsourcing

6.2.1 Background

PSE has undertaken one of the most extensive, if not the most extensive, utility outsourcing programs seen to date in the USA. In order to achieve this, PSE outsourced a large part of what would generally be described as the core of the utility function, including such activities as construction planning and design, customer contact and records completion.

The structure decided upon was based on an established concept of service provider contracts, built around the activities of construction, facility locating and marking, and leak surveying. The outsourcing involved the transfer of certain PSE-owned assets, equipment and employees to the construction service providers, along with the work to be performed. It was described as being a strategic component of PSE's "Competitive Distribution Company (CDC), asset management business model[2].

In support of the decision to outsource, PSE entered into five service provider (SP) contracts. Two of these are construction and system maintenance related, two are facility locating and marking contracts, and the last is a leak survey contract. The contract terms and structures differ depending on the complexity of the activities carried out so that the construction-based contracts are similar to each other, but differ from the locating contracts, which are similar to each other, etc. The intention from the outset, expressed by the Company, and understood by the SPs, was to create an alliance/partnering concept.

6.2.2 Findings

6.2.2.1 The PSE Outsourcing Model

PSE's Outsourcing model sought to:

- Retain in-house all asset management-related work such as: system planning; complex engineering; standards; quality assurance; system control; system operations; first response; initial customer contact; pressure control; materials management; and project management for large scale construction.
- Outsource to SPs all asset management-related work as deemed reasonable, including: routine project management; permitting[3]; design; project planning; scheduling; customer follow-up; second response; quality control; construction; maintenance; documentation;

[2] 'Distribution Outsourcing – Puget Sound Energy's Experience', by George Stockton – January 2002 published by Montgomery Research Inc.
[3] While SPs are responsible for preparing and obtaining permit applications, PSE has an organizational unit that is responsible for interacting with government agencies to facilitate permitting issues.

facility locating and marking; and leak surveying.

- Seek savings in the 15-20% range on construction-related contracts, using 1999 PSE performance figures as the baseline. Strive to maintain or enhance existing customer-service levels, and maintain the existing safety performance levels.
- Achieve consistency and predictability in pricing through the adoption of unit pricing for some 95% of the work. The unit prices are to include the SP's administrative and general (A&G) costs and profit.
- Transition certain utility employees to the SP allowing PSE to focus on managing assets, not the processes that surround traditional utility field activities.

6.2.2.2 Contract Awards

PSE awarded 5 contracts within the scope of its service provider outsourcing decision. These were:

- On January 8, 2001, a Master Services Agreement (MSA) was entered into with Pilchuck Contractors Inc. Pilchuck is now a subsidiary of Michels Corporation of Wisconsin. Pilchuck Contractors perform gas system maintenance and construction throughout PSE's service territory and all gas new customer installations in those areas identified as "Natural Gas Service" on the map in Appendix 1 with the exclusion of new customer work in Lewis County which is performed by another service provider.
- Also in 2001, a MSA was entered into with Quanta Services Inc. doing business in Washington State as Potelco Inc. This MSA was subsequently replaced by a new MSA for the same services on January 23, 2007. Quanta/Potelco performs electric system maintenance and construction throughout PSE's service territory, and all gas and electric new customer installations in those areas identified as "Combined electric and natural gas service" on the map in Appendix 1, but with the inclusion of new customer service in the area marked "Natural gas only" in Lewis County.
- On December 1, 2001, a Master Agreement for Locating Services was entered into with Central Locating Service Ltd. of North Carolina for locating gas facilities in the service area identified on the map in Appendix 2.
- On December 5, 2001, a Master Agreement for Locating Services was entered into with Locating Inc. of Washington State for locating gas facilities in the service area identified on the map in Appendix 2.
- On January 7, 2008, a new contract was entered into with Heath Consultants Inc. for leak survey services. This was the latest in a succession of contracts over a 30+ year period. This is the only leak survey contract.

- PSE and its gas distribution company predecessors have had a long-standing relationship with each of the construction service providers as traditional construction contractors, one of the facility locators and the leak surveyor. At the outset of the SP contract process, each contractor was involved in some limited discussions concerning SP concept. These discussions were reported by the SPs to be more about the nature of the relationship than of details of how the relationship would work out in practice or what was expected by PSE.

6.2.2.3 The Outsourcing in Action

- PSE states it set out to outsource as much of the traditional utility function as it could, deciding it should retain in-house the initial customer contact and the first responder capability. In doing so, PSE retained around 80% of the O&M (operations and maintenance) activities in-house, contracting out the rest.
- In order for the SP to be able to supply the new front and back-end activities it contractually agreed to provide, PSE transferred to the SP's organization staff that had previously performed the activities for PSE and were willing to be transferred. Thus the SP now had planners, designers, schedulers, project management personnel and QC capable people, though PSE states that the QC capable people were not used by the SP in a QC role.
- The construction SPs selected was described as being specialized service providers, selected after a year-long nationwide competitive procurement process[4]. In order for the SP to be able to carryout the extended construction workload, PSE transferred its construction workforce. In addition, after offers were made by the SPs, a workforce sufficient to enable the SP to be able to carryout second responder, and various clerical and supervisory activities was also transferred. In total, more than 500 people were transferred to the SPs. PSE retained a first responder workforce in-house.
- There is no clear definition given of the concept of service provider in the original contract documents. The definitions that are contained in the contract are closely linked to the activities to be performed following the transfer of PSE staff to the SP. The contract identifies the specifications of services and deliverables, predominately in terms of performance, as opposed to the management and performance of the services. Similarly, when management is referred to, it is to the management of specific tasks or activities.
- There are references in the contracts to the anticipated cost savings, defined in the range of 15-20%, and that these savings are central to the viability of the contract. It is further stated the SP will continue to identify improvements in processes, practices and

[4] 'Distribution Outsourcing – Puget Sound Energy's Experience', by George Stockton – January 2002 published by Montgomery Research Inc.

procedures that are expected to improve the savings to PSE from those stipulated in the contract to a range of percentages significantly greater[5].

- PSE reported the major value to the company was the ability to take advantage of the contractor's union contracts, which contained more flexible terms and working conditions. For example, the contractor had full flexibility dealing with operatives, whereas PSE had to operate within more stringent terms, such as the requirement to use full crews for all types of work. Moreover, the contractor's labor agreement permitted easy dismissal of non-performers.
- Performance in a number of areas, in particular in the quality of construction work, productivity and work allocation processes resulting in better crew utilization is widely stated to be believed to have been improved over what was the norm at PSE
- PSE expected to achieve the initial cost reductions, via the transfer of its utility workforce to the SP, to enable the adoption of the SP's union rates and terms and to enable the SP to manage the processes. These savings were verified as achievable, by the comparison of SP wage rates against workload, and PSE's rates against workload.
- PSE's expectation was that the SP would invest in these new technologies and process improvements[6]. However, the SPs interviewed reported that they would normally not make investments in performance improvements from new technologies. They would however, look at new technologies and processes where they were supported by PSE and where they would be largely funded by PSE. Their expectation was that PSE would introduce the new technology. In general, the SPs have lagged behind in the use of technology generally, such as the use of laptops for crews in the field, or for QC inspectors, while PSE has employed these technologies in their activities.
- The construction SP management is not always well–prepared for specific needs related to their tasks. For example, there is evidence that the Billing Department at Pilchuck failed to hire to meet the needs of increased invoice workflow until a backlog began to develop.
- Results publicly reported in 2005 show cost savings greater than the range expected; service levels maintained or improved in the areas measured, and safety performance being in compliance with standards. The cost savings ranged from 16% in 2002 to 28% in 2004 and were projected to remain at 25% or higher in 2005 and 2006[7].
- Subsequent contract-related moves, through the introduction of initiatives via the use of Memorandums of Understanding (MOU)[8], show there is a new concern about the continued viability of the targeted savings. PSE believes the baseline of 1999 costs has lost relevance, and there is also now some doubt as to whether the levels of service

[5] Clause 2.3.1 in each of the Service Contracts with the Construction service providers
[6] 'Distribution Outsourcing – Puget Sound Energy's Experience', by George Stockton – January 2002 published by Montgomery Research Inc.
[7] Document #017entitled 'PSE presentation to Western Energy Institute 2005'
[8] Document #040

have been maintained or improved. Some utility interviewees believe that certain service levels have not been maintained or improved. For example, the credibility of SP QC programs has been questioned.

- Since 2007, there has been a renewed focus on cost saving, improvements to SP management, emphasis on quality control, accuracy and timeliness in billing, and reactions to UTC interest.
- There is a new program in place within PSE to look closely and critically at the outsourcing concept and contracts, and to identify and recommend improvements to both. This program began in late 2008 and is actively underway. The program is expected to continue well into 2009.
- PSE states it is continuously reviewing the outsourcing model to identify areas of process improvement related to the SP agreements. Extensive work to validate decisions has previously been performed. For example, efforts exploring the benefit of returning crews to PSE from the SP were undertaken with the IBEW to identify any benefit.
- The Washington Administrative Code[9] states the operator is responsible for the actions and omissions of any contractor engaged in any activity that involves "the construction, operation, maintenance, and safety of gas facilities used in the…distribution and transmission of gas in (the) state." There is evidence that PSE, at least in its initial responses to UTC interventions, sought to pass responsibility directly to the SP as part of its defensive strategy; for example, this approach was used as the opening tactic in the "Phantom Leaks" investigation.
- When assessing the qualifications of the bidders to provide SP services, PSE appears to have satisfied itself that the successful bidders could provide the services by assuming they could perform the construction activities because they had done so for PSE and its predecessors for many years. In addition, they believed the SP could perform the front and back-end activities, because they had been given the people who had performed them for the Utility previously. However, the follow-through was not as effective as it should have been because the SPs did not always allocate the people received from the Utility in the areas they were qualified for; for example, the SPs received QC qualified people but did not use them in a QC role at the outset.
- While we have not reviewed the documents and process entered into at the time of the award of the contracts, it appears from the struggles being encountered, the successful bidders were not adequately or properly qualified by PSE before getting the contract. Additionally, there is no available documentation to establish that the bidders for the SP contracts had previously managed an SP process.

[9] WAC 480-93-007

6.2.3 Conclusions

We have seen no clear definition, in the original contract documents, of the concept of service provider. The definitions given in the contract are closely linked to the activities to be performed following the transfer of PSE staff to the SP. The contract talks of the provision of services and deliverables predominately in performance terms as opposed to the management and performance of the services. Where management is referred to, it is the management of specific tasks or activities. There is no language that identifies the relationship as partnering or an alliance. In fact, the opposite is the case as the language adopted suggests a relationship at arm's length.

From interview comments and from statements made at the outset of the SP model, PSE appears to have intended a partnering/alliance relationship, but over the intervening years has struggled to clearly maintain or communicate this in the actual operation of the contract. Over time, there have been a number of personnel changes in PSE's Contractor Management Department, resulting in a dilution of the relationship to a more arm's length operation. According to the SPs, PSE senior management has continued to understand the relationship to be a partnership, though this is not seen or experienced at the direct contract management interface.

The concept of service provider outsourcing adopted here is not, in Jacobs' opinion, bad or broken but it does need more definition, and the contract needs recasting to better define the scope and concept intended. The problem with the SP construction contracts is less in the concept than in the execution.

Interviews and general observations identify a lot of serious, dedicated people at the Utility, genuinely trying to make the process work; however, they have been focusing on small individual parts of processes and not on the whole concept. We understand that a process of review has now begun to look at the whole with a view to then re-assembling the constituent parts, and this should help if applied throughout the relationship.

The contract terms imply PSE believed the cost savings sought could be achieved. Performance in a number of areas, in particular productivity, quality and better crew utilization appears to have been improved over what was the norm at PSE. More recently, there is renewed focus on cost saving, improvements to SP management, emphasis on quality control, accuracy and timeliness in billing and reactions to UTC concerns. (See Recommendation 6.2.4.1)

Performance improvement by the service provider, achieved through the use of improved technologies and business processes, are not considered by the SPs to be something that they would invest in as part of the service to their customer.

From our observations the SPs have taken on more work processes on either side of the construction activities, but the relationship remains the same as if they were still contractors. No information has been provided to support the idea that outsourcing of the front and back room activities has led to any enhanced process efficiencies or benefits to the Company, other than the extent to which it has provided enhanced work visibility to the SP for planning purposes. The service provider and PSE do not always focus attention on processes and the benefits of process improvements on system safety when managing the outsourcing process. (See Recommendations 6.2.4.3, and 6.2.4.4)

PSE's focus has been directed to solving individual problems and not necessarily the underlying systemic issue. Jacobs has observed steps taken by the Company in reaction to UTC settlement agreements that are dealt with in isolation to the contract activities as a whole.

PSE's initial response to the UTC investigations of the phantom leak issue shows a willingness to seek to pass responsibility for safety-related responsibilities directly through to its SP. Good utility practices and Washington State law has long held that public service companies were liable for the actions of their contractors. This was clarified in the Washington State law in 2007 and was reflected in the Washington Administrative Code in June, 2008[10].

We have seen this view of responsibility and liability in the responses of contractor management people who do not always understand PSE's responsibility. While it is certainly the case that the SP should be responsible and liable for the work it performs, there needs to be a wider collaborative understanding of the need to share responsibility and to act jointly on matters involving system safety. This should be expressly contained in the contract terms with reference to the WAC and in the section on contract terms. (See Recommendation 6.2.4.2)

6.2.4 Recommendations

6.2.4.1 Redirect management of the service provider model to ensure outsourcing activities reflect sufficient communication, logistics, and oversight that will result in fulfillment of PSE's responsibilities for system safety.

6.2.4.2 Update the outsourcing contract by clearly describing that PSE takes direct responsibility for matters involving system safety.

6.2.4.3 Update the outsourcing contract by defining the relationship PSE intends to have and maintain with the service provider.

6.2.4.4 PSE and the SPs should establish a joint task force to consider utility contractor management and SP management processes, such as billing, to assess system safety impacts and to look to redesign processes to reduce or remove the system safety risks.

[10] Memo from the UTC Director of Safety and Consumer Protection, dated 11/16/09

6.3 Construction Service Provider Contracts

6.3.1 Background

There are two construction service provider contracts that were put together contemporaneously with the development of the service provider outsourcing concept. They are made up of a hierarchy of documents, with the Master Services Agreement (MSA)[11] containing the standard/boiler plate terms, the services contracts[12] more precisely setting out the services to be provided and on what basis, and work orders containing specific job-related information.

6.3.2 Findings

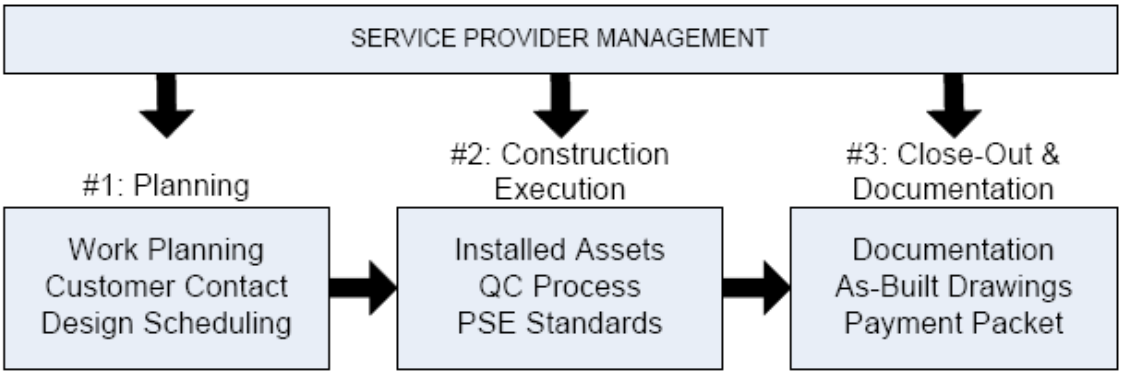
6.3.2.1 The Contract Design

Contract Overview

- The MSA establishes the terms of the warranties given by the service provider and the extent of the liabilities retained by PSE and those passed to the SP. Aside from some minor ones, all relevant liabilities are passed to the SP.
- Individual services contracts exist for New Customer Construction (NCC)[13] and Operations and Maintenance (O&M)[14].
- The contracts are for the most part unit priced[15] and these units are attached to the services contracts. The unit prices include the SP's administrative and general (A&G) costs and profit. Where there is no unit to reflect the type of work completed, and where it is agreed one is needed, a mechanism exists to establish a new unit. Some work is priced via a proposal for services requested by PSE. If PSE requests a proposal from the SP for a price, PSE is not bound to accept it.
- The contracts were structured around enhancing the original contractor activity construction contract. This was achieved by adding to the construction activity the "front-end" processes, such as design, planning, scheduling, customer contact and "back-end" processes such as documenting the completed job. This structure is illustrated in the following figure.

[11] Documents #006
[12] Documents #006
[13] Documents #006
[14] Documents #006
[15] Mostly excluding maintenance work

Figure 1 - Outsourced Activities and Responsibility



Contract Terms

- The contents list of the MSA sets out the headings for all the contract terms. The general purpose of this MSA is to define the responsibilities of the service provider in general terms and to pass liability.
- The purpose of the service contracts is to more precisely define the services, specify anticipated cost savings, to establish the performance metrics and to define the deliverables.
- Contract performance from the outset was managed by the measurement of a group of specific metrics[16] applied to certain contract activities and/or requirements. Some of the metrics have remained static over time and some have been altered or updated. The contract establishes authorized representatives to act as the first stage liaison for the contract operation.
- As a result of a settlement agreement between UTC and PSE on the leak issue, PSE refocused its attention on the contractor's quality control (QC) plans and expanded existing processes. There is a contractual requirement that a QC process[17] be established by the SP and be subject to audit by a quality assurance (QA) process[18] managed by PSE.
- The SP creates the as-built drawings and submits these to the Utility at the time of billing. No payment is made to the SP until the billing process is completed and approved.
- The SP is expressly permitted to outsource any kind of activity to sub-contractors without

[16] MSA Clause 3.3
[17] MSA Clause 3.4
[18] MSA Clause 3.5

notification or approval of PSE. The SP is reminded that if it should sub-contract, the SP's direct liability to PSE is not affected in any way by the introduction of a third-party[19].

- The contracts are evergreen in nature, with normally three yearly reviews for pricing adjustments. The right of PSE to terminate the contract for cause is limited by an obligation to always allow the SP an opportunity to fix the failure; however, PSE reserves the right to terminate the contract using the "Optional Termination" clause under Section 10.2 of the contract.
- PSE's contractor management people and the SP generally meet monthly in a hierarchical structure of management committees to manage the relationship and to resolve issues. The contract structure allocates equal representation, although in practice at the first level committee PSE has greater representation. It is our understanding this is intended to ensure issues are resolved without need of escalation to the higher level committee where representation is equal.
- Final issue resolution flows through the committee structure to non-binding mediation and finally binding arbitration subject to litigation action being allowed when the limitation act period is about to expire. The clauses are widely enough drafted to allow disputes regarding standards and procedures.
- The contracts are from time-to-time amended using different amending vehicles. Memorandums of Understanding[20] have been used twice to introduce initiatives designed by PSE to enhance contract performance.

6.3.2.2 Quality Control/Quality Assurance Programs

The SP contracts require each SP to have a quality control program. The contract requires the SP to comply with its program and that it reports program failures to PSE. The contract further requires PSE be given access to carry out its own audit. From time-to-time, PSE conducts specific target audits of areas it wishes to focus on[21]. Each SP has a quality control program. These programs were designed by PSE and mirror their own quality assurance program. The SP quality control programs that have been created are virtually identical to each other.

[19] MSA Clause 3.10
[20] Documents #040
[21] Documents #025

Program Establishment

- Even though the MSA required each SP have a QC program, only Pilchuck initially established one. Pilchuck's written QC program, which had been approved by PSE[22], resulted in the contractor being largely left on its own to run the business for the first 7 years of operation.
- In the early stages of operation, the Potelco contract presented PSE with management problems, primarily due to issues on the electric side, but also on the gas side in the areas of customer contact and quality control. Potelco was described as having a QC program, but not one that was considered by PSE to be viable.
- In 2006/2007 PSE addressed the absence of a viable Potelco QC plan, by directing it to adopt one, designed by PSE, via an initiative introduced through one of the MOUs[23]. The initiative/plan required the establishment of a QC Department within the SP organization and required it to follow a defined format, which would be monitored by the PSE QA program. The written document was prepared by Potelco and approved by PSE[24].
- After concluding the Potelco QC program was successful and after the discovery of the leak records issue by UTC, it was decided to introduce the same QC program to Pilchuck. This was initiated by PSE because they believed, when closely examined, the Pilchuck QC plan was not delivering the desired results. Pilchuck stated it believed they had a system that worked well because it had operated as such for 7 years without demurral from PSE. This perspective was further substantiated in a 2005 Industry Conference Presentation when PSE indicated that Pilchuck was generally meeting and/or exceeding performance requirements[25]. Pilchuck prepared a QC program document that was basically identical to Potelco's. Subsequently, the new Pilchuck QC plan was approved by PSE in May 2008[26].
- Pilchuck interviewees expressed uncertainty or reservations as to whether they would continue with the new form of QC program if it were not mandated by PSE, because the previous system had served them well for 6-7 years.

[22] Documents #008
[23] Documents #040
[24] Documents #008
[25] Document #017
[26] Documents #008

Program Requirements

- In the SP QC program document entitled Contractor Quality Control Program (CQCP), quality control is defined as "The planned and specified actions or operations necessary to produce a product or service that will meet the requirements for quality as specified in the contract, and in addition, the requirements of the published standards, plans, specifications and pipeline safety regulations"[27].
- In the document referred to above, quality assurance is defined as "A verification process that determines the success of individual quality control plans. Quality assurance provides a basis for confidence in a product or service delivered"[28].
- In the PSE quality assurance plan the definition of quality assurance is as follows: "Quality assurance provides a basis for confidence in a product or service delivered to PSE. The primary means through which this is accomplished, is by examining a representative sample of the work performed, to learn if the quality control (QC) process being used is working adequately. Unlike quality control, which is the effort put forth by front line workers and their management team to ensure quality work, quality assurance is a review process independent of the work that evaluates the effectiveness of the quality control process. PSE accomplishes this by first, inspecting a sample of the work performed that has undergone inspection by the QC process, and second, inspecting work that has been not directly inspected to determine if the quality controls in place are sufficient to ensure all work is performed to the standards of performance or performance requirements and processes. Quality assurance further supports the company's quality objectives by:
    - Identifying trends or precursors to potential problems in order to raise stakeholders' awareness of concerns and issues.
    - Implement mitigation plans, usually in the form of additional training or corrective action.
    - Providing input as to the effectiveness of standards and procedures in field applications.
    - Reviewing and evaluating the adequacy of written quality control programs.
    - Consulting with PSE department managers to support internal QC plans[29].

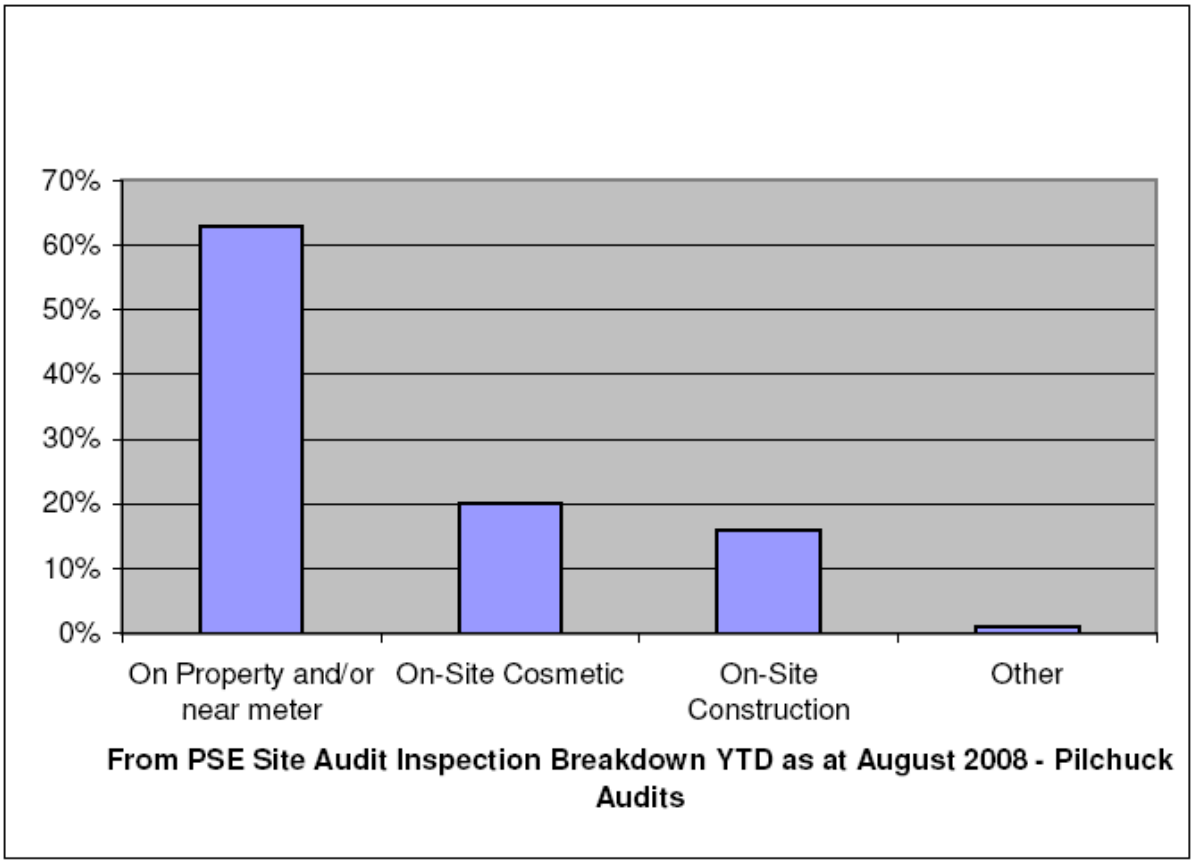
[27] Documents #008
[28] Documents #008
[29] Documents #007

Program Performance

- The first line of quality control in the CQCP is the crew leader in the field. They are required to certify on the as-built drawing that the work has been completed to the requirements of the contract. The second line is the superintendent, whose main area of concern is pre-construction. Consequently, the superintendents normally do not visit construction-sites in the course of their daily job.
- Pilchuck has a QC manager and two QC inspectors and Potelco has a QC manager and a QC inspector.
- The SP's QC inspectors indicated they carry out their activities in a manner designed generally to meet all PSE standards, specifically to meet the requirements of the PSE Site Audit Inspection manual[30], and to be auditable by PSE QA inspectors. The CQCM states the SP's QC inspectors provide oversight of the field crew leader's self inspection and QC certification of work.
- Over 85 percent of QC inspections are conducted post-construction, and are focused on easy to restore, and therefore largely visible facilities (such as paint on meters) and requirements (such as grass seeding, restoration generally) and leaks (at the meter), noting mostly cosmetic deviations from standards[31]. When site visits take place during construction, procedures (such as a butt fusion) are not viewed in their entirety as part of the QC process.
- Where the QC inspectors dig, it is usually close to the riser, where restoration is relatively simple. The SP's QC inspectors state that excavation never takes place at the main, as they are not equipped to make proper restoration. Accordingly, the connections to the main are never viewed in post-construction-site visits.
- QA inspectors' work is evenly spread across three types of activities: site visits in the course of construction; checking the QC inspectors' work; and mostly post construction random checking. When QA inspectors have been observed to dig, it is in similar conditions to the QC inspector, as the QA inspectors similarly are not equipped to make proper restoration at the main. About 83% of the QA inspection activities are completed on the customer side of the road pavement or at or near the meter or are "cosmetic" site related matters such as qualification cards or manuals[32]. The allocation of QA inspections by activity grouping inspected is depicted in the following figure.

[30] Documents #007
[31] Documents #041
[32] PSE Site Audit data breakdown for Pilchuck YTD August 2008

**Figure 2 - Percentage Allocation of PSE QA Program
Year to Date by Activity Grouping**



- PSE QA inspectors were not seen to document or enforce the use of personal safety equipment while observing service providers and did not inspect for personal or public safety and or paperwork accuracy when on-site; for example, they did not use as-built drawings or D-4 forms to check accuracy during an audit.
- The QC inspections are recorded on inspection forms supplied by each SP. The forms are different in layout and content between the SPs[33]. Pilchuck's are paper forms[34] and Potelco's are inputted into a laptop. Both are completed at the end of each inspection. The QA inspections are recorded on a site audit form[35], which is an electronic form accessed by the QA inspector through a truck-mounted laptop PC.

[33] Documents #008
[34] Documents #041
[35] Document #038

- The practices of each QC inspector vary, and the equipment available varies between SPs and between SPs and PSE. For example, different QC inspectors used different equipment to dig close to the riser; one uses a shovel exclusively and another sometimes uses a small trowel to dig close to the facility. The PSE inspector had a pipe locator with him; whereas the QC inspectors did not always have them available. No one was observed using vacuum equipment during inspections.
- Activities and facilities observed are scored by reference to a standard as to whether they were performed correctly, or observed to be compliant. The scores are allocated evenly so that a butt fusion joint or a weld is given the same score as paint on a meter. Therefore, all deviations carry the same weight for measurement against a metric[36].
- Three deviations will place a crew leader on a watch list.
- Pilchuck uses union members to perform the QC function, primarily so that they can perform simple repairs or corrections at the time of the inspection.
- On-site inspections are mostly done by SP superintendents. These occur relatively infrequently and generally only when they are on-site for some other reason, such as a scheduling delay, or are passing on the way to another job.
- Although occasionally the SP and PSE inspectors find themselves in the same place at the same time, each completes his/her activity totally separately. They do not at any stage conduct joint inspections. However, “ride-alongs” do occur between PSE QA staff and contractor QC staff to train newer personnel on the audit process and discuss issues found in the field. In addition, the QC and QA staff is in regular communication with each other to assure that standards and procedures are being consistently applied by the inspectors.
- In the normal course of the activity, QC inspectors sometimes have as-built drawings and D-4[37] cards but QA inspectors stated that they do not have D-4s, plans or as-built drawings with them at any time in the course of normal inspections. This means they do not verify the location of the pipeline as shown on the D-4 or as-built when using locating equipment to find a pipe or service line.
- The quality assurance team is highly trained and experienced in the items and tasks they review. The QA inspectors input their findings directly into a laptop computer in their truck. They also provide a valuable resource for the QC inspectors to assist with understanding and interpretation of standards and field procedures. The inspections are fair and accurate and they try to do one on-site crew inspection daily but it is challenging finding crews primarily due to inaccuracies in the schedule and the fact that there is no GPS system to locate crews so this, while well-intended, can be hit and miss.

[36] Documents #038 and 041
[37] A D4 card is a gas service order that shows the service size, location, date of installation, etc.

- PSE periodically initiates target audits of areas of activity that have shown trends or simply warrant a closer look. Such target audits have included audits of D-4 cards.
- PSE QA&I Department prepares a quarterly report[38] where they allocate a risk weighting to the items audited. This results in a higher risk weighting being given to construction-related items, such as fusions[39]. The risk allocation shows most items actually inspected or audited fall into the lower- or minimal-risk categories. The risk weighting does not transfer to the point scores allocated under the site audit program, which is the basis for the metric measurement, so paint on a meter still scores the same as a fusion or weld.

6.3.2.3 Contract Behaviors, Service Provider Management and Contractor Management, Metrics and Incentives

The SPs were awarded the contracts based primarily on the warranties given, and the bids lodged. The award of the contract to the SP signals acceptance of the warranties that they can perform all the services required by the contract. The contract passes all liabilities except for a few minor ones to the SPs.

The contract is managed by reference to the measurement of a number of metrics. These are introduced through the service contracts. Monetary incentives have or are being introduced to encourage SP response to metrics.

PSE Contract Management

- The initial concept was expressed by PSE to be a partnering/alliance type of relationship. Though it is talked about in the partnering/alliance manner at PSE top executive level, the SP managers report that the relationship does not operate in this way at the contract management interface level.
- The Contractor Management staffs at PSE view the SP as responsible and liable for the contract and its performance. From interviews we have observed this is viewed that all liability has passed; and this can be reinforced by the Utility taking a stance in response to issues with the UTC that the SP is responsible, as indicated above.
- The metrics used to measure contract performance play a significant role in defining contract performance, resulting in SP's focusing effort closely on what is required to meet the metric, especially in areas such as the quality control process.

[38] Quality Assurance & Inspection Quarterly Report
[39] Gas Site Audit Inspection Items Scores associated to Risk Scores

- The Contractor Management staff at PSE expressly stated they are not concerned that the SP might outsource the completion of many or any of the services, as the SP remains liable.
- The Contractor Management interviewees at PSE state they are not concerned that there may be qualification issues over subcontractors, as they have an opportunity to review the work through their QA program, and the SP is liable.
- While PSE does agree that ultimately it is responsible for all work performed on its system, it does not necessarily agree it must approve sub-contractors not working directly on affecting the safe operation of the gas system. Examples provided include: landscaping restoration contractors, paving contractors and gravel hauling contractors.
- The Contractor Management interviewees at PSE state they are confident their QA program will identify weaknesses. They are not all so confident in the SP's QC program.
- The Contractor Management interviewees express frustration that the SP management does not always seem to understand what is required. They see their role has developed into one where they have to lay out for the SP the precise deliverables.

Issues Expressed by Service Provider Management

- SP managers report they see their role as driving efficiencies into the job/activity processes, and look to reduce cost through productivity efficiencies. Continuous improvement is seen by the SP as further reducing cost, increasing productivity and doing more with fewer workforces.
- Changes to work requirements, standards and documentation are appropriately imposed as a matter of policy and do not involve or require the agreement of the SP. There is, however, no method used by PSE to measure the impact or implementation of the required changes, other than through mechanisms such as the QA program and the billing process. We understand there is a mechanism that places the obligation to raise issues regarding impact, implementation or cost on the SP.
- The SP managers report they believe the managers at PSE with whom they interacted do not understand their (the SPs) business.
- The SP managers stated there is a frequency of personnel changes at senior level in contract management at PSE that negatively impacts the operation of the contract. They note their staffing has remained consistent at management level throughout the life of the contract.
- The SP managers also noted there has been, from time-to-time, little or no gas knowledge or experience at the PSE contract manager level.

- The SP managers report PSE creates initiatives and demands on them, and changes standards and work process requirements often. For example, the requirement of Pilchuck that errors on paperwork be corrected in the field, with little or no appreciation of the impact on the SP.

Contractor Management

- PSE has a Contractor Management group. Within this group there are two main sections for the purposes of this report, namely contract services and contract management[40].
- The Contract Services group deals with the pricing relating to both existing pricing periods and renewals and is responsible for the guardianship of the metrics and for negotiating future contract terms. The contract services group contains the Operations Specialist (OS) staff who QA the SP's work at the data/billing end of the process.
- The Contract Management team is responsible for all non-pricing related matters and all field facing matters, such as dealing with performance-related matters arising out of the actual metric measurement. The team, based in Bellevue, deals with everything except the New Customer Construction (NCC) work, which is managed by a team based in Tacoma.
- Outside of the SP agreements, there is some large project work put out to bid in the traditional contracting manner.

Metrics

- The SP contracts have always been managed by and through the measurement of a series of metrics[41]. These metrics have not changed for Pilchuck to date, though they are currently under review and will undoubtedly change for the 2009 renewal. The metrics for Potelco were changed in 2007 when the contract was last renewed.
- The New Customer Construction (NCC) contract safety related metrics[42] deal with: compliance with standards measured by reference to deviations; records completion and data-integrity measured by reference to document completeness; the numbers of damage claims and the results of UTC inspections measured by number of notices of non-compliance. The remaining metrics are mostly customer/stakeholder facing or deal with matters such as inventory control.
- The O&M contract safety metrics[43] are for the most part the same as the NCC contract except that a metric for data integrity had not initially been developed and does not

[40] Document #001
[41] MSA Clause 3.3 and Service Contracts Clause 3.2
[42] Documents #035
[43] Documents #035

appear expressly in any later metric, and there is an emphasis on gas outages and over/under pressure incidents.

- The 2007 Potelco metrics for NCC work regarding safety[44] focused attention more closely on measuring the performance of the QC program by counting deviations from PSE quality expectations. The measure was reached by comparing SP QC findings of deviations against PSE QA findings. The metric then requires that these deviations are appropriately categorized for action, and are then corrected and resolved.
- There are two specific metrics relating to employee safety via willful Labor & Industry citations and worker's compensation experiences[45].
- Pending final development and discussion with Pilchuck, a new set of metrics is proposed for the 2009 renewal year of the contract. These metrics will be very similar to the ones in the Potelco contract.
- Some of the metrics are classified, or are to be classified as "Must Meet" with the remainder described as "General." These metrics are summarized in the following tables.

Figure 3 – General Metrics

Metric	Measure
Customer Complaints	<20 Complaints per month
Jurisdictional Complaints	100% Resolution within 7 days
Damage Claims	Job packets received within 15 days
UTC Outages	1 reportable incident per year
UTC Over/Under Pressure	No reportable incidents
UTC Inspection	No notices of non-compliance
Inventory Turn Ratio	9 or greater by year end
Job Completeness	90% of all corrections within 1-10 business days
Forecasting	+/- 10% accuracy for external & +/- 5% for growth/maintenance
Cycle Time	<60 minutes average

[44] Documents #035
[45] Documents #035

Figure 4 – 'Must Meet' Metrics

Metric	Measure
Standards	<5% deviations
Standards	Deviations to be assigned & <15 left to be corrected monthly
Appointments/Schedules – Simple	Meet 98% of commitment dates
Appointments/Schedules – Complex	98% of customers to be contacted by end of next business day. 98% completion schedules set within 10 days of receipt
Customer Satisfaction – NCC	78% score better than 5 on a scale of 1-7 on results of a survey
Safety L & I	No willful citations
Safety Experience Rate	<0.75 industry average for workers compensation experience rate
Gas Second Response	<60 minutes on average

- Some of the metrics are classified as compensatory metrics, which means that they carry a monetary penalty if not met.

The metrics are focused on achieving minimum performance levels defined by references, such as to percent minimums, or to minimum numbers of actual events.

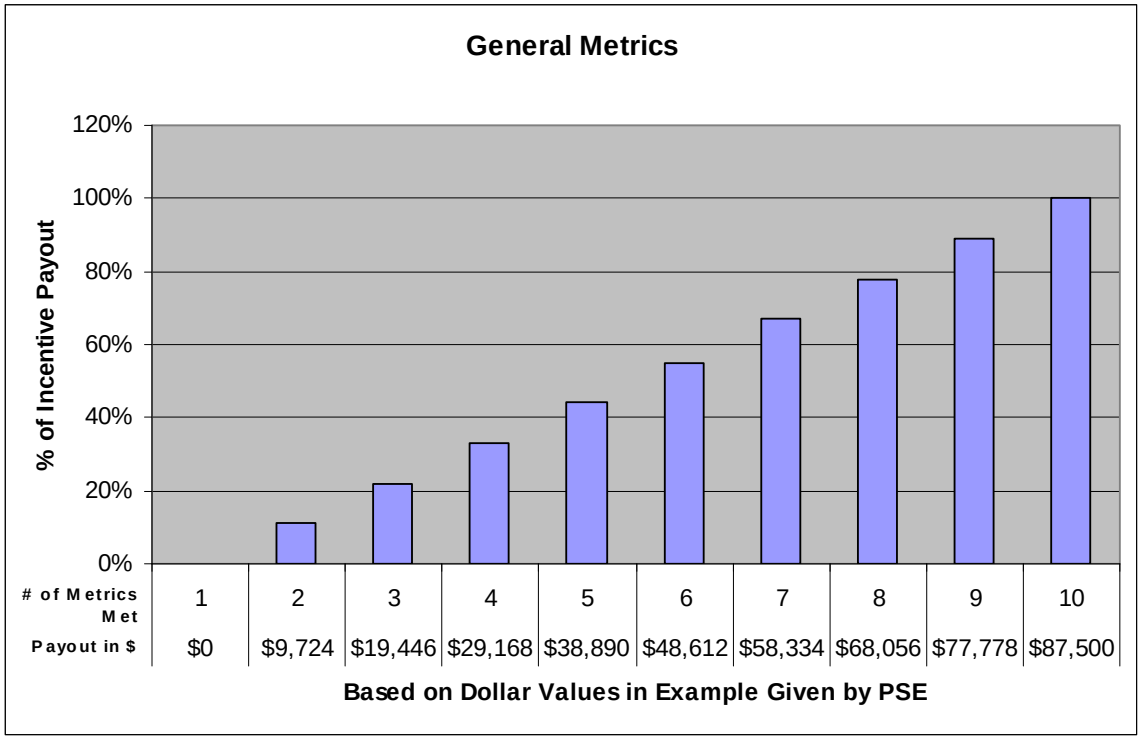
Incentives

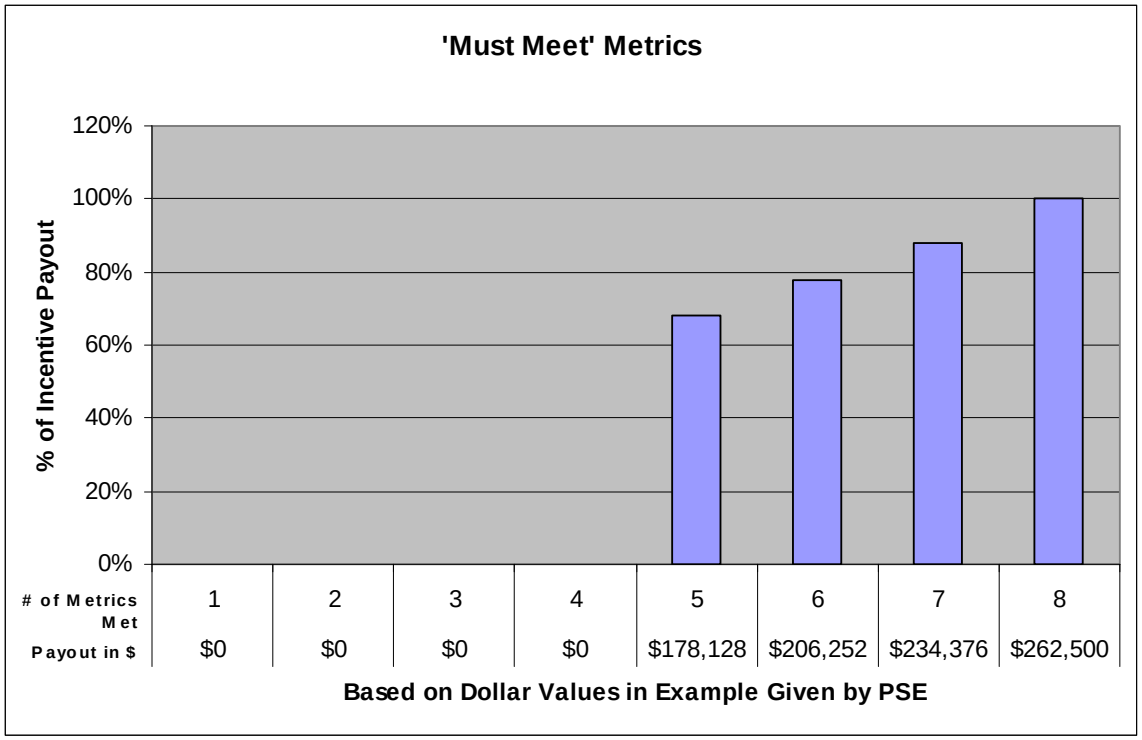
- An incentive plan designed to improve SP performance was introduced by PSE in 2007. The plan focuses specifically on a number of metrics described as "Must Meet", such as standards compliance; allocating most of the incentive to these. A lesser amount is allocated to the remaining metrics. A similar incentive plan will be proposed for Pilchuck in 2009[46].
- In both cases the incentive is designed so payment will begin on the "Must Meet" metrics when the SP achieves one more metric than 50% of the "Must Meet" metrics set; and on the general metrics, payment will begin at 20% of the general metrics set. On the sample figures given to us, the maximum payout on the ''Must Meet" metrics is $262,500 and on the general metrics, the maximum payout is $87,500. If the SP meets all of the "Must Meet" metrics, but none of the general metrics, it can earn an incentive payment of $262,500. Meeting 5 out of 8 metrics on the "Must Meet" list, but zero on the general list, can earn the SP an incentive payout of $178,128.

[46] Documents #035

- In some of the metrics with only one or no incidents allowable per year, it is possible to fail a metric on the first day of the year, as the pass/fail measure is one or zero.
- The following charts demonstrate how the payout is allocated in percentage and dollar terms according to the number of metrics achieved.

Figure 5 - Percentage Incentive Payout for Numbers of General and 'Must Meet' Metrics Met





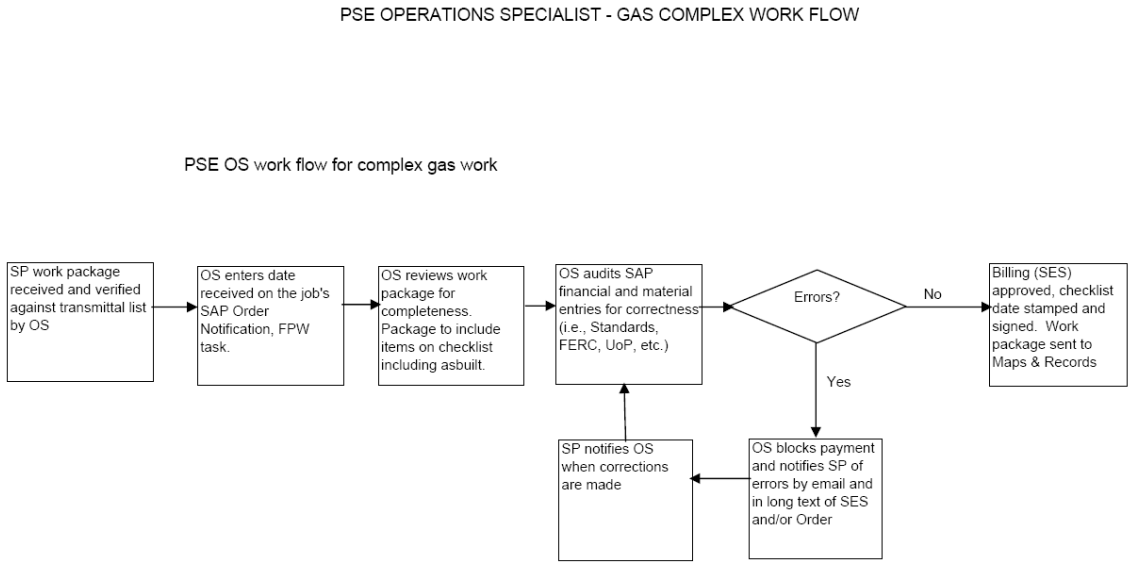
- The 2009 Incentive Plan for Pilchuck is still in draft format and, as of the time of writing, the dollar values have not yet been set, though the dollar range is known.
- It is not clear whether any assessment has been carried out to determine if the dollar values considered are adequate to motivate the SP.
- The incentive plan does not seek to alter the focus on the metrics. The plan seeks to incentivize the SP to meet the minimum performance requirements of the metrics.

6.3.2.4 Billing/Backlog/As-Built Drawings

- The SP contract gives the SP the responsibility of providing all required records[47] with the invoice for work done. The records are completed in the field and pass through the SP's Billing Department on the way to PSE for checking, mapping and payment. Delays in the billing process have been linked to delays in the release of approved as-built drawings, which has had a negative impact on system knowledge and other areas of continuing surveillance. The following flow diagram illustrates the flow of an invoice through the billing process including the correction loop that can be created when a bill is blocked.

[47] MSA Clause 3.7

Figure 6 - Complex Gas Work Flow



- This process does not address the accuracy of all of the field information contained on the D-4 or as-built drawing. The process does verify completeness, accuracy of units, and obvious indicators, such as direction, are correct. The location of the pipe is not verified as part of the billing process.

Pilchuck Invoicing Backlog

- Mains, services and service replacement invoicing are currently subject to a backlog. As of November 6, 2008, the backlog was approximately three weeks, but they expected to be caught up within three weeks or so of that date.
- Extensive main replacement projects are billed out of Pilchuck's Kirkland office and are billed periodically based on milestones agreed with PSE. A highlighted version of the as-built is supplied at the time of the invoice by way of information to show just what was done in connection with it. They are also working on catching up here
- Maintenance work billing is approximately two months behind as of November 6, 2008.
- There is now a requirement by PSE that all errors or omissions made in the field are sent back to the field for correction. The crew leader, who did the original work, or fitter when operating as a one-man team, has to make the correction and sign it. This can involve simple errors such as the wrong color pen used, a W left off NW where the direction appears clearly elsewhere, the crew leader's name left off one of the numerous places he has to fill it in, or the date omitted one of the numerous times it is required.

- When an invoice is blocked for a problem what happens with the as-built will depend on the type of job. If it is a straight service, then PSE will hold onto the as-built and will send back only the D-4. If it is a folder job (involves anything with a main job other than just a service tie-in) the entire folder comes back to the SP. If the as-built is illegible it will come back, regardless of the type of job.

In July 2008, PSE became aware of the billing process backlog and log of blocked invoices was preventing as-built drawings from making it through to Mapping within the six-month rule[48] period. As a result, PSE had to establish an initiative to look at a process[49] that highlighted as-built drawings as they reached 140 days since they entered the SAP queue for payment. When an invoice begins its process through the checking phase, the FCP date is entered which gives the job completion date from which to count the 140 days. When an invoice reaches this date without payment, Mapping can request the Operations Specialist (OS) to release the as-built drawing. Until then the as-built drawing remains either with the OS or with the SP.

As-built Drawings

- PSE works to a six-month rule in its mapping process: if new construction is mapped within six months it is considered a success.
- Recently, PSE asked Pilchuck for all as-built drawings and D-4s that are over 120 days. These were delivered Friday of the week ending October 31, 2008. This request came out of the meeting held about 2 months prior when the delay relating to as-builts was recognized as an issue. Now Pilchuck has to make sure when as-builts and D-4s reach the 120-day period they are copied and sent to PSE.
- Pilchuck has and continues to make improvements in their billing process to improve timeliness and data quality. Rather than developing a work around process (i.e. using a color copier), attention was paid to the root-causes that contributed to the delays and data quality issues. By addressing these, the process is much improved without adding additional steps.
- Occasionally, Pilchuck employees encounter discrepancies on prints, such as a wrongly marked pipe size. In the past they would make corrections on the as-built drawing and mark it for the attention of Mapping. Recently, coincidentally with the Jacobs audit, they found out these notations never reached the attention of Mapping. They now use a Gas Map Revision Request form[50], which enables the corrections to be noted. The form provided to us is dated January 2006, but Pilchuck billing said it has only recently come to their attention.

[48] WAC 480-93-018 (5)
[49] Document #048
[50] Gas Map Revision Request Form # 3666

- The locators use the maps only as a general directional aid because they are required to use their field locating equipment as their primary tool. PSE gets 40-50 calls per day from locators with questions about the location of pipes. When pipes are found by locators to be incorrectly mapped, there is no existing process for updating the maps
- The leak surveyors use the maps and do a survey of the entire system every three years. They often send in revisions based on unmapped service lines or mains.
- The construction SPs use the maps, but the version they have in the field is often said to be not the latest version. PSE, when asked about this, stated it is probably because the SP's designers were working off an older map and didn't update it in the process. When the crew is aware they are working off maps with incorrect information, they are to use the Gas Map Revision Request form to make a correction.
- Once the as-built drawings and D-4 cards are received in Mapping they are scanned, mapped and stored. To ensure the record properly reflects the information taken from the as-built, two people are involved in the process. One person maps the as-built and the other saves to the system. This provides a review/audit of the content.
- The scanned version of the as-built drawings and D-4 cards are made available to users. Users have commented these scanned documents are sometimes difficult to read.
- The D-1/Yellow Card [51]system never has been used to update the maps. They are only stored by Mapping.
- Submitted bills, without proper documentation, do not reach Mapping's attention. So the work represented by these invoices could likely slip by the 180-day period. This work will continue to remain outside Mapping's attention, as the FCP date will not have been initiated, thus giving no basis to check the 140-day anniversary. The FCP date is the critical indicator.

6.3.3 Conclusions

The Contract Design

The construction service provider contracts were drafted contemporaneously with the creation of the outsourcing concept itself, rather than with language and liabilities that reflected the intended partnering/alliance arrangement. There is no mention of the relationship concept in the contract and the terminology used to describe the concept appears to place the parties at arm's length. The wording should also contain specific references to responsibility for the safe operation of the gas distribution system as this clearly is a shared responsibility. As it stands the

[51] Exposed main condition report

contract only makes references in passing to compliance with laws and regulations in very general terms.

The structure was set around the traditional contractor activities enhanced by the addition of front-end and back-end processes. This was to be over-laid with the service provider management activity. We have not seen the service provider management activity operating at the level that would be expected given the structure of the contract. For the most part we see the management role being driven by PSE with the service provider taking a more traditional contractor role.

Certain specific contract terms concern us as they have potential safety consequences, such as the clause that expressly allows the SP to outsource any kind of activity to subcontractors without the knowledge of, nor any need for the approval of the Company. The SP is reminded in terms that if it should subcontract, the SP's direct liability to PSE is unaffected by the introduction of a third-party. This tends to suggest the asset owner is in some way not a utility and therefore is not responsible for the condition of the asset itself. The implication is that as long as it has the principal contractor on the hook for liability, it does not need to be concerned about the qualifications of a subcontractor.

PSE states it does agree that ultimately it is responsible for all work performed on its system, but it does not necessarily agree it must approve subcontractors not working directly on or affecting the safe operation of the gas system.

A prudent utility, as the operator of record, is legally liable for the condition of its assets, and would normally show this regardless of contractual liabilities, especially given the potential safety risks. When asked how they assure themselves as to the skills and capabilities of the subcontractor, PSE said it has confidence that the QC/QA program will alert them to any issues, yet as is seen in the QC/QA section the program is not designed nor set up to adequately provide such alerts. .

Another area of concern is the liability clauses. As written, they do not sufficiently recognize PSE's obligation as the owner under the Washington Administrative Code. In order for all parties to understand their respective obligations regarding system safety the liability terms should reflect the actual position. (See Recommendation 6.3.4.1)

Another set of clauses describes the contract interface rules which are the first phase of the contract dispute resolution process. In practice, the first level committee has more PSE than SP members though this has not been formalized in the contract. This is appropriate and should be reflected in the contract. PSE should have an overriding presence to be able to exercise its rights and obligations in terms of the WAC. (See Recommendation 6.3.4.3)

From time-to-time, the PSE contractor management group has tried to alter the contract terms via a variety of mechanisms, lately by Memorandums of Understanding. These are part of the "band-aid" approach to problem solution that has been adopted and has generally not been successful in resolving contract issues. (See Recommendation 6.3.4.2)

Quality Control/Quality Assurance Programs

Potelco had entered into a written QC program in 2001, which was described by PSE as being "not fully enacted." This absence of a QC program leads to quality problems being experienced, primarily on the electric side. Subsequently, PSE entered into a Memorandum of Understanding with Potelco in early 2007, which contained, among other things, an initiative aimed at fully implementing the QC program required by the MSA. In response, Potelco also created and staffed a QC Department.

In our opinion, the new QC programs, as they are written, are suitable to deliver an appropriate program to meet PSE's needs; however, the new programs, as they are executed, do not meet PSE's needs. The QC and QA programs should be seen as and used as a frontline verification process for system safety and safe work practices; however, we do not believe they achieve these goals.

The QC Programs

Each document states expressly that the measures and documentation contained in the QC program document are designed to demonstrate to PSE the specified quality of work has been delivered. To do this the program states the QC staff will:

- Confirm and document the work, material and services comply with the contract, the requirements of the published standards, plans, specifications and pipeline safety regulations.
- Non-conforming work, material or services are identified and corrected to conform to contract requirements.

The QC "staff" referred to in the process described above is the crew leader and supervisor in the case of the first requirement; and the QC inspector in the case of the second requirement. There is an audit process for the second requirement, but not an effective one for the first. In essence the QC program allocates first line of QC responsibility to the planners for design and the crew leaders for field work and the second line of QC responsibility to the QC inspectors. We are concerned at the level of responsibility placed on the crew leaders with regard to the QC process and to documenting the construction. Since they are focused on and directly involved in completing the work, adding the QC responsibility seems overburdening; particularly at this

point in the construction process where mistakes can get buried. Thus we must conclude there is no audit oversight to share the crew leaders' responsibility for the safe installation of the buried asset and as a result it is difficult to see how PSE can assure itself that the first QC requirement has been met.

An overriding concern with the contract is the level to which contract metrics drive and influence behaviors. With the QC and QA programs, the metrics applied are actively driving the wrong behavior, and in doing so create safety risks. There are two QC/QA program metrics. These metrics are:

- By using an agreed to checklist, the SP QC inspectors will conduct daily site visits designed to identify and document projects with outstanding compliance issues, a percentage of which will be audited by PSE QA. Ninety-five percent compliance was required as of the last update.
- A database of deviations is maintained. Each deviation must be allocated a status code;
    - Fifteen or fewer jobs from the database remain to be dealt with at time of measurement; and,
    - No more than four deviations scheduled for correction remain uncorrected at time of measurement.

More than 85 percent of QC inspections are conducted post-construction, and from Jacobs' observations are focused on easy to restore, or largely visible facilities and requirements, and noting mostly cosmetic deviations from standards. Where site visits are conducted in the course of construction, actual procedures are not watched and followed through on all the necessary phases. So for example, for a butt fusion procedure, there is no reliable or thorough validation of the quality of the procedures used, or the product delivered. When the procedure is observed it is usually more in passing than in detail. Again from Jacobs' observations, the same is true for the QA process, the only person in the entire QC/QA process to view complete construction procedures is the crew leader.

While we are not implying that these requirements are not important, we do not believe it appropriate they be the only or primary measures for QC program performance, yet that is precisely the status they have. Neither of these metrics enables PSE to assure itself the first requirement of the QC program has been met, yet a failure to deliver this requirement could result in significant safety consequences. The metrics do drive delivery of the second requirement, but it is difficult to see the same level of consequence arising from a failure.

The first level of QC inspection in both of the QC programs is the crew leader who is required to sign a QC statement which is placed in the work packet record for each job. The crew leader and his crew are the only people in the entire QC/QA process who see a construction job from start to finish. This means the crew leader validates his and his crew's own work and offers

assurance that all procedures were followed. In effect, the construction procedures the crew followed are not independently audited. It is worth noting this has always been the first line of QC in these SP contracts and has not changed at all with the introduction of the new written QC programs.

The second level of QC inspection is the supervisor. Jacobs' field observers noted a lack of supervision in the field with all service providers. Historically, supervisors stayed ahead of crews preparing projects to be worked and only visited the job site when there were specific issues to resolve. In June of 2008, this practice was changed so that supervisors do conduct QC inspections.

The PSE QA program audit checklist, created to measure QC performance, is used by the SPs to conduct their QC inspections. The QA program allocates scores to each individual item on the list, which are all treated evenly so a butt fusion joint scores the same as paint on a meter. This results in the QC inspectors focusing closely on the items on the list which can ensure that they meet the minimum metric requirement. This results in attention being focused by all parties on the more cosmetic, easy to see surface issues and leads the QC inspectors to seek to correct as many deviations as they can find ahead of the QA inspections so as to minimize the number of deviations that can be recorded against the driver metric.

All QC inspectors take their work seriously and appear dedicated to getting the job done right; however, the job is defined for them by the metrics. Not a lot of consistency was observed amongst QC inspectors. During site visits, one inspector will dig while another will pass. One SP's inspectors fill out paper forms in triplicate whereas the other took notes and then uploaded these to a laptop for distribution by email later. There is an observed discrepancy in the extent of training and skills of the QC inspectors when measured against the training and skills of the QA inspectors. At Pilchuck, the QC inspectors are bargaining unit and can thus make corrections in the field as they find them. This can be seen as an attempt by the SP's to avoid as many deviations as possible and thus assist the achievement of the metrics. This in fact was openly stated by Pilchuck to be the reason for this decision. However, if the purpose of QC is quality validation and assurance, it is difficult for someone who was recently a crew member or leader to be calling QC errors on crews, as he does not carry the appropriate level of authority. At Potelco the inspector was from management so he was in a better position to call out repairs, though given the small volume of work in the gas area this did not happen often. QC inspectors did state that they felt that they were being watched by PSE QA inspectors who are often seen as "policing" and looking for defects. Pilchuck QC inspectors said they also felt watched by their own management checking their productivity as measured by visiting as many sites as possible to correct as many deviations as possible each day. Pilchuck QC inspectors believe they are seen by their management as an added cost. (See Recommendation 6.3.4.8)

The QA Program

A principal role of the QA program as observed is to obtain and validate the information required to verify the metrics. In effect the QA program focuses on substantiating the QC program. But as we have previously described, the SP QC program is an attempt to avoid as many deviations as possible.

As observed, the QA program is focused primarily on compliance with the standards and not the accuracy and correctness of the procedures used in construction. The QA program allocates scores to each individual item on the list, which are all treated evenly so that a butt fusion joint scores the same as paint on a meter. This leads to some 80% of QA inspections being conducted post-construction, and are focused on easy to restore, and therefore largely visible facilities and requirements (such as grass seeding and meter sets), noting mostly cosmetic deviations from standards.

PSE states there is a confidence level that comes from knowing and witnessing individual's performance on a frequent basis. New personnel or personnel who have demonstrated poor performance are given a higher level scrutiny. PSE maintains that procedures are closely watched in detail until a level of confidence can be established for the subject individual. We believe that the purpose of a QA program is not primarily focused on individuals, but on the proper implementation of procedures. Although experienced employees may be less likely to make mistakes, all employees are capable of errors due to varying personal conditions.

Where site visits are conducted in the course of construction, actual procedures are not watched and followed through on all the necessary phases, so that there is no reliable or thorough validation of the quality of the procedures used on, or the product delivered in respect of, the buried facilities. When the procedure is observed it is usually more in passing than in detail; consequently there is still an imbalance between the QA teams' ratio of work done versus work type. Once again, the inspections are concerned with cosmetics, and not with what really carries risk and complexity as the primary purpose has been to validate the metrics and not the construction procedures.

Deviations can and should still be audited, but not to the current extent as the emphasis on cosmetic issues does little to assure safety, whereas audits of as-built drawings and D-4 forms can help improve the quality and accuracy of records with benefits that will flow right through to safety at the Utility and for accurate locates and leak surveys.

Customer education opportunities are being missed in the operation of the QC/QA programs. More can and should be made of this to promote an appropriate level of understanding in the community. (See Recommendation 6.3.4.9)

Jacobs observed that QA inspectors lost a significant amount of time in locating crews reducing their effectiveness. When the QA inspectors did locate a site crew, they still did not observe entire construction related processes. (See Recommendation 6.3.4.7) Instead they focused on checking qualifications, manuals, public protections, etc. A couple of observations were made by Jacobs of large pipeline jobs, which turned out to be individually contracted and not therefore part of this review. They do, however, show that PSE does operate a QA program that is focused on validation and assurance of construction procedures for large pipeline construction. We observed that there was a fulltime QC inspector allocated to the construction job and the PSE QA inspector regularly visited and stayed much longer on-site observing a wide range of complete procedures. This was a marked contrast to the metric driven audit of the distribution system. (See Recommendation 6.3.4.13)

Contract Behaviors, Service Provider Management and Contractor Management, Metrics and Incentives

PSE has spent a good deal of the contract period focusing on certain specific issues pertaining to Potelco, leaving Pilchuck to manage the processes as it saw fit. After doing this for seven years until the issues relating to Potelco were sufficiently resolved, PSE has now turned its attention to Pilchuck. The SPs are reactive to the demands of the Company and tend to determine the level of activity needed to meet the minimum requirements. These requirements are driven by the contract metrics, which in our opinion control the behaviors of the parties.

Behaviors

PSE creates initiatives and demands on the SPs and changes standards and work process requirements often, and in an ad-hoc way. There is no kind of impact or risk assessment as to how the SP might react to meet the demand or what the consequence might be. There appears to be no appreciation as to how any of this might impact safe operations at the Utility and there is no feedback from the SP on any impact the changes might have on safe operations. This highlights a lack of communication and clarity as to the role each plays in, and the responsibility each carries for, the safe operation of the system.

The original partnering/alliance concept still appears to be the contract concept understood and intended at the senior levels of both PSE and the SPs, but it is the SP's perception that this is not still the case at the day-to-day operating level of the contract. They are concerned the contract managers do not understand their business and that they do not appreciate the impact they have on the SPs business by the actions they take. Currently, the relationship at operating level takes on a more adversarial character in its application, although the SP management people did not believe the relationship had actually become adversarial. This is our conclusion as well, but the relationship risks becoming adversarial if left unintended. It appears there is a good basis for reforming the relationship to operate as a partnering/alliance as this appears to

still be the desire of both the SP's and PSE. The parties should renew efforts to do this and follow-up with contract wording that properly reflects this intention.

A number of the contract terms are driving negative behaviors; for example, the liability clauses, which are written in terms that appear to pass all responsibility to the SP. Other examples of contract terms driving negative behaviors include the metrics and the subcontracting clauses. The net effect of these contracting terms is that a number of PSE contract managers operate in a manner that suggests, and they confirm in interviews, the responsibility for the operation of the system is the SPs. They do not believe the distribution system is their responsibility and that it cannot be outsourced. Since they feel they have passed on these responsibilities, it blinds them to the consequences of a lot of their actions and decisions. The impact of the liabilities and responsibilities needs to be understood clearly by all in the contract management process.

There is also an issue with Pilchuck over a lack of adequate contract management by the Company for a substantial period of the contract's life; this led the SP to believe it was meeting all of the requirements more than adequately. Pilchuck's contract was managed for approximately seven years without specific negative input from PSE, either in significant areas of operation, or regarding the overall management of the process.

Management

The management of the contract and of the SP is not as effective as it should be because the metrics used to measure performance tend to dominate the entire process. The task of managing the contract has become a task of measuring performance against the metrics. There are only two metrics that deal with safety as an issue apart from occupational safety and of the consequences, as opposed to causes of incidents. These system safety metrics are QC/QA metrics and are dealt with in greater detail in the QC/QA section. The Contractor Management Section does not view system safety as one of its deliverables, believing it is the obligation of the SP to ensure it constructs and maintains a safe system. No connection between the metrics and the need to ensure system safety is made. This shows itself mostly in the QC/QA area.

The contractor management process would benefit from management stability and a broader, longer-term focus from the senior managers. Contractor management people meet with SP contract management staff regularly, mostly to discuss metrics performance and to seek to correct issues that have arisen from metric measurement. Contractor management people do not generally have experience in the field and do not generally understand what happens in the field in any detail. The senior contractor managers have mostly been drawn from the electric side of the business and exhibit little direct knowledge of gas system safety issues and how their actions can impact them. All their focus is on the resolution of immediate issues. Senior contractor managers have changed frequently and the SP management people have expressed concern at the turnover and lack of gas knowledge and experience. SP management has

largely remained stable. These concerns, however, are not raised by the SP, as their management is focused on satisfying the Utility's direct concerns.

The SP management people focus their attention on matters pertaining to cost, productivity, overheads, accounts receivable and "whatever it takes to keep PSE happy." They follow the behaviors of their PSE counterparts to determine the importance of any issue placed before them. They appear generally solicitous and anxious to know what it is that PSE requires of them. The refrain "just tell us what you want us to do" was often reported. They view the concept of continuous improvement as being directly related to the construction activity and not to the overall SP management role. This weakens the overall effectiveness of the SP model.

The PSE contractor management people introduce requirements without appearing to be aware of what the cost impact might be on the SP who, at times, will absorb the cost, looking elsewhere to protect its margin. PSE does not assess the risk this presents. The Company is traditionally cost-driven, whereas the SPs are profit-driven. The cost is not clearly seen at the contract interface at the Utility but is directly felt at the SP end. PSE managers should be more aware of the differences that drive the Company and the SP business drivers to allow them to understand and assess the impact of their decisions on the SP. This would need to include the understanding that even the simplest of changes or demands can impact safety. For example, if the SP has to absorb a cost associated with a change, the consequence may be ramped-up productivity in the field to allow recovery of the cost which can lead to increased pressure and stress on the crews.

Roles and relationships are confused and inconsistent because the expectations of PSE and the SP are at odds. This conflict is enforced by PSE reacting to the SP as a traditional utility and the SP responding in a manner more consistent with that of a traditional construction contractor than that of a modern service provider. This can be alleviated with each party better understanding the other's business.

The PSE contractor management process has placed faith and trust in a combination of metrics, MOUs, initiatives and incentives to deliver the level of SP management envisioned by the initial contract concept. This has created levels of frustration in both PSE and SP management, as each seems on a different plane in terms of understanding as to what is expected or even necessary to deliver the contract. In Pilchuck's case, seven years of operating without major objection means that they don't see the need for major change, yet PSE is pressing for it. There is a perception in the SP organization that what they are seeing is a direct reaction to the current UTC issue. There does not appear to be a satisfactory system of communication between the parties as to expectations. (See Recommendation 6.3.4.10)

The Metrics

The NCC contract safety-related metrics are mostly about compliance with standards, measured by reference to deviations, records completion and data-integrity, measured by completeness, numbers of damage claims and UTC inspections, measured by number of notices of non-compliance. The remaining metrics are mostly customer/stakeholder facing or deal with matters such as inventory control. These metrics do not completely deliver the QC/QA program and do not deliver any assurances around data integrity or the speed of system safety critical to data capture.

The O&M contract safety metrics are for the most part the same as the NCC contract, except that a metric for data integrity has not been developed and there is more emphasis on gas outages and over/under-pressure incidents. They suffer the same delivery failures as the NCC metrics.

There is no metric for speedy document completion or data integrity other than the one measuring job document completeness, the measure of which is blocked bills. This metric does not deliver fast or accurate documentation.

The management of the metrics is a process in and of itself, and seems to be driving the asset management function rather than the other way around. It does not seem that full consideration was given to the overall needs of a gas distribution system when the metrics were designed. The metrics look top down and are about following those areas watched by the regulator, which might result in customer-facing issues, or the needs of the QC/QA approach. If the system was looked at from the bottom up, a different set of metrics would emerge to deliver assurances on system safety and enable real assurances about the impact of the contractor management role. The customer and UTC-facing metrics are all probably effective and are certainly important, but the system-facing metrics are decidedly not effective and need to be changed. The metrics need to deliver business critical measures which drive the right behaviors in both parties.

The focus of the metrics is on achieving minimum performance levels and is generally negative in application, measuring failure instead of trying to drive performance by targeting improvement generally or by directly targeting areas lacking in performance for specific improvements. They tend to be static and do no change in any significant way over time. Only in the area of Customer Service is emphasis placed on performance improvement. We would like to see the focus change to delivering positive outcomes on system safety issues. (See Recommendations 6.3.4.4 and 6.3.4.11)

Incentive Program

With the Potelco metrics of 2007 and those proposed for Pilchuck in 2009, an incentive program has been introduced. It is stated by PSE to have been designed to improve performance. The program focuses specifically on a number of metrics described as “Must Meet”, such as

standards compliance, allocating most of the incentive to these, with a lesser amount allocated to the remaining metrics.

In both cases the incentive is designed so that a payment will be made for achieving only 60% of metrics set. Achievement of all metrics is said to enable a 120% incentive payment. The 2009 incentive for Pilchuck is still in draft format and the dollar values have not yet been set.

It is not clear if any assessment has been carried out to determine if the dollar value is adequate to motivate the SP. When this was put to an SP manager, who had been involved in negotiations on the subject, the reaction as to whether it was adequate was equivocal.

The incentive program does not alter the focus of the metrics and they are still not targeted at improvement. The program focuses attention on incentivizing the SPs to meet the minimum performance requirement of the metrics.

We are concerned that the program as designed simply reinforces the importance of the relevant metrics (which have not changed) by making them “Must Meet” and offering additional financial incentive to reach the same percentage level of performance as is currently required. Under the program it is possible for the SP to achieve the *same* level of financial reward as it currently does with a *reduced* level of performance. (See Recommendation 6.3.4.12)

Billing/Backlog/As-Built Drawings

There is a continuing issue with Pilchuck of blocked and backlogged bills. This issue highlights problems with the capture and mapping of as-built drawings and D-4 forms. It also identifies issues with the accurate collection and correction of data from the field. These lead to safety concerns in terms of the potential for ongoing delays in mapping the as-builts and D-4s resulting in gassed-up pipes being in the ground with no mapped record. There are also safety concerns surrounding added demands placed on field crews regarding the capture and correction of information necessary to operate the system. This is an example of a process management system that does not consider safety issues when making decisions impacting the process.

Mapping

The as-built and D-4 forms are a significant part of critical data base data necessary to the on-going safe operation of a gas distribution system. They are required by law and are intended to provide an accurate record of the buried facilities of the Company in the street, together with the accurate location of service lines and meters. Having accurate information not only allows PSE to know with confidence where its facilities are but also enables accurate locates and leak surveys which further protect the public interest. The timely capture and accuracy of this information and data should be a priority for any gas utility.

The law in Washington State requires mapping of this information within six months of the instillation of the facility and it concerns us that PSE has paid insufficient attention to its obligations in this area. The prudent utility practice should be to map as soon as possible, whereas PSE tends to focus on mapping no later than the six-month period. Until Jacobs' audit, PSE did not even have a clear measure to tell how close they were to the limit of the six-month law. Recently, (late 2008) an initiative was begun to run SAP searches to find as-builts and D-4s that had not emerged from the billing process after four months from the date they entered SAP so they could be traced and dealt with. As this initiative has developed, the focus is still on the six- month deadline and success is measured by reference to it. To help put the six months in prospective, participants in an American Gas Association best practices study reported a 60-day timeframe to be the average time from when a gas facility is installed until it is mapped. PSE compares poorly to this standard.

PSE reports that it is currently averaging approximately 66 days to get changes filed correctly from the field crews to the Mapping Department, 27.5 days to update the as-builts, and 15 days to return the information to the field crews.[52] They state that this average timeframe (108.5 days) is above AGA 60-day average reported in the best practice study, but below the 180-day maximum allowed by UTC. They also report more than 99% of the approximate 400 jobs received each month are updated within the 180-day maximum[53].

The billing backlog and the blocked bills process were identified in the course of Jacobs' investigation to be significant factors in the time taken to get field information and data into the PSE system. The reason for this is the as-built drawings and D-4 forms are part of the work packet passed from the SP to the Utility together with the invoice for the work. As work volume for Pilchuck increased in 2007 a backlog in billing developed due in part, we were told, by a delay in the SP staffing up its Billing Department and the further delay in training the new staff. In addition, since Pilchuck recruits for billing staff at the entry level, it may not be getting the most qualified people for an important task.

As can be seen from Figure 6 - Complex Gas Work Flow, the as-built and D-4 documents can easily find themselves caught up in a correction cycle, where a bill has been blocked for any of a variety of reasons, often nothing to do with the mapping documents themselves. This cycle can take weeks and sometimes months to resolve. Part of the issue is the impact of metrics, which here measures the performance of the OS who audits the invoice and its associated documents. The metric requires the OS to approve the bill for payment or block it within a certain fixed period. As a result, as-builts and D-4s can be blocked without regard to the importance of getting them to Mapping.

Contract metrics also have an impact here. The relevant metric focuses on "job completeness" as opposed to accuracy. The metric measure is the timeliness of corrections to blocked bills,

[52] PSE telephone conversation, September 30, 2009.
[53] Document Response 192

which is a minimum of 90% being corrected within one to ten business days of the block. The correction level is reviewed monthly, but is only measured at year end. This means despite monthly reviews, the success or failure of the SP measured against this metric is only determined at year end, reducing the focus on mapping document delays.

The as-built and D-4 documents are completed by the crew leader in the field. Pilchuck pays its crew leaders one hour of overtime each day to enable the completion of the documents. Often these are completed that night at home. Jacobs' observations have discovered that it is not unusual for the documentation to be completed the following weekend. Typically, the crew leader is working off notes taken at site. Despite the care taken to get the documents right, documents were found during the field observation process containing errors. (See Recommendation 6.3.4.13)

Capture and Correction of Information on Field Documents

There is a considerable volume of paperwork required to be completed by the crew leader in the field. The paperwork requires the same information in more than one place; for example, a large amount of information required on the D-4 form is also needed elsewhere. In some instances, a single job can require nine signatures from the crew leader. PSE requirements for different types of writing implements to be used to fill out paperwork, such as pencil, black ink and red ink also create an issue in the field by imposing an additional clerical burden on the crew leader.

Repetitive documentation requirements and the volume of paperwork place a lot of potential stress on the foremen and fitters and are unnecessary to achieve PSE's data requirements. The volume and repetition exist only to facilitate internal PSE processes. This is because the information is required to be used by a number of departments within PSE and it is viewed easier to have the crew leader complete the repetitive forms than have someone sift and distribute the information at the Utility. Jacobs believes this to be unreasonable and unwise. The crew leaders are not employed for their administrative skills yet they are required to complete clerical tasks that can lead to stress and potentially result in safety consequences to the crew leader and/or the distribution system if mistakes are made. The elimination of duplicative paperwork will enable crews to better concentrate on safely installing and maintaining gas plant and because there would be significantly less of it, probably resulting in improved accuracy.

As there is no metric addressing document accuracy, PSE does not routinely audit the accuracy of information in any field document, including as-built drawings and D-4 forms, focusing on metric driven requirements for document completeness. From time-to-time, PSE undertakes target audits on specific areas. Recently (late 2008) they targeted the accuracy of D-4 records for audit. This involved the QC inspectors taking a sample of D-4 forms into the field and checking the accuracy of locations, measurements, etc. This in our opinion is an appropriate audit subject and one which should become a regular part of the program. (See Recommendations 6.3.4.4, 6.3.4.5, and 6.3.4.6)

In addition, existing as-builts and D-4s have location and pipe-size errors that cause construction time loss in the field, as the original project planning was done on the basis of incorrect or outdated maps. These mapping errors were seen by the locators, leak surveyors and service provider construction crews. We understand that making changes on the as-built or D-4 was common practice in the field until recently. The system now requires a Map Change Request form be completed and submitted to the Mapping Department, where a decision is made on whether to incorporate the suggested map change. We have not seen any procedure or criteria for accepting or declining corrections, but from interviewee comments understand Mapping Department personnel will consider the validity of the change based on what they know of the crew and other such subjective factors. We are concerned that without a formal procedure subjective decisions made in the office can override observations of the crew leader in the field and corrections noted on an as-built drawing or a D-4 form will not be taken into account.

There is no formal written procedure to accompany the PSE map change process, nor has here been any attempt to promote use of the map corrections form. From Jacobs' observations it appears there is no clear common understanding as to the correct way to effect map changes. In addition, there seems to be a reluctance to take advantage correcting inaccurate records, wherever opportunities present themselves.

In 2008, there was a period of increased work volume at Pilchuck and a corresponding increase in errors in field documents. To address the error problem, PSE's contractor management imposed a process change on Pilchuck requiring that all corrections, additions or amendments to work package documents had to be made in the field by the crew leader/team member who made out the original document. This was done because of concerns that corrections were being made in the office, either by a staff member telephoning the crew leader for the information, or that even corrections were being made up.

The paperwork return process instituted has resulted in more blocked bills. It is sometimes perceived by the SP as being irritating; especially since the issue causing the block can be minor. The requirement does nothing to improve the accuracy of the underlying information and places an additional administrative burden on the field crews. The problem is exacerbated because the field crews are not paperwork specialists and the Billing Department has been understaffed.

No impact or risk assessment was done to assess the consequence of the changed process or of the documentation required. No evidence of thought was observed as to how the requirements, primarily impacting field crews, might also impact safety. From our observations there did not appear to be any kind of realization there could be a safety impact from those managing the contract at the Utility. The PSE change driver was largely frustration at the failure on the part of SP staff to "get it right." (See Recommendations 6.3.4.14 and 6.3.4.15)

6.3.4 Recommendations

6.3.4.1 To properly allocate responsibilities and understanding, redraft the contract to clearly articulate the Utility/SP relationship to better define the liabilities as reflected in the requirements of the Washington Administrative Code.

6.3.4.2 Prepare guidelines for the operation and management of the contract so it can be used as an operations manual for contractor management. The goal of the guidelines should be to maintain the partnering relationship between PSE and the SP while reinforcing system safety and the decisions that can impact it.

6.3.4.3 To allocate greater representation to PSE, redraft the contract terms concerning the contract committees. This change will reflect current practice.

6.3.4.4 Contract metrics need to be expanded to include measures such as conformance to PSE procedures as a result of actual observations. In order to meet the first requirement of the QC/QA programs, which is to confirm and document work, material and services comply with the contract, the requirements of the published standards, plans, specifications and pipeline safety regulations.

6.3.4.5 The QC/QA programs need to be refocused to enable more site visits to observe procedures during construction and operations and maintenance procedures. Post-construction inspections of connections made under hard surface are a last resort which would only become necessary if critical procedures inspections are not completed.

6.3.4.6 The scope of the QC/QA metrics should be expanded to include site and public safety, paperwork accuracy, units completed, and more on-site crew work inspections. The existing check list used should be amended so that deviations are not the main focus.

6.3.4.7 Currently when the PSE QA inspector is attempting to locate and SP crew significant time is lost, and if dispatch is contacted the element of surprise, useful in discovering disorderly jobsite conditions, is lost. Consequently consideration should be given towards GPS equipment to assist in locating the service provider crews or some other method that accomplishes the above need.

6.3.4.8 The SP should explore the possibility of fielding QC staff from supervision as opposed to using bargaining unit employees as QC inspectors. This change would improve the overall integrity of the QC process.

6.3.4.9 PSE and the SPs should take the opportunity to educate QC and QA staff on public communication and mark their vehicles as each respective company's quality control/quality assurance inspection team.

6.3.4.10 PSE should develop a training program to pass knowledge to contract managers about system safety and the kinds of decisions that can impact it. Training sessions should begin with the history of code violations and settlements to instill a sense of

urgency for the importance of doing jobs in conformance to the gas operating standards. There should also be training on business drivers and the kinds of reactions that will arise from management decisions and demands that might impact safety.

6.3.4.11 PSE should review its system-facing metrics to identify new metrics that deliver a measure of assurance of system safety. These will likely not involve easy counting measures as they will be focused on assurance and validation rather than deviations or failures.

6.3.4.12 PSE should introduce the incentive scheme after all proposed changes are made to the contract and metrics, and then only if it is convinced the need is still there. A lot of what is required for a successful outsourcing contract can be delivered via focused and effective management, once the recommended changes have been made.

6.3.4.13 PSE should strive to meet the AGA 60-day average reported in the best practices study. Reviewing the billing process to enable the removal of the as-built and D-4 documents from the billing package as soon as they are received will ensure the updated maps are expedited. A copy should be kept in the invoice folder for reference and completeness. The accuracy of the information on the as-built and D-4, aside from issues surrounding amounts of materials used, etc. should be dealt with through the QC/QA process.

6.3.4.14 Enhance the paperwork correction process utilizing a cross functional PSE SP team. The goal would be to eliminate sending needed corrections back to the field by developing parameters for corrections and establishing a basis for recording corrections. The veracity of the process developed could be assessed by periodic audits.

6.3.4.15 Review the field paperwork process and make a recommendation for reducing volume and streamlining the information captured. This recommendation scope could also include assessing electronic capture of data.

6.3.4.16 Assess the benefits and costs associated with using a roving inspector to visit larger job sites to QA and complete as-built drawings and D-4 forms to Mapping as is done on large scale pipeline jobs.

6.4 Facility Locating Service Provider Contracts

6.4.1 Background

The Washington Administrative Code (WAC) 480-93 requires gas pipeline operators to maintain and update records[54] demonstrating compliance with the Federal Code[55] and the WAC. The operator is also required to make the documents available to appropriate company operations personnel. The WAC also requires an operator to comply with the Revised Code of Washington (RCW), requiring the operator to participate in the One Number Locator Service, and, on request, provide "reasonably accurate" information as to the location of its facilities by locating and surface marking its underground facilities[56]. The provision entitled "Damage Prevention" also stipulates times for response.

The RCW[57] sets out the intent of the State Legislature in enacting the chapter being to "assign responsibilities for locating and keeping accurate records of utility locations, protecting and repairing damage to existing underground facilities, and protecting public health and safety from interruption in utility services caused by damage to existing underground utility facilities." It requires the operator to locate its facilities with reasonable accuracy. The Definitions[58] Section defines reasonable accuracy as meaning "location within twenty-four inches of the outside dimensions of both sides of an underground facility."

There are two locating services contracts utilized in the PSE service area.

6.4.2 Findings

6.4.2.1 The Contract

- The contract documents are made up of a Master Service Agreement (MSA) and a Service Agreement (SA). The MSA contains boilerplate terms consistent with the nature of the services being performed.
- All liability passes to the service provider subject to specific exceptions relating to bodily injury or property damage caused by or arising from the sole negligence of PSE.
- Upon giving written notice, the contracts can be terminated at any time by PSE.
- The SA describes the facilities to be located, sets out the scope of the services to be delivered, sets goals and schedules for performance, deals with damage claims, and establishes the basis for performance metrics.

[54] WAC 480-93-018(1) & (5)
[55] 49 CFR 191 & 192
[56] WAC 480-93-250
[57] RCW 19.122.010
[58] RCW 19.122.020

- In February 2007, PSE revised the specifications for the locating service. The revision purports to be a contract amendment designed to "fulfill PSE's facilities ownership responsibilities of Chapter 122, Title 19, RCW."

6.4.2.2 Contractor Management and Metrics

Contractor Management

- The contract is managed by a group in the Contractor Management Department at PSE in Bellevue.
- The contract performance is measured by reference to a series of metrics. There are four general metrics that apply to each SP and three more, which currently apply to Central Locating Services (CLS). The three extra CLS metrics measure the impact on the PSE contract of a large volume of work done for another utility by CLS. We understand this work is being significantly reduced in volume due to current economic conditions.
- The contract management group and the SPs meet monthly and more frequently if necessary, to review the performance of the contract by reference to the metrics and to damage claims. This involves a point-by-point analysis of the metrics and claims. This meeting also aims to deal with continuous improvement opportunities for PSE. Both SPs reported they saw it as their role and responsibility to bring new technologies and processes to this contract.
- PSE reported Locating Inc. has struggled with both the concept of the metrics and some of the actual metrics, whereas CLS has more naturally taken to the concept as its management is familiar with operating under metrics.
- The SPs and PSE report there is an unofficial (not contractual) concept of probation, which can be imposed by PSE on a SP should there be need, such as a drop in quality of locates leading to an increase in damages. Continuing failure could lead to contract termination, or as has happened, a loss of service territory.
- The SPs are paid per locate under the contract.

The Metrics

- There are four general metrics common to both SP contracts. These are: daily locate marking "on-time" rate, weekly locate marking accuracy/quality, critical gas system PSE inspector notifications and monthly "process improvement" updates.
- The daily locate marking "on-time" rate requires performance equal to or greater than 96% measured by reference to dates contained in the job ticket.

- The weekly locate marking accuracy/quality metric is measured solely by reference to numbers of damage claims. This is averaged over a greater period than one week. There is no measure of miss-locates or near-misses.
- When miss-locates are encountered by construction crews there is normally a claim for downtime to cover the waiting time for a locator to come to the jobsite or for the time it takes the crew to find the gas pipe.
- A critical gas system PSE inspector notification is initiated when a locate request for mains greater than 6 inches in diameter or a high pressure (>100 psig) main occurs. This high-profile locate request requires a PSE inspector be notified. One SP reports they have had to hire (at their cost) a person to carryout this activity given the high volume of high profile requests they receive. One SP comments the requirement is "overkill" as the notification has to be made to the inspector by phone, fax and email.
- Monthly process improvement updates include reports on the rectification actions taken in response to trends identified, such as damage claims against specific employees, reports on the QC process as well as process improvements in terms of efficiencies identified and new technologies identified.
- PSE reports a failure to meet any metric would result in the requirement that the SP create a plan to resolve the failure, and would likely result in a probation period during which they would be required to make the correction. There is no direct financial penalty applied to the failure of any metric.

6.4.2.3 Staffing

- Both of the SPs seek to recruit staff including locators on a career basis, offering pay terms above minimum wage and benefits such as 401k's, medical insurance, etc. Both SPs offer the chance for progression into management, and point to the number of managers who started as locators as evidence.
- PSE states they believe the SPs pay their employees fairly and do not see pay as an issue in terms of the viability of the contract or in terms of the safety issues inherent in the activity of locating underground gas facilities.
- Both SPs report an interest in creating a stable workforce, and look to recruit people who demonstrate a degree of stability in both their personal lives and in their job history.
- Both SPs report recruiting presents certain challenges, noting many young people may not want to work outside every day.
- Both SPs confirm all new locating staff is fully trained, beginning with operator qualification training as required by law. The training programs are conducted as part of the SP's quality control programs.

6.4.2.4 System Damage

- Both SPs report experiencing unacceptable levels of damage claims, though they stress they always get the blame, regardless of who is at fault. They both state they are striving for a higher quality ratio, and in the case of one SP, by quite a margin over current levels.
- Both SPs report experiencing difficulties in trying to introduce higher damage prevention awareness amongst their employees, particularly the older/more experienced ones.
- In both cases the QC program is used to concentrate on damage prevention with measures focusing, to a greater or lesser degree, on damage prevention awareness and correction via the audit process.
- The Locating Inc. QC program contains a section which describes their damage investigation procedure.
- PSE's tracking of damage claims shows damage to be a continuing issue for both SPs with most damages occurring on gas service lines.
- Both SPs state most problems occur as a result of "bleed off"[59] from other utility facilities. CLS reports its Locators start with cable, which is the shallowest, and then they move to power and finally gas. This process seeks to reduce or eliminate the risk of "bleed off."
- Both SPs report issues with the prints/plans they are given, though this does not present a major problem to them as they are expressly required not to use the maps as the principal method of locating. They use the prints as a general area locate tool, then use their equipment to find the facilities, and then refer back to the print. If they find errors on the print, they are required to use the Gas Map Revision Request form. These forms are either given to the PSE inspector or the contract manager, who send them directly to Mapping.

6.4.2.5 Quality Control Programs

- Both SPs operate quality control programs. In both cases the requirement for the program was introduced in the last contract renewal and has only been operating since 2008.
- The Locating Inc. QC program was drafted and introduced by PSE. The CLS QC program was written by CLS itself, and is reported to be a modified version of the QC program operated elsewhere within the CLS group.

[59] Shallower utilities such as telephone and cable can have a stronger locate signal, giving it the appearance they are the tracer wire associated with the gas pipe utility.

- The CLS plan focuses on quality control awareness among its employees and targets audits at poor performing employees regarding damages. It does not deal with miss-locates or near-misses, other than in terms of damage prevention awareness, as these are not recorded anywhere.
- The CLS program contains damage prevention continuous improvement process aimed at a root-cause analysis of damages, identifying training needs, and escalating awareness focused on meeting PSE's reporting requirements.
- The Locating Inc. QC program is directed at instilling awareness of damage prevention to the individual locate employee. When compared to the CLS program, it is less focused on overall QC awareness and is less focused on corrective action against poor performing employees.
- Presently, PSE does not carry out any kind of quality assurance program over either of the SP's QC program or activities. PSE reports they are introducing this activity in the QA work plan for 2009.

6.4.3 Conclusions

The Locating Service contract documents contain the normal type of terms for this kind of contract service and therefore are appropriate for a locating contract. The contracts are managed by a group in the Contractor Management Department and are primarily managed by the measurement of a series of metrics. All parties involved at the management level talked about their roles as being involved in damage prevention, though we did note a difference between the SPs and PSE as to how successful they were at this.

Contractor Management

The contract performance is measured by reference to a series of metrics. The contract management group and the SPs meet at least monthly to review the performance of the contract by reference to the metrics and to damage claims; this involves a point-by-point analysis of the metrics and claims, including the underlying causes of damage claims. This meeting also aims to deal with continuous improvement opportunities the SP's might provide for PSE. Both SPs reported they saw it as their role and responsibility to bring new technologies and processes to this contract. The meeting is also designed to resolve issues and to agree to a solutions when found. As part of this process there is a non-contractual concept of probation introduced by the PSE contract manager, which can be imposed by PSE on a SP should a need be perceived, such as a drop in quality of locates leading to an increase in damages. Continuing failure could lead to contract termination or, as happened with Locating Inc., a loss of service territory. Where probation is set in place, the SP is required to report at least monthly as to progress on improvement. There is currently no contractual basis for this probation though the

SPs do not seem to object to the concept and both have been through it at least once. There are no clear rules as to when probation will be triggered and it therefore is open to a subjective application.

PSE reported Locating Inc. has struggled with both the concept of the metrics and some of the actual metrics, whereas CLS is reported to have more naturally taken to the concept as its management has prior experience of operating under metrics. Both locators have recently brought new managers from other parts of their respective companies, and in both cases, from out-of-state with the specific intention of improving performance. Both SP managers reported being sent to the area to improve services based on successes elsewhere in tackling the same kind of issues. (See Recommendation 6.4.4.2)

The Metrics

Four general metrics are common to both SP contracts. These are: daily locate marking on-time rate, weekly locate marking accuracy/quality, critical gas system PSE inspector notifications and monthly “process improvement” updates. These metrics can impact safety.

The daily locate marking on-time rate requires performance equal to or greater than 96% measured by reference to dates contained in the job ticket. This metric is important because if the locators are out of time the delay may result in digging ahead of completing the mark-out.

The weekly locate marking accuracy/quality metric is measured solely by reference to numbers of damage claims, averaged over a period greater than one week. There is no measure of miss-locates or near-misses. This metric is miss-named, as it is not a measure of accuracy or quality. When miss-locates are encountered by construction crews there is normally a claim for downtime to cover the waiting time for a locator to come to the jobsite or for the time it takes the crew to find the gas pipe. This could provide a determination of miss-locates that would balance the damages measure to provide a broader gauge of accuracy and quality. (See Recommendation 6.4.4.1)

Monthly process improvement updates include reports on the rectification actions taken in response to trends identified, such as damage claims against specific employees, reports on the QC process as well as process improvements in terms of efficiencies identified and new technologies identified. This should be expanded to cover the issue of miss-locates.

PSE reports a failure to meet any metric would result in the requirement that the SP create a plan to resolve the failure, and would likely result in a probation period during which they would be required to make the correction. There is no direct financial penalty applied to the failure of any metric, nor any contractual right to probation. Further discussion of locator SP improvement programs appear in Section 8.3.3, Damage Prevention.

Staffing

Both SPs confirm all new locating staff is fully trained, beginning with operator qualification training as required by law. The training programs are conducted as part of the SPs quality control programs.

We are impressed by the level to which both locating SPs seek to create a career basis for the employment of locators and this was reinforced by the managers recently sent to the area to manage the contracts having come through the ranks starting as locators. In this regard the norm elsewhere in the US is to employ locators at a basic wage with minimal benefits and as a result face high employee turnover. Both SPs report recruiting presents certain challenges, noting that many young people do not want to work outside everyday.

Damages

PSE's tracking of damage claims shows the level of damage to be a continuing issue for both SPs. We are concerned as to what the damage risk related level really is if miss-locates are taken into account. PSE comments most damages occur on gas service lines.

In both cases the QC program is used to concentrate on damage prevention with measures focusing, to a greater or lesser degree, on damage prevention awareness and correction via the Audit.

Both SPs report issues with the prints/plans they are given, though this does not present a major problem to them in locating, as they are expressly required not to use the maps as the principal method of locating. We understand this express requirement is as a result of the low level of confidence PSE has as to the quality of its records. The prints are used as a general area locate tool, the locators then use their equipment to find the facilities, and then they refer back to the print. If they find errors on the print, they are required to use the Gas Map Revision Request form. These forms are either given to the PSE Inspector or the contract manager, who send them directly to Mapping. They report that previously they used the maps to note changes or corrections.

PSE states maps are to be used to identify what facilities may exist within the boundaries of the area to be located. However, as the maps only provide approximate location of the facilities, often measured from points of reference which are not always repeatable, physical locating of the facilities using locating equipment is required. This is consistent with industry (AGA) best practices.

Quality Control Programs

The CLS quality control plan focuses on quality control awareness among its employees and targets audits at employees with high numbers of damage claims. It does not deal with miss-locates or near-misses, other than in terms of damage prevention awareness, as these are not recorded anywhere. It contains a damage prevention, continuous improvement, process aimed at a root-cause analysis of damages, identifying training needs, and escalating awareness focused on meeting PSE's reporting requirements. It appears on its face to be a thorough program, except for the lack of QC over near-miss or miss-locates. The absence of this measure appears directly linked to the fact that PSE does not measure miss-locates and is another example of the metrics driving service provider behavior.

The Locating Inc. QC program is directed at instilling damage prevention awareness to the individual locate employee. When compared to the CLS program, it is less focused on overall QC awareness and is less focused on corrective action against poor performing employees. PSE does not carry out any kind of quality assurance program over either of the SPs QC program or activities. PSE reports they are considering introducing this activity. (See Recommendation 6.4.4.3)

6.4.4 Recommendations

6.4.4.1 Consider developing a leading type metric to measure miss-locates. A possible surrogate for this measure could be the number of downtime claims from a third-party contractor from attempting to find the main themselves or waiting for the locator to return to site.

6.4.4.2 Create a contractual basis for the locating SP probation concept and establish objective rules as to its application.

6.4.4.3 Establish and continue a QA program to audit the locators' QC programs.

6.5 Leak Survey Service Provider Contract

6.5.1 Background

The Washington Administrative Code (WAC) 480-93 requires a leak survey using a gas detection instrument be conducted by a system operator across each main and service line. The WAC also requires available openings, such as manholes, cracks in the pavement, etc. to be surveyed and all above ground piping, such as meter sets to be checked.

Heath Consultants Inc. (HCI) performs gas leak surveys for PSE, excluding inside meter sets. HCI has been engaged in this activity for PSE and its gas predecessors for more than 30 years. HCI reports the entire system is surveyed every three years covering some 60 million feet of pipe with 33 surveyors.

6.5.2 Findings

6.5.2.1 The Contract

- The contract document is a traditional style of contract made up of a contract for services, backed up by a general Terms and Conditions of the contract. There is an attachment to the contract setting out terms describing the work, describing the reports and documentation required, and setting out the basis for a quality control plan and program.

- There are currently no metrics used in the management of the leak survey contract nor are there plans to develop any. PSE reports, in general, they are satisfied with the performance of HCI.
- All liabilities for, or arising from, the performance of the services pass to HCI and PSE has the right to terminate the contract at any time on the giving of a written notice.

6.5.2.2 The Program

Standards

- PSE has detailed operating standards and procedures setting out the requirements for patrolling a leak survey program.
- The program is designed and the standards are written to meet the specific requirements of the Washington Code[60] while the survey frequencies are designed to meet the Washington Code[61] and the Code of Federal Regulations[62].
- The standards and procedures do not specifically address what a surveyor is to do when encountering obstructions to walking a pipeline route, such as parked vehicles.

Survey Methods

- The determination as to whether gas piping will be surveyed via a walking or mobile method is made considering the type of survey to be performed, facilities to be surveyed, location of underground and above ground facilities, and frequency.
- The location of main or service pipe and the number of service lines tapped into the main are the key factors in determining whether a leak survey will be performed using the walking or mobile method.
- More than 90% of the surveys completed are walking surveys. For a long time the surveys were predominately mobile surveys; however, PSE reported it has determined, after discussions with the UTC, the Washington Administrative Code requires that mains and services be surveyed *directly* over the pipe's line[63], in addition to surveying openings such as cracks in pavement and manholes, etc.
- PSE reports, as service pipe is not typically in the street and therefore not accessible to be covered by a mobile (driving) survey unit, it is most often completed via a walking survey. Meters are to be surveyed, and if there is no meter visible at or near the building, a survey around the perimeter of the building wall is performed. PSE states this can only be accomplished on foot with the current equipment being used.
- PSE also comments even though main pipe may be located in the street it is often located in an easement adjacent to a public right-of-way (and behind the sidewalk) or runs across terrain not suitable for driving. In these situations, a walking survey is required to provide adequate leak survey coverage.
- PSE periodically delivers boxes of system maps to HCI for each phase of the survey. HCI uses the maps to locate the pipes.

[60] WAC.480-93-188-1
[61] WAC.480-93-188-3
[62] 49.CFR.192.723
63 Document PG 050331 & PG 050526

- In the past when HCI operatives found errors on the maps they marked corrections directly on the maps and returned them to PSE. However, they discovered PSE was not updating its records based on their corrections. This is not the case today as the Gas Map Revision Request is used now for this purpose. The type of error found, for example, could be the gas main location was determined to be on the other side of the street.
- HCI reports they often find service lines mistakenly placed according to the maps, and that this is a bigger issue than wrongly mapped mains. This requires them to survey the entire area to ensure a proper survey.

6.5.2.3 Findings

Survey Equipment

- HCI uses vehicle mounted Optical Methane Detectors (OMD), Flame Ionization (FI) equipment (both portable and vehicle mounted) and combustible gas indicators to complete surveys for PSE.
- HCI reported it manufactures the detecting equipment used in the PSE contract.
- HCI believes it is their role and responsibility to look for, and bring to the contract, new technologies and processes.

6.5.2.4 Quality Control Program

The QC Program

- HCI has a quality control program as is required by the contract. They utilize a program[64] jointly developed by PSE and HCI.
- The QC program is based on QC inspections of HCI personnel who perform leak surveys.

[64] Document # 008

The Inspections

- The inspections are divided into three categories, which are: QC Field Tag Audit, Follow-up Inspections, and QC Field Ride Audits.
- The QC Field Tag Audit involves the placing of tags along the surveyor's route. The surveyor retrieves the tags and submits them to a supervisor with a description of the work done. Deficiencies are dealt with and will include a random sampling of the surveyor's work.
- The Follow-up Inspections involve a rework of selected surveys within 10 days of the original to verify each step of the process including the pre-survey steps, such as the surveyor's attendance at monthly safety meetings, status of field manuals, etc.
- The QC Field Ride Audit takes place when employees with no prior experience working on PSE facilities are tasked to do such work. The HCI supervisor who conducts the audit places specific attention on the areas of safety, workmanship, manuals, productivity and vehicles. The supervisor observes the daily work routine for a period they deem necessary to allow a full evaluation of performance.
- The field tag audit will expose each employee to such audit three times each quarter. A follow-up audit will occur at least twice a year and a new employee will have a follow-up audit within 30 days of their field ride audit.

6.5.3 Conclusions

The contract document is a traditional style of contract made up of a contract for services, backed by general Terms and Conditions. There is an attachment to the contract setting out terms describing the work, the reports and documentation required, and setting out the basis for a quality control plan and program. The contract terms are appropriate for this kind of agreement.

There are currently no metrics used in the management of the leak survey contract. PSE has intended for some time to incorporate metrics into the contract. At the time of this audit, contractor management group was developing suitable metrics. Draft metrics are currently in place and will be incorporated into the 2010 contract with Heath.

PSE reports it is satisfied, generally, with the performance of HCI. All liabilities for, or arising from, the performance of the services pass to HCI and PSE has the right to terminate the contract at any time on the giving of a written notice. PSE has detailed operating standards and procedures setting out the requirements for patrolling a leak survey program.

Survey Methods

The program meets the specific requirements of the Washington Code and the survey frequencies meet the requirements of the Washington Code and the Code of Federal Regulations.

The determination as to whether gas piping will be surveyed via a walking or mobile method is made considering the type of survey to be performed, facilities to be surveyed, location of underground and above ground facilities, and frequency. The location of main or service pipe and the number of service lines tapped into the main are the key factors in determining whether a leak survey will be performed using the walking or mobile method.

More than 90% of the surveys completed are walking surveys. For a long time the surveys were predominately mobile surveys; however, PSE reported it has determined, after discussions with the UTC, that the Washington Administrative Code requires mains and services to be surveyed *directly* over the pipe's line, in addition to surveying openings such as cracks in pavement and manholes, etc. This is in our experience not in keeping with the mainstream of surveys in the US, although we are aware that other utilities in Washington State adopt the same approach. Modern technology makes it possible to survey distribution mains using a mobile survey. The standards and procedures do not specifically address what a surveyor is to do when he/she encounters obstructions to walking a pipeline route, such as parked vehicles, so it is difficult to see how all mains can always be surveyed directly over the pipe.

PSE reports that, as service pipe is not typically in the street and therefore not accessible to be covered by a mobile (driving) survey unit, it is most often completed via a walking survey. Meters are to be surveyed, and if there is no meter visible at or near the building, a survey around the perimeter of the building wall is performed. PSE states this can only be accomplished on foot and this practice is consistent with utilities across the US.

Maps

The general area of map revisions and corrections is of concern to us as the accuracy of records is not only required by law but is necessary to the safe management of the distribution system. PSE periodically delivers boxes of system maps to HCI for each phase of the survey. HCI uses the maps to locate the pipes. The Gas Map Revision Request form is used now to correct errors. The type of error found, for example, could be that the gas main was found to be on the other side of the street. HCI reports they often find service lines incorrectly mapped, and that this is a bigger issue than wrongly mapped mains. This requires them to survey the entire area to ensure a proper survey. (See Recommendation 6.5.4.1)

The Quality Control Program

HCI has a quality control program as is required by the contract. They utilize a program jointly developed by PSE and HCI. It is based on QC inspections of HCI personnel who perform leak surveys. At the time of writing there was no QA process for HCI QC efforts. We are informed that one is planned for the 2009 QA program. Jacobs agrees that PSE should operate a QA program on leak survey activities. (See Recommendation 6.5.4.2)

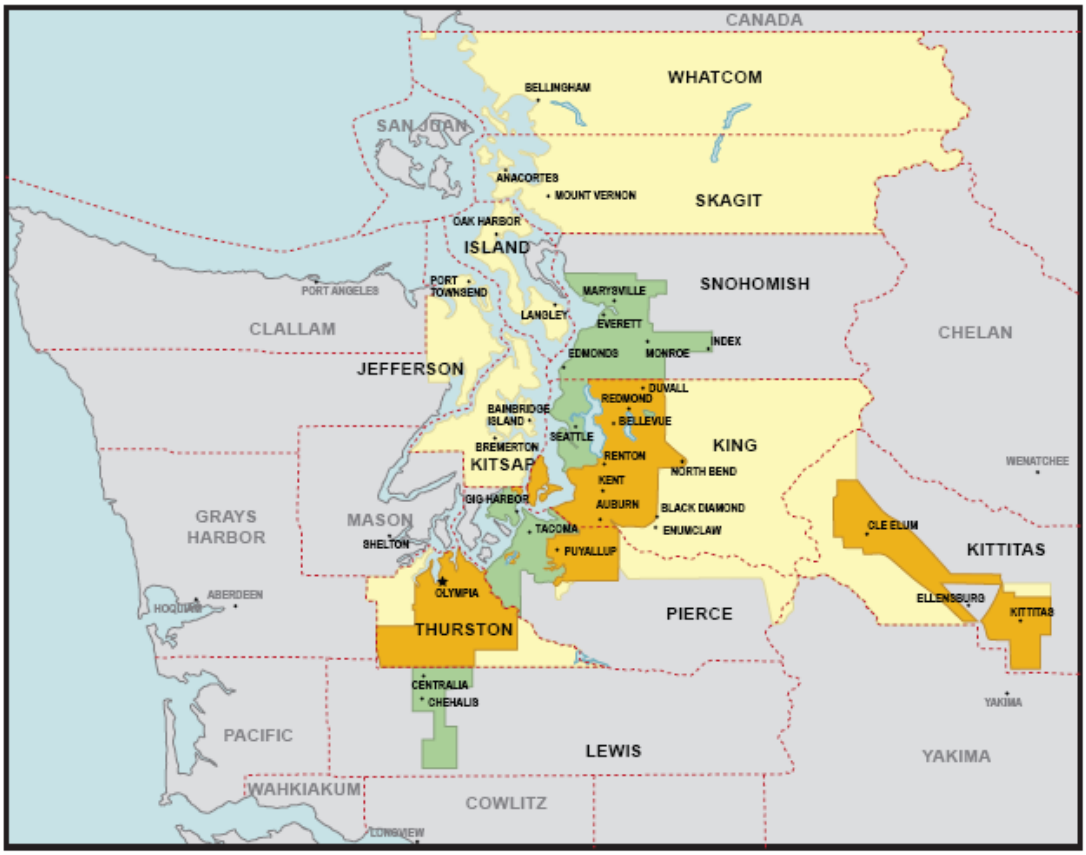
6.5.4 Recommendations

6.5.4.1 PSE should develop a consistent system for the collection of data/map errors found in the field by perhaps capturing these corrections directly from maps/as-built drawings or D-4 forms used in the field.

6.5.4.2 PSE should establish a continuing program to QA audit the leak survey QC programs.

Appendix 1

PUGET SOUND ENERGY SERVICE AREA



Combined electric and natural gas service
Electric service
Natural gas service

Puget Sound Energy's service area:
Electric Service: all of Island, Skagit, Thurston, and Whatcom counties; parts of Jefferson, King (not Seattle), Kitsap, Kittitas, and Pierce (not Tacoma) counties.
Natural Gas Service: parts of King (not Enumclaw), Kittitas (not Ellensburg), Lewis, Pierce (not Buckley), Snohomish, and Thurston counties.

Washington state's oldest and largest energy utility, with a 6,000-square-mile service territory stretching across 11 counties, Puget Sound Energy (PSE) serves more than 1 million electric customers and 737,000 natural gas customers, primarily in the Puget Sound region of Western Washington. PSE meets the energy needs of its growing customer base through incremental, cost-effective energy conservation, low-cost procurement of sustainable energy resources, and far-sighted investment in the energy-delivery infrastructure. For more information, visit PSE.com.

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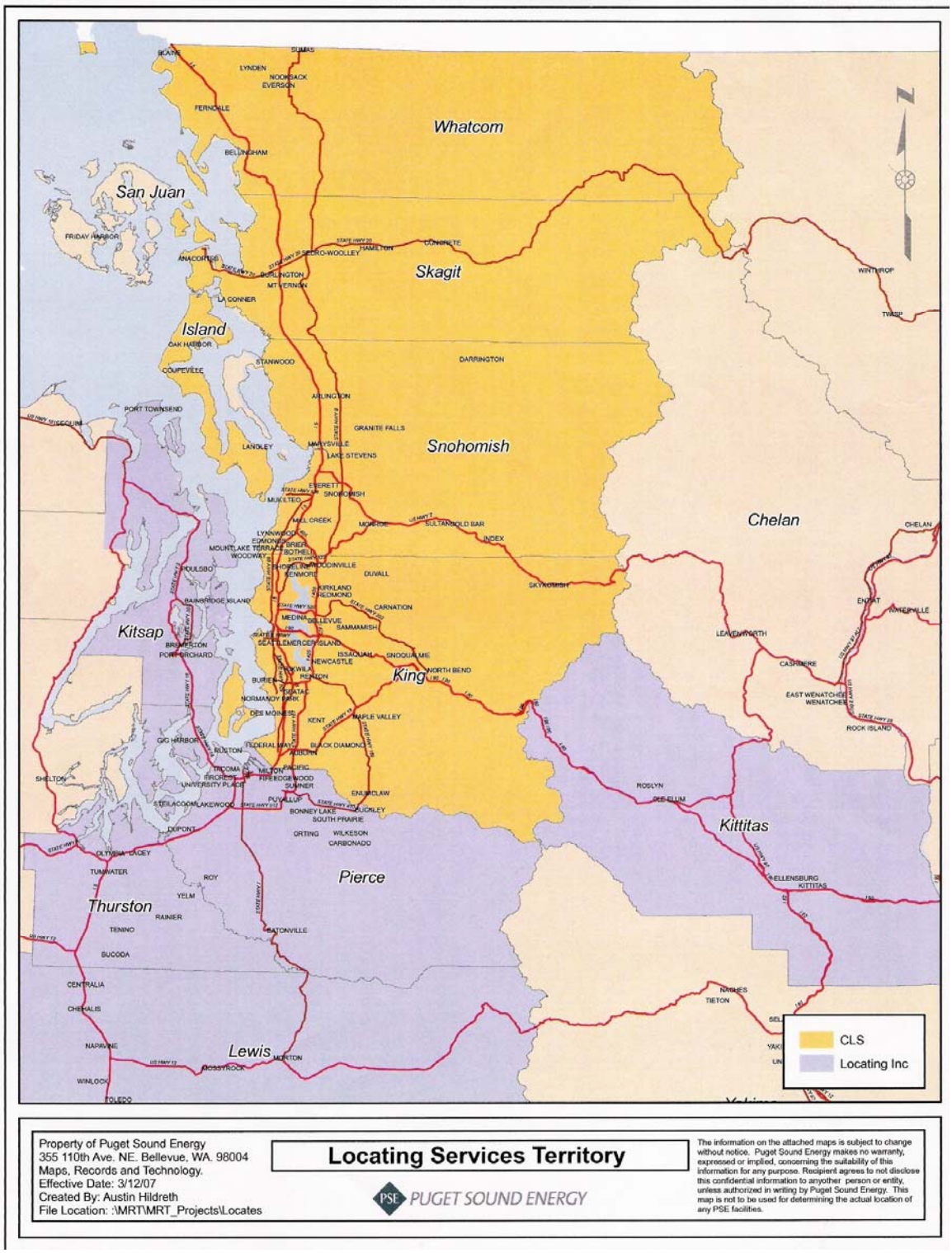
Appendix 2


Whatcom
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Chelan
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King
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Pierce
Thurston
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CLS
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Property of Puget Sound Energy
355 110th Ave. NE. Bellevue, WA. 98004
Maps, Records and Technology.
Effective Date: 3/12/07
Created By: Austin Hildreth
File Location: :\MRT\MRT_Projects\Locates
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