

# **Puget Sound Energy Gas Safety Audit Section 8 - Continuing Surveillance**



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**JACOBS**™ Consultancy

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# Continuing Surveillance

## 8.1 Introduction

### 8.1.1 Background

PSE and the UTC prescribed this section of the safety audit to review whether PSE's practices related to continuing surveillance are effective and result in the company taking the appropriate action when needed. The UTC adopts, by reference, the definition of continuing surveillance which appears in Title 42 of the Code of Federal Regulations (42CFR.192.613):

- (a) Each operator shall have a procedure for continuing surveillance of its facilities to determine and take appropriate action concerning changes in class location, failures, leakage history, corrosion, substantial changes in cathodic protection requirements, and other unusual operating and maintenance conditions.
- (b) If a segment of pipeline is determined to be in unsatisfactory condition but no immediate hazard exists, the operator shall initiate a program to recondition or phase out the segment involved, or, if the segment cannot be reconditioned or phased out, reduce the maximum allowable operating pressure in accordance with §192.619 (a) and (b).

The phrase "other unusual operating and maintenance conditions" indicates a broad-based application of continuing surveillance is appropriate.

#### PSE's Standards and Practices

- We found that there are both narrow and broad interpretations of continuing surveillance at PSE and UTC that may contribute to less than optimal collection and use of data. The broad definition, as expressed by a PSE manager<sup>1</sup>, encompasses anything that is observed related to maintenance needs as defined in an existing maintenance program. The narrow definition is limited to observed issues that fall outside a specific maintenance program, and is encompassed by PSE's Form 3704 dedicated to continuing surveillance, *Reporting Abnormal or Unusual Operating Conditions on Gas Facilities*, also known as the "Blue Card" program.
- A PSE manager stated that PSE believes that the UTC's definition of continuing surveillance covers both the broad and narrow definition of continuing surveillance<sup>2</sup>.
- PSE believes when an audit related to continuing surveillance is conducted by UTC, it is more focused on whether the Blue Cards were used and if the process was working<sup>3</sup>.

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<sup>1</sup> Interview 51

<sup>2</sup> Interview 51

<sup>3</sup> Interview 51

- Our observation of field technicians and performance metrics likewise finds an emphasis on Blue Cards being issued, but not on follow-up of the conditions being reported on the Blue Cards.

PSE's scope for continuing surveillance is set forth in section 2575.2700 of PSE's Operating Standards. PSE's Gas Operating Standards for continuing surveillance appear in Appendix 1 of this report.

## 1. Scope

This Operating Standard establishes the requirements for continuing surveillance of PSE's pipelines through periodic examination of records and through visual examination of facilities during construction, operation, and maintenance activities. Continuing surveillance activities related to pipeline facility failures are specified in Operating Standard 2575.1900.

- We found that this scope definition in terms of types of facilities, specifically relating to pipelines, is more limited than PSE's actual practice. This narrowed definition and the origin of PSE's Continuing Surveillance Operating Standards are linked to pipeline-related construction conditions cited in a 2005 settlement (also discussed later in this report).
- The inclusion of "cradle to grave" activities – construction, operation, and maintenance - is appropriate.

### **The Meaning of Continuing Surveillance for this Study**

Based on our analyses of the actual practices of PSE, the regulatory concerns of the UTC, and the system safety concerns of all parties, we have arrived at the following definition of continued surveillance for this audit:

Continuing surveillance is collection of system knowledge, maintaining and monitoring of records, and acting on that knowledge to ensure system safety.

## **8.1.2 Objective and Scope**

The objective of this task was to conduct a review of PSE's continuing surveillance of natural gas system conditions. This effort focused on the organization's actual approach toward continuing surveillance by reviewing PSE's processes for periodic examination of records and visual examination of facilities through construction, operations, and maintenance activities, as well as its supporting culture and philosophy.

This review not only examined PSE and their SP's records, policies, and procedures, but also the implementation, performance, and values of the people involved. Examination of the use of PSE's "Blue Card" provided only a small part of the overall analysis. It was necessary to examine a large variety of operations and maintenance programs to provide an assessment of the elements of the overall continuing surveillance mission. Our findings are listed under the following headings:

- Current PSE Continuing Surveillance Programs
- Organizational Structure Relating to Continuing Surveillance
- System Maintenance Planning
- System Control and Protection
- Blue Card Procedures
- Emergency Response
- Damage Prevention
- Continuing Surveillance Trends Analyses
- Continued Surveillance Reporting and Compliance

## **8.2 Current PSE Continuing Surveillance Programs**

### **8.2.1 Organizational Structure Relating to Continuing Surveillance**

#### **Continuing Surveillance Program Flow Diagram**

The Continuing Surveillance Program Flow Diagram graphically depicts and identifies six primary elements that guide, or contribute information to, the Continuing Surveillance program at PSE. Referring to Figure 1, Continuing Surveillance Program Flow Diagram, the six elements are:

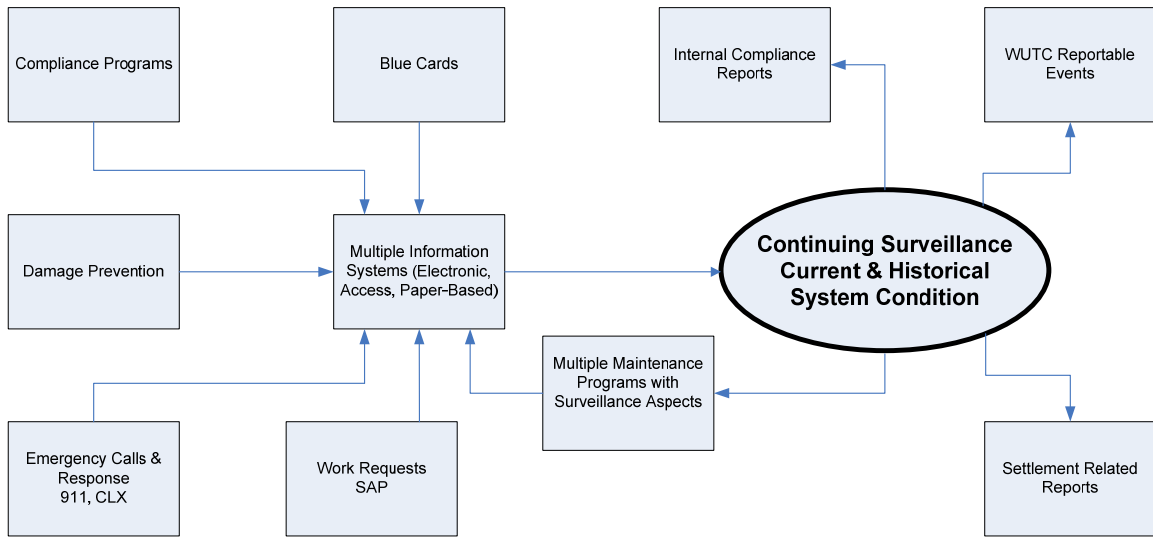
- PSE Blue Card Programs
- Maintenance Programs
- Work Requests
- Emergency Response
- Damage Prevention Programs
- Compliance Programs

In addition, these varied sources of continuing surveillance information contribute to three forms of output reports:

- UTC Reportable Events
- Internal Compliance Audits
- Settlement Related Reports to UTC

These elements of the continuing surveillance process flow at PSE will be discussed in further detail in the report.

**Figure 1 - Continuing Surveillance Program Flow Diagram**



As seen in the following Figure 2 - Organizations with Continuing Surveillance Responsibilities or Uses, given the breadth of continuing surveillance responsibilities and uses, there are multiple organizations with other continuing surveillance responsibilities. This list is not all-inclusive, but contains organizations which we observed and/or interviewed. In many cases, we found that interviews would identify additional organizations with continuing surveillance responsibilities or uses which were also interviewed or observed.



**Figure 2 - Organizations with Continuing Surveillance Responsibilities or Uses**

Organization Name	Reports To	Continuing Surveillance (CS) Responsibilities or Uses
Engineering and Operations Services	Director, Compliance and Safety	Project Management, Oversight
Standards	Director, Compliance and Safety	Design of Operating Standards
Compliance & Regulatory Audits	Director, Compliance and Safety	Oversight of Audits and Compliance Reporting
Quality Assurance and Inspection	Director, Compliance and Safety	Coordinating QA and Compliance issues
Mapping, Records, and Technology	Director, Compliance and Safety	Maintenance of Information
Customer Service Operations & SAP Roadmap	SVP, Customer Service, Information Technology, & CIO	CLX work orders and customer information
Directors of Community Services (North & South)	SVP, Corporate Affairs	Damage prevention
Director, Risk Management	SVP, Corporate Affairs	Third Party Damages
Director, Gas Operations	SVP, Operations	System Control and Protection; Gas system Operations; Corrosion Control; Gas First Response
Director, Customer Construction Services	SVP, Operations	System Improvements
Director, Project Management & Engineering	SVP, Operations	System Condition and Improvements
Director, Contractor Management	SVP, Operations	System Conditions
Director, Purchasing, Materials & Fleet	SVP, Operations	System Materials and Conditions
Manager, System Maintenance Planning	Director, System Planning	Blue Card program, Compliance-Driven Maintenance; System Performance Programs Annual Review
Manager, Performance Measurement	Director, System Planning	Use of CS Data, Trend Analysis

- As shown in Appendix 2, PSE Operations Organization Chart, there are a multitude of organizational units within PSE, potentially posing hierarchical barriers to communication. Although there is evidence of improved communication in terms of inter-organizational committees and working groups, this report later cites communication problems between organizations, especially to field personnel and their supervisors.
- While recognizing the roles that so many organizations play in continuing surveillance, two groups, System Planning (primarily System Maintenance Planning) and Gas Operations (primarily System Control and Protection, and Gas First Response), emerged as major users of and contributors to continuing surveillance within PSE.
- We asked PSE to provide a list of all maintenance programs and the organizations responsible for carrying them out<sup>4</sup>. In response, PSE provided a list of 128 maintenance line items, each one characterized by one of the following three designations:

<sup>4</sup> Document request 26

**Group 1** -- Routine inspection and maintenance performed by Gas Operations, Heath, and Pilchuck. This work is required per State and Federal Code and/or PSE Gas Operating Standards. Examples include: leak survey, cathodic protection system maintenance, and valve locates and operation activities.

**Group 2** -- Work budgeted and planned for by System Maintenance Planning, part of System Planning department, typically in the form of formal compliance programs and commitments to the UTC. This work may be performed by Gas Operations, Pilchuck, or other third-party contractors. Examples include: Wrapped Steel Service Assessment Program, Isolated Facilities, and Integrity Management.

**Group 3** -- Specific O&M budgets driven by System Maintenance Planning. Includes O&M projects related to bridge and slide locations, regulator stations, and valves. These projects keep PSE on cycle with maintenance issues reported by field personnel and eliminate safety concerns and compliance risks.

- Each of the 128 line items was referenced to PSE's operating standards or UTC/Federal regulations; however, although eleven were classified as Continuing or Continual Surveillance, none specifically referenced continuing surveillance operating standards or UTC code.
- There are organizations within PSE having responsibilities in continuing surveillance reporting to at least five different senior vice presidents or directors.

## 8.2.2 Role of System Maintenance Planning

The role of System Maintenance Planning is laid out in PSE's operating standards for continuing surveillance:

### 5. Records Review

5.1 The *Manager Total Energy System Planning* shall be responsible for:

- 5.1.1 Reviewing completed work orders (including leak repairs, maintenance, and other work), patrol records, leakage survey records, leakage history, and inspection records for abnormal or unusual operating and maintenance conditions on unprotected steel and polyethylene pipelines.
- 5.1.2 Determining the general status of pipeline facilities based on the above review and generating replacement work orders.
- 5.1.3 Reviewing unsafe, unsatisfactory, and nonstandard conditions to identify trends and to determine the appropriate follow-up to address those trends, such as suggesting revisions to maintenance requirements, Operating Standards, or Field Procedures.

We have found that the titles *Manager, System Maintenance Planning* and *Manager, Total Energy System Planning* are used interchangeably.

### **8.2.2.1 Blue Card Program**

PSE's Blue Card was established in mid-2005 as a result of an UTC audit of new construction facilities in the areas Puyallup, Auburn, and Lacey, Washington. The Commission staff issued a Non-Compliance Report alleging several violations of its statutes and rules regarding the installation, construction and inspection of polyethylene pipelines by PSE. As a result, PSE agreed to amend its gas operating standards manual to include standards for continuing surveillance.

- In practice, PSE has told us the Blue Card was designed to capture any conditions outside the normal standards in effect<sup>5</sup>, and there was a massive education program within PSE when the Blue Card was first introduced.

The Blue Card Form is located in Appendix 1.

- It is intended that the Blue Card be filled out by field personnel as conditions are noticed. Therefore, the form has a space for listing the inspection program engaged in at time of discovery.
- Only specific conditions are listed in the checklist. There is no "other" category to be checked. Most of the items are related to pipeline installation, and would not be likely to be seen unless the pipe is uncovered by other actions. This is likely due to the original adoption of continuing surveillance after the UTC found violations regarding PE pipe installation resulting in the 2005 settlement agreement.

Results obtained through the Blue Card program can generally be summarized as follows<sup>6</sup>:

- According to System Maintenance Planning, of the approximate 8,000 Blue Cards submitted since the program began, about 1% was forwarded to a specific program.
- About 10% of the remaining Blue Cards were low priority.
- Approximately 1% was safety related.
- Many of the low-priority categories were reporting nonstandard conditions, which is understandable due to changes in standards.

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<sup>5</sup> Interview 51

<sup>6</sup> Interview 51

We instituted a follow-up document request to further assess the performance of the Blue Card program each year, in regard to the total number received the quantity and status of those noting conditions that needed remediation, and how many were referred to existing programs<sup>7</sup>.

PSE responded with information shown in Figure 3 - Blue Card Deployment.

**Figure 3 - Blue Card Deployment<sup>8</sup>**

Year	Blue Cards	Quantity Remediated	Part of Existing Program	Pending Remediation
2005	1418	103	0	--
2006	2609	26	0	--
2007	1733	44	0	--
2008	2465	115	27	--
2009	650	4	1	1362
Total	8875	292	28	1362

- PSE notes that the year a Blue Card report was re-mediated, does not necessarily correspond to the year it was reported. For example, in 2009 PSE is expecting to remediate approximately 1200 buried meters/risers, some of which date back to the beginning of the program in 2005.

In the same document request we asked PSE to report on the status of Blue Cards that reported unsafe conditions needing immediate attention.

- PSE responded that employees are trained to act so unsafe conditions are observed are addressed immediately, handled by Gas First Response (GFR) and sometimes Pilchuck, depending on the type of remediation required. A Blue Card is normally not created in these instances. The work is managed in SAP and/or CLX (the data base for customer calls), but there are no formal records kept in terms of how many are completed in a given year. The records in SAP or CLX are not unique and there is not a robust way to query the information. Therefore, the numbers in the above figure do not include immediately addressed unsafe conditions.
- In addition, PSE employs a Safety-Related Condition Report form. PSE states that the two forms are very different because the Safety-Related Condition Report form is code and incident-driven, whereas the Blue Card is viewed as recording unsatisfactory conditions not part of an existing program.

<sup>7</sup> Document Request 86

<sup>8</sup> Document Request 86

- After the Blue Card is submitted, the Senior Engineering Specialist reviews it to determine if it is an unsafe condition that needs to be reported immediately before entering it into SAP. The Blue Card review is used to help with trending and determining if it is a nonstandard condition or requires additional attention. Then a notification with the scope, schedule, and budget is created to send to the SP or GFR. The Senior Engineering Specialist tracks the completion of the work.
- Further review of the data in Figure 3 indicates out of 8875 cards submitted, 292 or 3.3% have been re-mediated and 1362 or 15.3% are pending remediation. Only 18.6 % of the cards are deemed requiring any action.
- The low percentage of remedied conditions noted on Blue Cards is reflected in employee frustrations voiced to us during field inspections. Employees report that work they submitted on Blue Cards is rarely performed, and there is no usable method for them to track the progress of individual Blue Cards they have submitted.
- One PSE supervisor claims to upgrade the condition on submitted Blue Cards from unsatisfactory to unsafe in order to better assure the requested work gets completed<sup>9</sup>.
- We find little reference to continuing surveillance in PSE's Field Performance Standards, where it could be expected to find requirements for filling out Blue Cards or other data records if unsatisfactory conditions are encountered. Continuing surveillance is mentioned in only two areas, both involving meters. There are many other references to other forms of recordkeeping while performing construction, maintenance, and inspection tasks.

Further analysis of the ways in which Blue Cards are processed is presented in Section 8.2.4 - Coordination between System Maintenance Planning and System Control and Protection.

### **8.2.2.2 Other System Maintenance Planning Programs Involving Continuing Surveillance**

In our interview with the System Maintenance Planning group<sup>10</sup>, we asked which programs fall into the broad definition category of continuing surveillance. The response received in document request 75 stated that the broad definition of continuing surveillance includes ongoing inspections and patrols that require mitigation and remediation. These include:

- Bridge and Slide Remediation
- Leakage Action
- Valve Remediation
- Inside Meter Set Remediation

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<sup>9</sup> Interview 57

<sup>10</sup> Interview 51

- Un-maintainable District Regulator Remediation
- Un-maintainable MSA Remediation
- Mobile Home Community Remediation
- Sidewalk Regulator Remediation

Upon further inquiry, the distinction between System Maintenance Planning's Maintenance Programs and those performed by System Control and Protection were further clarified:

- System Maintenance Planning's programs are dictated by "outside" forces such as UTC settlements and system growth. Referring to the three groups of project types discussed in Section 8.2.1 – Organizational Structure, these are in Group 2.
- System Maintenance Planning also sets the budgets for Group 3 projects, which keep PSE on cycle with maintenance issues reported by field personnel and eliminate safety concerns and compliance risks. The Group 1 projects, which System Maintenance Planning refers to as routine maintenance, are more directly controlled by System Control and Protection.

### **8.2.3 Role of System Control and Protection**

Maintenance programs under System Control and Protection fall under the SVP of Operations and include ongoing maintenance programs with yearly quotas and continuing surveillance aspects. These programs may be considered routine and fall under PSE's Group 1 category as discussed in Section 8.2.1 – Organizational Structure Relating to Continuing Surveillance. As such, they comprise the heart of system maintenance for the Utility. The value of these maintenance programs to continuing surveillance is unmistakable. In performing routine maintenance, if accessible records are kept, the Utility would contribute to knowledge of its system components' current conditions, performance trends and issues, and expected service life.

- Of the 128 separate maintenance programs reported by PSE in data response 26 (see Appendix 4), approximately 2/3 of the programs are listed as being in Group 1.

In order to analyze this large group of programs, we have focused on several which encompass the majority of aspects related to continuing surveillance, as identified by our interviews and field observations at PSE. These major program groupings include:

- Leak Management
  - Outside Meter Inspection
  - Valve Inspection
  - Pipeline Markers
  - Atmospheric Corrosion
  - Corrosion Prevention
  - Bridge and Slide
  - Mobile Home Encroachment
  - Un-metered Risers
  - Hard-to- Reach Locations
- This work is performed by PSE's employees located in Field Operations Centers and service providers (SPs) such as Pilchuck and Heath.
  - Coordination of work with the SPs is provided primarily by PSE staff located at Field Operations Centers, including South King and Georgetown.
  - When conditions are seen within the program that require remediation, work requests, not Blue Cards, are generated.

### **8.2.3.1 Leak Management**

Leak detection and repair is of prime concern to the UTC and PSE in protecting public safety. There are a number of ways in which a robust Continuing Surveillance program could contribute to the prevention of leaks: providing data regarding trend stemming from equipment manufacture, installation, maintenance, and operation. In addition, the settlement agreement leading to this audit includes findings of abnormalities in the records regarding leak repairs. The UTC had an issue with leak work order irregularities, including numbers not following the sequential work order date for gas leak rechecks. This matter will be discussed in greater detail on the Auditability of Records Section of this report. We also interviewed PSE's Program Coordinator of the Leak Survey Program<sup>11</sup>, who is responsible for coordinating the leak survey program as well as managing the Leak Management System (LMS) database, regarding continuing surveillance aspects of the leak management program.

- PSE has a contract with Heath Consultants to survey PSE's system (excluding inside meter sets, which are checked by PSE employees) and report leaks. Leaks found by Heath are submitted to PSE on a weekly basis using their leak drawing form (F001 form). The Heath form is tied to a house or street number and also includes the designated leak grade. The sequence number for this form is noted using the Heath employee initials and number of leaks found that year. Once PSE enters the leak into LMS, a sequential leak work order is created and a hardcopy is sent to service provider,

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<sup>11</sup> Interview 59

Pilchuck, to perform the leak repair. The Pilchuck office maintains a “leak folder” with all the paperwork pertaining to the leak repair. There are approximately 3500 leak repair requests per year.

- According to PSE’s Gas Operating Standards, Section 2625.1300, leak grades are defined as follows:

Grade A - Leaks that represent an existing or probable hazard to persons or property and require immediate repair or continuous action until the conditions are no longer hazardous.

Grade B - A leak recognized as being non-hazardous at the time of detection, but justifies scheduled repair based on probable future hazard.

Grade C - A leak that is non-hazardous at the time of detection and can reasonably be expected to remain non-hazardous.

- Leak repair requests are also generated by Gas First Response (GFR) personnel, who notify gas dispatch to create a leak ticket for A or B leaks in LMS. For C leaks, the GFR completes paperwork to turn into the Operations Clerk, who creates a leak work order in LMS and mails a hard copy to Pilchuck.
- Leaks can also be reported by other PSE employees, service providers’ employees, the fire department, and customers by calling the Access Center located in Bothell. The Access Center generates a service order in the customer information system (CLX), which gets picked up by Gas Dispatch and the PCAD system sends the request to GFR. Odor calls for above ground facilities are entered in CLX. A confirmation is required before it is entered into LMS.
- When the list of leak surveys to be completed is issued, the list of active leaks is also provided so those leaks can be re-evaluated during normal leak surveys. This is an excellent example of the immediate use of continuing surveillance information.
- The paperwork for B leaks is turned in on a weekly basis and C leaks are turned in after a plat map is completed. The list of active leaks in an Access database is printed six weeks before the leak survey is due. This is a parallel process where Pilchuck may be at the site to do a leak recheck if it is within three weeks of the due date, but at the same time Heath could be rechecking the site as part of their annual survey. Thus the leak work order numbers and dates may be out of sequence. This issue has been resolved by programming LMS to no longer accept dates out of sequence. Pilchuck will modify the sequence number if the date is out of sequence.
- PSE stated that data entry into LMS can be an issue occasionally, but the situation is monitored and employees usually call in to report necessary corrections. The Program Coordinator also runs reports to check on a monthly basis for possible errors in the LMS.
- Every five years a self-audit of the leak management system program is conducted. The PSE QC group conducts spot checks as well. When the Commission conducts an audit,



they request a list of specific work orders that the UTC Auditor will review in detail, and are provided the information accordingly.

A review of continuing surveillance reporting measures and trends analyses, including leak management, appear in Section 8.3 of this report.

### **8.2.3.2 Outside Meter Inspection**

- The Leak Survey Contractor, Heath, also performs leak surveys and atmospheric corrosion inspections for outside meters on a three-year cycle.
- Service provider, Pilchuck, conducts the service valve inspections that are required annually, not to exceed 15 months. These work orders are electronically generated yearly and Pilchuck prints their own work order from the SAP system<sup>12</sup>.

### **8.2.3.3 Valve Inspection**

- The Pierce County Audit last year included an audit of valve records. The audit revealed there were a large number of valves past their due dates and that Pilchuck was not performing the inspections on time, due to lost paperwork and a lag in data entry<sup>13</sup>.
- PSE claims it is difficult for PSE to monitor the timeliness of the inspections or determine if they are in the stack of completed inspections not entered into the database, because these inspections are managed by Pilchuck. To improve this process, service valve inspections have now been added to the monthly compliance report<sup>14</sup>.
- The valves of facilities of evacuation concern, such as churches, hospitals, and schools, are inspected by Pilchuck, annually.
- There is no program for service valve box inspections, but emergency section valves are inspected by GFR and the Public Inspectors (PIs).
- The paperwork for these inspections is done by the Operations Clerk. A major issue is that the information is entered in an Access database. We found there are several separately-maintained Access databases in use throughout PSE's maintenance programs<sup>15</sup>. PSE states they have requested the valve inspection database be moved to SAP, but they have not received approval, allegedly due to higher pressing needs stemming from the merger taking priority.

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<sup>12</sup> Interview 59

<sup>13</sup> Interview 59

<sup>14</sup> Interview 59

<sup>15</sup> Interview 47

#### **8.2.3.4 Bridge and Slide Inspection**

- During these inspections of pipeline facilities located under bridges and in slide-prone areas, the inspectors also inspect for atmospheric corrosion and pipeline markers at bridges.
- Hard to reach locations on bridge crossings are coordinated with the SP. The paper work is sent back to the Maintenance Programs Department to enter into SAP. This program is in SAP and conducted by GFR or PI inspectors quarterly<sup>16</sup>.
- Any required work orders are issued to System Maintenance Planning. The communication between System Control and Protection, and System Maintenance Planning for this and other maintenance programs is discussed further in Section 8.2.4 - Coordination between System Maintenance Planning and System Control and Protection.
- For items that are in SAP, every Monday the System Control and Protection staff receives an email with a list of work that is due, as generated by the Business Warehouse application of the SAP program. Business Warehouse also generates the monthly compliance reports.

#### **8.2.3.5 Pipeline Markers**

- The Pipeline Marker Program, started in 2003, consists of installing pipeline markers in required locations and is carried out primarily by Heath Consultants. Heath uses GPS to log the locations and the data is entered in an Access database. Pathfinder is the Global Positioning System (GPS) software used to download pipeline marker locations to the computer.
- An inspection is required every 5 years. In 2005, Pierce County was patrolled and the remaining counties were patrolled in 2008. In 2007, Heath installed the pipeline markers at railroad crossings. In 2009, Pierce County will be patrolled again. The new state rule in 2007 added the requirement that state route crossings would also need markers. The pipeline markers are also entered into the plat maps<sup>17</sup>.

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<sup>16</sup> Interview 59

<sup>17</sup> Interview 59

### 8.2.3.6 Mobile Home Park Inspection

- The Mobile Home Park Patrol Program is based on a PSE standard to look for encroachment in mobile home parks. Older mobile home parks had mains run along trailers and now with growth in home size, more mobile homes are encroaching over mains. If a new encroachment is found, it is sent to System Maintenance Planning which tracks them and can request for the main to be relocated.
- Existing encroachments are to be re-mediated within five 5 years. The patrols are on a 3-year cycle and are also included in compliance reporting since the data is stored in SAP. The patrols are performed by a PI or fitter and maps are updated as needed. PSE cannot force the mobile home to move but will either move the main or cut and cap the main and not add new services.

### 8.2.3.7 Atmospheric Corrosion

- Atmospheric corrosion inspections are coordinated by System Control and Protection's Maintenance Programs, but is performed by Heath. The data, including the level of corrosion, is entered into the Meter Data Warehouse (MDW) by System Control and Protection. This is still a paper-driven process. MDW stores meter information for AMR, atmospheric corrosion data, and isolated facilities data. The system is linked to the customer information in CLX<sup>18</sup>.

### 8.2.3.8 Corrosion Control and Pipeline Integrity Management

PSE's Gas Operating Standards for continuing surveillance specify the following responsibilities within this group:

5.2 The *Consulting Engineer, Corrosion Control* shall be responsible for:

- 5.2.1 Reviewing completed work orders (including leak repairs, corrosion control, maintenance, and other work), leakage survey records, leakage history, and inspection records for abnormal or unusual corrosion conditions and on substantial changes in cathodic protection requirements for cathodically protected pipelines.
- 5.2.2 Determining the general trend of corrosion processes and corrosion control mechanisms for pipeline facilities based on the above review and generating remedial work orders, or other follow-up as necessary (such as further engineering analysis or more stringent maintenance criteria).

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<sup>18</sup> Interview 59

- Cathodic protection equipment is monitored by System Control and Protection, which requires remediation within 90 days, but the supervisor reports that the deadline is difficult to meet because of the required permits and paperwork. The supervisor further stated the company often agrees with compliance programs before consulting with the group involved<sup>19</sup>. The applicable code (WAC 480-93-110(2) states:

“An additional 30 days may be allowed for remedial action if due to circumstances beyond the gas pipeline company's control the company cannot complete remedial action within ninety days. Each gas pipeline company must be able to provide documentation to the commission indicating that remedial action was started in a timely manner and that all efforts were made to complete remedial action within 90 days. (Examples of circumstances allowing each gas pipeline company to exceed the 90-day time frame include right of way permitting issues, availability of repair materials, or unusually long investigation or repair requirements.”

On December 17, 2003, the USDOT adopted the final rule on Pipeline Integrity Management in High Consequence Areas (HCA) for Gas Transmission Pipelines (49 CFR 192).

- PSE has approximately 30 miles of transmission main in its system. In its Integrity Management Program to assess and manage the condition of its entire transmission main, PSE has trained field staff to perform External Corrosion Direct Assessments (ECDA), as the primary method used to assess the condition of the transmission main. According to PSE's 2008 System Performance Programs Annual Review (Annual Review) prepared by System Maintenance Planning, the required assessment was accomplished by the December 17, 2004 deadline.

The following description of the Integrity Management Program is provided in the 2008 Annual Review:

- Based on risk profile data, PSE pipelines were segmented according to the different risk attributes along the pipeline. Each segment was then scored, and a corrosion assessment scheduled starting with the higher risk segments. A baseline schedule was established to inspect all 9.5 miles in HCAs over the subsequent seven years. During this schedule, each HCA is evaluated annually, possibly affecting the inspection schedule.
- Of the 9.5 miles of transmission pipelines in HCAs, in 2004 PSE assessed approximately 0.325 miles of the 20 inch South Seattle transmission line, 1.60 miles on the Lynnwood transmission lines in 2005, 3.1 miles of the North Midway transmission lines in 2006, and 3.04 miles of the South Seattle and North Midway transmission lines in 2007. ECDA was used and confirmed that the pipelines were in good condition. In

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<sup>19</sup> Interview 59

2008, PSE will assess approximately 3.27 miles of the South Seattle and North Midway transmission lines.

- PSE will continue to actively manage the Integrity Management Program. Not only is it subject to periodic reporting to the DOT and regular audits by the UTC, but continual improvements are also a DOT regulatory requirement. Effective management of the Integrity Management Program will ultimately provide PSE with a Systematic Pipeline Integrity Management process that can be clearly demonstrated to any agency or the public. Additionally, the concepts developed used by the Integrity Management Program are being applied to other areas of the gas system, such as the Wrapped Steel Service Assessment Program and the development of PSE's Distribution Integrity Management Program.

#### **8.2.3.9 Hard-to-Reach Location Program**

- The PSE's system has approximately 14,000 Hard-to-Reach Location Program (H2RL) locations, including inside and rooftop meters and services that go through a building, but the meter is located outside. The H2RL survey encompasses four types of inspections: leakage, atmospheric corrosion, service valve, and pipeline marker inspection for above ground exposed facilities. The pipeline marker component is based on 2007 Washington Administrative Code requiring PSE to mark all exposed surfaces with a decal by the end of the 2009<sup>20</sup>.
- Each year, work tickets are issued by location, typically a ticket for each meter. A sheet with the number of surveys needed on each street is provided and during the visit, all four inspections are performed. Once the inspection is done by GFR, the paperwork is turned into an operations clerk, who enters the data into the database. The database has locations in it, but as field surveys are conducted, locations are added to the list.
- The three-year isolated facilities project also helped identify more hard to reach locations. In addition, Heath, the contractor that performs the atmospheric corrosion inspections, will add additional sites. Information is also taken from CLX regarding the locations of usage points. As meters get removed, they get marked as inactive.
- A System Control and Protection Supervisor reported that based on the data, they cannot query what type of work was done in a particular location. If there was a leak repair, it is tracked in LMS and not tied to the H2RL Database<sup>21</sup>.

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<sup>20</sup> Interview 59

<sup>21</sup> Interview 59

We also interviewed four customer field representatives (CFRs) from the Gas First Response group regarding their work in the H2RL Program<sup>22</sup>. We found that many continuing surveillance-related functions are performed by these employees.

- The GFR team performs all call-backs, leak investigations, atmospheric corrosion checks of meters and risers, minor repairs to appliances, turn-ons, light-ups, and meter removals. This particular group does surveys of hard-to-reach meters, which is inside work including lines and regulators. They also check outlet spuds and the first downstream fitting.
- The rest of the equipment is customer-owned fuel line, but that is also checked when performing a gas odor call. Once they are inside they do a visual test and leak monitor with a Combustible Gas Monitor (CGM). If leaks are found with the CGM, they do a soap test and fix the leak as needed. They operate suspected appliances and check for valve problems. The inspections are all recorded on a paper check sheet. There is also a procedure for dealing with fuel line leaks based on the leak level.
- The group also checks regulator vaults, if they are less than 4 feet deep.
- Some meter checks are done by appointment, especially when advance access permission is needed, as in apartment buildings. Co-op building work can be challenging because there may be one shut-off for the entire building. After three documented attempts to access a building, there is a three-stage letter process, each with two to three weeks of allowed response time, leading up to possible disconnection if no response is received. Out of 8,000 sites, only one or two have resulted in shutoff from this process.
- Electronic technology is utilized for certain work assignment and completion. Crews have been using laptop computers for the last two years, and believe that they have been a great help. They like the reduction in paperwork and the GPS features which allow them to do their own routing, also helping out dispatch problems. This technology is an example of another reason for compiling continuing surveillance-related information into one GPS-based system, as it begins with collecting basic and essential maintenance and survey-related information about the gas system.
- H2RL facilities are kept in a maintenance program database, and must be inspected each year. The H2RL assignments come in by zip code. There were approximately 9,000 last year for Seattle. One employee can complete approximately four H2RL inspections per day. Standards have changed so that new meters must be installed outside, and PSE tries to use every opportunity to get them relocated, so this program will eventually end through newer installations.
- The integration of electronic information is not carried throughout the process. H2RL Inspections are recorded on a paper-check sheet. These forms are turned into a bin at

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<sup>22</sup> Interview 58

the Operations Center, and then entered into XL by the Supervisor of Maintenance's Employees.

- The GFR group believes that public safety is the highest priority at PSE, citing strict adherence to evacuation and fire department notification guidelines. Evacuation meetings are held 2 or 3 times a year, and public and system safety topics are part of the monthly meetings. However, it was noted some areas need improvement to increase public and system safety. The group expressed amazement at the number of missed locates. This report examines damage prevention and locating service performance trends in Sections 8.2.6 – Damage Prevention; and Section 8.3 - Continuing Surveillance Trends Analyses.
- One area of concern expressed to us by the GFR group is the belief PSE has not been spending enough on “remediation” – meaning tasks such as relocation of meters with unsafe conditions and/or difficult access to shut-offs; or relocating hidden service lines in buildings<sup>23</sup>.
- The GFR group stated such conditions have been noted by the group on work request forms, not Blue Cards. They estimated each of them fill out several work request forms each day.
- Although the GFR group might think the conditions reported are “unsafe”, they believe PSE tends to classify these as less-urgent “unsatisfactory” conditions, and has allegedly told them Pilchuck is not able to keep up with this workload.
- In actuality, work requests referred to Pilchuck are completed at a higher rate than those assigned to within PSE (Figures 4 and 5 below).

This seemingly inconsistent application of work request forms caused us to issue a document request regarding work requests generated by Customer Service representatives in the GFR group<sup>24</sup>. Our interests were in regard to the quantity of work requests submitted, the number of unsafe conditions observed in the work request, the ultimate categorization by PSE supervisors of the conditions noted in the work requests, and the length of time required completing the work according to the ultimate designation of the type of work.

The response to this request was addressed by the System Maintenance Planning group and is discussed in the following section, Coordination between System Maintenance Planning and System Control and Protection.

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<sup>23</sup> Interview 58

<sup>24</sup> Document Request 95

- The GFR group we interviewed were vaguely familiar with the Blue Cards, but stated they only occasionally fill them out, believing the job checklists they routinely fill replace the function of the Blue Card. They believe some items such as guard posts damaged or in need of repair fall outside their normal duties and could result in their filling out a Blue Card. They do not know if some of the work they are assigned is the result of Blue Cards submitted by others, nor what happens to those Blue Cards which they occasionally submit. They speculated some fill-in work they perform, such as painting meters, might have been generated by Blue Cards submitted by others.
- The unfamiliarity with Blue Cards does not appear to be universal throughout the Operations Center. One manager stated his employees turn in Blue Cards daily, and the cards have been a very useful tool for ensuring proper maintenance and correction of unsafe conditions, and work resulting from the Blue Cards is added to the mobile work assignment system<sup>25</sup>.
- This manager also believes that employee concerns regarding poor response to unsafe conditions noted in work requests is due to inconsistent write-ups of the conditions. On the contrary, if work is not completed for unsatisfactory conditions, the manager will upgrade the rating to unsafe.
- He has tracked every work request and notification to the SP, and will follow-up his requests with the SP and contract management. In the vast majority of cases, he has found unperformed work is due to situations he believes are beyond the control of the SP, such as poor response from property owners or public agencies.

This seemingly inconsistent application of Blue Card ratings caused us to issue a further document request, to ascertain if there is inconsistent use of Blue Cards by field operations locations in both the number submitted, and the manipulation of reported conditions in order to ensure timely remediation<sup>26</sup>. We were also interested in how often unsafe conditions were being downgraded to unsatisfactory conditions.

The response to this request was addressed by the System Maintenance Planning group and is discussed in the following section, 8.2.4 - Coordination between System Maintenance Planning and System Control and Protection.

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<sup>25</sup> Interview 57

<sup>26</sup> Document Request 96



## 8.2.4 Coordination between System Maintenance Planning and System Control and Protection

Because some of the routine maintenance programs are budgeted or planned by System Maintenance Planning, and the fact that System Maintenance Planning in general would benefit from continuing surveillance information gathered by routine maintenance programs in System Control and Protection, we investigated coordination between the two groups.

### 8.2.4.1 Work Requests

- System Maintenance Planning responded to our document request regarding the ratings and disposition of work requests submitted by Gas First Response (GFR),<sup>27</sup> that work requests are not categorized as unsafe or unsatisfactory and, therefore, they could not provide statistics based on those criteria. However, System Maintenance Planning states it has been working over the past 15 months to develop and implement new processes and tools for documenting, tracking, and communicating the status of non-Blue Card work requests.
- System Maintenance Planning did, however, provide statistics on the disposition of the work requests (Figures 4 and 5). The manner in which the work is tracked is dependent upon the organization that ultimately performs the work. For example, work requests requiring routine maintenance are either processed by GFR or addressed by a combination of Gas Operations personnel and Pilchuck, but work requests requiring complex, costly remediation are categorized under an existing maintenance program and forwarded on to System Maintenance Planning for scoping, budgeting, and prioritization. Work requests to Pilchuck were not reported in the data shown in Figure 4<sup>28</sup>.

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<sup>27</sup> Document Request 95

<sup>28</sup> Document Request 95

**Figure 4 - Disposition of Work Requests to Other than Pilchuck**

Operating Base	Requests Submitted in 2008	2008 Requests Completed	2008 Requests Pending Construction in 2009	2008 Requests Planned for Future Years
Georgetown	84	5	48	31
Everett	64	3	59	2
Tacoma	27	0	20	7
Olympia	169	12	1	156
Factoria	22	2	3	17
Kittitas	2	0	0	2
South King	272	1	126	145
<b>TOTAL</b>	<b>640</b>	<b>23</b>	<b>257</b>	<b>360</b>

- Out of 640 work requests submitted in 2008, 23 work requests were completed in 2008.
- System Maintenance Planning reports work requests from GFR primarily apply to three different programs: Mobile Home Community patrols, H2RL (Inside Meter Set Survey), and Bridge and Slide patrols. System Maintenance Planning offered the following information in regard to the processing and communication stemming from work requests<sup>29</sup>:
  - Reviews the request and follows up with individual who made the request if more information is needed.
  - Logs the request into appropriate tracking spreadsheet or database.
  - Develops scope, schedule, budget, and SAP notification required to remediate the maintenance issue(s). This is typically done through discussions and meetings with multiple groups at PSE and its service providers. These groups typically include Gas System Engineering, CFS/GFR representative who submitted the request, and Pilchuck.
  - Communicates project details back to stakeholders including individual who submitted request.
  - Periodically updates System Maintenance Planning website for projects currently in construction or for those set to go to construction in the next budget year. The intent of this step is to ensure Gas Operations personnel can see the current status of any active projects. Training on how to find project specific information was provided to GFR in 2008.
  - Communicates back to stakeholders when project is complete.

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<sup>29</sup> Document Request 95

- PSE reports that many work requests originate from the Mobile Home Community patrols, with each riser counting as a different work request. When efforts are underway to remediate work identified by this program, a large number of work requests will be completed<sup>30</sup>.
- Figure 5 - Disposition of Work Requests to Pilchuck<sup>31</sup> depicts the disposition of work requests, submitted by operating bases in 2008, directly to Pilchuck. PSE notes that these are requests from the H2RL Program. It is evident that work requests assigned to Pilchuck are being performed at a faster rate than work requests assigned within PSE.

**Figure 5 - Disposition of Work Requests to Pilchuck**

Operating Base	Requests Submitted in 2008	2008 Requests Completed	2008 Requests Pending Construction in 2009
Georgetown	76	42	34
Everett	5	1	4
Tacoma	33	17	16
Olympia	6	6	0
Factoria	20	9	11
South King	8	3	5
<b>TOTAL</b>	<b>148</b>	<b>78</b>	<b>70</b>

- PSE notes these work requests are in regard to conditions requiring generally routine remediation. Pilchuck receives a scope of work and they perform the work as soon as they can get to it. PSE states the work that comes into System Planning is much more diverse in scope and priority and is weighed against all the other maintenance requests received<sup>32</sup>.
- Both PSE and Pilchuck have constraints to work planning such as economic dispatch, workforce usage, and to varying degrees, budget constraints.

<sup>30</sup> PSE Comments dated May 9, 2009 on Draft report

<sup>31</sup> Document Request 95

<sup>32</sup> PSE Comments dated May 9, 2009 on Draft report

#### 8.2.4.2 Blue Cards

- In response to our document request regarding the ratings and disposition of Blue Cards submitted by GFR,<sup>33</sup> System Maintenance Planning responded that there is not an effective way to filter Blue Cards submitted by GFR, but they did provide data for all Blue Cards submitted in 2008.
- Also, they are unable to provide information on the ultimate rating of the system condition noted on the Blue Card, stating when an unsafe condition is downgraded to unsatisfactory by the field supervisor, that information is not communicated to System Maintenance Planning on the submitted Blue Card, so there are no statistics available on quantity or average days to complete this work.
- Several GFR supervisors told us they are rarely in the field with their crews, with the exception of during emergency response<sup>34</sup>.

Figure 6<sup>35</sup> depicts the disposition of Blue Cards noting “Unsatisfactory” or “Non-Standard” Conditions in 2008, as reported by PSE. PSE notes that the vast majority of Blue Card requests being re-mediated in 2009 are not from 2008, but from prior years. Remediation is prioritized based on the type of maintenance issue, safety and compliance risks, resource constraints, and budget availability.

**Figure 6 - Disposition of Blue Cards Noting "Unsatisfactory" Or "Non-Standard" Conditions, 2008**

Nearest Operating Base	Blue Cards Submitted in 2008	2008 Blue Cards Completed	2008 Blue Cards Pending Construction in 2009	2008 Blue Cards Planned for Potential Remediation in Future Years
Georgetown	598	0	4	594
Everett	157	0	0	157
Tacoma	601	0	11	590
Olympia	138	0	0	138
Factoria	278	0	1	277
Kittitas	27	0	0	27
South King	240	0	3	237
<b>TOTAL</b>	<b>2039</b>	<b>0</b>	<b>19</b>	<b>2020</b>

<sup>33</sup> Document Request 96

<sup>34</sup> Interview 57

<sup>35</sup> Document Request 96

- As in the case of work requests, it is evident that the vast majority of Blue Cards submitted are placed into backlog.

According to PSE’s Gas Operating Standards, the System Maintenance Planning has the following responsibilities:

7.9 The *Manager Total Energy System Planning* shall maintain the completed Reporting Abnormal or Unusual Operating Conditions on Gas Facilities form (Form 3704), also known as the Blue Card, until the condition is remediated.

7.9.1 If a suspected unsafe, unsatisfactory, or nonstandard condition is reevaluated and reclassified, the reason for reclassification shall be recorded on the Reporting Abnormal or Unusual Operating Conditions on Gas Facilities (Form 3704).

7.9.2 A copy of the form indicating the reason for reclassification shall be distributed to the person who reported the condition, the manager of the person reporting the condition, and the *Manager Standards*.

- PSE reports that this operating standard is generally not followed. In practice, reclassifications of submitted blue cards are typically done by GFR and not communicated to System Planning when the Blue Card is submitted<sup>36</sup>.

Figure 7 depicts the disposition of Blue Cards noting “Suspected Unsafe Conditions” in 2008.

**Figure 7 - Disposition of Blue Cards Noting "Suspected Unsafe Conditions", 2008**

Nearest Operating Base	Blue Cards Submitted in 2008	2008 Blue Cards Completed	2008 Blue Cards Pending Construction in 2009	2008 Blue Cards Planned for Potential Remediation in Future Years
Georgetown	10	3	6	1
Everett	2	1	1	0
Tacoma	13	3	10	0
Olympia	3	1	1	1
Factoria	6	4	1	1
Kittitas	0	0	0	0
South King	4	1	3	0
<b>TOTAL</b>	<b>38</b>	<b>13</b>	<b>22</b>	<b>3</b>

<sup>36</sup> PSE Comments dated May 9, 2009 on Draft report

- Although only 38 of the Blue Cards submitted in 2008 were ultimately determined to fall into the “Suspected Unsafe Conditions” category, as compared to 2039 with lesser condition ratings, it is evident that the vast majority are remedied in the same year, or scheduled for remediation in the following year.
- Some discrepancies with the information submitted by PSE and shown in Figure 3 are apparent when compared to information submitted for Figures 6 and 7. Figure 3 purports to show that in the year 2008, 2,465 Blue Cards were submitted, and 115 Blue Cards were re-mediated. However, when adding together the Blue Cards submitted in 2008 from Figures 6 and 7, 2,077 were submitted, and 13 were re-mediated. The differences in numbers re-mediated may be explained because PSE noted for Figure 3 that the year a Blue Card report was re-mediated does not necessarily correspond to the year it was reported, and the remediation of some is carried over from previous years.

#### **8.2.4.3 Other Coordination**

We asked PSE to provide examples and frequency of the various types of interactions between the System Maintenance Planning, and System Control and Protection’s Maintenance Programs organizations<sup>37</sup>.

- PSE responded that there are numerous opportunities for System Control and Protection’s Maintenance Programs and System Maintenance Planning to interact, offering the following examples of some of the more defined interactions:

#### **O&M Budget Development**

System Control and Protection’s Maintenance Programs (MP) and System Maintenance Planning (SMP) meet in the spring of each year to develop a portion of the next year’s O&M budget for Gas Operations. Over the course of 10-12 weeks, MP and SMP will meet in person up to 3 times and regularly communicate via phone and e-mail. MP is tasked with determining unit counts for the various patrols, surveys, and inspections they manage and delivering that information to SP. SP then compiles unit cost information and works with other stakeholders to develop the overall budget for Gas Operations.

#### **Mobile Home Community Program**

Response to Patrols - MP initiates and tracks three-year patrols for each mobile home park, and GFR performs actual patrol. MP forwards patrol results to SP for follow-up action. There is sufficient data in the inspection report for SMP to plan any remediation activity without further involvement from MP. If there are questions about a particular

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<sup>37</sup> Data Request 87

patrol, SMP will follow up with the individual who performed the patrol (GFR), not MP. Communication between MP and SMP is infrequent, but when it does occur it's via phone or e-mail.

Customer Service Request – MP takes initial requests for new services within mobile home communities. MP reviews patrol records and will process the request if the patrols show no maintenance/safety issues. Otherwise, MP will forward the request on to SMP and SMP will decide whether or not to approve the request. SMP sees about three requests a year and communication with MP is done via e-mail or phone.

### **Bridge and Slide Program**

Response to Patrols - MP initiates and tracks quarterly patrols for each site, GFR performs the actual patrol. MP documents the results of each patrol in SAP. SMP regularly reviews SAP patrol records looking for maintenance/safety issues associated with bridge and slide locations. If MP is made aware of an unsafe condition, e.g., level 4-atmospheric corrosion, they will contact SMP immediately via phone or e-mail. This generally occurs up to five times a year. If there are questions about a particular patrol or the results documented in SAP, SMP will follow-up with the individual who performed the patrol (GFR), not MP.

Adjustments to Patrols – If, through review of site specific data and field observations, SMP feels a new patrol location needs to be created or an existing location should be patrolled more/less aggressively, that information will be communicated to MP, so they can adjust the patrol frequency. This occurs fewer than five times per year and is generally communicated via phone or e-mail.

Leakage Survey/Mitigation Reporting – MP schedules all leak surveys with Heath and reports on various statistics based on survey results. SMP is one of several recipients of this report which is sent out via e-mail monthly. SMP uses the report for certain analysis and reporting functions and may request MP to generate a more detailed report specific to a certain area, vintage, facility type, etc. Depending on the amount and complexity of the effort involved, the request may come in the form of a meeting, phone conversation, or e-mail. This typically occurs four to eight times per year.

Adjustments and Additional Surveys – SMP reviews maintenance data (including leakage information) across the gas distribution system for various facilities. As a way of mitigating certain safety and maintenance risks, SP may decide that an increased leak survey is appropriate either on a permanent or temporary basis. SMP will communicate the details of the leak survey need to MP who will then implement the request by coordinating with Heath. Depending on the level and complexity of effort involved, the request may come in the form of a meeting or phone call. MP will typically report back to

SMP on the results of the survey via e-mail. These sorts of requests occur between four and ten times per year.

During our interviews, System Control and Protection indicated that better coordination is needed with System Maintenance Planning, citing:

- Emergency section valves and odor test locations are in SAP and inspected by GFR, but there is no oversight from System Maintenance Planning even though System Maintenance Planning sends the work requests<sup>38</sup>.
- When the H2RL inspectors note that a meter should be moved, the request is sent to System Maintenance Planning, but Systems Protection and Control is not sure if the work is completed<sup>39</sup>.
- Ideally, all requests originating from H2RL tickets should be entered by the group performing the work. The operations clerks that do some of the data entry report to GFR supervisors and it's hard to tell what is past due because of data entry lag. The overdue work would be more visible if the data was stored in SAP<sup>40</sup>.
- Hard to reach bridge patrols for atmospheric corrosion is managed by System Maintenance Planning, but will be transferred to System Control and Protection later<sup>41</sup>.
- Standards and compliance does not get adequate operational level input from System Control and Protection on whether the data and money is available before committing to a program<sup>42</sup>.
- System Control and Protection has not been able to meet the 90-day rule for completion of corrosion protection remediation work, due to difficulties in receiving necessary permits and authorizations, but has been unable to get standards and compliance to agree to extend the timeframe to the 120 days allowable by UTC, if certain provisions are met.
- At least one supervisor in System Control and Protection's Maintenance Programs believes that PSE's Gas Compliance and Regulatory Audits is their main internal customer, not System Maintenance Planning. Their goal is to make sure all work is done on time and document why not. It is not inconsistent in that regulatory compliance is the codification, measurement, and reporting of system safety<sup>43</sup>.

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<sup>38</sup> Interview 59

<sup>39</sup> Interview 58

<sup>40</sup> Interview 59

<sup>41</sup> Interview 59

<sup>42</sup> Interviews 57 and 59

<sup>43</sup> Interview 59



System Maintenance Planning<sup>44</sup> indicated the following needs regarding coordination:

- They would like to see the relationship with the service provider improved. Examples given were the Critical Bond Program where PSE created a project manager and the SP (Pilchuck) did not.
- Remediation of corrosion work within 90 days was being used by the SP as fill-in work, and it seemed no matter how hard or often they contacted SP, it remained low priority. System Maintenance Planning believes an oversight position person seemed to work well for PSE, and they would like to see Pilchuck have a similar person.

System Maintenance Planning also submitted a supplemental report describing its continued efforts to improve communication with other departments<sup>45</sup>. They described the following:

- At the start of 2008, Gas Operations and System Maintenance Planning (SMP) began working to improve how maintenance requests sent to SMP were tracked and communicated back to Gas Operations, but specifically to GFR. This initiative involved three areas of focus: 1) development of a method to make maintenance requests sent to SMP more visible to GFR, 2) development of an SMP contact list for Gas Operations to use when inquiring about maintenance work, and 3) an effort by SMP to attend GFR staff meetings to provide education on what SMP does, how they perform their jobs, and to educate GFR on how to use the new department website where maintenance request information is stored.
- It has been jointly agreed upon by GFR and SMP that displaying maintenance requests and active projects on SMP's department website was the best option for allowing anyone in Gas Operations access to the status of Blue Card and other maintenance requests. From February through December 2008, SMP worked closely with GFR to develop, test and roll-out the new website tool.
- SMP attended two GFR staff meetings in Everett and Olympia to discuss the SMP contact list, Blue Card Notification Search tool, and the SMP active project list on the department website.
- In addition to working with GFR and Gas Operations on getting more visibility around maintenance requests, SMP has also attended 10 GFR staff meetings in 2008 and 2009 in an attempt to better communicate SMP's core responsibilities, how they make decisions, and the programs that they manage. SMP states this is an ongoing effort by SMP and will continue beyond 2009.

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<sup>44</sup> Interview 51

<sup>45</sup> PSE comments dated May 9, 2009

## 8.2.5 Emergency Response

Emergency response provides another source of continuing surveillance information in addition to maintenance programs. Not only does emergency response data represent a source of continuing surveillance information in regard to failed or damaged equipment, it could also benefit from continuing surveillance data. For example, the maintenance history or material type and composition involved in a facility could help emergency response personnel in remedying specific situations.

We also interviewed four Customer Field Representatives (CFRs) from the Gas First Response group regarding their work in emergency response<sup>46</sup>.

- The CFRs will be paged or phoned and asked if he/she is available for immediate movement. If they are available, the job is sent to their laptop and they proceed to the site (laptops are GPS enabled). The CFR may go inside and outside buildings. They are qualified to work on PE pipes of diameters 5/8 to 1 1/8 inch. Pilchuck is called for larger diameters and the interviewee's state Pilchuck responds very well with equipment and personnel.
- Emergency response data is recorded in the UTC Log of Reportable Events. Data from this log is evaluated further in Section 8.3 - Continuing Surveillance Trends. While the UTC Log confirms that continuing surveillance data from Emergency Response is being recorded and used for compliance purposes, we did not see evidence that there is full use of the data in maintenance, largely due to the lack of a GIS-based unified continuing surveillance data information system.

## 8.2.6 Damage Prevention

There are two areas of damage prevention which have a direct link to continuing surveillance:

- For high-profile facilities, such of high-pressure facilities or greater than 6" pipelines, there is a PSE requirement that the locating contractor contact the PI by phone, fax, and email so the PI can make arrangements to be onsite with 24 hours. There is an interface document outlining this process.
- When any part of the gas system is damaged by third parties, information should be recorded for the affected facility, including the nature of the damages and the repairs or replacements that have been made.
- Prevention is the key to third-party damage and PSE has documented its processes in the Gas Operating Standards Section 2425.600, and the more detailed Damage Prevention Program in Section 7600.1100. PSE's responsibilities in damage prevention

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<sup>46</sup> Interview 58

are pervasive throughout the company, from the managers of compliance and public relations, through the First Response and maintenance managers, and including customer service representatives and locating service contractors.

- The Gas Operating Standards contain specifications for the dissemination of information regarding the “call before you dig” law, and information dissemination through local governments, contractors, and their associations. The customer service representatives meet with contractors in the field to remind them of their responsibilities under the law. PSE is a member of the Northwest Utility Notification Location Center (NUNC), which is administered and overseen by the Utilities Underground Location Center (UULC), of which PSE is a charter member and underwrites the cost. Excavators are required by law to call a minimum of two business days before excavating. When a call comes into a one-call center, one of the two locating contractors, Central Locating Services, and Locating, Inc., is required to go the site and mark the location of buried utilities within the same two days.
- The Common Ground Alliance, discussed in greater depth in Section 8.3, provides best practices for excavation damages prevention which is accepted throughout the industry. PSE reports that they are considering adoption of various practices along with their associated costs<sup>47</sup>.
- Based on our examination of field crews, PSE’s service providers do a good job in preventing damages from their own excavations. The field observers inspected for adherence to the Washington Dig Laws and proper excavation techniques around existing utilities. It was observed that all excavation crews understood and were well-trained in hand exposing around utility locates, and crews also used field experience to determine if there were possible utilities not identified.
- We have noted from interviews and examination of performance records that PSE has had cause and has been making efforts since 2006 to monitor and improve the performance of its locating contractors<sup>48</sup>. PSE states most of the locating complaints (60-80%) come from Potelco and Pilchuck, when they perform construction work for PSE, but this has helped improve the damage prevention program and decrease the number of damages<sup>49</sup>.

Some of the changes implemented include:

- Reducing the number of unit prices
- Adding metrics on timeliness
- Adding quality and accuracy metrics tied to RCW requirements for damage prevention
- Introducing process improvement reviews

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<sup>47</sup> PSE telephone conversation, September 30, 2009

<sup>48</sup> Interview 53, Document Request 53

<sup>49</sup> Interview 53

- If the locate contractor cannot complete the mark-out within 48 hours, they have to call the customer and document how they personally talked to the customer before it can be reported as an acceptable missed locate. PSE keeps a daily report on timeliness and on a monthly basis reviews the quality/accuracy locate report. This will be discussed in further detail in Section 8.3-Continuing Surveillance Trends.
- Damage prevention investigations are reviewed with the locate contractors in a monthly meeting, which includes PSE personnel from Claims, Compliance, Contract Management, Field Audit group, and the Operations Analyst that does billing. Trends are identified to determine whether they are caused by people not calling for locates, mis-locates, or because of locates not done on time.
- One idea being considered is to provide positive response or contact the requestor to let them know when the locate is done. Currently, the requestor is only contacted when the locate cannot be done on time<sup>50</sup>. The Call before You Dig brochure states no digging is allowed before utilities are marked, but if a locator is late, some inexperienced excavators might assume that no utilities are present if no markings are observed.
- We found the damage prevention monitoring program and monitoring of locate contractor performance appears to have improved since 2006<sup>51</sup>, but there also can be improvements in the area of third-party damages, not caused by the locate contractors. Trends in these matters are examined more fully in the next section.

## 8.2.7 Conclusions

There are a multitude of organizational units within PSE that are involved in continuing surveillance activities, potentially posing hierarchical barriers to communication. The Blue Card Program is just one of several inputs into the decision process to determine what items are addressed in any given year. The evaluation of leakage data, CP system performance and exposed pipe condition reports also play in developing PSE's annual maintenance effort. Programs such as Bare Steel Pipe Replacement and WSSAP continue to be refined and formalized as PSE and the industry move to a more risk based decision process as envisioned in DIMP. Some of the coordination problems noted in the findings are rooted in the fact that the primary organizations involved, System Maintenance Planning, and System Control and Protection, are situated in two different organizational hierarchies. Other communication problems appear to be caused by the lack of a unified automated record system.

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<sup>50</sup> Interview 53

<sup>51</sup> Document Request 53

System Maintenance Planning has stated that they are committed to improving communication system with System Control and Protection, and cite a variety of programs including attendance at safety and staff meetings with Gas First Response, authoring future articles for an internal newsletter, and establishing an interactive website for monitoring work request information and encouragement of its use. This website, however, was not mentioned to us by any field personnel.

We approached the possibility with System Maintenance Planning that because there are so many distinct programs involving continuing surveillance, they may be disjointed. System Maintenance Planning responded that all the programs do in fact work together, and the reason why they have separated the programs is to track their spending for each area for budgeting purposes (See Recommendation 8.2.8.1).

Nevertheless, internal frustration in regard to a lack of communication was indicated in interviews with subunits of System Control and Protection. These frustrations are based primarily on the perceived lack of use of continuing surveillance information collected during the performance of operations and maintenance tasks, and the setting of maintenance program deadlines by System Maintenance Planning. A specific communications example cited was System Maintenance Planning's "insistence" on the remediation of cathodic protection within 90 days. Both the UTC and PSE's Gas Operating Standards allow for 120 days due to external influences, such as permit acquisition or customer scheduling. However, System Maintenance Planning communicates to System Control Protection the 90-day requirement and believes it should not be exceeded. When the 90 days are exceeded System Control Protection must create paperwork documenting why the 90 days was exceeded. Since it is difficult to tell which particular corrosion order will exceed the 90 days, an extensive amount of documentation is required to comply with System Maintenance Planning request. (See Recommendation 8.2.8.2)

Other frustrations were voiced in regard to the disposition of Blue Cards and the work request forms, which are for the most part generated by System Control and Protection, and service provider field technicians. Blue Cards and work requests are transformed into actual scheduled work by System Maintenance Planning, with the exception of some work requests which go directly to Pilchuck. There is a perceived lack of communication or feedback regarding what happens to a Blue Card or work request after it is submitted by the field technician. This has resulted in GFR employees stating to us that they feel PSE is not giving high enough priority to remediation. The same employees spoke to us with pride about the importance that PSE places on worker safety. If PSE truly believes the vast majority of Blue Cards or work requests do not comprise conditions that would affect system safety, then PSE needs to better communicate the reasons for the low prioritization of the work back to the employees who submitted the cards.

It is evident why we have heard dissatisfaction from submitters about the speed of remediation work. Out of 640 work requests submitted in 2008, only 23 work requests were completed in

2008. If System Maintenance Planning has legitimate reasons for delaying the vast majority of the work requests to later years, we have seen strong indications that the communication of those reasons to the submitters can be improved.

In regard to Blue Cards, if the purpose of the program is to report unsatisfactory conditions, it begs the question why only 18.6 % of the cards are deemed requiring any action. The low actionable rate of the Blue Cards would indicate the possibilities of 1) employees are reporting conditions not intended to be covered by Blue Cards; and/or 2) a large number of reported unsatisfactory conditions are not being re-mediated.

PSE has responded the low actionable rate is a result of normal work prioritization methods, and work not scheduled represents the lowest level of maintenance priority<sup>52</sup>. An example given is for work where standards have changed after the work was completed<sup>53</sup>. Nevertheless, field observers and interviewers heard frustration regarding the low rate of Blue Cards re-mediated, and lack of feedback, with indications there is reduced motivation to fill out Blue Cards. If Blue Cards are depended upon by PSE to collect information within the wider definition of continuing surveillance, then PSE should reexamine the effectiveness of its current method of communicating with workers about the program. We also see a value for planning future maintenance at PSE knowing which facilities were installed according to outdated Standards, and also in encouraging employees to be aware of them.

PSE has also reported, unlike the procedures described in Section 7.9 of the Gas Operating Standards for Continuing Surveillance, in practice reclassifications of submitted Blue Cards are typically done by GFR instead of System Planning, and are not communicated to System Planning when the Blue Card is submitted. Either the operating standards should be revised to reflect the common practice, or the practice should conform to the operating standards, after consideration of which change will better reflect the needs of a viable continuing surveillance program<sup>54</sup>.

Examination of the Blue Card shows it is not designed to capture most continuing surveillance information, other than that relating to pipeline installation. Many of the pipeline installation items could only be discovered if observed during construction or if the pipe was uncovered for some other reason. Even though PSE maintains a wider variety of continuing surveillance information is reported on the Blue Cards than is specified by the card, revision of the card is needed so the full purpose of the form is specified rather than implied.

There are at least three documents for reporting unsafe, unsatisfactory, or non-standard conditions. These include the Blue Card, the work request form, the safety-related condition report, and the "Yellow Tag". These multiple methods for reporting continuing surveillance information has resulted in some confusion among field technicians. Many are unclear

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<sup>52</sup> PSE Comments dated May 9, 2009 on Draft Report

<sup>53</sup> Interview 51

<sup>54</sup> PSE Comments dated May 9, 2009 on Draft Report

regarding which is the proper form to fill out, and have voiced frustration regarding communication about how the form is processed and frustration regarding the small number of repairs stemming from the reports.

Since PSE has begun efforts in improving communication, especially in regard to a website for tracking Work requests and Blue Cards, perhaps the card itself could also do a better job of explaining what type of information PSE would like to collect. We do not believe, however, that the card should be limited to reporting imminent safety problems. On the contrary, the card should be an important collector of continuing surveillance information of use to PSE (See Recommendation 8.2.8.3). Recommended improvements to consider should include:

- A single form should be created for the recording of continuing surveillance information, capturing unsafe, unsatisfactory, and nonstandard conditions on all types of facilities.
- Comprehensive training for all field personnel and SPs should be implemented regarding reporting continuing surveillance information on the revised form. Clear instructions for the immediate reporting of unsafe conditions, as well as accurate recording of other conditions as necessary should be provided.
- All field technicians and SPs should be aware of their responsibilities for reporting Blue Card information, and performance evaluations regarding the content of Blue Card reporting for field technicians and their supervisors should receive increased importance.
- Further use of Information Technology such as the interactive Website should be developed. Field technicians, SPs and their supervisors should expect and receive timely and complete feedback regarding the evaluation and disposition of conditions reported.
- PSE should prepare and disseminate to its employees and supervisors a procedure for the prioritization and disposition of conditions reported on submitted Blue Cards.
- Either Section 7.9 of the Continuing Surveillance Gas Operating Standards should be revised to reflect the common operating practice of GFR reclassifying conditions reported on Blue Cards, or the practice should conform to the operating standards, after consideration of which change will better reflect the needs of a viable continuing surveillance program.

When reviewing descriptions of the 128 different maintenance line item categories practiced at PSE, no items were referenced to continuing surveillance, standards or code, but many programs listed should be considered as such. This may be an indicator that although this report will demonstrate that continuing surveillance is practiced through varying programs at PSE, there is a lack of unified data and centralized responsibility for the program.

Maintenance operations groups under System Control and Protection, located in the Operations Centers, manage and maintain the bulk of the compliance program data and records, but there appear to be too many databases working in silos. The need for a GIS-based system for tracking all continuing surveillance related to particular facilities is evident. A System Control and Protection Supervisor reports that based on the data, they cannot query what type of work was done in a particular location. If there was a leak repair, it is tracked in LMS and not tied to the H2RL Database. This is one reason why the H2RL Database needs to be put in SAP. The issue of the need for consolidated Geographic Information System (GIS) based recordkeeping is addressed further in the Auditability of Records Section (See Recommendation 8.2.8.4).

In regard to compliance maintenance programs, which are in both SAP and Access databases, it is difficult or impossible to simply aggregate all compliance maintenance program results for analysis. PSE reported a diverse number of tracking systems and formats – to be discussed further in the Auditability of Records Section. However it is noteworthy that in a data response from PSE listing various records systems<sup>55</sup>, many have a “required by” column that includes references to Gas Operating Standards - but none referencing the Continuing Surveillance Section of Gas Operations.

Integrity Management is closely related to continued surveillance, in that it requires constant monitoring of system conditions which lead to the selection and development of risk-based preventative actions. With the expected advent of federal Distribution System Integrity Management (DIMP) regulations in 2009, utilities that have established comprehensive Continuing Surveillance programs will be in optimal positions to comply with DIMP. Ideally, the presence of a comprehensive Continuing Surveillance program, with “cradle to grave” accessible records describing all actions affecting each of the system’s segments and facilities, goes beyond information obtained from specialized audits and assessments.

## 8.2.8 Recommendations

- 8.2.8.1 In order to enable a more robust Continuing Surveillance program, improve communications between System Control and Protection, and System Maintenance Planning. If significant improvements in communication are not achievable, conduct an organizational assessment to fully evaluate the benefits of both organizations reporting to the same SVP or Director.
- 8.2.8.2 System Maintenance Planning and System Control and Protection should work together to minimize the documentation required when a corrosion order exceeds the 90 day requirement, but is completed within the 120 days allowed by UTC and PSE standards.
- 8.2.8.3 PSE should revise the system condition reporting programs for its employees and SPs in a manner that is useful for reporting a variety of conditions; with all parties’

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<sup>55</sup> Data Request 3



responsibilities well known, and with clear communication to all parties of the program's usefulness in promoting system safety. Recommended improvements to consider should include: a single form, comprehensive training, clear responsibilities, increased use of Information Technology, established a prioritization procedure and updated gas operating standards.

- 8.2.8.4 Continue to aggressively evaluate the cost-benefit of investing in a GIS system to aggregate system Information for analysis. Implementation will also better enable compliance with DIMP regulations.

## 8.3 Continuing Surveillance Trends

### 8.3.1 Background

A useful exercise for gathered continuing surveillance data is to examine and ascertain trends indicating trouble spots within the gas system. We asked the Utility to indicate which group within System Control & Protection or PSE is responsible for assessing, monitoring, and trending results obtained for each of the various maintenance activities and compliance programs<sup>56</sup>.

- PSE responded that there are several groups within PSE that oversee maintenance and compliance-related activities. They also stated trending is an integral step in assessing these programs; however, the amount of trending and the value it provides varies from program to program. They noted there is some overlap in the programs different groups may be involved with, but they believe that responsibilities within any program are generally well defined.
- The following is a list of groups PSE stated are involved in assessing, monitoring, and trending various maintenance activities and programs, followed by the number of individual programs that are analyzed:
  - System Maintenance Planning (21)
  - System Control and Protection (4)
  - Gas system Engineering (4)
  - System Planning (1)
- PSE gathers related data in the System Performance Programs Annual Review (Annual Review) prepared by System Maintenance Planning<sup>57</sup>. This document is compiled for both the electric and gas systems. The most current document was released in late June, 2008, generally reviewing data for five years up to and including 2007.
- The Annual Review provides the following information in regard to continuing surveillance:

Since April 2005, the Continuing Surveillance program has provided visual surveillance of PSE's natural gas facilities during normal construction, operations, and maintenance work. PSE employees and contractors record potential concerns about PSE's pipeline facilities and the environment they operate in. In 2007, this program re-mediated 140 conditions including partially buried meters, shallow mains and services, encroached meters, and services

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<sup>56</sup> Document Request 88

<sup>57</sup> Document Request No. 29

trespassing on neighboring property. Through the Continuing Surveillance program we expect to remediate approximately 200 conditions in 2008.

- The above statement apparently refers to more actions than can be attributed to only the Blue Card program. According to information provided by PSE and shown in Figure 3 – Blue Card Deployment, PSE re-mediated 44 conditions in 2007 and 115 conditions in 2008 identified from the Blue Card Program.
- PSE also states the following in the Annual Review regarding continuing surveillance:

System Maintenance Planning also reviews the conditions reported under continuing surveillance holistically to identify trends that may be more efficiently addressed through a system-wide program rather than on an individual basis. One such opportunity identified in 2007 was buried meters reported through continuing surveillance and the Atmospheric Corrosion/Isolated Facilities inspections. System Maintenance Planning is developing a program to identify the resources and schedule required to remediate all buried meters. In late 2007/early 2008, GFR began a pilot project to provide data needed to determine the number of units, remediation requirements, and man hours required. Development of the program framework is expected by the end of 2008.

In this section of our report, we examine data and identify trends from the Annual Review, and from document requests, which illustrate the link between continuing surveillance and system safety. In doing so, we are concentrating on two areas that are indicators of a wide array of continuing surveillance information and feedback: leaks and damages. In addition, these two areas are integrally allied with service provider and contractor issues addressed throughout this audit.

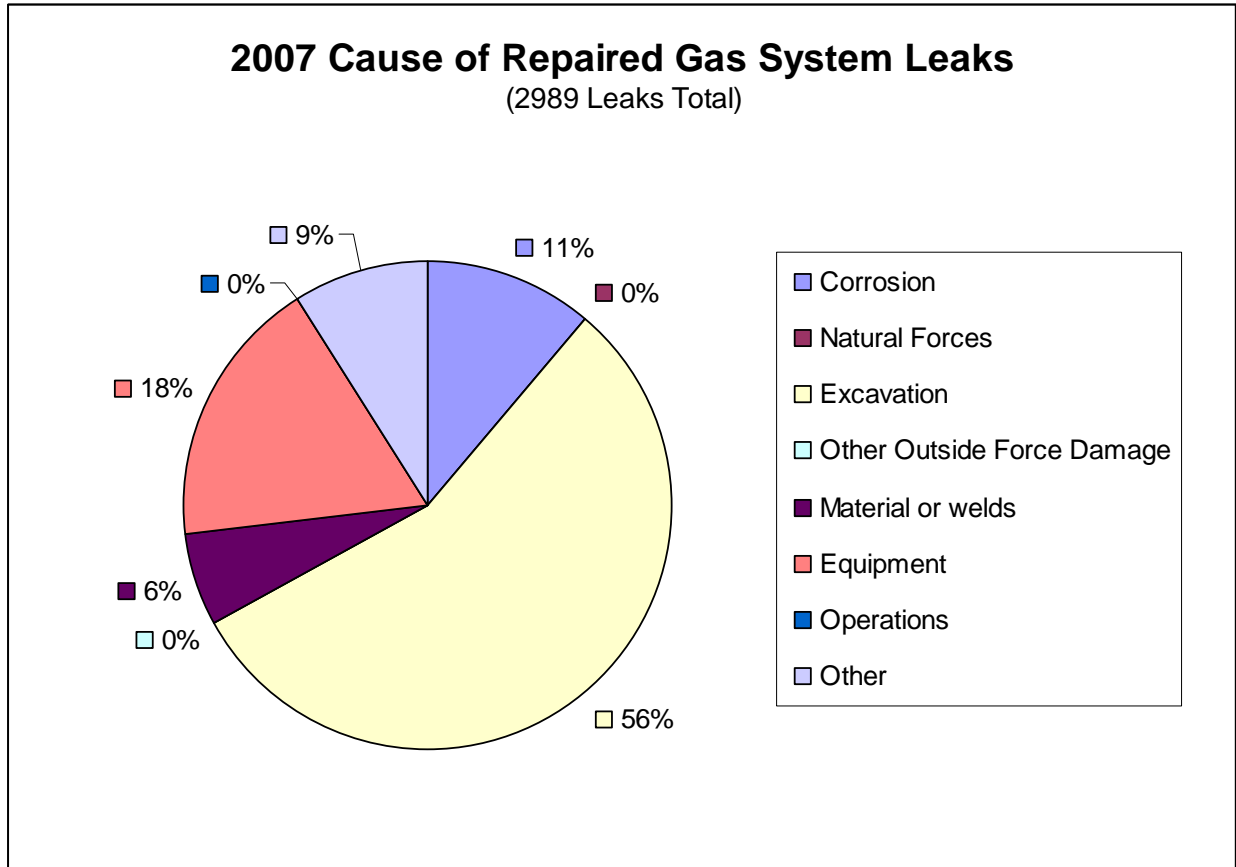
### **8.3.2 Leak Trends**

We begin our trend analysis with a discussion of leaks, not only because they are of prime safety concern due to the combustibility of natural gas, but also because leaks can be indicators of many problems which require continuing surveillance, including but not limited to faulty installation, repair, materials, corrosion, and third-party damages.

Furthermore, the performance and recordkeeping regarding leak repairs were driving forces contributing to the need for this audit. PSE has recently instituted a program in connection with the settlement agreement with the UTC (Docket PG-060215) to improve the accuracy of PSE gas safety records. This program will be discussed in our separate report on auditability of records.

PSE's most currently available Annual Review provides the following causes for repaired leaks in 2007:

Figure 8 - Causes of Repaired Gas System Leaks in PSE System



- Third-party damages (excavation) were the major cause of repaired leaks in 2007. We also found that third-party damages have consistently been labeled as the cause of approximately 77-78% of events reported to UTC over the past 5 years<sup>58</sup>.
- PSE does not track data regarding benchmarking of root-cause of gas system leaks<sup>59</sup>.
- We also noted in examining leak-cause data for years prior to 2007, equipment accounted for 17% of the leaks in 2005, 2% in 2006 and 18% in 2007. These large swings in proportion caused us to ask PSE to provide a working definition for each cause cited<sup>60</sup>. PSE responded that it has discovered inaccurate coding of information in the Leak Management System (LMS) by field personnel, and that steps have been taken including revised codes and LMS forms, and improved training.

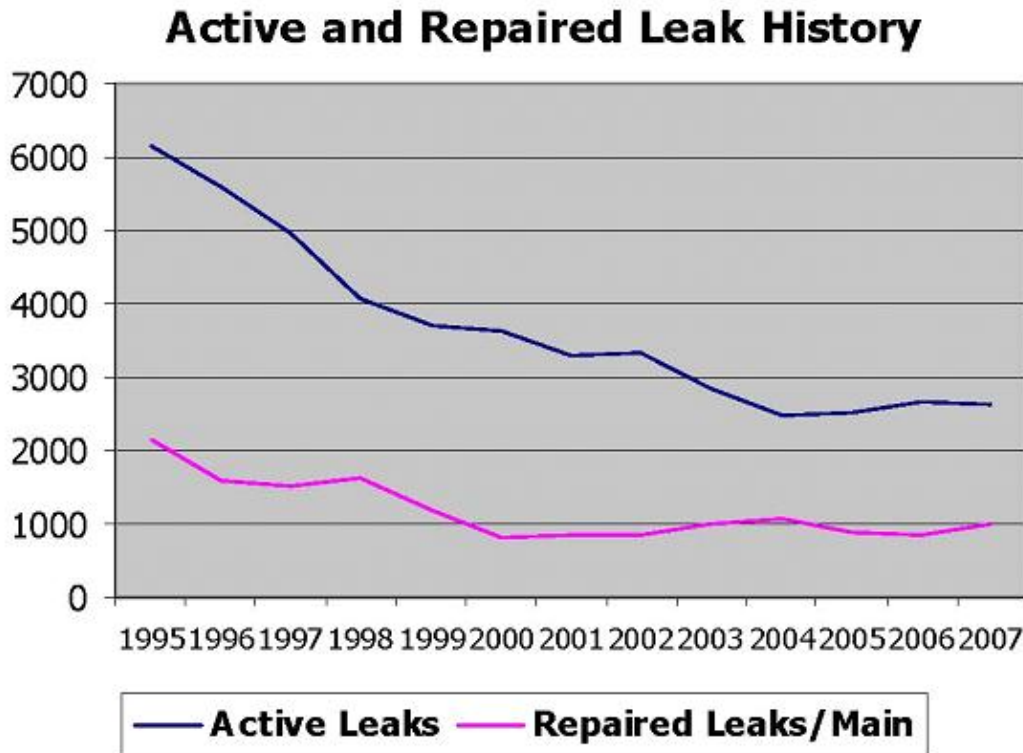
The Annual Review also provides the following multi-year trending of active and repaired leak history:

<sup>58</sup> Document Request 14

<sup>59</sup> Document Response 108

<sup>60</sup> Document Response 105

Figure 9 - Active and Repaired Leak History, 1995-2007



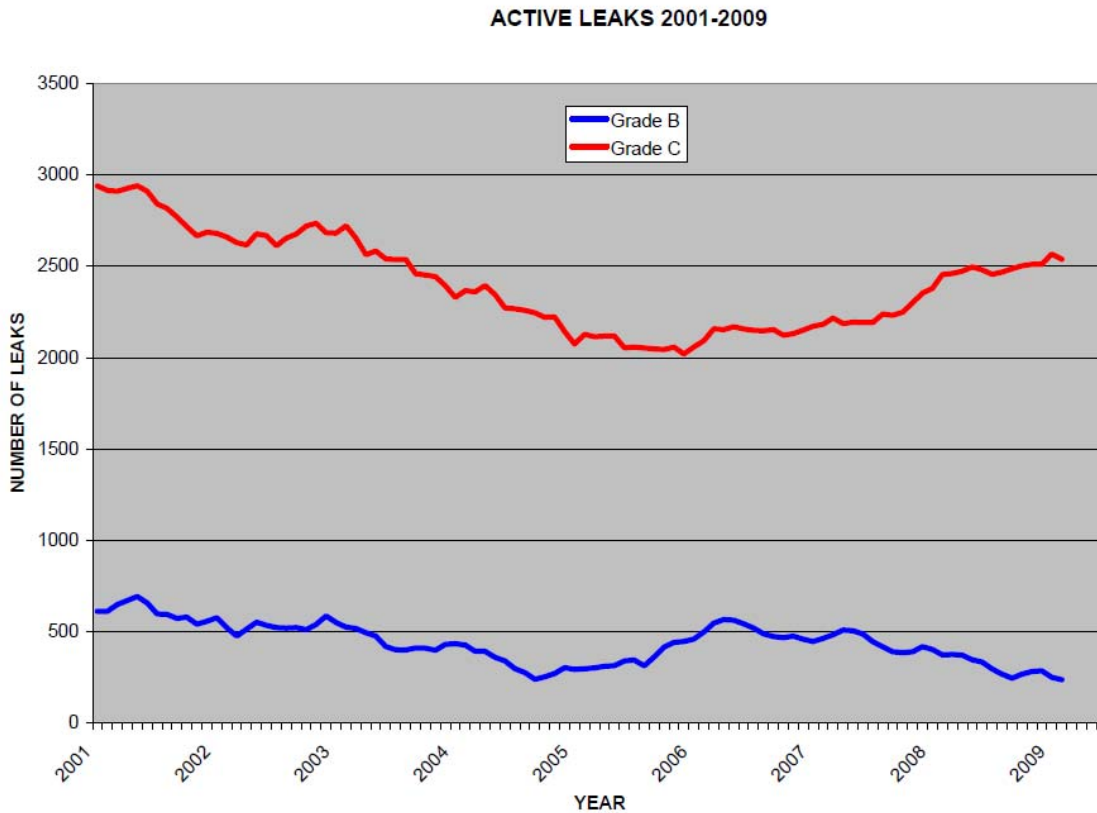
- This graphic shows that PSE has reduced active leaks by over 50% since 1996, largely as a result of PSE’s Cast Iron Replacement Program, which resulted from a settlement with the UTC.
- There is a leveling and/or increase in active and repaired leaks in later years, especially 2003 – 2007. PSE attributes this trend to the aging of its system, the change from a five-year to three-year leak survey frequency, and an effort by PSE and SPs to align repairs more closely with the increased survey frequency. PSE has also stated they believe much of the problem stems from a large number of inexperienced Heath employees filing false reports in 2007 due to more sensitive equipment while working on the unprotected steel project<sup>61</sup>. They believe a downward trend can now be seen, bringing leaks to a normal ratio.

Whereas overall repaired leaks could indeed reflect increases in leak monitoring, we focused our attention on active leaks, which in varying levels according to their assigned grades, represent continuing conditions in need of attention<sup>62</sup>. PSE responded with the following data and explanations:

<sup>61</sup> Interview 52

<sup>62</sup> Document Request 100

Figure 10 - Active Leaks to Date



- PSE is continuing to reduce the number of active Grade B leaks, but Grade C leaks, which by definition are non-hazardous at the time of detection and can reasonably be expected to remain non-hazardous, continue to rise.
- Grade A leaks by definition must be immediately eliminated, and therefore do not remain active.

We further assessed the balance between new leaks discovered and active leaks during the most recent year. PSE responded with the following data<sup>63</sup>:

<sup>63</sup> Document request 101

**Figure 11 - Active and New Leaks by Month, 2008**

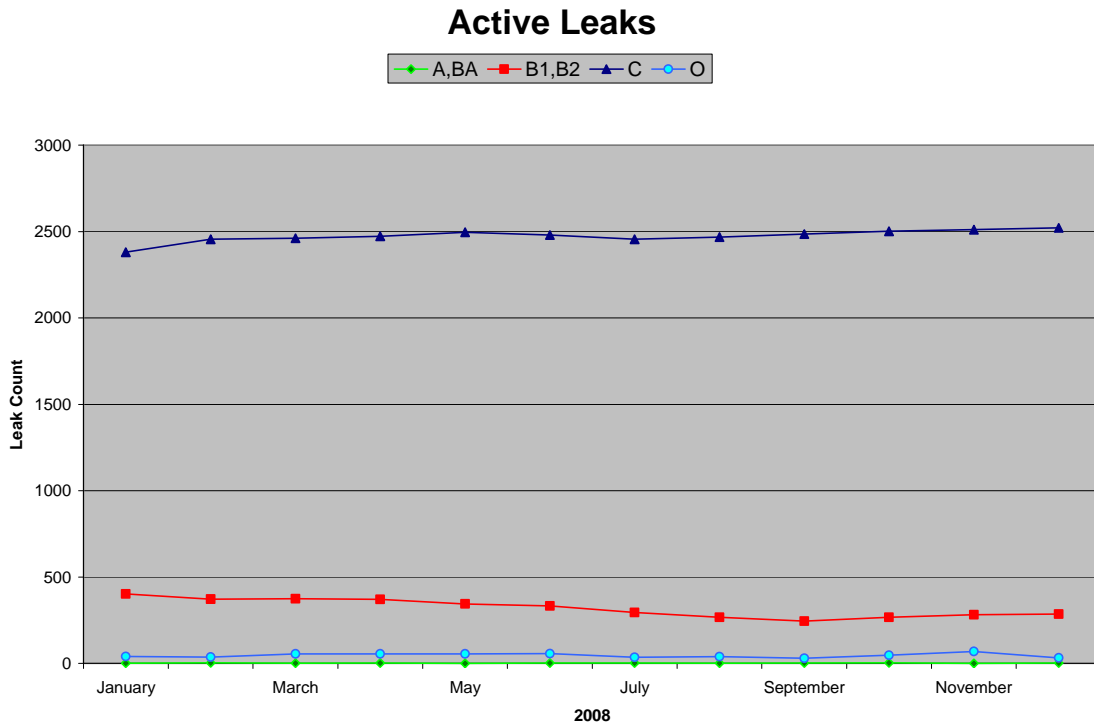
2008	Active Leaks	New Leaks	Total Eliminated
January	2823	233	299
February	2868	263	248
March	2892	228	208
April	2901	239	236
May	2896	256	269
June	2872	246	277
July	2789	181	270
August	2775	228	257
September	2763	253	308
October	2820	235	235
November	2862	230	248
December	2840	139	192
<b>Total</b>		<b>2731</b>	<b>3047</b>

It is difficult to make month-by-month comparisons, due to differences in weather, and workforce availability in both leak detection and repair. However, the following trends are apparent:

- The number of active leaks on any month varies from a low of 2763 in September to a high of 2901 in April. There is a slight downward trend in active leaks during the summer months perhaps due to less leak surveying.
- The low number of new leaks discovered and leaks eliminated in December could be a cause of reduced-holiday work schedules among leak detection contractors and repair crews, or weather factors affecting labor.
- The number of active leaks in the system was fairly constant and not reduced when comparing the end of the year to the beginning.
- The number of leaks eliminated declined during the latter three months of the calendar year 2008.
- PSE has determined that the number of active leaks listed in the table is correct. However, the total eliminated is slightly inflated as leaks requiring a follow-up or recheck visit were occasionally double-counted (approximately 10%).

We also have analyzed the active new and eliminated leaks by leak grade.

Figure 12 - Active Leaks by Grade in 2008<sup>64</sup>

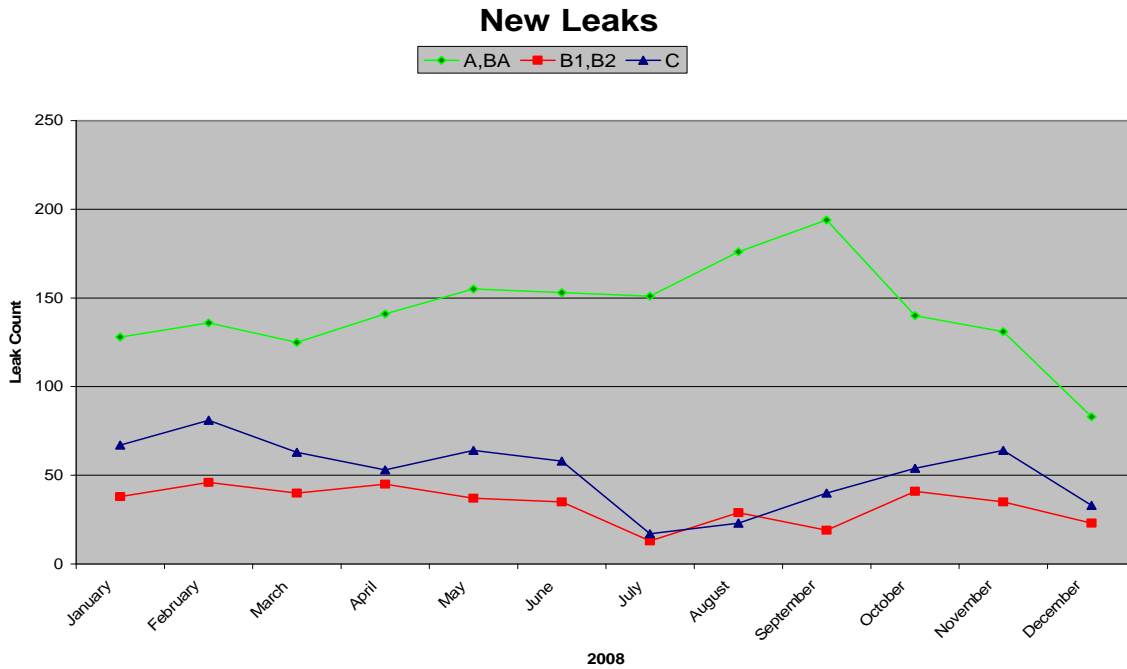


- Active leaks for all grades remain at a fairly constant level despite wider swings in the quantity of new leaks.

<sup>64</sup> Document Request 101



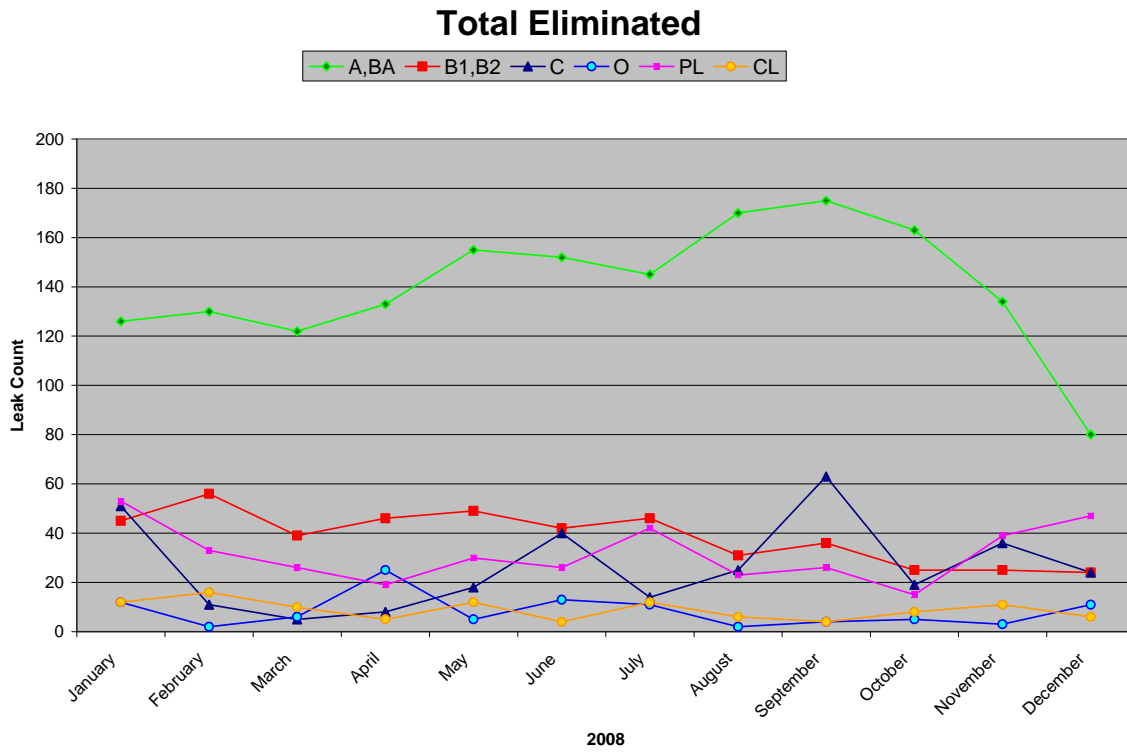
Figure 13 - New Leaks by Grade in 2008 <sup>65</sup>



- New Grade A and BA leaks tended to increase steadily January through September, and then declined more rapidly during the remainder of the calendar year.
- New Grade B1, B2, and C leaks tended to decline steadily January to July, then increase steadily to November, followed by a decline into December.
- In all grades of leaks, there were fewer new leaks at the end of the year than there were at the beginning of the year.

<sup>65</sup> Document Request 101

**Figure 14 - Leaks Eliminated by Grade in 2008** <sup>66</sup>



- Eliminated leaks for all grades for all months and grades, vary by month, with a result that PSE’s active leaks (Figure 12) remain fairly constant.
- Cancelled leaks (CL) increased steadily from January through September, declined rapidly through December to a level much lower than the beginning of the year.
- Phantom leaks declined January through April, increased April through July, and decreased July through October, then rose again to levels at year’s end which were almost equal to levels at the beginning of the year.
- PSE has determined that the number of active leaks listed in the table is correct. However, the total eliminated is slightly inflated as leaks requiring a follow-up or recheck visit were occasionally double-counted (approximately 10%).
- The total number of active leaks indicates that PSE has managed leaks appropriately.

<sup>66</sup> Document Request 101

### 8.3.3 Damage Trends

Because third-party excavation is listed as the major cause of repaired leaks and events reportable to UTC<sup>67</sup>, in this section of the report we evaluate trends at PSE in third-party damage prevention and causation. Damage plays a direct role in continuing surveillance, both in the required monitoring of excavation near pipeline facilities that are 6" in diameter or greater, and in the recording of data related to facilities that are damaged or otherwise affected by construction activities.

As discussed in Section 8.2.6 – Damage Prevention, damage prevention is the prompt and accurate location of PSE's facilities in response to "on-call" notices; the "Buck Stops Here" activity relating to third-party damages. The reader will note in this discussion that 2006 was a peak year for locates. PSE states that the reason locates increased were due, in part, to the tremendous economic growth within our service territory. Further, PSE states the reason for the increase in damages for 2006 was directly related to the number of telecommunications contractors installing fiber and cable and their blatant disregard for Washington State's Dig Law.

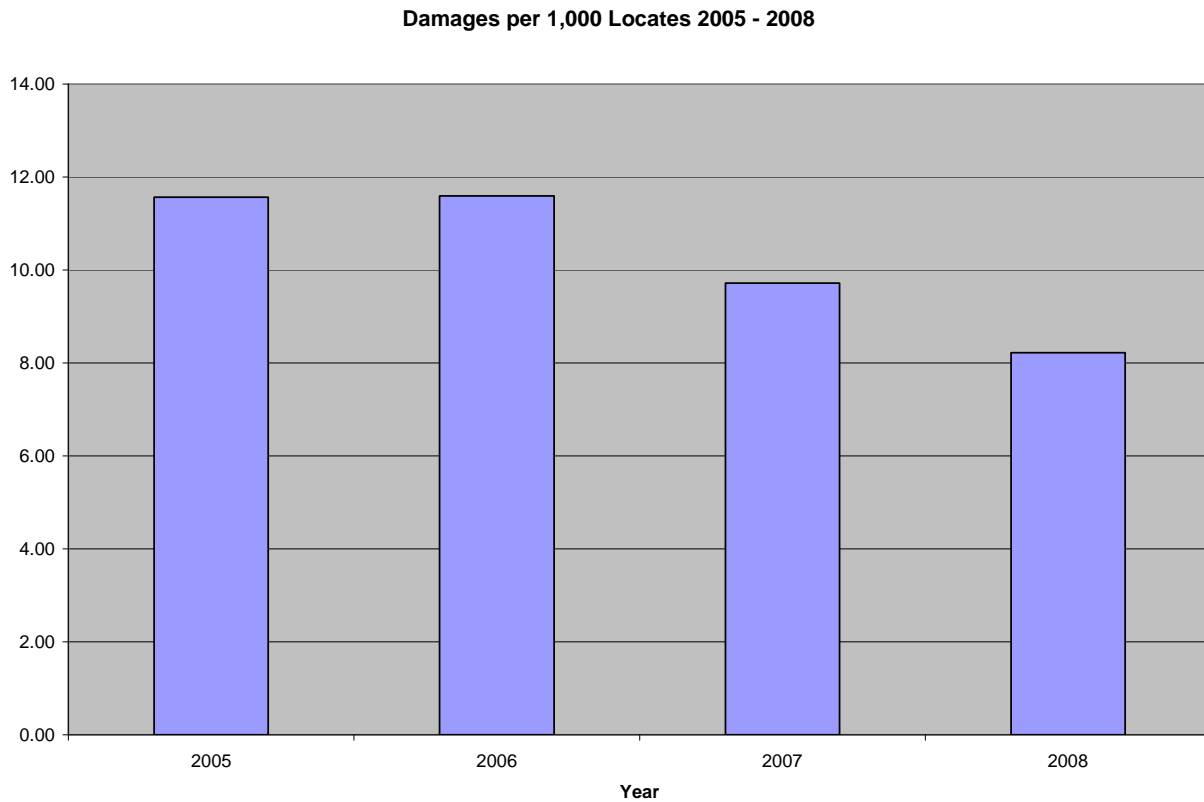
- PSE's Annual UTC Damage Prevention Statistics Report Forms for Calendar Years 2005 – 2008, as required by WAC 480-93-200 (7) (b)<sup>68</sup> provide the following information in regard to locates performed by its contractors, and the number of damages recorded:

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<sup>67</sup> Document Request 14

<sup>68</sup> Document Request 158

**Figure 15 - Natural Gas Locates and Damages**

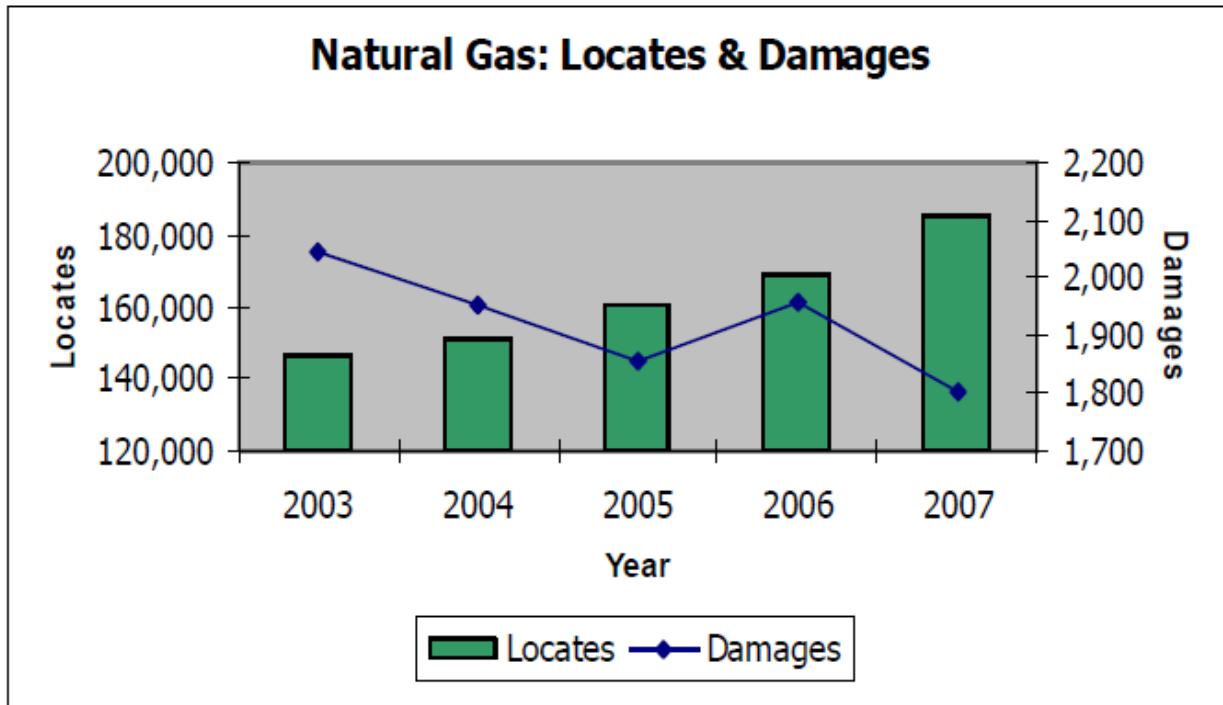


- PSE has made progress in reducing the number of damages per 1000 locates in recent years, from 11.59 in 2006, to 8.22 in 2008.

The general amount of excavation activity is directly reflected by the number of locates.

- Figure 16 from the Annual Review compares total number of locates performed and damages reported (Note: the currently available Annual Review's most recent data is for 2007).

Figure 16 - Total Locates and Damages from 2008 Annual Review



- Throughout the five-year period from 2003-2007, locates have been increasing. PSE achieved a favorable trend by generally reducing the number of damages, while the number of locates is increased. The year 2006 appears to be an anomaly. There is a general downward trend from 2003-2007 in damages. In the year 2007, third-party damages were the lowest reported in the prior five years.
- An interview with some PSE field staff yielded a perceived unhappiness with the quality of work being performed by PSE’s two main locating contractors, Locating, Inc. and Central Locating Service, Inc. (CLS)<sup>69</sup>. We obtained data describing damage claims relating to both of the locating contractors. We also asked for “near-miss” data, *i.e.* where the mark-out is off but no damage occurs.
- PSE replied that it does not collect “near-miss” data, but did provide data regarding damages relating to locates requested but not marked, and inaccurate locates<sup>70</sup>.
- We then obtained PSE’s ZDIG report from SAP for the last five years, showing third-party damages statistics including inaccurate locates, and locates not performed on time<sup>71</sup>. The Other category refers to Party Causing Damage being listed as other than CLS or Locating Inc. It is a combination of various other utilities, PSE, Pilchuck, Potelco, individuals, and undetermined parties.

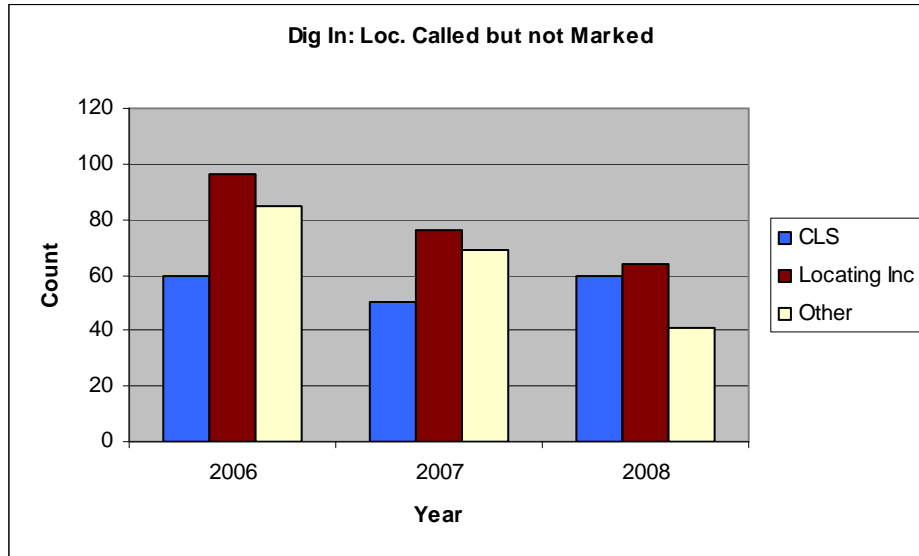
<sup>69</sup> Interview 58

<sup>70</sup> Document Request 50

<sup>71</sup> Document Request 92

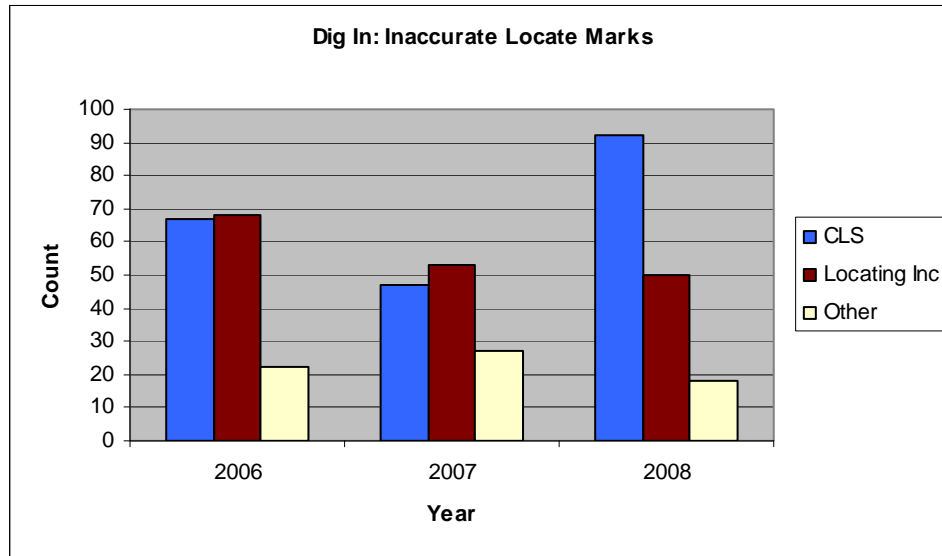
- Figure 17 shows the number and trend for three years when statistics were kept regarding damages caused by each of the major locating contractors because locates were not performed.

**Figure 17 - Damages from SP Not Performing Locates After Being Notified**



- Damages due to failure to locate after being notified over the three-year time span have been declining for Locating, Inc. but rising for CLS from 2007 to 2008.
- Figure 18 shows the trends for damages caused by inaccurate locates by the major locating contractors.

**Figure 18 - Damages from SP Performing Inaccurate Locates**



- Damages due to inaccurate locates over the three-year time span have been declining for Locating, Inc. but rising markedly for CLS from 2007 to 2008. The question arises what portion of damages to PSE’s system are “at fault”, *i.e.*, that are attributed to the actions of their locating contractors. PSE’s response provided the following as shown in Figure 19 - Percentage of PSE Damages with Locating Contractors at Fault<sup>72</sup>.

**Figure 19 - Percentage of PSE Damages with Locating Contractors at Fault**

Year	At Fault: Locating, Inc.	At Fault: CLS	Total	CGA “DIRT” Report National Average <sup>73</sup>
2006	9.7	13.7	23.4%	18%
2007	14.3	13.2	27.5%	21%
2008	15.6	13.8	29.4%	n/a

<sup>72</sup> Document Request 73

<sup>73</sup> According to the Utility industry group Common Ground Alliance’s (CGA’s) most recent Damage Information Reporting Tool (DIRT) report on its website for a greater understanding of industry-wide damages caused by inaccurate or unperformed locates. The root cause of “Location Practices Not Sufficient”, which would encompass these areas of concern, is used in this table.

- It appears that PSE's locating contractors are a root-cause of damages at a higher percentage than national average.
- PSE believes its measurement and management of locating contractor performance, as shown in the metrics described below in this section, is a more effective method for controlling these types of damages<sup>74</sup>. PSE states it has not tracked damage-cause benchmarks for the period in question. While PSE has an awareness of these types of benchmarking measures, tracking them and doing direct comparisons has not been a target. PSE further stated that the variations of data collection and definitions have made PSE management wary of making comparisons on this type of level. PSE also states that variations in the way the data is collected nationally, or even "what is a locate" (i.e. is it a single call, a foot distance, a single facility, does a single locate count both main and service, etc.), and the variety of responses demonstrates that these numbers are not accounted for in any standard way throughout industry. PSE focuses in continual improvement in its measures and reporting, with a focus on timeliness and accuracy of locates as reported.

According to the utility industry Group Common Ground Alliance's (CGA's) 2008 Damage Information Reporting Tool (DIRT) Report (© Common Ground Alliance 2008), facilities located by contracted entities are damaged more often than facilities located by the utilities themselves. This may be attributed to the fact that contractors perform more locates than do utility staff, and/or factors unrelated to the contractor, such as inadequate mapping provided by the Utility. CGA states the national data relating to these and other factors remain a concern and bear watching in the future.

- Our field observations noted that more accurate maps with details of the location of the meter are needed. Mapping errors were seen by the locators, leak surveyors, and service provider construction crews. Existing as-builds have location and pipe size errors that cause construction time loss in the field.
- Concerning performance measurement by PSE of its locating contractors, the Utility responded that<sup>75</sup>:
  - CLS and Locating, Inc. are performing above specified metrics in locating accuracy, and Locating, Inc. is meeting its standard (> 96%) in regard to timeliness.
  - CLS is not meeting goals of locate timeliness, and made notifying phone calls to requesters only 45% of the time on late locates.
  - Through the first half of 2008, CLS maintained a daily locate on time average of 94%.

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<sup>74</sup> Document Request 108

<sup>75</sup> Document Request 53



Late locates or failure to notify requestors of late locates could result in excavation prior to utility locations being marked. Inexperienced excavators may not realize the mark-out has not been performed. In addition, late locates could adversely affect construction schedules and associated costs of delay.

- PSE has provided evidence of monthly meetings with both locating contractors<sup>76</sup>. There are disparate levels of attention to performance metrics, with CLS being tracked much more closely in the monthly reports, perhaps in response to their somewhat poorer performance than Locating, Inc.
- PSE's Compliance and Regulatory Audits, and Gas Operations departments have stated improvement of third-party damages currently lies within Public Awareness and Communications Departments, but Gas Operations also works on it, especially concerning documentation<sup>77</sup>. They stated there is a program planned for the near future which will pool all resources together and address problems, with a focus on certain contractors.
- PSE also supplied us with monthly summaries of meetings attended and handouts distributed in regard to damage prevention<sup>78</sup>. The involvement of the Public Awareness Department and Gas Operations, particularly meetings held by the former and the distribution of handouts by the latter, is evident. However, there is a lack of information regarding the targeting of problem excavation contractors.

### 8.3.4 Conclusions

In general terms, the continuing surveillance process described in the Annual Review by PSE would apply to a Continuing Surveillance program that is compliant with the regulatory definitions of continuing surveillance. However, there is a lack of evidence this process is applied throughout PSE in the evaluation of all construction, operation and maintenance programs (See Recommendation 8.3.5.1). If a consolidated Continuing Surveillance program were in place with GIS-based information, we believe that PSE could manage many more preventive maintenance programs, and report a greater span of preventative and re-meditative actions under continuing surveillance in future annual reviews.

PSE appears to be eliminating leaks in a manner to keep active leaks at steady levels for all grades. Class A active leaks, which could potentially pose the greatest safety threat, are eliminated on a timely basis. The recent reduction in active Class B leaks is commendable, and one could reasonably expect that a more rigorous application of leak detection, as is claimed by

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<sup>76</sup> Document Request 99

<sup>77</sup> Interview 52

<sup>78</sup> Document Request 102

PSE, would result in an increase in active Class C leaks, which are deemed non-hazardous. However, further investigation may be needed to determine if continuing surveillance information is being fully utilized to prevent the increase in active leaks (See Recommendation 8.3.5.2). The underlying cause of these leaks, if linked by a GIS-based system to particular facilities or conditions, could result in some type of preventive maintenance reducing overall leakage of the gas system (See Recommendation 8.3.5.3). Cancelled leaks declined sharply in the latter months of 2008, indicated that PSE and its SPs are making improvements in reporting false positives.

Although there is evidence of damage prevention efforts on many fronts and organizations within PSE, and improvements particularly in the number of damages per 1,000 locates, the number of third-party damages to PSE's system indicates that further improvement of the damage prevention program is needed. Lacking a GIS-based information system, it is difficult to enter previous damages and near-miss information into a robust Continuing Surveillance program. CLS's performance regarding on-time calls when locating services are delayed has been poor in the past. Inexperienced excavators may not realize the mark-out has not been performed. In addition, late locates could adversely affect construction schedules and associated costs of delay. It would seem contractor and public education could be used to combat damages from late calls - stressing the importance of waiting for locates to be performed before excavation.

The percentage of damages attributable to locate contractor errors appears to be greater than the national average (See Recommendation 8.3.5.4). PSE does not track "near-miss" data which could provide important continuing surveillance information regarding the accuracy of locates. The Common Ground Alliance is an authoritative industry organization on the subject of utility damage prevention, in its latest best practices<sup>79</sup>; the following applies to the tracking of near-misses:

9-2: Standardized Information Is Reported.

Practice Statement: The requested data is standardized and consists of minimum essential information that can be analyzed to determine what events could, or did, lead to a damaged facility. This means that collected data should include damage information, downtime and near-misses.

PSE has active programs to reduce third-party damages to its system through public awareness and improvement of its contractors' ability to provide timely and accurate locations. Although PSE establishes seemingly high performance measures for its locating contractors, the sheer volume of calls result in a large number of damages due to missed or inaccurate locates, even at these high performance levels. PSE is also apparently making a large effort to improve

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<sup>79</sup>[http://www.commongroundalliance.com/Content/NavigationMenu/Best\\_Practices/Best\\_Practices\\_2008/Best\\_Practices\\_Version\\_5\\_0.htm](http://www.commongroundalliance.com/Content/NavigationMenu/Best_Practices/Best_Practices_2008/Best_Practices_Version_5_0.htm)

locating contractor performance (See Recommendations 8.3.5.5 and 8.3.5.6). Lack of a usable GIS-based data system for all continuing surveillance-related actions, and the arcane methodology for plat maps updating by SPs and utility personnel (Contracts and Auditability of Records Sections), could be contributing to the number of inaccurate locates.

In other areas of damage prevention, improvements are needed or are in the process of near-future implementation. PSE states that they will begin a thorough evaluation of damage prevention and begin a program targeting problem excavation contractors. Excavating activity is tied to the economy and especially real estate activity. This has a direct bearing on gas hits and provides additional reason to increase excavating education prior to the improvement in the economy.

## **8.3.5 Recommendations**

- 8.3.5.1 In order to play a greater role in identifying trends and enabling new programs and program adjustments, and facilitating the evaluation of recent year data, efforts should be made to complete the System Performance Programs Annual Review closer to the beginning of the calendar year than the current June issuance date.
- 8.3.5.2 PSE should examine and rectify its process for accounting of eliminated leaks.
- 8.3.5.3 Continue to aggressively evaluate the cost-benefit of investing in a GIS system to aggregate system Information for analysis. Implementation will also better enable PSE to determine the root-causes and prevent damages and leaks.
- 8.3.5.4 Improve coordination or consider reorganization of damage prevention responsibilities among the several organizations involved to create a more unified management process. A task force similar to the Gas Compliance Steering Committee would provide an effective format for the communication of damage control information and coordination of monitored efforts.
- 8.3.5.5 PSE should create a feed back mechanism to capture root analysis on poor or no locates, including tracking “near-miss” data which could also provide important continuing surveillance information regarding the accuracy of locates.
- 8.3.5.6 PSE should adopt Common Ground Alliance’s best practices that will enhance locator accuracy and timeliness, and incorporate them into goals reflected in the locator contracts. This includes establishing objective measures for locator accuracy and timeliness and then establishing targets for year-over-year improvement.

## **8.4 Continued Surveillance Compliance and Reporting**

### **8.4.1 Background**

Compliance is an outcome of the continuing surveillance process, as shown in the Process Flow Diagram in Figure 1. We identified three primary output areas of continuing surveillance information relating to compliance:

- UTC Reportable Incidents
- Internal Compliance Reports
- Settlement-related Reports

In addition, there is an important feedback function of continuing surveillance information to System Maintenance Planning and System Control and Protection, as was previously discussed in Section 2 of this report.

### **8.4.2 UTC Reportable Incidents**

According to the Gas Operating Standards, the following incidents are reportable to the UTC within prescribed timeframes.

**Figure 20 - UTC Reportable Incidents**

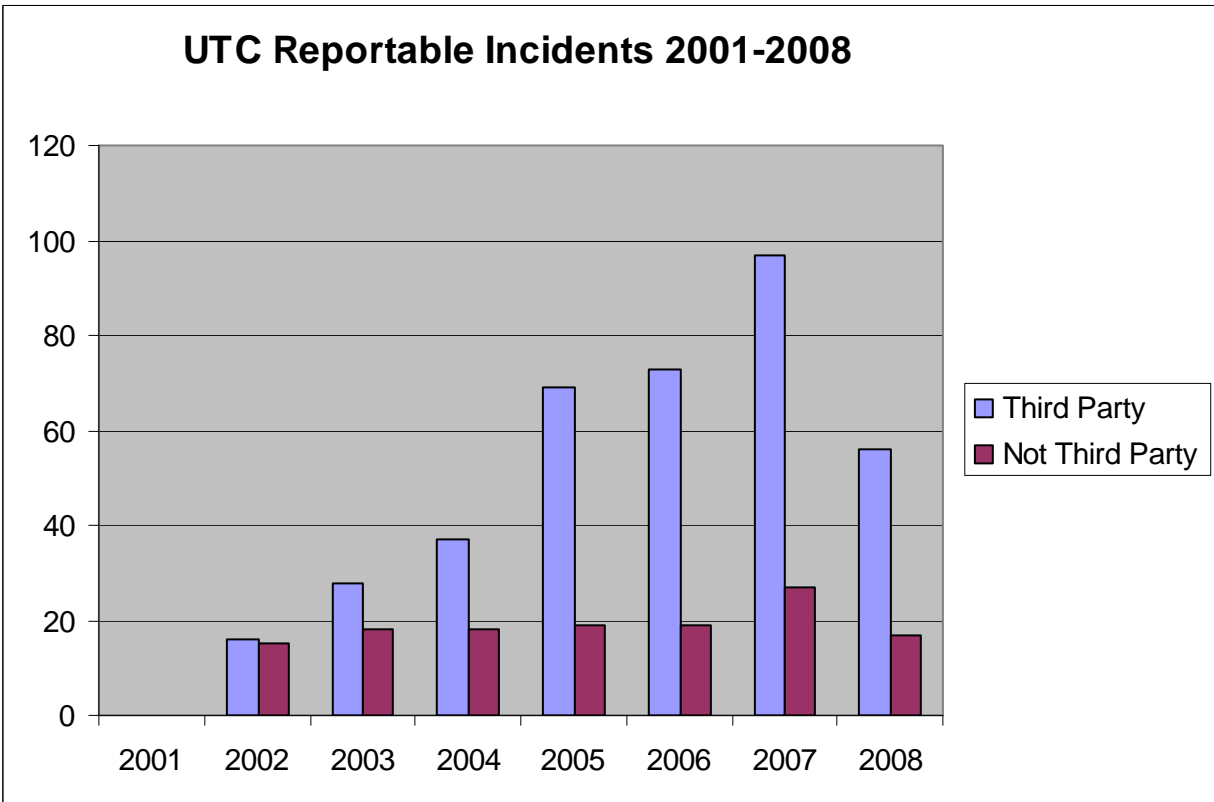
Incident Description	Report to UTC within 2 hours	Report to DOT within 2 hours	Report to UTC within 24 hours
A fatality or personal injury requiring hospitalization.	X	X	
Estimated property damage, including cost of gas lost, to the operator or others or both, of \$50,000 or more.	X	X	
An event that results in an emergency shutdown of an LNG facility.		X	
An evacuation of a building or high occupancy structure or area with the exception of a self-evacuation of the structure or area.	X		
The unintentional ignition of gas.	X		
Unscheduled interruption of service furnished by the Company to 25 or more distribution customers.	X		
Pipeline or system pressure exceeds the MAOP plus 10 percent.	X		
Pipeline or system pressure exceeds the MOP, where the MOP is established through a pressure authorization from the UTC.	X		
The news media is reporting the occurrence, even though it does not meet the criteria set forth in this table.	X		
Is a significant incident, in the judgment of the Company, even though it does not meet the criteria set forth in this table.	X	X	
Uncontrolled release of gas for more than two hours.			X
Taking high pressure supply, transmission pipeline, or major distribution supply pipeline out of service. (See Section 4.1 for exception.)			X
Pipeline or system operating at low pressure drops below the safe operating conditions of attached appliances and gas equipment.			X
Pipeline or system pressure exceeds the established MAOP.			X

The UTC repealed the rule regarding notification of incidents being reported by the media in May 2008.

- A written report of each reportable incident is required within 30 days to UTC.
- PSE provided a log of UTC reportable incidents for the years 2001 – 2008<sup>80</sup>. Figure 21 shows the number of incidents each year caused by third-party damages, or by other causes.

<sup>80</sup> Document Request 14

Figure 21 - UTC Reportable Incidents 2001-2008



The following trends are indicated by the data:

- Third-party damages cause the vast majority of reportable incidents. With the exception of 2007, the number of reported incidents in the log that were not caused by third parties held very steady, at or near 18.
- From 2005 through 2008, the percentage of reported incidents in the log remained steady in terms of cause by third-party, at about 78%.
- The year 2007 saw a spike in items in the log, but the percentage allocated to third parties remained very similar to surrounding years.
- Some UTC reportable incidents are related to variations in the pressure maintained on the gas system. The parameters and incident code names have been modified over time. They are currently coded as:

PR-MAOP +10%

Pressure-related - MAOP violation

PR-MOP

Pressure-related - MOP violation

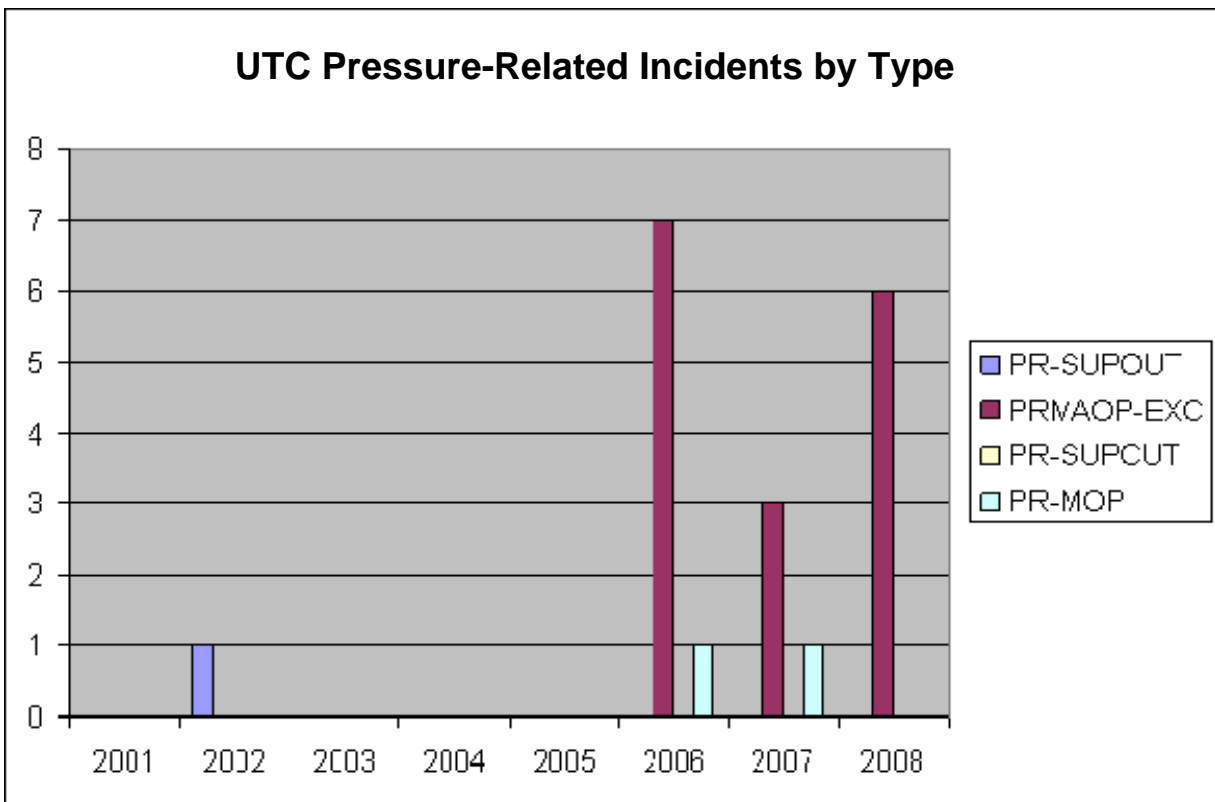
PR-SUPOUT	Pressure-related - Supply main taken out of service
PR-LOW	Pressure-related - System dropped below utilization pressure
PR-MAOPEXC	Pressure-related - System exceeds the MAOP

Other categories which were discontinued in June, 2005 are:

PD-5000	Property damage - \$5000 or greater
PR-MAOP	Pressure-related - MAOP violation
PR-SUPCUT	Pressure-related - supply main-pressure cut 50% or more

- Figure 22 displays the occurrence of pressure-related reportable incidents from 2001 to 2008<sup>81</sup>.

**Figure 22 - UTC Reportable Pressure Incidents**

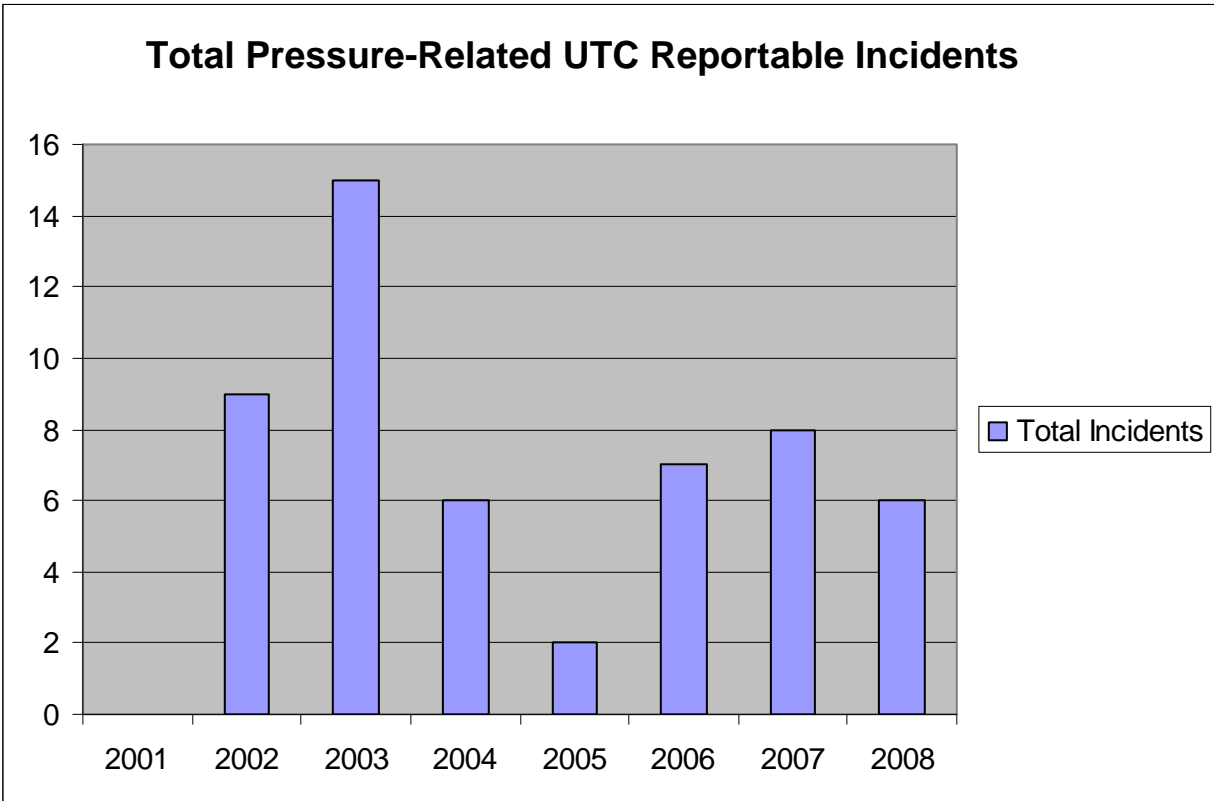


- Prior to June, 2005, the code PR-MAOP covered a larger range of pressure-related incidents. The total number of pressure-related incidents grouped together by year is shown in Figure 23<sup>82</sup>.

<sup>81</sup> Document Request 14

<sup>82</sup> Document Request 14

Figure 23 - Total Pressure Related UTC Reportable Incidents



- After peaking in 2003 and declining through 2005, the total number of pressure-related incidents in the last three years has been three to four times greater than in 2005. Except for one incident in 2007, these incidents have been due to over-pressurization of the system.
- In evaluating the individual entries reported for each year in the log, the following items appear to need greater clarification for the purpose of continuing surveillance:
  - In the Description column, a more consistent use of terms designating whether damages were done by a third-party is needed. The term Contractor should describe if it is referring to a third-party or PSE service provider.
  - Incidents not attributable to third parties would benefit from a more consistent description of causes.
  - The category column often contains media coverage (MC) alone.



- There were no entries in the log attributed to corrosion. Although material failures from corrosion or other causes could result in line breaks, PSE states they normally result in leaks which are not reportable.

### 8.4.3 Internal Compliance Audits

We interviewed PSE's Manager, Gas Compliance and Regulatory Audits (GC&RA); along with the Director of Operation Services in regard to the role of continuing surveillance<sup>83</sup>.

- The GC&RA Manager sees the role of his group's job in compliance as having three major facets:
  - Responding to regulatory audits and data requests from regulators, as well as questions on standards from UTC.
  - Internal coordination and guidance including working on new regulations, the internal development of operating standards, and providing inputs to industry associations.
  - Advocating on behalf of other PSE departments to help keep PSE in compliance.
- The GC&RA Manager would like to see improvements in the aggregation of information in one system. Getting data from the numerous systems in place now is stated as very difficult. A major improvement planned is the use of XEM, a program related to SAP, which will become a compliance tool. It is already in place on the electric side of the business. The XEM system will be in place by summer 2009, but will be limited to tracking compliance items only.
- The GC&RA Manager also believes the department's influence has grown larger within PSE. The Gas Compliance Steering Committee has been a vehicle for raising awareness at PSE and making people more accountable. There is a GC&RA participation in the process, managing the improvements stemming from audits "from cradle to grave."
- GC&RA examines the results and decide what internal investigations are needed. For example, on the Pierce County Audit, internal commitments were made to fix the problems. If violation of a UTC rule is found, normally a thorough investigation is done first before reporting it.
- The purpose of the Gas Compliance Steering Committee is to:
  - Review compliance programs
  - Track progress on tasks stemming from settlements

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<sup>83</sup> Interview 52

- Discuss development of internal and external audits
- Follow-through on major matters of concern which are discovered during the on-going QA/QC process
- Other or new business
- The Manager of Quality Assurance and Inspection sets the agenda, prepares and distributes the meeting minutes and assigns action items. The group discusses commitments made to the UTC with regard to audit findings and settlement agreements. This group is also used as an avenue for various program coordinators to get director guidance and approval for decisions made as a result of their programs.

Typical Gas Compliance Steering Committee attendees include:

- Manager, Quality Assurance and Inspection
- Manager, Compliance and Regulatory Audits, Gas
- Manager, Quality Control Gas Operations
- Director, Gas Operations
- Director, Operations Services
- Director, Compliance and Safety

Jacobs participated in the March, 2009 Gas Compliance Steering Committee Meeting as observers<sup>84</sup>, and also received the minutes, agenda, and supporting documents from the 2008 and 2009 meetings<sup>85</sup>.

- The Gas Compliance Steering Committee meetings provide an excellent forum for communicating continuing surveillance information. The three types of continuing surveillance output were evident in our observation of a Gas Compliance Steering Committee Meeting, and previous meeting materials:
  - UTC reporting
  - Internal auditing
  - Complying with settlement agreements
- We observed an emphasis on the first- and third-items, a more reactive philosophy focused on UTC's findings, rather than a proactive planned approach to system maintenance that could be based on knowledge gained and organized through the

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<sup>84</sup> Interview 56

<sup>85</sup> Document Request 99

continuing surveillance process. The lack of a unified continuing surveillance tracking system appeared to be a root-cause of that emphasis.

- Audits are usually specific to a settlement driven program, specific concern, or geographic location.

A crucial tie between continuing surveillance and Internal Auditing falls within the responsibilities for both System Maintenance Planning and System Control and Protection in the area of recording and reviewing of information. In that regard, the Gas Operating Standards have the following requirements:

## **6. Frequency**

- 6.1 Continuing surveillance reviews required under Section 5 shall be conducted on an annual basis.
- 6.2 Continuing surveillance as required in Section 4 shall be ongoing and performed in the course of construction, operations and maintenance activities.

Section 5, referred to in the operating standards above, and is in reference to functions under the Manager, Total Energy System Maintenance Planning, and the Consulting Engineer, Corrosion Control. Section 4, referred to above, is visual surveillance conducted throughout the company during the course of construction, operation and maintenance.

Referring to the meaning of continuing surveillance used in this report, the collection of system knowledge, maintaining and monitoring of records, and acting on that knowledge to ensure system safety:

- Field observers noted no material inventory is related back to the actual pipe installed. In terms of continuing surveillance, this would indicate there is no easy way to locate potentially defective material/equipment that might be identified in the future.
- We have found no evidence of an annual continuing surveillance review as specified in Section 6.1 of the Gas Operating Standards.
- The Annual Review contains information in regard to the status of several maintenance programs, with an emphasis on those related to UTC settlement agreements. It is not in Jacobs's opinion an annual review of ongoing continuing surveillance performed in the course construction, operations and maintenance activities as required by Section 6.2 of the Gas Operating Standards.

- The Utility states the records review is part of the process conducted by the Senior Engineering Specialist to identify trends on the number and severity of issues. It is described as an on-going review to categorize work for budgeting purposes<sup>86</sup>.

#### **8.4.4 Settlement - Related Reports**

- A major agenda topic of the Compliance Steering Committee meetings is progress reporting on items related to settlement agreements with the UTC.
- PSE has also developed a new method for tracking their responses to UTC data requests. It clarifies the intent of UTC's data requests, and according to the GC&RA Manager, UTC is said to be happy with that process<sup>87</sup>. There will be a second stage of the process activated if problems occur. The UTC and PSE will have 72 hours to escalate the problem to upper management to resolve the problem.
- In regard to existing settlement agreement programs, metrics were presented at the observed March 2009 meeting regarding:
  - Bare Steel Replacement Program
  - Isolated Facilities Program
  - Wrapped Steel Assessment Program
  - Relief Vent Inspection and Remediation Report
- Data including target completion dates, number, and percentage of targeted actions completed was presented for each program.
- All programs were reported as being on target except the Isolated Facilities Program. In that case, the Un-metered Riser and Bridge Casings subprograms are behind schedule and will need an extension granted beyond the July 2009 deadline.
- Three audits were discussed:
  - Thurston/Lewis County
  - Pierce County
  - West King County
- A summary of the Compliance Steering Committee materials supplied in regard to settlement - related reports<sup>88</sup> indicates further that PSE is taking its responsibilities under the settlement agreements seriously.

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<sup>86</sup> Interview 51

<sup>87</sup> Interview 52

<sup>88</sup> Document Request 99

## 8.4.5 Discretionary Programs

According to the definition of continuing surveillance applied in this report, an effective Continuing Surveillance program would include collection of system knowledge, maintaining and monitoring of records, and acting on that knowledge to ensure system safety. Therefore, we asked PSE to describe their discretionary compliance-type programs, not driven by UTC Settlement Agreements, which resulted from an expansion of mandated programs. PSE responded with the description shown in Figure 24<sup>89</sup>.

**Figure 24 – PSE’s Self-Described Discretionary Maintenance Programs**

Program Name	Program Scope
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<sup>89</sup> Document Request 176

Service Regulator Relief Vent Program	Following the identification of PVC vent pipes on service regulators, it was discovered that well meaning Mechanical/HVAC contractors were continuing to install PVC piping after retrofitting existing HVAC systems. PSE has begun communicating with these installers and continues to look for recent installations.
Buried Meter/Riser Remediation	During the recently completed isolated facility/atmospheric corrosion inspection, a number of installations were identified with meters and/or risers buried too deep. PSE has begun a remediation program of these installations.
Casings on Steel Services	PSE expanded the identification and remediation of steel mains in casings to include steel service lines installed in casings.
Double Insulated Flange Mitigation	Investigation and remediation of electrically isolated steel valves. This is a combination of replacement, maintenance, and inspection work that came about from the critical bond program.
HVAC Mitigation	Investigation, assessment, and mitigation of areas where high voltage alternating current (overhead transmission lines) may pose a safety risk to field operations employees. Current work is limited to investigation and assessment. Future work will include mitigating areas of concern and potential replacement work.
Inside Meter Set Remediation	Remediation of maintenance issues discovered during annual H2RL survey. Includes remediation of atmospheric corrosion, encroachments, access issues, venting issues, etc.
Mobile Home Community Remediation	Remediation of maintenance issues discovered during 3-year mobile home community patrol. Maintenance issues are typically associated with main and service encroachments as well as idle risers.
Pre-1985 PE Pipe Mitigation	Mitigation of maintenance/safety concerns associated with older polyethylene pipe with a focus on DuPont PE. Current work is limited to replacement activities. Future work may include increased leak surveys or patrols.
Sidewalk Regulator Remediation	Remediation of maintenance issues discovered during sidewalk regulator inspections. Maintenance issues may be associated with atmospheric corrosion, access problems, cathodic protection and venting.

Unmaintainable District Regulator Remediation	Remediation of maintenance issues discovered during annual regulator station inspections. Includes gate and limit stations, district regulators, and farm taps. Maintenance issues may be associated with equipment malfunction, atmospheric corrosion, access problems, vaults, etc.
Unmaintainable MSA Remediation	Remediation of MSAs under the responsibility of Industrial Meter Operations (IMO). Maintenance issues may be associated with equipment malfunction, atmospheric corrosion, access problems, etc.

- In reviewing these items, only the Casings on Steel Services program are truly discretionary. In that program, PSE has taken an existing program regarding mains, and proactively applied to investigate if the same problems occur in cased-steel services.
- All other programs listed are examples of the remediation of maintenance issues after they are discovered, as would be required and expected of all utilities.

## 8.4.6 Conclusions

Continuing surveillance includes the collection and evaluation of historical data in order to survey patterns and trends which could indicate future problems. Our examination of the log of incidents reportable to the UTC found some areas where that information could be improved. It should be noted the information reported was apparently in compliance with the requirements set by the UTC. Examples include

- In the Description column, a more consistent use of terms designating whether damages were done by a third-party is needed. The term Contractor should describe if it is referring to a third-party or PSE contractor.
- Incidents not attributable to third parties would benefit from a more consistent description of causes.
- The category column often contains media coverage (MC) alone. Even though UTC no longer requires reporting in this category, the log should be modified to reveal if other reportable incident types led to the media coverage of the incident.
- There were no entries in the log attributed to corrosion. Although material failures from corrosion or other causes could result in line breaks, PSE states that they normally result in leaks which are not reportable.

If PSE has collected additional information on these past incidents, which would be expected in regard to a Continuing Surveillance program, then they should be able to provide additional data (See Recommendation 8.4.7.1).

As evidenced by the Gas Compliance Steering Committee meeting we observed, past meeting materials provided by PSE, and materials supplied in regard to settlement-related reports<sup>90</sup>, PSE is apparently taking its responsibilities under the settlement agreements seriously. The main thrust of the Compliance Steering Committee appears to be in tracking progress on settlement agreement items. More recently, we have seen evidence of a major undertaking to increase the auditability of leak repair records<sup>91</sup>. We also note these efforts require the coordination of many different organizations within PSE, and the coordination of several different record-keeping systems. This is a first step in the systemic change that is needed, with a greater emphasis on prevention through continuing surveillance of PSE's system.

We believe from our observations the emphasis of PSE in regard to the use of continuing surveillance information is on compliance with UTC settlements, not a proactive management of its system. This belief is further evidenced by PSE's list of discretionary maintenance programs where all but one was remediation of discovered problems (See Recommendation 8.4.7.2).

The Gas Compliance Steering Committee Meetings provide an excellent forum for communicating continuing surveillance information, but as their title suggests, and work has evidenced, there is more emphasis on complying with UTC Audits and regulatory reporting than internal auditing that could be based on knowledge gained and organized through the continuing surveillance process. Another example is although the GC&RA Manager would like to see improvements in the aggregation of information in one system, and a major improvement planned is the use of XEM, a program related to SAP, it will be limited to tracking compliance items only. Likewise, we have seen evidence of a major undertaking to increase the auditability of leak repair records. The lack of a unified continuing surveillance tracking system appears to be a root-cause of a lesser degree of emphasis on proactive internal auditing. PSE's organizational structure and separation of data is better suited to respond to compliance-driven audits of particular programs (See Recommendation 8.4.7.3).

We have found no report meeting all of the requirements for an annual continuing surveillance review conducted by PSE as specified in Section 6.1 and 6.2 of the Gas Operating Standards for continuing surveillance. PSE states the records review is part of the process conducted by the Senior Engineering Specialist to identify trends on the number and severity of issues. PSE describes this process as an on-going review to categorize work for budgeting purposes<sup>92</sup>. They also maintain, while no annual report is produced, the output of the budgeting process is evidence the review is performed<sup>93</sup>.

Looking at the meaning of continuing surveillance defined by this report:

- Collection of system knowledge

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<sup>90</sup> Document Request 99

<sup>91</sup> Document Request 118

<sup>92</sup> Interview 51

<sup>93</sup> PSE Comments dated May 9, 2009 on Draft Report



- Maintaining and monitoring of records
- Acting on that knowledge to ensure system safety

The budgeting process emphasizes the last item. It does not meet the requirements for a Continuing Surveillance Annual Review, especially in regard to Section 6.2, lacking a complete annual review of ongoing system conditions recorded during construction and operation. In regard to maintenance, continuing surveillance data was found to be collected on a variety of systems and in a variety of locations, which may be unified with great effort in the budget process (See Recommendation 8.4.7.4).

The gas portion of the System Performance Programs Annual Review also does not meet the requirements of an annual continuing surveillance review. It is focused primarily on settlement-related programs, and performance issues (See Recommendation 8.4.7.5).

## **8.4.7 Recommendations**

- 8.4.7.1 PSE should add clarification to the record regarding certain categories of UTC-reportable incidents as described in Section 4.2 UTC reportable incidents for the purpose of continuing surveillance.
- 8.4.7.2 A greater focus on the use of continuing surveillance information for internal auditing and a proactive approach to management of the gas system is needed. PSE should use the annual continuing surveillance report to identify trends, initiate proactive measures, and track subsequent progress. The end result would be enhanced system integrity and a reduced need for settlement agreements and settlement-related audits.
- 8.4.7.3 In the interest of coordinating all aspects of continuing surveillance, PSE should coordinate various departments (if not consolidated in response to Recommendation 8.2.8.1) concerning continuing surveillance, and appoint a manager to report on continuing surveillance to the Gas Compliance Steering Committee.
- 8.4.7.4 Efforts to consolidate information to provide a workable continuing surveillance system should receive a higher priority.
- 8.4.7.5 The annual continuing surveillance review as specified in the Gas Operating Standards should be performed and become the major indicator of the state of the gas system.

# Appendix 1

## PSE Form 3704 or "Blue Card" for Continuing Surveillance

### REPORTING ABNORMAL OR UNUSUAL OPERATING CONDITIONS ON GAS FACILITIES

ADDRESS		CITY	COUNTY
PLAT NO.		LOCATION	
CONDITION REPORTED BY (Print Full Name)		JOB TITLE	
COMPANY		PHONE NO.	DATE
METER NUMBER (If Applicable)		METER LOCATION (If Applicable)	
<b>SUSPECTED UNSAFE CONDITION</b> (Check all that apply) <input type="checkbox"/> Normally buried pipeline is exposed <input type="checkbox"/> The pipeline has less than 12 inches of cover with no concrete cap or additional protection. <input type="checkbox"/> Pipeline has moved and appears stressed <input type="checkbox"/> Pipeline facility has been tampered with in a way that impairs the safe operation of the facility <input type="checkbox"/> Pipeline facility has been vandalized in a way that impairs the safe operation of the facility <input type="checkbox"/> Pipeline facility has sustained vehicular or other damage <input type="checkbox"/> Permanent inhabited building has been installed upon the pipeline facility <input type="checkbox"/> A vent termination is within 2 feet of an air intake <input type="checkbox"/> Pipeline is in direct contact with another utility <input type="checkbox"/> A direct buried PE pipeline is within 6 inches of direct buried electric cables <input type="checkbox"/> The pipeline is routed through another utility		<b>SUSPECTED UNSATISFACTORY CONDITION</b> (Check all that apply) <input type="checkbox"/> Meter is buried or in contact with the ground <input type="checkbox"/> Permanent encroachment or structure located over the pipeline <input type="checkbox"/> Rocks impinging upon the surface or coating of the pipe <input type="checkbox"/> Foreign material that may cause damage to the pipe or pipe coating; found in contact with the pipe <input type="checkbox"/> Sharp rocks found in the bedding or initial backfill around PE pipe <input type="checkbox"/> Rocks larger than 10 inches present in the backfill <input type="checkbox"/> A direct buried PE pipeline is within 7-11 inches of direct buried electric cables <input type="checkbox"/> Relief vent does not point downward <input type="checkbox"/> Relief vent piping does not have a weather cap or point downward	
		<b>SUSPECTED NON-STANDARD CONDITION</b> (Provide Description) _____ _____	
		<b>STANDARD NUMBER</b> (If known) _____	
HOW WAS THE CONDITION DISCOVERED? Describe the reason why you were in the area. <input type="checkbox"/> Leak Survey <input type="checkbox"/> Yearly Inspection <input type="checkbox"/> Other inspection program _____ <input type="checkbox"/> Leak Repair <input type="checkbox"/> Chart Changing <input type="checkbox"/> Other _____ <input type="checkbox"/> Test and Tie <input type="checkbox"/> Main or service replacement work <input type="checkbox"/> Uprate _____			
ACTION TAKEN AT TIME OF DISCOVERY OF CONDITION (If no action taken, please note) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Describe _____ Submitted to Supervisor <input type="checkbox"/> Yes <input type="checkbox"/> No			

3704 10/06

PLEASE CONTINUE FILLING OUT FORM ON REVERSE

DESCRIPTION OF CONDITION - BE SPECIFIC. Include all pertinent information; e.g. main or service, pipe size, type, pressure. Attach photos or sketch if possible.

**TO BE FILLED OUT BY MAINTENANCE PLANNING OR GAS FIRST RESPONSE**

SUSPECTED CONDITION CLASSIFICATION CORRECT?  YES  NO

IF NO, RECLASSIFY CONDITION \_\_\_\_\_

ACTION REQUIRED?  YES  NO

IF NO, PROVIDE REASON \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

IF YES, DESCRIBE ACTION TAKEN \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

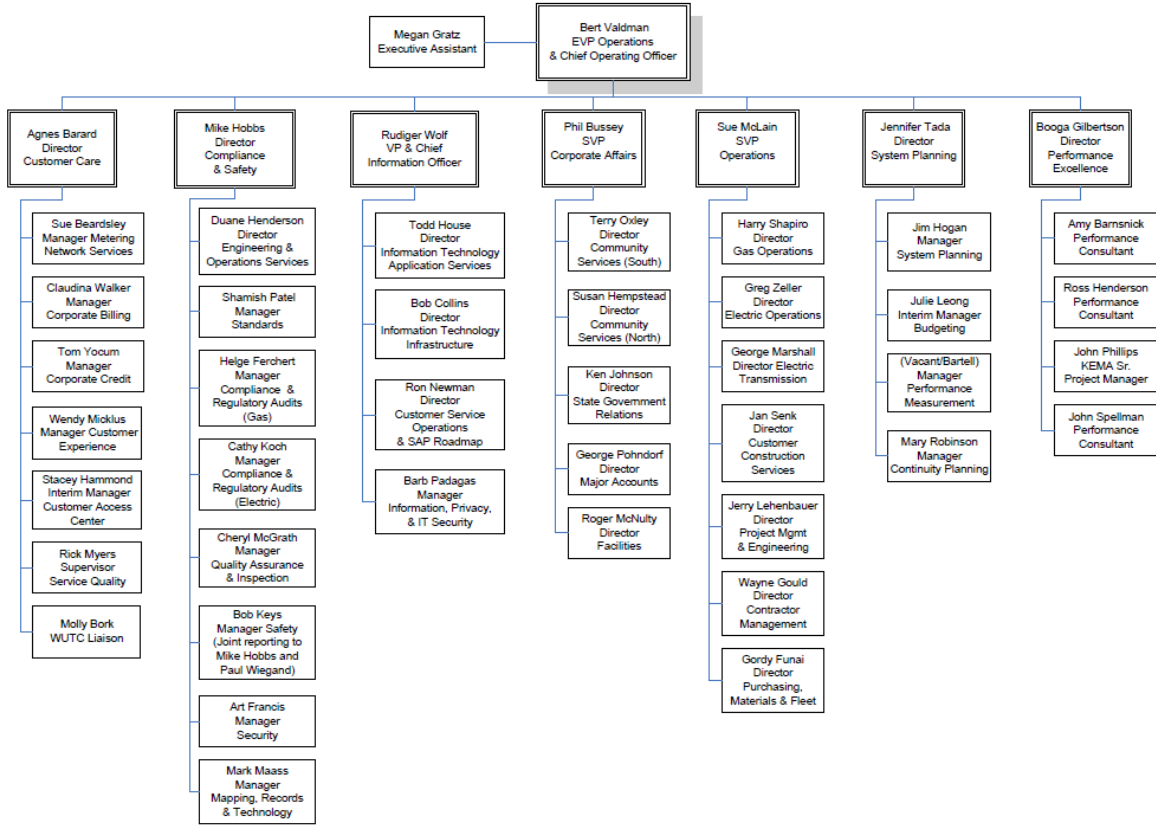
ORDER NO./NOTIFICATION NO.

NAME

PHONE NO.

# Appendix 2

## PSE Operations Organization Chart



# Appendix 3

## PSE Operating Standards for Continuing Surveillance

### Continuing Surveillance

2575.2700

#### 1. Scope

This Operating Standard establishes the requirements for continuing surveillance of PSE's pipelines through periodic examination of records and through visual examination of facilities during construction, operation, and maintenance activities. Continuing surveillance activities related to pipeline facility failures are specified in Operating Standard 2575.1900.

#### 2. Responsibilities

- 2.1 The *Manager Total Energy System Planning* shall be responsible for:
  - 2.1.1 Conducting a records review, as required by Section 5 of this Operating Standard.
  - 2.1.2 Developing a remediation plan for unsatisfactory conditions, as required by Section 7 of this Operating Standard.
  - 2.1.3 Reviewing and prioritizing maintenance and repair work to correct unsatisfactory pipeline conditions that are determined to require repair.
  - 2.1.4 Determining if remediation is necessary for nonstandard conditions or if other actions are appropriate, such as suggesting revisions to Operating Standards and Field Procedures.
  - 2.1.5 Maintaining records in accordance with Section 8 of this Operating Standard.
- 2.2 The *Consulting Engineer, Corrosion Control* shall be responsible for conducting a records review, as required by Section 5 of this Operating Standard, and maintaining documentation in accordance with Section 8 of this Operating Standard.
- 2.3 *All Company and Contract Personnel* performing construction, operation, or maintenance activities shall be responsible to observe pipeline facilities and report unsafe, unsatisfactory, or nonstandard conditions as defined under Section 3 of this Operating Standard.
  - 2.3.1 Report unsafe conditions to the *Manager Gas First Response*.
  - 2.3.2 Report unsatisfactory conditions to the *Manager Total Energy System Planning*.
  - 2.3.3 Report nonstandard conditions to the *Manager Total Energy System Planning*.
- 2.4 The *Manager Gas First Response* shall be responsible for:
  - 2.4.1 Responding to suspected unsafe conditions.
  - 2.4.2 Initiating remediation for confirmed unsafe conditions.
  - 2.4.3 Notifying the *Manager Total Energy System Planning* of unsafe conditions that are downgraded to unsatisfactory in accordance with Section 7.5 of this Operating Standard.
  - 2.4.4 Determining if confirmed unsatisfactory conditions should be monitored and initiate monitoring as appropriate with Section 7.6.2 of this Operating Standard.

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- 2.5 The *Manager System Control and Protection* shall be responsible for notifying the *Manager Total Energy System Planning* when reports of patrols, surveys, and other maintenance activities identify unsatisfactory conditions.
- 2.6 The *Manager Gas Compliance and Regulatory Audits* shall be responsible for reporting safety related conditions to the WUTC and the Office of Pipeline Safety, in accordance with the requirements set forth in Operating Standard 2425.1200.
- 2.7 The *Manager Contractor Management* shall be responsible for ensuring remediation work is scheduled and completed.
- 2.8 The *Manager Gas First Response* or the *Manager Engineering* shall be responsible for classifying pipeline conditions if the employee reporting the condition is unable to determine whether the condition is unsafe or unsatisfactory.

### 3. General Requirements

(CFR 192.613)

- 3.1 For the purposes of this Operating Standard, the following definitions apply:
  - 3.1.1 *Unsafe* is any abnormal operating condition which, unless remediated and controlled, could result in an immediate hazard to public safety and property.
  - 3.1.2 *Unsatisfactory* is any abnormal operating condition that will not result in an immediate hazard to public safety and property.
  - 3.1.3 *Nonstandard* is any abnormal or unusual operating condition that is a potential concern.
- 3.2 Classification of the conditions listed in Section 4 shall be made as either unsafe, unsatisfactory, or nonstandard. Examples of unsafe conditions are listed in Section 4, most other conditions would be considered unsatisfactory or nonstandard.
  - 3.2.1 If the employee reporting the condition is unsure whether the condition is unsafe or unsatisfactory, that person shall report the condition as unsafe.
- 3.3 Reports of unsafe, unsatisfactory, or nonstandard conditions that are not immediately remediated shall be reported on the Reporting Abnormal or Unusual Operating Conditions on Gas Facilities (Form 3704).
  - 3.3.1 Report any unsafe condition that meets the description of a safety related condition, as defined in Operating Standard 2425.1200, in accordance with that Operating Standard.

### 4. Visual Surveillance

- 4.1 In the course of construction, operation, and maintenance activities; visual inspections shall be made to identify the following conditions:
  - 4.1.1 Exposure or movement of pipeline facilities.
    - 4.1.1.1 If the change in topography has resulted in exposure or excessive erosion over the pipeline, this shall be considered an unsafe condition.

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- 2.5 The *Manager System Control and Protection* shall be responsible for notifying the *Manager Total Energy System Planning* when reports of patrols, surveys, and other maintenance activities identify unsatisfactory conditions.
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- 4.1.1.2 If the pipeline has moved and is stressed as a result of the movement, this shall be considered an unsafe condition until further engineering analysis determines that the installation is acceptable.
- 4.1.1.3 If land movement meets or exceeds the limitations of Operating Standard 2575.3100, this shall be considered an unsafe condition.
- 4.1.2 Potential for or evidence of tampering, vandalism, or damage.
  - 4.1.2.1 If the pipeline or pipeline facility has been tampered with, vandalized, or damaged in a way that would impair its serviceability or safe operation, this shall be considered an unsafe condition.
    - 4.1.2.1.1 If tampering has occurred, the Risk Management Department shall be contacted to conduct an investigation, and the situation shall be documented and remediated in accordance with this Operating Standard.
  - 4.1.2.2 A riser, meter, or manifold that has been disconnected from the fuel line and not properly supported shall be considered an unsafe condition.
  - 4.1.2.3 Emphasis shall be given to damage caused by vehicular operation.
    - 4.1.2.3.1 The need for additional protection for meter assemblies or other Company facilities damaged by a vehicle shall be evaluated by the repair crew before leaving the site.
    - 4.1.2.3.2 If it is determined that additional protection should be installed to reduce the possibility of similar damage occurring in the future, the crew shall install suitable protection immediately, if possible.
    - 4.1.2.3.3 If protection is required, but cannot be installed immediately, the crew shall leave a protective barricade in place and shall institute an order for installation of a permanent protective device.
      - 4.1.2.3.3.1 A protective barrier may consist of a traffic barricade (MID 7225800) or traffic cones (MID 7240300) and barricade caution tape (MID 6887100).
- 4.1.3 Encroachments on pipeline facilities.
  - 4.1.3.1 If any inhabited building has been installed upon a pipeline, this shall be considered an unsafe condition.
  - 4.1.3.2 Other encroachments or structures such as retaining walls, sound walls, or uninhabited buildings may be considered unsatisfactory conditions.
- 4.1.4 Potential for gas migration into buildings from vents through air intakes.
  - 4.1.4.1 If the air intake is located within 2 feet of a vent piping termination, this shall be considered an unsafe condition.



- 4.1.5 Potential for moisture to enter a service regulator or regulator breather vent.
  - 4.1.5.1 If the regulator vent terminates in the horizontal direction or does not have adequate weather protection, this shall be considered an unsatisfactory condition.
- 4.1.6 Damage to or imperfections of pipelines when buried pipelines are exposed.
  - 4.1.6.1 If the damage or imperfection of the pipeline meets or exceeds the limitations of Operating Standards 2575.1700, 2575.1800, or 2575.2800, this shall be considered an unsafe condition.
- 4.1.7 Irregular environmental conditions surrounding pipelines when buried pipelines are exposed.
  - 4.1.7.1 If the environmental condition meets or exceeds the cover or clearance criteria of Operating Standard 2575.2800, this shall be considered an unsafe condition.

## 5. Records Review

- 5.1 The *Manager Total Energy System Planning* shall be responsible for:
  - 5.1.1 Reviewing completed work orders (including leak repairs, maintenance, and other work), patrol records, leakage survey records, leakage history, and inspection records for abnormal or unusual operating and maintenance conditions on unprotected steel and polyethylene pipelines.
  - 5.1.2 Determining the general status of pipeline facilities based on the above review and generating replacement work orders.
  - 5.1.3 Reviewing unsafe, unsatisfactory, and nonstandard conditions to identify trends and to determine the appropriate follow-up to address those trends, such as suggesting revisions to maintenance requirements, Operating Standards, or Field Procedures.
- 5.2 The *Consulting Engineer, Corrosion Control* shall be responsible for:
  - 5.2.1 Reviewing completed work orders (including leak repairs, corrosion control, maintenance, and other work), leakage survey records, leakage history, and inspection records for abnormal or unusual corrosion conditions and on substantial changes in cathodic protection requirements for cathodically protected pipelines.
  - 5.2.2 Determining the general trend of corrosion processes and corrosion control mechanisms for pipeline facilities based on the above review and generating remedial work orders, or other follow-up as necessary (such as further engineering analysis or more stringent maintenance criteria).

## 6. Frequency

- 6.1 Continuing surveillance reviews required under Section 5 shall be conducted on an annual basis.
- 6.2 Continuing surveillance as required in Section 4 shall be ongoing and performed in the course of construction, operations and maintenance activities.

**7. Remediation**

(CFR 192.613 and CFR 192.703)

- 7.1 Damage to pipe or pipe fittings shall be remediated in accordance with Operating Standards 2575.1700, 2575.1800, or 2600.1900.
  - 7.1.1 Damaged coatings shall be remediated in accordance with Operating Standard 2600.1100.
- 7.2 For situations that do not involve pipeline damage, such as encroachments, erosion, and irregular environmental conditions; the unsafe, unsatisfactory, or nonstandard condition should be remediated such that the pipeline meets current Operating Standards and Field Procedures.
- 7.3 If an unsafe condition is suspected, the condition shall be investigated and action shall be directed toward protecting people first and then property.
- 7.4 If an unsafe condition is confirmed, the segment of pipe shall be replaced, repaired, or removed from service.
- 7.5 If after investigation by Gas First Response it is determined that the suspected unsafe condition will not result in an immediate hazard to public safety or property, the condition shall be downgraded to an unsatisfactory condition and Section 7.6 shall be followed.
- 7.6 If an unsatisfactory condition is confirmed, the following shall be done:
  - 7.6.1 The *Manager Total Energy System Planning* shall ensure a remediation plan is developed to recondition or phase out the segment involved. This should be done in consultation with Engineering, Gas First Response, Contract Management, and System Control and Protection.
  - 7.6.2 The *Manager Gas First Response* shall determine if the site should be monitored, and initiate monitoring as appropriate until the unsatisfactory condition is remediated.
  - 7.6.3 If the segment cannot be reconditioned or phased out, the maximum allowable operating pressure (MAOP) shall be reduced to a maximum safe pressure after considering the history of the segment, known corrosion, and the actual operating pressure.
    - 7.6.3.1 Overpressure protective devices shall be installed on this segment to prevent the maximum safe pressure from being exceeded.
    - 7.6.3.2 The *Manager Total Energy System Planning, Manager Standards, Supervisor Maps, Records, and Technology, and Manager Gas System Operations* shall be notified before reducing the MAOP.
- 7.7 If a nonstandard condition is suspected, the *Manager Total Energy System Planning* shall review the reported condition, determine if remediation is necessary, and initiate corrective action as needed.
- 7.8 The Total Energy System Planning Department shall be responsible for scheduling and tracking remediation work orders for unsatisfactory and nonstandard conditions.

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7.9 The *Manager Total Energy System Planning* shall maintain the completed Reporting Abnormal or Unusual Operating Conditions on Gas Facilities form (Form 3704), also known as the Blue Card, until the condition is remediated.

7.9.1 If a suspected unsafe, unsatisfactory, or nonstandard condition is reevaluated and reclassified, the reason for reclassification shall be recorded on the Reporting Abnormal or Unusual Operating Conditions on Gas Facilities (Form 3704).

7.9.2 A copy of the form indicating the reason for reclassification shall be distributed to the person who reported the condition, the manager of the person reporting the condition, and the *Manager Standards*.

**8. Records**

8.1 A work order shall be opened and tracked for all conditions that are scheduled for remediation.

8.2 The annual review on Section 5 shall be documented and maintained for a minimum of 5 years by the department responsible for the review.

**9. Covered Task Summaries**

The following PSE Covered Task Summaries (CTS) apply to this standard:

9.1 CTS 0901 System Patrolling

**10. References**

The following PSE documents apply to this standard:

# Appendix 4

## PSE's Budgeted Maintenance Programs



Gas 2009 Budget  
Planning.xls

Group	SMP Category	Major System	Managing Organization	System or Major Asset	Sub-Category	Compliance Authority	Program Description	Population (total units in system)	Frequency	Program Duration
1	CP Source and Test Site	Gas - Mains & Services	SC&P	Mains and Services	Cathodically Protected Transmission	DOT 192.465, WAC 480-93-110	CP Transmission Power Source Inspections	33	Every 2 months	Perpetual
1	CP Source and Test Site	Gas - Mains & Services	SC&P	Mains and Services	Cathodically Protected Transmission	DOT 192.465, WAC 480-93-110	CP Transmission Test Site Inspections	1,179	Annual	Perpetual
1	CP Source and Test Site	Gas - Mains & Services	SC&P	Mains and Services	Cathodically Protected Distribution	DOT 192.465, WAC 480-93-110	CP Distribution Power Source Inspections	267	Every 2 months	Perpetual
1	CP Source and Test Site	Gas - Mains & Services	SC&P	Mains and Services	Cathodically Protected Distribution	DOT 192.465, WAC 480-93-110	CP Distribution Test Site Inspections: Includes test sites on both the annual and 9-year inspection schedule.	44,064	Annual	Perpetual
1	CP Source and Test Site	Gas - Mains & Services	SC&P	Mains and Services	Cathodically Protected Distribution Services	DOT 192.465, WAC 480-93-110	CP Service Maintenance	1,737	As needed	Perpetual
1	CP Source and Test Site	Gas - Mains & Services	SC&P	Mains and Services	Cathodically Protected Distribution	DOT 192.465, WAC 480-93-110	CP Distribution Main Maintenance performed by SC&P	1,737	As needed	Perpetual
1	CP Source and Test Site	Gas - Mains & Services	SC&P	Mains and Services	Cathodically Protected Transmission	DOT 192.465, WAC 480-93-110	CP Transmission Main Maintenance	1,737	As needed	Perpetual
1	Valve Locate, Operate, and Maintain	Gas - Valves	GFR	Valves	Distribution Critical Main Valves	DOT 192.747	<b>Locate &amp; Operate:</b> Annually locate and operate critical main valves. Perform corrective maintenance as required by inspections. This includes "unplanned" work on these valves by GFR & SP	310	Annual	Perpetual
1	Valve Locate, Operate, and Maintain	Gas - Valves	GFR	Valves	Distribution Critical Main Valves	DOT 192.747	<b>Valve maintenance &amp; repair:</b> Gas First Response corrective maintenance of distribution and transmission main valves as required.	310	Annual	Perpetual
1	Valve Locate, Operate, and Maintain	Gas - Valves	GSW	Valves	Distribution Critical Main Valves & Transmission Critical Main Valves	DOT 192.747	<b>Valve maintenance &amp; repair:</b> Pilchuck corrective maintenance of distribution and transmission main valves as required.	310	As needed	Perpetual
1	Instrumentation	Gas - Metering	GSO	Instruments	ECATS/AMR	GOS 2450.1600	<b>ECATS/AMR Inspections:</b> Checked in the field, using various shop-calibrated instruments. A calibration check is required to ensure the instruments are operating within allowable tolerances. Calibration of gas control instruments is required when the results of the calibration check fall outside allowable tolerances. Per Operating Standards, ensure correct measurement of pressures, volumes and temperatures of gas in distribution system.	600	Annual	Perpetual
1	Instrumentation	Gas - Metering	GSO	Instruments	ECATS/AMR	GOS 2450.1600	<b>ECATS/AMR</b> maintenance resulting from inspections. This work is primarily unplanned.	unplanned	As needed	Perpetual
1	Valve Locate, Operate, and Maintain	Gas - Valves	SC&P	Valves	Critical Valves on Transmission Main	DOT 192.747	<b>Locate &amp; Operate:</b> Annually locate and operate critical main valves on Transmission Main as performed by Pressure Control only. Perform corrective maintenance as required by inspections. This includes unplanned work. This does not include most of the corrective maintenance (which is done by Pilchuck).	13	Annual	Perpetual
1	Valve Locate, Operate, and Maintain	Gas - Valves	SC&P	Valves	Critical Valves on Distribution Main	DOT 192.747	<b>Locate &amp; Operate:</b> Annually locate and operate critical main valves on Distribution Main. Perform corrective maintenance as required by inspections. This includes unplanned work by Pressure Control. This does not include most of the corrective maintenance (which is done by Pilchuck).	748	Annual	Perpetual
1	Valve Locate, Operate, and Maintain	Gas - Valves	SC&P	Valves	Critical Valves on Transmission Main	DOT 192.747	<b>Valve maintenance &amp; repair:</b> Pressure Control corrective maintenance of transmission main valves as required.	13	As needed	Perpetual
1	Valve Locate, Operate, and Maintain	Gas - Valves	SC&P	Valves	Critical Valves on Distribution Main	DOT 192.747	<b>Valve maintenance &amp; repair:</b> Pressure Control corrective maintenance of distribution main valves as required.	310	As needed	Perpetual

	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Mains & Services	GFR	<b>Services</b>	Everything associated with services leading to inside meter sets.	DOT 192.723, WAC 480-93-188	<b>Inside meter survey:</b> Inside meter survey (leak test, accessibility, presence of shut off valve, assess surrounding area), atmospheric corrosion inspection of service and regulator. Locate and operate valve. Includes corrective maintenance by GFR.	14,603	Annual or every five years as required by location	Perpetual
	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Mains & Services	GFR	<b>Services</b>	Everything associated with services leading to inside meter sets.	DOT 192.723, WAC 480-93-188	<b>Inside meter survey resulting maintenance associated to service valves done by GFR only.</b>	13,603	As needed	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Meter Set</b>	Gas Meters and Regulation	GOS 2550.1400	<b>Fixed Factor Checks:</b> Fixed Factor Measurement is defined as the measurement of gas at a controlled elevated pressure by applying a pressure-correcting factor to the measured volume. Per Operating Standards, ensure correct measurement of pressure of gas for accurate customer billing. This includes minor maintenance found necessary at the time of inspection.	4,817	Annual	Perpetual
1	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Metering	GFR	<b>Meter Set</b>	Gas - Metering	WAC 480.90.348	<b>Res/Comm Meter Changes:</b> Periodic Meter Change-Outs, Random Samples, Failed Families (Res/Comm)	0	Annual	Perpetual
1	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Metering	SC&P	<b>Meter Set</b>	Meters (Industrial)		<b>Industrial Meter Changes:</b> Periodic Meter Change-Outs (Industrial)			Perpetual
1	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Metering	SC&P	<b>Meter Set</b>	Meters having level "3" Atmospheric Corrosion, thus requiring timely repair	DOT 192.481, WAC 480-93-112	<b>Atmospheric Remediation:</b> As Needed, Repair atmospheric corrosion found on all meters within 90 days of detection. Only Industrial/Commercial meters that are handled by SC&P. Note: the inspection work is handled by the AMR group.		As needed	Perpetual
1	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Metering	SC&P	<b>Meter Set</b>	Ind/Comm meters & Regulator Stations	DOT 192.481, WAC 480-93-112	<b>Atmospheric Remediation:</b> Changes reflect a PM approach to providing Atmospheric protection to IMO MSAs and Regulator Stations rather than simply responding to severe corrosion.	All Reg Stations plus all IMO MSAs (700)	10% of ind mtrs & Reg. Stations each year	Perpetual
1	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Metering	GFR	<b>Meter Set</b>	Meters having level "3" Atmospheric Corrosion, thus requiring timely repair	DOT 192.481, WAC 480-93-112	<b>Atmospheric Corrosion Remediation:</b> As Needed, Repair atmospheric corrosion found on all meters within 90 days or 12 months of detection as required by the GOS. MSA corrosion repaired by GFR.		As Required	As Required
1	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Metering	GSW	<b>Meter Set</b>	Meters having level "3" Atmospheric Corrosion, thus requiring timely repair	DOT 192.481, WAC 480-93-112	<b>Atmospheric Remediation:</b> As Needed, Repair atmospheric corrosion found on all meters within 90 days of detection. MSA corrosion repaired by PCI.		As Required	As Required
1	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	SC&P	<b>Mains</b>	Pipeline Markers on Distribution Mains	WAC 480-93-124	<b>Pipeline Marker (PLM):</b> Inspect and maintain pipeline markers on distribution mains. This includes replacing damaged or missing markers and getting locations for newly installed markers. This reflects work that will be done by Heath only.	4,900	5 year Cycle	Perpetual
1	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	SC&P	<b>Mains</b>	Pipeline Markers on Transmission Mains	WAC 480-93-124	<b>Pipeline Marker (PLM):</b> Inspect and maintain pipeline markers on transmission mains. This includes replacing damaged or missing markers and getting locations for newly installed markers. This reflects work that will be done by Heath only.	270	5 year Cycle	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	PV/PVT Recording Charts on Large Volume Customers	GOS 2450.1600	<b>PV/PVT Recording Chart Inspections on Large Volume Customers;</b> Checked in the field, using various shop-calibrated instruments. A calibration check is required to ensure the instruments are operating within allowable tolerances. Calibration of gas control instruments is required when the results of the calibration check fall outside allowable tolerances. Per Operating Standards, ensure correct measurement of pressures, volumes and temperatures of gas in distribution system.	229	Annual	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	PV/PVT Recording Charts on Large Volume Customers	GOS 2450.1600	<b>PV/PVT Recording Chart maintenance resulting from inspections.</b>	unplanned	As needed	Perpetual

							<b>RTU Scheduled Operations for Customer:</b> Checked in the field, using various shop-calibrated instruments. A calibration check is required to ensure the instruments are operating within allowable tolerances. Calibration of gas control instruments is required when the results of the calibration check fall outside allowable tolerances. Per Operating Standards, ensure correct measurement of pressures, volumes and temperatures of gas in distribution system.			
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	RTUs (Customer)	GOS 2450.1600		55	Annual	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	RTUs (Customer)	GOS 2450.1600	<b>RTU Customer Maintenance resulting from inspections</b>	unplanned	As needed	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	RTUs (PSE)	GOS 2450.1600	<b>RTU Scheduled Operations for system:</b> Checked in the field, using various shop-calibrated instruments. A calibration check is required to ensure the instruments are operating within allowable tolerances. Calibration of gas control instruments is required when the results of the calibration check fall outside allowable tolerances. Per Operating Standards, ensure correct measurement of pressures, volumes and temperatures of gas in distribution system.	263	Annual	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	RTUs (PSE)	GOS 2450.1600	<b>RTU System Maintenance resulting from inspections</b>	unplanned	As needed	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	Suburban Gauges	GOS 2450.1600	<b>Suburban Gauge Inspections:</b> Checked in the field, using various shop-calibrated instruments. A calibration check is required to ensure the instruments are operating within allowable tolerances. Calibration of gas control instruments is required when the results of the calibration check fall outside allowable tolerances. Per Operating Standards, ensure correct measurement of pressures, volumes and temperatures of gas in distribution system.	378	Annual	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	Suburban Gauges	GOS 2450.1600	<b>Suburban Gauge maintenance resulting from inspections.</b>	unplanned	As needed	Perpetual
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	Test Gauges	GOS 2450.1600	<b>Test Gauge Inspection &amp; Calibration:</b> Checked in the field, using various shop-calibrated instruments. A calibration check is required to ensure the instruments are operating within allowable tolerances. Calibration of gas control instruments is required when the results of the calibration check fall outside allowable tolerances. Per Operating Standards, ensure correct measurement of pressures, volumes and temperatures of gas in distribution system.	876		Quarterly for billing gauges, semi-annually for Non-billing, annually for SC&P & shop
1	Instrumentation	Gas - Metering	GSO	<b>Instruments</b>	Test Gauges	GOS 2450.1600	<b>Test Gauge Maintenance / Repair:</b>	unplanned	As needed	Perpetual
2	Integrity Management	Gas - Mains & Services	GSE	<b>Mains</b>	Transmission Mains	GOS 2425.2200	<b>Integrity Management:</b> Pre-assessment and indirect examination work performed by GSE.	30 miles of Transmission Gas Mains	TBD	Perpetual
2	Integrity Management	Gas - Mains & Services	GSE	<b>Mains</b>	Transmission Mains	GOS 2425.2201	<b>Integrity Management:</b> Direct examination work performed by GSE in response to indirect examination results.			
2	Integrity Management	Gas - Mains & Services	GSW	<b>Mains</b>	Transmission Mains	GOS 2425.2202	<b>Integrity Management:</b> Direct examination work performed by PCI in response to indirect examination results.	30 miles of Transmission Gas Mains	TBD	Perpetual
2	Integrity Management	Gas - Mains & Services	Other	<b>Mains</b>	Transmission Mains	GOS 2425.2203	<b>Integrity Management:</b> Outside Contractor Services pertaining to guided wave investigation of casings..	30 miles of Transmission Gas Mains	TBD	Perpetual
2	Integrity Management	Gas - Mains & Services	GSW	<b>Mains</b>	Transmission Mains	GOS 2425.2204	<b>Integrity Management:</b> Pre-assessment and indirect examination work performed by PCI.			
2	Integrity Management	Gas - Mains & Services	SC&P	<b>Mains</b>	Transmission Mains	GOS 2425.2205	<b>Integrity Management:</b> Pre-assessment and indirect examination work performed by SC&P.	15 Miles	As Required	Perpetual

							<b>Underwater Crossings Surveying</b> - Preliminary list of 89 locations based on plat review that will require review. Heath charges \$38/hr for isolated locations. Assumed 2 hours/location including drive time to complete survey. As of 4/14/06 there are no surveys scheduled for 2006, so 1/3 of the 89 locations are assumed to require survey in 2007. Budget estimate includes \$17k for purchase of leak detection equipment.			
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains</b>	Distribution Mains			89		
1	Leak Repair	Gas - Mains & Services	SC&P	<b>Mains</b>	Distribution Mains		<b>Underwater Crossings Maintenance</b>			
	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	GFR	<b>Mains</b>	Gas mains located in slide areas or installed across bridges	DOT 192.721, WAC 480-93-120	<b>Continual Patrols- Bridge and Slide:</b> Monitor pipelines crossing bridge and slide areas to discover and address minor issues in order to avoid facing major issues. / Minor CM is included but the majority of CM is done by Pilchuck. This includes unplanned \$ for earthquake, slides, WSDOT requests.	349	Quarterly	Perpetual
3	Valve Locate, Operate, and Maintain	Gas - Mains & Services	GSW	<b>Valves</b>	Gas mains located in slide areas or installed across bridges	DOT 192.721, WAC 480-93-120	<b>Maintenance resulting from Continual Patrols- Bridge and Slide - Valves:</b> Pilchuck corrective maintenance of valves associated with bridges or slide areas. This is where SMP includes specific O&M projects associated with valve repairs.	558 (approx 2x # bridges/slides minus 20%)	As Needed	Perpetual
	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	GSW	<b>Mains</b>	Gas mains located in slide areas or installed across bridges	DOT 192.721, WAC 480-93-120	<b>Maintenance resulting from Continual Patrols- Bridge and Slide:</b> Monitor pipelines crossing bridge and slide areas to discover and address minor issues in order to avoid facing major issues. Includes 21 bridge maintenance projects (totaling \$318,225), two unplanned bridge maintenance projects (totaling \$36,022) and two expected slide remediation projects at \$30,000 each (based on 2005 costs). Minor CM is included but the majority of CM is done by Pilchuck	349	As Needed	Perpetual
	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	GSW	<b>Mains</b>	Gas mains located in slide areas or installed across bridges	WUTC agreement.	<b>Inspection - Continual Patrols - Bridge and Slide - Boomtrucks:</b> Inspect bridge sites using boomtrucks as part of T/L audit commitment to address atmospheric corrosion at hard-to-reach locations. 45 boomtruck locations with inspection required every three years gives approx. 15 locations per year at ~\$2,000 per boomtruck inspection (cost varies depending on site access, traffic conditions, bridge configuration, number of sites inspected per day in same area, etc.)	45	As Needed	Perpetual
	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	GFR	<b>Mains</b>	Gas mains located in slide areas or installed across bridges	DOT 192.721 WAC 480-93-120	<b>Continual Surveillance Patrols- Bridge and Slide:</b> This is for additional review of condition reported by field inspectors (e.g. bridge access using a boom truck, Engineering time to evaluate pitting etc.) The dollars for this work is accounted for in AVA01	340	As Needed	Perpetual
1	Alt Fuels	Gas - Storage	SC&P	<b>Storage</b>	Storage facilities		<b>Swarr Corrective Maintenance:</b> Repair and reinstate 6 propane tanks (\$36k) - this is being kept in the budget per Sharon Morgan.			
1	Alt Fuels	Gas - Storage	SC&P	<b>Storage</b>	Storage facilities		<b>Swarr/Dieringer Scheduled Work Orders:</b> Inspections and Repairs. This budget is an existing annual budget set as agreed with Steve H and Chuck D.	varies	Annual (not to exceed 15 months) - Includes as needed repairs.	Perpetual
1	Alt Fuels	Gas - Storage	SC&P	<b>Storage</b>	Storage facilities		<b>Swarr/Dieringer Unscheduled Work Orders:</b> Required Maintenance and Repairs	varies	As needed	Perpetual
1	Alt Fuels	Gas - Storage	SC&P	<b>Storage</b>	Storage facilities		<b>Swarr Corrective Maintenance:</b> Repaint above ground piping	varies	As needed	Perpetual
1	Valve Locate, Operate, and Maintain	Gas - Valves	GSW	<b>Gas Valves</b>	Service Valves at "Buildings of Major Assembly"	DOT 192.747	<b>Locate &amp; Operate:</b> Annually locate and operate service valves at buildings of major assembly (School, Hospital, Church, etc.) to evaluate the reliability of the valve.	5000 buildings with evacuation concerns	Annual	Perpetual



1	Valve Locate, Operate, and Maintain	Gas - Valves	GSW	<b>Valves</b>	Service Valves (all)	DOT 192.747	<b>Valve maintenance &amp; repair:</b> Pilchuck corrective maintenance of service valves as required based on L&O and IMS inspection or as problems are found during operations. A small portion of this work is "unplanned", but this does not include all unplanned work on service valves.	5,500	As Needed	Perpetual
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains</b>	Transmission Mains	DOT 192.706, WAC 480-93-188	<b>Leak Survey &amp; Patrol:</b> Conduct leak survey and patrol of all Transmission mains every year. The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource. (This work is done by Heath)	15	Twice annually, not to exceed 7 1/2 months	Perpetual
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains</b>	Supply Mains	DOT 192.721 DOT 192.723, WAC 480-93-188 Company Std.	<b>Leak Survey &amp; Patrol:</b> Conduct annual leak survey of all supply mains operating at 250 psig and below. The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource. (This work is done by Heath)	455	Once every 3 years not to exceed 39 months	Perpetual
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains and Services</b>	Gas Mains and Services affected by special circumstances	480-93-115, 480-93-188, 480-93-186	<b>Other Leak Surveys:</b> Perform special leak surveys as needed. Planned portion of this work results from Shorted Casings which need to be surveyed every 90 days for initial visit, semi-annually thereafter. Other sampling surveys included are driven by events such as Earthquakes, and excessive rain. (This work is done by Heath)	Varies	As Needed	As Needed
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains and Services</b>	Gas Mains and Services affected by special circumstances	480-93-115, 480-93-188, 480-93-186	<b>Other Leak Surveys:</b> Transmission perform special leak surveys as needed. Planned portion of this work results from Shorted Casings which need to be surveyed every 90 days for initial visit, semi-annually thereafter. Other sampling surveys included are driven by events such as Earthquakes, and excessive rain. (This work is done by Heath)	Varies	As Needed	As Needed
1	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	GFR	<b>Mains and Services</b>	Gas Mains and Services located in Mobile Home and Trailer Parks	Company Standard	<b>Mobile Home Park:</b> Conduct mobile home park Patrols and Operating Rights Reviews to identify and document encroachments for further action. Some minor CM is done on O&M but the majority of the CM is either at the expense of the customer or a capital solution	175	Every 3 years not to exceed 39 months	Perpetual
1	Leak Repair	Gas - Mains & Services	GFR	<b>Mains</b>	Mains with active B and C leaks and unplanned leak repairs	WAC 480-93-186	<b>Leak Repairs:</b> Repair active leaks as required. / This also includes unplanned leak repairs. These are repairs done by GFR only. (STW)		As Required	
1	Leak Repair	Gas - Mains & Services	GFR	<b>Mains</b>	Mains with active B and C leaks and unplanned leak repairs	WAC 480-93-186	<b>Leak Repairs:</b> Repair active leaks as required. / This also includes unplanned leak repairs. These are repairs done by GFR only. (CI)			
1	Leak Repair	Gas - Mains & Services	GFR	<b>Mains</b>	Mains with active B and C leaks and unplanned leak repairs	WAC 480-93-186	<b>Leak Repairs:</b> Repair active leaks as required. / This also includes unplanned leak repairs. These are repairs done by GFR only. (STL)		As Required	
1	Leak Repair	Gas - Mains & Services	GFR	<b>Mains</b>	Mains with active B and C leaks and unplanned leak repairs	WAC 480-93-186	<b>Leak Repairs:</b> Repair active leaks as required. / This also includes unplanned leak repairs. These are repairs done by GFR only. (PE )		As Required	
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Services</b>	Cathodically Protected Services	DOT 192.723, WAC 480-93-188	<b>Leak Survey &amp; Patrol:</b> Conduct leak survey of cathodically protected and plastic services. The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource. (Conducted by Heath only)	660,000	Annual, 33% of system Per Year (2006-2008)	Perpetual

1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains</b>	Cathodically Protected Mains	DOT 192.723, WAC 480-93-188	<b>Leak Survey &amp; Patrol:</b> Conduct leak survey of cathodically protected and plastic mains. The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource. (This work is done by Heath)	9630 miles of main	Annual, 33% of system Per Year (2006-2008)	Perpetual
1	Leak Monitoring	Gas - Mains & Services	SC&P	<b>Services</b>	Services with Active B and C Leaks	WAC 480-93-186	<b>Leak Monitoring:</b> Monitor active leaks as required. This includes leaks monitored by Heath	750	As Required	Perpetual
1	Leak Monitoring	Gas - Mains & Services	GFR	<b>Services</b>	Services with Active B and C Leaks	WAC 480-93-186	<b>Leak Monitoring:</b> Monitor active leaks as required. This includes leaks monitored by GFR	n/a	As Required	Perpetual
1	Leak Monitoring	Gas - Mains & Services	GSW	<b>Services</b>	Services with Active B and C Leaks	WAC 480-93-186	<b>Leak Monitoring:</b> Monitor active leaks as required. This includes leaks monitored by Pilchuck	1,056	As Required	Perpetual
1	Leak Monitoring	Gas - Mains & Services	SC&P	<b>Mains</b>	Mains with active B and C Leaks	WAC 480-93-186	<b>Leak Monitoring:</b> Monitor active leaks as required. This includes leaks monitored by Heath	4758 (varies)	As Required	As Required
1	Leak Monitoring	Gas - Mains & Services	GFR	<b>Mains</b>	Mains with active B and C Leaks	WAC 480-93-186	<b>Leak Monitoring:</b> Monitor active leaks as required. This includes leaks monitored by GFR	4758 (varies)	As Required	As Required
1	Leak Monitoring	Gas - Mains & Services	GSW	<b>Mains</b>	Mains with active B and C Leaks	WAC 480-93-186	<b>Leak Monitoring:</b> Monitor active leaks as required. This includes leaks monitored by Pilchuck	4758 (varies)	As Required	As Required
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Services</b>	Gas Mains & Services associated to Business District and High Occupancy Structures	DOT 192.723, WAC 480-93-188	<b>Leak Survey &amp; Patrol:</b> Conduct Leak Survey of services at Business District and High Occupancy Structures. The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource. (Done by Heath)	82,150 Services	Once each calendar year not to exceed 15 months	Perpetual
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains</b>	Gas Mains & Services associated to Business District and High Occupancy Structures	DOT 192.723, WAC 480-93-188	<b>Leak Survey &amp; Patrol:</b> Conduct Leak Survey of mains at Business District and High Occupancy Structures. The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource.	1,775 miles of main	Once each calendar year not to exceed 15 months	Perpetual
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Services</b>	Gas Mains and Services that are of Non-Cathodically Protected Steel Pipe (Cast Iron, Bare Steel)	WAC 480-93-188	<b>Leak survey &amp; Patrol:</b> Conduct Leak Survey of Non-Cathodically Protected Steel Pipe (Bare Steel). The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource. (Done by Heath) Services	5,300 services	Once each calendar year not to exceed 15 months	Perpetual
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains</b>	Gas Mains and Services that are of Non-Cathodically Protected Steel Pipe (Cast Iron, Bare Steel)	WAC 480-93-188	<b>Leak survey &amp; Patrol:</b> Conduct Leak Survey of Non-Cathodically Protected Steel Pipe (Bare Steel). The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource. (Done by Heath) Mains	220 miles of main	Once each calendar year not to exceed 15 months	Perpetual
1	Leak Survey	Gas - Mains & Services	SC&P	<b>Mains</b>	Supply Mains	DOT 192.721 DOT 192.723, WAC 480-93-188 Company Std.	<b>Leak Survey &amp; Patrol:</b> Conduct annual leak survey of all supply mains operating above 250 psig. The patrol looks at factors affecting safety and operation of the pipeline. Note: these two separate tasks are together since they are done simultaneously by the same resource. (Done by Heath)	59	Annual	Perpetual
1	Leak Repairs	Gas - Mains & Services	GSW	<b>Mains</b>	Mains with active B and C leaks and unplanned leak repairs	WAC 480-93-186	<b>Leak Repairs:</b> Repair active leaks on STW pipe as required. / This also includes unplanned leak repairs. These are repairs done by Pilchuck		As Required	As Required
1	Leak Repairs	Gas - Mains & Services	GSW	<b>Mains</b>	Mains with active B and C leaks and unplanned leak repairs	WAC 480-93-186	<b>Leak Repairs:</b> Repair active leaks on CI pipe as required. / This also includes unplanned leak repairs. These are repairs done by Pilchuck		As Required	As Required
1	Leak Repairs	Gas - Mains & Services	GSW	<b>Mains</b>	Mains with active B and C leaks and unplanned leak repairs	WAC 480-93-186	<b>Leak Repairs:</b> Repair active leaks on bare STL pipe as required. / This also includes unplanned leak repairs. These are repairs done by Pilchuck		As Required	As Required

1	Leak Repairs	Gas - Mains & Services	GSW	<b>Mains</b>	Mains with active B and C leaks and unplanned leak repairs	WAC 480-93-186	<b>Leak Repairs:</b> Repair active leaks on PE pipe as required. / This also includes unplanned leak repairs. These are repairs done by Pilchuk	As Required	As Required	
1	Leak Repairs	Gas - Mains & Services	GSW	<b>Services</b>	Services with Active B and C Leaks	WAC 480-93-186	<b>Leak Repairs:</b> Repair active service leaks as required. This only includes repairs by Pilchuck.		Perpetual	
1	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	<b>Regulator</b>	Distribution Regulator Stations which are defined as District Regulator Stations, Town Border Stations, Limiting Stations, Multiple Service Farm Taps and the various Mobile Regulator Stations.	DOT 192.739, DOT 192.743	<b>Distribution Regulator Station Maintenance:</b> Additional \$135,000 annually is needed to keep up with painting and Reg. Station Facility Maintenance (and therefore prevent growth of the backlog). To eliminate backlog would require \$780,000.	665	Annual (not to exceed 15 months)	Perpetual
1	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	<b>Regulator</b>			<b>Distric Regulator Station Maintenance:</b> Maintenance of other facilities (e.g. buildings and structures, fences, gates, lights, vegetation control)	665	As Needed	Perpetual
1	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	<b>Regulator</b>	Distribution Regulator Stations which are defined as District Regulator Stations, Town Border Stations, Limiting Stations, Multiple Service Farm Taps and the various Mobile Regulator Stations.	DOT 192.739, DOT 192.743	<b>Distribution Regulator Station Inspection &amp; Routine Maintenance :</b> Annual, tear down and inspection of defined distribution Regulator Station regulators, relief valves and other related equip.	665	Once each calender year not to exceed 15 months	Perpetual
3	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	<b>Regulator</b>	Distribution Regulator Stations which are defined as District Regulator Stations, Town Border Stations, Limiting Stations, Multiple Service Farm Taps and the various Mobile Regulator Stations.	DOT 192.739, DOT 192.743	<b>Maintenance:</b> Non-routine maintenance resulting from inspections. This will include 10 maintenance projects from SMP.	665	As Needed ( Not to exceed 15 months)	Perpetual
1	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	<b>Regulator</b>	Transmission Regulator Stations which are defined as Gate Stations	DOT 192.739, DOT 192.743	<b>Transmission Gate Station Inspection &amp; Routine Maintenance:</b> Annual, Full tear down and inspection of gate station regulators, relief valves and other related equip.	39	Annual	Perpetual
2	Regulator Station Maintenance	Gas - Regulator Stations	GSW	<b>Regulator</b>	Farm Taps	Federal requirement for system improvement work per System Planning. WUTC agreement.	<b>Farm Tap Inlet Retesting:</b> Retest inlet piping of up to 4 farm taps @ approximately \$30K each. (GSW costs are 80% of total costs.) In conjunction with the Unmaintainable DR Program, fifteen farm taps need to be retested or retired by 2008 due to inadequate pressure tests being performed at the time of installation. Approximately 11-12 farm taps can be retired rather than retested.	15	once only	once only
1	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	<b>Regulator</b>	Farm Taps (Single Service)	DOT 192.481	<b>Farm Tap Atmospheric Inspections:</b> Inspect farm taps for atmospheric corrosion and remediate as necessary. The Inspection includes minor remediation of Farm Taps that can be done simultaneously.	62	Once each calender year not to exceed 15 months	Perpetual

2	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	Regulator	Farm Taps	Federal requirement for system improvement work per System Planning. WUTC agreement.	<b>Farm Tap Inlet Retesting:</b> Retest inlet piping of up to 4 farm taps @ approximately \$30K each. (SC&P costs are 20% of total costs.) In conjunction with the Unmaintainable DR Program, fifteen farm taps need to be retested or retired by 2008 due to inadequate pressure tests being performed at the time of installation. Approximately 11-12 farm taps can be retired rather than retested.	15	Once only	Once only
1	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	Regulator	Master Meter regulator stations	DOT 192.739, DOT 192.743	<b>Master meter inspection and routine maintenance:</b> Annual inspection and routine maintenance of Master Meter (customer meter)	11	Annual	Perpetual
1	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	Regulator	Master Meter regulator stations	DOT 192.739, DOT 192.743	<b>Master meter maintenance:</b> maintenance resulting from inspections of Master Meter (customer meter)	11	Annual	Perpetual
1	Alt Fuels	Gas - Storage	SC&P	Storage	Gas Peak Shaving Facilities	DOT 192.739, DOT 192.743	<b>Gig Harbor LNG Plant Scheduled Work Orders:</b> Inspections and Repairs	varies	Annual (not to exceed 15 months)	Perpetual
1	Alt Fuels	Gas - Storage	SC&P	Storage	Gas Peak Shaving Facilities	DOT 192.739, DOT 192.743	<b>Gig Harbor LNG Plant Unscheduled Work Orders:</b> Required Maintenance and Repairs	varies	As needed	Perpetual
1	Leak Repair	Gas - Metering	SC&P	Meter Set	MSA Heath Leak Repairs (Industrial)	DOT 192.739, DOT 192.743	<b>Leak Repair:</b> Investigation and repair of industrial MSA leaks.	1,600	Annual (not to exceed 15 months)	Perpetual
2	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	GSW	Mains	Mains	GOS 2575.3100 - 3.1.3	<b>Main inspection</b> - Engineering or Geotechnical evaluation of areas where unexpected earth movement may take place. Five slides are expected with an average inspection cost of \$3000 each (based on 2005 average costs per slide), including those requiring assessment by an outside consultant.		As needed	Perpetual
2	Continuing Surveillance	Gas - Mains & Services	SC&P	Varies			<b>Continuing surveillance program:</b> This is a visual examination of facilities during construction, operations and maintenance activities	Varies	As needed	Perpetual
2	Continuing Surveillance	Gas - Mains & Services	GFR	Varies			<b>Buried Meter Remediation (Continuing Surveillance Program):</b> reinspection and resolution up to but not including riser replacements.	Varies	As needed	Perpetual
2	Continuing Surveillance	Gas - Mains & Services	GSW	Varies			<b>Buried Meter Remediation (Continuing Surveillance Program):</b> riser replacements identified by GFR.	Varies	As needed	Perpetual
2	Continuing Surveillance	Gas - Mains & Services	GSW	Varies			<b>Set or recondition guard posts for protection from vehicular traffic (Continuing Surveillance Program)</b>	Varies	As needed	Perpetual
1	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Mains & Services	GSW	Varies			<b>Relocate meters from non-compliant locations</b>	Varies	As needed	Perpetual
2	Continuing Surveillance	Gas - Mains & Services	GSW	Varies			<b>Continuing Surveillance:</b> Install vent pipe	Varies	As needed	Perpetual
2	Isolated Facilities	Gas - Mains & Services	Isol Fac	Mains	Casings and Mains	WUTC agreement.	<b>Isolated facilities program - Casing Inspection (Mains):</b> This funding is largely unknown at this point. This is a placeholder, but this assumes we'll be clearing shorts and testing casings.	1,000	One Time	through 2009
2	Isolated Facilities	Gas - Mains & Services	GSW	Mains	Mains	WUTC agreement.	<b>Isolated facilities program - Mains Remediation:</b> This funding is for remediation of isolated mains.		One Time	Through 2009
2	Isolated Facilities	Gas - Mains & Services	GSW	Services	Services	WUTC agreement.	<b>Isolated facilities program - PSP Reads:</b> This funding is for PCI taking PSP reads taken on services. Dollars are based on the best available data on 5/4/07.		One-Time	Through 2009
2	Isolated Facilities	Gas - Mains & Services	Gas System Engr.	Mains	Mains	WUTC agreement.	<b>Isolated Facilities Program - GSE Support:</b> This funding is for GSE (Gas System Engineering) support of SC&P CP Operations. Dollars are based on the best available data on 5/4/07.		As Needed	
1	Gas Meter: Atmospheric remediation, inside meter survey, master meter inspect & maintain, meter changes	Gas - Mains & Services	Isol Fac	Services	Services	WUTC agreement.	<b>Atmospheric Corrosion Inspection - Meters/Risers:</b> This is the continuation of inspections from the work done in concert with Isolated Facilities.	720,000	1/3 per year	Perpetual

2	Isolated Facilities	Gas - Mains & Services	Other - MRT	Services	Services	WUTC agreement.	<b>Isolated facilities program - Services Inspection:</b> Funding for MRT office work in support of the Isolated Facilities Program. This accounts for work on EUF/riser process.	650,000	One Time	
2	Isolated Facilities	Gas - Mains & Services	Other - MRT	Mains	Mains	WUTC agreement.	<b>Isolated facilities program - Mains Inspection:</b> Funding for MRT office work in support of the Isolated Facilities Program. Includes work on casings and mains and some stub work.		One Time	
2	Isolated Facilities	Gas - Mains & Services	SC&P	Gas Services	Services	WUTC agreement.	<b>Isolated facilities program - Casing Inspection (Services):</b> This funding supports the investigation of several thousand services expected to be encased.		One Time	Through 2009
2	Isolated Facilities	Gas - Mains & Services	SC&P	Mains	Mains	WUTC agreement.	<b>Isolated facilities program - Mains Inspection:</b> This funding is for inspection of suspected isolated mains		One Time	Through 2009
2	Wrapped Steel Service Assessment Program	Gas - Mains & Services	GSW	Services	Pre-1972 STW Services	WUTC agreement.	<b>WSSAP - Field Confirmation:</b> Funding for PCI to pothole and confirm service is STW. This work is the result of inconclusive records.	100,000	One Time	Until selected services are examined
2	Wrapped Steel Service Assessment Program	Gas - Mains & Services	SC&P	Mains	Pre-1972 STW Services	WUTC agreement.	<b>WSSAP - Electrical Surveys:</b> Funding for CP electrical surveys on mains. SC&P has committed to doing this work.	Variable	One Time	Until selected services are surveyed
2	Wrapped Steel Service Assessment Program	Gas - Mains & Services	SC&P	Services	Pre-1972 STW Services	WUTC agreement.	<b>WSSAP - Direct Examinations:</b> Funding for CP support of direct examinations.	100,000	One Time	Until selected services are surveyed
2	Wrapped Steel Service Assessment Program	Gas - Mains & Services	GSW	Services	Pre-1972 STW Services	WUTC agreement.	<b>WSSAP - Direct Examinations:</b> Funding for Pilchuck support of direct examinations. This will be digging the necessary holes over the service.	100,000	One Time	Until selected services are surveyed
2	Wrapped Steel Service Assessment Program	Gas - Mains & Services	SC&P	Mains	Pre-1972 STW Services	WUTC agreement.	<b>WSSAP - Direct Examinations:</b> Funding for SC&P support of direct examinations on mains.		One Time	Until selected services are surveyed
2	Wrapped Steel Service Assessment Program	Gas - Mains & Services	GSW	Mains	Pre-1972 STW Services	WUTC agreement.	<b>WSSAP - Direct Examinations:</b> Funding for Pilchuck support of direct examinations on mains.. This will be digging the necessary holes over the main.		One Time	Until selected services are surveyed
2	Wrapped Steel Service Assessment Program	Gas - Mains & Services	SC&P	Services	Pre-1972 STW Services	WUTC agreement.	<b>WSSAP - Electrical Surveys:</b> Funding for CP electrical surveys on services. SC&P has committed to doing this work.	100,000	One Time	Until selected services are surveyed
2	Wrapped Steel Service Assessment Program	Gas - Mains & Services	SC&P	Services	Pre-1972 STW Services	WUTC agreement.	<b>WSSAP - Leak Surveys:</b> Includes semi-annual and annual surveys. Contiguous surveys are at \$0.0320/ft and non-contiguous (not part of regular survey for given year) are at \$0.0607/ft. Assumed 87ft/service, see 2009-2010 budget estimate for further calculation details.	100,000	One Time	Until selected services are surveyed
2	Integrity Management	Gas - Mains & Services	SMP	Mains and Services	Gas Distribution System	Federally Mandated Program	<b>Distribution Integrity Management:</b> Funding for development and implementation of new DIMP.	na	TBD	Perpetual
2	Gas Mains and Services, Inspection and Maintenance		Outside Contractor	Mains	Mains	Permit Authority	<b>Vegetation Management:</b> Annual vegetation management costs for Union Hill road HP Project completed in 2007.	na	Through 2010	
2	Valve Locate, Operate, and Maintain	Gas - Mains & Services	SC&P	Valves	Valves	WUTC agreement.	<b>Double IF Program - Locate &amp; Inspect:</b> Conduct survey to locate double insulated flanged valves and examine their condition (corrosion level, cathodic protection). 2008-2009: pilot test sites are currently being evaluated for critical bonds and PSP reads. Maintenance & Repairs: A first phase "pilot" is planned for 2008-2009 to have SMEs examine all double IFs found during the course of inspections. From the results, a course of action will be determined to implement for the rest of the system. \$10,000 for location & inspection, \$50,000 for maintenance, per Dave Moffett's estimate (taking into account unfinalized scope)	unknown	TBD	Until selected valves are inspected and protected

	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	GSE	Mains	Valves	DOT 192.467, Company Standard	<b>HVAC Mitigation Program:</b> Identify pipelines that are at risk for induced AC or ground fault interference from overhead power transmission, then design and construct accordingly to reduce damage to facilities and increase safety. 2009-Phase II: Identify IP and LP distribution pipelines at risk (\$251,000); Phase I was this for HP supply pipelines (\$58,000). 2010-Phase III: Design of work (\$95,000). 2011-Phase IV: Construction of Phase III work (\$760,000). Dollars are based on figures given 4/11/08 from Gas Engr Corrosion.	Through 2011	Until selected pipelines are surveyed and protected	
	Gas Mains and Services, Inspection and Maintenance	Gas - Mains & Services	MRT	Mains	DuPont Main		<b>DuPont Pipe Research:</b> This funding is for MRT research into the location of suspected DuPont pipe. This will also include an EPCR review and potentially some work with D4s.	Unknown	One Time	Perpetual
1	Sumas Transmission	Gas - Mains & Services	SC&P, GSO, GFR	Mains	Transmission Mains	DOT 192 & WAC 480-93	<b>Sumas Transmission Operation &amp; Maintenance:</b> All aspects of gas operations and maintenance pertaining to the Sumas transmission main, including leak survey, patrol, pipeline markers, critical valves, cathodic protection, pressure control, etc.		As Required	Perpetual
2	Regulator Station Maintenance	Gas - Regulator Stations	SC&P	Regulator	Distribution Regulator Stations which are defined as District Regulator Stations, Town Border Stations, Limiting Stations, Multiple Service Farm Taps and the various Mobile Regulator Stations.	DOT 192 & WAC 480-93	Regulator Station Maintenance (Pipe Supports): This funding is needed to fund the modification of pipe supports at various regulator stations (including gate stations). Some pipe supports prevent an atmospheric corrosion inspection. These will need to be modified or replaced.		As Required	Perpetual

**Group Definitions:**

**Group 1** – Routine inspection and maintenance performed by Gas Operations, Heath, and Pilchuck. This work is required per state and federal code and/or PSE gas operating standards. Examples include leak survey, CP system maintenance, and valve locate and operate activities.

**Group 2** – Work budgeted and planned for by System Maintenance Planning typically in the form of formal compliance programs and commitments to the WUTC. This work may be performed by Gas Operations, Pilchuck, or other 3rd party contractors. Examples include WSSAP, Isolated Facilities, and Integrity Management. Also includes new programs that are still in development such as Double IF.

**Group 3** – Specific O&M budgets driven by System Maintenance Planning. Includes O&M projects related to bridge and slide locations, regulator stations, and valves. These projects keep PSE on cycle with maintenance issues reported by field personnel and eliminate safety concerns and compliance risks.