Pacific Gas and Electric Company	PG&E Hydro-Test Program Process Manual	Version E

PACIFIC GAS AND ELECTRIC COMPANY

Hydro-Test Program

Process Manual and Program Execution Plan

Revision History

Date	Change Requested By	Revision	Change(s) Made	Affected Sections
5/20/11	[redacted]	A	Initial Issue for Review	All
6/3/2011	[redacted]	B	Incorporate feedback from PMO	All
6/9/2011	[redacted]	C	Incorporate feedback from Water Quality, QAQC, Construction, Engineering	All
6/23/2011	[redacted]	D	Supply Chain, PMO, Engineering, Program Controls, Risk Management, Appendices	2, 3, 8, 11, 16, 17
9/14/2011	[redacted]	E	Environmental Operations and Emergency Response, Appendices	10, 16

Endorsements

PMO Lead	PMO Ops Lead	PRJ Scope & Quality	Reporting	PRJ Controls	Safety	Planning & Risk Management	Project Coordination	Customer Relations	Corporate Affairs	Engineering	Land & Environmental Approvals	Clearance	Supply Chain	Construction	Mapping/Records

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Table of Contents

1. Overview

As part of the response to the San Bruno Incident, Pacific Gas and Electric (PG&E) developed the Pipeline 2020 Modernization Program initiative. Part of the initiative is the Hydro-Test Program. The objectives of the Hydro-Test Program are to verify the Material of Record, to hydrostatically test all identified pipeline segments, and to create new supporting documentation to validate the pipe segments' historically accepted maximum allowable operating pressure (MAOP) for each pipeline segment. In 2011, the Hydro-Test Program focuses on testing 152 miles of pipeline segments that are of the same vintage or have other similar characteristics (e.g., pipe diameter, age, records, etc.) to the ruptured segment of Line 132 in San Bruno.

The order in which PG&E plans to perform hydrostatic testing is based on several constraints, including system hydraulics, customer demand, electric generation impact, timing of availability of records for engineering, timing of ability to obtain permits, material lead times, clearance resources, coordination with other pipeline work, construction resources, and local government preferences. The ability to balance the multiple constraints is complicated, so the schedule has little flexibility, and the program is managed to meet the proposed schedule as closely as possible. The schedule may be adjusted to keep the program moving forward if unexpected delays occur, or if existing hydrostatic test records are found and validated for a particular pipeline test segment.

The processes, roles, and responsibilities involved in the Hydro-Test Program are identified and defined by this manual. The processes described in this manual are separated into functional groups of activities, and are used as a platform to develop each hydrostatic test project. PG&E's utility standards, procedures, forms, and documents are referenced throughout this manual and listed in the appendices. As Lessons Learned and Best Practices emerge from the program, the revisions are incorporated in the Program Manual to better serve the program on the remaining tests.

The references in this manual are actively linked to the reference document itself, both inline and in the appendices, and can be recognized by the blue font. If you are viewing this document in print form, and would like to view the hyperlinked reference document, you can find the latest online version of the Hydro-Test Program Process Manual on the SharePoint at the following location:

Hydrotest 2011 > Shared Documents > Hydro-Test Program Process Manual

To make revisions, add comments, or ask questions about the document, check out the document using the Share Point feature. Turn on "track changes" within the Word "tools" directory and make your proposed changes, save the document, and check it back in. This will alert the document controller that changes have been proposed, and allow the document editor to easily find the changes made to the document. The revisable document can be found on the SharePoint website at the following location:

Hydrotest 2011 > Shared Documents > Hydro-Test Program Process Manual

2. Program Organization

The Program Management Office (PMO) provides the leadership for the testing of each of the identified pipeline segments, proves that the pipelines can operate safely at the MAOP established by the test, and creates verifiable records for future reference. The PMO for this program is illustrated in the PMO Organization Chart below.

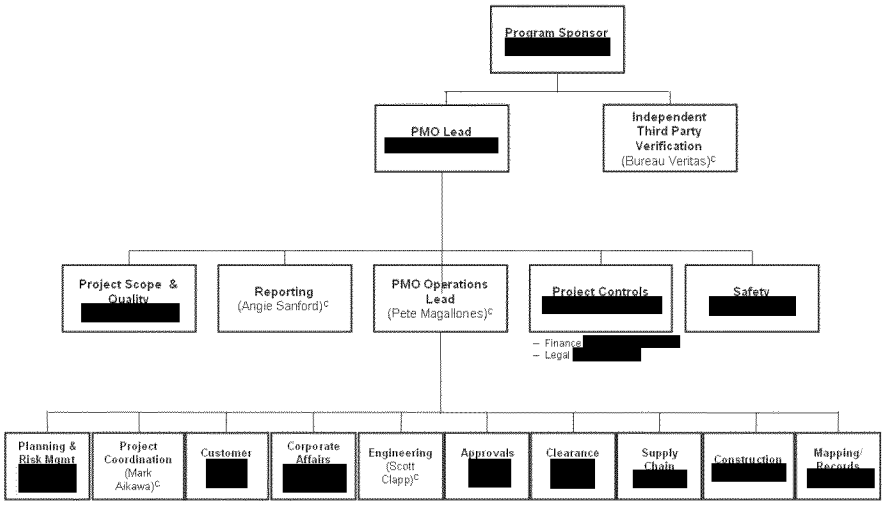

Figure 1. PMO Organization Chart

The PMO and project teams are organized to execute the individual test segment projects in a matrix management environment. The PMO provides the leadership to execute each discrete project. The Project Coordinators provide the leadership and task coordination for each test segment project. The Lead of the Project Coordination group is a member of the PMO, and oversees the Project Coordinators for each individual test segment.

2.1 Critical Success Factors

The critical success factors for the Hydro-Test Program 2011 are as follows:

- A program safety record of zero recordable injuries
- A program environment record of zero reportable incidents
- Completion of the hydrostatic testing or replacement of 152 miles of pipeline segments, unless the required documentation of a previous test is found and that segment has been eliminated from the test group
- Creation and storage of the required test documentation

2.2 Roles and Responsibilities

The roles and responsibilities of the PMO are as follows:

- **Program Sponsor** – Provides overall program direction and interface with PG&E stakeholders.
- **PMO Lead** – Provides the day-to-day program leadership and coordination for successful delivery.
- **independent Third Party Verification** – An independent agency providing certification of test completion.
- **PMO Operations Lead** – Provides leadership and direction of the functional groups to ensure effective communication for timely decision making.
- **Project Scope & Quality** – Leads the development of the test scope. Provides oversight on the quality systems and Third Party Verification.
- **Reporting** – Produce program reports and presentations in support of executive communications. Coordinates with the CPUC and other agencies to ensure a proper flow of communication.
- **Program Controls** - Develops and manages the testing schedule and cost aspects of the program including updating forecasting.
- **Safety** – Responsible for leading, training and reporting the program safety performance.
- **Planning & Risk Management** – Manages the GSO approval plans and manages the risk associated with the scheduled activities.
- **Project Coordination** – Provides the leadership per a group of Project Coordinators that provide task coordination for each test segment.
- **Customer Relations** – Manages the customer and community outreach portions of the program.
- **Corporate Affairs** – Responsible for state and local government communication.
- **Engineering** – Provides the leadership and quality assurance for the planning, engineering and design for each test segment project.
- **Environmental/Land Permits** – Applies for and acquires all of the necessary permits required by local, state and federal law; obtains new land rights or utilizes existing land rights as needed.
- **Clearance** – Works with internal Gas System Operations (GSO) to perform the pipeline shutdown, clears the pipeline of natural gas and makes the pipeline safe and ready for the hydrostatic test.
- **Supply Chain** – Provides all material and services required by the program.
- **Construction** – Safely executes the segment test plans.
- **Mapping/Records** – The owner of the final documentation produced by the program, and responsible to ensure that all documents are properly tracked, stored, catalogued, and accounted for.

For a more detailed description of the program roles and responsibilities, refer to the Hydro-Test Program RACI Chart.

More in-depth job descriptions for the Construction Coordinator Supervisor, the Project Coordinator, and the Segment Engineering Lead can be found on the SharePoint website.

The Hydro-Test Program RACI Chart is currently under development and review.

2.3 Safety

The basis of the Hydro-Test Program is PG&E's commitment to zero in on safety. Public and individual safety is the primary consideration of this program and all of its components, stages, and processes. Safety protocols and practices are defined for workers in offices, worksites, and throughout all handling processes. Although safety is addressed specifically in the Safety section of this document, the scope of safety is applicable to all of the sections.

2.4 PG&E Internal Communication

The PMO communicates the progress of the Hydro-Test Program to PG&E employees through articles in the PG&E At Work Bulletin. Hydrostatic testing has been explained in the May 10, 2011 issue of the At Work Bulletin, which also addressed the plan for field testing of pipeline segments throughout the entire service territory. As the scheduled date for each pipeline segment test is confirmed, key stakeholders are notified via e-mail, followed shortly after by an article in the At Work Bulletin. As the testing progresses and each test is completed, similar notifications to key stakeholders are sent about the test results. Regular articles in the At Work Bulletin are released that provide the test results and identify the next set of tests coming up on the schedule. When appropriate, the PMO sends communications regarding specific work groups that will be directly affected by the testing. The PMO Reporting Lead produces various reports and presentations for executive and stakeholder communications.

2.5 Program Internal Communication

To facilitate internal communication within the program, the various team members must anticipate how their work and actions may affect stakeholders. Each project and program team member must evaluate the following:

- Identify how the work, project, and program elements affect specific stakeholders
- Consider ways to mitigate these concerns
- Communicate this information to the Discipline Lead (a member of the PMO) or the PMO Operations Lead
- Coordinate among the team functions and areas on matters that overlap or are of mutual interest
- Recognize that creative resolution or mitigation of project and program effects contributes to program success

Cooperation and communication between members of the Hydro-Test Program staff is crucial because of the interrelated aspects of the program and the complexity of issues presented. Additionally, information needed by

one part of the program team will often be coordinated and compiled by a different part of the program team. For these reasons, it is important that the program team establish processes for sharing and jointly considering information as plans are initiated. The following methods are used to communicate progress by the Hydro-Test Program staff:

- Participating in regular team meetings comprised of all or several functional groups
- Sharing written summaries of activities (monthly reports and minutes)
- Anticipating cooperation and coordination between the functional teams
- Reaching out to others in the program to ask for or offer input
- Using impromptu calls and face-to-face discussions on a frequent basis
- Informal conversations, emails, and phone calls.
- Web-based communications

Timely and periodic communication between the project, program, and functional teams are essential. It is expected that these groups, or representatives from these groups, will meet regularly to review key plans and progress. The frequency of these meetings may vary. In general, discussion topics include program and project activities planned, in progress, and completed. In addition, if there are any problems, potential solutions will be discussed. Risk and change management is a standard agenda item during team meetings.

Impromptu meetings between functional leads, Project Coordinators, and Program Management Officers will be held as needed. Meeting minutes will be recorded and maintained by document control for future reference. Minutes for all meetings are recorded and maintained by document control for future reference. For timing of regularly scheduled Program and Project meetings, Change Management, Risk, and Board meetings, the current program meeting schedule is as follows:

Organization	Frequency	Topic
PMO	Daily	critical items – near term segment issues
PMO	Bi-weekly (Tues/Thurs)	forward looking/process improvements
PMO	Weekly (Monday afternoon)	schedule revision discussion
PMO	One Meeting	Chartering Session
Project Coordinators	Weekly	Coordination
Segment Teams	As Required	Segment Kick-off Meeting
Segment Teams	As Required	Web Meeting
Segment Teams	As Required	Segment 25% Site Visit
Segment Teams	As Required	Segment 50% Site Visit
Segment Teams	As Required	Segment Pre-construction Meeting
Segment Teams	As Required	Segment Lessons Learned Meeting
Segment Teams	As Required	Clearance/ Test Plan/Tie-in Meeting

2.6 Action Items and Needs Lists

Two action items lists are maintained. The first action item list is generated from the daily meeting, and identifies issues associated with near term tests. The second action items list is developed during the bi-weekly meeting or segment lesson learned meeting, and focuses on forward looking and process improvement.

2.7 Requests for Information

Requests for Information (RFIs) from the field construction staff are a key method for identifying questions or the need for additional information on drawing, specification, or procedures. An RFI may also be used to suggest alternative designs, fabrication, or construction methods.

2.8 Planning and Scheduling

Prior to hydrostatic testing, a record search is performed for each proposed test segment. If previously existing records are found and verified, hydrostatic testing may not occur for that specific test segment. If records are not found, then testing will be performed as scheduled. The records research and testing "go / no go" decision is illustrated in the following diagrams:

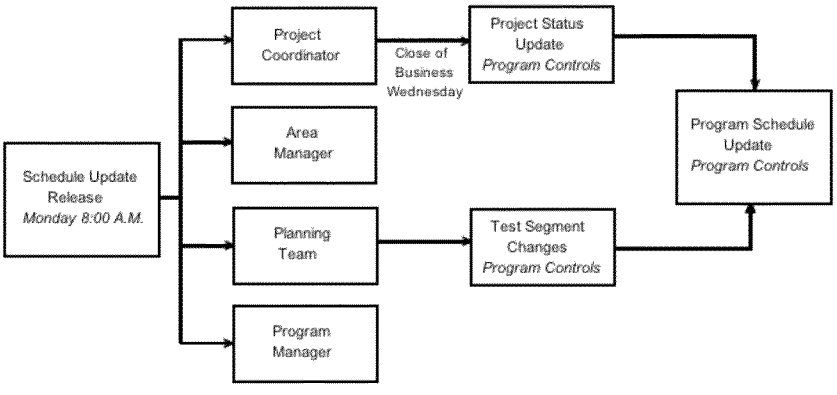

Figure 2. Hydrostatic Testing Schedule Update Process

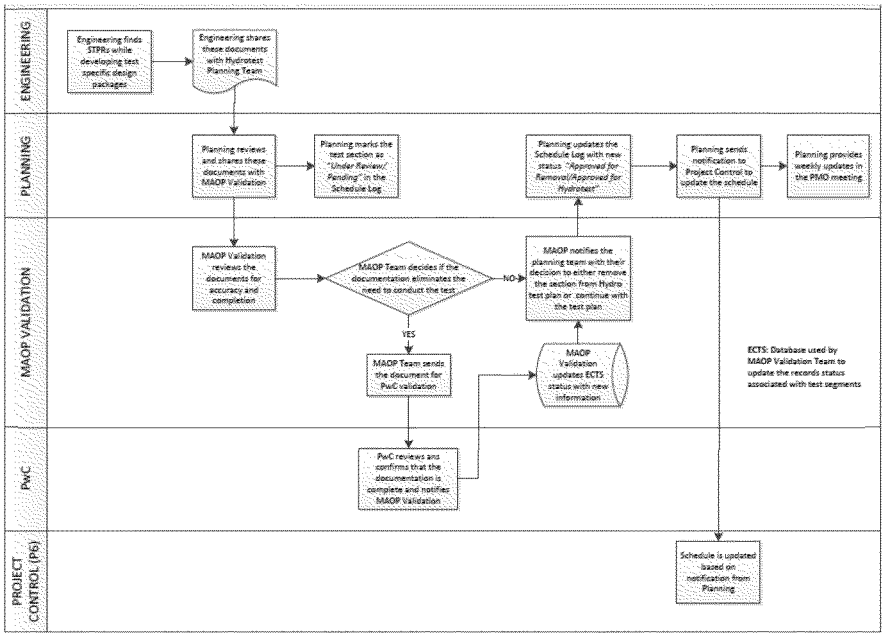

Figure 3. Hydro-Test Sections Review & Reconciliation Process between Hydro-Test Planning and MAOP Validation Teams

3. Risk Management and Contingency Planning

The purpose of Risk Management is to identify potential problems before they occur and to ensure that opportunities to avoid or mitigate risk are taken as early as possible. This enables leaders and team members to act proactively rather than reactively to reduce overall risk potential and impact.

3.1 Risk Management Plan

The Risk Management Plan, found in Appendix A, is defined for the PG&E Hydrotest Program as a whole to ensure a consistent and professional approach to Risk Management throughout all projects. The PG&E Hydrotest Program Risk Management Plan defines methodologies, work processes, and tasks that are applied to the program as well as each project. Overall, the plan includes components to:

- Identify potential threats, opportunities, and risk owners
- Evaluate the likelihood and consequences of risks
- Determine the impact of risk programs
- Analyze risk options and develop plans for risk mitigation
- Track risk mitigation activities
- Reassess program risks on a regular basis

3.2 Program-Wide Risk

The Risk Register Form, found in Appendix A, lists overall potential risks to the program, the potential risk impact on program schedule, completion, and cost, and resulting risk management actions. The Program Management Office (PMO) Risk Manager develops the Risk Register Form with the input of the program team. The PMO Risk Manager also provides ongoing risk monitoring and updates the program team by delivering a monthly Risk Report.

4. Project Coordination

The Project Coordinator shepherds a site-specific project from start to finish, leading the Segment Project Teams and facilitating communication between functional groups, project team members, and the PMO. The Project Coordinator works with all teams in all phases of the project to ensure that work and documentation from the various teams are on-time and complete. The Project Coordinator serves as the initial point of contact for any escalating issues.

The Project Coordinator references the Project Coordinator Checklist, found in Appendix A, as a guide to verify that all of the necessary tasks are being accomplished on time and everyone has the information they need to keep the project on schedule.

The following is a summarized list of tasks and events included in the Project Coordinator Checklist:

- Assemble pre-planning data and initial line shutdown considerations
- Identify project team members representing each department of the program, and compile and maintain a Project Team Roster on SharePoint
- Conduct a Project kick-off meeting, utilizing a web conference if all the team members are not available to gather around a satellite image of the test location and review all information, including potential issues to investigate.
- Coordinate the 25% Web Conference and Site Visit and verify that the project team achieves specific tasks and objectives, including identifying safety concerns, staging locations, access, permits, water sources, etc.
- Coordinate the 50% Site Visit and verify that the project team achieves specific tasks and objectives, including identifying safety plan details, number of baker tanks, test site details, taps/valves, etc.
- Verify that Engineering has the information required to complete the Site Specific Design Package and track to completion
- Verify that materials are ordered, permits are in place and all pre-test logistics are in order
- Conduct an 80% design review meeting to verify the status of Engineering drawings
- Ensure the communications requirements are completed
- Obtain reviews and approvals as required for Land and Environmental to issue the Release to Construction letter
- Verify all contracts are established as required for Contracts to issue the Notice to Proceed to Contractor for Site Mobilization
- Verify all “Pre-Test” construction tasks are accomplished

- Verify the hydrostatic test is accomplished
- Verify all "Post-Test" construction tasks are accomplished
- Verify with Field Engineers the Quality Review of the As Built package is accomplished before the Contractors and Inspectors leave the site
- Verify all required project documentation is returned to Records and Mapping

The As Built Checklist is designed to help verify that all of the required documents are accounted for, and the engineer, test conductors, and third party inspectors review the package to verify that the information contained is accurate, and the necessary signatures, approvals, and validations are present.

5. Government Relations and Customer Communications

The magnitude of pipeline work involved in the Hydro-Test Program requires extensive customer and community outreach to both inform and engage public support in order to achieve the objectives of the program. Because the scope of the program has so many individual test sites spread across the entire service territory, each hydrostatic test location must be evaluated for site-specific conditions that may cause adjustments to the typical customer and community outreach schedule.

5.1 Outreach Objectives and Strategy

The objectives of customer and community outreach for this program are summarized as follows:

- Ensure local government officials, emergency response teams, customers, and communities are well-informed about PG&E's Hydro-Test Program, and well-educated about field activities before, during, and after local construction work
- Provide multiple methods for customers to get answers to their questions, particularly regarding any safety concerns
- Ensure ongoing two-way communications between PG&E and local customers and the community
- Initiate outreach well ahead of visible PG&E onsite presence. Ensure that there are no surprises to local officials, customers, or the community

Customers and local communities want to be kept well-informed of what work is taking place in their community, how it impacts them, what they can expect, and when. In addition, the general public wants to understand the context in which transmission pipeline work is being performed. Ultimately, this outreach effort helps demonstrate the progress California is making to modernize gas transmission lines and restore customer confidence in natural gas as a safe energy source.

5.1.1 Specific to Each Hydrostatic Test Project Schedule

Outreach activities follow disciplined "T-minus" schedules tailored to each pipeline project and local situation. There are "go / no go" decisions made to move forward with key outreach steps triggered by

operational milestones. As a result, the outreach efforts are coordinated with each individual pipeline segment, and managed out of the program management office.

The following illustration is a comprehensive "T-minus" outreach schedule ("T-Schedule") designed to address all plausible local community and surrounding area situations. The local community for each individual pipeline segment is evaluated to determine which elements of the comprehensive T-schedule are appropriate to implement, given the specific situation.

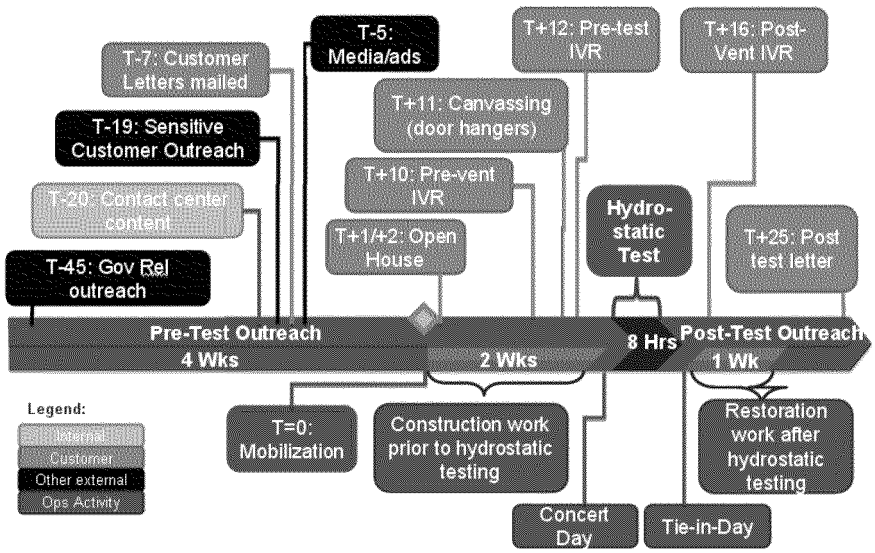

Figure 4. Typical Project T-Schedule (Outreach Focus)

5.2 Government Relations

The Government Relations team helps support the site test project team by making sure that all of the government regulations for each specific test site are identified and met. This includes, but is not limited to, helping to obtain all of the required permits, helping with job site check in, and making sure all employees are dressed appropriately for onsite activities.

5.3 Media Relations

Prior to onsite activities, a tailboard is conducted by the Construction Manager Director to provide an overview of communication sensitivity and how to handle the appearance of media and onlookers. Any non-PG&E observers with questions, including media and customers, are given media cards with hotline contact information, or are directed to the designated onsite point of contact or the local Energy Solutions and Services (ES&S) Manager.

A site visitor must be pre-approved and authorized to visit the location, and must follow the guidelines per the Site Visitor Guide.

5.4 Customer Communications

Interactive voice responses (IVRs) are sent out to customers within close proximity to the testing site, along with pre-test and post-test letters, media ads, etc. Customer communications help to inform customers of the overall test process, such as the dates of testing, the nature and extent of testing, and safety precautions. Customers are also notified once testing is complete.

6. Safety

PG&E incorporates specific safety procedures throughout all processes and stages of hydrostatic testing. A tailboard on Utility Standard Practice (USP) 22, "Safety and Health Program," found in Appendix A, must be given to all PG&E employees and contractors involved in hydrostatic testing. These procedures can be accessed in the Code of Safe Practices found in Appendix A. Refer to the Project Safety Plan, found in Appendix A.

6.1 Office Safety and Health Management

In accordance with state and federal regulatory requirements and USP 22, the Office Safety and Health Management System (Office HSMS) requires that each department assign a person to be its designated Safety Representative. This person will be the point person to implement and maintain the Office SHMS in the department, and will liaison between Safety, Health & Claims and his or her department supervisor.

Departments working primarily in an office-based environment must either use this system or one established by the Senior Vice President or Vice President. Questions are directed to the department's Safety Engineering and Health Services Safety Program Consultant (SEHS SPC). Refer to Safety Health and Claims (SH&C) Procedure 221, "Ergonomics Program Procedure", found in Appendix A.

6.2 Develop Site Specific Safety Plans

A Site Specific Safety Plan must be established at every worksite by the Safety Department and the Site Monitor. Each Site Monitor will have a safety plan binder onsite, which has all of the required forms and safety information. The Site Specific Safety Plan must include, but is not limited to, the following items and conditions:

- Local emergency contact information (fire, police, medical, direct line to the dispatch center, etc.)
- The local emergency technical rescue response resources, including trench and confined space rescue
- The location of the nearest hospital emergency room
- The identity of the onsite Incident Commander, should an incident occur during construction

- The location of the nearest first aid kit and automatic external defibrillator (AED), if available, at the work location
- Evacuation routes by foot and car
- Secondary meeting points and areas of refuge in the event of an emergency
- Identification of any plant or animal life that might be hazardous to employees or public health
- Location hazards, such as slopes, rivers, high traffic volume, overhead lines, subterranean hazards, open trench vaults, etc.

NOTE – Two-way communication must be verified between the Incident Commander and the local emergency response resources to ensure that all parties are notified of emergency response procedures.

An example of a Site Specific Safety Plan can be found in Appendix A. Refer to the Safety Engineering and Health Services website and the SH&C Procedure 229, "First Aid Procedure" found in Appendix A.

6.3 Identify and Evaluate Safety Hazards

Tasks associated with the work must be reviewed and discussed, and hazards associated with each task must be identified during the pre-site visit. The risk and possible severity of the identified hazards must also be evaluated. PG&E ranks risk and severity of hazards per SH&C Procedure 201, "Hazard, Evaluation and Control Procedure" found in Appendix A.

6.4 Control Safety Hazards

PG&E implements safety controls based on the risk and severity of the tasks identified. Engineering controls are utilized to mitigate the hazards during the site visit. If engineering controls are not feasible, administrative and personal protective equipment (PPE) controls are implemented to reduce the risk of injury. PG&E uses a hazard control strategy per SH&C Procedure 201.

6.5 Review of Safety Controls

The implemented controls are reviewed by the Site Monitor to ensure quality and safety throughout the project. Controls must be reviewed and evaluated to ensure they do not increase hazards associated with other tasks.

7. Environmental Compliance, Land Rights, and Permits

Prior to implementation of the hydrostatic testing process, PG&E applies for and acquires all of the necessary permits as required by local state and federal law, and obtains new land rights or utilizes existing land rights as needed.

7.1 Property Owner Notifications

Before hydrostatic testing begins, the PG&E Customer Care team notifies all property owners in the vicinity of the project by sending out a series of letters

with the dates of testing, the nature and extent of testing, and all applicable safety precautions.

7.2 Existing Land Rights

PG&E is the owner of various land rights for the construction, operation, and maintenance of company-owned facilities. A land agent reviews the Geographic Information System (GIS) Land Rights Library and pulls any existing documentation for each testing site to compare to the system map. For maintenance projects such as hydrostatic testing, PG&E utilizes existing land rights whenever possible. PG&E reviews and confirms these land rights prior to construction.

7.3 Temporary Working Areas

When necessary, temporary construction easements, leases, permits, or other land rights are obtained to use private or public land for the temporary work sites. The temporary working area is identified, including the amount of space required for construction crews, equipment, etc. Once identified, PG&E's Customer Care team and a rights-of-ways agent negotiate with the property owner to obtain the required temporary rights prior to construction.

7.4 Franchise Rights

PG&E has entered into franchise agreements with the cities and counties in its service territory that grant PG&E the right to install, operate, and maintain its gas and electric facilities within public streets and highways. If a site specific encroachment permit is required to work within public rights-of-ways, Engineering applies for encroachment permits and works with the local jurisdiction to revise drawings and develop traffic control plans as necessary.

7.5 General Best Management Practices

If no site specific permitting is required, PG&E implements standard best management practices (BMPs) for each site. These include items such as erosion control, cleanliness of work sites, contact information if wildlife enters the worksites, etc. A pre-construction tailboard is conducted by the designated compliance representative to review the proposed measures prior to each segment going to construction.

7.6 Environmental Permitting

PG&E is required to comply with all applicable local, state, and federal environmental laws and regulations. Certain laws and regulations apply to the construction, replacement, expansion, or re-location of company-owned facilities, and depending on site specific conditions, apply to inspection and maintenance activities as well, depending on the site. The specific regulations and permit requirements that apply to work on any particular segment of pipeline or station are dependent on a range of factors, including the jurisdiction of the agency, site conditions at the project location, and the scope of work.

The scope of the environmental review for each project include desktop reviews and field visits by trained personnel such as biologists, permit specialists, and cultural resources specialists. Actual impacts at each location dictate the level of permitting required to comply with the applicable environmental regulations. PG&E Environmental Planners obtain all of the necessary permits for this activity.

7.7 Release to Construction

Upon obtaining all required permits and land rights, and after customers have been notified of the pending construction, the Land and Environmental team issues a Release to Construction letter to the Project Coordinator, which contains any site specific permit or land requirements, contacts, or any other measures that apply.

7.8 Environmental Compliance Management Plan

A site specific Environmental Compliance Management Plan is developed to cover the general compliance activities and responsibilities for the Hydro-Test Program. Site specific compliance measures and responsibilities are identified in the Release to Construction Letter and the project tailboards delivered by the designated compliance representative. These measures include holding onsite training for sensitivity to particular habitat or endangered species, water quality, and all of the specific needs of the specific test site.

7.9 Environmental Monitoring

PG&E provides and has onsite all of the required Environmental Monitors for the Hydrostatic Test Procedure. The role of the Environmental Monitor varies by site, and can include looking for specific species in the area, making sure the construction crew is applying BMPs and environmental compliance, and reporting weekly on the status of the test site. The requirements for each site are determined by the specifics of each site, as well as any site specific permit requirements and overall BMPs, such as PG&E's Environmental Stewardship Initiative.

7.10 Restoration of Job Sites

After all construction and testing has finished, the construction crew must restore the test site to its original condition. The Site Monitor verifies that all post-construction restoration is performed and all issues are resolved.

8. Engineering

Extensive planning and design work takes place long before any hydrostatic test is performed. When developing the engineering documentation for each specific project site, communication between all program departments is essential to ensure that the requirements of all aspects of the program are identified and satisfied by the proposed designs.

The engineering hydrostatic test design activities for each test to be conducted result in the creation of the Site Specific Hydrostatic Test Design Package. Other aspects of the program are also considered during the test design phase, and result in safety plans, notifications, permits, and supply chain material requirements.

8.1 Hydrostatic Test Design Package Development

The engineering deliverable for each pipeline segment is the Hydrostatic Test Design Package. Most of the effort from engineering goes into the design drawings for the Design Package, which is developed in a four stage planning process at the 25%, 50%, 80%, and 100% design levels corresponding to the amount of remaining approvals and details required. Developing the Design Package involves the following key stages:

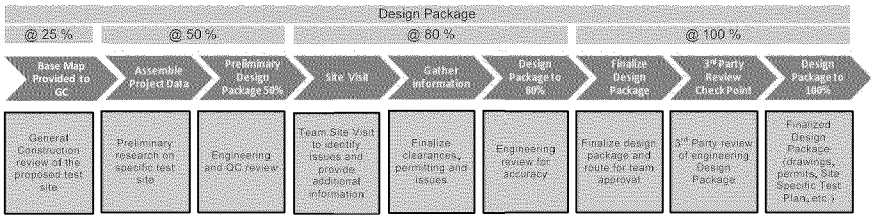

Figure 5. Hydrostatic Test Design Package Development Process

8.2 Records Research

Based on the pipeline segments that have been identified in the planning phase of the Hydro-Test Program, engineering gathers the available records for each pipeline test segment and the surrounding areas. The information required to produce the initial test design typically includes the following items:

- As built drawings
- Job estimates and STPRs
- The most current pipeline features list (PFL)
- Transmission and distribution plat sheets
- The operating map
- All operating diagrams for affected stations

8.3 Base Map Drawing (25% Level)

The first engineering deliverable is a base map drawing, showing the test segment and the preliminary test locations. Project team personnel use this base drawing to inspect the site, confirm details, and raise any concerns or make suggestions regarding details, the test location, or the staging area(s).

8.3.1 Encroachment Permits

If the test locations, staging areas, or any part of the test disrupts the local traffic, engineering develops detail drawings that illustrate the proposed test area(s) and detail the proposed encroachments, and

uses these to request an encroachment permit. By this time, the Government Relations department has already contacted the local officials to let them know of the plan to conduct work in the area. The engineering department works with the local officials to obtain a permit that will allow the work to be performed.

8.4 Issued for Site Visit (50% Level)

The 50% benchmark indicates that the design drawings have been approved for release to the test team for information gathering purposes and safety investigation of the area. The 50% drawings include the plan view, R stations, top of ground profile view, vicinity sketch, proposed test locations, specific test head configuration details, staging areas, preliminary test procedures, and other relevant site-specific details in preparation for conducting the site visit stage.

8.5 Site Visit (80% Level)

The purpose of the site visit is to gather field information to take the drawings to 80%, to provide opportunity for the project team to inspect the site and look for details that will help define the Site Specific Safety Plan, and to identify any permit, access, or environmental compliance obligations. The 80% Site Visit identifies any permit, access, or environmental compliance obligations also makes a final determination of the location and configuration of each test head and staging area for air compressors, pumps, water sources, and the discharge and number of storage tanks. These locations are chosen to minimize the impact on the community and environment where possible. The Project Coordinator verifies complete items and tracks outstanding issues. Refer to the Project Coordinator Checklist for the complete list of information to be obtained.

When all of the requested information is gathered, it is submitted back to engineering for incorporation into the design drawings.

8.6 Issued for Final Comment (80% Level)

The 80% benchmark is achieved after the test team conducts the Site Visit, processes the gathered information, and addresses any observations or concerns regarding the proposed test site. Engineering completes the STPRs and updates the design drawings, incorporating the final bill of materials, contingency bill of materials, material of record, stationing, detailed tie-in designs, and the plan and profile view, specifying the locations to stage materials, isolating the pipeline sections, identifying the test station locations, and identifying the minimum and maximum pressure control points. The Hydrostatic Test Design Package is intended to be ready for final review when the 80% benchmark is achieved.

8.7 Strength Test Pressure Reports (STPRs)

The Strength Test Pressure Report is used by Engineering to compile the design data for all of the pipeline material within the test segment, list the test

segment elevations for each component, and determine the test duration and the minimum and maximum test pressures required for the hydrostatic test.

8.7.1 Independent Third Party Review

An independent third party engineering organization provides a review of the proposed test pressures. They review the STPR, material of record, and the consistency of manufacturing practices, and compare the historic Mill test pressure against the specified maximum test pressure. The test pressures are either approved, or new test pressures are recommended.

8.8 Hydrostatic Test Procedure

Engineering prepares a Hydrostatic Test Procedure for every test site, which includes detailed procedures for conducting each hydrostatic test. The Test Procedure template is downloaded from the S: Drive, as specified in the Hydrostatic Test Procedure User Guide, and modified for each specific test site per the User Guide. Each step in the Hydrostatic Test Procedure is sequenced step by step and requires sign-off to verify that each task was accomplished. The Hydrostatic Test Procedure is created in compliance with the PG&E document A-37, "Hydrostatic Testing Procedure" and A-34, "Piping Design and Test Requirements" found in Appendix A. The Hydrostatic Test Procedure requires signatures by the engineer who developed the test drawings and procedures, the Test Supervisor assigned to the specific test, the Project Engineer of Record who is responsible for the Program design aspects, and the PG&E Authorization delegate who works on the overall Program.

8.9 Design Package Complete (100% Level)

Once a site specific Hydrostatic Test Design Package passes the internal review Quality Control checklist process, it is presented to the Project Engineer of Record for the Program, who provides the final review, the stamp, and necessary signatures. At this point, the completed Design Package is approved for distribution.

The Design Package to be transmitted includes the following documents:

- Distribution / Routing Slip
- Issued for Construction (IFC) Engineering Drawings
  - Material of Record
  - Bill of Material
  - Contingency Bill of Material
- Hydrostatic Test Procedure
- Geographical Information System (GIS) markups
- City Encroachment Permits (if applicable)
- STPRs
- Signed Kiefner Review, if requested
- Welding procedures

- Operating maps and diagrams
- A Form, blank
- H Form, blank
- Chain of Custody Procedure
- RMR Chain of Custody Form
- Dew Point Test Form
- Design Change Notices, as required
- Contractor Operator Qualifications, if required
- Weld testing summary, blank

Prior to transmitting the assembled Design Package, Engineering verifies the required number of copies with the Project Coordinator, the Construction Manager, PG&E General Construction, and the video camera crew, as applicable, and confirms the destination locations of the copies.

Engineering transmits the Design Package to PG&E GC Construction and the video camera crew as applicable. The Construction Manager transmits the Design Package, with a transmittal cover page (Transmittal Form found in Appendix A) to the construction contractor. The Transmittal Sheet is signed upon receipt by the construction contractor. The GC Construction Manager sends the Transmittal Sheet to the Contract Supervisor in Sourcing and serves as proof of receipt by the construction contractor of the transmittal documents.

In instances where the information benefits the Construction testing crew, portions of the approved Design Package are transmitted in advance of the completed package. When sending an incomplete transmittal, the omitted document(s) are listed as absent with the date the document(s) will be provided. The process remains the same as detailed above.

9. Quality Assurance and Quality Control (QAQC)

9.1 Independent Certification

PG&E utilizes independent third parties to provide quality oversight of the Hydrostatic Test Program based on the nature and importance of the work performed. An industry certified Quality Assurance and Quality Control (QAQC) organization approves the complete Program quality procedures and certifies that each individual hydrostatic test is performed in accordance with the designed Hydrostatic Test Plan. The certification organization reports directly to the PG&E's Hydro-Test Program Sponsor. A separate QAQC organization monitors critical construction activities with results sampling throughout the Hydro-Test Program procedures.

9.2 Construction Inspection, Quality Control, and Quality Assurance

Construction Inspection services are applied to construction activities provided by third party construction contractors. Construction inspectors

confirm the procedures and results for key field activities, including but not limited to, the following activities:

- Materials tracking
- Trenching
- Welding
- X-ray tracking
- Surface preparation
- Coating
- Backfill
- Compaction
- Site repair
- As built record keeping

Inspectors follow and document construction activities related to set-up, watering, pressure testing, de-watering, and drying. Inspectors also critically track and record problems with pressure testing that require pipeline repairs. All pipeline segments identified and removed for repair, as well as segments removed for testing, are recorded and tracked using the chain of custody process and form discussed in the Construction Clearance section of this document.

Quality Control (QC) sampling is applied to critical Hydro-Test Program process steps. An experienced third party contractor randomly samples the process results of select hydrostatic test projects, starting with 100% of the projects at the commencement of the program, to confirm that all of the project activities are completed as engineered and documented to PG&E standards. As the required measurement results are solidly confirmed, sampling rates are reduced to levels that maintain full confidence in results. Process activities that struggle to achieve expected results must be sampled more frequently, as determined by the importance of the results and the usefulness of the quantitative data. The QC contractor measures and records the key process activities, maintaining a database of these records for analysis. QC focus on all activities in the hydrostatic testing process, from construction preparation, hydrostatic testing, and restoration, through to as built mapping.

The independent Quality Assurance (QA) organization certifies the quality procedures for the Hydro-Test Program. QA will use referenced PG&E standards and procedures to insure that proper rigor is applied to critical hydrostatic test process steps, and use industry standard disciplines (ASQ, ASME, etc.) to confirm that quality procedures have been effectively applied to the program.

9.3 Quality Procedures

Quality measurements occur at key steps throughout the hydrostatic testing process, with particular emphasis during the engineering package

development, construction set up, hydrostatic test, tie-in, restoration, and final documentation.

Quality checkpoints have been developed with consideration for the Project Construction Checklist and Hydrostatic Test Procedure. Construction and engineering have created several progress hold points to confirm results of critical project milestones. These hold points frequently reflect areas of quality concern and potential quality results measurement. As the construction and test checklists are modified or updated, related quality activities are changed as required.

Points of process review and quality measurement are at these critical steps:

- Development of the Design Package (focus at 50% and 100%)
- Construction Setup Inspection activities
- Hydrostatic Test Procedure documentation
- Drying, Tie In, and Restore Construction Inspection activities
- As-Built Records and Mapping / GIS

9.3.1 Development of the Design Package

The Site Specific Hydrostatic Test Design Package includes the following components:

- Hydrostatic Test Procedure
- Design Drawings
- Bill of Materials
- STPRs
- Encroachment Permits

Engineering is responsible for project package quality through the issuance to Construction. As the project package is developed by Engineering (Section 8) data quality is checked and recorded at the 50% status and the 100% status. Engineering ultimately completes the Out of Engineering Checklist, found in Appendix A. At this point, it is ready to be issued to construction and another quality assessment is performed.

9.3.2 Construction Inspection

Construction Inspection is applied over the scope of field work and includes the following activities:

- Site preparation
- Clearance
- Pretest, setup and fill pipe
- Pressurize and test
- Depressurize and de-water
- Tie in and restore site

- As built documentation

The Construction Inspector is responsible for checking and recording key results of the construction contractor activities relating to hydrostatic test projects.

The Project Construction Guide is used to track critical deliverables and hold points. These activities help define areas of concern for quality results. Quality reviews occur over these milestones to develop an understanding of the potential issues, impact, and frequency. Quality procedures are vetted to ensure issues are being appropriately captured.

- During the site preparation activities, the pipeline is exposed and data begins to be collected. PG&E forms A and H are completed and an ABI test is performed and recorded. Quality sampling of this data will be tracked.
- A clearance is performed to isolate the pipe segment for testing. As existing pipe pieces are removed, material tracking and testing activities are performed. Quality sampling of this data will be tracked.
- Fabrication of test components commences and Construction Inspectors record results. Quality sampling procedures will be applied as they currently exist for General Construction QAQC. This will include welding and x-ray tracking.

9.3.3 Hydrostatic Test Procedure

The site specific Hydrostatic Test Procedure is used to track and record the critical deliverable of this stage of the process, including many hold points to confirm results are to expectations.

- A certified test company performs the actual hydrostatic test and records critical data (handwritten in ink) to complete each test. This company is responsible for completing the required PG&E Strength Test Pressure Report (STPR) and related documents.
- A separate company uses the recorded data to perform analysis of the pipeline test and confirm test results. The pipeline experts (RCP) use specialized tools to provide additional validation of pipeline strength data.
- A third quality certified contractor (Bureau Veritas) acts as Quality Assurance for each individual hydrostatic test, certifying that each test is accurately executed and recorded from the time of pressurization. QA confirms that the test preparations were completed as planned, using details from the Out of Engineering Checklist, Construction Inspection process records, Hydrostatic Test Procedure, Quality Control (QC) measurements. QA publicly certifies that each hydrostatic test was completed per industry and PG&E Standards.

In Stage 1 of the As-Built Documentation, the original test records (handwritten, dated and signed in ink) are combined with red-lined construction drawings to complete the STPR. A quality checkpoint occurs with these records and the critical supporting data to confirm the required PG&E records are accurate and complete. The contractors should be on-site during this review.

9.3.4 Depressurize, Dry, Tie In and Restore

After the hydrostatic test, the pipeline is depressurized and all water is removed before the pipeline is tied back into service (tie in) and the site is restored. Construction Inspection records the results of these activities, including welding, x-ray, surface preparation and coating repairs. Inspectors record backfill and compaction, as required. Quality sampling of these activities and data are tracked.

In Stage 2 of the As-Built Documentation, while the tie in and restore activities are underway, the critical documentation continues to be developed. Contractors are responsible for providing accurate and complete red line drawings, signed weld inspection stamps, weld maps, radiographers daily inspection sheets, signed forms (Keifer review, Form A, Form H, Chain of Custody, Bill of Material) and confirmation of completion of relevant procedures. The contractors should be available for record corrections during this review.

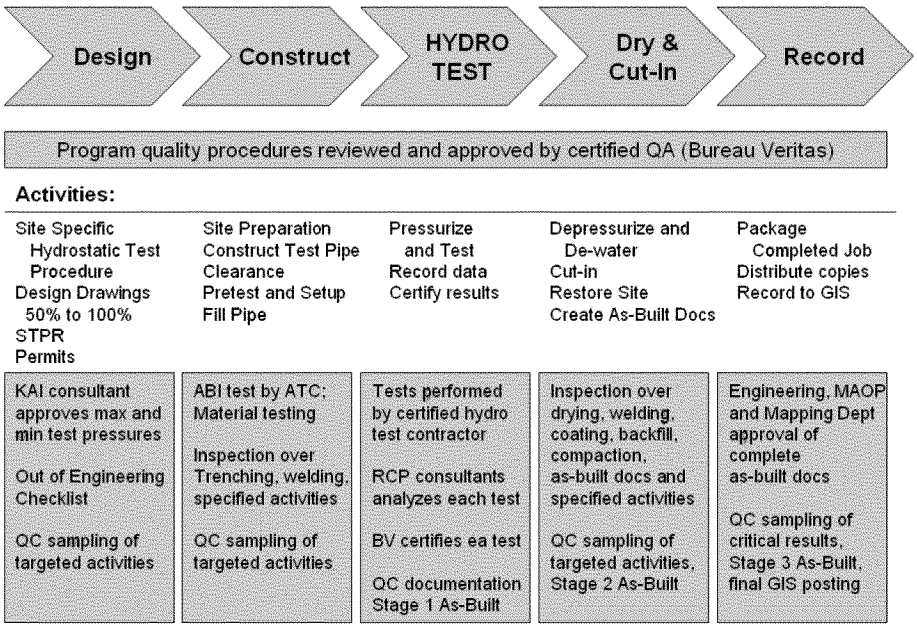

Figure 6. QAQC Program Process Flow Chart

9.3.5 Records

In Stage 3 of the As Built Documentation, final records consist of the completed As-Builts, including restoration details. The revised Hydrostatic Test Program As-Built Documentation Checklist defines the expectations for the final records, and requires comments when results are incomplete. All documentation from Stage 1 and 2 are packaged into Stage 3. Quality sampling of these records confirm required results.

Project Engineering participates in the quality assessment of these project records before the Project Coordinator submits them to Mapping. Mapping confirms that the submitted documentation is complete and legible. Quality checks elements of this process through Mapping to confirm that the necessary details are accurately recorded with the final result of accurately recorded project data applied to GIS.

Existing PG&E GC Quality Procedures are being introduced to the contractor projects. New Quality Checkpoints are currently under development and review.

9.4 Culture of Quality

PG&E Gas Transmission and General Construction apply QAQC to new pipeline construction after significant development work. All contractors are encouraged to embrace Quality, as has been required for Safety. If any aspect of process results or material features is noticed as out of the ordinary or concerning, involved workers must bring this to the attention of inspection and/or QC. Questions about the appropriateness of procedures must also be addressed.

Pipeline workers must be comfortable with inspection and QC participation with reviews of their results. Any measurements that are out of range are discussed with the foremen and workers on the spot. Workers are provided with the tools needed to measure and confirm their own results in order to meet quality expectations.

Program management must introduce the Quality activities to all employees involved in the Program. Only with strong adoption can the Quality program deliver the required effectiveness.

10. Environmental Operations and Emergency Response

At each specific work site, PG&E employees and contractors must practice environmental awareness and safety. This includes awareness of wildlife, natural environment, work conditions, construction site safety, possible contamination during testing, and proper disposal of test materials.

10.1 Environmental Awareness

PG&E is committed to being an environmental leader, and demonstrates this through safe and considerate work practices. Before working onsite, PG&E workers receive an environmental awareness training tailboard, during which they are given the Pipeline Hydrotest Program Environmental Awareness Training brochure found in Appendix A. This includes an understanding and respect of biological and cultural resources, preparing for fire protection, consideration for water quality, and the appropriate handling of hazardous material. Because the hydrostatic testing process is disruptive to the environment and community around the test area, it is important to cause the least amount of disturbance possible.

10.2 Construction Site and Work Conditions

During hydrostatic testing, the construction site must be set up and maintained according to the BMPs as outlined in the Activity Specific Erosion and Sediment Control Plan (A-ESCP) requirements found in Appendix A, and the Segment Storm Water Pollution Prevention Plan. This ensures that the work site is a safe and controlled environment for construction workers, minimizing the risk for accidents to occur. Typical activities performed might include the following:

- Establish clear work area

- Establish lay down, staging, or vehicle parking areas
- Construct a stabilized construction entrance/exit
- Install dumpsters and other waste management facilities at least 50 feet from an inlet
- Provide for removable dumpster covers
- Procure covers for stockpiles from trenches or excavations
- Construct a concrete waste washout if concrete will be used during construction
- Make sure spill control kits are onsite and available
- Check equipment and vehicles daily for signs of drips/leaks and provide drip pans as necessary
- Store all soluble materials under cover or in clearly marked containers on pallets
- Establish proper locations for temporary or portable sanitary/septic waste systems, if necessary
- Demobilize after removing all temporary BMPs.

NOTE – Areas of soil disturbance will be stabilized and coordinated with the property owner(s).

Refer to Activity Specific Erosion and Sediment Control Plan (A-ESCP) "Good Housekeeping" and "Small Urban Excavation Projects" found in Appendix A.

10.3 Storm Water and Discharge Water Management

In support of this initiative, Standard Operating Procedures (SOPs) have been developed to facilitate a systematic, consistent, and cost-effective approach for managing storm water and the discharge water generated during the hydrostatic testing process. These SOPs, describe procedures for planning, coordinating, and monitoring water collection and discharges associated with each hydrostatic test segment. Refer to Water Management SOPs found in Appendix A. The SOPs establish:

- data requirements, methods, and management procedures for characterizing water and wastewater associated with the testing program
- storm water management procedures required for compliance with the National Pollutant Discharge Elimination System for construction and land disturbance activities
- monitoring, communication, and response requirements in the event of a release during hydrostatic testing
- data collection, permitting, and discharge requirements for discharge of water to land or a Publically Owned Treatment Works (POTWs)

The nine SOPs that have been developed include the following:

- Wastewater Monitoring, Discharge Coordination, and Discharge Permit Closeout
- Discharge to Land Permitting and Process
- Evaluation and Management of Excavation Water for Hydrostatic Testing Program
- POTW Permitting Process
- Waste Characterization Procedure for Hydrostatic Water
- Storm Water and Discharge Water Data Management Procedure
- Quality Assurance Work Plan Hydrostatic Pressure Test Water Sampling and Analysis
- Storm Water Pollution Prevention Plan Preparation and Implementation for Hydrostatic Testing Program
- Leak Response Plan Preparation, Training, and Reporting for Hydrostatic Testing Program

The procedures described in the nine SOPs apply to Water Specialists, Water Field Specialists, and Supervisors involved in hydrostatic testing, and employees that perform environmental inspections including Environmental Field Specialists.

10.3.1 Sampling of Hydrostatic Test Source Water

PG&E's Environmental Operations team analyzes samples of the water source to be used for the test projects. Local water sources have to be identified and selected in order of preference: potable water, AG well, stream, irrigation ditch, pond water and so forth selecting the cleanest source available so as not to introduce potentially corrosive contaminants into the pipeline. Analyses are selected based on the source, such as municipal supply, groundwater, or surface water, to document water quality and anticipate discharge permitting issues.

10.3.2 Sampling of Pipeline Liquids for Contamination

The pipeline is cleaned prior to introducing the hydrostatic test water by forcing a clearing pig through the pipeline with compressed air. This is intended to push any particles or accumulated fluids out of the pipeline. Cleaning may expel pipeline liquids, which are then characterized based on prior experience and appropriate analyses, and are managed in accordance with applicable federal, state, and local regulations. The sampling methodology that PG&E follows for all waste determination is Environmental Protection Agency's (EPA) National Technical Information Service (NTIS) SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" and 40 Code of Federal Regulations 136 (40 CFR 136) found in Appendix A.

A contingency plan for leaks or spills of hydrostatic test water is prepared for each test segment that identifies potential points of discharge to storm sewers or waterways, and specifies equipment, materials, and methods to

contain and recover leaked or spilled hydrostatic test water. Source water and leak characterization sample quality provides the basis for responding to leaks or spills as soon as possible to prevent delays.

PG&E's policy is to treat the water used in a hydrostatic test or any contaminants resulting from cleaning a pipeline as hazardous material until lab testing can be completed to accurately characterize the medium. Field sampling is done per EPA's method SW-846 and 40 CFR 136, which in short states that sampling must be random and representative of the waste. Additionally, SW-846 establishes testing criteria and methods for waste characterization, which are written on PG&E's Form 62-6406, "Record of Material Removed from Existing Natural Gas Transmission Pipeline" found in Appendix A. Chain of Custody procedures are also established to accurately track the samples through the analysis process. A laboratory accredited by the California Environmental Laboratory Accreditation Program is utilized for all sample testing.

10.3.3 Hydrostatic Test Water Disposal

The preferred hydrostatic testing water disposal method is to discharge the water to a local Publicly Owned Treatment Works (POTW). The water must meet POTW's discharge requirements and permits. Where POTW discharge is not an option, water management alternatives include transporting the hydrostatic testing water offsite to a permitted disposal facility or discharging the water to land or surface water in accordance with Regional Water Quality Control Board (RWQCB) requirements and under a permit or authorization from the RWQCB. RWQCB permit requirements vary by region.

Hydrostatic testing water is filtered with micron filters and granulated activated carbon (GAC) to eliminate pipeline odors prior to discharge. The GAC system, at a minimum, is sized to the amount of water that needs to be cleaned. A representative sample of the hydrostatic testing water is taken before and after carbon treatment and analyzed to document compliance with discharge requirements. Hydrostatic testing water is not discharged until PG&E confirms with the POTW that the carbon-treated water meets the discharge requirements.

10.3.4 Non-Water Spills

An Environmental Field Specialist is identified in the Hydrostatic Test Procedure to coordinate the Non-Water Spill Emergency Response Procedure. This procedure is followed in the event of a non-water spill if the facility does not have a Spill Prevention, Control, and Countermeasure (SPCC) Plan on file. All spill response equipment must be onsite before the start of construction, and all spill response vendors must be notified of and verify the need for standby spill response services before construction begins. Vendors must also be on standby for the duration of the construction process.

11. Supply Chain

PG&E employees and contractors maintain a complete record of pipe, valves, and fittings (PVF) for all stages of the project. A specified party is responsible for handling, marking, and identifying pipe throughout every stage of the project and prior to each instance of pipe being cut. Tracking of pipes, valves, and fittings starts before delivery to the warehouse and continues through the return of any unused pipe.

11.1 Pre-delivery

PG&E General Construction (GC) Gas maintains and updates the materials requirements in SAP's Plant Maintenance (PM) module. PG&E Warehouse Operations coordinates and delivers the pipe to the warehouses.

A process to record the materials and construction of each piece of pipe in the SAP system is being developed by Procurement.

11.2 At the Warehouse

PG&E GC Gas releases the materials via SAP. PG&E Warehouse Operations and/or the Pipe Warehouse Vendor receive the materials and stock the warehouses.

When manufactured, the pipe vendor places a uniquely identifying number on the inside of each joint of every pipe. As pipe is loaded for delivery, the warehouse creates a ticket showing the length, wall thickness, grade, and heat number for each joint.

11.3 Delivery to Job Site

PG&E Warehouse Operations coordinates the delivery of materials to the job site. Either the Construction Contractor or the Trucking Contractor delivers materials to the job site. The Construction Contractor confirms the delivery and receipt of the materials.

Additional PVF and joint tracking information is recorded as the material is unloaded at the job site. Each joint is assigned a number showing the order in which the pipe was unloaded. Each joint number is further defined with the length, diameter, wall thickness, heat number, and serial number (bar code). This information is kept on a stringing report. The continuity and consistency of stringing report numbers are maintained by having one person supervise the unloading and assign stringing numbers.

11.4 Placement in the Pipeline Route

The Construction Contractor moves the pipe from the job site to the pipeline route.

Before the pipe is delivered to and installed in the route, the appropriate stringing report number is painted on each end of the pipe. To ensure the

numbers are visible no matter how the pipe is turned, the numbers are large, and painted on three sides of both ends of the pipe.

Cut pipe that is not put into the ground is marked with the stringing number, as well as an assigned numeric suffix. This stringing number plus suffix method is used to mark every pipe, no matter how many times the pipe is cut, ensuring that the each joint is traceable.

11.5 Placement of Pipe

PG&E GC Gas cuts pipe. The Construction Contractor places new pipe into the pipeline. PG&E GC Gas welds the joints.

When put into the ground, each weld is identified and recorded in three types of documents: the weld map, the x-ray record, and the as-built drawings. Each weld is identified with the stringing report number of the two pipe joints welded. For instance, if joint 1 is welded to joint 2, the weld identification number is 1-2. Fittings such as elbows are numbered in the same manner, using the stringing report number plus a suffix to indicate a cut. All welds and fittings are recorded on the weld map and identified on the as builts by GPS.

11.6 Handling of Removed Pipe

Sections of removed pipe are identified, marked, and moved using the methods previously outlined in this section and in section 12.5.6, Marking, Removing, and Moving Pipe (Chain of Custody).

The Construction Contractor will follow the directions in Section 11.10 to deliver the removed pipe to PG&E's Removed Pipe Storage Facility.

11.7 Repair of Pipe

PG&E GC Gas makes the repairs, cuts, and welds to the pipe.

A weld repair map and weld log track each repair made to pipe. The weld log shows the date and reason the weld was rejected, the name of the welder, and whether the weld was repaired or cut out. Repaired weld numbers are amended with the suffix "R".

11.8 Lab Testing of Removed Pipe

PG&E ATS receives the sample, performs lab tests, and documents the results. After the testing is complete, the Trucking Contractor ships the sample to the storage facility, and PGE ATS reviews and scans the test results, and ships the hard copies to Walnut Creek.

Sections of removed pipe are identified and marked using the methods previously outlined in this section. PG&E ATS updates the RMR Chain of Custody Form.

11.9 Reconciliation

Contractors reconcile all material at the end of each project. For reconciliation, the bill of material (BOM) ordered for the project is compared to the materials used, as determined by the as-builts, and the materials remaining in the project yard. Pipes over 10 feet in length and useable fittings are returned to the warehouse. Contractors dispose of pipes under 10 feet long and unusable fittings, crediting PG&E for the salvage value. Reconciliations showing a discrepancy of more than one-half of one percent are investigated.

11.10 Material Return

11.10.1 Return or Disposal of Unused Pipe

After reconciliation, the Construction Contractor packs materials, coordinates the delivery of returnable materials from the job site to the warehouse in Port of Stockton (pipe) or Modesto for all other unused materials, and works with the PG&E Materials Distribution to ship the materials back to the warehouse. The Construction Contractor also updates usage for reusable materials & scrap end of life (EOL) materials.

PG&E Materials Distribution receives the returned materials, and PG&E Supplier Quality performs a quality control inspection on all of the returned parts. PG&E Materials Distribution then updates inventory in the Surplus Inventory Spreadsheet. All parties send final project documentation to the Job Closeout Desk in Walnut Creek.\

11.10.2 Returns of Removed Pipe

The Construction Contractor packs pipe, coordinates the delivery of removed materials from the job site to the warehouse in Modesto, and works with the PG&E Materials Distribution to ship the materials back to the warehouse.

Removed materials are stored according to the procedures highlighted in Section 12.5.6 Marking and Moving Pipe (Chain of Custody).

Additional detail about the parties responsible and accountable, and those who must be consulted and informed, is displayed in the To-Be Delivery and To-Be Return flow charts below.

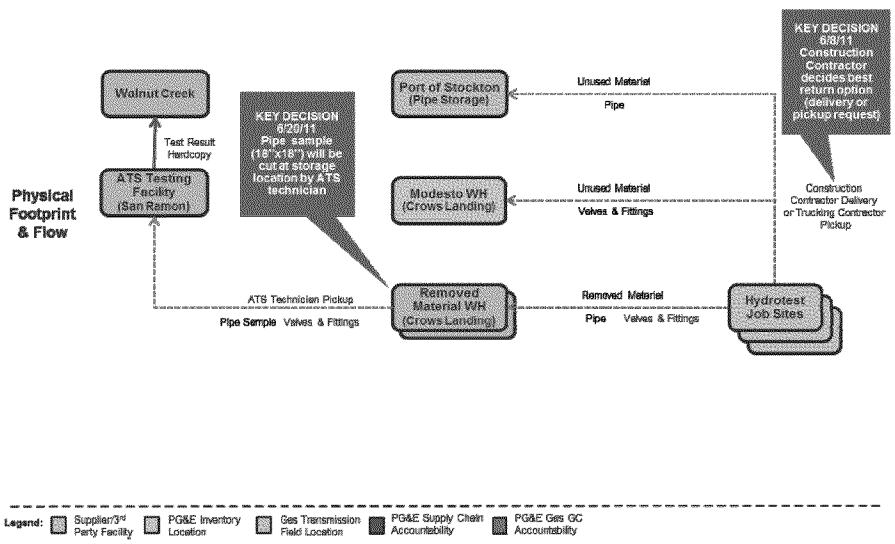

Figure 7. To-Be Returns (Unused and Removed) Flow Chart

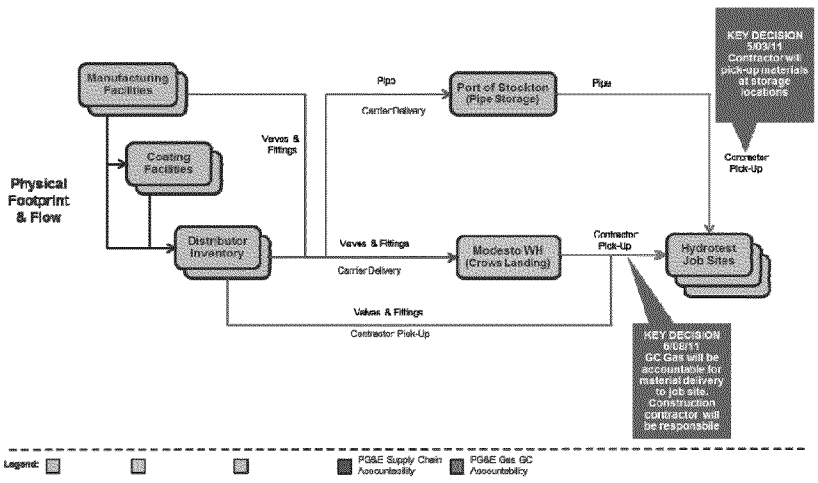

Figure 8. To-Be Delivery Flow Chart

12. Construction Management

The excavation of gas facilities, inspection, shut-down, clearance, tie-in, patrolling requirements, pipe wrap handling, return to service, and other aspects of physically accessing the pipelines and associated duties are well-documented procedures that are included in this manual as reference documents and are cited in each specific section. The Construction Management Process follows the requirements as defined in the referenced documents found in Appendix A.

Procedures specific to these hydrostatic test requirements are further defined and controlled in the Hydrostatic Test Procedure for each specific test to be performed. Performing a hydrostatic test involves the following key activities:

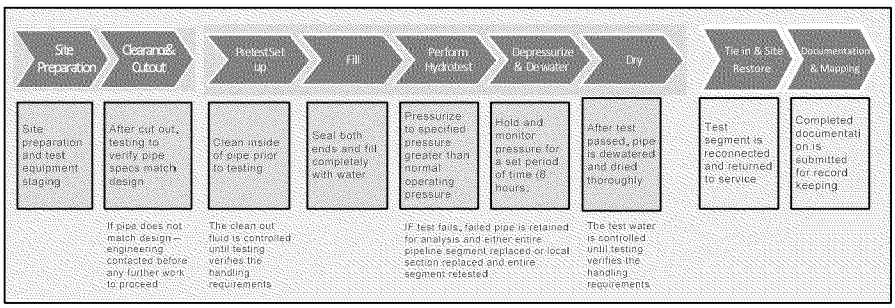

Figure 9. Construction Phase

12.1 Staffing

Acquiring contractors for site preparation is done in accordance with the Supply Chain's Requisition To Pay Procurement Manual, as specified in the sub-process, "Identify Suppliers & Create Selection Criteria" found in Appendix A. This process ensures that contract personnel associated with the test are qualified. Qualifications of contract and operations personnel for conducting pressure tests vary based on certification requirements by regulation, code, or operator standards and procedures.

Any work on gas lines that requires Operator Qualification (OQ) is done either by PG&E OQ personnel or by contractors that have been verified by PG&E to meet the OQ requirements. If necessary, personnel attend PG&E Technical Academy for OQ certification in specified areas of work, such as purging, gas detection devices, and standby.

There must also be a clearly designated Clearance Supervisor for all clearances. The Clearance Supervisor must remain responsible and available for the duration of the clearance. The Clearance Supervisor is responsible for confirming the welding pressure and submitting the clearance two weeks prior to site excavation. Planning is needed to test for contaminants in the pipe. Any liquids that are found are sampled and sent to the lab for testing by

Environmental Operations, and contained until disposal disposition is provided.

12.2 Preliminary Review Meeting

Prior to any onsite work, a Preliminary Clearance, Tie-in, and Test Review meeting is held to review the end-to-end site specific project, from site prep, clearance, tie-in, hydro-test, and restoration procedures. This helps key team members understand their roles and responsibilities, as well as giving them an opportunity for input. The individuals that should be in attendance include:

- Project Coordinator
- Clearance Supervisor
- Transmission System Planner
- Local Distribution Planner
- Gas System Operations (GSO) Clearance Representative
- Construction Foreman supervising and performing the tie-in
- Construction Foreman supervising and performing the hydrostatic test procedure
- Construction Manager
- Test Supervisor
- Inspector

This meeting is held a minimum of three weeks before the actual clearance to review the Clearance Application draft, the pipe cut tie-in plan, the Hydrostatic Test Procedure, and the restoration to service. The meeting covers the following topics:

- Determination of whether a welding clearance is needed for a pipeline liquids check prior to cutting the pipeline
- Review of Clearance Application draft and approvals needed for a clearance
- Review of planned pipe cutting and tie-in procedure
- Review of the Hydrostatic Test Procedure
- Review of return to service procedure

12.3 Site Visitors

Prior to visiting the test site, an outside visitor must receive approval and authorization for a site visit from the Construction Coordinator Supervisor (CCS). Any visitor must follow the Site Visitor Guide, including the appropriate use of PPE and an on-site contacts list.

12.4 Site Preparation

After contractors have been selected, engineering releases the design package, and the PG&E Contracts Department issues the Release to Construction Letter. The primary contractor then performs the site preparation as needed, based on the conditions at the site as outlined in their contract and the Design Package.

12.4.1 Conduct Tailboard

Tailboard meetings are conducted prior to the start of the job, and are conducted as conditions change throughout the job. The tailboard held before site prep describes the details of the Hydrostatic Test Procedure for the crew performing the site prep, including safety, environmental compliance, and the objective of the work to be completed.

12.4.2 Excavation and Reconciliation of Missing Data

Excavation is performed per the utility procedures found in Appendix A, including the following references:

- Utility Procedure WP4412-05, "Excavation Procedures for Damage Prevention"
- Utility Standard S4415, "Excavation Safety."
- Utility Procedure TD-4412P-06, "Handling Excavators, Contractors, and the Public Working Unsafely Around Utility Facilities"
- Utility Procedure WP4412-03, "Marking and Locating PG&E Underground Facilities"

If trench water encountered during excavations must be removed, the groundwater will be characterized, and either transported to a permitted disposal facility in accordance with applicable federal, state, and local requirements, discharged to a POTW under permit, or land applied as an authorized non-storm water discharge under the California Storm Water General Construction Permit or other Regional Board Permits or Waivers.

Once the pipe coating has been removed, Advanced Technology Corporation's Automatic Ball Indentation (ABI) technique is performed as per the ABI Assessment Procedure, found in Appendix A, to verify yield strength. Also, the overall pipe diameter, wall thickness, and longitudinal seam type are recorded using Form A, "Data Element Check Sheet" and Form H, "Direct Examination Data Sheet", found in Appendix A.

The pipe sample material is sent to a testing laboratory per the Chain of Custody procedure, as described in the Supply Chain section of this manual. The ABI yield results are reviewed against the as built documentation. Engineering confirms that the ABI tested values match or exceed the as built values. The results are then posted in the share point website in the T-40/Engineering Documents folder.

If the materials of record details on the design drawings do not agree with the findings of the verification task during site preparation, then testing cannot commence, and engineering is notified. Engineering

must review the findings and amend the Hydrostatic Test Procedure as necessary to accommodate the unexpected details.

12.5 Clearance

The Clearance stage is comprised of the PG&E Clearance activities necessary to perform the clearance that shuts down the pipeline, clears the pipe of any natural gas (blowdown), and makes the pipe ready for the hydrostatic test construction activity. Clearance is done in accordance with PG&E's WP4100-10.

12.5.1 Conduct Initial Clearance Review Meeting

The initial Clearance review meeting is held three weeks prior to Clearance. The Project Coordinator discusses the Clearance process and any potential issues with the Construction Manager, Clearance Supervisor, Clearance execution team, Transmission System planner, Tie-In Supervisor, GSO Clearance representative, and, if needed for the site, the LNG/CNG lead and Distribution Planner.

12.5.2 Conduct Pre-Clearance Meeting, Construction Clearance Review, and Day-Of Tailboard

The pre-clearance meeting is conducted by the Clearance Supervisor, Gas Control, the Tie-In Supervisor, the Communications Lead, the Site Safety Lead, the Hydrostatic Test Procedure Supervisor, the Construction Inspector, and the Construction Manager prior to performing the clearance process and cutting the pipe. This meeting must be conducted with an approved clearance, and should be held two to four days prior to pipeline clearance.

A review of the Clearance procedure is conducted by the Tie-In Supervisor and Clearance Supervisor prior to the approved Clearance procedure.

The Day-Of tailboard is held at the beginning of the work process, immediately preceding the implementation of clearance. The tailboard covers the following topics:

- Confirming all work assignments
- Ensuring that proper tagging is ready and GSO approval has been received
- Ensuring that clearance activities are coordinated
- Addressing safety concerns
- Reviewing the objectives of clearance
- Reviewing communication methods that are used during clearance

In addition, before the start of any work, the Safety team conducts a safety tailboard, and re-tailboards as conditions or the task change.

12.5.3 Request Clearance

The Clearance Supervisor requests clearance from Gas Control to begin the open clearance process using Form F100-10-4 Attachment 4, "Application for Gas Clearance" found in Appendix A.

Gas Control also updates the master clearance board.

12.5.4 Perform Open Clearance Process

The clearance crew performs the open clearance process, which includes:

- Making local notifications to local governments and first responders
- Walking down affected equipment
- Placing tags on all clearance points (man-on-line, caution, information)
- Positioning all isolation points as necessary for clearance work

After the open clearance process is performed, the Clearance Supervisor notifies Gas Control to hand off the pipe to the Construction Tie-In Supervisor. At that time, Gas Control also updates the master clearance board.

12.5.5 Perform Shutdown Procedure

The shut down procedure involves the clearance crew performing the following activities:

- Purging gas facilities in accordance with WP 4100-10 subsection 3 D, "Blown Gas".
- Installing and operating air movers as per A-38, "Procedures for Purging Gas Facilities" and A-38.1, "Installation and Operation of Air Movers" found in Appendix A.
- Cutting and capping the pipe as per PG&E's Utility Procedure WP4100-01, "Hot and Cold Work Methods for Natural Gas Pipeline Shutdown and Tie-In" found in Appendix A, which establishes procedures for working on natural gas pipelines during shutdowns, cut offs and tie-ins.
- Isolating the test segment.

12.5.6 Marking, Removing, and Moving Pipe (Chain of Custody)

The chain of custody for removed pipe begins when the pipe is cut, and continues through testing to the delivery of the pipe to the storage facility.

Once the hydrostatic test site has been prepared, the open clearance and shutdown procedures are performed, and the construction crew

removes the cutout sections of the pipe as part of the hydrostatic test preparation. The Construction Manager ensures that the pipe segments are marked with the following information:

- Transmission Line Number (e.g. TL 132)
- The Top of Pipe is noted at the top center of the pipe (e.g. T.O.P.)
- Gas Direction of Flow is noted with an arrow (e.g. Direction of Flow ·)
- Mile Point from project overview for the location (e.g. 40.8350)
- Nearest street address (e.g. 1500 Crest Drive)
- Date removed (e.g. 05/26/2011)

The cutout sections are transported to the storage facility. Prior to transporting the pipe to storage, the Construction Manager ensures that digital photos of the removed sections are taken and the RMR RMR Chain of Custody Form has been updated. The form must include the information marked on the pipe and any additional identifying information. Before transport, the completed RMR form contains the following information:

- Transmission Line Number
- The Top of Pipe
- Gas Direction of Flow
- Mile Point from project overview
- Nearest street address
- Date removed
- GPS Coordinates taken from the project job package (for example, 122.44229d / 37.64087d Lat Long/NAD83)
- Location description from the project overview (for example, Camera Insertion Location #1)
- The full name of the employee coordinating pipe removal and transportation

Once at the storage facility, PG&E ATS personnel will perform initial tests. PG&E ATS representative will oversee and coordinate the cutting of the pipe sample at the storage facility and deliver of samples from the PG&E Materials Facility to a test facility. The pipe is marked before the test segment is cut, and the RMR is completed.

PG&E ATS will fill in a child Chain of Custody form for every test sample (coupon) to track the chain of custody when the pipe sample is moved from storage to ATS, from ATS to any third party testing locations, and from third party testing locations back to ATS and from ATS back to storage, where it will be stored with the original segment. The following diagram tracks the Chain of Custody for pipe that is removed from test locations:

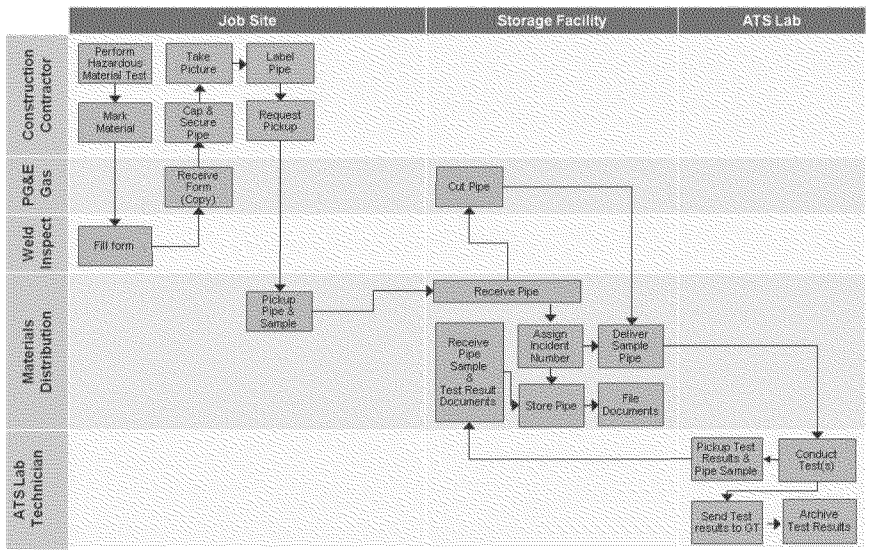

Figure 10. Removed Materials Chain of Custody Process

Additional information about pipe movement can be found in the Supply Chain section of this manual.

12.5.7 Off-Site Pipe Tests

When the pipe segment arrives at the testing facility, it is tested for yield strength, hardness, pipeline composition, fracture toughness and Charpy energy. Test samples are as close to full size as possible, considering the wall thickness. ATS conducts a comparison of the results of the field ABI test to the lab test to determine whether to continue with the ABI test in future hydrostatic tests. After testing, the pipe is stored in a locked storage container, or a secure, roped area, and the location is noted on the RMR form.

12.5.8 Ruptured and Replaced Pipe

In the event of a rupture during the actual hydrostatic test, PG&E cuts out the pipe joint with the failure and uses the Chain of Custody procedures to route the pipe to ATS or another designated testing facility to analyze the failed section and determine the cause of the failure. The resulting report is sent to Program Engineering and the third party engineering organization for review and development of a repair plan. The determined quantity of pipe is replaced with new pipe, and the entire segment is retested.

Reference Advanced Technology Corporation Automated Ball Indentation (ABI) Test, Form F100-10-4, and PG&E's Utility

Procedure WP4330-02, "Removal and Control of Liquids from Pipelines and Maintenance and Operation of Associated Gas Conditioning Equipment," found in Appendix A.

12.6 Test Support Operations

After the Clearance process is complete, hydrostatic testing can commence. Prior to the actual testing, the support operations must be in place and detailed in the Hydrostatic Test Procedure.

At the first hold point, the Test Supervisor must sign off and verify that all PG&E employees and contractors that are performing the covered tasks on the Right of Way (ROW) are qualified in accordance with 49 CFR 192, Subpart N, as found in Appendix A.

The Test Supervisor is responsible for ensuring that each emergency responder is familiar with the patrolling and incident reporting requirements for the specific test site. The Incident Commander, Emergency Spill Responders, and the Patrol Lead must be identified and listed in the Hydrostatic Test Procedure. The identified patrolmen are responsible for maintaining communication with the Test Supervisor, patrolling the line, and monitoring intersections for the duration of the hydrostatic test. The Incident Commander is responsible for calling and reporting the incident to the appropriate emergency responders, as detailed in the Hydrostatic Test Procedure.

Once the Test Supervisor has verified that all emergency response is onsite and aware of their role requirements, they sign off on the hold point in the Hydrostatic Test Procedure.

12.6.1 Spill Response

In the Hydrostatic Test Procedure, spill response equipment is identified and staging locations are established. All spill response equipment must be on site. Equipment varies by site, and may include straw bales, silt fences, vacuum trucks to be on standby during the fill and test stages, sand bags, straw wattles, and plastic sheeting as detailed in the procedure for each specific test site.

The Test Supervisor must verify and sign off that emergency response team has been briefed on their roles, the communication plan, incident objectives, and the location of response equipment.

12.6.2 Equipment

Pigging equipment must be identified for the initial run (clear pipeline of liquids/debris), the pipeline fill, and the drying pigs, and recorded in the Hydrostatic Test Procedure. If there is a pipe diameter transition in the pipeline segment being tested, the type of pigging equipment must be able to accommodate that.

Testing equipment must be identified and the description, location, and calibration recorded in the Hydrostatic Test Procedure per A-37. Test equipment includes, but is not limited to, the following:

- Deadweight tester
- Primary temperature recorder
- Secondary temperature recorder
- Pressure recorder
- Pressure gauge
- Ambient thermometer
- Dew point meter

Once the Test Supervisor has verified that all equipment is onsite and approved, they sign off the hold point in the Hydrostatic Test Procedure.

12.6.3 Roles and Responsibilities

Roles and responsibilities must be identified and detailed in the Hydrostatic Test Procedure for the Construction Foreman, the test contractor, the third party witness, Customer Care, Patrolling, the Water Specialist, and the Gas Quality Engineer.

12.7 Pre-Fill Operations

Before the pre-fill process can begin, the Test Supervisor must conduct a tailboard review of the Hydrostatic Test Procedure with all of the personnel involved in the testing.

After the tailboard, the pre-fill procedures commence according to the steps detailed in the site specific Hydrostatic Test Procedure.

12.7.1 Water Testing

The Water Specialist ensures that the test supply water is sampled and analyzed for contaminants, such as chlorine, pH level, chloride, and other content as detailed in the Hydrostatic Test Procedure. The Test Supervisor must sign off that the test water has been sampled.

12.7.2 Pre-Fill Operations

The pre-fill operation steps are detailed for each specific site in the Hydrostatic Test Procedure.

Dry pigging is performed to verify that the pipeline is clear of obstructions. If free liquids are collects, samples are provided to the PG&E Gas Quality Engineer. When clearing runs are complete, the pipeline segment is setup in test configuration and prepared to fill with water.

12.8 Fill Operations

The pipeline segment is filled with water and the pipe is pressurized with the fill pump. The pressure for the stand up test is recorded in the Hydrostatic Test Procedure.

12.8.1 Temperature Equilibrium

All pipeline components must be monitored for the amount of time specified in the Hydrostatic Test Procedure, allowing the temperature to reach equilibrium. During the allotted time, checks are done for leaks, and the pressure reading is recorded in the procedure. If the recorded pressure differs significantly from the previously recorded pressures, checks for leaks continue and engineering is contacted.

12.9 Test Operations

The test sequence of operations is detailed in the Hydrostatic Test Procedure. The test equipment is connected and precautions are taken to establish a safe test site.

Pressure is raised in the pipeline at a slow and smooth rate up to a specified percentage of the minimum test pressure, and held for an hour. Once the Test Supervisor has checked all visible connections for leaks and allowed the pressure to stabilize, they must sign off on the hold point.

Pressurization then continues to the specified Ramp Up pressure and held for a half hour. The pressure is then reduced to between the minimum and maximum test pressure at the test site and held for the amount of time specified in the Hydrostatic Test Procedure. The pressure, temperature, and added or subtracted volume are documented at 15 minute intervals for the remainder of the test.

12.9.1 Hydrostatic Test Certification

Pressure, temperature, and volume readings are provided to the test certification company. Prior to pressure reduction, the Test Supervisor must verify that the certification organization has certified the test and sign off on the hold point.

12.10 Dewatering Operations

Safety precautions are taken when releasing the water at test pressure. When opening any valves or appurtenances, the operator must adjust their body position to stand clear of the line of fire. Test pressure is relieved by first opening a small tap valve before initiating the full water removal process. All pressurized water is discharged into the vacuum truck.

Discharge piping is connected to route the discharge water, typically into the array of Baker tanks staged at the discharge end of the test segment. Once the Test Supervisor has verified that all piping connections are secured with rigid piping, they sign off on the hold point. Dewatering the line begins by

propelling the poly pig, which is already in the line, with compressed air. The test water remains in the baker tanks for either reuse or disposal. Representative test water is passed through the 25 micron filters and granulated activated carbon units so that samples can be taken for analysis. After the applicable regulatory authority grants permission, the water is discharged as allowed by the permit requirements.

12.11 Drying Operations

Once dewatering is complete, the test heads are removed and the pig traps are installed. The pig traps are connected to the air compressor and the baker tanks or a vacuum truck at the opposite end to catch residual water. Poly pigs are sent through the pipe to remove any residual water from the dewatering operation. Multiple pig runs may be required. The Construction Manager determines when pigging is no longer required.

Dryers are then set up and connected to the pig traps. Foam pigs are propelled from end to end with dry air until the specified dew point level is achieved. An Electronic Dew Point Meter is used to measure and confirm the dew point. Once the drying procedure has been completed, the Test Supervisor signs off on the hold point in the Hydrostatic Test Procedure. The dew point measurements are recorded in the Dew Point Test Form, found in Appendix A.

At the conclusion of the drying operation, the drying heads are removed and the ends of the pipeline are sealed to keep the pipeline free of dirt, water, and other contaminants.

12.12 Tie In and Restore Site

Several groups are involved with the steps required to restore the site, including General Construction, T&R/District Gas Transmission and Maintenance, Gas Control, Primary Contractor, X-Ray Contractor, and the Construction Management/Inspector.

12.12.1 Conduct Pre-Tie-In and Restore Tailboard

The Construction Manager/Inspector conducts a tailboard to review tie in/restore site procedures before these activities begin. The Pre-Tie In and Restore tailboard covers when the pipe will be turned over to GC for tie in, when CG turns the line back to T&R/District Gas Transmission.

12.12.2 Tie In and Restore Site Activities

The activities for tying in and restoring the site include:

- Tie in pipeline segment (General Construction)
- X-ray new joint/pipeline (X-Ray Contractor)
- Prepare to turn off clearance (General Construction)

- Notify Gas Control that General Construction is ready to take back the pipeline
- Mark and identify all newly placed pipe as noted in Section 11.4, Placement in the Pipeline Route
- Position all isolation points as necessary to close clearance work
- Remove all tags
- Report ready to turn off clearance
- Update/complete master clearance board (Gas Control)
- Restore site (Primary Contractor)
- Coat all bare piping
- Backfill with appropriate fill material
- Restore site (e.g., pave, etc.)
- Prepare "As Built" package redlines
- Add signed results of test and restoration to "As Built" package

The Water Specialist performs a final site inspection after the site is restored and stabilized to obtain photographic documentation for preparing the Construction General Permit Notice of Termination.

12.13 Documentation and Mapping

After testing and site restoration, Engineering and Construction Management verify that the "As Built" redline package is accurate and complete as per the As Built Checklist. The package must be completed before the contractors and the inspector leave the site. The as built drawings include all of the hydrostatic test dig locations, including repair locations showing horizontal field stationing information, orientations, and GPS coordinates. The redline package is then handed over to Mapping, who updates the drawings and the asset records.

13. Document Controls

The Hydro-Test Program Document Control Plan (DCP) defines the document management policy, work processes, and responsibilities of Hydro-Test Program including its Program Management Office, Consultants, and Contractors. The DCP calls for recording, tracking, storage, and control of all program management, administrative, design, and construction project documentation. The DCP addresses the following:

- Organization
- SharePoint Site
- Document Management Workflow
- Distribution
- Transmittals
- Administration

Refer to the Document Management Plan, found in Appendix A.

14. Program Controls

The Hydro-Test Program Controls Plan (PCP) defines the methods that will be used to effectively control schedule and cost performance for the program. The PCP consists of the following documents:

- Program Schedule Management Procedure
- Cost Management Procedure
- Change Management Procedure

14.1 Schedule Management Procedure

The Schedule Management Procedure addresses all processes and activities related to the development, baselining, monitoring, and reporting of the program schedule. In particular, it outlines how the program schedule is developed and updated on a daily/weekly basis, and how the schedule can be used to identify current status, measure performance, and give advance notice of potential slippage and criticality issues in the future. The Schedule Management Plan addresses the following areas:

- Schedule management, statusing, and revisions
- Work and Cost Breakdown Structures
- Program Key Performance Indicators (KPIs)
- Systems
- Reporting

14.2 Cost Management Procedure

The Cost Management Procedure establishes a program approach to facilitate an effective cost management process to validate financial data for the PG&E Hydrostatic Testing Program. The many benefits to operating a structured and pro-active approach to cost management at a program level include the following:

- Delivery of the Program within budget constraints
- Improved and informed decision making
- Enhanced knowledge and understanding of the Program
- Identification and management of the most commercially viable program solutions for CRL
- Provision of consistent cost data for project and program reporting
- Focused management effort and allocation of resources

The Cost Management Procedure provides the basis for the implementation of Program Cost Management on the PG&E Hydrostatic Testing Program. It details the systems, processes, procedures, and tools required to identify, collect, integrate, and analyze all cost data related to the program. There are also references to other processes that are key to successful cost and commercial management. This procedure applies to all projects and functional departments in the PG&E Hydro-Test Program

The following cost management processes are covered in the Cost Management Procedure:

- Cost Management Principles
- Roles & Responsibilities
- Cost Reporting
- Budgeting
- Financial Controls;
- Payment
- Cost Verification
- Final Accounts
- Commercial Close
- Resource Planning

14.3 Change Management Procedure

Change Control is the process by which any change to the Scope, Requirements, Schedule or Baseline Budget of the agreed program baseline is managed. The process considers key potential impacts of change, including Health, Safety & Security, Environment, Commitments, etc.

Change is defined with reference to the Program Control Baseline in force at the time the change is being considered. Approved Change forms the basis of re-baselining the program.

14.3.1 Schedule Change Management

As events occur that change the planned schedule for the hydrostatic testing process, such as the discovery of existing records or unexpected delays, the schedule goes through a change management process to incorporate the changes and keep the program moving forward. Any proposed schedule changes must go through an approval process as illustrated below:

15. Mapping and Records

Once the testing is completed for each pipeline segment and the segment has been returned to service, the completed job package paperwork (as-built or redline package), which reflects actual field conditions, is consolidated by engineering and submitted to Mapping for review and processing.

15.1 Completed Job Packages

The completed job package from each test segment contains the redline package from the field team, including marked-up field drawings, pressure test information, data on the facilities, and other associated information. A complete list of materials to be submitted in a completed Job Package is given in the As Built Checklist, found in Appendix A.

Once the package is received, it is reviewed for completeness and legibility by the Principle Mapper. If additional information or clarification is required, the mapping department contacts the engineering department and/or the Project Coordinator to resolve the issue. Once review is complete, the mapping and recording process begins.

15.2 Quality Control

At this point, the assigned mapper performs data entry, makes drawing updates, and incorporates field information into mapping records. QC is performed by a third party on the GIS Operation maps and diagrams. After the data is entered and the drawings are updated, the Principle Mapper reviews the changes as part of a second quality control step.

Quality Control Procedures are under development.

15.3 Data Entry and Storage

PG&E stores the redline package data both electronically and as hardcopy files. Electronic copies are posted and updated in the electronic database and the GIS. Hardcopy job files are stored in PG&E's records facility at the Walnut Creek location.

16. Appendix A: Reference Documents

16.1 Best Management Practices

A. Activity Specific Erosion and Sediment Control Plan (A-ESCP) "Good Housekeeping."

B. Activity Specific Erosion and Sediment Control Plan (A-ESCP) "Small Urban Excavation Projects."

16.2 Forms

C. Dew Point Test Form.

D. Record of Material Removed (RMR) Chain of Custody Form.

E. Form F100-10-4 Attachment 4, "Application for Gas Clearance."

F. Hydrostatic Test Procedure Template.

   a. Hydrostatic Test Procedure User Guide.

G. Risk Register Form.

H. RMP-09 Forms

   a. Form A, "Data Element Check Sheet."

   b. Form H, "Direct Examination Data Sheet."

I. Transmittal Form.

16.3 Gas Standards and Specifications

J. Gas Standards and Specifications.

K. A-34, "Piping Design and Test Requirements."

L. A-37, "Hydrostatic Testing Procedure."

M. A-38, "Procedures for Purging Gas Facilities."

N. A-38.1, "Installation and Operation of Air Movers."

16.4 Safety Practices and Procedures

O. Code of Safe Practices.

P. Project Safety Plan.

Q. Safety Engineering and Health Services

R. Safety, Health and Claims Procedure 201, "Hazard, Evaluation and Control Procedure."

S. Safety Health and Claims (SH&C) Procedure 221, "Ergonomics Program Procedure."

T. Safety, Health and Claims Procedure 229, "First Aid Procedure."

U. Sample Site Specific Safety Plan.

V. Uility Standard Practice 22, "Safety and Health Program."

W. Utility Standard S4415, "Excavation Safety."

16.5 Utility Procedures

X. Utility Procedure TD-4412P-06, "Handling Excavators, Contractors, and the Public Working Unsafely Around Utility Facilities."

Y. Utility Procedure WP4100-01, "Hot and Cold Work Methods for Natural Gas Pipeline Shutdown and Tie-In."

Z. Utility Procedure WP4100-10, "Gas Clearance Procedures for Facilities Operating Over 60 PSIG."

AA. Utility Procedure WP4330-02, "Removal and Control of Liquids from Pipelines and Maintenance and Operation of Associated Gas Conditioning Equipment."

BB. Utility Procedure WP4412-03, "Marking and Locating PG&E Underground Facilities."

CC. Utility Procedure WP4412-05, "Excavation Procedures for Damage Prevention."

16.6 Manuals, Checklists, and Plans

DD. ABI Assessment Procedure.

EE. As Built Checklist.

FF. At Work Bulletin.

GG. Construction Coordinator Supervisor Job Description.

HH. Document Management Plan.

II. Hydro-Test Program RACI Chart.

JJ. Out of Engineering Checklist.

KK. Pipeline Hydrotest Program Environmental Awareness Training.

LL. Project Coordinator Checklist.

MM. Project Coordinator Job Description.

NN. Requisition To Pay Procurement Manual.

OO. Risk Management Plan.

PP. Segment Engineering Lead Job Description.

QQ. Site Visitor Guide.

RR. Storm Water and Discharge Water SOPs.

16.7 Outside Resources

SS. Advanced Technology Corporation Automated Ball Indentation (ABI) Test.

TT. Code of Federal Regulation Title 40--Protection of Environment, Chapter I--Environmental Protection Agency, Subchapter D--Water Programs, Part 136--Guidelines Establishing Test Procedures for the Analysis of Pollutants.

UU. Code of Federal Regulation Title 49--Transportation, Subtitle B--Other Regulations Relating To Transportation, Chapter I--Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Subchapter D--Pipeline Safety, Part 192--Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards.

VV. National Technical Information Service (NTIS) SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods".

17. Appendix B: Supplemental Reference Documents

17.1 Forms

A. Form 61-0532, "Hot Work Permit."

B. Form 75-53, "Nondestructive Testing of Welds on Facilities Designed to Operate at 20% or More of SMYS and Piping Systems Located on Bridges and Operating at a Pressure Exceeding 200 psig Job Summary."

C. Form FA-34-A, "Emergency Pipe Test Information Form."

17.2 Gas Standards and Specifications

D. A-34.1, "General Requirements Work Reportable to the California Public Utilities Commission."

E. D-22, "Arc Welding Procedure Requirements: All Stress Levels."

F. D-40, "Weld Inspection."

17.3 Utility Procedures

G. Utility Procedure TD-4110P-06, "Field Inspections of Gas Facilities."

H. Utility Procedure TD-4413P-01, "Procedure for Reportable Gas Incidents."

I. Utility Procedure WP4330-03, "Hydrocarbon Dew Point Testing."

J. Utility Procedure WP4412-04, "Field Meets and Standby - Damage Prevention."

K. Utility Procedure WP4414-04, "Assessing and Working with Hazardous/Gaseous Atmospheres."

L. Utility Procedure WP4710-02, "Contaminated Soil and Material Handling Procedures."

M. Utility Procedure WP4711-01, "Gas Pipe Wrap Removal, Handling, and Disposal Procedures."

N. Utility Procedure WP4900, "Gas Transmission and Distribution Design Change Procedure."

O. Utility Standard S4412, "Preventing Damage to Underground Facilities."

P. Utiltiy Standard D-S0353 S4112, "Physical Inspection of Pipelines, Mains and Services."

17.4 Manuals, Checklists, and Plans

Q. Construction Guide.

R. Gas Mappers Manual.

18. Appendix C: Abbreviations, Acronyms, and Definitions

Abbreviation/ Acronym	Definition
ABI	Automated Ball Indentation
AED	Automatic external defibrillator
A-ESCP	Activity Specific Erosion and Sediment Control Plan
ARC	Abrasion resistant coating
ASME	American Society of Mechanical Engineers
ASQ	American Society of Quality
ASTM	American Society for Testing and Materials
ATS	Applied Technology Services
BMP	Best management practices
BOM	Bill of Materials
Cal/OSHA	California Occupational Safety and Health Administration
CCS	Construction Coordinator Supervisor
Charpy	A test for pipe material hardness/strength
DCP	Document Control Plan
DFT	Dry film thickness
DOT-PHMSA	Department of Transportation's Pipeline and Hazardous Materials Safety Administration
EOL	End of Line
EPA	Environmental Protection Agency
ES&S	Energy Solutions and Services
ETS	Electrolysis test station
FBE	Fusion bonded epoxy

GAC	Granulated activated carbon
GC	General Construction
GIS	Geographic Information System
GPS	Global Positioning System
GSO	Gas System Operations
GT&D	Gas Transmission and Distribution
HAC	High areas of concern
HDD	Horizontal directional drilling
IVR	Interactive voice response
KPI	Key Performance Indicator
MAOP	Maximum allowable operating pressure
Mfrs	Manufacturers
MSDS	Material Safety Data Sheet
NTIS	National Technical Information Service
Office SHMS	Office Safety and Health Management System
OQ	Operator Qualification
PC, PCJ	Powercrete, Powercrete J
PCP	Program Control Plan
PFL	Pipeline features list
PG&E	Pacific Gas and Electric
PM	Project Management
PMO	Program Management Office
POTW	Publicly Owned Treatment Works
PPE	Personal protective equipment
QA	Quality Assurance

QAQC	Quality Assurance and Quality Control
QC	Quality Control
QFT	Quality Focus Team
RACI	Responsible, Accountable, Consulted, and Informed
RCP	Regulatory Compliance Partners
RFI	Request for Information
RH	Relative humidity
RMR	Record of Materials Removed (Chain of Custody Form)
ROW	Right-of-way
RWQCB	Regional Water Quality Control Board
SAP	Systems, Applications, and Products in Data Processing
SEHS SPC	Safety Engineering and Health Services Safety Program Consultant
sf	Square feet
SH&C	Safety Health and Claims
SME	Subject matter expert
SMYS	Specified minimum yield strength
SPCC	Spill Prevention, Control, and Countermeasure
SSPC	Society for Protective Coatings (former Steel Structures Painting Council)
STPR	Strength Test Pressure Report
SWPPP	Storm Water Pollution Prevention Plan
Tailboard	Brief instructional meeting for open communication
WFT	Wet film thickness