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SUPPLEMENTAL WORKPAPERS TO

PREPARED DIRECT TESTIMONY

OF DEVIN K. ZORNIZER

(GAS MAJOR PROJECTS)

ON BEHALF OF SOUTHERN CALIFORNIA GAS COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

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SoCalGas™

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Appendix A

Summary of Standard Planning and Construction Practices for Replacement, Hydrotest, Valve, and Abandonment Projects

APPENDIX A

SUMMARY OF STANDARD PLANNING AND CONSTRUCTION PRACTICES FOR REPLACEMENT, HYDROTEST, VALVE & ABANDONMENT PROJECTS

The following information provides an overview of typical planning and construction activities that occur during SoCalGas pipeline replacement, hydrotest and abandonment projects as well as valve enhancement projects. Some projects may differ from general activities described below, as project activities depend on the unique characteristics of each project. As appropriate, these conditions are described in the individual work papers for each project.

A. INTERNAL PLANNING AND COORDINATION

Prior to and concurrent with the design and engineering of a project, a great deal of project management, coordination, preparation, and research is necessary to design and execute a successful pipeline project.

Planning and coordination of a pipeline project starts with organizing locating activities including base mapping, surveying, potholing, and site visits. These activities aid in determining and confirming proposed routes by identifying location and depth of existing substructures, soil conditions, jurisdictions and/or landowners, right of way (ROW) constraints, etc. These data points serve to influence routing and design of the project as well as the project schedule.

Once a preliminary route alignment is determined, the process of acquiring permits and land rights begins. Permits typically involve long lead times, negotiations of conditions, and may include last-minute agency requirements that are incorporated into project design that may impact the project schedule. In addition, during construction there are site visits associated with permit applications and job walks with agency inspectors. Inspectors can, and often do, change permit requirements, often impacting the project schedule.

Material procurement includes long-lead material and short-lead material. Long-lead material is identified and purchased at the 30% design stage, while short-lead material is identified and purchased at the 60% design stage. When possible, SoCalGas acquires materials by aggregating anticipated material needs (bulk purchasing) from multiple projects thereby making periodic purchases for larger quantities of material at a lower unit cost. Once the detailed design is finished and construction documents are completed, necessary permits and authorizations are attained as well as pipeline materials are purchased, received, inspected, and prepared for turnover to the Construction Contractor.

The construction timeline begins with preparation of sites within the construction area and mobilizing of construction equipment and supplies. Following completion of site preparation, trenching and excavation activities are conducted along various portions of the pipeline to expose and confirm pipeline feature locations, such as tap locations (feeds off the pipeline that will need to be isolated or provided with an alternative source of supply), and features identified for removal and/or replacement. If traffic control is required, K-rails may be set up to protect the construction area and other mitigation efforts to protect the work environment. Construction activities are planned to efficiently execute the construction phase of the project.

Gas Operations coordination is crucial in order to schedule required shut-in and tie-in activities. Due to the importance of high-pressure transmission lines to system reliability, these projects require extensive schedule coordination with local operations personnel to minimize customer impacts, execute gas handling, and complete stand-by and tie-in operations. In addition, project schedule accommodations must be made for Gas Control to support system reliability. Some capacity constraints can be planned for ahead of time, but others need to be mitigated in real-time. Such rescheduling can have significant impacts on overall productivity and efficiency of the project.

In addition to scheduling of local personnel and Gas Control, an extensive effort takes place to schedule and coordinate required equipment (pressure control, hydrotest equipment, Non-Destructive Testing (NDT), tapping equipment, etc.), construction contract crews (pipeline, electrical, mechanical, etc.), inspectors (Welding, Coating, NDT, environmental, safety etc.) and oversight personnel (PMO support, Contract Administrators, etc.). There are numerous individuals with required technical knowledge, trade licenses, and certifications that are essential to producing a successful project that meets the objectives.

B. LAND SERVICES AND PERMITTING

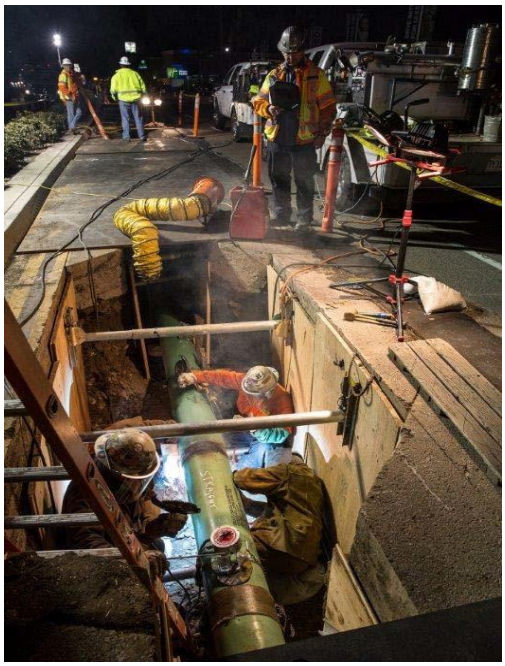
The acquisition of any necessary land rights and securing any necessary permits are essential planning activities that affect project design decisions and project scheduling for pipeline construction projects. The Land Services and Permitting teams develop strategies to support project site access for construction through acquisition of any necessary temporary rights of entry (TREs) and permanent easements, and securing of any necessary permits from jurisdictional agencies (e.g. Caltrans). For construction projects, there can be significant differences between projects that are on private land and those that are on public right-of-way (ROW). In the latter, certain permits and rights may be required from local municipalities for

construction to occur. Pipeline projects are primarily linear projects located in franchised right of way but may also be located on private and federal land.

Each construction site presents unique requirements that are necessary for safe and successful construction, including specific permitting requirements. Examples of permitting requirements are traffic controls that can include limits on length of open trenching, lane closures (See Figure 1), flagmen, metal plating requirements, lighting requirements for night work (See Figure 2), etc.

Figure 1: Traffic Control Lane Closure

Figure 2: Night Work



There are multiple jurisdictional agencies that require permits. There are also requirements during the excavation process that is governed by various permits issued for a project. For example, when excavating in traveled roadways, recessed steel plates and temporary paving are often required to cover an open trench at the end of each day. The process of moving steel plates on a trench and welding them together at the end of day and then removing them each morning takes additional time, decreasing productivity.

Permitting requirements vary from site to site, may take many months to secure, and may not be known until construction is about to begin. Additionally, once construction has begun, agency inspectors may modify a permit once a construction site has been observed or based on input received from the community.

The design of some pipeline projects may require acquisition of temporary and/or permanent pipeline easements from private landowners. Permanent easements and/or temporary use agreements may take a long time to negotiate which could impact the project schedule. Some property owners may seek to impose their own work restrictions or requirements. Property owners may also request compensation for damages to crops that occurred during construction activities.

Most pipeline projects require TREs for one or more laydown yards for equipment storage, material storage, water storage for hydrotests, fabrication, work and office trailers, etc. Easements may be required for a period of several weeks or months. Every laydown yard is subject to an environmental inspection. Erosion control is managed using silt fencing sandbags, straw wattles, etc. (collectively referred to as Best Management Practices or BMPs) in specific project work areas to minimize the potential for water runoff, soil/silt migration, unauthorized discharge to storm drains, and protection of animals and protected species/plant life. Whenever practical, adjacent projects will share a laydown yard. Typically included in at the end of construction is laydown yard restoration.

C. SURVEYING AND LOCATING

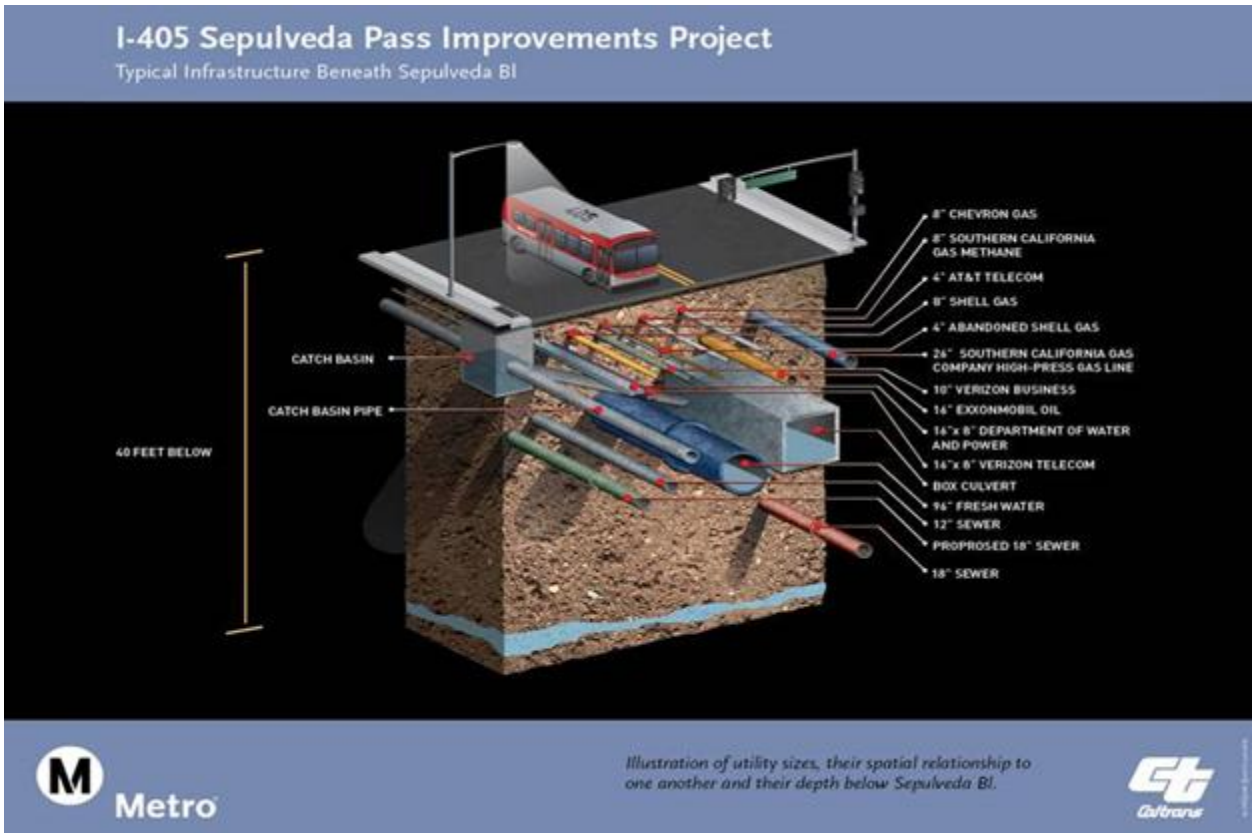
Surveying and locating activities help determine necessary permanent and/or temporary construction easements, identify possible substructure conflicts within the desired replacement location, and bring forward other issues that will need to be addressed in project engineering, design, and planning phases. This is accomplished by extensive research which includes the review and analysis of city, county and

other utilities' official records, site visits, and confirmation via potholing prior to and during construction.

Before any construction activities can begin, specific crews carefully survey and mark the construction ROW for existing pipeline and other substructure locations. For a replacement project, this activity will span the entire length of the pipeline segment and/or the rerouted alignment. For a hydrotest project, surveying and locating will take place at the locations selected for test heads and where features impact piggability or the integrity of the pipeline which has been identified for removal.

Construction locations, both above and below ground, are typically crowded with other utility infrastructures (See Figure 3), requiring project teams to perform extensive research to identify the substructures prior to construction. The project teams frequently discover undocumented substructures during excavation, causing construction delays and project redesigns.

Figure 3: Substructure Example



Whenever possible, potholing is conducted along the pipeline alignment to confirm locations of substructures. Potholing is a construction activity that includes vacuum excavation to obtaining visual confirmation of utilities and underground obstructions near or crossing the planned excavation path. It

is a process whereby a small, exploratory hole is excavated along the proposed pipeline alignment to ensure there is no conflict with existing substructures. These activities can also occur during construction when unknown substructures are encountered. Once a pothole is complete and the substructure is identified, it is then backfilled and restored (See Figure 4).

Figure 4: Potholing Location After Restoration

D. ENVIRONMENTAL ASSESSMENT, ABATEMENT, AND MANAGEMENT

Pipeline and valve projects traverse through a variety of geographic locations: congested urban areas, highways/freeways, commercial centers, and natural areas including coastal zones, mountains, and deserts. These locations may require environmental permits for wildlife or cultural sites. Environmental permits may be issued by local, state, or federal agencies and typically address protection of environmental resources (i.e., land, air, water, natural and cultural resources) as well as interests of the general public such as noise and traffic. Some of the most common agencies involved in projects are U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Bureau of Land Management, California Department of Fish and Wildlife, State Water Quality Control Board, and Air Quality Management Districts. Environmental permits can have long lead times and may impact project schedules. When feasible at reasonable cost, projects may be adjusted to avoid or minimize environmental impacts. Often Biological and/or Cultural Monitors will be assigned to specific sites to observe and confirm that appropriate protection measures are in place.

Oftentimes, when an existing pipeline is exposed and inspected, asbestos containing asphaltic (coal tar) pipe coating or wrap is found around the pipeline. Abatement must be completed to remove asbestos containing materials (ACMs) from the pipeline as necessary (See Figure 5). Removal of ACMs is an

extensive process that is carefully planned by the project manager and then executed. ACM removal begins with identifying approved Personal Protective Equipment (PPE) and selecting the appropriate removal equipment and tools. Depending on the scope, either a company personnel or an approved contractor performs activities that may include carefully exposing the pipe to minimize disturbance, spreading tarp or sheeting to contain pipe wrap, removing necessary pipe wrap sections using hand tools, and securing any loose pipe wrap that may be present during removal. The pipe is then transported to an approved disposal location.

Figure 5: Typical Pipeline Abatement

E. CONSTRUCTION SITE MOBILIZATION, SITE PREPARATION AND FACILITIES

At the beginning of a project, setup activities are necessary before construction can begin. First, site mobilization of personnel and equipment to the project site must occur. Site mobilization activities may include heavy equipment transport, on-site specific training, personnel travel time, and equipment loading and unloading costs. Once personnel and equipment have mobilized, site preparation and facilities setup may begin. Site preparation and facilities setup includes but is not limited to site clearing and grading, temporary access roads, temporary fencing, BMP Installation, project office facilities, storage yards, restrooms, wash stations, dumpsters, etc. Specifically, clearing and grading activities may be needed for projects in non-paved locations or to prepare laydown yards. Some projects require extensive clearing and grading when construction work areas are located on uneven terrain. Clearing is the removal of all brush from the construction work area and grading is required to provide a relatively level surface to allow safe operation of heavy equipment. It should be noted that before any

construction activity takes place, an environmental inspection is required of the laydown yard and pipeline construction area. As mentioned above, erosion control is managed using BMPs in specific project work areas to minimize the potential for water runoff, soil/silt migration, unauthorized discharge to storm drains, and protection of animals and plant life.

Figure 6: Construction Laydown Yard

F. TRENCHING AND EXCAVATING

Generally, for a replacement project, the trenching operation in pavement begins with a saw cutting crew that cuts the pavement before excavation (See Figure 7). Once the pavement is removed, trenching can begin.

Figure 7: Saw Cutting Trench Pathway

The trenching crew typically uses a backhoe to excavate the pipeline trench (See Figure 8). The trench is excavated to a depth that provides sufficient coverage over the pipeline after backfilling.

Figure 8: Trench Excavation with Backhoe

Many pipelines are installed at a depth which requires shoring systems to be installed during construction (See Figure 9). For example, a greater pipeline depth is needed when crossing under a culvert or railroad or to resolve a conflict with an existing substructure. The shoring is necessary, for safety reasons, when an excavation is more than five feet deep or is in sandy soil conditions. Shoring limits the work area in a trench due to crossbeams that obstruct construction processes and slow down production.

Figure 9: Shoring Installed in Pipeline Trench

Depending on what work needs to take place on the existing pipeline the excavation may require, per code, hand digging over the gas pipeline to expose pipe and other potential substructures in the area (See Figure 10). For example, if the pipeline trench is running laterally with another utility structure and the distance is under a certain threshold for mechanical excavation the entire length must be hand excavated. Hand digging is labor and time intensive compared to mechanical excavation.

Figure 10: Hand Dug Trench

Often, existing pipelines have taps that feed an individual customer or a regulator station which need to be connected to the new pipeline once it is put into service. Each tap location requires an excavation and takes a crew approximately one day per tap to excavate depending on soil conditions (shoring may also be needed). The excavation will be plated and left open until the new pipeline section is tested and placed in service. Only then can tap connections to the new pipeline be completed and backfilled.

The trenching and excavation activity for a hydrotest project includes uncovering the ends of each hydrotest segment, exposing all non-piggable pipeline features, and excavating any pipeline features that cannot be pressure tested. In addition, all tap locations (customer lines, regulator station taps, etc.) that are off the main line will be excavated so they may be isolated before a hydrotest.

Figure 11: Pipeline Excavation and Repair Site

G. ENGINEERED CROSSINGS

During the design of a pipeline, the project team may encounter underground obstructions (geological formations, other utility infrastructure, etc.), above ground infrastructure (railroads, highways, culverts, rivers, etc.), and/or environmentally sensitive areas that cannot be disturbed. If an obstruction is discovered, the Project Team may choose to employ a trenchless, engineered crossing using horizontal directional drilling (HDD) or boring construction methods.

HDD is a minimal impact trenchless method of installing underground pipe along an engineering designed underground path, using a surface-launched drilling rig that enables the pipeline to pass beneath obstacles without disturbing them. HDD offers significant environmental advantage over traditional trench pipeline installations because there are only two excavation sites, one at the entry and one at the exit of the HDD. Securing the appropriate sites for the entry and exit of the HDD requires temporary access to a large area of land to accommodate construction equipment and materials. This activity requires extensive preparation and is a complicated process that necessitates a specialized crew and equipment.

An HDD is accomplished by drilling a pilot hole along a directional path from one surface point to another. Next, the bore created during pilot hole drilling is enlarged to a specified diameter during a reaming pass

that will facilitate installation of the desired pipeline (See Figure 12). Lastly, the pretested pipeline is pulled into and through the enlarged hole, thus creating a continuous segment of pipe underground, exposed only at the two initial endpoints (See Figure 14 and 15).

Figure 12: Back Reamer Used to Enlarge Pilot Hole

Figure 13: Horizontal Directional Drill (HDD) Equipment

Figure 14: HDD Pullback

Figure 15: HDD Pullback

For shorter distance crossings and limited workspaces at large depths, a bore may be the preferred trenchless technology option. The first construction activity necessary to complete a bore is to excavate the entry and exit sites (See Figure 16). A boring machine is then lowered to the bottom of the entry bore pit. The entry bore pit is usually larger than the exit bore pit as it must fit the boring machine and at least a 20-foot segment of casing pipe (See Figure 17). The boring machine will then push casing pipe that

contains the cutting head mounted on an auger. The auger rotates through the pipe casing as it is pushed forward to create the bore hole. Once the bore hole is complete, the carrier pipe that will contain the gas is installed through the pipe casing, separated from the casing pipe by spacers, and tied into the existing pipeline.

Figure 16: Excavation and Bore Pit

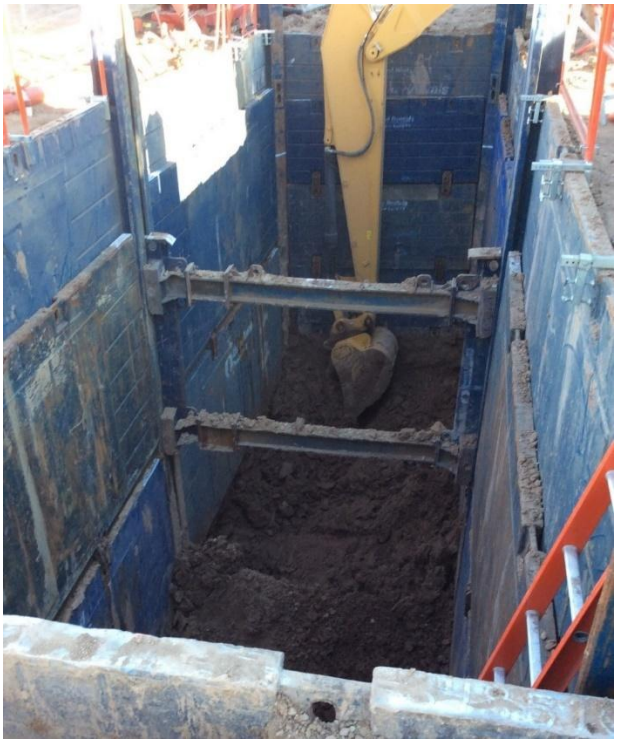


Figure 17: Boring Machine Pushing Casing Pipe

Figure 18: Boring Operations

H. PIPELINE LAYING, BENDING, WELDING

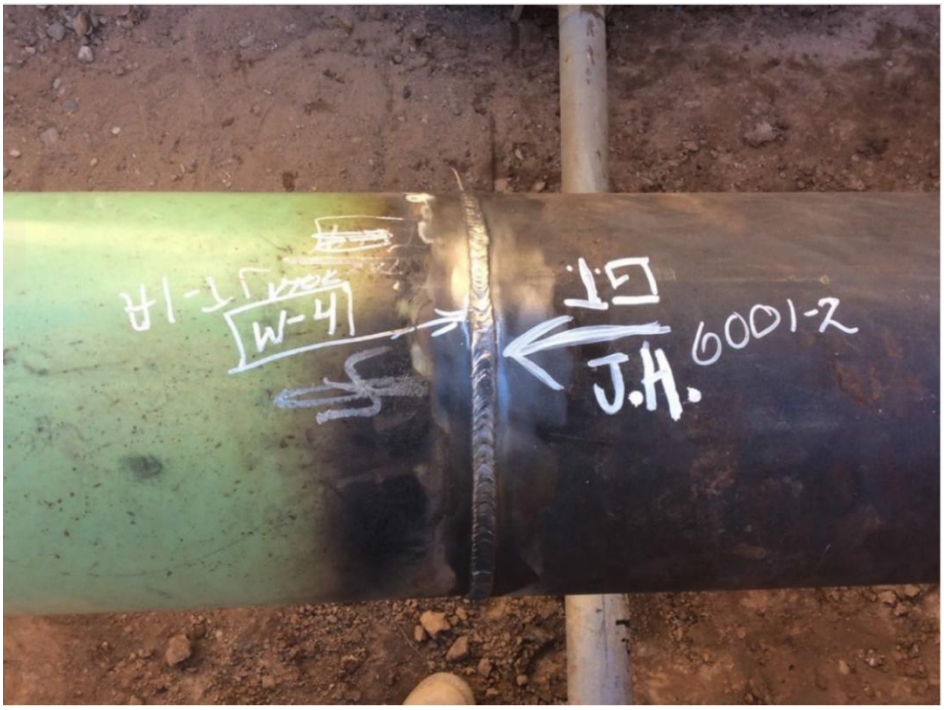
For a replacement project, pipe sections, fittings, and other pipeline components are laid out on the job site for installation as construction proceeds. In order to follow the engineering designed route, the pipe direction is modified by either bends or welding in segmented elbows (See Figure 19). In some cases, the joints are welded together above grade and placed on temporary supports.

Figure 19: Pipe with Field Bend Laying on Supports

The pipe crew and a welding crew are responsible for the welding process (See Figure 20). The pipe crew typically uses special pipeline equipment called side booms to pick up each joint of pipe, align it with another joint, and make the first part of the weld (a pass called the stringer bead). Additional filler passes are made by welders who immediately follow the stringer bead. There could be different welders for different welding needs. Stringer, hot-pass, and capping welders make up the typical welding crew. They are often followed by tie-in welders. As part of the quality assurance process, each welder must pass qualification tests (Operator Qualification) to work on a pipeline job. Each weld procedure must be approved for use on that job in accordance with federally adopted welding standards. The welds undergo visual and Non-Destructive Examination (NDE) radiographic inspection (a.k.a., X-ray), as outlined in 49 CFR Part 192 by qualified technicians and inspectors. The technicians take X-rays of the pipe welds to ensure that the completed welds meet federally prescribed quality standards. The X-ray technician processes the film in a small, portable darkroom at the site. If the technician detects any unacceptable flaws, the weld is repaired or cut out, and a new weld is made per

code requirements.

Figure 20: Pipeline Weld



I. LOWERING PIPE INTO THE TRENCH

Due to the length and weight of the pipeline, constricted work areas, and complex engineering design, lowering the welded pipe into the trench demands close coordination and skilled operators. Using a series of side booms (tractor designed to move pipelines into place), operators lift and carefully lower the welded pipe sections into the trench (See Figure 21). The bottom of the trench is shaded with at least six inches of sand to protect the pipe and coating from damage. Lastly, cathodic protection test stations may be installed on the pipeline to prevent corrosion before backfilling.

Figure 21: Lowering Section of Pipe into the Trench

J. FIELD COATING AND BACKFILLING

Pipelines are externally coated to prevent moisture from coming into direct contact with steel and causing corrosion. Typically, coated pipelines are delivered with uncoated areas three to six inches on each end to prevent coating from interfering with the welding process. Once welds are completed, a coating crew will coat the remaining portion of the pipeline (See Figure 22). Prior to this coating application, a coating crew thoroughly cleans the bare pipe with a power wire brush or a sandblast machine to remove any dirt, mill scale, or debris. The crew then applies coating and allows it to dry. Once dry, the pipeline coating is inspected to ensure it is free of defects. It is electronically inspected for faults or voids within the epoxy coating and visually inspected for faults, scratches, or other coating defects (See Figure 23).

Figure 22: Field Coated Pipeline

Figure 23: Electronic Inspection method - Holiday Testing of a Coated and Wrapped Weld

After all welds have passed NDE, coating is completed and passes inspection, and survey crews record the location of the pipe and various valves/fittings, the crews then begin backfilling. As with previous construction crews, the backfilling crew takes care to protect the pipeline and coating by using a minimum of 12 inches of zero-sack slurry (sand and water mixture) on top of the top of pipe. Then the remainder of the backfill material is placed over the pipe.

K. ABANDONMENT OF EXISTING PIPELINE

In many cases, the replaced pipeline is abandoned in place. The abandoned pipe is cut and capped and filled with slurry. However, in some instances the existing pipeline cannot be abandoned in place, usually due to jurisdictional agencies requiring removal of the abandoned pipeline as a permit condition. This removal step can add to project complexity, cost, and schedule.

L. HYDROSTATIC TESTING

SoCalGas conducts hydrostatic testing according to requirements set forth in the Code of Federal Regulations, Part 192, Subpart J. To conduct a hydrotest, each section of pipe is filled with water and pressurized up to a level that exceeds the normal operating pressure. The pressure is held for a specified period of time to determine if the pipeline meets design strength requirements and if any leaks are present. The number of separate hydrotest sections in each hydrotest project are determined primarily by engineering review of project specific elevation, pipeline terrain, and the location of available water sources.

Figure 24: Hydrotest Equipment

Figure 25: Hydrotest Equipment Set-up with Sound Proofing to Minimize Noise

Once a section successfully passes the hydrostatic test, water is emptied from the pipeline into large water tanks and is dried to ensure that no water is present when natural gas begins to flow. Pipeline drying is completed using large compressors and foam tools also known as pigs. A pig launcher and receiver are installed at each end of the hydrotest to facilitate this process. The team will continue to pass pigs through the system until a desired dew point is reached as determined by engineering. Once achieved, final tie-ins and commissioning activities can commence. The drying process usually takes approximately three days depending on pipeline length, diameter, and elevation changes. The used water is tested and treated by environmental services for disposal purposes. Containers such as water tanks are used to store water before disposal while water testing results are being evaluated. The above-described process applies to all hydrotest projects and new replacement pipe.

Figure 26: Water Tanks and Test Head

Filtration equipment is used to remove organic and inorganic material to permitted disposal levels. The water may be disposed of at a sewer, transported to a disposal facility via a truck, or provided to a third party for non-potable reuse. Permit requirements typically dictate how used hydrotest water is disposed.

Replacement work during a hydrotest project is necessary to isolate the pipe and install test heads. This replacement activity requires removal of a section of pipe at each end. The non-tested side of the pipeline must be welded with a cap that will be cut out after testing is completed.

See the following link for a video illustrating the hydrostatic testing process:
https://www.youtube.com/watch?v=lRFWeTRAcCU

M. FINAL TIE-IN AND COMMISSIONING

Following successful hydrostatic testing and drying, the final pipeline tie-ins are completed and inspected (See Figure 27 and Figure 28). The line may then be odorized for safety reasons which is a process that takes up to two days or more to complete. After odorization is achieved, the tie-in process is completed with gas flow being opened to the mainline and all taps.

Figure 27: Crews Completing Final Tie-in

Figure 28: Checking for Leaks Before Start of Line Odorizing

Any customers who were being fed by Compressed Natural Gas (CNG) or Liquified Natural Gas (LNG) have their service switched to being fed from the new pipeline. The process for abandonment of the original line also needs to take place. It begins by purging, isolating ends and taps, and permanently decommissioning the line which typically takes a few days to complete.

N. CLEANUP AND RESTORATION

The final step in the construction process is to restore impacted streets, ROWs, TREs, easements, and laydown yards as closely as possible to their original condition. This step involves removing all equipment, materials, trailers, etc. and cleaning up the laydown yard, completing paving repairs or land restoration as required by applicable permit or landowner agreements. Careful attention is paid to unpaved areas so that future erosion and water runoff issues are addressed after construction is completed.

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Appendix B
Glossary of Terms

APPENDIX B

GLOSSARY OF TERMS

The following list of acronyms, terms and high-level definitions are intended to accompany the PSEP & GTSR supplemental workpapers. These terms describe cost, gas operations, construction and land use terms that may not be commonly understood. They also provide the full name for less common acronyms that are referenced in these workpapers. This is not a comprehensive or detailed glossary of utility and construction terms. It is assumed that the reader is familiar with basic utility industry and regulatory terms, and those terms and acronyms have been intentionally omitted from this list.

Acronym	Term	Definition
	5-8s	A work schedule that consists of five working days per week, where eight hours are worked each day.
	5-10s	A work schedule that consists of five working days per week, where 10 hours is worked each day.
	Accelerated Mileage	Pipeline that would otherwise be addressed in a later phase of PSEP under the approved prioritization process but have been advanced to Phase 1A to realize operating and cost efficiencies. Accelerated miles may be Phase 1B or Phase 2 mileage.
	Actuator	A device that causes a valve to move from the open to the closed position or vice versa.
	Alliance Contractor	SoCalGas solicited competitive bids on rates from qualified Electrical Contractors for four geographic regions, and selected contractors to be the "Alliance" contractors for electrical construction activities in each region on PSEP valve projects.
AFUDC	Allowance for Funds Used During Construction	AFUDC is the net cost for borrowed funds used for construction purposes plus a reasonable rate on other funds, such as equity.
ASV	Automatic Shut-off Valve	A valve that has electric or gas-powered actuators to operate the valve automatically based on data sent to the actuator from pipeline sensors. The sensors send a signal to close the valve based on predetermined criteria, generally based on pipeline operating pressure or flow rate.
A/AG	New Actuator Above Ground	Installation of a new valve actuator above ground.
A/VT	New Actuator in Vault	Installation of a new valve actuator below ground (housed inside a vault).
	Back Reamer	Back reamers are used in Horizontal Directional Drilling (HDD) operations primarily for enlarging the pilot bore to accommodate the carrier pipe

APPENDIX B

Acronym	Term	Definition
	Ball Valve	A valve that is opened and closed by pivoting a ball with a hole that fits into a cup-shaped opening to control gas flow.
	Beam and Lag Engineered Shoring System	An excavation support technique where vertical piles (beams) are either driven or lowered into a drilled excavation and grouted at regular intervals along the proposed excavation location. Wood boards (lagging) are placed between the piles as excavation proceeds.
	Bell Hole	An excavation that minimizes surface disturbance and provides sufficient room for examination or repair of buried facilities.
BMPs	Best Management Practices	Activities, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs are also operating procedures and practices to control facility site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
	Block Valve	A mechanical device (valve) installed in a pipeline that can be closed to block the flow of gas through the line.
	Blowdown	A controlled activity to release gas from an active pipe section to isolate the pipe section for maintenance or construction activities.
	Blow-off Valve	A valve that is utilized to reduce pressure in the pipeline by venting gas to atmosphere.
	Bollards	Short vertical post structures to control or direct road traffic.
	Bore Pit	An excavation that allows for the boring equipment to either send or receive pipe which has been bored through earth.
	Boring	The act or process of making or enlarging a hole.
	Branch Connection	A fitting that provides an outlet from a larger pipe to a smaller one (or one of the same size).
	Bridle	A bridle pipeline system is designed to allow alternative flow to isolate a section or entire pipeline from service. It can allow alternative feed options during isolation activities.
	Bypass	Delivery of gas through alternate piping that allows for a section of pipeline to be isolated from the system.

APPENDIX B

Acronym	Term	Definition
	Capital	Costs of new additions of plant, property and equipment that have a useful life of more than one year. New additions include any costs incurred to construct, install and/or prepare plant, property, and equipment for its intended use. Capital-related costs include depreciation, taxes and return associated with the cost of the assets.
	Category 1	Pipeline segments that have documentation of pressure testing to at least 1.25 times the MAOP.
	Category 2	Pipeline segments that have documentation of pressure testing to at least 1.25 times MAOP using a medium other than water.
	Category 3	Pipeline segments for which documentation validates that the highest in-service operating pressure is at least 1.25 times the current MAOP.
	Category 4	Pipelines segments that lack sufficient documentation of a post-construction strength test to at least 1.25 times the MAOP.
	Check Valve	A valve that allows liquids or gases in a pipeline to flow in one direction and closes to prevent flow in the opposite direction. These types of valves are used to prevent reverse-flow or back-flow in the event of a pipeline leak or abnormal operating occurrence.
	Class 1	An offshore area, or any class location unit that has ten or fewer buildings intended for human occupancy.
	Class 2	Any class location unit that has more than ten but fewer than 46 buildings intended for human occupancy.
	Class 3	A Class Location unit that has 46 or more buildings intended for human occupancy; or an area where the pipeline lies within 100 yards (300 feet) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theatre, or other place of public assembly) that is occupied by 20 or more persons on at least five days a week for ten weeks in any 12 month period. (The days and weeks need not be consecutive.)
	Class 4	A class location unit where buildings with four or more stories above ground are prevalent.

APPENDIX B

Acronym	Term	Definition
	Class location or Class	Class locations are a method of differentiating risk along gas pipelines. Regulations for gas transmission pipelines establish pipe strength requirements based on population density near the pipeline. Locations along gas pipelines are divided into classes from 1 (rural) to 4 (densely populated) and are based on the number of buildings or dwellings for human occupancy.
	Coal Tar	A water-resistant coal based material that is used as a coating to protect the pipelines against underground corrosion.
	Coal Tar Wrap	A thermoplastic polymeric coating produced from the plasticization of coal tar pitch, coal and distillates, followed by the addition of inert filler.
	Cold Tie-In	The method of connecting new pipe to existing pipe that is shut-in and not pressurize during the tie-in procedure.
CSED	Combination Service Entrance Device	Enclosure for electric watt-hour meter including main and branch circuit breaker.
	Competitive Bid	A procurement method in which the selection of the successful bidder is based on submitted bids from vendors or contractors for goods or services.
	Concrete Collar	A collar of reinforced concrete which is placed around an existing column so that it can be jacked up; the shrinkage of the concrete causes it to grip the column firmly.
CMS	Construction Management System	Gas distribution planning system used by SoCalGas's Field Operations.
COZEEP	Construction Zone Enhanced Enforcement Program	The Construction Zone Enhanced Enforcement Program (COZEEP) is a Statewide Interagency Agreement (contract) between Caltrans and the California Highway Patrol (CHP). It enables the Department to hire CHP officers and vehicles to patrol project construction zones.
C/P	Control and Power	Installation of power and communications to convert a valve from ASV to RCV technology.
	Control Valve	A valve used to control conditions such as flow, pressure, and liquid level, by fully or partially opening or closing in response to signals received from controllers that compare a "set-point" to a "process variable," whose value is provided by sensors that monitor changes in such conditions.
	Coordinated Mileage	Phase 1A pipeline that is included within the scope of Phase 1B or Phase 2A projects in order to realize operating and cost efficiencies.

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Acronym	Term	Definition
	Coupon	A sample piece of material cut out of a pipeline.
	Criteria	Class 3 and 4 locations and Class 1 and 2 High Consequence Areas (HCA).
	Dewater	The removal of the test water from a pipeline.
	Derate	Lowering the Maximum Allowable Operating Pressure (MAOP).
DSAW	Double Submerged Arc-Welded	A welding process wherein the arc weld is submerged under flux while the welding takes place. Both inside and outside welds are required and are usually accomplished in separate processes.
	Direct Costs	Direct costs are for those activities and services that support execution of a specific project such as: labor costs, which include salaries of Company employees, and non-labor costs, which include costs for contract labor, purchased services, and materials required to complete a specific project.
	Disbonded	Any loss of bond between the protective coating and steel pipe as a result of coating adhesion failure, chemical reaction, mechanical damage, or hydrogen concentrations.
	Drain	A capped off section of a gas pipeline installed in a manner designed to capture debris or moisture in the gas pipeline, where it can be cleaned out.
	Drip Leg	An additional section of gas pipeline installed in a manner designed to capture debris or moisture in the gas pipeline, where it can be cleaned out.
	Drip Pot	A drain installed on the bottom of a pipeline to capture and remove liquid and solid debris pushed along the pipeline.
	Dual Run Pipe	Two pipelines that run parallel to each other in the same system; also known as a double barrel.
	Elbow	A fitting that is bent in a manner designed to produce a 90 degree change in the direction of flow in the pipe.
ETS	Electrolysis Test Station	A test station installed on a cathodically protected pipeline used to perform potential, current or resistance measurements.

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Acronym	Term	Definition
	Encroachment	Any tower, pole, pole line, pipe, pipeline, fence, billboard, stand or building, or any structure, which is in, under, or over any portion of the street or highway right of way.
ECDA	External Corrosion Direct Assessment	A four-step process that includes pre-assessment, indirect inspection, direct examination, and post assessment to evaluate the threat of external corrosion to the integrity of a pipeline.
	Feature Study	A study that provides the physical components of a pipeline and the attributes associated with those components.
	Flow Meter	An instrument used for measuring the flow rate of gas.
	Flow Valve	A control valve that regulates the flow or pressure of gas.
	Operating Districts	Organizations responsible for operation and maintenance of a gas pipeline.
	Gate Valve	A pipeline valve consisting of a flat or wedge shaped gate that can be lowered into a seat to seal off the line or raised into an external recess so that the full area of the line is open.
GMA	General Management and Administration	Programmatic costs incurred in support of PSEP project execution. The PSEP GMA tracks, monitors, and allocates PSEP support costs to the various PSEP projects.
GPR	Ground Penetrating Radar	A geophysical assessment method that uses radar pulses to image the subsurface. This nondestructive method uses electromagnetic radiation in the microwave band (UHF/VHF frequencies) of the radio spectrum and detects the reflected signals from subsurface structures.
	Guy Wire	A tensioned cable designed to add stability to a free-standing structure.
HCA	High Consequence Area	An area where a pipeline release could have greater consequences for health and safety or the environment.
	High Pressure	Pressure greater than 60 psig.

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Acronym	Term	Definition
	Holiday Testing (Jeeping)	The act of assessing a pipeline using a holiday detector or "jeep." Holiday detectors are employed in the non-destructive detection and location of pinholes, holidays, bare spots or thin points in protective coatings applied for corrosion protection over metal or concrete (conductive) surfaces. A holiday detector is also known as a porosity detector, pinhole tester, spark tester, jeep tester or jeeper.
HDD	Horizontal Directional Drilling	A minimal impact, trenchless method of installing underground pipe in a relatively shallow arc or radius along a prescribed underground bore path.
	Hot Tap	A method of making a connection to existing piping without the interruption of emptying that section of pipe. The pipe can continue to be in operation while maintenance or modifications are being made to it.
	Hot Tie-in	The method of connecting new pipe to existing pipe that is not shut-down and is pressurized during the tie-in procedure.
	H-Pile	A type of shoring that utilizes steel beams "H-Piles" that are driven into the ground for purposes of shoring.
	Incidental Mileage	Pipeline that does not fall within the scope of the Commission's directives in D.11-06-017 or California Public Utilities Code section 958, but is addressed as part of a PSEP project, where its inclusion is determined to improve cost and program efficiency, address constructability, or facilitate continuity of testing.
	Incidental Take Permit	A permit issued under Section 10 of the United States Endangered Species Act (ESA) to private, non-federal entities undertaking otherwise lawful projects that might result in the "take" of an endangered or threatened species. "Take" is defined by the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species.
	Indirect Costs	Costs for activities and services that are associated with direct costs—such as payroll taxes, property taxes and pension and benefits —and benefit a project but are not directly charged to a project.
ILI	In-line Inspection	Inspection of a pipeline using a device ("smart pig") that travels through the pipeline internally and detects signals caused by pipeline flaws.

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Acronym	Term	Definition
	Jack and Bore	Method of horizontal boring construction. Construction crews drill a hole underground horizontally between two points without disturbing the surface between sending and receiving pits.
	K-Rail	A modular concrete or plastic barrier employed to separate lanes of traffic.
	Lateral	A segment of a pipeline that branches off a main or transmission line to transport gas to a termination point.
	Linebreak	Device that senses the rate of pressure differential in a pipeline to detect a possible break and activates a valve to close.
	Line Seasoning	Also referred to as "pickling" the line, the pre-odorization of gas pipelines to maintain the odorant level of the pipeline.
	Loaded Costs	Direct costs and indirect costs.
MLV	Mainline Valve	A valve positioned at a location along the pipeline system that can be closed down to isolate a line section in an emergency or for maintenance purposes.
MAOP	Maximum Allowable Operating Pressure	The maximum pressure at which a pipeline or segment of a pipeline may be operated under 49 CFR Section 192.
MRC	Measurement Regulation and Control	A department within SoCalGas and SDG&E that manages meter and regulation activities (*e.g.*, regulator station operation).
	Medium Pressure	Pressure equal to or greater than 10 psig, but not more than 60 psig.
	Midden Soil	A midden is an old dump for domestic waste which may consist of animal bone, human excrement, botanical material, molluskshells, sherds, lithics (especially debitage), and other artifacts and Eco facts associated with past human occupation. Midden soils are formed from composted material accumulated via incidental human activity (often in middens).
	Miter bend	A joint made by beveling each of two parts to be joined, usually at a 45° angle, to form a corner, usually a 90° angle.
NV/AG	New Valve and Actuator Above Ground	Installation of a new valve and actuator above ground.
NV/NP	New Valve and Actuator in Replaced Pipe	Installation of a new valve and actuator on a new section of pipeline.

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Acronym	Term	Definition
NV/VT	New Valve and Actuator in Vault	Installation of a new valve and actuator below ground (housed inside a vault).
	Nipple	A short stub of pipe, usually composed of threaded steel, brass, chlorinated polyvinyl chloride (CPVC) or copper.
NDE or NDT	Nondestructive Examination or Nondestructive Testing	Evaluation of a pipeline using a number of inspection methods that are typically performed manually on exposed pipeline surfaces without causing damage, such as radiography, ultrasonic inspection, or magnetic particle testing.
NOP	Notice of Operation	Notification from a Project Team to the Accounting department that an asset has been placed in service. In some instances, NOP may also refer to the date an asset is placed in service.
O&M	Operations and Maintenance	Costs for activities related to the operation or maintenance of an asset.
	Overheads	See Indirect Costs.
	Performance Partner	SoCalGas solicited competitive bids on rates from qualified pipeline construction contractors for four geographic regions, and selected contractors to be the "Performance Partner" for each geographic region.
	(Pierced) Hump Bands	A method of repair and reinforcement of pipelines damaged due to internal and/or external corrosion, gouges, dents, cracks and defective welds. Piercing refers to the action that allows gas in the expanded chamber.
PIG	Pipeline Inspection Gauge or "Smart Pig"	A device that is sent through a pipeline internally to detect signals caused by pipeline flaws.
	Piggable	A pipeline that is capable of being evaluated using currently available In-Line Inspection (ILI) technology.
PI	Pipeline Integrity	Department within SoCalGas that manages and provides oversight of certain aspects of pipeline integrity and compliance work.
	Plug Valve	Is shaped like a cylinder or cone and can be rotated inside the valve body to control flow of fluids.
	Plume Study	An evaluation to determine minimum required horizontal separation distance between a temporary blowdown-stack and the nearest potential ignition source during a blowdown operation.
	Pneumatic Actuator	Converts energy (typically in the form of compressed air) into mechanical motion.

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Acronym	Term	Definition
	Porosity	Void space within a weld due to gas formations that did not escape prior to the weld solidification.
	Potholing	An excavation used to locate known subsurface structures. Potholing is most often used when a contractor needs to verify the depth, size or type of underground utility.
PCV	Pressure Control Valve	A control valve used to control pressure by fully or partially opening or closing in response to signals received from controllers that compare a "set-point" to a "process variable" whose value is provided by sensors that monitor changes in such conditions.
PCF	Pressure Control Fitting or Stopple	The fittings used to stop or redirect flow in an active pipeline system.
PRV	Pressure Relief Valve	A mechanical safety device that provides protection to a pressurized container, such as a pipeline, by reducing the internal pressure by releasing it outside the container.
	Pressure Transducers	A device that measures pressure in a liquid, fluid, or gas.
	Pressure Transmitter	A device that measures pressure in a liquid, fluid, or gas and communicates signal.
	Producer	An entity that produces natural gas as a byproduct or primary product of oil production operations.
PLC	Programmable Logic Controller	A digital computer used for automation of electromechanical processes, such as control of machinery on factory assembly lines, amusement rides, or light fixtures.
	Pup	A short length of pipe.
	Reducer	The component in a pipeline that reduces the pipe size from a larger to a smaller bore (inner diameter).
	Regulator Station	Equipment installed on a pipeline for the purpose of automatically reducing and regulating the gas pressure in the downstream pipeline.
RCV	Remote Control Valve	A valve equipped with electric or gas powered actuators to operate (open or close) the valve based on an order (signal) from a remote location, such as a gas control room.
RER	Request for Engineering Review	Process by which the Engineering Department within SoCalGas reviews pipeline change requests and determines system impacts based on engineering analysis.

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Acronym	Term	Definition
RFI	Request for Information	A process initiated by the contractor used for requesting information regarding clarification, interpretation, or omission in issued documents; resolving conflicting instructions received; or reporting changed conditions encountered during the course of work.
ROW	Right of Way	A strip of land on which pipelines, railroads, power lines, and other similar facilities are constructed. It secures the right to pass over property owned by others.
	Ripping	A term used to describe the practice of mechanically plowing fields.
ERW	Electric Resistance Welding	A group of welding processes that produce coalescence of faying surfaces where heat to form the weld is generated by the electrical resistance of material combined with the time and the force used to hold the materials together during welding.
	Segment	A length of pipeline that has unique characteristics. A section of pipe can be made up of multiple segments.
	Service Valve	A valve used to separate one piece of equipment from another in a natural gas system and typically refers to the separation between a customer and company's piping.
	Single Sourced or Sole Sourced	A contract for the purchase of goods (materials) or services that is entered into by the Company with a single vendor without first obtaining pricing from other potential vendors.
SSAW	Single Submerged Arc-Welded	An arc welding process that requires a continuously fed consumable solid or tubular (metal cored) electrode. The molten weld and the arc zone are protected from atmospheric contamination by being "submerged" under a blanket of granular fusible flux consisting of lime, silica, manganese oxide, calcium fluoride, and other compounds. When molten, the flux becomes conductive, and provides a current path between the electrode and the work. This thick layer of flux completely covers the molten metal thus preventing spatter and sparks as well as suppressing the intense ultraviolet radiation and fumes.
	Slide Rail	A type of shoring that is modular and utilized for trench shoring excavations.
	Slot Trenching	The process of digging narrow trenches for installing pipes, cables or other below ground utilities.

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Acronym	Term	Definition
	Slurry	A slurry is a thin wet mud or cement or, in extended use, any fluid mixture of a pulverized solid with a liquid (usually water).
SCORE or DBE	Smaller Contractor Opportunity Realization Efforts or Diverse Business Enterprise	A multi-team approach to expand the pool of smaller diverse businesses in our supplier base.
SMYS	Specified Minimum Yield Strength	The minimum yield strength prescribed by the specification under which pipe is purchased from the manufacturer.
	Spool	Piece of pipe flanged on both ends that can be removed and reinstalled.
	Static Head	The height of a column of water at rest, that would produce a given pressure.
SWPPP	Stormwater Pollution Prevention Plan	A fundamental requirement of stormwater permits that identifies potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the construction site, describes the practices to be used to reduce pollutants in storm water discharges from the construction site, and helps assure compliance with the terms and conditions of the permit (when the plan is designed for the individual site, and is fully implemented).
	Subpart J	Subpart J refers to 49 CFR Section 192, Subpart J – Test requirements, which is a section of the Code of Federal Regulations (CFR) that prescribes minimum leak-test and strength-test requirements for pipelines.
SCADA	Supervisory Control and Data Acquisition	A system for remote monitoring and control that operates with coded signals over communication channels.
SL	Supply Line	A distribution supply line can be either a transmission line or a distribution main and is operated at a pressure more than 60 psig, and supplies one or more distribution regulator stations, or supplies three or more customers.
	Supply Line Lateral	A line that functions at higher than 60 psig with no pressure regulation at the off-take from the source supply line.
	System Average Cost	The average cost per mile to pressure test a pipeline segment. Used to determine certain disallowances per D.14-06-007 and D.15-12-020.

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Acronym	Term	Definition
	Tap Valve	A welded branch connection with valve made to a pipeline in the form of a single connection to supply or transfer gas between pipeline systems.
TPE	Target Price Estimate	The estimate for construction contractor costs that is negotiated between the Performance Partner and a third-party estimator and approved by SoCalGas.
	T-Cuts	Cuts made to asphalt after the backfill is completed for structural strength and sealing against water intrusion.
	Tee	A pipe fitting that is T-shaped having two outlets, at 90° to the connection to the main line. It is used for connecting pipes of different diameters or for changing the direction of pipe runs.
TRE	Temporary Right of Entry	Temporary permission to enter and perform various activities on private property which include but are not limited to land and environmental surveys to support planning and design and contractor laydown yards and workspace in support of construction.
	Test Head	A piece of equipment through which water is pumped to conduct a pressure test. A pipeline that will be pressure tested has a test head welded to the end of a pipeline segment.
T&E	Time and Expense	A contract for construction, product development or other services in which the employer agrees to pay the contractor based upon the time spent by the contractor's employees and subcontractor's employees to perform the work, and for expenses realized as a result of the contracted project.
T&M	Time and Material	A contract for construction, product development or other services in which the employer agrees to pay the contractor based upon the time spent by the contractor's employees and subcontractor's employees to perform the work, and for materials used in the construction (plus the contractor's mark-up).
T&M NTE	Time and Material Not to Exceed	A Time and Material contract that includes a cost cap (*i.e.*, limits the maximum amount that can be charged by the contractor).
	Transite	A generic term for asbestos cement products, including boards and pipes.

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Acronym	Term	Definition
	Turnover	A term used to indicate a project team has no further activities to be addressed on a project and the asset is returned or "turned over" to the operating department.
	Type C Soil	The least stable type of soil, which includes granular soils in which particles do not stick together and cohesive soils with a low unconfined compressive strength; 0.5 tons per square foot or less. Examples of Type C soil include gravel and sand.
	Uprate	Increase of the Maximum Allowable Operating Pressure (MAOP).
	Valve	A device that controls the flow of natural gas.
	Vault	An underground room/space that provides access to subterranean equipment, such as valves for water or natural gas pipes, or switchgear for electrical or telecommunications.
	Wedding bands	A welded sleeve on a pipeline that can be used to repair gas transmission pipelines. It allows for full encirclement repair over damage or defects.
WOA	Work Order Authorization	A utility form that summarizes and documents approval to proceed with execution of a project. A "Phase 1 WOA" authorizes a project team to conduct preliminary design and planning work for a project. A "Phase 2 WOA" is based on a fully loaded estimate of project costs
	Wrinkle Bend	A pipe bend produced by a field machine or controlled process which may result in abrupt contour discontinuities on the inner radius.