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Revised Final Mitigated Negative Declaration Appeal

3516-3526 Folsom Street

DATE: September 11, 2020

TO: Angela Calvillo, Clerk of the Board of Supervisors

FROM: Lisa Gibson, Environmental Review Officer – lisa.gibson@sfgov.org
Joy Navarrete, Principal Planner – joy.navarrete@sfgov.org
Josh Pollak, Senior Planner – josh.pollak@sfgov.org

RE: Planning Case No. 2013.1383ENV – Appeal of the Revised Final Mitigated Negative Declaration for 3516-3526 Folsom Street Project

HEARING DATE: September 15, 2020

ATTACHMENTS: A – September 3, 2020 letter from San Francisco Fire Department Regarding 3516-3526 Folsom Street Project
B – August 12, 2020 email from PG&E Regarding 3516-3526 Folsom Street Project
C – August 24, 2020 email from PG&E Regarding 3516-3526 Folsom Street Project
D – September 4, 2020 email from PG&E Regarding 3516-3526 Folsom Street Project

PROJECT SPONSOR: Fabien Lannoye, Bluorange Designs, 415-626-8868
APPELLANT: Kathy Angus, Bernal Heights South Slope Organization

ADDITIONAL SUPPORTING DOCUMENTS

The planning department has received additional information supporting the San Francisco Fire Department's approval of the Emergency Response and Evacuation Plan for the 3516-3526 Folsom Street project (proposed project) and Pacific Gas & Electric's (PG&E's) approval of the Vibration Management Plan and Emergency Response and Evacuation Plan for the proposed project. This additional information is supplemental to the approvals that were required as part of the Board of Supervisor's Motion No. M17-152 (board motion) and does not change the conclusions or analysis provided in Revised Final Mitigated Negative Declaration (RFMND), dated March 25, 2020. The attached information includes:

Attachment A:

- Letter from San Francisco Fire Department dated September 3, 2020 addressing the San Francisco

Fire Department's review of the Emergency Response and Evacuation Plan and the San Francisco Fire Department's statement that it finds that material provided for the project adequate to proceed to site permit review. This is new information in the project record.

Attachment B:

- Email sent by PG&E staff on August 12, 2020 summarizing work performed by PG&E staff for the proposed project related to PG&E Pipeline 109, and a determination that the project would not affect pipeline safety or integrity. This is new information in the project record.

Attachment C:

- Email sent by PG&E staff on August 24, 2020 addressing the operational and maintenance history of PG&E Pipeline 109, the lack of detected leaks on the pipeline in the project area, and PG&E's plan for operating and maintaining the pipeline. The operational and maintenance history of the pipeline includes a description of the inspection and monitoring program, which includes patrols, leak surveys, cathodic protection system inspections, and integrity assessments that incorporate three federally approved methods. The email, is itself new information in the project record, and contains the following attachments, which are appended in their entirety, and are briefly summarized below:

    - September 3, 2017 report including responses from John Eidinger, P.E., S.E. of G&E Engineering Systems Inc., addressing pipeline safety, which documents an independent engineer's review of the work of PG&E's internal engineering assessment. The report validates the 2 inches per second vibration threshold for construction of the proposed project to prevent impacts to the pipeline during construction by a third-party engineer. This is new information in the project record. This document is the fourth separate engineering review affirming the vibration threshold of 2 inches per second as incorporating safety-protective assumptions to prevent construction impacts to PG&E Pipeline 109. The other three engineering assessments were performed by PG&E staff, Illingworth & Rodkin (see below), and ICF.

    - PG&E pipeline information provided by PG&E (undated), describing the pressure, age, pipe size, and depth of PG&E Pipeline 109, and the safety requirements for excavating near PG&E Pipeline 109. This is new information in Board of Supervisors File No. 200800 (board file).[1]

    - March 30, 2017 Memo from PG&E Gas Transmission Pipeline Services—Integrity Management, which described PG&E requirements related to standby inspection, grading /excavation, pipeline markers, landscaping, fencing, structures, and construction loading. This is new information in the board file.

[1] The board file is all the information included in Board of Supervisors File No. 200800, available at: https://sfgov.legistar.com/LegislationDetail.aspx?ID=4602127&GUID=37197DC6-6FA2-493C-9738-1F84DC853294&Options=IDText&Search=200800. The board file is a subset of all the information in the project record, which consists of all documents and communications the planning department has received.

- March 6, 2018 email providing inspection summary of PG&E Pipeline 109, including a description of patrols, leak surveys, cathodic protection system inspections, and integrity assessment. This is new information in the board file.

- March 24, 2018 Memorandum from Illingworth & Rodkin, "Construction Vibration Evaluation for 3516 and 3526 Folsom Street." This information is already in the board file.

- Vibration Management Plan and Emergency Response and Evacuation Plan with PG&E and San Francisco Fire Department approvals. This information is already in the board file.

- July 2018 "Folsom Street Emergency Response Plan." This information is already in the board file.

Attachment D:

- Email sent by PG&E staff on September 4, 2020 addressing a tree removed nearby the project site in 2018, which describes the reasons for the tree removal and affirms that the removal did not harm the integrity of the PG&E Pipeline. The email, which is new information in the project record, contains the following attachments, which are appended in their entirety:

  - March 30, 2017 Memo from PG&E Gas Transmission Pipeline Services—Integrity Management, which is same as the memo sent in PG&E's email on August 2, 2020. The memo in part describes PG&E's tree removal practices.

  - November 2010 Pipeline and Informed Planning Alliance (PIPA): Partnering to Further Enhance Pipeline Safety in Communities Through Risk-Informed Land Use Planning: Final Report of Recommended Practices report, which outlines factors for tree removal, among other materials. This item was sent as a reference document, and is new information in the project record; however, some portions were included as part of the appellant's April 24, 2020 letter.

  - September 2, 2020 letter to PG&E sent by Steven Vianni, consulting engineer for the appellant, which is new information in the board file. PG&E stated in their September 4, 2020 email that they will respond shortly. Their response will be shared by the planning department with the appellant, sponsor team, and the board when it is available.

RESPONSE TO ADDITIONAL APPELLANT CONCERNS

Response 8: Additional pipeline maintenance records requested by the appellant are not necessary for the RFMND to satisfy the requirements of the board Motion No. M17-152.

The planning department received an e-mail from the appellant, sent September 9, 2020, expressing additional concerns. The appellant asserts that maintenance records for PG&E Pipeline 109 have not been included in the documents previously submitted by PG&E.

The decision before the board is whether to uphold the RFMND as meeting the requirements of Motion

No. M17-152, which directed the department to undertake further analysis with respect to the specific issue of the potential vibration impacts of project construction, or to return the project to the department for additional analysis to meet the requirements of Motion No. M17-152. The board motion does not include direction to the department to provide further pipeline maintenance records for PG&E Pipeline 109. Therefore, no information regarding the maintenance of the pipeline is required to satisfy the requirements of the Motion No. M17-152. In addition, PG&E staff noted in the March 6, 2018 email (listed above) that pipeline maintenance records are considered confidential information: "unfortunately, PG&E cannot provide the documentation from these inspections because they contain confidential information that PG&E only provides to its regulators."

As noted in Response 2 in the department's August 3, 2020 appeal response, the location and condition of PG&E Pipeline 109 was confirmed in a document "Location, Depth and Condition of Pipeline No. 109," which was added to the project record on March 24, 2020.

Furthermore, the additional documents provided by PG&E, discussed above, describe their maintenance practices in general and highlight the specific condition of PG&E Pipeline 109. PG&E's description of the operational and maintenance history of the pipeline includes a description of the inspection and monitoring program, which includes patrols, leak surveys, cathodic protection system inspections, and integrity assessments that incorporate three federally approved methods. Aerial patrols have been conducted monthly, and PG&E Pipeline 109 was last aerially patrolled in July 2020, with no reported observations. The cathodic protection system which protects against corrosion was last inspected in October 2019 and found to be operating correctly. The integrity assessments include three federally approved methods to test pipe strength. The most recent pressure test in 2016 revealed that the pipeline was tested to a strength of over 3 times the maximum operating pressure without leaks or failures. As described above, there has never been a detected pipeline leak in the project area.

It is noteworthy that the September 2, 2020 letter (listed above) sent to PG&E by the appellant's engineering consultant does not request information from PG&E related to the pipeline maintenance. Prior correspondence sent by the appellant's consulting engineer to the planning department on August 6, 2020 also does not include a request for further pipeline maintenance records. For these and other reasons explained above, we request that the board reject the erroneous and belated suggestion that additional pipeline maintenance records are required to satisfy the requirements of Motion No. M17-152.

CONCLUSION

In summary, the additional supporting documents attached reaffirm the planning department's conclusions in the RFMND and support the adequacy of mitigation measures provided in the document. These documents do not provide new information showing that the project will have significant effects not discussed in the RFMND, that significant effects previously examined will be substantially more severe than shown in the RFMND, or any other circumstances that might trigger further environmental review. Furthermore, the additional information is supplemental to the requirements of the board motion.

Department staff respectfully recommends that the board uphold the planning department's adoption of the RFMND and deny the appeal. The appellant fails to provide substantial evidence supporting a fair argument that the RFMND has not satisfied the requirements of the board motion. In addition, as established by the board motion, the record does not include substantial evidence that the project may have a significant effect on the environment that would warrant preparation of an EIR.

ATTACHMENT A

San Francisco Fire Department **Division of Fire Prevention & Investigation**

MEMORANDUM

TO:

FROM: Fire Marshal de Cossio

SUBJECT: 3516-3526 Folsom St.

DATE: September 3, 2020

REFERENCE: 3516-3526 Folsom St. Extension Construction Vibration Management Plan

ENCLOSURE: None

SFFD has reviewed the site plan, engineering documents, and the Emergency Response and Evacuation Plan provided by the project sponsor, Planning Department, and PG&E, and finds the material adequate to proceed with the proposed project at 3516-3256 Folsom Street. SFFD also reviewed fire access plans associated with street improvements for Folsom Street. SFFD reviewed and approved the Emergency Response and Evacuation Plan on January 10, 2019.

As part of the normal permitting process of the site permit under the Department of Building Inspection, once the Planning Department has completed review, SFFD will independently review the site permit. SFFD staff intends to attend the pre-construction meeting for the proposed project and may request additional material as part of project review. The subsequent review of the site permit and any additional material requested does not affect the adequacy of the materials reviewed by SFFD, and the project may proceed to site permit review from the perspective of SFFD.

ATTACHMENT B

Subject: RE: PG&E pipeline 109
Date: Wednesday, August 12, 2020 at 3:33:07 PM Pacific Daylight Time
From: Cowsert, Christine
To: Beinart, Amy (BOS)
CC: Pollak, Josh (CPC)

Hi Amy:

Thanks for the discussion this morning. Following our call, I have one clarification – you were correct that we observed potholing rather than performing the potholing ourselves. I apologize for the confusion.

Below is a summary of the work we performed to evaluate the safety and integrity of L-109 in the vicinity of this project. Please let us know if it would be helpful for us to provide any additional detailed documentation for your records.

Thanks,
Christine

Christine Cowsert
Asset Management and System Operations
Pacific Gas and Electric Company
christine.cowsert@pge.com
415-238-0874

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PG&E has participated in a detailed engineering review (including stress and vibration analysis by 2 independent firms) and a physical excavation/inspection, to evaluate the integrity of gas transmission Line-109 in relation to the proposed development. Based on these reviews, and the developer adhering to PG&E's requirements during construction, this project will not affect pipeline safety or integrity.

Between 2017 and 2019, PG&E worked with both the SF Planning Department and the developer to review the proposed construction of two residential buildings located at 3516 and 3526 Folsom St., San Francisco. The proposed project is near gas transmission pipeline L-109, which was installed in 1981.

We reviewed the project and provided the City Planning Department with the requirements to ensure construction was being performed in a safe manner (for public safety, and to protect the pipeline from damage), including:

- A PG&E standby representative must be onsite when excavating near the pipeline
- Hand-digging when excavating within 2 feet of the pipeline
- Specific horizontal and vertical distance of structures from the pipeline (fencing, landscaping, and other general structures such as stairs, foundations, etc.)
- Rules for maintaining cover over the pipeline
- Construction loading limits to prevent heavy construction equipment from damaging the pipeline
- Conservative vibration limits to prevent pipeline damage

To address specific concerns related to vibration levels as well as pipeline integrity (raised in an appeal from neighbors to the SF Board of Supervisors), PG&E confirmed the following:

- Previous patrol, leak survey, cathodic protection, and integrity assessments confirmed that the

pipeline is operating normally with no issues.

- PG&E observed potholing (physically exposing and inspecting the pipe) at the Folsom St. location and noted no concerns.
- A stress analysis confirmed vibration limits were acceptable from a pipeline integrity standpoint. Two independent analyses were performed, by the developer and a PG&E third-party consultant (Illingworth & Rodkin, working for the developer, and G&E, working for PG&E). These reports were reviewed by PG&E's Pipeline Engineering and Geosciences departments and concluded that vibration levels did not present a safety issue, as long as the project was constructed as planned and PG&E requirements are followed. Based on engineering review, this project did not raise ground movement concerns given the proposed construction methodology.
- To comply with PG&E's requirements to proactively ensure public safety, the developer created a vibration management plan, as well as a site-specific emergency response plan with input from PG&E.

ATTACHMENT C

Subject: RE: PG&E pipeline 109

Date: Monday, August 24, 2020 at 4:12:37 PM Pacific Daylight Time

From: Cowsert, Christine

To: Pollak, Josh (CPC)

CC: Beinart, Amy (BOS)

Attachments: 1. PG&E Provided - Development Review - PG&E Gas Transmission Review - Folsom St. SF.pdf, 2. PG&E Provided - Pipeline Info.pdf, 3. PG&E Provided - Inspection Summary - PGE-Pipeline-109-INSPECTIONS-2018-03-06.pdf, 4. Developer Provided - Folsom Street Project Vibration Study-2017-03-24.pdf, 5. PG&E Third-Party Consultant Provided - PGV Pipe Ground Shaking.pdf, 6. Developer Provided - Vibration Management and Emergency Plan - Folsom St_Public.pdf, 7. Developer Provided - Folsom Street Emergency Response Plan-FJL_Public.pdf

Hi Josh:

Attached are the documents related to the historical engagements we've had on this project. In addition, below are the responses to the questions posed by Amy. We have logged the questions with index numbers for our future reference if we have follow ups, but you can disregard them.

Please let me know if you have any questions or need any additional information.

Thanks,
Christine

QUESTION 14164.01: What is the operational and maintenance history of the pipeline?

RESPONSE 14164.01: Gas transmission pipeline Line 109 is near the Folsom Street neighborhood. Line 109 is a 26-inch diameter steel pipeline installed in 1981 and 1983. This pipeline has a maximum allowable operating pressure (MAOP) of 145 pounds per square inch gage (psig), which results in a low operating stress level that is only about 19.2% of the pipe's specified minimum yield strength (SMYS). 100% of the SMYS is the point at which the steel in the pipe could begin to deform. Limiting the pressure to 122 psig provides a considerable margin of safety, since it would take a pressure of over 756 psig to reach 100% SMYS.

PG&E has a comprehensive inspection and monitoring program to ensure the safety of its natural gas transmission pipeline system. PG&E regularly conducts patrols, leak surveys, and cathodic protection (corrosion protection) system inspections for its natural gas pipelines. Any issues identified as a threat to public safety are addressed immediately. PG&E also performs integrity assessments of certain gas transmission pipelines in urban and suburban areas.

Patrols: PG&E patrols its gas transmission pipelines at least quarterly to look for indications of construction activity and other factors affecting pipeline safety and operation. Line 109 through the Folsom Street neighborhood was last aerial patrolled in July 2020, and there were no reported observations. Additionally, L-109 is aerial patrolled monthly and no observations have been recorded from February 2018 to present day.

Leak Surveys: PG&E conducts leak surveys of its natural gas transmission pipelines semi-annually. Leak surveys are either conducted by a leak surveyor walking above the pipeline with leak detection instruments or conducted aerially and followed-up with a ground leak survey if there is a leak indication identified during the aerial survey. Line 109 was last leak surveyed in April 2020 and no leaks were detected. Additionally, no leaks have been detected between Mile Point (MP) 50.0 and 50.2 from October 2017 to present day.

Cathodic Protection System Inspections: PG&E utilizes an active cathodic protection (CP) system on its gas transmission and steel distribution pipelines to protect them against corrosion. PG&E inspects its CP systems annually to ensure they are operating correctly. The CP systems on Line 109 were last inspected in October 2019 and were found to be operating correctly. Additionally, no CP issues have been detected from January 2018 to present day.

Integrity Assessments: PG&E incorporates three federally approved methods in its Transmission Integrity Management Program: In-Line Inspections (ILI), Direct Assessment (DA) and Pressure Testing. An In-Line Inspection involves a tool (commonly known as a "pig") being inserted into the pipeline to identify any areas of concern such as potential metal loss (corrosion) or geometric abnormalities (dents) in the pipeline. Direct Assessment may involve any of three separate processes to assess for the presence of External Corrosion (EC), Internal Corrosion (IC) and Stress Corrosion Cracking (SCC), depending on the specific threat(s) identified. During ECDA, ICDA or SCCDA, the pipe is excavated in order to perform direct examination of the pipe in identified areas of concern. Pressure testing is a strength test normally conducted using water, which is also referred to as a hydrostatic test.

PG&E performs pipeline integrity assessments on its sections of transmission pipeline in high consequence areas (HCAs) at least every seven years. The maximum allowable reassessment interval for integrity assessments are summarized in the Code of Federal Regulations (CFR) (see 49 CFR Part 192, Subpart O). Line 109 had a strength test conducted in November 2016. The 2016 strength test successfully tested the pipeline without leaks or failures to 3.2 times the MAOP, providing a safety factor allowing for a re-assessment of 15 years as prescribed in American Society of Mechanical Engineers (ASME) B31.8S-2004, Table 3. Additionally, L-109 has a low-stress re-assessment scheduled in December 2020. Please note, this re-assessment is subject to change depending on delays in permitting.

QUESTION 14164.02: Have there ever been detected leaks on the pipeline?

RESPONSE 14164.02: No, there have been 0 leaks detected on L-109 between MP 50.0 and 50.2.

QUESTION 14164.03: How will PG&E continue to inspect and monitor after the pipeline is paved over?

RESPONSE 14164.03: Please see Response 14164.01 for PG&E's comprehensive inspection and monitoring program.

September 3 2017

PG&E (Joseph Sun) requested that G&E provide a brief letter report that addresses the following:

Third parties are undertaking a construction effort, possibly including excavation, blasting or some other type of work. This effort may result in some vibrations in the ground. PG&E has a gas pipeline nearby, called L109. PG&E has set a ground shaking acceptance limit at L109 of PGV = 2 inches per second, below which the construction activities can continue, and above which some type of hold or review may be needed.

Joseph Sun of PG&E asked John Eidinger (California Registered P.E., S.E.) of G&E the following question:

Is PGV = 2 inches per second a reasonable criteria?

G&E Response.

Yes. PGV ≤ 2 inches per second is a reasonable criteria.

Technical Basis for this Response.

Ground shaking will impose incremental stresses into underground pipes. The PG&E pipe L109 is assumed to be a medium to larger diameter gas transmission pipe. PG&E has not provided to G&E any design drawings or details for the gas pipeline.

G&E presumes the gas pipeline has the following characteristics:

Welded steel pipe. Girth joints are all full penetration butt welds. There are no slip joints / Dresser couplings in the gas pipe in the vicinity (within 1,000 feet) of the site of construction. There are no branch pipes in the vicinity of the construction. The local soils are characterized as firm ground or rock-like conditions. There are no local weak soils (prone to liquefaction or landslide) under the pipe. The pipe is 24 inch diameter.

There are many references that describe how to compute stresses in buried pipelines due to ground shaking (ALA 2005 describes how to compute pipe stresses in some detail for steel pipelines; these are essentially the same for steel gas or water pipelines). The main assumption is that the pipe moves with the ground, with no slippage between the pipe wall and the fill in the pipe trench. For low levels of ground shaking (PGA < 0.3g, PGV < 15 inches per second), these assumptions are reasonably valid for essentially all cases.

The stresses imposed on the pipeline can be computed as a function of PGV and PGA. The bulk of the stresses will be due to PGV; incremental stresses due to PGA are

generally an order of magnitude smaller than those from PGV, and we will ignore them in the following computations.

Basic Stress Analysis

The basic assumption is that ground shaking will result in ground strain, ε_g can be computed as:

$$\varepsilon_g \propto \frac{PGV}{bC}$$

where PGV is the Peak Ground Velocity (inches per second) measured at the surface of the ground at the pipe location (assuming the pipe that is located just a few feet beneath the surface feels the same level of shaking), C is the wave propagation speed and b is a factor that reflects the style of incoming wave form. For earthquakes, the most common assumption is that the wave form that generates the highest PGVs and pipe stresses are vertically propagating shear waves, and in which case b = 2. For deep firm soil sites, the wave propagation speed will usually be 13,000 feet per second (or higher). For these conditions, if we assume the pipe strain is the same as the ground strain (i.e., no slippage between the pipe and soil), then:

$$\varepsilon_p = \varepsilon_g = \frac{2 \ \ inch/\sec}{2*13{,}000 \ \ ft/\sec *12 \ \ inch/ft} = 6.41e-6$$

And assuming Youngs modulus for a steel pipe is 29,600 ksi, then the longitudinal stress in the pipe is:

$$\sigma = E\varepsilon_p = 0.19 \ \ ksi = 190 \text{ psi}$$

The common gas pipe design for a 24 inch pipe with 400 psi operating pressure would have hoop stress due to internal pressure as:

$$\sigma_h = \frac{pr}{t} = \frac{400*12}{t} < 0.5F_y$$

Assuming the gas pipe steel material is grade X42, which has minimum Fy of 42 ksi, then t (min) = 0.23 inches, say 0.25 inches actual.

Assuming the pipe is operating at 400 psi, then near bends in the pipe, there will be longitudinal stresses due to internal pressure that are half the hoop stress, or 10,500 psi.

The total stresses under incremental shaking of PGV = 2 inches per second, in this case, would therefore be: 10,500 psi (due to pressure) plus 190 psi (shaking) =~ 10,700 psi.

For a gas pipe that commonly has at least a factor of safety of 2 when operating at 400 psi internal pressure, the variation of peak longitudinal stresses from 10,500

psi to 10,700 psi should keep total pipe stress well under yield, and pose no material risk to a well designed and constructed and in-situ pipe.

Considerations in the Basic Stress Analysis

The above "basic stress analysis" is a simplified approach to capture the basic trends in induced pipe stress due to ground shaking. This basic computation does not capture all possible conditions. For example:

- We do not know the style of wave form that will impact the pipe. For nearby pile driving or blasting, the imposed ground shaking impacting the pipe might be a combination of P-waves and surface waves. P waves have higher C than shear waves, and thus impose lower stresses on the pipe. Surface waves, especially in soft soils, might have lower C.

- We do not know what the wave propagation speeds will actually be. The slower the speed (smaller C), the higher the pipe stress. In the 1985 Mihoacan earthquake in Mexico, some researchers attributed damage to large diameter steel water pipes in Mexico City to conditions of very high PGVs (perhaps 30 inches / second or higher) and very low wave Rayleigh-type propagation speeds (perhaps 2000 feet per second), which could have resulted in pipe stresses on the order of 18,500 psi, high enough to induce pipe wrinkling in very thin-walled water pipes, or perhaps weld failures in cases where wells were not well made. However, the soft "jelly-like" soil conditions underlying Mexico City are unlikely to reflect the conditions at the project site, and certainly PGV limit if 2 inches per second are much lower than what happened in the Mexico earthquake.

- We have neglected issues like bends and branches and appurtenances in the PG&E gas pipe (bends and branches will tend to have higher stresses than in straight pipe). Other discontinuities might exist.

- We have assumed no ground failures caused by the pile driving / blasting work that might undermine the PG&E pipe.

Even with all these considerations in mind, we think that setting a "acceptance" criteria of PGV = 2 inches / second should not result in inducing much over a few thousand psi into the PG&E pipes. The PG&E pipes should not be operating at hoop stresses higher than about 0.5Fy, which is about 21,000 psi for grade X42 steel, or longitudinal stresses of about 10,500 psi. This means that even with allowance for a variety of conditions in the field, the total longitudinal stress in the PG&E pipe due to shaking should be no more than 15,000 psi or so, which is safely beneath yield, likely maintaining a factor of safety of around 3. All common pipeline codes and guidelines (ASME, ASCE, AWWA. API) for steel pipe would confirm that a factor of safety of about 3 under minimum yield is acceptable.

Other Considerations

The above analysis shows that a well designed and constructed steel gas pipe can safely accommodate incremental stresses due to imposed shaking that is limited to PGV = 2 inches per second.

For the current effort, G&E has had no opportunity to examine if there are any existing defects in the PG&E pipeline. We assume there are no serious defects in the gas pipe and there are no incipient soil failure conditions under the PG&E gas pipe.

Therefore, we have no reason to think that the existing pipe, if well built, cannot sustain the stresses imposed due to PGV = 2 inches per second.

Pipe Fragility

The author of this report has been involved with the examination of performance of buried pipelines in many earthquakes in California and around the world (Reference, ALA 2001). The following highlights the key points.

Table 1 provides a "backbone" pipe vulnerability functions (damage algorithms, fragility curves) for PGV mechanisms. These functions can be used when there is no knowledge of the pipe materials, joinery, diameter, corrosion status, etc. of the pipe inventory; and when the evaluation is for a reasonably large inventory of pipelines.

Hazard	Vulnerability Function
Wave Propagation Repair Rate per 1000 feet of pipe PGV in inches per second	RR= K1 * 0.00187 * PGV

Table 1. Buried Pipe Vulnerability Function

The Repair Rate (RR) is adjusted using variable K1 to account for the type of pipe as follows: RR = K1 * 0.00187 * PGV. For single lap-welded 12-inch diameter or larger steel thin-walled water pipe (common operating pressure under 150 psi), K1 = 0.15.

The welded steel pipe fragility curve factors in the following considerations:

If the steel pipe is in corrosive soils, the damage rate should be higher than if the pipe is in non-corrosive soils. Adjustment for corrosion should be applied only when there is no corrosion protection measures taken and the pipe is in corrosive or moist soil; corrosion measures might include a suitable coating system with sacrificial anodes.

For steel pipe, corrosion protection includes suitable coating and sacrificial anodes, or suitable coating with impressed current. We believe the PG&E gas pipeline has corrosion protection.

Corrosion is an age related phenomenon. Relatively new (under 25 years of age) steel pipe in corrosive soil environments will not be as affected as older steel (over 50 years old) pipe in the same environment.

The repair rates are decreased for steel pipe having nominal diameters greater than or equal to 12 inches. Several studies have shown there are lower damage rates for larger diameter pipes. The reduction for repair rates for large diameter pipe probably reflects a number of factors:

- There are few service connections attached to large diameter pipe.
- Corrosion effects on large diameter pipes (which can lead to small pin hole leaks) are not as pervasive for large diameter pipes as for small diameter pipes.
- There are fewer bends and tees in large diameter pipes (stress risers).
- Large diameter pipes have thicker walls to contain an equal amount of pressure, and are hence stronger.
- Large diameter pipes may be installed with better care.
- It is easier to weld large diameter pipes than small diameter pipes.
- Soil loads, as a function of pipe strength, are lower for larger diameter pipe given the same depth of soil cover.

Factor K1 should be reduced to reflect that butt welded are on average 2 times to 4 times more robust than single lap welds, with respect to preventing wall buckling in compression. Say K1 (butt weld) = 0.05.

With these factors in mind, assuming a butt welded pipe for L109, assuming RR = 0.05 * 0.00187 * 2, we get a repair rate of 0.000187 for a 1,000 foot-long pipe. This would suggest a chance of any type of damage that might need a repair of about 1 chance in 5,300.

In other words, for a butt welded gas pipe, we expect less than 1 chance in 5,000 that a 1,000-foot long stretch of gas pipe that is exposed to PGV = 2 inches per second would sustain any type of damage that would require a repair. This 1-in-5,000 chance presumes that there are some types of unknown defects in the pipe. If there are no defects, then we think the chance of a repair is much lower, and arguably should be near zero as long as the pipe stresses are kept well below yield.

REFERENCES

American Lifelines Alliance, Seismic Fragility Formulations for Water Systems, FEMA, 2001.

American Lifelines Alliance, Seismic Guidelines for Water Pipelines, FEMA, 2005.

PG&E Pipeline information provided by PG&E:

1) Can you provide general information on L-109 (Pressure, Age, Pipe Size, Depth, Hydrotest records) near the address of 3516-2526 Folsom street in Bernal Heights San Francisco?

Gas transmission pipeline Line 109 runs near the properties located at 3516 and 3526 Folsom Street. Line 109 is a 26-inch diameter steel pipeline installed in 1981 and 1983. This pipeline has a maximum allowable operating pressure (MAOP) of 150 pounds per square inch gage (psig), which results in a low operating stress level that is only about 19.8% of the pipe's specified minimum yield strength (SMYS). 100% of the SMYS is the point at which the steel in the pipe could begin to deform. Limiting the pressure to 150 psig provides a considerable margin of safety, since it would take a pressure of over 750 psig to reach 100% SMYS.

Line 109 nearest you was successfully pressure tested when installed.

PG&E's records indicate a depth of cover ranging from approximately 2 feet to approximately 5.6 feet for Line 109 in this area. Please note that pipeline depth of cover may vary significantly over the length of the pipeline and is subject to change over time as land leveling and construction affects the amount of cover. Furthermore, without digging and exposing a pipeline, it is not possible to determine the exact depth at specific locations.

For exact locations of PG&E's facilities, please call Underground Service Alert (USA) at 811 at least two working days before digging to request that PG&E locate and mark its facilities (a free service).

2) Does PG&E have Pipeline Safety Requirements developers excavating near Gas Transmission pipelines?

It is imperative that any proposed construction work not impair the safety of the gas lines. This not only includes any immediate safety risk to the pipeline during demolition or construction activities, but also long-term public safety with respect to this critical piece of infrastructure. PG&E requires adequate access at all times to patrol, survey, excavate, inspect, test, and otherwise maintain the pipeline(s) on a continuous basis. It is critical that any proposed digging be reported through the one-call system, Underground Service Alert (USA) at 811, at least two working days before digging, so that all operators that have facilities near the proposed excavation can locate and mark those facilities.

Further requirements are itemized below:

1. Standby Inspection: A PG&E Gas Transmission Standby Inspector must be present during any demolition or construction activity within 10 feet of the gas pipeline(s). This includes all grading, trenching, gas line depth verifications (potholes), asphalt or concrete demolition/removal, removal of trees, signs, light poles, etc. This inspection can be coordinated through the Underground Service Alert (USA) service at 811 or 1-800-227-2600. A minimum notice of 48 hours is required.

2. Grading/Excavation: PG&E requires a minimum of existing grade or 36 inches of cover over gas lines (whichever is less), and a maximum of 7 feet cover. Any excavations, including grading work, above or around the gas transmission facilities must be performed while a PG&E inspector is present. This includes all laterals, subgrades, gas line depth verifications (potholes), etc. Any plans to expose and support a PG&E gas transmission pipeline across an open excavation need to be approved by PG&E Pipeline Engineering in writing PRIOR to performing the work. Any digging within 2 feet of a gas pipeline

must be dug by hand. Water jetting to assist vacuum excavating must be limited to 1000 psig and directed at a 40° angle to the pipe.

3. Pipeline Markers: PG&E requires pipeline markers be placed along the pipeline route in order to ensure public awareness of the presence of the pipeline. Any existing markers can be temporarily relocated to accommodate construction work (with written PG&E approval), however markers must be reinstalled once construction is complete

4. Boring/Trenchless Installations: PG&E must review and approve of 3rd party plans to bore across or parallel to (within 10 feet) a gas transmission pipeline. There are stringent criteria to pothole the gas transmission facility at regular intervals for all parallel bore installations.

5. Landscaping: Trees or deep rooted shrubs shall not be located within 10 feet of edge of pipe (pipe zone). Trees less than 12 inches in diameter with non-intrusive root structures can be placed outside of the 10 foot pipe zone. Removal of trees is acceptable, given the stumps are not removed. If stumps/roots are being removed, further evaluation will be required to ensure that removal will not interfere with the pipelines.

6. Fencing: Care must be taken to ensure the safety and accessibility of the pipelines. No parallel fencing will be allowed within 10 ft. of the pipeline, and any perpendicular fencing will require 14 foot wide access gates to be secured with PG&E corporation locks.

7. Structures: Permanent structures must be located a minimum distance of 10 ft. from edge of pipe. Additionally, for pipeline maintenance, future construction, emergency response provisions, etc., we need a total width of 45 ft. to access the location. Do not stockpile or store demolition/construction material or equipment within this distance. PG&E cannot compromise on the ability to safely access, operate and maintain our facilities, especially when considering emergency situations.

8. Substructures: All utility crossings must be as close to perpendicular as feasible (90° +/- 15°) to the gas lines and must be separated by a minimum of 12 inches from the gas pipeline. This includes but is not limited to electrical conduit, irrigation lines, water lines, sewer lines, etc.

9. Cathodic Protection: The gas transmission pipelines in the project area are protected from corrosion with an “Impressed Current” Cathodic Protection System. Any proposed substructures/facilities, such as metal conduit, pipes, service lines, ground rods, anodes, wires, etc. that may affect the pipeline Cathodic Protection System will require review and approval by PG&E Corrosion Engineering.

10. Construction Loading: To prevent damage to the buried gas pipeline(s), there are weight limits that must be enforced whenever any equipment gets within 10 feet of traversing a pipeline. Due to the weight variability of tracked equipment, cranes, vibratory compactors, etc., do not allow any construction equipment within 10 ft. of the gas pipeline(s) without approval from the PG&E gas transmission pipeline engineer. Wheel loading calculations will need to be determined, and the pipeline may need to be potholed by hand in a few areas to confirm the depth of the existing cover. These weight limits also depend on the support provided by the pipeline’s internal gas pressure. If PG&E’s operating conditions require the pipeline to be depressurized, maximum wheel loads over the pipeline will need to be further limited. For compaction, please use walk-behind compaction equipment if within 2 feet of the pipeline. Crane and backhoe outriggers must be set at least 10 feet from the centerline of the gas pipeline.

Ramneek Saini

RVSZ@pge.com

Pacific Gas and Electric Company®

Date: MARCH 30, 2017

To: JOY NAVARRETE – SAN FRANCISCO PLANNING DEPARTMENT

From: PG&E GAS TRANSMISSION PIPELINE SERVICES – INTEGRITY MANAGEMENT

Subject: 3516/3526 FOLSOM ST.

Dear Joy,

Thank you for making us aware that you plan to do grading work near the PG&E gas transmission pipeline located near 3516 and 3526 Folsom St. As you are aware, it has been confirmed that an active 26" PG&E gas transmission pipeline L-109 is routed through this location. It is imperative that any proposed demolition or construction work not impair the safety of the gas lines. This not only includes any immediate safety risk to the pipeline during demolition or construction activities, but also long-term public safety with respect to this critical piece of infrastructure. PG&E requires adequate access at all times to patrol, survey, excavate, inspect, test, and otherwise maintain the pipeline(s) on a continuous basis in accordance with PG&E Utility Standard TD-4490S "Gas Pipeline Rights-of-Way Management."

Please be aware that this letter is being sent to address PG&E gas transmission facilities only. This letter is not intended to address PG&E gas distribution or PG&E electric facilities.

If any changes are made to the site plans as discussed via previous email, PG&E will need to re-evaluate before site development begins. Considering any comments/feedback we may have, an ideal time to send us any plan changes would be during the design phase of the project, to allow the possibility of modifying the design as necessary before launching into the construction phase.

1. Standby Inspection: **A PG&E Gas Transmission Standby Inspector must be present during any demolition or construction activity within 10 feet of the gas pipeline(s).** This includes all grading, trenching, gas line depth verifications (potholes), asphalt or concrete demolition/removal, removal of trees, signs, light poles, etc. This inspection can be coordinated through the Underground Service Alert (USA) service at **811 or 1-800-227-2600**. A minimum notice of 48 hours is required. This is absolutely required for your grading project.

2. Grading/Excavation: PG&E requires a minimum of existing grade or 36 inches of cover over gas lines (whichever is less), and a maximum of 7 feet cover. Current records show that the depth of cover (top of grade to top of pipe) could be as shallow as 24", however potholing would be required to confirm this. Any excavations, including grading work, above or around the gas transmission facilities must be performed while a PG&E inspector is present. This includes all laterals, subgrades, gas line depth verifications (potholes), etc. Please follow PG&E Work Procedure TD-4412P-05 "*Excavation Procedures for Damage Prevention*" when working in the vicinity of the gas transmission pipeline. Any plans to expose and support a PG&E gas transmission pipeline across an open excavation need to be approved by PG&E Pipeline Engineering in writing **PRIOR** to performing the work. **Any grading or digging within 2 feet of a gas pipeline must be dug by hand.** Water jetting to assist vacuum excavating must be limited to 125 psig.

3. Pipeline Markers: PG&E requires pipeline markers be placed along the pipeline route in order to ensure public awareness of the presence of the pipeline. Any existing markers can be temporarily relocated to accommodate construction work (with written PG&E approval), however markers must be reinstalled once construction is complete. It is unknown at this time how accurate the pipeline marker locations are at this specific site. As stated above, please coordinate an inspection through the Underground Service Alert (USA) service at **811 or 1-800-227-2600**.

4. Landscaping: Trees or deep rooted shrubs shall not be located within 10 feet of edge of pipe (pipe zone). Trees less than 12 inches in diameter with non-intrusive root structures can be placed outside of the 10 foot pipe zone. This is in accordance with PG&E Utility Standard TD-4490S "Gas Pipeline Rights-of-Way Management" Section 2. Removal of trees is acceptable, given the stumps are not removed. If stumps/roots are being removed, further evaluation will be required to ensure that removal will not interfere with the pipelines.

5. Fencing: Care must be taken to ensure the safety and accessibility of the pipelines. No parallel fencing will be allowed within 10 ft. of the pipeline, and any perpendicular fencing will require 14 foot wide access gates to be secured with PG&E corporation locks.

6. Structures: Permanent structures must be located a minimum distance of 10 ft. from edge of pipe. Additionally, for pipeline maintenance, future construction, emergency response provisions, etc., we need a total width of 45 ft. to access the location. Do not stockpile or store demolition/construction material or equipment within this distance. PG&E cannot compromise on the ability to safely access, operate and maintain our facilities, especially when considering emergency situations.

7. Construction Loading: Please refer to chart below for approved construction loading as applicable to this project. To prevent damage to the buried gas pipelines, there are weight limits that must be enforced whenever any equipment gets within 10 feet of traversing a pipeline. Due to the weight variability of tracked equipment, cranes, vibratory compactors, etc., **do not allow any construction equipment within 10 ft. of the gas pipeline(s) without approval from the PG&E gas transmission pipeline engineer.** Wheel loading calculations will need to be determined, and the pipeline may need to be potholed by hand in a few areas to confirm the depth of the existing cover. These weight limits also depend on the support provided by the pipeline's internal gas pressure. If PG&E's operating conditions require the pipeline to be depressurized, maximum wheel loads over the pipeline will need to be further limited. For compaction, please use walk-behind compaction equipment if within 2 feet of the pipeline. Crane and backhoe outriggers must be set at least 10 feet from the centerline of the gas pipeline. **Specific to this project, please ensure max PPV vibration levels are less than 2in/sec.**

   Referencing the chart below, for wheeled equipment only (excludes tracked equipment and vibratory rollers), for a depth of cover of 2ft over top of the 26" pipeline, the pipe may be subjected to a maximum half-axle wheel load of 4580 lbs. **Specific to this project, the 17,500 lb Takeuchi TB175 excavator and 8,000 lb Bobcat Excavator are approved for use.** If any equipment is planned to be operated within 10 ft. of the pipeline that exceeds the half-axel weight specified below, please contact the gas transmission pipeline engineer for approval. Half axle weight is the gross weight upon any one wheel, or wheels, supporting one end of an axle.

Depth of Cover (ft. to Top of Pipe)	Max. Half-Axle Wheel Loading (lbs.)
2	4580
3	6843
4	7775
5	7318

Feel free to contact me if there are any questions or concerns.

John Dolcini
Pipeline Engineer - Gas Transmission
Pacific Gas and Electric Company
Email: J7DP@pge.com

-------- Forwarded Message --------
Subject:RE: Fwd: Re: Fwd: RE: 3516 and 3526 Folsom
Date: Tue, 6 Mar 2018 22:41:22 +0000
From: Freedman, Jon <J3FB@pge.com>
To: Fabien Lannoye <fabien@bluorange.com>

PG&E has a comprehensive inspection and monitoring program to ensure the safety of its natural gas transmission pipeline system. PG&E regularly conducts patrols, leak surveys, and cathodic protection (corrosion protection) system inspections for its natural gas pipelines. Any issues identified as a threat to public safety are addressed immediately. PG&E also performs integrity assessments of certain gas transmission pipelines in urban and suburban areas.

Patrols: PG&E patrols its gas transmission pipelines at least quarterly to look for indications of missing pipeline markers, construction activity and other factors that may threaten the pipeline. Line 109 through the neighborhood was last patrolled in February 2018 and everything was found to be normal.

Leak Surveys: PG&E conducts leak surveys at least annually of its natural gas transmission pipelines. Leak surveys are generally conducted by a leak surveyor walking above the pipeline with leak detection instruments. Line 109 was last leak surveyed in October 2017 and no leaks were found.

Cathodic Protection System Inspections: PG&E utilizes an active cathodic protection (CP) system on its gas transmission and steel distribution pipelines to protect them against corrosion. PG&E inspects its CP systems every two months to ensure they are operating correctly. The CP systems on Line 109 in your area were last inspected in January 2018 and were found to be operating correctly.

Integrity Assessments: There are three federally-approved methods to complete a transmission pipeline integrity management baseline assessment: In-Line Inspections (ILI), External Corrosion Direct Assessment (ECDA) and Pressure Testing. An In-Line Inspection involves a tool (commonly known as a "pig") being inserted into the pipeline to identify any areas of concern such as potential metal loss (corrosion) or geometric abnormalities (dents) in the pipeline. An ECDA involves an indirect, above-ground electrical survey to detect coating defects and the level of cathodic protection. Excavations are performed to do a direct examination of the pipe in areas of concern as required by federal regulations. Pressure testing is a strength test normally conducted using water, which is also referred to as a hydrostatic test.

PG&E performed an ECDA on Line 109 in this area in 2016 and no issues were found. PG&E plans to perform the next ECDA on L-109 in this area in 2023. PG&E also performed an ICDA (Internal Corrosion Direct Assessment) on L-109 near 3516 and 3526 Folsom Street in 2016, and no issues were found.

Unfortunately, PG&E cannot provide the documentation from these inspections because they contain confidential information that PG&E only provides to its regulators.

Feel free to contact me if there are any questions or concerns with the above information.

Sincerely,

Jon E. Freedman
Gas Transmission Pipeline Engineer
Pacific Gas and Electric Company
408-282-7128 office
925-979-8038 mobile

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Acoustics • Air Quality
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www.illingworthrodkin.com *illro@illingworthrodkin.com*

M E M O

Date: March 24, 2017

To: Fabien Lannoye
Bluorange Designs
241 Amber Drive
San Francisco, CA 94131

From: Paul R. Donavan, Sc.D.
Illingworth & Rodkin, Inc.
1 Willowbrook Court, Suite 120
Petaluma, CA 94954

Subject: Construction Vibration Evaluation for 3516 and 3526 Folsom Street

An evaluation was completed of the potential for vibration levels from the residential building construction project at 3516 and 3526 Folsom Street of effecting a buried PG&E gas line located about 13 feet from the nearest outside perimeter of the buildings. The approximate locations of the residences are shown in Figure 1.

Figure 1: Aerial view of the site of the proposed residential buildings

Three aspects of this project were considered: the excavation of the sites for the purpose of developing a proper foundation for the buildings, digging trenches for utilities to the residences, and extension of Folsom Street for access to the residences. A plan view of the project is provided in Figure 2.

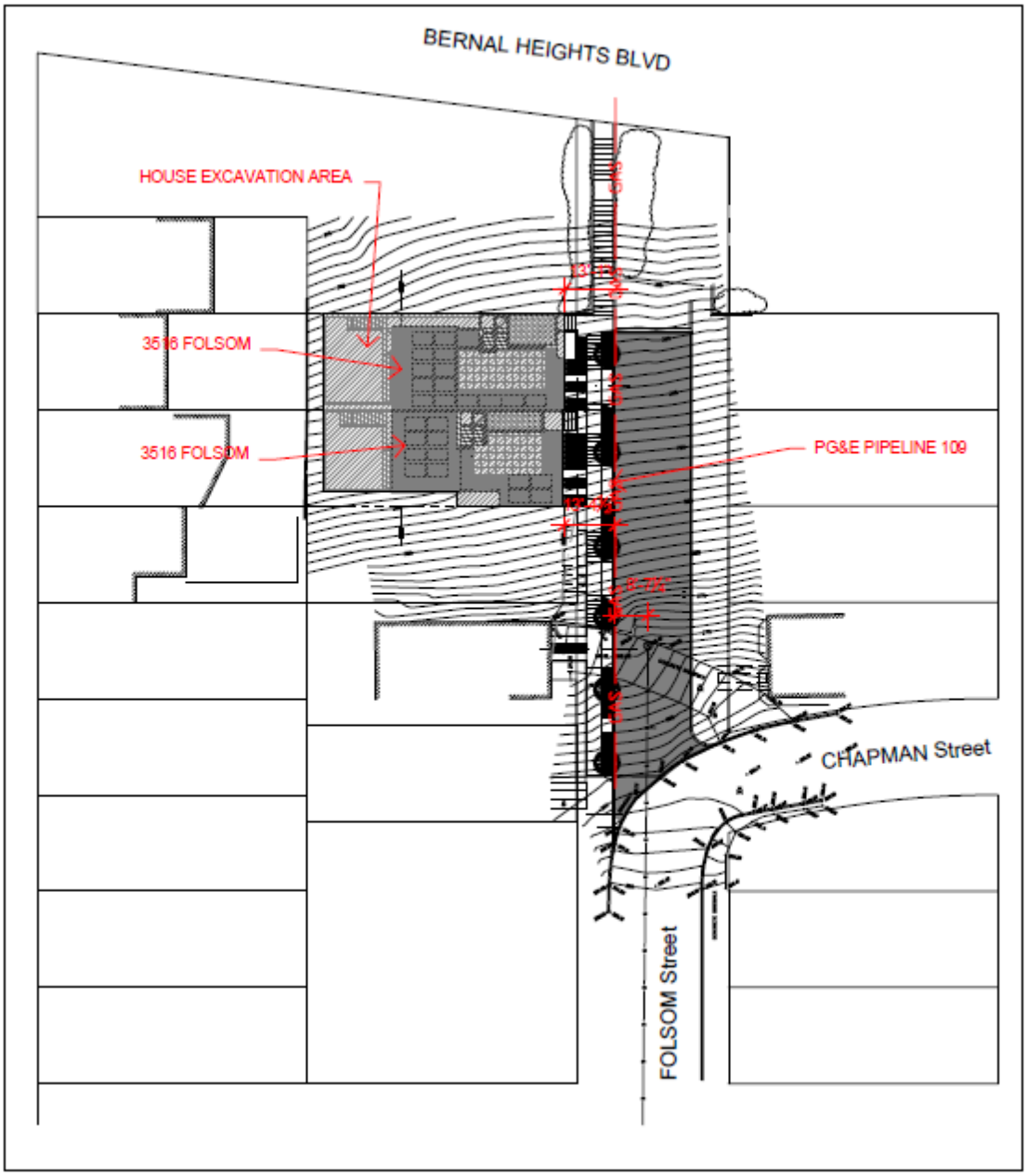

Figure 2: Plan view of the proposed Project with the location of the PG&E pipeline indicated

For the foundations, activity would involve the excavation and the installation of a 12-inch to 18-inch thick concrete slab, with a potential of drilling holes for piers. If needed, compaction of the site would be done by hand, and there is potential of hand operated jack hammering being

required. For the utility trenches, excavation would be done at distances no closer than 5 feet from the gas line. For the street extension, top soil up to as much as 12 inches will be removed, and a cement concrete road surface with a thickness of 8 to 10 inches will be installed. For both the foundations and the street extension, the soils from the sites are to be transported out by a conveyor belt to Bernal Heights Boulevard.

In order to estimate the vibration level at the pipe, source vibration levels at reference distances for various types of construction equipment are available from Caltrans[1], the Federal Highway Administration (FHWA)[2], and the Federal Transit Authority (FTA)[3]. However, these resources all refer to the FTA levels which are taken as the standard reference of source levels. In cases where there are no FTA values for equipment, other source levels are obtained from the New Hampshire Department of the Transportation (NHDOT)[4]. In their 2012 report, NHDOT present levels based on their projects, as well as data from others including a Chaco Canyon Project[5] and construction activities at Haleakala National Park in Hawaii[6]. These data are typically provided in in/sec at a reference distance of 25 feet. These levels are summarized in Table 1. For equipment which has more than one value, the average was calculated and shown in the right

Table 1: Peak Particle Velocities at 25 feet for construction equipment in in/s

Type of Equipmnt	Data Source				Average
	FTA[3]	NHDOT[4]	Hawaii[6]	Chaco Canyon[5]	
Vibratory roller	0.21				
Large bulldozer	0.09				
Hoe Ram		0.28	0.12	0.04	0.15
Caisson drilling	0.09				
Loaded trucks	0.08				
Excavator		0.04	0.18		0.11
Jackhammer	0.04				
Backhoe		0.04	0.03		0.03
Small bulldozer	0.003				
Scrapper				0.02	

column of the table. For excavating the foundations and digging utility trenches, the equipment shown in Figure 3 is planned to be used. From Table 1, two PPVs have been reported in the literature covering a wide range of source level. This is not surprising as there is a large range in the size of excavators. The references do not supply details on the excavators used in generating these data. As indicated by Figure 3, the Takeuchi TB175 Excavator planned for this project is relatively small, however to be conservative in the vibration estimate, the maximum value of 0.18 in/s was used in the analysis. Since there is possibility that a hand-held jackhammer could be used in some of foundation work, the value of 0.04 in/s is used from the Federal Transit Authority Guidance[3]. For the grading work for removal of top soil for the Folsom Street extension, the small bulldozer value of 0.003 in/s was used in the estimations. If drilling for piers is required, the value of 0.09 in/s was to estimate the PPV at the gas line.

Figure 3: Photograph of a Takeuchi TB175 Excavator to be used on site

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In order to estimate the vibration at specific distances, the following equation (Eqn 1) is used:

$$PPV_{equip} = PPV_{ref} (25/D)^n \quad (1)$$

where PPV_{equip} is the peak particle velocity of the construction equipment at 25 feet, PPV_{ref} is the calculated velocity at the distance D in feet, and *n* is determined by the soil conditions. There are various recommendations for the value of *n*. These range from 1.5 to 1.1[1]. From the soils report of August 2013, the soil is characterized as "very stiff" and "firm"[7]. Caltrans recommends a value for *n* of 1.1 under these conditions, and this is also the value recommended by NHDOT. However, the FTA uses a value of 1.5[3]. For distances less than the 25 feet reference distance, value of n=1.5 results in higher values of PPV so that this is also the most conservative assumption for distances of concern for the Folsom Street project. It should be noted that the above expression (Eqn 1) is primarily used to estimate vibration values at distances beyond the reference distance of 25 feet. As the distance becomes shorter than 25 feet, the vibration values increase exponentially and are increasingly sensitive to the value of *n*. As a result, the use of Eqn 1, particularly with an *n* value of 1.5, is somewhat questionable, but certainly conservative for distances less than about 10 feet. In practice, Eqn 1 has been used to estimate peak particle velocities at distances as close as 3.3 feet (1 meter)[8].

Using the highest peak particle velocity values from Table 1 discussed above and Eqn 1 with n=1.5, PPVs were estimated for the project. For an excavator, the vibration level 13 feet from the foundation construction was calculated to be 0.48 in/s. For a jackhammer, the vibration levels at 13 feet would be 0.11 in/s. If drilling of piers for the foundation is necessary, the minimum distance would also be 13 feet giving a PPV of 0.24in/s. For the street extension, the vibration velocity for the gas line will vary depending on the location of the grading operation over the width of the street. In the extreme case, this would be directly over the gas line. The gas line,

according to PG&E, is about 2 to 5.6 feet below the existing cover. As the existing soil is removed, the small bulldozer (or the Takeuchi TB175 configured with a blade and no excavator) could be operating at a distance of 1 foot from the gas line. Using Eqn 1 at a distance of 1 foot, the estimated vibration levels would be 0.38 in/s. For vibration concerns, this would be expected to be an upper bound as the vibration cannot physically increase exponentially as projected by Eqn 1. For utility line excavation, the excavator would not be used closer than 5 feet from the pipe for this work. Assuming that Eqn 1 provides an upper bound on estimated PPV, this relationship gives a value of 2.01 in/s at a distance of 5 feet.

The criteria for damage due to vibration cover a wide range in PPV as documented in the Caltrans guidance[1]. These criteria are generally for building damage of varying degrees, type of structure, and whether the source is transient or continuous/frequent intermittent. In the Caltrans guidance, the extreme case is for extremely fragile historic buildings where the threshold for potential damage is a PPV of 0.08 in/s for continuous/frequent intermittent sources. For industrial buildings and bridges, a limiting criterion PPV of 2.0 in/s is suggested[9]. However, these criteria are for the response of aboveground structures, which include their unrestrained vibration that can be amplified by the incoming ground motions[9]. For buried pipe, the response is constrained; that is, the pipe cannot move freely and amplify the ground motions[1]. For these cases, higher levels of PPV can be tolerated compared to structures. PPV values from 25 to 150 in/s have been reported to cause no damage to buried pipe for transient sources[1]. A conservative PPV of criteria between 12.5 and 15 PPV has been developed based on buried pipe exposed to underground blasting. With this information, the West Roxbury Lateral Project in Massachusetts adopted of criterion of 12 in/s[10] for underground gas lines.

Using the fore mentioned described conservative assumption of equipment source levels and propagation rates, the results for this analysis for the Folsom Street project are summarized in Table 2, which identifies the specific operation and estimated PPV at the specified distance. All

Table 2: Calculated peak particle velocities for equipment and operations at the Folsom Street construction site

Equipment & Operation	Minimum Distance to Pipeline, feet	Highest Estimated PPV, in/s
Excavator - Foundation	13	0.48
Jackhammer - Foundation	13	0.11
Drilling – Foundation Piers	13	0.24
Small Bulldozer – Road Construction	1	0.38
Excavator – Utility Trenches	5	2.01

the estimated PPVs are well below the West Roxbury criteria of 12 in/s. The PPVs are essentially at or below the 2.0 in/s criterion for industrial buildings and bridges. It should also be noted that for any construction equipment operations within 10 feet of the gas pipeline, PG&E requires that Gas Transmission Standby Inspector be present during those activities. This would apply to the road construction and work on the utility trenches.

References

[1] Transportation and Construction Vibration Guidance Manual, California Department of Transportation, Report CT-HWANP-RT-13-069.25.3, September, 2013.

[2] FHWA Highway Construction Noise Handbook, Federal Highway Administration, FHWA-HEP-06-015, DOT-VNTSC-FHWA-06-02, NTIS No.PB20006-109012, Final Report, August, 2006.

[3] Transit Noise and Vibration Impact Assessment, Federal Transit Administration, DOT-T-95-16, Office of Planning, Washington, D.C., 2006.

[4] Ground Vibration Emanating from Construction Equipment Final Report, New Hampshire Department of Transportation, Report FHWA-NH-RD-12323W, Concord, New Hampshire, September 2012.

[5] Impacts of Construction Vibrations on Rock Pinnacles and Natural Bridges, General Hitchcock Highway, Tucson, AZ, Ken W. King of Geologic and Geophysical Consulting, Lakewood, CO and Matthew J. DeMarco of Central Federal Lands Highway Division, FHWA, Denver Federal Center, Denver, CO.

[6] Study of Vibrations due to Construction Activities on Haleakala, LeEllen Phelps, Mechanical Engineering Group, Document TN-0113, Revision A, ATST (Advanced Technology Solar Telescope), Appendix Q: Vibration Study, July 8, 2009.

[7] Report Geotechnical Investigation Planned Residence at 3516 Folsom Street, San Francisco, CA, prepared by H. Allen Gruen, Geotechnical Engineer, Oakland, CA, August 2013

[8] H. Amick and M. Gendreau, Construction Vibrations and Their Impact on Vibration-Sensitive Facilities, ASCE Construction Congress 6, Orlando, Florida, February, 2000. Wiss (ref)

[9] Dowding, Charles H., Construction Vibrations, Prentice-Hall, 1996.

[10] Algonquin Incremental Market Project, Analysis of the West Roxbury Crushed Stone Operations on Construction and Operation of the West Roxbury Lateral, Appendix A, prepared for Spectra Energy Partners, L.L.C. by GZA GeoEnvironmental, Inc. Norwood, MA, March 28, 2014

Folsom Street Emergency Response Plan

July 2018

Pre-Construction

- 48 hour notice to PG&E, Elpinike Pappous, Pipeline Engineer, 925-872-1027, prior to commencing any construction
- Schedule 811 to mark all utilities in work area.
- Fence Pipeline area 10' each site. Clearly post notices indicating that no work can be done in defined area without presence of PG&E standby engineer.
- Install protection Fence around Blue Sage area
- Install Vibration monitoring equipment
- Test Vibration monitoring equipment with PG&E.
- Setup pre-construction meeting with DPW and DBI
- 48 hour advance notice of emergency routes within 300 feet from project site
- 48 hour notice of key contact information with Name, Address, Phone and Email information
- Establish an effective communication system between owner, contractor, PG&E
- Establish and post notice of emergency evacuation routes
- Post communication system at project site
- Identify one or more assembly areas where residents and workers can gather in event of an emergency

During Construction within 10' of PG&E Pipeline 109

- PG&E INSPECTOR must be on Standby during all excavation work within 10' of Pipeline
- PG&E Inspector will manage Vibration Monitoring equipment and insure that vibration levels remain below 2ips.
- If Vibration Monitoring Equipment alarm is activated, PG&E Standby Inspector ensures that all construction activity ceases and calls the Pipeline Engineer responsible for the SF area (Elpinike Pappous, 925-872-1027).
- For gas related emergencies such as leaks, call Gas Control @ [redacted]. Gas Control will communicate with SFFD and SFPD as well as other first responders.
- To verify that damage has not occurred, Leak Survey personnel will be deployed to survey the pipeline in the immediate vicinity of the vibration. Response time is a maximum of 2-3 hours and the survey should be completed within the same business day.
- Work can only resume with PG&E authorization.

During Excavation outside of marked 10' area along PG&E Pipeline 109

- PG&E Inspector not required to be on Standby.
- Project Manager will manage Vibration Monitoring equipment and insure that vibration levels remain below 2ips.
- If Vibration Monitoring Equipment alarm is activated, all work needs to stop immediately.
- Person in charge will contact PG&E Pipeline Engineer, Elpinike Pappous, 925-872-1027
- If a gas leak is detected, call Gas Control at [redacted]. Gas Control will communicate with SFFD and SFPD as well as other first responders.

- To verify that damage has not occurred, Leak Survey personnel will be deployed to survey the pipeline in the immediate vicinity of the vibration. Response time is a maximum of 2-3 hours and the survey should be completed within the same business day.
- Work can only resume with PG&E authorization.

Additional Notes:

- Maintain on-site, trained personnel knowledgeable about emergency procedures.
- Comply with all CalOSHA regulations regarding shoring and excavation
- Comply with all City and County regulations regarding shoring and excavation
- Combustible scrap and debris shall be removed at regular intervals during the course of construction
- Smoking shall be prohibited on the jobsite and in the vicinity of operations which constitute a fire hazard and shall be conspicuously posted: "No Smoking or Open Flame."
- The entire storage site shall be kept free from accumulation of unnecessary combustible materials.
- All materials shall be stored, handled, and piled with due regard to their fire characteristics.
- Noncompatible materials, which may create a fire hazard, shall be segregated by a barrier having a fire resistance of at least 1 hour
- Material shall be piled to minimize the spread of fire internally and to permit convenient access for firefighting. Stable piling shall be maintained at all times. Aisle space shall be maintained to safely accommodate the widest vehicle that may be used within the building for firefighting purposes

Leak, Hazard, and Emergency Response

INDICATIONS OF A LEAK

- An odor like rotten eggs or a burnt match
- A loud roaring sound like a jet engine
- A hissing or whistling noise
- Fire coming out of or on top of the ground
- Dirt blowing from a hole in the ground
- An area of frozen ground in the summer
- An unusual area of melted snow in the winter
- An area of dead vegetation
- Bubbling in pools of water

HAZARDS OF A RELEASE

- Highly flammable and easily ignited by heat or sparks
- Will displace oxygen and can cause asphyxiation
- Fire may produce irritating and/or toxic gases
- Vapors may form an explosive mixture with air
- Vapors may cause dizziness or asphyxiation without warning
- Is lighter than air and can migrate into enclosed spaces

EMERGENCY RESPONSE

- Avoid any action that may create a spark
- Do NOT start vehicles, switch lights or hang up phones
- Evacuate the area on foot in an upwind and/or uphill direction
- Alert others to evacuate the area and keep people away
- From a safe location, call Gas Control at [redacted] to report the emergency
- Call PG&E pipeline engineer Elpinike Pappous, 925-872-1027 and report the event
- Wait for emergency responders to arrive
- Do NOT attempt to operate any pipeline valves

NATURAL GAS is a naturally occurring resource formed millions of years ago because of heat and pressure acting on decayed organic material. It is extracted from wells and transported through gathering pipelines to processing facilities. From these facilities, it is transported through transmission pipelines to distribution pipeline systems. The main ingredient in natural gas is methane (approximately 94 percent). Natural gas is odorless, colorless, tasteless and nontoxic in its natural state. An odorant (called mercaptan) is normally added when it is delivered to a distribution system. At ambient temperatures, natural gas remains lighter than air. However, it can be compressed (CNG) under high pressure to make it convenient for use in other applications or liquefied (LNG) under extremely cold temperatures (-260° F) to facilitate transportation.

APPENDIX A
CalOSHA REGULATIONS RE: EXCAVATIONS

§ 1541. General Requirements

(a) Surface encumbrances. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

(b) Subsurface installations.
(1) The approximate location of subsurface installations, such as sewer, telephone, fuel, electric, water lines, or any other subsurface installations that reasonably may be expected to be encountered during excavation work, shall be determined by the excavator prior to opening an excavation.

(A) Excavation shall not commence until:
1. The excavation area has been marked as specified in Government Code Section 4216.2 by the excavator; and 2. The excavator has received a positive response from all known owner/operators of subsurface installations within the boundaries of the proposed project; those responses confirm that the owner/operators have located their installations, and those responses either advise the excavator of those locations or advise the excavator that the owner/operator does not operate a subsurface installation that would be affected by the proposed excavation.

(B) When the excavation is proposed within 10 feet of a high priority subsurface installation, the excavator shall be notified by the facility owner/operator of the existence of the high priority subsurface installation before the legal excavation start date and time in accordance with Government Code Section 4216.2(a), and an onsite meeting involving the excavator and the subsurface installation owner/operator's representative shall be scheduled by the excavator and the owner/operator at a mutually agreed on time to determine the action or activities required to verify the location of such installations. High priority subsurface installations are high pressure natural gas pipelines with normal operating pressures greater than 415 kPA gauge (60 p.s.i.g.), petroleum pipelines, pressurized sewage pipelines, conductors or cables that have a potential to ground of 60,000 volts or more, or hazardous materials pipelines that are potentially hazardous to employees, or the public, if damaged.

(C) Only qualified persons shall perform subsurface installation locating activities, and all such activities shall be performed in accordance with this section and Government Code Sections 4216 through 4216.9. Persons who complete a training program in accordance with the requirements of Section 1509, Injury and Illness Prevention Program (IIPP), that meets the minimum training guidelines and practices of the Common Ground Alliance (CGA) Best Practices, Version 3.0, published March 2006, or the standards of the National Utility Locating Contractors Association (NULCA), Standard 101: Professional Competence Standards for Locating Technicians, 2001, First Edition, which are incorporated by reference, shall be deemed qualified for the purpose of this section.

(D) Employees who are involved in the excavation operation and exposed to excavation operation hazards shall be trained in the excavator notification and excavation practices required by this section and Government Code Sections 4216 through 4216.9.

(2) All Regional Notification Centers as defined by Government Code Section 4216(j) in the area involved and all known owners of subsurface facilities in the area who are not members of a Notification Center

shall be advised of the proposed work at least 2 working days prior to the start of any digging or excavation work. EXCEPTION: Repair work to subsurface facilities done in response to an emergency as defined in Government Code Section 4216(d).

(3) When excavation or boring operations approach the approximate location of subsurface installations, the exact location of the installations shall be determined by safe and acceptable means that will prevent damage to the subsurface installation, as provided by Government Code Section 4216.4.

(4) While the excavation is open, subsurface installations shall be protected, supported, or removed as necessary to safeguard employees.

(5) An excavator discovering or causing damages to a subsurface installation shall immediately notify the facility owner/operator or contact the Regional Notification Center to obtain subsurface installation operator contact information immediately after which the excavator shall notify the facility operator. All breaks, leaks, nicks, dents, gouges, grooves, or other damages to an installation's lines, conduits, coatings or cathodic protection shall be reported to the subsurface installation operator. If damage to a high priority subsurface installation results in the escape of any flammable, toxic, or corrosive gas or liquid or endangers life, health or property, the excavator responsible shall immediately notify 911, or if 911 is unavailable, the appropriate emergency response personnel having jurisdiction. The facility owner/operator shall also be contacted.
Note: The terms excavator and operator as used in Section 1541(b) shall be as defined in Government Code Section 4216(c) and (h) respectively. The term “owner/operator” means an operator as the term “operator” is defined in Government Code Section 4216(h).

(c) Access and egress.
(1) Structural ramps.
(A) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

(B) Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

(C) Structural members used for ramps and runways shall be of uniform thickness.

(D) Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

(E) Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments to the top surface to prevent slipping.

(2) Means of egress from trench excavations.
A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

(d) Exposure to vehicular traffic. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

(e) Exposure to falling loads. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with Section 1591(e), to provide adequate protection for the operator during loading and unloading operations.

(f) Warning system for mobile equipment. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(g) Hazardous atmospheres.
(1) Testing and controls. In addition to the requirements set forth in the Construction Safety Orders and the General Industry Safety Orders to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:
(A) Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth.

(B) Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation.

(C) Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

(D) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

(2) Emergency rescue equipment.
(A) Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

(B) Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

(3) Whenever internal combustion engine-driven equipment is operated inside a shaft subject to Section 1542 of these Orders, a ventilation system shall be provided and operated in accordance with Sections 1530 and 1533(b) of these Orders.
Note: For shafts greater than 20 feet in depth and excavations unrelated to the Construction Safety Orders, refer to Title 8, Division 1, Chapter 4, Subchapter 20, the Tunnel Safety Orders.

(h) Protection from hazards associated with water accumulation.
(1) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

(2) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.
(3) If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with Sections 1541 (h)(1) and (h)(2).

(i) Stability of adjacent structures.
(1) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

(2) Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:
(A) A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or
(B) The excavation is in stable rock; or
(C) A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

(3) Sidewalks, pavements and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

(j) Protection of employees from loose rock or soil.
(1) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

(2) Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

(k) Inspection.

(1) Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rain storm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(2) Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

(l) Fall protection.
(1) Where employees or equipment are required or permitted to cross over excavations over 6-feet in depth and wider than 30 inches, walkways or bridges with standard guardrails shall be provided.

(2) Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and other similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code; and Section 4216, Government Code

ATTACHMENT D

Subject:	RE: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence
Date:	Friday, September 4, 2020 at 4:30:05 PM Pacific Daylight Time
From:	Cowsert, Christine
To:	Pollak, Josh (CPC)
CC:	Beinart, Amy (BOS)
Attachments:	image001.png, image002.jpg, Index 14209-01_PG&E Gas Transmission Review - Folsom St. SF_20170330.pdf, Index 14209-01_PIPA-Report-Final-20101117.pdf, spv9-1lettertowescrail 2.pdf

Hi Josh:

My apologies for the delay. Here is the additional information you requested – please let me know if you need anything else.

I also wanted to pass along a letter we received from one of the customers that has reached out to PG&E related to this project. They have contracted with an engineer who provided this response to the information we have provided to the customer in the past. We will be providing a detailed response to this letter and will keep you posted on the information we provide.

Have a wonderful long weekend!

Thanks,
Christine
****

QUESTION 14209.01: If the presence of this tree for some time nearby the pipeline could have impeded the integrity of the pipeline.

RESPONSE 14209.01: Trees located too close to gas transmission pipelines can delay emergency response and tree roots can damage pipeline coating. Damaged pipeline coating can lead to external corrosion in some circumstances. PG&E's Transmission Integrity Management Program (TIMP) assesses for external corrosion in accordance with published standards, PHMSA and CPUC requirements. PG&E gas pipeline L-109 had a strength test conducted in November 2016, which is a valid external corrosion assessment method, and no leaks or failures were detected. Based on the presence of the tree at the site during the 2016 strength test, it can be concluded that any hypothetical coating damage caused by the tree roots had not resulted in any unsafe external corrosion.

Please see attachment "*Index 14209-01_PG&E Gas Transmission Review - Folsom St. SF_20170330.pdf*" for a copy of the letter PG&E provided to the City of San Francisco Planning Department on March 30, 2017, which outlined PG&E's tree removal practices (page 1, #4). PG&E's Community Pipeline Safety Initiative (CPSI) program assessed the pine tree located at the L-109 site and removed it in 2018 because the tree was not compliant with established PG&E procedure stated in the letter to the planning department. Please note, tree stumps and roots are generally not removed unless necessary. When it is necessary to remove stumps, PG&E follows rigorous excavation safety guidelines.

Please see attachment "*Index 14209-01_PIPA-Report-Final-20101117.pdf*" which further outlines factors for tree removals.

QUESTION 14209.02: if its removal in 2018 does not appear to fit PG&E standard requirements and/or could somehow affect the future integrity of the pipeline.

RESPONSE 14209.02: Please see Response 14209.01.

QUESTION 14209.03: I am also unaware of the specific reference to a PG&E spokesperson in the email below so if you are able to provide any context for that it would also be very helpful.

RESPONSE 14209.03: PG&E is unable to confirm the reference to the PG&E spokesperson mentioned in the customer's email. However, PG&E previously provided a response to an inquiry from Bernal Heights residents regarding pipeline safety, including the inspection and monitoring activities of L-109 in location, in December 2016. PG&E also provided the developer with the review letter referenced in Response 14209.01 in March 2017.

From: Pollak, Josh (CPC) <josh.pollak@sfgov.org>
Sent: Friday, September 4, 2020 4:04 PM
To: Cowsert, Christine <ECCa@pge.com>
Cc: Beinart, Amy (BOS) <amy.beinart@sfgov.org>
Subject: Re: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence

Hi Christine,

Hope you're doing well. I wanted to check in about the additional information requested related to the tree removal… do you think that it might be available at some point early next week? We're trying to get everything lined up before the upcoming hearing.

Thanks much and have a great long weekend,

Josh

Josh Pollak, AICP
Senior Environmental Planner
San Francisco Planning
PLEASE NOTE MY NEW ADDRESS AND PHONE NUMBER AS OF AUGUST 17:
49 South Van Ness Avenue, Suite 1400, San Francisco, CA 94103
Direct: 628.652.7493 | www.sfplanning.org
San Francisco Property Information Map
Email: josh.pollak@sfgov.org

From: "Pollak, Josh (CPC)" <josh.pollak@sfgov.org>
Date: Friday, August 28, 2020 at 3:28 PM
To: "Cowsert, Christine" <ECCa@pge.com>
Cc: "Beinart, Amy (BOS)" <amy.beinart@sfgov.org>
Subject: Re: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence

Hi Christine,

So the hearing will be officially continued to September 15, so we have more time. If you are able to collect the information by the end of next week or early the following week if possible that would be helpful so we have adequate time to review.

Thanks very much!
-Josh

Josh Pollak, AICP
Senior Environmental Planner
San Francisco Planning
PLEASE NOTE MY NEW ADDRESS AND PHONE NUMBER AS OF AUGUST 17:
49 South Van Ness Avenue, Suite 1400, San Francisco, CA 94103
Direct: 628.652.7493 | www.sfplanning.org
San Francisco Property Information Map
Email: josh.pollak@sfgov.org

Due to COVID-19, San Francisco Planning is not providing any in-person services, but we are operating remotely. Our staff are available by e-mail, and the Planning and Historic Preservation Commissions are convening remotely. The public is encouraged to participate. Find more information on our services here.

From: "Cowsert, Christine" <ECCa@pge.com>
Date: Friday, August 28, 2020 at 12:10 PM
To: "Pollak, Josh (CPC)" <josh.pollak@sfgov.org>
Cc: "Beinart, Amy (BOS)" <amy.beinart@sfgov.org>
Subject: RE: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence

Thanks Josh. We will work to get this information pulled together as soon as possible, but if you could keep me posted on the timing of the hearing, that would be very helpful.

Have a great weekend!

Christine

_____

Christine Cowsert
Asset Management and System Operations
Pacific Gas and Electric Company
christine.cowsert@pge.com
415-238-0874

From: Pollak, Josh (CPC) <josh.pollak@sfgov.org>
Sent: Friday, August 28, 2020 11:54 AM
To: Cowsert, Christine <ECCa@pge.com>
Cc: Beinart, Amy (BOS) <amy.beinart@sfgov.org>
Subject: Re: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence

HI Christine,

There is a small chance that we will have a hearing this upcoming Tuesday, but we are now awaiting additional information from the Fire Department related to the project so it seems more likely that we would instead be having the hearing on September 15, so there might be more time. Thanks again for your responsiveness on this project, it's much appreciated and has been very helpful!

Have a good weekend,
Josh

Josh Pollak, AICP
Senior Environmental Planner
San Francisco Planning
PLEASE NOTE MY NEW ADDRESS AND PHONE NUMBER AS OF AUGUST 17:
49 South Van Ness Avenue, Suite 1400, San Francisco, CA 94103
Direct: 628.652.7493 | www.sfplanning.org
San Francisco Property Information Map
Email: josh.pollak@sfgov.org

Due to COVID-19, San Francisco Planning is not providing any in-person services, but we are operating remotely. Our staff are available by e-mail, and the Planning and Historic Preservation Commissions are convening remotely. The public is encouraged to participate. Find more information on our services here.

From: "Cowsert, Christine" <ECCa@pge.com>
Date: Friday, August 28, 2020 at 11:04 AM
To: "Pollak, Josh (CPC)" <josh.pollak@sfgov.org>
Cc: "Beinart, Amy (BOS)" <amy.beinart@sfgov.org>
Subject: RE: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence

Hi Josh:

I will follow up on the questions you pose below and get back to you ASAP. Do you have a timeframe by which you need a response?

Thanks,
Christine

_____

Christine Cowsert
Asset Management and System Operations
Pacific Gas and Electric Company
christine.cowsert@pge.com
415-238-0874

From: Pollak, Josh (CPC) <josh.pollak@sfgov.org>
Sent: Friday, August 28, 2020 10:48 AM
To: Cowsert, Christine <ECCa@pge.com>
Cc: Beinart, Amy (BOS) <amy.beinart@sfgov.org>
Subject: FW: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence

Hi Christine,

We received an assertion by one of the project appellants of the 3516-3526 Folsom Street project relating to PG&E Pipeline 109 and I'm hoping you or your staff may be of assistance. The concern in the email below is related to a tree removal that occurred adjacent to pipeline 109 nearby the project area in early 2018.

From looking at Google Street view it appears the tree was west of an existing tree somewhere near the pipeline alignment. I've attached a before/after view from Folsom looking north to Bernal Heights Blvd, and Bernal Heights Blvd looking south along the Folsom Street. My reading of the general PG&E safety requirements from the material you provided, specifically from the March 30, 2017 memo, says that removal of trees are acceptable, given that stumps are not removed.

I don't believe that the presence of the root system from the tree would impact the multiple safety evaluations and leak detections that have occurred by PG&E staff of this section of pipeline, but I wanted to ask if 1) if the presence of this tree for some time nearby the pipeline could have impeded the integrity of the pipeline and 2) if its removal in 2018 does not appear to fit PG&E standard requirements and/or could somehow affect the future integrity of the pipeline. I am also unaware of the specific reference to a PG&E spokesperson in the email below so if you are able to provide any context for that it would also be very helpful.

Thanks for your help,
Josh

Josh Pollak, AICP
Senior Environmental Planner
San Francisco Planning
PLEASE NOTE MY NEW ADDRESS AND PHONE NUMBER AS OF AUGUST 17:
49 South Van Ness Avenue, Suite 1400, San Francisco, CA 94103
Direct: 628.652.7493 | www.sfplanning.org
San Francisco Property Information Map
Email: josh.pollak@sfgov.org

From: "Beinart, Amy (BOS)" <amy.beinart@sfgov.org>
Date: Thursday, August 27, 2020 at 4:37 PM
To: Marilyn Waterman <yaviene@yahoo.com>, "Ronen, Hillary" <hillary.ronen@sfgov.org>, "Pollak, Josh (CPC)" <josh.pollak@sfgov.org>
Cc: "kathyangus@gmail.com" <kathyangus@gmail.com>, Barbara Underberg <bjunderberg@yahoo.com>, Herb Felsenfeld <herbfelsenfeld@gmail.com>
Subject: Re: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence

Thank you, Marilyn. We take the safety concerns seriously. I am cc'ing Josh Pollak from Planning to be sure this gets into the record.
Amy

<<<<<<<<<<<>>>>>>>>>>>
Amy Beinart| Legislative Aide/Chief of Staff
Office of Supervisor Hillary Ronen
415.554.7739 | amy.beinart@sfgov.org
https://sfbos.org/supervisor-ronen-district-9

From: Marilyn Waterman <yaviene@yahoo.com>
Sent: Thursday, August 27, 2020 4:01:42 PM
To: Ronen, Hillary <hillary.ronen@sfgov.org>; Beinart, Amy (BOS) <amy.beinart@sfgov.org>
Cc: kathyangus@gmail.com <kathyangus@gmail.com>; Barbara Underberg <bjunderberg@yahoo.com>; Herb Felsenfeld <herbfelsenfeld@gmail.com>
Subject: Two Pictures, One Potential Disaster: Bernal's Pipeline 109 and PG&E's Deadly Negligence

Dear Supervisor Ronen (cc Amy Beinart),

First**, thank you for all the work you have been doing on the budget**. We know it is totally time-consuming. And thank you for the time and effort you are giving our concerns. We are deeply appreciative.

* * * * * *

Below are **two pics** that illustrate one example (among many) why we don't trust PG&E - nor the Planning Department's **flawed approval of a dangerous construction project on Upper Folsom Street.**

Photo #1: This first picture is published by PG&E to show how critical it is to **protect pipelines from tree root damage**.

From PG&E's "Tree Root Interference Assessment Report," January 14, 2014

Photo #2: This shows the 30' pine tree that **grew for years directly over Pipeline 109** *adjacent to the proposed Folsom Street project site* **- despite PG&E's claim it regularly patrolled to prevent such dangerous encroachments**. The pix was taken on the day it was cut down in 2018. **The stump and tree roots remain** because, according to a PG&E spokesperson, **it is too dangerous to remove them.**

The pics demonstrate why **the omission of this section** of the Pipeline 109 **from any safety assessments is unacceptable**. This section is identified by pipeline experts as vulnerable to excavation vibration damage by this project - potentially causing a catastrophic gas accident.

This intentional omission is one example of a **highly flawed mitigation plan by the Planning Department.** It is also an example of Planning's strategy of omitting problematic data from proper analysis. It is incredulous anyone would sign off on it.

We urge you to **rescind the RFMND and require a full EIR**. Such **dangerous and repeated cat and mouse games** by the Planning Department, PG&E, and the developers are unacceptable.

Sincerely,
Marilyn Waterman
on behalf of concerned Bernal neighbors

Pacific Gas and Electric Company®

Date: MARCH 30, 2017

To: JOY NAVARRETE – SAN FRANCISCO PLANNING DEPARTMENT

From: PG&E GAS TRANSMISSION PIPELINE SERVICES – INTEGRITY MANAGEMENT

Subject: 3516/3526 FOLSOM ST.

Dear Joy,

Thank you for making us aware that you plan to do grading work near the PG&E gas transmission pipeline located near 3516 and 3526 Folsom St. As you are aware, it has been confirmed that an active 26" PG&E gas transmission pipeline L-109 is routed through this location. It is imperative that any proposed demolition or construction work not impair the safety of the gas lines. This not only includes any immediate safety risk to the pipeline during demolition or construction activities, but also long-term public safety with respect to this critical piece of infrastructure. PG&E requires adequate access at all times to patrol, survey, excavate, inspect, test, and otherwise maintain the pipeline(s) on a continuous basis in accordance with PG&E Utility Standard TD-4490S "Gas Pipeline Rights-of-Way Management."

Please be aware that this letter is being sent to address PG&E gas transmission facilities only. This letter is not intended to address PG&E gas distribution or PG&E electric facilities.

If any changes are made to the site plans as discussed via previous email, PG&E will need to re-evaluate before site development begins. Considering any comments/feedback we may have, an ideal time to send us any plan changes would be during the design phase of the project, to allow the possibility of modifying the design as necessary before launching into the construction phase.

1. Standby Inspection: **A PG&E Gas Transmission Standby Inspector must be present during any demolition or construction activity within 10 feet of the gas pipeline(s).** This includes all grading, trenching, gas line depth verifications (potholes), asphalt or concrete demolition/removal, removal of trees, signs, light poles, etc. This inspection can be coordinated through the Underground Service Alert (USA) service at **811 or 1-800-227-2600**. A minimum notice of 48 hours is required. This is absolutely required for your grading project.

2. Grading/Excavation: PG&E requires a minimum of existing grade or 36 inches of cover over gas lines (whichever is less), and a maximum of 7 feet cover. Current records show that the depth of cover (top of grade to top of pipe) could be as shallow as 24", however potholing would be required to confirm this. Any excavations, including grading work, above or around the gas transmission facilities must be performed while a PG&E inspector is present. This includes all laterals, subgrades, gas line depth verifications (potholes), etc. Please follow PG&E Work Procedure TD-4412P-05 "*Excavation Procedures for Damage Prevention*" when working in the vicinity of the gas transmission pipeline. Any plans to expose and support a PG&E gas transmission pipeline across an open excavation need to be approved by PG&E Pipeline Engineering in writing **PRIOR** to performing the work. **Any grading or digging within 2 feet of a gas pipeline must be dug by hand.** Water jetting to assist vacuum excavating must be limited to 125 psig.

3. Pipeline Markers: PG&E requires pipeline markers be placed along the pipeline route in order to ensure public awareness of the presence of the pipeline. Any existing markers can be temporarily relocated to accommodate construction work (with written PG&E approval), however markers must be reinstalled once construction is complete. It is unknown at this time how accurate the pipeline marker locations are at this specific site. As stated above, please coordinate an inspection through the Underground Service Alert (USA) service at **811 or 1-800-227-2600**.

4. Landscaping: Trees or deep rooted shrubs shall not be located within 10 feet of edge of pipe (pipe zone). Trees less than 12 inches in diameter with non-intrusive root structures can be placed outside of the 10 foot pipe zone. This is in accordance with PG&E Utility Standard TD-4490S "Gas Pipeline Rights-of-Way Management" Section 2. Removal of trees is acceptable, given the stumps are not removed. If stumps/roots are being removed, further evaluation will be required to ensure that removal will not interfere with the pipelines.

5. Fencing: Care must be taken to ensure the safety and accessibility of the pipelines. No parallel fencing will be allowed within 10 ft. of the pipeline, and any perpendicular fencing will require 14 foot wide access gates to be secured with PG&E corporation locks.

6. Structures: Permanent structures must be located a minimum distance of 10 ft. from edge of pipe. Additionally, for pipeline maintenance, future construction, emergency response provisions, etc., we need a total width of 45 ft. to access the location. Do not stockpile or store demolition/construction material or equipment within this distance. PG&E cannot compromise on the ability to safely access, operate and maintain our facilities, especially when considering emergency situations.

7. Construction Loading: Please refer to chart below for approved construction loading as applicable to this project. To prevent damage to the buried gas pipelines, there are weight limits that must be enforced whenever any equipment gets within 10 feet of traversing a pipeline. Due to the weight variability of tracked equipment, cranes, vibratory compactors, etc., **do not allow any construction equipment within 10 ft. of the gas pipeline(s) without approval from the PG&E gas transmission pipeline engineer.** Wheel loading calculations will need to be determined, and the pipeline may need to be potholed by hand in a few areas to confirm the depth of the existing cover. These weight limits also depend on the support provided by the pipeline's internal gas pressure. If PG&E's operating conditions require the pipeline to be depressurized, maximum wheel loads over the pipeline will need to be further limited. For compaction, please use walk-behind compaction equipment if within 2 feet of the pipeline. Crane and backhoe outriggers must be set at least 10 feet from the centerline of the gas pipeline. **Specific to this project, please ensure max PPV vibration levels are less than 2in/sec.**

   Referencing the chart below, for wheeled equipment only (excludes tracked equipment and vibratory rollers), for a depth of cover of 2ft over top of the 26" pipeline, the pipe may be subjected to a maximum half-axle wheel load of 4580 lbs. **Specific to this project, the 17,500 lb Takeuchi TB175 excavator and 8,000 lb Bobcat Excavator are approved for use.** If any equipment is planned to be operated within 10 ft. of the pipeline that exceeds the half-axel weight specified below, please contact the gas transmission pipeline engineer for approval. Half axle weight is the gross weight upon any one wheel, or wheels, supporting one end of an axle.

Depth of Cover (ft. to Top of Pipe)	Max. Half-Axle Wheel Loading (lbs.)
2	4580
3	6843
4	7775
5	7318

Feel free to contact me if there are any questions or concerns.

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Pipelines and Informed Planning Alliance

PIPA-info.com

Partnering to Further Enhance Pipeline Safety In Communities Through Risk-Informed Land Use Planning

Final Report of Recommended Practices

November 2010

The Pipelines and Informed Planning Alliance is sponsored by the United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety.

The initial PIPA effort was conducted by approximately 130 stakeholder participants representing a wide range of interests, organizations, and viewpoints on pipelines and community planning. Appendix A of this report lists the initial PIPA participants.

Our thanks go out to all of the PIPA participants and the many other unidentified individuals who may have supported the PIPA effort in one way or another.

Cycla Corporation supported the initial PIPA effort and provided assistance in preparing this report and integrating it into PHMSA's Stakeholder Communications website.

The PIPA logo was created by Sven Upsons and provided courtesy of The Danielle Dawn Smalley Foundation, Inc., Crandall, Texas.

PIPA information may be found online at PIPA-Info.com.

PREFACE

Over the past 70 years, a nationwide system of gathering, transmission, and distribution pipelines has been constructed to transport almost 100 percent of the natural gas and about 66 percent of the ton-miles of oil and refined petroleum products consumed in the United States. Many portions of the transmission pipelines were originally constructed in sparsely populated areas; subsequent growth has transformed some of these previously rural and sometimes remote areas into urban and suburban areas with housing subdivisions, shopping centers, and business parks.

The goal of the Pipelines and Informed Planning Alliance (PIPA) is to reduce risks and improve the safety of affected communities and transmission pipelines through implementation of recommended practices related to risk-informed land use near transmission pipelines. The PIPA recommended practices describe actions that can be taken by key stakeholders relative to proposed changes in land use or new development adjacent to existing transmission pipelines. Local governments, property developers/owners, transmission pipeline operators, and state real estate commissions have key roles to enhance pipeline safety and ensure the protection of people, the environment and the pipeline infrastructure.

To address increasing trends of excavation damage to pipelines and to fulfill the requirements of the Transportation Equity Act for the 21st Century, the US Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) undertook a study of damage prevention practices associated with existing one-call notification systems. In 1999, PHMSA published the landmark Common Ground Study of One-call Systems and Damage Prevention Best Practices. Building on the success of the Common Ground Study, PHMSA facilitated the founding of the Common Ground Alliance to provide stewardship to help ensure acceptance and implementation of the Damage Prevention Best Practices across the country.

To further address the impact of community growth on pipeline safety, and the requirements of the Pipeline Safety Improvement Act of 2002, the Transportation Research Board (TRB) of the National Academies conducted a comprehensive study of pipeline safety and land use practices to better understand land use planning issues. The results, published in 2004 as TRB Special Report 281, "Transmission Pipelines and Land Use: A Risk-Informed Approach," included several recommendations for PHMSA. To address these recommendations, in August 2007 PHMSA facilitated the establishment of the Pipelines and Informed Planning Alliance.

Approximately 130 stakeholder participants undertook the work to develop the PIPA recommended practices. The initial PIPA effort has resulted in recommended practices for local governments, property developers and owners, transmission pipeline operators, and real estate boards to be aware of and to implement as appropriate. PHMSA plans to continue working with stakeholders to ensure that a sound implementation strategy is developed and that the PIPA recommended practices are communicated to and understood by those that need to adopt them.

GLOSSARY

Terms in the PIPA Report that may be unfamiliar to the reader are included in this Glossary. Some, such as "right-of-way," may be legal terms that normally have a specific meaning differing from their lay usage. Other terms may be defined strictly in accordance with their usage in the context of the PIPA Report.

Sources for the terms in this glossary include:

- PIPA participants
- Common Ground Alliance Best Practices, v6.0
- Transportation Research Board (TRB) Special Report 281, "Transmission Pipelines and Land Use: A Risk-Informed Approach"
- Washington Utilities and Transportation Commission (WUTC), Report: "Land Use Planning In Proximity to Natural Gas and Hazardous Liquid Transmission Pipelines in Washington State; Appendix D: Pipeline Typology and Glossary"
- Federal pipeline safety regulations, 49CFR Parts 190 – 199

Abandoned Pipeline – A transmission pipeline that has been permanently removed from service and left in place.

As-built Drawing – A detailed drawing or set of drawings depicting the actual configuration of installed or constructed facilities.

Backfill – The act of filling in the void in a utility ditch that was created by excavating, usually by replacing the soils that were removed. Also, the material used to fill the ditch.

Building Setback – See "Setback"

Cathodic Protection – The process of arresting corrosion on a buried or submerged metallic structure, by electrically reversing the natural chemical reaction. This includes, but is not limited to, installation of a sacrificial anode bed, use of a rectifier based system, or any combination of these or other similar systems. Wiring is installed between the buried or submerged structure and all anodes and rectifiers. Wiring is also installed to test stations which are used to measure the effectiveness of the cathodic protection system.

Consultation Zone – *Reference Recommended Practice BL05.* An area extending from each side of a transmission pipeline, the distance of which should be defined by local governments, to describe when a property developer/owner, who is planning new property development in the vicinity of an existing transmission pipeline, should initiate a dialogue with a transmission pipeline operator.

Damage – Any impact or exposure that results in the need to repair an underground facility due to a weakening or the partial or complete destruction of the facility, including, but not limited to, the protective coating, lateral support, cathodic protection or the housing for the line, device or facility.

Demolition – The partial or complete destruction by any means of a structure served by, or adjacent, to an underground line or facility.

Designer – Any architect, engineer or other person who prepares or issues a drawing or blueprint for a construction or other project that requires excavation or demolition work.

Developer – An individual or group of individuals who apply for permits to alter, construct and install buildings or improvements or change the grade on a specific piece of property.

Distribution Pipeline – A natural gas pipeline other than a gathering or transmission line (reference 49 CFR 192.3). A distribution pipeline is generally used to supply natural gas to the consumer and is found in a network of piping located downstream of a natural gas transmission line.

Easement – (1) A legal instrument giving a transmission pipeline operator a temporary or permanent right to use a right-of-way for the construction, operation, and maintenance of a pipeline. It may also include temporary permits, licenses, and other agreements allowing the use of one's property. (2) An easement is an acquired privilege or right, such as a right-of-way, afforded a person or company to make limited use of another person or company's real property. For example, the municipal water company may have an easement across your property for the purpose of installing and maintaining a water line. Similarly, oil and natural gas pipeline companies acquire easements from property owners to establish rights-of-way for construction, maintenance and operation of their pipelines. (3) A legal right, acquired from a property owner, to use a strip of land for installation, operation and maintenance of a transmission pipeline.

Emergency Preparedness – The act or state of being prepared to respond to and handle a pipeline emergency. Pipeline operators are required to have emergency preparedness programs, plans, and procedures in place to implement during pipeline emergencies.

Emergency Response – The actual response taken to address an emergency. The response to a pipeline emergency should be consistent with the pipeline operator's and other emergency responders' programs, plans, and procedures.

Encroachment – (1) A human activity, structure, facility, or other physical improvement that intrudes onto a transmission pipeline right-of-way. (2) Encroachment refers to the unauthorized use of a right-of-way in violation of the easement terms.

Excavation – Any operation using non-mechanical or mechanical equipment or explosives in the movement of earth, rock or other material below existing grade. This includes, but is not limited to, augering, blasting, boring, digging, ditching, dredging, drilling, driving-in, grading, plowing-in, pulling-in, ripping, scraping, trenching, and tunneling.

Excavator – Any person proposing to, or engaging in, excavation or demolition work for himself or for another person.

Facility Operator – Any person, utility, municipality, authority, political subdivision or other person or entity who operates or controls the operation of an underground line/facility.

Facility – A buried or aboveground conductor, pipe, or structure used to provide utility services, such as electricity, natural gas, liquids refined from oil, oil, telecommunications, water, sewerage, or storm water.

Feather Cut - A method to trim trees to create a natural looking profile. (Also see Hard Cut.)

Gas – Natural gas, flammable gas, or gas which is toxic or corrosive. (Reference 49 CFR 192.3) Gases are normally compared to air in terms of density. The specific gravity of air is 1.0. Any gas with a specific gravity less than 1.0 (such as natural gas) will rise and usually disperse. Any gas having a specific gravity greater than 1.0 will fall and collect near the ground or in low-lying areas such as trenches, vaults, ditches, and bell holes – such occurrences can be hazardous to human health and safety.

Gas Transmission Pipeline – A pipeline, other than a gathering line, that 1) transports gas from a gathering line or storage facility to a distribution center, storage facility, or large-volume customer that is not downstream from a distribution center; 2) operates at a hoop stress of 20 percent or more of specified minimum yield strength; or, 3) transports gas within a storage field. (Reference 49 CFR 192.3) A gas transmission pipeline includes all parts of those physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies.

Geographic Information System (GIS) – An organized collection of computer hardware, software, and geographic data used to capture, store, update, maintain, analyze, and display all forms of geographically referenced information.

Hard Cut - A method to trim trees to create an abrupt, clearly delineated boundary. (Also see Feather Cut.)

Hazardous Liquid – Includes petroleum, petroleum products, anhydrous ammonia, and carbon dioxide. (Reference 49 CFR 195.2)

Hazardous Liquid Pipeline – All parts of a pipeline facility through which a hazardous liquids move in transportation, including, but not limited to, line pipe, valves, and other appurtenances connected to line pipe, pumping units, fabricated assemblies associated with pumping units, metering and delivery stations and fabricated assemblies therein, and breakout tanks.

High Consequence Area – A location that is specially defined in pipeline safety regulations as an area where transmission pipeline releases could have greater consequences to health and safety or the environment. Regulations require a transmission pipeline operator to take specific steps to ensure the integrity of a transmission pipeline for which a release could affect an HCA and, thereby, the protection of the HCA.

High-Priority Subsurface Installation –Sometimes referred to as high-priority underground installation, these include natural gas transmission pipelines operating at a pressure that creates a hoop stress of 20% or more of the steel specified minimum yield strength, hazardous liquid pipelines, high voltage electric supply lines, fiber optic lines, pressurized sewage pipelines, and other hazardous underground installations.

Incident – An unintentional release of product from a transmission pipeline that may or may not result in death, injury, or damage to property or the environment. (Note that as used in pipeline safety regulations, an "incident" is an event occurring on a natural gas pipeline for which the operator must make a report to PHMSA's Office of Pipeline Safety. Events of similar magnitude affecting hazardous liquid pipelines are considered "accidents". (Reference 49 CFR 191.3, 49 CFR 195.50)).

Line pipe – The lengths of pipe comprising the main part of transmission pipeline segments, line pipe is identified as only the pipe, excluding ancillary facilities and structures that are located on company property adjacent to the pipeline ROW.

Locate – The process of determining the existence and location of an underground facility, such as an oil or gas pipeline. Following the locate, the surface of the ground above the underground installation is normally marked through the use of stakes, flags or paint, or in some other customary manner. Such markings identify the location of the underground facility so that excavators can avoid damage to the facility when digging.

Locate Request – A communication between an excavator and one-call center personnel in which a notice of proposed excavation and request for locating underground facilities is processed. The one-call center subsequently passes this information to underground facility owners based on the location of the proposed excavation and underground facility data.

MAOP – See Maximum Allowable Operating Pressure

Mark – To indicate the existence and location of a line or facility by establishing a mark through the use of stakes, paint or some other customary manner.

Maximum Allowable Operating Pressure – The maximum pressure at which a gas transmission pipeline or segment of a pipeline may be operated under federal pipeline safety regulations (29 CFR Part 192).

Mitigation – Actions taken to alleviate, reduce the severity of, or moderate the consequences of failure.

NPMS – National Pipeline Mapping System – a geographic information system (GIS) database that contains the locations and attributes of hazardous liquid and gas transmission pipelines operating in the United States. The NPMS also includes data on the locations of other geographic features throughout the U.S. The NPMS supports queries by the public and local governments to determine if transmission pipelines are located near their communities and to determine areas that could be impacted by releases from these pipelines. The NPMS may be accessed at http://www.npms.phmsa.dot.gov/.

One-call Center – An entity that administers a one-call system through which a person can notify transmission pipeline operators of proposed excavations.

One-call System – A system that enables an excavator to communicate through a one-call center to transmission pipeline operators to provide notification of intent to excavate. The one-call center will gather information about the intended excavation and then issue tickets to notify affected member transmission pipeline operators. The operators can then clear the tickets or locate and mark the location of their pipelines before the excavation begins. Excavators can then take care when excavating to avoid damaging the transmission pipelines. All 50 states within the U.S. are covered by one-call systems. Most states have laws requiring the use of the one-call system at least 48 hours before beginning an excavation.

Ordinance – An authoritative public rule, law or regulation, such as a zoning ordinance, issued by a local community government. A zoning ordinance is a device of land use planning used by local governments to designate permitted uses of land based on mapped zones which separate one set of land uses from

another. Zoning may be use-based (regulating the uses to which land may be put), or it may regulate building height, lot coverage, and similar characteristics, or some combination of these.

Person – Any individual or legal entity, public or private.

Petroleum Products – Flammable, toxic, or corrosive products obtained from distilling and processing of crude oil, unfinished oils, natural gas liquids, blend stocks and other miscellaneous hydrocarbon compounds.

Pipeline – Used broadly, pipeline includes all parts of those physical facilities through which gas, hazardous liquid, or carbon dioxide moves in transportation.

Pipeline Easement – See "Easement"

Pipeline Operator – For natural gas transmission pipelines, a person who engages in the transportation of gas (reference 49 CFR 192.3). For hazardous liquid pipelines, a person who owns or operates pipeline facilities (reference 49 CFR 195.2). Generally, an operator is a company or person responsible for the operation, maintenance and management of the transmission pipeline.

Pipeline Segment – A discrete portion of a transmission pipeline system as defined by the pipeline operator. A pipeline segment usually consists of a length of line pipe and may contain ancillary structures and other appurtenances associated with the pipeline. The end points defining the boundaries of a pipeline segment are usually determined by geographic features (e.g., mile posts) and/or features of the pipeline itself, such as welds, valves, etc.

Planning – An activity at the beginning of a project where information is gathered and decisions are made regarding the route or location of a proposed excavation based on constraints including the locations of existing facilities, anticipated conflicts and the relative costs of relocating existing facilities or more expensive construction for the proposed facility.

Planning Area – *See Recommended Practice BL06.* An area surrounding a transmission pipeline that is defined by ordinance and is based on characteristics of the pipeline and the area surrounding the pipeline. Local governments and property developers/owners should consider implementing a planning area to protect communities where new development is planned near transmission pipelines.

Plat – A map or representation on paper of a piece of land subdivided into lots, with streets, alleys, etc., usually drawn to a scale.

Project – An activity or task (or set of related activities or tasks) that is contemplated, devised, or planned and carried out for the purpose of accomplishing a goal. For example, a communication project could involve a planned set of activities to communicate the PIPA recommended practices to affected stakeholders. Usually thought of as affecting construction, maintenance or development activities, projects that could affect a transmission pipeline could be as simple as the planting of a tree or as complex as multi-million dollar construction projects.

Right-of-way (ROW) – (1) Property, usually consisting of a narrow, unobstructed strip or corridor of land of a specific width, which a pipeline company and the fee simple landowners have legal rights to use and occupy. A ROW is a string of contiguous properties on which easements have been acquired along which

the pipeline operator has rights to construct, operate and maintain a pipeline. (2) A defined strip of land on which an operator has the right to construct, operate and maintain a pipeline. The operator may own a right-of-way outright or an easement may be acquired for specific use of the right-of-way. (Also see Rights-of-way.)

Right-of-way Agreement – See "Easement"

Rights-of-way – See "Right-of-way"

Risk – the product of the probability or likelihood of an undesired event occurring and the consequences that may result from that event.

Risk Informed – Having adequate knowledge of associated risk to be able to make appropriate decisions relative to the risk.

Risk Reduction – Measures taken to minimize the probability or likelihood and/or consequences of risk.

Rural – An area outside the limits of any incorporated or unincorporated city, town, village, or any other designated residential or commercial area such as a subdivision, a business or shopping center, or community development. (Reference 49 CFR 195.2)

Setback – The minimum distance between a pipeline or the edge of a pipeline easement, and a building or other structure. A line established by local government ordinance, within a property, defining the minimum distance between any building or structure or portion thereof to be erected or altered, and an adjacent right-of-way, street or property line. The setback is usually expressed as the minimum distance between the line of demarcation (e.g., a pipeline or the edge of a pipeline easement) and a building or other structure.

Statutory Agency – A governmental agency empowered with the authority to implement and enforce statutory codes and regulations.

Temporary Work Space – An area of land within which certain activities are authorized for a specified purpose and period of time, typically of short duration.

Third-party Damage – Third-party damage includes outside force damage to underground facilities (e.g., transmission pipelines) that can occur during excavation activities and is caused by someone other than the facility operator or its contractors.

Ton-miles – Describes the units of measure to measure the quantity and traffic of transportation used in transportation statistics, planning, and their related fields. A ton-mile is equivalent to moving one ton of freight product one mile.

Transmission Pipeline – When not specified includes both hazardous liquid and gas transmission pipelines. Transmission pipelines carry oil, petroleum products, natural gas, natural gas liquids, anhydrous ammonia and carbon dioxide from producing regions of the country to markets.

Transmission Pipeline Corridor – A pipeline corridor is a linear area where two or more pipelines (either part of the same or different pipeline systems) are closely grouped in a single right-of-way.

Urban – 1) Relating to or concerned with a city or densely populated area (e.g., "urban development"); 2) Located in or characteristic of a city or city life (e.g., "urban property owners").

Vapor Pressure – (also equilibrium vapor pressure) is the pressure of a vapor in thermodynamic equilibrium with its condensed phases in a closed container. Said another way, the vapor pressure of a liquid is the pressure exerted by its vapor when the liquid and vapor are in dynamic equilibrium. All liquids and solids have a tendency to evaporate into a gaseous form, and all gases have a tendency to condense back to their liquid or solid form. The equilibrium vapor pressure is an indication of a liquid's evaporation rate. It relates to the tendency of particles to escape from the liquid (or a solid). A substance with a high vapor pressure at normal temperatures is often referred to as *volatile*.

CONTENTS

EXECUTIVE SUMMARY

The Pipelines and Informed Planning Alliance (PIPA) is a stakeholder initiative led and supported by the US Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA). PIPA's goal is to reduce risks and improve the safety of affected communities and transmission pipelines through implementation of recommended practices related to risk-informed land use and development near transmission pipelines. The PIPA recommended practices describe actions that can be taken by key stakeholders, including local government, transmission pipeline operators, property developers/owners, and real estate commissions.

The landmark Common Ground Study of One-call Systems and Damage Prevention Best Practices identified best practices for all stakeholders to prevent excavation damage to underground facilities. However, land use planning and development near transmission pipelines is not addressed in the Common Ground Best Practices. The PIPA recommended practices fill this gap.

To further address the impact of community growth on pipeline safety, and the requirements of the Pipeline Safety Improvement Act of 2002, a comprehensive study of pipeline safety and land use practices was conducted by the Transportation Research Board (TRB) of the National Academies. The results, published in 2004 as TRB Special Report 281, "Transmission Pipelines and Land Use: A Risk-Informed Approach," included several recommendations for PHMSA. To address those recommendations PHMSA facilitated the establishment of the Pipelines and Informed Planning Alliance.

The initial PIPA effort has resulted in recommended practices for local governments, property developers and owners, transmission pipeline operators, and real estate boards to be aware of and to implement as appropriate. Two key practices address the development and implementation of "consultation zones" and "planning areas" when making decisions regarding land use planning and development near transmission pipelines.

Transmission pipeline failures present risks that may impact people and property beyond the edge of pipeline rights-of-way (ROW). To address these risks, some communities have imposed zoning restrictions, including fixed-distance building setbacks for development along transmission pipeline ROW. Building setbacks are typically used by local governments to provide separation between the community and potential risks, in this case pipelines. However, fixed-distance setbacks commonly don't consider the risks involved with a specific pipeline and the physical environment in which the pipeline operates. Individual transmission pipelines differ in character – some are large-diameter, high-pressure, cross-country pipelines traversing mostly rural areas, while others are located in urban areas and densely-populated urban centers. Transmission pipelines operated within urban areas may be located underneath public streets and roadways in areas that are already well-developed. Federal regulations attempt to mitigate the risk of transmission pipelines located in more densely-populated areas by imposing more stringent requirements. For example, gas transmission pipelines located in heavily populated urban areas are generally required to adhere to additional design, operation, and maintenance requirements. However, each situation is unique relative to the pipeline characteristics and the areas surrounding the pipeline ROW. Thus, PIPA recommends that implementing a risk-informed approach to land use planning and development and establishing good communication with

the transmission pipeline operator is more appropriate than establishing a fixed-distance setback to be applied in all situations.

Consultation zones and planning areas are important, as transmission pipeline failures are classic examples of events of low probability but potentially high consequence, and the consequences may adversely affect the general public. It is important for local governments and other stakeholders to make risk-informed decisions regarding land use planning and development in locations where residences and businesses are increasingly in proximity to transmission pipelines. Local governments should make full use of available resources and communicate with the operators of the transmission pipelines in their communities to better understand the characteristics of the specific pipelines involved and the characteristics of the surrounding areas that can affect risks.

Some communities began adopting some of the PIPA recommended practices prior to the issuance of the PIPA report. After soliciting proposals, PHMSA provided community Technical Assistance Grants (TAG) to four communities to demonstrate and evaluate implementation of some aspects of the draft PIPA recommended practices.

The PIPA recommended practices are not mandated by any public or private entity. However, they were developed by task teams of representative stakeholders who agreed on the practices using a consensus agreement process similar to that used during the Common Ground Study. All stakeholders are encouraged to become aware of and implement the PIPA recommended practices where appropriate.

PHMSA plans to continue working with pipeline safety and land use planning stakeholders to ensure that a sound implementation strategy is developed and that the recommended practices are communicated to and understood by those that need to adopt them. Lessons learned from implementation of these practices are expected to lead to their improvement and expansion. The most current version of this information will be available on PHMSA's Pipeline Safety Stakeholder Communications website.

SCOPE

The recommended practices developed by the Pipelines and Informed Planning Alliance apply to land use planning and development in proximity to hazardous liquid or gas transmission pipelines. Our energy pipeline transportation system also includes networks of production, gathering, and distribution pipelines. However, the PIPA initiative focuses exclusively on transmission pipelines and the PIPA recommended practices are not intended to apply to those production, gathering, and distribution pipeline systems.

Some of the PIPA recommended practices may not be appropriate for consideration in the siting of new pipelines. There is an extensive network of federal and state regulatory and judicial processes involved with the evaluation and approval of new transmission pipeline siting and construction. These are beyond the scope of the PIPA recommended practices. Additionally, the PIPA recommended practices do not specifically address environmental resource conservation issues in pipeline rights-of-way.

The PIPA recommended practices associated with reducing the risks of excavation damage may be applicable to all underground facilities. However, the PIPA recommended practices are considered to complement the damage prevention best practices developed, maintained and promoted by the Common Ground Alliance (CGA) and are not intended to replace or conflict with any of the CGA best practices.

The PIPA recommended practices are not mandated by any public or private entity. However, they were developed by task teams of representative stakeholders using a consensus agreement process and the PIPA participants recommend that all stakeholders become aware of and implement the PIPA recommended practices, as appropriate, to reduce risks and ensure the safety of affected communities and transmission pipelines .

INTRODUCTION

The Pipelines and Informed Planning Alliance is a broad stakeholder initiative led and supported by the US Department of Transportation's Pipeline and Hazardous Materials Safety Administration. The goal of PIPA is to reduce risks and improve the safety of affected communities and transmission pipelines through implementation of recommended practices related to risk-informed land use and development near transmission pipelines. The PIPA recommended practices describe actions that can be taken by stakeholders when there are proposed changes in land use or new development adjacent to existing transmission pipelines.

Over the past 70 years, a nationwide system of gathering, transmission, and distribution pipelines has been constructed to transport almost 100 percent of the natural gas and two-thirds of the ton-miles of oil and refined petroleum products consumed in the United States. The majority of these hazardous liquid and gas commodities are transported via large diameter transmission pipelines as intrastate or interstate commerce. Many portions of the transmission pipelines were originally constructed in sparsely populated areas; however, subsequent growth has transformed some of these previously rural and sometimes remote areas into urban and suburban areas, with housing subdivisions, shopping centers, and business parks. In turn, this widespread growth of new communities has spurred the construction of even more pipelines to meet growing energy needs.

The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in June 1998. To address increasing trends of excavation damage to pipelines and to fulfill the requirements of TEA-21, in 1999 PHMSA sponsored and supported the landmark Common Ground Study of One-call Systems and Damage Prevention Best Practices. The focus of the Common Ground Study was to identify and promote best practices for all stakeholders to prevent excavation damage to underground facilities.

Building on the success of the Common Ground Study, Congress directed PHMSA to support and facilitate the formation of a nonprofit entity to provide stewardship to help ensure acceptance and implementation of the Damage Prevention Best Practices across the country. With continuing stakeholder support, this led to the founding of the Common Ground Alliance (CGA). Today, the CGA continues to refine and promote the Damage Prevention Best Practices, develop educational programs,

and collect excavation damage data. The CGA programs reduce the risk of excavation damage for all types of underground facilities, including gas and hazardous liquid pipelines, electrical and communications systems, water systems, and sewer systems. However, land use planning and development near transmission pipelines are not addressed in the Common Ground best practices. The PIPA recommended practices are intended to fill this gap by providing land use planning guidance to key stakeholders, including local officials, property developers/owners, transmission pipeline operators and real estate commissions.

In 2000 and 2001, PHMSA undertook research and solicited input on how to communicate pipeline risks to communities. PHMSA initiated a cooperative agreement with the Transportation Research Board (TRB) of the National Academies to undertake a comprehensive study of pipeline safety and land use practices, to better understand land use planning issues. The results were published in TRB Special Report 281 "Transmission Pipelines and Land Use: A Risk-Informed Approach" in October 2004, and included several recommendations for PHMSA related to the development of risk-informed land use guidance. Two of those recommendations were for PHMSA to:

(1) Develop risk-informed land use guidance for application by stakeholders and
(2) Develop the guidance through a process that:
    a. involves the collaboration of a full range of public and private stakeholders;
    b. is conducted by persons with expertise in risk analysis, risk communication, land use planning, and development regulation;
    c. is transparent, independent, and peer reviewed; and
    d. incorporates learning and feedback to refine the guidance over time.

It should be noted that the TRB Report also recommended "The transmission pipeline industries should develop best practices for the specification, acquisition, development, and maintenance of pipeline rights-of-way. In so doing, they should work with other stakeholders." (See Appendix G) The third recommendation stated, "With regard to the specific maintenance issue of clearing rights-of-way to allow for inspection, the federal government should develop guidance about appropriate vegetation and environmental management practices that would provide habitat for some species, avoid threats to pipeline integrity, and allow for aerial inspection." The PIPA recommended practices do address vegetation management along the transmission pipeline ROW but do not specifically address environmental resource conservation issues.

To address the TRB recommendations, PHMSA brought together representatives of several stakeholder organizations to form the PIPA Steering Committee in August 2007 (See Appendix A). The PIPA Steering Committee invited organizations representing key stakeholders in land use planning to join traditional pipeline safety stakeholders in an effort to define land use planning practices that could provide safety benefits to communities and to transmission pipelines.

PIPA is a collaborative effort by stakeholder representatives, similar to the Common Ground Study. The initial PIPA effort included about 130 stakeholder representatives of the pipeline industry, local city and county governments, the public, developers, fire marshals, and state and federal regulators (See Appendix A). The participants represented the following organizations:

- American Gas Association (AGA)
- American Land Title Association (ALTA)
- American Public Works Association (APWA)
- Association of Oil Pipelines (AOPL)
- Common Ground Alliance (CGA)
- U. S. Department of Housing and Urban Development (HUD)
- Federal Energy Regulatory Commission (FERC)
- Gas Processors Association (GPA)
- International Right-of-Way Association (IROW)
- Interstate Natural Gas Association of America (INGAA)
- National Association of Counties (NACo)
- National Association of County Planners (NACP)
- National Association of Home Builders (NAHB)
- National Association of Industrial and Office Properties (NAIOP)
- National Association of Local Government Environmental Professionals (NALGEP)
- National Association of Pipeline Safety Representatives (NAPSR)
- National Association of Realtors (NAR)
- National Association of Regulatory Utility Commissioners (NARUC)
- National Association of State Fire Marshals (NASFM)
- National Fire Protection Association (NFPA)
- National League of Cities (NLC)
- US Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA)
- Pipeline Safety Trust (PST)
- Virginia Utility Protection Services (VUPS)

During 2008 and 2009, the three PIPA task teams met numerous times to discuss and develop recommended practices to address the following questions:

- Protecting Communities – What should transmission pipeline safety stakeholders do, or avoid doing, adjacent to the transmission pipeline right-of-way to reduce the risk to communities?
- Protecting Transmission Pipelines – What should transmission pipeline safety stakeholders do, or avoid doing, on the right-of-way to reduce the risk to transmission pipelines while preserving environmental resources?
- Communication – How should the risks to transmission pipelines and communities be communicated among pipeline safety stakeholders?

The task teams followed a process similar to one used in the Common Ground Study in which consensus agreement was needed by all team participants for each recommended practice. Consensus was defined as requiring that each participant must be able to "live with" the team recommendations and decisions, even if not ideal. The process of developing consensus is considered to have increased each participant's appreciation for the legitimate needs and concerns of the other stakeholders.

Approaching the Issues

Changes in land use and new developments near transmission pipelines can create risks to communities and to the pipelines. New development near existing transmission pipeline facilities may also experience noise and odors from these facilities that may lead to dissatisfaction among residents of the new development. Early communication and action among stakeholders can help to ensure these actions can be accomplished safely. The PIPA recommended practices are intended to enhance safety by guiding stakeholder communications and actions early in the planning stages.

Achieving the PIPA goal of reducing risk and improving the safety of affected communities and transmission pipelines can be challenging due to the differing and sometimes conflicting concerns of stakeholders. Property developers/owners are concerned with their options for and the economic feasibility of developing land. Local governments need to adopt development decision-making processes that protect the safety of their residents while encouraging and allowing planned development to occur. Transmission pipeline operators need to protect their pipelines from potential damage by activities on or near the pipeline rights-of-way and to provide unrestricted access for maintenance and emergency response. These and other stakeholders, such as land surveyors, development design professionals, other underground utility operators, real estate professionals, and federal and state pipeline regulators are best served by a decision-making process that is efficient, effective, and not unduly time-consuming or costly.

Fortunately, safety is a common goal for all stakeholders and should be considered when decisions are made that impact life, property, or the environment. When transmission pipelines are located in proximity to where people live, work, shop, or travel, pipeline safety concerns must be incorporated into every level of the decision-making and land development approval process.

The input of the PIPA participants has been gathered and reviewed during the PIPA process. The concepts and examples they discussed evolved into recommended practices to advance the mutual understanding of all stakeholders to transmission pipeline and land use planning issues adjacent to the pipeline right-of-way. When each stakeholder understands the relevant roles, interests, and issues of other stakeholders, fruitful communication, cooperation, and mutually agreeable compromise are achievable.

Demonstration Projects

Some communities began early adoption of some of the PIPA recommended practices prior to the issuance of the PIPA report. After soliciting proposals through a Federal Register Notice (FRN), PHMSA provided community technical assistance grants to four communities to demonstrate and evaluate implementation of some aspects of the draft PIPA recommended practices. The four communities included Brookings County, SD; Montgomery County, VA; City of St. Peters, MO; and the City of Fort Worth, TX.

- Using its TAG grant, Brookings County developed and implemented a revised zoning ordinance for developments near existing transmission pipelines, upgraded its geographic information system (GIS) mapping capabilities to show the location of existing pipelines, and developed an associated safety brochure for the public. The new “Transmission Pipeline Risk Reduction

Overlay District" incorporated into the zoning ordinance utilized recommendations from the PIPA recommend practices. Brookings County enacted new consultation zone and planning zone requirements. Brookings County worked with multiple stakeholders, including two transmission pipeline operators, in establishing the appropriate distances for the consultation and planning zones. A copy of the final report submitted by Brookings County is available at: http://primis.phmsa.dot.gov/tag/PrjHome.rdm?prj=326.

- Montgomery County's project utilized its TAG grant to initiate communication and establish a working relationship with the various pipeline operators within the county. The Montgomery County GIS staff and pipeline operators discussed Montgomery County's pipeline database to confirm pipeline locations and pipeline characteristics. County mapping was updated to include pipeline information to assist the County with land use planning and building permit reviews. Following discussions with the pipeline operators, educational materials were developed and are now being distributed to the public by County staff. These results helped to achieve the original objectives of the project to increase communication with existing pipeline operators within Montgomery County; increase GIS mapping database, analysis and modeling capabilities and knowledge of pipeline characteristics and properties; increase awareness of pipeline safety; increase planning awareness adjacent to pipelines; and, increase public safety awareness and knowledge of how to respond to a potential incident. A copy of the final report submitted by Montgomery County is available at: http://primis.phmsa.dot.gov/tag/PrjHome.rdm?prj=328.
- The City of St. Peters' TAG project was to develop an educational public webpage for residents, property owners, contractors, and developers to enhance community awareness of pipeline safety issues and provide education regarding land use planning, damage prevention, rights-of-way issues and other concerns regarding development near transmission pipelines. More information on the City of St. Peters' TAG project is available at: http://primis.phmsa.dot.gov/tag/PrjHome.rdm?prj=325.
- The City of Fort Worth utilized its TAG grant in a project to convert paper-based pipeline records to a public GIS to be used for land use planning. Fort Worth retained a GIS consultant to develop an import process manual for current and backlogged as-built gas pipeline data. The consultant determined the data requirements and needs of individual departments and met with the gas pipeline operators to ascertain which of the many different data formats are currently being used in submittals to the city. A data import process manual and a prototype model were developed to demonstrate functionality of the process and how the data can be viewed. A key feature is a hyperlink to as-built plans and agreements between the pipeline operators and the city. This allows users to quickly and accurately retrieve data and information relevant to managing the expanding pipeline systems across the Dallas and Fort Worth metropolitan area. The city will also make information available through a public map viewer to city departments, citizens, developers and private contractors as it is imported into the city's GIS database. More information on the City of Fort Worth's TAG project is available at: http://primis.phmsa.dot.gov/tag/PrjHome.rdm?prj=327.

The PIPA participants encourage all stakeholders to consider adopting and integrating the PIPA recommended practices into the culture of their local communities, companies, and organizations in order to reduce risks, to enhance pipeline safety, and protect communities. PHMSA plans to enlist the help of PIPA stakeholders in maintaining the ideas and recommended practices developed to date. With stakeholder participation, the ideas and recommended practices will be refined over time, and new and better methods for coordinating pipeline safety and land use planning on a national basis will be developed.

KEY STAKEHOLDERS

Local Government

Local government officials (typically the town, city, county, or parish legislative body) are responsible for the health, safety, and welfare of the residents and for establishing development regulations and zoning. In more populated areas, detailed recommendations regarding land use regulations, zoning, and in some cases comprehensive plans, are made by professional planning staff. Some jurisdictions also incorporate planning commissions into their planning process. Though there are many variations in the way local governments are structured, land development is important in every community. Major decisions regarding land use planning, zoning, and development are generally made by the elected local government legislative body.

Property Developer/Owner

The property developer/owner is responsible for project planning relating to a parcel of land. This involves gathering all available and necessary information and making decisions affecting a planned development project, such as proposed excavation, construction, or development activity, as well as developing the project plans and getting the necessary approvals and permits to ensure all zoning and construction requirements are met.

Site planning decisions should include consideration of project constraints, including the location of and anticipated conflicts resulting from transmission pipeline facilities existing within the development area and the relative costs and benefits associated with resolving or accommodating such conflicts. Planning must also consider the constraints imposed by community development plans and zoning regulations.

Transmission Pipeline Operator

Transmission pipeline operators are responsible for the safe operation and maintenance of hazardous liquid and/or natural gas transmission pipelines. These pipelines are subject to federal pipeline safety regulations administered either directly by PHMSA or by a state agency. Operator responsibilities include taking actions to avoid pipeline damage or failure. Such actions include: periodic testing and continued maintenance of transmission pipeline facilities, development of emergency plans, performance of leak surveys, continuing surveillance, encroachment mitigation and right-of-way patrolling, and the development and implementation of damage prevention programs and public awareness programs. These activities are required by federal pipeline safety regulations, and transmission pipeline companies frequently augment these requirements.

For public awareness programs, transmission pipeline operators must follow the federal pipeline safety regulations (49 CFR 192.616, 49 CFR 195.440) which incorporate by reference the general program recommendations of the American Petroleum Institute (API) Recommended Practice (RP) 1162. Each operator's program must specifically include provisions to educate the public, appropriate government organizations, and persons engaged in excavation related activities on:

1. Use of one-call notification systems prior to excavation and other damage prevention activities;

2. Possible hazards associated with unintended releases from a pipeline facility;
3. Physical indications that such a release may have occurred;
4. Steps that should be taken for public safety in the event of a pipeline release; and
5. Procedures for reporting pipeline releases.

Under the regulations, each operator's public awareness program must also include activities to advise affected municipalities, school districts, businesses, and residents of pipeline facility locations. The program and the media used must be as comprehensive as necessary to reach all areas in which the operator transports hazardous liquid or carbon dioxide. The program must be conducted in English and in other languages commonly understood by a significant number and concentration of the non-English speaking population in the operator's area.

Real Estate Commission

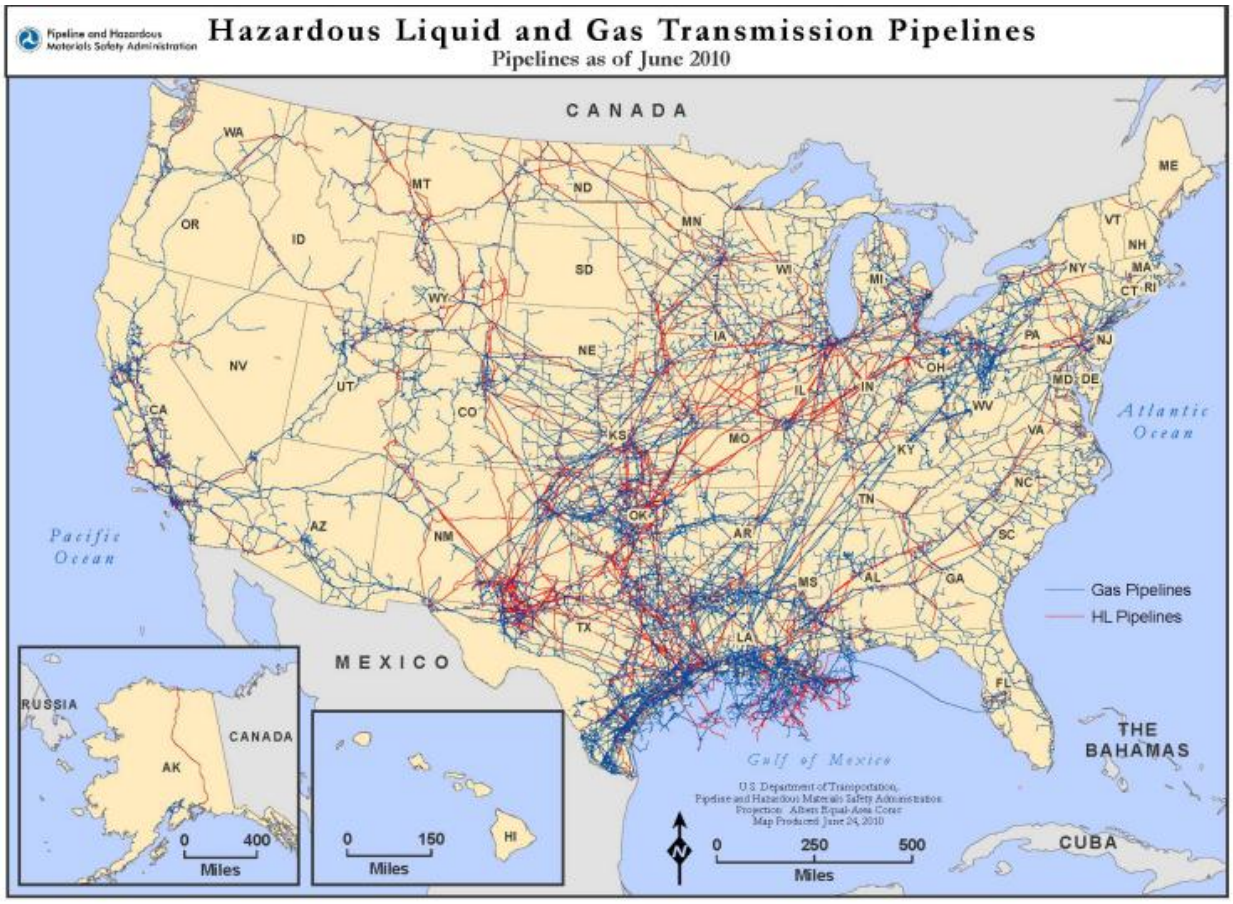
Real estate commissions are generally established to protect the public interest in real estate brokerage transactions in each state. The commission may have many diverse goals and objectives. For example, one goal may be to assure that licensees are competent and morally fit to act as real estate brokers. The objective of this goal could be to effectively administer, monitor and improve the quality of the real estate pre-licensing education program, license examination program, and the continuing education program.

Another goal may be to ensure that real estate licensees comply with the real estate practice standards imposed by the real estate license law and commission rules. Objectives related to this goal could include actions to process, inquire into or investigate, and prosecute complaints against licensees in a thorough, timely, and efficient manner. Another objective related to this goal could be to serve as a real estate information resource for licensees and consumers.

Finally, a third goal may be to identify and address issues affecting real estate consumers and practitioners. Objectives of this goal could include detection and monitoring of special problems and areas of concern affecting real estate consumers and licensees, adopting positions, promulgating rules and proposing legislation to address problems and concerns, and disseminating information and addressing subjects of special interest and concern to licensees and consumers.

TRANSMISSION PIPELINE BENEFITS AND RISK

Our nation's economic well-being and security depend upon a vast network of pipelines to transport the huge volumes of energy products that we consume every day. There are over 295,000 miles of natural gas transmission pipelines and over 164,000[1] miles of hazardous liquid pipelines moving energy products throughout the U.S. every day. Approximately 66 percent of the ton-miles of oil and refined petroleum products and almost 100 percent of the natural gas that we consume are transported by pipeline.



As communities develop and evolve, we are very likely to see an increase in community development in proximity to existing transmission pipelines. It is important that local governments, property developers/owners, transmission pipeline operators, and state real estate commissions are aware of and understand the actions they can take to reduce risks and enhance the safety of their communities when there are proposed changes in land use or new development adjacent to existing transmission pipelines.

[1] PHMSA Office of Pipeline Safety (OPS) pipeline mileage data from Annual Reports. Mileage cited is from 2008 annual reports submitted as of May 2010.

The Benefits of Transmission Pipelines

Transmission pipelines provide benefits to our general economy and security by providing efficient, cost effective, reliable, safe and secure delivery of the energy products we rely upon. Some people who live near pipelines may not see themselves as being direct beneficiaries of pipeline transportation; they may instead consider the beneficiaries to be communities and cities perhaps hundreds of miles away. However, everyone in the US uses and benefits from the energy and consumer products produced from natural gas and petroleum made available by pipeline transportation.

Transportation – Approximately 97 percent of our transportation energy is supplied by petroleum.[2] More than one out of every ten workers in America is employed in transportation and transportation-related industries.

Refined petroleum products provide the fuel to power all motorized transportation in America such as cars, motorcycles, buses, trucks, locomotives, ships and airplanes. All of these refined fuel products (and others) come from crude oil, most of which is first transported to refineries by a system of gathering and transmission pipelines. After the refining process, the petroleum products are transported, generally by transmission pipeline, to storage and distribution centers.

Heating – Approximately 22 percent of the energy consumed annually in the U.S. comes from natural gas.[3] More than 62.5 percent of the nation's 66.8 million homes use natural gas stoves, furnaces, water heaters, clothes dryers, and other household appliances.[4] Another seven percent of the homes in the U.S., primarily in the Northeast, use oil as their main heating fuel. Natural gas and heating oil are transported through transmission pipelines over long distances.

Electricity – Electricity is also used for our residential and industrial energy needs, and a growing percentage of our electricity is generated by natural gas. Approximately 19 percent[5] of our nation's electricity is generated from over 1,700 power plants that use natural gas, of which almost all is delivered by pipelines. Most power plants built in the last decade are fueled by natural gas due to the improved flexibility in siting and operating the plants, reasonable generation costs, and lower environmental emissions. Natural gas-fired electricity generation is projected to increase dramatically over the next 15 years as new electric generation capacity that is now being constructed or planned comes online.

National Defense - The U.S. armed services rely on pipelines to meet their energy needs. The Defense Department buys more refined oil products than any other single buyer in the world – roughly $11.4 billion of petroleum and $24.9 million of natural gas in 2007[6]. Much of this fuel is delivered by transmission pipelines. More than 100 Air Force, Army, Marine Corps, and Navy installations in the U.S. have direct connections to transmission pipelines so they can receive the natural gas and petroleum supplies they need to meet their missions.

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[2] Introduction to Energy, The Need Project, 2007, p.11.
[3] Energy Information Administration, *Natural Gas Annual 2006*, December 2007.
[4] Energy Information Administration, *Natural Gas Annual 2006*, December 2007.
[5] Energy Information Administration website, 2006 data.
[6] Defense Energy Support Center Fact Book, 2007.

Total Economic Impact – More than ten percent of our nation' Gross Domestic Product, or about $1.3 trillion, stems directly from the transportation sector.[7] Since 97 percent of all American transportation energy comes from petroleum, the importance of transmission pipelines to the American economy is clear. Many U.S. industries also rely on raw materials that are derived from large volumes of crude oil and natural gas delivered by transmission pipelines. A significant percentage of the economic benefits from our core national industry sectors, including food products, pharmaceuticals, plastics and resins, industrial organic chemicals, and automotive, would not be possible without oil and natural gas energy and related feed stocks transported by transmission pipelines.

Transmission Pipeline Risks

PHMSA provides statistical reports of pipeline incidents and consequences. Additional information on transmission pipeline risks and risk mitigation can be found in a separate report prepared by PHMSA in 2010 entitled: "Building Safe Communities: Pipeline Risk and its Application to Local Development Decisions".

Risks associated with transmission pipelines result from accidental releases of the transported products, which can impact public safety, the environment, national security and our economy. Economic impacts may result from business interruptions, damaged infrastructure, and loss of energy fuel supplies. Accidental releases can result in injuries or fatalities from fires or explosions caused by ignition of the released product, as well as from possible toxicity and asphyxiation effects. The potential consequences of transmission pipeline releases vary according to the transported commodity as well as characteristics of the surrounding area.

Hazardous liquid pipelines can transport a variety of products. Releases of hazardous liquids having a high vapor pressure, such as propane, pose an acute hazard of fire or explosion. Some of these high vapor pressure commodities have densities greater than air and tend to remain near the ground where they can present asphyxiation risks. Releases of hazardous liquids such as gasoline and crude oil pose both acute and more long-term potential risks, as these products can spread over land and water, flowing downhill into valleys, ravines, and waterways. This can result in the risks being presented some distance from the initial point of release.

The primary hazard from natural gas is an explosion and/or fire immediately following and near the point of the release. For fire or explosion to occur an ignition source must be involved, otherwise the released gas will dissipate and the explosion/fire hazard will be reduced over a relatively short period. It is possible that the size or movement of the vapor cloud of the gas could result in consequences away from the initial point of the release, but as natural gas is lighter than air, this situation rarely occurs.

Accidental pipeline releases can result from a variety of causes, including natural disasters, excavation and other outside force damage, internal and external corrosion, mechanical failure, and operator error. And, although transmission pipeline incidents are infrequent, they do have potential serious consequences that may significantly impact the general public. Pipeline incident and accident data,

[7] The Transportation Challenge, Moving the U.S. Economy, prepared for the National Chamber Foundation, 2008.

including data for injuries, fatalities and property damage, and for the causes of pipeline incidents are available on PHMSA's Stakeholder Communications website.

According to the data[8], during the ten years between 2000 and 2009, there was a combined average of four fatalities per year resulting from onshore hazardous liquid and natural gas transmission pipeline incidents. Although pipeline releases have caused relatively few fatalities in absolute numbers, a single pipeline accident can be catastrophic. One such example occurred in Bellingham, Washington in 1999, when a gasoline pipeline accident caused three fatalities and millions of dollars of ecological damage. Another serious incident occurred near Carlsbad, New Mexico, in August of 2000. In that incident, 12 people were killed when a natural gas transmission pipeline ruptured and the released natural gas ignited.

As noted above, more information is available from PHMSA's Stakeholder Communications website and the aforementioned report "Building Safe Communities: Pipeline Risk and its Application to Local Development Decisions". In spite of the relatively low numbers, we must continue our efforts to reduce risks and improve the safety of our communities and transmission pipelines when there are proposed changes in land use or new development adjacent to existing transmission pipelines.

Transmission Pipeline Risk Mitigation

Reducing transmission pipeline risks and enhancing safety is best achieved through proper pipeline operation and maintenance by pipeline operators. Comprehensive and effective public awareness and damage prevention programs, risk-informed planning, design and construction of industrial, commercial and residential developments near transmission pipelines, and effective regulatory oversight of operators for compliance with applicable pipeline safety regulations can also contribute significantly to reducing pipeline risks.

The pipeline industry takes numerous steps to prevent pipeline incidents and to mitigate their risks by reducing the likelihood and consequences of accidents. Transmission pipeline operators are required by law and by pipeline safety regulations to develop and implement programs and processes that focus specifically on safe operating and maintenance activities. These include system design and construction, operator qualifications, pipeline and pipeline rights-of-way inspections, public education and awareness, and excavation damage prevention programs. Pipeline operators are required to adhere to numerous other regulations and safety standards and their compliance is audited by federal and state regulatory agencies.

However, regulatory requirements and operator actions to prevent and mitigate accidents do not negate the need for all stakeholders to work together to further ensure pipeline safety. All stakeholders can communicate issues concerning pipeline safety and support initiatives related to damage prevention. This includes activities such as following safe excavation practices, including use of the one-call process (e.g., calling 811); monitoring and reporting suspicious activity on pipeline right-of-ways, keeping right-of-ways free from obstructions and encroachments, and following PIPA recommendations

[8] PHMSA Significant Incident Files, February 17, 2010

on land use and development near transmission pipelines. Working together, transmission pipeline operators and other stakeholders can reduce the risks to people, communities, and to the environment.

Transmission pipelines are typically located in easements on land owned by governments, corporations, tribal nations, or private citizens. The rights of both the property owner and the transmission pipeline operator are typically described in a written easement agreement. When individual easements are strung together to form a corridor for the pipeline, the corridor is generally referred to as a right-of-way (ROW). While transmission pipeline systems are comprised of many parts, generally only line pipe and associated appurtenances (inline valves, branch connections, etc.) are located within a pipeline ROW. Other parts of a pipeline system such as tank farms and pump or compressor stations are generally located on company owned property off of the ROW.

Transmission pipeline failures present risks that may impact people and property beyond the edge of pipeline rights-of-way (ROW). To address these risks, some communities have imposed zoning restrictions, including fixed-distance building setbacks for development along transmission pipeline ROW. Building setbacks are typically used by local governments to provide separation between the community and potential risks, in this case pipelines. However, fixed-distance setbacks commonly don't consider the risks involved with a specific pipeline and the physical environment in which the pipeline operates. Individual transmission pipelines differ in character – some are large-diameter, high-pressure, cross-country pipelines traversing mostly rural areas, while others are located in urban areas and densely-populated urban centers. Transmission pipelines operated within urban areas may be located underneath public streets and roadways in areas that are already well-developed. Federal regulations attempt to mitigate the risk of transmission pipelines located in more densely-populated areas by imposing more stringent requirements. For example, gas transmission pipelines located in heavily populated urban areas are generally required to adhere to additional design, operation, and maintenance requirements. However, each situation is unique relative to the pipeline characteristics and the areas surrounding the pipeline ROW. Thus, PIPA recommends that implementing a risk-informed approach to land use planning and development and establishing good communication with the transmission pipeline operator is more appropriate than establishing a fixed-distance setback to be applied in all situations.

PIPA focuses on the safety risks of new development occurring adjacent to pipeline rights-of-way, and the safety risks the transmission pipelines pose to affected communities. Local governments, property developers/owners, transmission pipeline operators, and state real estate commissions have key roles to enhance pipeline safety and ensure the protection of people, the environment and the pipeline infrastructure.

Two of the PIPA recommended practices address consultation zones and planning areas. These are important concepts to put into practice. As transmission pipeline failures may adversely affect the general public, it is important for local governments to make risk-informed decisions regarding land use planning and development in locations where residences and businesses are increasingly in proximity to transmission pipelines. Consequently, local governments should consider the risks, including both likelihood and consequences, of transmission pipeline incidents when making decisions related to land use planning and development. They should make full use of available resources and communicate with

the operators of the transmission pipelines in their communities to better understand the characteristics of the specific pipelines involved and the characteristics of the surrounding area that affect risks.

Local government actions may include:

- Constraints on activities on or near transmission pipeline rights-of-way;
- Restrictions on the types of land use and development that is allowed along transmission pipeline rights-of-way;
- Specific design or construction features of the development;
- Measures to facilitate emergency response and evacuation in the event of a transmission pipeline incident.

When weighing the potential risks of hazardous materials releases in areas proposed for development, local governments should obtain all available information and base decisions on a balanced consideration of all risks. This includes consideration of all modes of hazardous materials transportation in the area, including roads, railway transportation, and transmission pipelines.

Other PIPA-recommended practices address mapping, land records management, communications, and design and development considerations. Stakeholders in land use planning and development and transmission pipeline safety are encouraged to become aware of and to implement PIPA-recommended practices as appropriate.

GENERAL INFORMATION ON RECOMMENDED PRACTICES

As mentioned earlier, the recommended practices developed by the PIPA stakeholder participants are not mandated by any public or private entity. Furthermore, in some cases implementation of the recommended practices may not be feasible or cost effective. They are intended to provide guidance to pipeline operators, local officials, property owners and developers to provide for the safe use of land near transmission pipelines. Some local governments may want to adopt certain practices within their development regulations or simply encourage voluntary adoption by their local development community. Both approaches have been used by communities around the country.

During the development of the recommended practices, it was recognized that a wide variety of technology is used by local governments both for mapping and development proposal processing. Local governments with limited technology and funding may not be able to fully implement the recommended practices.

Also, consider a property developer/owner with a small parcel of land with a significant portion of the property contiguous to a transmission pipeline right-of-way. The size and shape of the parcel would limit the ability of the property developer/owner to implement the development recommended practices as included in this report.

The recommended practices are grouped into one of two scenarios. Each recommended practice includes the practice title, a brief practice statement, the stakeholder audience intended to take action to implement the practice, practice details, and references if applicable. The practices are numbered and arranged roughly in a logical order within each scenario. The scenarios are:

- Baseline (BL) Recommended Practices **–** *These practices should be implemented by stakeholders in preparation for future land use and development.*
- New Development (ND) Recommended Practices **–** These practices should be implemented by stakeholders when specific new land use and development projects are proposed.

All stakeholders are encouraged to become familiar with each of the recommended practices. Even though you may not be taking action under a practice, you may be affected by another stakeholder implementing the practice. The following table shows each recommended practice and the key stakeholder(s) that should take action based on the recommended practice.

Recommended Practice		Local Government	Property Developer/ Owner	Transmission Pipeline Operator	Real Estate Commission
BASELINE (BL) RECOMMENDED PRACTICES					
BL01	Obtain Transmission Pipeline Mapping Data	X			
BL02	**n/a –** *Recommendation is incorporated into other practices.*				
BL03	Utilize Information Regarding Development around Transmission Pipelines	X		X	
BL04	Adopt Transmission Pipeline Consultation Zone Ordinance	X			
BL05	Define Transmission Pipeline Consultation Zone	X			
BL06	Implement New Development Planning Areas around Transmission Pipelines	X			
BL07	Understand the Elements of a Transmission Pipeline Easement		X		
BL08	Manage Land Records		X	X	
BL09	Document and Record Easement Amendments		X	X	
BL10	Implement Communications Plan			X	
BL11	Effectively Communicate Pipeline Risk and Risk Management Information			X	
BL12	Notify Stakeholders of Right-of-Way Maintenance Activities			X	
BL13	Prevent and Manage Right-of-Way Encroachment			X	
BL14	Participate to Improve State Excavation Damage Prevention Programs	X	X	X	
BL15	Enhance Damage Prevention Practices near High-Priority Subsurface Facilities			X	
BL16	Halt Dangerous Excavation Activities near Transmission Pipelines	X		X	
BL17	Map Abandoned Pipelines			X	
BL18	Disclose Transmission Pipeline Easements in Real Estate Transactions				X

Recommended Practice		Local Government	Property Developer/ Owner	Transmission Pipeline Operator	Real Estate Commission
NEW DEVELOPMENT (ND) RECOMMENDED PRACTICES					
ND01	**n/a –** *Recommendation is incorporated into other practices.*				
ND02	Gather Information for Design of Property Development near Transmission Pipelines		X	X	
ND03	Review Acceptability of Proposed Land Use of Transmission Pipeline Right-of-Way Prior to Design		X		
ND04	Coordinate Property Development Design and Construction with Transmission Pipeline Operator		X	X	
ND05	**n/a –** *Recommendation is incorporated into other practices.*				
ND06	Require Consideration of Transmission Pipeline Facilities in Land Development Design	X	X		
ND07	Define Blanket Easement Agreements When Necessary	X	X	X	
ND08	Collaborate on Alternate Use and Development of Transmission Pipeline Right-of-Way	X	X	X	
ND09	Provide Flexibility for Developing Open Space along Transmission Pipeline Rights-of-Way	X			
ND10	Record Transmission Pipeline Easements on Development Plans and Final Plats	X	X		
ND11	Reduce Transmission Pipeline Risk through Design and Location of New Parking Lots and Parking Structures	X	X		
ND12	Reduce Transmission Pipeline Risk through Design and Location of New Roads	X	X		
ND13	Reduce Transmission Pipeline Risk through Design and Location of New Utilities and Related Infrastructure	X	X		
ND14	Reduce Transmission Pipeline Risk through Design and Location of Aboveground Water Management Infrastructure	X	X		
ND15	Plan and Locate Vegetation to Prevent Interference with Transmission Pipeline Activities	X	X		
ND16	Locate and Design Water Supply and Sanitary Systems to Prevent Contamination and Excavation Damage	X	X		
ND17	Reduce Transmission Pipeline Risk in New Development for Residential, Mixed-Use, and Commercial Land Use	X	X		

Recommended Practice		Local Government	Property Developer/ Owner	Transmission Pipeline Operator	Real Estate Commission
ND18	Consider Transmission Pipeline Operation Noise and Odor in Design and Location of Residential, Mixed-Use, and Commercial Land Use Development	X	X	X	
ND19	Reduce Transmission Pipeline Risk through Design and Location of New Industrial Land Use Development	X	X		
ND20	Reduce Transmission Pipeline Risk through Location, Design, and Construction of New Institutional Land Use Developments	X	X		
ND21	Reduce Transmission Pipeline Risk through Design and Location of New Public Safety and Enforcement Facilities	X	X		
ND22	Reduce Transmission Pipeline Risk through Design and Location of New Places of Mass Public Assembly (Future Identified Sites)	X	X		
ND23	Consider Site Emergency Response Plans in Land Use Development	X	X		
ND24	Install Temporary Markers on Edge of Transmission Pipeline Right-of-Way Prior to Construction Adjacent to Right-of-Way	X	X		
ND25	Contact Transmission Pipeline Operator Prior to Excavating or Blasting	X	X	X	
ND26	Use, Document, Record and Retain Encroachment Agreements or Permits	X	X	X	
ND27	Use, Document and Retain Letters of No Objection and Conditional Approval Letters	X	X	X	
ND28	Document, Record and Retain Partial Releases		X	X	

BL01 Obtain Transmission Pipeline Mapping Data

Practice Statement Local government agencies responsible for land use and development planning or the issuance of development permits should obtain mapping data for all transmission pipelines within their areas of jurisdiction from PHMSA's National Pipeline Mapping System or from the transmission pipeline operators and show these pipelines on maps used for development planning.

Audience Local Government

Practice Description Transmission pipeline operators are required to submit pipeline location information to PHMSA's National Pipeline Mapping System (NPMS). Operators must update the information annually and include identification of an operator contact and an estimation of data accuracy. PHMSA combines data submittals from all transmission pipeline operators and displays the pipelines through a geographic information system (GIS) called the Pipeline Integrity Management Mapping Application (PIMMA). The raw GIS data viewed through PIMMA is available to local government officials.

When technically feasible, local governments should apply for raw NPMS data, which is available in ESRI shape file format. Details on obtaining the data appear below. The mapping data in NPMS is a valuable tool to initially obtain pipeline location data. Operators may provide more detailed maps. When transmission pipelines are shown on local government planning maps, they should be accompanied by a warning that the pipeline location information is not to be used as a substitute for calling the one-call damage prevention system before excavating. Since NPMS is updated annually by transmission pipeline operators, local governments should obtain updated data from the NPMS annually to check for the addition or retirement of pipelines. As mentioned, NPMS data includes contact information for each transmission pipeline operator if local governments need to contact them for additional information.

Online Data Access

It is recommended that local government agencies establish PIMMA accounts to view transmission pipeline data sets at the county level. The application for a PIMMA account is available online.

Access to PIMMA allows local government users to view transmission pipeline maps and pipeline attributes for transmission pipelines within their areas of jurisdiction. They may also create or print maps in the Adobe portable document format (PDF).

The NPMS Public Viewer is available to the general public. It allows users to view pipeline maps for a user-specified state and county, but does not offer as many attributes or as large a scale as the password-protected PIMMA viewer does. The NPMS Public Viewer is available online.

Raw Data Distribution

Local government agencies can also request pipeline GIS data in ESRI format for transmission pipelines within their areas of jurisdiction. Information about requesting raw data can be found online.

BL02 Incorporated into other recommended practices. Page is otherwise blank.

BL03 Utilize Information Regarding Development around Transmission Pipelines

Practice Statement Transmission pipeline operators should provide information about their pipelines to local governments and property developers/owners who are planning development around their pipelines. Local government authorities regulating development should use this information to establish requirements regarding land use and development around transmission pipelines.

Audience Local Government, Transmission Pipeline Operator

Practice Description

As required by federal pipeline safety regulations and, through incorporation to the regulations by reference, the American Petroleum Institute's Recommended Practice (API RP) 1162, transmission pipeline operators must provide information regarding their pipelines to local government organizations. Pipeline operators should include local government organizations having jurisdiction for regulating land use and property development. This will help ensure adequate understanding of the risks posed by transmission pipelines and encourage land use planners to incorporate pipeline coordination in their plan approval process.

Operators should also provide information related to transmission pipeline characteristics and associated hazards to local governments to enable them to make risk-informed decisions on proposed developments and/or development plans in relation to the pipeline risks.

By providing clear information and guidelines, transmission pipeline operators can standardize, to some degree, their own requirements and processes for coordinating development near their pipelines.

Educating property developers/owners regarding the rights of the transmission pipeline operator can lessen the likelihood that excavators will use construction techniques or procedures that threaten the integrity of the transmission pipeline. It can also reduce the likelihood of development designs that fail to take into account encroachment on pipeline rights-of-way a transmission pipeline operator's need for access to the pipeline for maintenance and repairs.

The information and guidelines should be made readily available through the operators' websites, and communicated via e-mail and other methods to organizations that represent the various stakeholder constituent groups (local government planning and zoning organizations, builders associations, engineering organizations, etc.).

Local government authorities regulating development should use this information to establish requirements for development around transmission pipelines and to make informed decisions relevant to pipeline risks on proposed developments and/or land use and development plans. Those requirements should also consider other Pipelines and Informed Planning Alliance (PIPA) recommended practices.

References:

- El Paso Pipeline Group "Developer Handbook"
- Northern Natural Gas Company "Developers' Handbook"
- Marathon Pipeline "A Guideline for Property Development"

- Canadian Standards Association (CSA) document, Land Use Planning for Pipelines: A Guideline for Local Authorities, Developers, and Pipeline Operators (CSA PLUS 663)
- Municipal Research and Services Center of Washington, Land Use Planning In Proximity to Natural Gas and Hazardous Liquid Transmission Pipelines in Washington State
- City of Austin, TX, City Code, Title 25, § 25-2-516, Development Near a Hazardous Pipeline
- American Petroleum Institute Recommended Practice (API RP) 1162, Public Awareness Programs for Pipeline Operators, First Edition, December 2003
- 49 CFR Parts 192.616 and 195.440
- Common Ground Alliance Best Practices

BL04 Adopt Transmission Pipeline Consultation Zone Ordinance

Practice Statement Local governments should adopt land development procedures requiring property developers/owners to consult with transmission pipeline operators early in the development process, so that development designs minimize risks to the populace living or working nearby and are consistent with the needs and legal rights of the operators.

Audience Local Government

Practice Description

Local governments should adopt ordinances requiring that property developers/owners must review their proposed projects with the transmission pipeline operators for any application for a land use or development permit within a transmission pipeline "consultation zone". This applies for developments in either urban or rural areas.

Local developers are not transmission pipeline experts; therefore, they should consult with the pipeline operator to determine whether a proposed land use or development will impact the integrity of the nearby transmission pipeline or the future safety of persons or property. If the transmission pipeline operator is involved early in the development process, there should be adequate time to incorporate the operator's concerns into the design.

During the consultation, the pipeline operator and the property developer/owner should develop a mutually agreeable timeline for the operator's review of the proposed project. If the pipeline operator and property developer/owner cannot reach agreement on pipeline-related issues, the operator can provide input to the local government planning and zoning organization regarding potential impacts of the proposed project, *before* the project is approved and permits are issued.

The goal of this recommended practice is to avoid situations where transmission pipeline operators learn of proposed land use and development projects only after the design is complete or construction begins. In those situations, it is often difficult or impossible to make cost-effective changes that may be needed to enhance public safety and ensure operator access to the pipeline facilities.

Section 2 of the Model Ordinance in Appendix B includes requirements for property developers/owners to notify and provide development information to transmission pipeline operators when applying for a land use permit for property within the consultation zone.

References:

- Whatcom County, Washington, Proposed Pipeline Safety and Development Changes, Docket #ZON2007-00014 (2008)
- Washington Model Pipeline Ordinances, Municipal Research & Services Center, Seattle
- "Land use planning for pipelines: A guideline for local authorities, developers and pipeline operators" Canadian Standards Association (CSA) 2004

BL05 Define Transmission Pipeline Consultation Zone

Practice Statement Local governments should define a "consultation zone" to provide a mechanism for communication between property developers/owners and operators of nearby transmission pipelines when new land uses and property developments are being planned.

Audience Local Government

Practice Description

Local governments should define a consultation zone to provide a mechanism to initiate communication between property developers/owners and operators of nearby transmission pipelines when new land uses and property developments are being planned. Optimally, the consultation zone distance should be measured from the transmission pipeline centerline and should be based on specific pipeline characteristics and local conditions.

The intent of this recommended practice is to initiate a dialogue between the property developer/owner and the transmission pipeline operator when new land use or property development is planned near a transmission pipeline. This dialogue will serve to: (1) protect the transmission pipeline by promoting adequate consideration of the potential safety impacts of the proposed land use or property development on the pipeline; and (2) raise awareness of the potential safety impacts of the transmission pipeline on the proposed land use or development so they can be taken into account during planning and design.

For proposed new land uses and developments within the consultation zone, the property developer/owner should be required to initiate consultation with the transmission pipeline operator as early as possible in the development planning process. The local government and the property developer/owner should consult local land records to determine if transmission pipelines are located in the proposed development area. In addition, the National Pipeline Mapping System (NPMS), http://www.npms.phmsa.dot.gov/, may be utilized, with the caution that the accuracy of pipeline locations in the NPMS vary from pipeline to pipeline and may be as much as +/- 500 feet. Also, neither local land records nor the NPMS should ever be used in lieu of calling the one-call center to have the actual position of transmission pipelines and other underground facilities located and marked prior to excavation. In most cases an excavator can generally dial 811 to contact the one-call center.

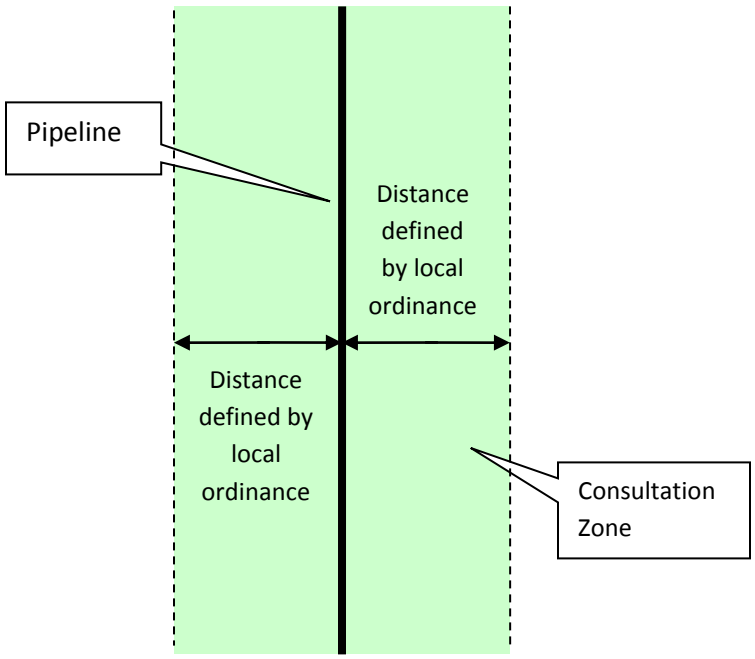
Once consultation has begun, specific considerations to further enhance safety and protect communities where new development is planned near transmission pipelines may be taken into account. Several additional considerations are discussed in PIPA recommended practices BL06 and ND11 through ND23. Recommended Practice BL06 addresses the development and implementation of a "planning area".

A consultation zone distance should be measured from the transmission pipeline centerline. So that consultation zone requirements are appropriately applied to proposed land uses and developments, a site-specific distance based on the characteristics of the pipeline (e.g., pipeline diameter, operating pressure, potential spill volumes, transported commodities, unrestrained flow characteristics of transported commodities) and the area surrounding the pipeline (e.g., topography, population density, vegetation, structures, etc.) should be determined. Local governments should work with the pipeline

operators to determine site-specific pipeline characteristics when developing their consultation zone distances.

Absent site-specific information, it is suggested that a standard consultation zone distance, on either side of the pipeline centerline, of 660 feet be used for natural gas transmission pipelines. For hazardous liquid pipelines, also absent site-specific information, it is suggested that a standard consultation zone distance in a range from 660 to 1,000 feet be considered. However, in either case it is recommended that communities develop and utilize site-specific distances for consultation zones, based on the unique characteristics for the pipeline and the area surrounding the pipeline. As noted, the transmission pipeline operator can be helpful and should be consulted in assisting local governments to better understand the pipeline characteristics when they develop site-specific consultation zone distances.

Generally, consultation zone distances larger or smaller than the standard distances may be warranted. High/low operating pressure, large/small pipe diameters, type of product carried and local topography can influence the potential impact on nearby development. Related information on refining planning area distances (see PIPA Recommended Practice BL06) is provided in Appendix I. Additionally, American Petroleum Institute Recommended Practice (API RP) 1162, Public Awareness Programs for Pipeline Operators, First Edition, December 2003, includes recommendations for collaboration among pipeline operators, property owners/developers and emergency response officials that may be helpful in developing criteria for a planning area. API RP 1162 applies within 660' of a hazardous liquid pipeline.



Local requirements should be clear that the consultation zone is only intended to:

- Alert the transmission pipeline operator that a development near its pipeline is being planned;

- Help protect transmission pipelines by promoting adequate consideration of the potential safety impacts of the development on the transmission pipeline; and
- Raise awareness of the potential safety impacts of the transmission pipeline on the development.

Satisfying these objectives may help to avoid costly changes in land use and development plans at a later date and potential damage to the pipeline.

Relationship to Practice BL04

PIPA Recommended Practice BL04 encourages local governments to enact ordinances, regulations, or procedural recommendations that require property developers/owners to consult with transmission pipeline operators as part of the land use planning and permitting process, when development is planned within a consultation zone. The definition of a consultation zone, as provided here in Recommended Practice BL05, helps to simplify the determination of when such consultations should be initiated. Verification that the requirements for consultation are met should not impose an undue burden on the landowner, developer, or pipeline operator.

Relationship to Pipeline Operator Public Awareness Programs

The purpose for and size of a consultation zone does not affect the requirements for transmission pipeline operators to develop and implement pipeline public awareness programs as defined by PHMSA pipeline safety regulations.

Information the Transmission Pipeline Operator may need from the Property Developer/Owner

During consultation, a transmission pipeline operator may need information from the property developer/owner in order to discuss appropriate considerations for the proposed development.

1. What is the street address (or if not available, the general location) of the property.
2. Is the property encumbered by a pipeline easement? If so, please attach a copy of the easement or provide the recording (volume and page) information.
3. Is there visual evidence of a pipeline on subject property (e.g., aerial markers, above-ground appurtenances, etc.)?
4. Will the proposed development of the property require/entail (and if so, please describe briefly):
    a. Road crossings over the pipeline?
    b. Other utility lines crossing over or under the pipeline?
    c. Permanent structures or paving within the easement area (e.g., paving, parking lots, buildings, pedestrian paths, signage, poles, retaining walls, septic systems, basketball/tennis courts, etc.)?
    d. Extensive landscaping (including irrigation systems) within the easement area?
    e. Changing the amount of cover (by adding or removing dirt) within the easement area?
    f. Construction equipment crossing the pipeline?
    g. Blasting, seismic vibration testing, pile driving, or similar event which produces significant shock and/or sound waves?

h. Significant excavation (underground parking structures or building foundations, core samples, rock/mineral quarries, dams, etc.)?
i. Impounding water or building drainage ditches or other drainage facilities?
j. Fencing running parallel to (within 100 feet) or crossing the pipeline?
k. Storing materials, equipment, vehicles, or other items within the easement area (e.g., construction materials, junk or scrap heaps, cut timber, boats, military equipment, etc.)

5. What is the approximate distance of the proposed building closest to the pipeline?
6. Has the pipeline operator been previously contacted regarding this development? If so, by whom.
7. Provide a site plan if available.

Information Transmission Pipeline Operators may provide during Consultation

Some examples of information that transmission pipeline operators may provide to local governments and/or property developers/owner to assist them in developing consultation zone distances or planning specific developments:

1. Pipeline diameter and wall thickness
2. Age of pipeline
3. Depth of cover
4. Typical operating pressure and maximum allowable operating pressure
5. Material transported and typical daily flow rate
6. Estimated worst case spill volume in the area of the development

References:

- California Department of Education, Guidance Protocol for School Site Pipeline Risk Analysis, 2007
- American Petroleum Institute (API) Recommended Practice (RP) 1162, Public Awareness Programs for Pipeline Operators.
- References on Potential Gas Pipeline Impacts:
  - Gas Research Institute GRI-00/0189, A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines, 2000
  - 49 CFR 192.5, 49 CFR 192.903
  - ASME B31.8-2004, *Managing System Integrity of Gas Pipelines*

BL06 Implement New Development Planning Areas around Transmission Pipelines

Practice Statement Local governments should consider implementing "planning areas" to enhance safety when new land use and property development is planned near transmission pipelines.

Audience Local Government

Practice Description

Local governments should consider implementing "planning areas" to enhance safety when new land use and property development is planned near transmission pipelines. A planning area can provide for the application of additional development regulations, standards, or guidelines to ensure safety when development occurs in close proximity to a transmission pipeline. PIPA recommended practices ND11 through ND23 describe additional considerations for use within a planning area.

Risk is defined as the product of the probability of an incident occurring and the consequences of that incident. Existing pipeline safety regulations focus on reducing pipeline risk by prescribing strict design, construction, operation and maintenance, and inspection requirements for pipeline operators. However, transmission pipeline operators have direct control only over activities within their easements or rights-of-way.

Land use planning regulations that address the development of property near a pipeline easement are generally developed and implemented by local governments (cities, towns, townships, counties, parishes). Such measures can help reduce the potential consequences and, thereby, the potential risks of transmission pipeline incidents. Local governments should make informed, risk-based decisions on how to manage land use and property development near transmission pipeline rights-of-way. These decisions should be balanced with other planning considerations to avoid placing undue burdens on land use and property development near transmission pipelines.

A planning area distance should be measured from the transmission pipeline centerline. So that planning area requirements are appropriately applied to proposed land uses and developments, a site-specific distance based on the characteristics of the pipeline (e.g., pipeline diameter, operating pressure, potential spill volumes, transported commodities, unrestrained flow characteristics of transported commodities) and the area surrounding the pipeline (e.g., topography, population density, vegetation, structures, etc.) should be determined. Local governments should work with the pipeline operators to determine site-specific pipeline characteristics when developing their planning area distances.

A planning area should not be construed as an unsafe area and the planning area distance is not intended to be used as a fixed setback distance. Rather, a planning area is a corridor in which additional measures, such as those described in PIPA recommended practices ND11 through ND23, may have potential benefits in protecting transmission pipelines, mitigating the immediate consequences of a transmission pipeline incident, and facilitating emergency response to a potential transmission pipeline incident.

Absent site-specific information, it is suggested that a standard planning area distance, on either side of the pipeline centerline, of 660 feet be used for natural gas transmission pipelines. For hazardous liquid pipelines, also absent site-specific information, it is suggested that a standard planning area distance in a

range from 660 to 1,000 feet be considered. The suggested standard distances are intended to apply to common pipeline sizes and pressures and don't take into account the possibility of flow of liquid or heavier than air gases. Thus, in either case it is recommended that communities develop and utilize site-specific distances for planning areas, based on the unique characteristics for the pipeline and the area surrounding the pipeline. As noted, the transmission pipeline operator can be helpful and should be consulted in assisting local governments to better understand the pipeline characteristics when they develop site-specific planning area distances.

Generally, planning areas larger or smaller than the standard distances may be warranted. High/low operating pressure, large/small pipe diameters, type of product carried and local topography can influence the potential impact of a transmission pipeline incident on nearby development. More information on further refining planning area distances is provided in Appendix I. American Petroleum Institute (API) Recommenced Practice (RP) 1162 includes recommendations for collaboration among pipeline operators, property owners/developers and emergency response officials that may be helpful in developing criteria for a planning area. PHMSA and state pipeline safety regulators may also be consulted. API RP 1162 applies within 660' of gas transmission and hazardous liquid pipelines.

References:

- Gas Research Institute GRI-00/0189, A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines, 2000
- 49 CFR 192, subpart O (Gas Transmission Pipeline Integrity management)
- 49 CFR 195. 450, 49 CFR 195.452 (Liquid Pipeline Integrity Management)
- ASME B31.8-2004, *Managing System Integrity of Gas Pipelines*
- NISTIR 6546 Thermal Radiation from Large Pool Fires

BL07 Understand the Elements of a Transmission Pipeline Easement

Practice Statement Property developers/owners should have an understanding of the elements of and rights conveyed in a transmission pipeline easement.

Audience Property Developer/Owner

Practice Description Understanding the elements of and rights conveyed in a transmission pipeline easement can improve the relationship among stakeholders and ultimately pipeline and public safety.

An easement agreement and survey (and/or accurate drawing) should be available to the affected landowner. Easement agreements and survey documents may be available from various sources, including the pipeline operator and the county/municipal land records department.

The property developer/owner should consider what is allowed under the easement agreement relative to the pipeline operator's rights to site aboveground transmission pipeline facilities, such as compressor stations, metering stations, valves, pipeline markers, and cathodic protection systems (see PIPA Recommended Practice ND18). The property developer/owner and local government should work with the pipeline operator to ensure that any land use and development plans would not interfere with the current or potential future locations of such pipeline facilities or the operation and maintenance of the pipeline and related facilities.

What are the elements of an easement?

The forms of transmission pipeline right-of-way easements differ from company to company, and the legal requirements of a right-of-way easement differ from state to state. Easements can range from one page with a few provisions to twenty or more pages that attempt to address every eventuality. To be enforceable, the agreement must conform to all of the requirements set out by state law.

While requirements for easement provisions vary, the following items are typical for most easements.

1. The easement must designate a grantee and a grantor. The grantor is normally the landowner or an agent of the landowner, and the grantee is normally the transmission pipeline company.
2. The granting clause is normally the first or second paragraph of an easement and describes the rights granted to the grantee. For transmission pipeline easements, this clause usually lists the rights granted to the pipeline company such as: "lay, construct, maintain, alter, replace, change the size of, and remove a pipeline or pipelines…."
3. Most states require that all real estate-related documents provide for compensatory consideration. The object is to provide the landowner with just or adequate compensation in exchange for the easement.
4. The property over which the easement is granted and the locations and dimensions of the easement and of the transmission pipeline are described in some manner. Legacy easements may exist where the location of the pipeline or the boundaries of the right-of-way were not defined. New easements should define both.

In most states, the property can be described by referencing its deed of acquisition or other related documents in the chain of title, by written description, or by plat or drawing. (Note: In some states, a drawing must be attached to an easement or right-of-way grant before the document can be recorded). The easement to be granted can be described by written description, by drawing or by a defined reference such as, for example: "Said right of way being fifty foot in width and extending twenty-five feet from each side of the centerline of the pipeline installed hereunder, together with the right to use a strip of land adjacent to the said right of way as temporary work space during construction of said pipeline, (all as generally depicted on Exhibit "A" attached hereto), on, over, under, and through the following described lands…."

There may be a second, separate and fairly wide, temporary working easement. The easement should be surveyed and marked before construction begins.

5. Optimally, easements should have a series of applicable provisions that further establish the rights and responsibilities of each party. Such provisions may include but are not limited to:

    a. Construction related provisions, including specifications of: temporary workspace, restoration requirements, timetable or time of day for construction, temporary crossings across open trenches or ditches, backfilling and compaction of trenches.

    b. Site-specific environmental issues.

    c. Other transmission pipeline details, such as: depth of cover requirements; number and size of pipelines; additional line rights; product transported; maximum size; maximum pressure; and above-ground facilities, such as but not limited to: test leads, markers, rectifiers, casing vents, valves and valve actuators, meter stations and pig launcher/receivers.

    d. Encroachments: driveways, access roads, gates or cattle guards where easement crosses fence lines, acceptable landowner uses (see PIPA Recommended Practice ND08)

    e. Routes of ingress and egress: maintenance of access roads, gates and/or cattle guards.

    f. Inspection and maintenance: right-of-way clearing, pipeline operator maintenance and inspection schedules.

    g. Pipeline and appurtenance abandonment: disposition of the transmission pipeline and easement after the pipeline is abandoned. Disposition of idled or out of use but not abandoned transmission pipelines.

    h. Liability for certain damages or negligence.

    i. Indemnification: An indemnity agreement provides that one party will save and hold harmless the other party against any legal causes of action, including environmental, levied as a result of activities both on and off the land. The indemnity could include both judgments and any legal fees incurred in defense of a suit. Each party should consider indemnification from the other.

j. Notification of assignment to a third party: “Assignment” is the ability of a transmission pipeline operator to transfer the easement with the sale of the pipeline to another party. Landowners may want to be notified if the operator sells the pipeline to another entity.

k. State and local government requirements.

l. Payment: Payment may be specified, for example, for the easement, damages to crops, timber or other products located within or outside of the easement, impact to land entitlements, division between the landowners and the surface tenant, duration, survey fees, legal review fees, recording fees, and taxes on payment.

6. The date of the document, signatures of the grantors and their acknowledgements are not provisions but are mandatory requirements of an easement or real estate type documents. Signatures of the grantors of the easement documents must be exactly as they appear on the previous documents confirming their capacity in which they hold title to the property. Notary public information is below the landowner and pipeline company signatures. Easements are recorded with the appropriate statutory body and are accessible to the public.

BL08 Manage Land Records

Practice Statement Land use agreements between pipeline operators and property owners should be documented and managed and, when necessary, recorded.

Audience Property Developer/Owner, Transmission Pipeline Operator

Practice Description

Allowable property owner activities and uses of a transmission pipeline right-of-way (ROW) are initially created when an easement agreement (see PIPA Recommended Practice BL07) is signed between the property owner and the pipeline company. These agreements are normally recorded with the appropriate statutory office. Once an easement agreement is executed, the property owner may have limited rights to perform certain activities within the boundaries of the easement. Usually, the property owner may make use of the easement in any manner that is consistent with and that will not interfere with the rights and activities granted to the pipeline operator in the easement. The character and extent of the rights created for both the grantor and grantee by a grant of easement is determined by the language of the grant.

A property owner may desire to use the land within the boundaries of the easement in a manner that was not allowed in the original easement agreement. To do so, the property owner will need to consult with the transmission pipeline operator to gain permission to perform the desired activity or use. If permission is granted, the agreement may be documented in the form of an encroachment agreement (see PIPA Recommended Practice ND26), a letter of no objection (Practice ND27), a partial release (Practice ND28), or an easement amendment (Practice BL09). The type of agreement document may vary, depending on the type and scope of the proposed activity or use of the easement.

Anyone who subdivides property, including subdivision developers, should provide purchasers of individual lots copies of applicable easements and, if available, a survey or drawing showing the location of the transmission pipeline and extent of the pipeline easement (see PIPA Recommended Practice ND10). Subdivision developers should record in the deeds the existing pipeline easements covering each lot in the subdivision.

Land documents should be recorded in order to provide public access to the records and public notice (i.e. constructive notice) of encumbrances on the affected property. Recording land documents is the official means by which interests in real property are made a matter of public record, and is necessary when public access to information related to easements, encroachment agreements, partial releases, letters of no objection, etc. is needed. Affected parties are charged with "constructive notice" of all recorded documents. Unrecorded easements and other interests may be challenged if a subsequent purchaser of a property subject to an easement buys it with no actual notice of the easement or other interest.

Transmission pipeline operators or property owners should record property easements and similar agreements as soon as possible after acquiring them. If existing easements were not recorded when they were acquired, they still can be recorded. In order to maintain or protect rights or meet obligations, the property owner and transmission pipeline operator must know such rights or obligations exist. A

documented agreement between a property owner and a transmission pipeline operator provides a clear, enforceable vehicle to communicate allowable activities or uses of the pipeline right-of-way, including those that are not allowed in the original easement. Recording easements will help ensure that land use and development activities are not conducted in a manner that could be detrimental to transmission pipeline integrity and safety.

Documentation of easements is necessary to identify issues that may arise in planning future land use and development. Identification of potential conflicts and issues provides the opportunity to resolve them through discussion early in the planning process. Regardless of the type or duration of the agreement, property owners are subject to applicable state one-call damage prevention laws prior to performing any excavation on a transmission pipeline right-of-way.

In addition to recording documents with the appropriate statutory office, transmission pipeline operators should have a comprehensive record-keeping system established for land documents. Agreement records should be retained for the life the document, including any "encroachment agreement", letter of no objection", "partial release", or "easement amendment".

References:

- State of Minnesota in Supreme Court CX-96-2319

BL09 Document and Record Easement Amendments

Practice Statement Easement amendments should be documented, managed and recorded.

Audience Property Developer/Owner, Transmission Pipeline Operator

Practice Description

A transmission pipeline operator may desire to use the land within the boundaries of the easement in a manner that was not allowed in the original easement agreement. Examples of modifications to the agreement include the installation of additional appurtenances, the utilization of an existing right-of-way for additional pipelines for the efficient use of land, or the redefining of the easement. To do so, the transmission pipeline operator will need to consult with the property owner to gain permission to perform the desired activity or use. If permission is granted, the agreement may be documented in the form of an easement amendment.

Easement amendments modify the existing agreement between the pipeline operator and the landowner. The parties with legal interests to the land come to agreement on the language of the easement amendment, survey the property and record the amendment with the appropriate statutory office (i.e. county recorder, parish clerk). The easement amendment is retained for the life of the easement. There may be additional compensation provided to the landowner based on the value of the land in exchange for the new rights.

BL10 Implement Communications Plan

Practice Statement Transmission pipeline operators should develop and implement effective communications plans when communicating acceptable transmission pipeline right-of-way uses and activities to property developers/owners and other stakeholders.

Audience Transmission Pipeline Operator

Practice Description

Typical transmission pipeline operator to stakeholder communications regarding acceptable rights-of-way uses and activities occur either to: 1) exchange information; 2) educate; or 3) cause behavior or a change in behavior. Most pipeline operator communications regarding acceptable right-of-way uses and activities are intended to cause certain behaviors among stakeholders. Understanding what behavior is expected and what behavior is currently exhibited is important to changing behavior. To maximize the opportunity created with each communication, the pipeline operator should give considerable thought to what behavior is desired, what behavior needs to change, and what behavior should be maintained by the specific stakeholder segment.

A process model for communicating to stakeholders regarding acceptable uses and activities on transmission pipeline rights-of-way is applicable in any circumstance. This includes existing transmission pipelines in existing developed areas and rural areas, when a new transmission pipeline is being constructed, and when new development is occurring near an existing transmission pipeline. The following PIPA seven-step model is useful when a transmission pipeline operator is communicating acceptable right-of-way uses and activities to land owners and other stakeholders. However, the model can be used by any stakeholder to make their communications more effective.

1. Identify the problem (or need) the communication will address
2. Determine which stakeholder(s) receives the communication
3. Identify draft message to be communicated
4. Develop the final message and message delivery system based on a strategy best suited for the desired outcome
5. Implement communications
6. Measure effectiveness
7. Identify and implement changes if necessary

Further discussion of the PIPA seven-step communication model is included as Appendix E.

Transmission pipeline operators are required by current pipeline safety regulations to develop and implement enhanced public awareness programs following the American Petroleum Institute's Recommended Practice (RP) 1162. RP 1162 has requirements similar to this seven-step process. Additionally, the Common Ground Alliance (CGA) Damage Prevention Best Practices include practices for communicating with damage prevention stakeholders.

BL11 Effectively Communicate Pipeline Risk and Risk Management Information

Practice Statement Transmission pipeline operators should identify barriers to effectively communicating with stakeholders and use communication techniques designed to overcome those barriers and effectively engage stakeholders to communicate with them regarding pipeline risks and how the operator manages such risks.

Audience Transmission Pipeline Operator

Practice Description

For communication to be effective, it must be a two-way dialogue. However, personal experiences affect the way messages are received. This and other considerations make it essential that the transmission pipeline operator understands that there may be barriers to effective communication and finds ways to overcome those barriers to better communicate with stakeholders.

Appendix F to this report looks at communications barriers from the perspective of a transmission pipeline company communicating with key stakeholder audiences, and provides some suggested considerations and tools to potentially address those barriers. Some, all, or none of the barriers identified in Appendix F may be present in any actual situation.

Identification of barriers to effective communication is also inherent to the PIPA seven-step communication model (see Recommended Practice BL10). Communication regarding pipeline risk and risk management should follow the PIPA seven-step model. (See Appendix E)

The transmission pipeline operator should openly communicate with stakeholders regarding land use and development near pipelines. Regular meetings with key local officials involved in land use planning and development and with local developers and developer organizations should be held to provide an easy flow of information to and from these key stakeholders.

BL12 Notify Stakeholders of Right-of-Way Maintenance Activities

Practice Statement Transmission pipeline operators should notify affected stakeholders of right-of-way maintenance activities, including vegetation management.

Audience Transmission Pipeline Operator

Practice Description

After a transmission pipeline is installed, the pipeline right-of-way (ROW) must be maintained by the pipeline operator to allow for inspection of surface conditions as required by federal law. The transmission pipeline operator must maintain the ROW vegetation so that it will not hinder pipeline inspection and maintenance activities. Extensive landscaping or other obstructions can block the view of and impede the operator's access to the pipeline.

Prior to implementing ROW maintenance activities, the pipeline operator should make a reasonable effort to contact the affected stakeholders and provide an explanation regarding the need for vegetation management activities. This should include a discussion of the rights granted under easements for the pipeline operator to maintain the ROW, and the anticipated start and completion dates for the maintenance activities. Timely notification should be provided to the affected stakeholder. Notification may take place via methods such as mailed letters, door hangers, phone calls, or face-to-face contacts, depending on the location and situation.

Re-establishing a right-of-way that has not been previously maintained may require additional advance communications between the property owner and the transmission pipeline operator prior to initiating the activity.

Following is a discussion regarding the bases for maintaining the ROW. The transmission pipeline operator may want to include a discussion of these bases in its communication with affected stakeholders.

The transmission pipeline right-of-way must be maintained in order to facilitate the identification of surface conditions such as:

- Unauthorized activities on or near the right-of way
- Heavy equipment on the right-of-way without authorization
- Urban encroachment
- Construction activities on or near the right-of-way
- Soil defects
- Erosion at water crossings, flooding on the right-of-way or sedimentation in streams
- Damage to company property
- Missing or moved aerial markers, pipeline line markers or identification signs
- Evidence of leaking gas or liquid

A transmission pipeline ROW that is adequately maintained free of obstructions is an important visual indicator of the existence of transmission pipeline facilities for anyone performing construction or other work near the pipeline. Third-party incidents are a leading cause of damage to transmission pipelines

and often occur when excavation or other construction activity occurs near the pipeline and the pipe is accidentally struck.

If pipeline damage occurs, the pipeline operator may need direct and immediate access to the pipeline and this will be facilitated by an adequately maintained ROW. In the event of an emergency, a clear ROW is necessary to facilitate access by both the pipeline operator and emergency response personnel. Obstructions on the ROW can prohibit their ability to respond.

A clear ROW makes conducting inspections, often performed via aerial patrol, more efficient and effective. Other methods of inspecting transmission pipelines, such as vehicle and foot patrols, also require a clear ROW.

A clear ROW enables the transmission pipeline operator to conduct inspections and testing to verify pipeline integrity and to perform general maintenance and repairs as needed. According to pipeline safety regulations, transmission pipeline operators must have a patrol program to inspect and observe surface conditions on and adjacent to the transmission line right-of-way for indications of leaks, construction activity, and other factors affecting safety and operation. While an operator may choose to perform inspections more frequently, hazardous liquid transmission pipeline operators must inspect 26 times a year at an interval that does not exceed 21 days. Natural gas transmission pipeline operators must inspect 1 to 4 times a year at an interval that does not exceed 4.5 to 15 months, depending on the population density near the pipeline. The pipeline ROW should be maintained at a frequency that allows the operator to inspect surface conditions at the minimum required inspection intervals.

The ROW maintenance frequency should also be in keeping with the surrounding environment. For example, a greenway in a suburban development may be maintained more frequently than a ROW through a forested park.

Although maintaining the ROW for 25 feet on each side of the pipeline is typical, the easement agreement may dictate otherwise. A smaller maintenance distance may be adequate, depending on local conditions and methods used for ROW inspection, as long as it is adequate for access and inspection of the ROW surface conditions.

Side trimming of the tree canopy may be necessary for aerial surveillance to be effectively performed. For aesthetic purposes, operators may “feather cut” in more urban and developed areas while they may “hard cut” in more rural areas. Whichever technique is used, the result should be a clearly defined ROW to help keep the public aware of the pipeline’s presence and provide for operation and maintenance needs.

In addition to side trimming, operator vegetation maintenance practices should include scheduled mowing and brush-hogging where necessary. Typically, pipeline operators use herbicides in a limited way to control weeds, vines and woody vegetation near valve locations, fences, above-ground facilities and difficult to access locations.

Trees should not be allowed within the boundary of the ROW. Tree roots have the potential to damage pipeline coatings which may contribute to the loss of integrity of the pipeline. With prior approval from the transmission pipeline operator, grass and certain types of shrubs may be permitted within the ROW,

provided that the plantings do not interfere with the maintenance, inspection and operation of the pipeline and related facilities. Typically these would include seasonal crops that would be consistent with the area, flower beds, vegetable gardens and lawns. Rights-of-way can provide useful and functional habitats for plants, nesting birds, small animals, and migrating animals. Plants that are native to the area are desirable.

References:

- 49 CFR 192.705, 49 CFR 195.412
- American Petroleum Institute Guidelines for Property Development
- Transportation Research Board Special Report 281, *Transmission Pipelines and Land Use: A Risk-Informed Approach*
- American Petroleum Institute (API) Recommended Practice (RP) 1162, Public Awareness Programs for Pipeline Operators

BL13 Prevent and Manage Right-of-Way Encroachment

Practice Statement Transmission pipeline operators should communicate in a documented and timely manner with property developers/owners to prevent or rectify unacceptable encroachments or inappropriate human activity within the transmission pipeline right-of-way.

Audience Transmission Pipeline Operator

Practice Description

When property developers/owners place structures, trees or other facilities on the transmission pipeline right-of-way (ROW), these encroachments may interfere with pipeline operations. The transmission pipeline operator should seek relief from the encroachment, particularly when the obstruction of an easement is of a permanent character.

To ensure consistency, a transmission pipeline operator should have a written encroachment policy in place. The policy should address: educating stakeholders, patrolling and inspecting the pipeline ROW for unsafe conditions and activities, documenting the results of patrols and inspections, communicating with stakeholders regarding encroachments, and removing unacceptable encroachments, including long-standing ones.

Once an encroachment is detected, the pipeline operator should document the encroachment and contact the encroaching party. If the encroachment is deemed acceptable by the pipeline operator, an encroachment agreement should be documented and signed by the landowner and the pipeline operator in accordance with the operator's policy, and recorded with the statutory office (i.e. county recorder, parish clerk).

Encroachment policies should be enforced diligently, uniformly and consistently. To promote encroachment prevention, landowners and developers should seek approval from the transmission pipeline operator for any plans that could impact the transmission pipeline ROW. Pipeline operators should ensure that all pipeline markers and signs are in good condition, legible and properly located. They should have adequately maintained and clearly defined ROWs (see PIPA Recommended Practice BL12).

Communication between the transmission pipeline operator and the property developer/owner builds a partnership in pipeline safety.

References:

- Interstate Natural Gas Association of America (INGAA) Sample Documents: Encroachment Procedure, Encroachment Report, Encroachment Reporting Procedure (See Appendix I)
- 49 CFR Parts 195.410, 195.412, 192.705 & 192.707
- American Petroleum Institute (API) Recommended Practice (RP) 1162, Public Awareness Programs for Pipeline Operators
- American Petroleum Institute Guidelines for Property Development

BL14 Participate to Improve State Excavation Damage Prevention Programs

Practice Statement All pipeline safety stakeholders should participate in the work of organizations seeking to make improvements to state excavation damage prevention programs, especially efforts to reduce exemptions from participation in one-call systems.

Audience Local Government, Property Developer/Owner, Transmission Pipeline Operator

Practice Description

A state excavation damage prevention program is comprised of a combination of state law, regulation, and procedure intended to facilitate communication between excavators and owners of underground facilities. Generally, excavators submit notices prior to excavation, which the one-call system passes on to affected facility owners in the vicinity of the proposed excavation. The facility owners/operators can then locate and mark their facilities before excavation begins. By facilitating this communication, one-call systems reduce the risk of excavator injury, damage to underground facilities, and construction down-time. Transmission pipeline operators are required by federal pipeline safety regulations to participate in qualified one-call systems. The Common Ground Alliance (CGA) Best Practices are internationally accepted as effective methods of reducing the risk of excavation damage to all underground facilities.

Some state excavation damage prevention laws include exemptions from one-call system participation that detract from the goals of the system. Typical exemptions fall into three categories:

1. Facility Owners Some state laws exempt owners of specific types of underground facilities from participation in the one-call system. Excavators must contact these facility owners directly for facility locating and marking before excavating. While this exemption allows certain facility owners to avoid the cost of participation, excavators may not be aware of these exemptions and could begin excavating without having all affected utilities located and marked. This could result in damage to those facilities. Types of facility owners exempted by some state laws include municipalities, state departments of transportation, and small water and sewer companies.
2. Excavators Some excavators are exempted from calling for underground facilities to be located and marked before they begin digging. If the excavator chooses to exercise this exemption, the likelihood of excavation damage is increased. Damage to any type of underground infrastructure could have negative consequences. Thus, these exemptions create safety risks. Types of excavators exempted by some state laws include homeowners and state departments of transportation.
3. Types of Excavation Excavators are exempted from calling for a utility locate before conducting specific types of excavation. Any excavation can damage underground facilities, especially if the facilities are shallow or the type of excavation changes during the course of the project. Types of excavations exempted by some state laws include road grading.

Many organizations across the country are actively working to improve state excavation damage prevention programs. The Common Ground Alliance (CGA) works at the national level and has recently formed partnerships with regional organizations. Many of these regional organizations existed well before the CGA as damage prevention councils or utility coordinating councils, but have welcomed the CGA's support to broaden their membership base.

A summary of PHMSA damage prevention initiatives is available on PHMSA's Pipeline Safety Stakeholder Communications website.

References:

- 49 CFR 192.614, 49 CFR 195.442

BL15 Enhance Damage Prevention Practices near High-Priority Subsurface Facilities

Practice Statement Transmission pipeline operators should implement enhanced damage prevention practices within the transmission pipeline right-of-way to ensure that pipeline operators and excavators meet on-site prior to excavation activity near high-priority subsurface facilities.

Audience Transmission Pipeline Operator

Practice Description

The Common Ground Alliance (CGA) Best Practices are internationally accepted as effective methods of reducing the risk of excavation damage to all underground facilities. However, the CGA Best Practices apply to all types of underground facilities, including cable television, water pipelines, and transmission pipelines. High-priority subsurface facilities warrant more stringent damage prevention practices.

High-priority subsurface facilities include transmission pipelines, high-voltage electric supply lines, fiber optic lines, and pressurized sewage pipelines. Damage to these high-priority subsurface facilities could result in significant physical injury to the excavator and/or individuals in the vicinity of the excavation. Damage could also result in interruption of critical services or products. Unreported or undetected damage to high-priority subsurface facilities poses a significant risk to life, property, and infrastructure.

CGA Best Practice 4-9, "Positive Response is Provided to Facility Locate Requests" does not require a face-to-face meeting or an onsite meeting between the transmission pipeline operator and excavator prior to the beginning of the excavation. Under the practice, positive response can be markings or documentation left at the job site, callback, fax, or automated response system.

To ensure appropriate damage prevention when excavation is proposed within 10 feet of a transmission pipeline or other high-priority subsurface facility, the pipeline operator or other facility operator should notify the excavator of the existence of the transmission pipeline or other high-priority subsurface facility prior to the legal excavation start date and time, as such date and time are authorized pursuant to one-call requirements. The excavator and transmission pipeline operator should conduct an onsite meeting at a mutually agreed upon time to determine actions or activities required to verify the location of the pipeline or other high-priority subsurface facility prior to the start of excavation.

When excavators are performing tasks that are of high risk to transmission pipeline safety, communication clearly delineating the technical details of the operation needs to be documented. Transmission pipeline operators should provide information such as the location, size and type of pipeline facility to the excavator.

Excavators should provide the operator with details about the type of equipment excavation equipment to be used, duration of the excavation project, dynamic loading over the pipeline, and other technical information in order for the pipeline operator to perform an engineering evaluation of the effects on the pipeline. The pipeline operator may require additional measures be taken to protect the pipeline from excessive loads or potential damage due to misaligned horizontal directional drills. Additional dirt cover and/or mats, timber bridges, or other protective materials deemed necessary by the transmission pipeline operator may be placed over the pipeline for the duration of any loading. Vibration equipment

is usually not permitted within the transmission pipeline right-of-way. Hand digging at a minimum of two feet from the pipeline is typically required. This recommended practice is not intended to preempt any existing state or transmission pipeline operator requirements that currently specify a different distance.

Once the required information (planned work, types of equipment, loads, etc.) is received from the excavator, the pipeline operator will need sufficient time to review and develop solutions to ensure that the pipeline is adequately protected. Work should not commence until the operator has provided written notification to proceed. The operator and the one-call system need to be contacted before digging. After excavation begins, the transmission pipeline operator should have a representative on site to monitor construction activities within the right-of-way.

BL16 Halt Dangerous Excavation Activities near Transmission Pipelines

Practice Statement Transmission pipeline operators should have procedures and established contacts with local enforcement personnel in order to act appropriately to halt dangerous excavation activities that may damage their pipelines and potentially cause an immediate threat to life or property.

Audience Local Government, Transmission Pipeline Operator

Practice Description

Transmission pipeline operators should have written procedures to address the need to stop an excavation when it poses an immediate threat to the transmission pipeline facility or the general public. These procedures should include outreach to local enforcement agencies and personnel. The outreach communications should include information describing potential dangers to public safety of unsafe excavation practices near the pipeline.

Local enforcement personnel play a critical role due to their authority to legally halt an unsafe excavation. Agencies with the authority to halt a dangerous excavation may vary among governments. For example they may include titles such as Safety Officer, Police, Fire Department, Fire Marshal, Utility Coordinator, and Building Code Department.

The transmission pipeline operator should build relationships with the proper enforcement personnel in advance to facilitate timely response and corrective action.

References:

- American Petroleum Institute (API) Recommended Practice (RP) 1162, Public Awareness Programs for Pipeline Operators

BL17 Map Abandoned Pipelines

Practice Statement When a transmission pipeline operator abandons a transmission pipeline, information regarding the abandoned pipeline should be maintained and included in the information provided to the one-call center.

Audience Transmission Pipeline Operator

Practice Description

When abandoning a transmission line, the pipeline operator should maintain the facility registration of the abandoned line with the one-call system. When receiving a notice of excavation from the one-call center, the transmission pipeline operator should, if known: (a) provide markings or notification to the excavator of the abandoned pipeline, (b) advise the excavator of the abandoned pipeline's contents, if known, and (c) advise the excavator of any safety precautions to take while working over or in close proximity to the abandoned pipeline. Transmission pipeline operators should inform excavators that if an unidentified pipeline facility is encountered during excavation, the excavator should not treat the underground pipeline facility as abandoned until receiving notification from the pipeline operator that the underground pipeline facility is abandoned.

Most one-call centers do not maintain line segment data from transmission pipeline operators. Operators typically identify by mapped polygons or grids areas for which the operator requests notification of excavating activities. The one-call center does not differentiate between active and abandoned lines. This recommended practice is intended to enable the transmission pipeline operator to identify the location of an abandoned pipeline for the excavator. This practice applies to transmissions pipelines abandoned after the PIPA recommendations are issued.

References:

- Arizona Statute 40-360.22
- Common Ground Alliance (CGA) Best Practices, Practice # 4-11: Information on Abandoned Facilities Is Provided When Possible.

BL18 Disclose Transmission Pipeline Easements in Real Estate Transactions

Practice Statement As part of all real estate sales contracts, each state should require the disclosure of known transmission pipeline easements on the property.

Audience Real Estate Commission

Practice Description

Disclosure of transmission pipeline easements should be done in the same way that the state requires disclosure of other environmental risks, such as lead paint or asbestos products. A copy of the easement document and contact information for the transmission pipeline operator should be provided to any prospective purchaser, by the seller or seller's agent, prior to the time the initial purchase documents are signed. The existence of a transmission pipeline easement on a property should be made clear to all prospective purchasers to enable them to make informed decisions concerning the risks. Though the existence of an easement is typically noted in real estate closing papers or title reports, purchasers can be unaware that the easement is for a transmission pipeline. The disclosure language should make clear that the pipeline easement is for a transmission pipeline. The rights of the property owner and easement holder are typically spelled out in the easement document; it is important that a prospective purchaser have a copy of the easement document to examine.

ND01 Incorporated into other recommended practices. Page is otherwise blank. See PIPA Recommended Practices BL03 and BL05 for guidance.

ND02 Gather Information for Design of Property Development near Transmission Pipelines

Practice Statement In designing a proposed property development the property developer/owner should use all reasonable means to obtain information about transmission pipeline facilities in the area of the proposed development.

Audience Property Developer/Owner, Transmission Pipeline Operator

Practice Description

During the planning phase of a property development project, property developers/owners should seek available information about existing and possible future transmission pipeline facilities.

If the one-call center has a process for receiving and transmitting requests for meetings between developers and/or excavators and pipeline facility operators, the property developer/owner should utilize this service to request a consultation with the transmission pipeline operator. A meeting request through the one-call center can inform an affected transmission pipeline operator (and other underground facility operators) of the requestor's need to meet and discuss the proposed design. Or, it can provide a listing of affected transmission pipeline operators (and other underground facility operators) to the requestor so that a call to each operator can be made to request a meeting.

In response to requests for information, transmission pipeline operators may locate and mark their underground facilities or identify the locations of their underground facilities to the designer by other means, such as by marking-up design drawings or providing facility records to the designer. The property developer/owner should request maps of existing, abandoned and out-of-service facilities, cathodic protection and grounding systems, as-built drawings of facilities in the area if the maps are not current, future proposed project designs, and schedules of other pipeline-related work in the area. Information gathered when evaluating different design possibilities relative to the needs of the developer, community, and the transmission pipeline operator may include information such as easement widths, pipeline contents, and pipe diameter.

Transmission pipeline operators may use this opportunity to provide the property developer/owner a copy of the company's development guidelines and procedures, if they exist. Other methods of gathering information available to the property developer/owner may include contacting coordinating committees/councils, other designers, engineering societies, and governmental agencies as a means of identifying underground facility owners/operators in an excavation area. Gathering information may also include a review of the site for above ground indications of underground facilities (i.e. permanent signs or markers, manhole covers, vent pipes, pad mounted devices, riser poles, power and communication pedestals and valve covers).

Another reference source for determining the general location of transmission pipelines is the National Pipeline Mapping System (NPMS). Developers may access the NPMS online.

References:

- Minnesota Statute 216D
- Pennsylvania Act 287 of 1974, as amended by Act 187 of 1996
- Subsurface Utility Engineering. Federal Highway Administration

- Florida Department of Transportation Utility Accommodation Manual, Topic No.: 710-020-001-f, October 2007
- NTSB Safety Study, Protecting Public Safety through Excavation Damage Prevention, NTSB Report Number: SS--97/01, NTIS Report Number: PB97-917003)
- Common Ground Alliance Best Practices 2-2 and 3-15

ND03 Review Acceptability of Proposed Land Use of Transmission Pipeline Right-of-Way Prior to Design

Practice Statement The property developer/owner should review preliminary information about acceptable land uses on a transmission pipeline right-of-way prior to the design of a property development.

Audience Property Developer/Owner

Practice Description

Managing land use activities on a transmission pipeline right-of-way (ROW) is a challenge for all stakeholders involved. A property developer/owner may desire to utilize the ROW in a property development. However, inappropriate land use activities can contribute to the occurrence of a transmission pipeline incident and expose those working or living near a transmission pipeline to harm should an incident occur.

When considering a new land use activity in a transmission pipeline ROW, the property developer/owner, along with the pipeline operator should consider who maintains the ROW and how it is maintained. The existing easement is the governing document and any changes to that document should be recorded in an encroachment agreement (see Recommended Practice ND26). Encroachment agreements are encouraged to ensure appropriate communication occurs and that all parties have appropriate and complete information on which to base decisions. It should be noted that most ROW agreements have a section for pipeline repairs with the understanding that the ROW may be disturbed, whether by access or excavation. The need for repairs is a considering factor into the acceptability of a land use or activity on a transmission pipeline ROW.

Many transmission pipeline operators provide operator specific guidelines for uses of the pipeline right-of-way. Pipeline industry association websites provide guidance materials to assist the property developer/owner in assessing the common acceptability of different uses of the pipeline right-of-way. The table in Appendix D is another source of guidance intended to increase awareness and encourage early communication among key stakeholders when considering changes to existing land use or new land use development near existing transmission pipelines.

Appendix D lists common land use activities as a guideline in determining whether a proposed land use may be acceptable or not. There may be variances to this guidance based on site specific conditions and individual pipeline operator practices. Early notification to the transmission pipeline operators by the property developer/owner is encouraged, to ensure optimum land use considerations and pipeline safety.

ND04 Coordinate Property Development Design and Construction with Transmission Pipeline Operator

Practice Statement When property development is planned within the consultation zone (reference PIPA Recommended Practice BL05), the property developer/owner and the transmission pipeline operator should communicate to ensure possible impacts of pipeline incidents and maintenance needs are considered during development design and construction.

Audience Property Developer/Owner, Transmission Pipeline Operator

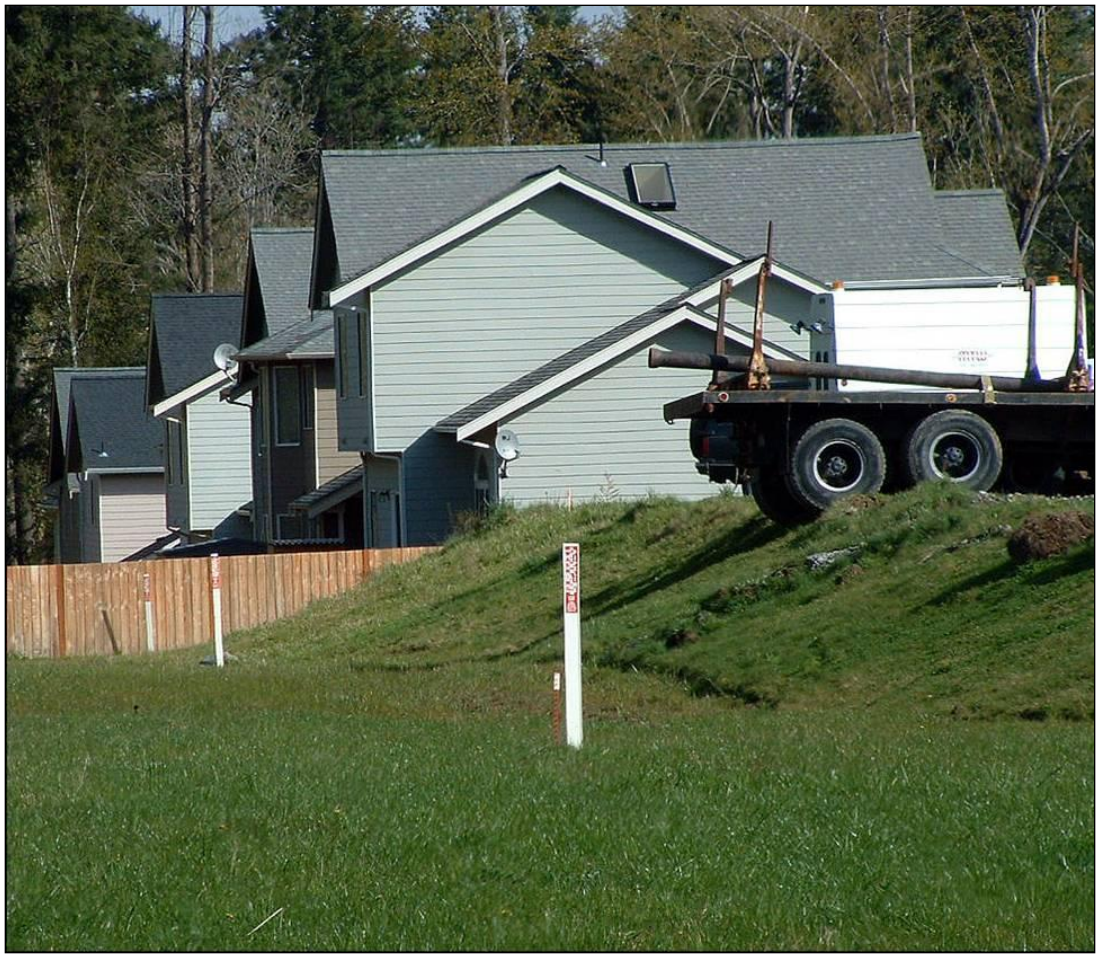
Practice Description

Property developers/owners should initiate communication with transmission pipeline operators as early as possible in the property development planning process. Early discussions may ward off development designs that could raise the risk of impact to the community or damage to a nearby transmission pipeline.

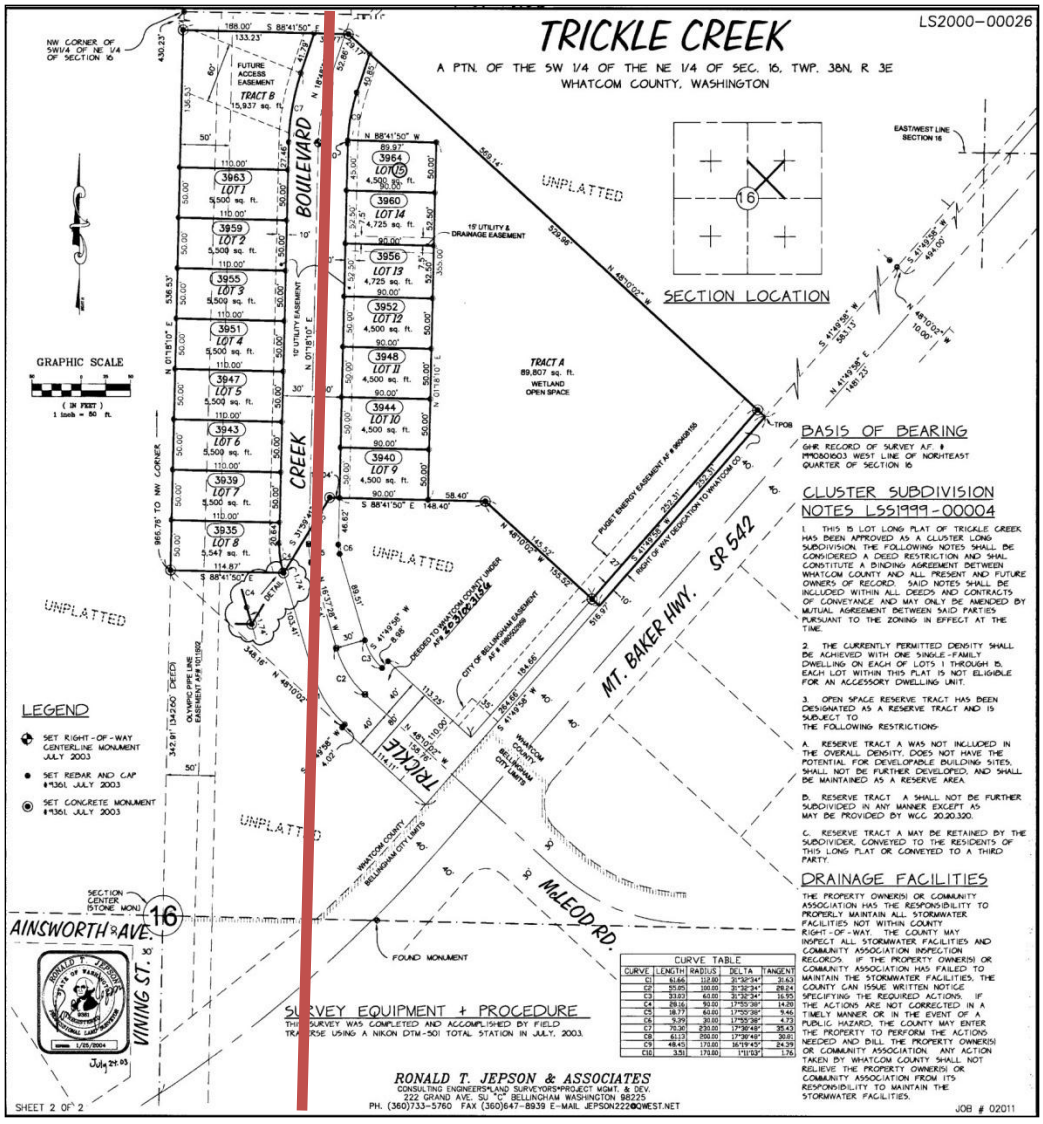
As the development construction start date draws nearer, the cost of redesigns can become much more significant. Also, the property developer/owner may miss an opportunity to use the transmission pipeline right-of-way to enhance the property development (see PIPA Recommended Practice ND08). Other property development design considerations relative to the proximity of a pipeline are discussed in PIPA Recommended Practices ND08 – ND15.

Regardless of when communication begins, the construction phase of a property development poses the greatest risk to the integrity of a nearby transmission pipeline. The location of the transmission pipeline easements should be shown on the construction plans. The one-call system should be used to ensure the precise location of all underground facilities is determined before excavation begins. Also, the development construction should not inhibit access for to the transmission pipeline for the pipeline operator or emergency responders.

The following examples illustrate the negative consequences for stakeholders if communication about proposed property developments near transmission pipelines occurs late in the planning process.



Example of development constructed over a transmission pipeline right-of-way without consultation among property developer/owner, transmission pipeline operator and local government. Note the encroachment of the fence on the transmission pipeline right-of-way. It obstructs the transmission pipeline operator's ability to patrol the pipeline. With proper advance planning between the parties in the initial platting stage, perhaps a greenbelt could have been incorporated to eliminate the potential for subsequent ROW encroachments by the property owners. The truck on the right in this picture has the potential for heavy vehicular encroachment over the pipeline. The property owners are prohibited from installing large landscaping, patios or other structures on the transmission pipeline right-of-way.



Example plat of development constructed over a transmission pipeline right-of-way without consultation among developer, transmission pipeline operator, and local government. Note location of the transmission pipeline right-of-way in red. Proper consultation between all parties may have enabled the pipeline to be platted at the rear edge of all lots with possibly a green belt (i.e. no lot lines crossing the easement) provided on the plat.

References:

- Land Use Planning In Proximity to Natural Gas and Hazardous Liquid Transmission Pipelines in Washington State

ND05 Incorporated into other recommended practices. Page is otherwise blank.

ND06 Require Consideration of Transmission Pipeline Facilities in Land Development Design

Practice Statement Whenever development is proposed on property containing transmission pipeline facilities, local governments should require that the submitted land development plans address in detail the steps necessary to safely integrate the transmission pipeline into the design of the project.

Audience Local Government, Property Developer/Owner

Practice Description

Many states and/or local governments have a list of issues that must be addressed as part of the land development process, such as the availability of potable water, sewer, adequate roads, environmental constraints, etc. The land development process should require an analysis of how the development design can safely integrate any existing transmission pipeline facilities.

ND07 Define Blanket Easement Agreements When Necessary

Practice Statement Upon request by the landowner, a transmission pipeline easement agreement may be defined to an acceptable, reasonable, and safe width and explicit location. State statutes or local government regulations may require easements to be defined prior to the approval of rezoning, subdivision plats and development permits.

Audience Local Government, Property Developer/Owner, Transmission Pipeline Operator

Practice Description

Some legacy transmission pipeline easements did not explicitly define the location or size of the easement or the location of the transmission pipelines within the easement. Some agreements did not describe the types of land use activities that could or could not occur on the right-of-way. In some states, these "blanket easements" may give the transmission pipeline operator the right to put a replacement pipeline anywhere on the property within the boundaries of the original easement grant.

The lack of clarity of an easement can lead to conflicts among stakeholders regarding the land use, the location of the transmission pipelines and easement, and the respective rights and obligations of both the land owner and transmission pipeline operator. By defining easement locations prior to approving rezoning, subdivision plats and development permits, confusion is avoided regarding which lands are burdened by the easement rights of the transmission pipeline operator. Mortgage companies may also require the easement be defined prior to providing a mortgage. Some states require the easement owner of blanket easements to define the easement to a specific location when requested by the landowner. Additionally, most transmission pipeline operators have a process for defining the easement to a specific location when requested.

The amended easement should be recorded at the appropriate statutory office (i.e. county recorder, parish clerk).

ND08 Collaborate on Alternate Use and Development of Transmission Pipeline Right-of-Way

Practice Statement Property developers/owners, local governments and transmission pipeline operators may collaborate on alternative use of the transmission pipeline right-of-way and related maintenance.

Audience Local Government, Property Developer/Owner, Transmission Pipeline Operator

Practice Description

Transmission pipeline rights-of-way (ROW) have the potential to be utilized for the benefit of the community and/or the property developer/owner while still maintaining the safety and integrity of the transmission pipeline facilities. Property developers/owners and local governments may work with the pipeline operators to explore possible uses of the property. These could include utilizing the transmission pipeline easement to create green spaces, parks, golf courses, hike and bike trails, horse trails, and other recreational spaces.

In considering such uses, the stakeholders should discuss who will maintain the ROW and how they maintain it. Some local governments and property developers/owners have worked together to the mutual benefit of the community and the developer by offering incentives such as higher building densities in exchange for development that enhances the transmission pipeline ROW.

Appendix C is intended for use by city and county planners, engineers, developers, land surveyors and others involved in the initial stages of land development on or near existing transmission pipeline ROW. It provides visual examples that illustrate both successful collaborative efforts and situations to avoid. In safely developing along a transmission pipeline ROW, certain criteria should be met. These include:

- The ROW should be a clearly defined transmission pipeline corridor that blends with the surroundings. It should not be disguised. The width of a ROW varies, depending on the size and number of transmission pipelines located in the ROW, the products transported, site specific conditions, and pipeline operator practices.
- Permanent structures, significant grade changes, and large landscaping are generally not acceptable.
- The transmission pipeline operator may require the right to disturb the developed use of the ROW in order to maintain and access the transmission pipeline.
- While analyzing potential development of the ROW, the pipeline operator considers potential loading, corrosiveness to the pipeline, increased likelihood of third-party damage, and the ability to monitor and maintain the pipeline.
- For incident and emergency response planning, the pipeline operator considers public escape routes, emergency responder access and situation control, site specific product spill characteristics, and potential environmental impact.

- The operator should establish an effective transmission pipeline marking strategy that will help keep markings in place. Additional markers designed to prevent unauthorized excavation may be warranted.

Development on or near transmission pipelines increases the probability of excavation damage. In an ideal layout for a new development, the entire easement width should be reserved for green space or other community use. It is also desirable to have as few individual landowners as possible be affected by the easement. A lot division on either boundary of the easement is preferable to splitting the easement between lots. Construction, maintenance and routine inspections of the transmission pipeline can be disruptive to the landowner when the easement is split between lots. All stakeholders should consider ways to mitigate this risk throughout the lifetime of the use of the developed right-of-way.

Individual transmission pipeline operators are likely to have different maintenance and operations practices, which could make a specific type of ROW development acceptable to one pipeline operator but not to another. Transmission pipeline operators need enough lead time to review site specific development plans. Generally, the operator will request a scope of work, description, and plan and profile drawings of the proposed development. The pipeline operator may charge for the review if the nature of the proposed development requires extensive preliminary engineering and/or field inspection services. A clear understanding of the property developer's/owner's and pipeline operator's rights, restrictions and responsibilities should be legally documented. Examples of types of land use agreements commonly used are encroachment agreements, encroachment permits, easement amendments, reimbursement agreements, partial releases and letters of no objection.

Development activities near a transmission pipeline ROW may affect the integrity of the transmission pipeline and the safety of the public. Property developers/owners should consult with the pipeline operator as early as possible when planning development near the pipeline ROW. Development activities or land uses near the transmission pipeline ROW that may affect the integrity of the pipeline include but are not limited to: blasting, contouring or terracing, clear cutting, retention ponds, drainage, walls and fences, excavations (e.g., pools, decks, and roads), drilling, boring, and landscaping. Early consultation can help reduce the chance for project delays and ensure that safe development activities can be implemented.

ND09 Provide Flexibility for Developing Open Space along Transmission Pipeline Rights-of-Way

Practice Statement Local governments should consider allowing site planning flexibility in the development of commercial, industrial or residential property whenever a transmission pipeline is located in, or in close proximity to, the proposed development.

Audience Local Government

Practice Description

Site planning flexibility has been incorporated into the development regulations of many jurisdictions, often to accommodate development when there are environmental constraints, such as wetlands and other sensitive areas. Local governments have allowed clustered, higher-density development to be located within broader swaths of open space, thereby creating a buffer to and preserving sensitive areas.

The goal in this recommended practice is to allow the same overall density of development within a given area while providing more space between the transmission pipeline and the development, if there are indications that such flexibility would provide greater safety. While solutions are site specific due to a parcel's topography, shape or size, local governments are encouraged to adopt regulations that allow creative designs that address both public and transmission pipeline safety concerns.

References:

- Vancouver, Washington Municipal Code chapter 20.940, On-Site Density Transfers, for analogous land regulations that are used as described above when "sensitive lands and cultural resources" are located on the property.
- Richland, Washington Municipal Code 22.10.340, example of density transfer used to provide flexibility when there is a "sensitive area and associated buffer area or setback".

ND10 Record Transmission Pipeline Easements on Development Plans and Final Plats

Practice Statement Local governments should require all recorded development plans and final plats to clearly show the location of transmission pipeline easements and identify the pipeline operators.

Audience Local Government, Property Developer/Owner

Practice Description

Final plats and other recorded land records are a primary source for property records research and should show the location of all transmission pipeline easements. They should also identify the pipeline operators.

ND11 Reduce Transmission Pipeline Risk through Design and Location of New Parking Lots and Parking Structures

Practice Statement Parking lots and parking structures should be preferentially located and designed to reduce the consequences that could result from a transmission pipeline incident and to reduce potential interference with transmission pipeline maintenance and inspections.

Audience Local Government, Property Developer/Owner

Practice Description

Parking lots and parking structures can provide low occupant density, lower-risk land use adjacent to a pipeline right-of-way (ROW). Since human occupancy of parking lots or parking structures is likely to be short-term and low-density, they may be preferentially located to create a buffer between the transmission pipeline ROW and other occupied structures. In this manner, they may serve to reduce the exposure of other occupied structures during any potential pipeline incident. Enhanced fire protection and/or the use of materials and design providing enhanced fire endurance may be considered for parking structures adjacent to transmission pipelines to further mitigate the impact of a potential pipeline incident. Additionally, parking lots and parking structures may be designed to reduce potential interference with pipeline maintenance and inspections.

Parking structures cannot normally encroach onto a transmission pipeline ROW. Several factors should be considered in designing parking lots that encroach on a transmission pipeline ROW:

- Written permission from the transmission pipeline operator will likely be required.
- Parking areas very near or over the pipeline should be designed to limit loading that could damage the pipeline.
- Parking lots covering portions of underground transmission pipeline ROW could hamper the discovery of pipeline leaks. To prevent this, parking lot design must take into account methods of improving leak detection. Examples could include periodic strips of grass or shrubbery, vent pipes, sensor strips, etc.
- The effect of water runoff affecting the pipeline cathodic protection and soil cover should be considered when designing the parking lot. Runoff drains and gutters should not funnel water directly into the transmission pipeline ROW, as excess water could erode pipeline soil cover and subsurface pipeline support and could impact pipeline corrosion protection systems.
- Medians and islands adjacent to the transmission pipeline ROW should not contain trees that would obscure the ROW or that have a root system that could damage the pipeline. Shrubs and other low landscaping plants are generally acceptable (see PIPA Recommended Practice ND-15).
- Parking lots between a transmission pipeline and buildings should have an “air gap” between the parking lot and the buildings to reduce the potential for gas leaks to migrate underneath the parking lot and into the buildings.

The property developer should keep in mind that the parking lot might be disturbed by pipeline maintenance activities, including excavation. The transmission pipeline operator may also need to place pipeline markers, sniff points, and cathodic test stations, along the pipeline ROW, possibly within the parking lot itself. These can often be placed within medians and other landscaped areas.

References:

- NFPA 101: Life Safety Code
- NFPA 88A: Standard for Parking Structures

ND12 Reduce Transmission Pipeline Risk through Design and Location of New Roads

Practice Statement Roads and associated appurtenances should be preferentially located and designed to reduce the consequences that could result from a transmission pipeline incident and reduce the potential of interference with pipeline operations and maintenance.

Audience Local Government, Property Developer/Owner

Practice Description

The design and construction of roads near transmission pipelines is complex and requires careful planning and coordination between the transmission pipeline operator, state and local authorities, and the road designer, developer, and constructor. Roads that cross a transmission pipeline ROW should be designed such that the pipeline is not adversely affected, including the provision of adequate protection for the pipeline during and after road construction. This includes but is not limited to ensuring adequate depth of cover for the pipeline and proper road sub-grade and load carrying capacity. The transmission pipeline operator may decide to make modifications to the pipeline to preserve its integrity if a road is built across the pipeline ROW or adjacent to the ROW.

Other considerations for the design and location of roadways across or adjacent to transmission pipeline ROW include:

- Roadway intersections generally should not coincide with a transmission pipeline ROW. Such situations could result in increased exposure to pipeline risk for vehicle drivers stopped at the intersection. These situations could also result in additional interruptions in traffic when pipeline maintenance is performed.
- Roads should generally be located perpendicular to the long axis of the transmission pipeline, which generally reduces the loads on the pipeline from vehicle traffic and reduces the road construction hazard to the pipeline. If the road is placed parallel to the pipeline, the road should be placed outside of the pipeline ROW. If the pipeline ROW is narrow, additional consideration should be given to designing the road to prevent adverse effects on the integrity of the pipeline and to reduce future road impacts due to adjacent pipeline maintenance interruptions.
- Roads may be designed with very wide medians to accommodate a transmission pipeline ROW, with the agreement of the pipeline operator. However, designers and developers should be mindful that pipeline maintenance may require excavation within the pipeline ROW. Also, the presence of a pipeline within a wide median may prevent or limit the ability to place landscaping within the median (see PIPA Recommended Practice ND-15).
- If a road near, or crossing, a transmission pipeline serves as the only means of emergency access or egress then local emergency plans should identify an alternate emergency access and egress route.
- Roadside appurtenances (bridges, tunnels, sound barriers, signage, traffic lights, etc.) should be designed so they do not adversely affect operator access to the transmission pipeline ROW and do not interfere with cathodic protection systems or adversely impact integrity of pipeline.

- A development may avoid costly relocation of transmission pipeline facilities if roads and appurtenances that require specific grades for drainage (such as storm drains, sewers, etc.), are designed to avoid conflicts with the pipeline.

References:

- API Recommended Practice 1102, Steel Pipelines Crossing Railroads and Highways, 7th edition, 2007, API Product Number: D11021
- 49 CFR 192.111, § 192.323, § 192.605, § 192.917, § 195.256, § 195.402, §195.452
- NFPA 502, Standard for Road Tunnels, Bridges, and Other Limited Access Highways, ed. 2008

ND13 Reduce Transmission Pipeline Risk through Design and Location of New Utilities and Related Infrastructure

Practice Statement Utilities (both above and below ground) and related infrastructure should be preferentially located and designed to reduce the consequences that could result from a transmission pipeline incident and to reduce the potential of interference with transmission pipeline maintenance and inspections.

Audience Local Government, Property Developer/Owner

Practice Description

Utilities that cross and/or parallel transmission pipelines should be developed in close cooperation with the pipeline operator to avoid costly relocation of the pipeline or potential conflict with pipeline operations and maintenance. Items to consider include:

- The transmission pipeline's horizontal and vertical orientation must be considered, including any offset distance required by the transmission pipeline operator.
- Utilities crossing the transmission pipeline should be designed so they do not interfere with the pipeline, including its cathodic protection, and should assure the transmission pipeline operator has access to the pipeline.
- To the extent possible, design and construction of underground utilities and related infrastructure should try to minimize potential "migration paths" that could allow leaks from the pipeline to migrate to buildings.

Coordination with the transmission pipeline operator during planning and construction is critical, especially given the history of transmission pipeline incidents associated with utility installation and maintenance.

References:

- Common Ground Alliance Best Practices
- American Petroleum Institute (API) Recommended Practice (RP) 1102, "Steel Pipelines Crossing Railroads And Highways" , 7th edition, 2007, API Product Number: D11021
- 49 CFR 192.467
- American Petroleum Institute (API) Recommended Practice (RP) 1162, Public Awareness Programs for Pipeline Operators

ND14 Reduce Transmission Pipeline Risk through Design and Location of Aboveground Water Management Infrastructure

Practice Statement Storm water and irrigation water management facilities**,** retention ponds, and other above-ground water management infrastructure should be preferentially located and designed to reduce the consequences that could result from a transmission pipeline incident and to reduce the potential of interference with transmission pipeline operations and maintenance.

Audience Local Government, Property Developer/Owner

Practice Description

Storm water and irrigation water management facilities, retention ponds, and other above-ground water management infrastructure can be located between occupied structures and a transmission pipeline to provide a separation buffer to reduce the risk or mitigate the impact of a pipeline incident.

In considering such designs:

- Discharges from ponds and other drainage facilities should be designed to not cause erosion or compromise soil stability that could result in reduction of the soil cover over the transmission pipeline or otherwise compromise pipeline operations and maintenance.
- Culverts, and other enclosed or at-grade drainage systems should be designed to reduce the risk of a potential hazardous liquid or denser-than-air gas release from the transmission pipeline flowing into the drainage system.
- If the flow path to enclosed, or at-grade, drainage systems cannot be avoided, emergency response personnel should be informed to consider this scenario in their response plans.
- The potential for environmental contamination by transmission pipeline releases into drainage facilities and retention basins and downstream environmentally sensitive areas should also be considered.

Vegetated strips and other soft, non-structural storm water treatment methods placed adjacent to or within the transmission pipeline right-of-way may be compatible with pipeline operations and maintenance.

References:

- 40 CFR 122, National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Regulations

ND15 Plan and Locate Vegetation to Prevent Interference with Transmission Pipeline Activities

Practice Statement Trees and other vegetation should be planned and located to reduce the potential of interference with transmission pipeline operations, maintenance, and inspections.

Audience Local Government, Property Developer/Owner

Practice Description

Federal and state pipeline safety regulations require transmission pipeline operators to periodically patrol their pipeline rights-of-way (ROW) to observe surface conditions on and adjacent to the ROW for indications of leaks, construction activity, and other factors that could affect pipeline safety and operation. These patrols are often done by air, using helicopters or planes. To facilitate such aerial inspections, transmission pipeline operators may keep their pipeline ROW clear of trees and tree branches that overhang and obscure the ROW. Pipeline operators may remove or side-cut trees if they obscure or impede the inspection and maintenance of the ROW.

The transmission pipeline ROW should be clearly identifiable apart from trees or other tall vegetation. Property developers/owners should not place trees or vegetation on the pipeline ROW without the pipeline operator's permission. Trees and vegetation planted outside the pipeline ROW should not obstruct the ROW or associated markers or signage. Thus, planting trees and vegetation with broad canopies adjacent to the ROW should be avoided.

Trees and other vegetation should be located and controlled so as not to impede the pipeline operator's ability to access, inspect and maintain the transmission pipeline. Additionally, trees and other vegetation adjacent to a transmission pipeline ROW with root systems that may reach down to the pipeline should also be avoided, since contact from their root systems may physically impact the pipe or its protective coating.

The landowner/developer and transmission pipeline operator should work together using local land use planners and landscape and forestry professionals to make landscape choices that are acceptable.

References:

- 49 CFR Parts 192.705, 192.613, and 192.616, and Part 195 equivalents.
- American Petroleum Institute (API) Recommended Practice (RP) 1162, Public Awareness Programs for Pipeline Operators

ND16 Locate and Design Water Supply and Sanitary Systems to Prevent Contamination and Excavation Damage

Practice Statement Individual water supplies (water wells), small public/private water systems and sanitary disposal systems (septic tanks, leach or drain fields) should be designed and located to prevent excavation damage to transmission pipelines, interference with transmission pipeline maintenance and inspections, and environmental contamination in the event of a transmission pipeline incident.

Audience Local Government, Property Developer/Owner

Practice Description

Proper location and design of water/sanitary systems located adjacent to a transmission pipeline are vital to both public safety and the integrity of the pipeline. The design and location of these systems should take into consideration the potential impact on the water/sanitary system and on the transmission pipeline, resulting from activities associated with the installation, operation, and maintenance of the pipeline or the water/sanitary system. Considerations should include the potential for excavation damage to the water/sanitary system or the transmission pipeline, and the potential for contamination of the water/sanitary system from a pipeline incident.

If a water well is to be installed near a transmission pipeline, the pipeline and pipeline appurtenances (e.g., cathodic protection system) should be clearly located and identified Water supply drill rigs should stay clear of the pipeline right-of-way (ROW) to ensure no direct damage to the pipeline or pipeline appurtenances from drilling or movement of the drill rig.

To reduce the risk of contaminating a water well during a hazardous liquid transmission pipeline incident, it is generally best to place the well up-gradient from the pipeline. (Keep in mind that groundwater hydraulic gradients don't necessarily follow surface topography.) The risk of contamination during a pipeline incident for wells that cannot be placed up-gradient of a hazardous liquid pipeline can be reduced by increasing the down-gradient distance from the pipeline and by ensuring that wellheads are properly sealed. Note that gas transmission pipelines do not typically pose a threat for water contamination, unless liquids are present in the gas stream.

When installing individual sanitary disposal systems (septic systems and leach or drain fields) near transmission pipelines, the septic tank and drain field should be located off the pipeline ROW but not placed in an area immediately adjacent to the ROW where heavy equipment used in pipeline maintenance might damage the septic tank or drain field.

References:

- U.S. EPA Drinking Water Protection Website
- Common Ground Alliance Best Practices

ND17 Reduce Transmission Pipeline Risk in New Development for Residential, Mixed-Use, and Commercial Land Use

Practice Statement New development within a transmission pipeline planning area (see PIPA Recommended Practice BL06) should be designed and buildings located to reduce the consequences that could result from a transmission pipeline incident and to provide adequate access to the pipeline for operations and maintenance.

Audience Local Government, Property Developer/Owner

Practice Description

While transmission pipelines have an admirable safety record, it is prudent to design buildings and related facilities in a manner that mitigates the potential impacts on people and property from a transmission pipeline incident. Locating structures away from the pipeline right-of-way (ROW), minimizing surface and subsurface encroachments on the ROW, designing alternate escape routes, and incorporating more stringent building fire safety measures are examples of mitigation techniques that may improve public safety and limit damage to buildings or infrastructure in the event of a transmission pipeline incident.

Buildings and associated structures should not be allowed on the transmission pipeline ROW as this places building occupants in close proximity to the pipeline and could result in interference with pipeline operations and maintenance.

Roads, driveways, utilities, lot boundaries, landscaping, finished grades, green space, and fences should be planned to ensure adequate access to the transmission pipeline ROW to avoid interference with pipeline operations and maintenance activities and allow access for emergency response to transmission pipeline incidents (see PIPA Recommended Practice ND23).

The landowner or developer should consider what is allowed by the pipeline right-of-way agreement with respect to the siting of aboveground facilities such as compressor stations, metering stations, valves, pipeline markers, and cathodic protection systems (see PIPA Recommended Practice ND18). The developer or landowner and local government should work with the transmission pipeline operator to ensure that current or potential future locations of these facilities would not create interference between the development and the operation and maintenance of the pipeline and facilities. Also, development of the property should consider the current or potential future location of these facilities.

In the event of a transmission pipeline incident, evacuation of a building or shelter-in-place may be necessary. Evacuation routes should be considered during the design of a development to ensure that the potential impacts of a transmission pipeline incident will not compromise a necessary evacuation. For example, buildings should have a safe means of egress with exits located where they would not be made inaccessible by the impacts of a pipeline incident. Similarly, cul-de-sac streets should not be designed crossing a transmission pipeline as the only route of ingress or egress could be blocked during a pipeline incident.

High-rise buildings such as hotels, dormitories, apartment complexes, and office buildings may not lend themselves to a timely evacuation. Specific emergency plans addressing transmission pipeline incidents should be developed for these buildings and integrated with overall emergency plans for the site. Site emergency plans should be developed in coordination with the transmission pipeline operator (see PIPA Recommended Practice ND23).

Several codes have been issued to address these concerns, including:

- NFPA 1 – National Fire Protection Association (NFPA): Fire Code
- NFPA 101 – NFPA: Life Safety Code
- NFPA 5000 – NFPA: Building and Construction Safety Code
- IBC – International Code Council (ICC): International Building Code
- IRC – ICC: International Residential Code
- IFC – ICC: International Fire Code

These codes provide minimum standards for means of building egress, including capacity, quantity, arrangement, location, protection, and marking of means of egress. Minimum standards for emergency plans are also provided, where applicable.

Enhanced fire protection of buildings (i.e. automatic sprinklers, water screens, exposure protection, air handling/ventilation systems, etc.) and/or enhanced fire endurance (non-combustible construction, window limitation, etc.) may also be implemented to further mitigate the impact of a potential transmission pipeline incident. NFPA 1, Fire Code, provides minimum standards for separation distances for various occupancies based on fire endurance (in hours), and incorporates many other NFPA codes and standards (by reference) for fire protection. NFPA 5000 and IBC provide minimum standards for fire endurance for various buildings. Enhanced fire protection and fire endurance measures may be implemented for all categories of buildings considered under this recommended practice.

Local government agencies and property developers should consider modeling of fire, explosion, or toxic release impacts that could occur during a transmission pipeline incident for the specific land use under consideration. Egress models should also be considered. If appropriate, land use development and facility design should take this modeling into account to minimize potential impacts. The model should be fit-for-purpose and the model user should have appropriate expertise.

References:

- NFPA 1: Fire Code
- NFPA 101: Life Safety Code
- NFPA 5000: Building Construction and Safety Code
- International Code Council (ICC): International Building Code
- ICC: International Residential Code
- ICC: International Fire Code

- 49 CFR 192, 49 CFR 195
- 24 CFR Part 51, Subpart C, Siting of HUD-Assisted Projects Near Hazardous Operations Handling Conventional Fuels or Chemicals of an Explosive or Flammable Nature

ND18 Consider Transmission Pipeline Operation Noise and Odor in Design and Location of Residential, Mixed-Use, and Commercial Land Use Development

Practice Statement Consider noise, odor and other issues when planning and locating developments near above-ground transmission pipeline facilities, such as compressor stations, pumping stations, odorant equipment, regulator stations and other pipeline appurtenances.

Audience Local Government, Property Developer/Owner, Transmission Pipeline Operator

Practice Description

Aboveground transmission pipeline facilities, such as compressor stations, pumping stations, regulator stations, launcher/receiver stations and other pipeline appurtenances may generate noise and odors. These may not be initially noticed in some settings. However, they may be noticeable when land use is modified or a development is placed near the pipeline facility. These changes may place people in close proximity to the aboveground pipeline facilities for extended periods of time. Plans for land use and development should attempt to minimize exposures to these types of facilities.

Examples of aboveground pipeline operation and maintenance activities that may impact adjacent land development include:

- The operation of gas compressor or pump station machinery may generate noise and odors;
- Start-up and shut-down activities may produce noise and odors;
- Heat exchangers or other equipment may produce visible emissions, such as steam, to the air;
- Some pressure limiting stations may include relief valves that may release gas to the atmosphere;
- Facilities used to odorize natural gas are designed to minimize odorant emissions; however, occasional releases or spills could occur that could concern nearby residents;
- Backup power generators may be operated periodically, resulting in noise and odor; and
- Facility repairs and maintenance may require the operation of heavy construction equipment.

The property developer/owner and the transmission pipeline operator may consider additional measures to further reduce noise or visible effects from these facilities. For example, sound-insulating equipment, such as silencers or sound-reduction air plenums, natural foliage, increased separation distance, and other sound attenuating considerations may mitigate noise concerns. Additionally, land use and development around gas compressor and pumping stations should avoid practices or layouts that would adversely affect normal operation and maintenance of the pipeline facility. For example, power lines providing electric service to compressor/pumping stations need to be integrated into developments so that the service is not compromised.

The transmission pipeline operator should provide information regarding its aboveground pipeline facilities to the local government authority having jurisdiction for regulating land use and development. The purpose for providing information is to ensure there is adequate understanding of the operational

impacts of the facilities and to encourage them to incorporate pipeline coordination in their plan approval process (see PIPA Recommended Practice BL03). The local government authority should use this information to establish requirements for land use and development around the particular aboveground sites based upon the guidance on specific land uses provided in the PIPA recommended practices.

References:

- 18 CFR 157.206 (5)
- 18 CFR 380.12 (k)

ND19 Reduce Transmission Pipeline Risk through Design and Location of New Industrial Land Use Development

Practice Statement New industrial land use development within a transmission pipeline planning area (see PIPA Recommended Practice BL06) should be designed and buildings located to reduce the consequences that could result from a transmission pipeline incident and reduce the potential of interference with transmission pipeline operations and maintenance.

Audience Local Government, Property Developer/Owner

Practice Description

The risks from a transmission pipeline incident may be compounded and more complex if the storage of or processes involving flammable liquids or gases, toxic chemicals, explosives, or other hazardous substances are compromised as a result of the incident. Such materials are often found in industrial land uses such as manufacturing and storage, including freight, train, and marine terminals.

The design for industrial land use development in proximity to transmission pipelines should consider the need for more complex emergency response requirements and should include coordination with the transmission pipeline operators and emergency responders. For example, if flammable liquid or gas storage tanks are to be included in the development, they may need to be located farther from the transmission pipeline or otherwise designed to prevent the escalation of risks from a pipeline incident. The National Fire Protection Association standard NFPA 1, "Fire Code", provides standards on spacing of hazardous materials to minimize an escalation of a hazard, but does not specifically address transmission pipelines.

Onsite power plants, gas plants, water supplies, water treatment plants, and other critical infrastructure could also escalate the risks if compromised during a transmission pipeline incident. Specific site emergency response plans should also consider impacts to these infrastructures. The potential for hazardous liquid or heavier-than-air gas migration into water supplies, drainage channels, culverts, ditches, etc. should be evaluated. For additional precautions concerning water supplies and water treatment plants see PIPA Recommended Practice ND16.

Local government agencies and property developers should consider modeling of fire, explosion, or toxic release impacts that could occur during a transmission pipeline incident for the specific land use under consideration. Egress models should also be considered. If appropriate, land use and development design should take this modeling into account to minimize potential impacts. The model should be fit-for-purpose and the model user should have appropriate expertise.

It should be noted that transmission pipeline operators are required to provide emergency liaison and consultations by existing pipeline safety regulations. Gas and liquid transmission pipeline operators must maintain, modify as appropriate, and follow the plans, procedures and programs they are required to establish under Title 49 Code of Federal Regulations, Parts 192 and 195, respectively.

The Pipeline and Hazardous Materials Safety Administration (PHMSA) has formed partnerships, funded research, development and training programs, and published supplementary documents to assist transmission pipeline operators, emergency response personnel, and others in developing emergency

response plans. For more information, local governments and property developers/owners can contact the PHMSA Community Assistance and Technical Services representatives.

References:

- NFPA 1: Fire Code
- NFPA 101: Life Safety Code
- NFPA 5000: Building Construction and Safety Code
- International Code Council (ICC): International Building Code
- ICC: International Residential Code
- ICC: International Fire Code
- 49 CFR 192, 49 CFR 195

ND20 Reduce Transmission Pipeline Risk through Location, Design, and Construction of New Institutional Land Use Developments

Practice Statement New development of institutional facilities that may be difficult to evacuate within a transmission pipeline planning area (see PIPA Recommended Practice BL06) should be designed and the facilities located and constructed to reduce the consequences that could result from a transmission pipeline incident. Such facilities should also be located to reduce the potential of interference with transmission pipeline operations and maintenance activities. Emergency plans for these facilities should consider potential transmission pipeline incidents.

Audience Local Government, Property Developer/Owner

Practice Description

Property development that includes institutional facilities should place these facilities in locations on the property to reduce the consequences that could result from a transmission pipeline incident. This includes facilities such as schools, daycare facilities, hospitals, nursing homes, jails and prisons, and other potentially difficult to evacuate facilities. The location of these facilities should also be designed to reduce the potential of interference with transmission pipeline operations and maintenance.

In the event of a transmission pipeline incident, evacuation of a building or shelter-in-place may be necessary. Evacuation routes should be considered during the design of the development to ensure that the potential impacts of a transmission pipeline incident will not compromise a necessary evacuation. For example, buildings should have a safe means of egress with exits located where they would not be made inaccessible by the impacts of a pipeline incident. Similarly, cul-de-sac streets should not be designed crossing a transmission pipeline as the only route of ingress or egress could be blocked during a pipeline incident.

Institutional facilities may be difficult to evacuate facilities may not lend themselves to timely evacuation. Specific emergency plans addressing transmission pipeline incidents should be developed for these buildings and integrated with overall emergency plans for the site. Site emergency plans should be developed in coordination with the transmission pipeline operator (see PIPA Recommended Practice ND23). Several codes have been issued to address these concerns, including:

- NFPA 1 – National Fire Protection Association (NFPA): Fire Code
- NFPA 101 – NFPA: Life Safety Code
- NFPA 5000 – NFPA: Building and Construction Safety Code
- IBC – International Code Council (ICC): International Building Code
- IRC – ICC: International Residential Code
- IFC – ICC: International Fire Code

These codes provide minimum standards for means of building egress, including capacity, quantity, arrangement, location, protection, and marking of means of egress. Minimum standards for emergency plans are also provided, where applicable.

Enhanced fire protection of buildings (i.e. automatic sprinklers, water screens, exposure protection, etc.) and/or enhanced fire endurance (non-combustible construction, window limitation, etc.) may also be implemented to further mitigate the impact of a potential transmission pipeline incident. NFPA 1, Fire Code, provides minimum standards for separation distances for various occupancies based on fire endurance (in hours) and incorporates many other NFPA codes and standards (by reference) for fire protection. NFPA 5000 and IBC provide minimum standards for fire endurance for various buildings. Also, consider standards for outside air intake sources for buildings near transmission pipelines.

Local government agencies or property developers should consider modeling of fire, explosion, or toxic release impacts that could occur during a transmission pipeline incident for the specific land use under consideration. Egress models should also be considered. If appropriate, facility design should take this modeling into account to minimize potential impacts. The model should be fit-for-purpose and the model user should have appropriate expertise.

It should be noted that transmission pipeline operators are required to provide emergency liaison and consultations by existing pipeline safety regulations. Gas and liquid transmission pipeline operators must maintain, modify as appropriate, and follow the plans, procedures and programs they are required to establish under Title 49 Code of Federal Regulations, Parts 192 and 195, respectively.

In addition, the Pipeline and Hazardous Materials Safety Administration (PHMSA) has formed partnerships, funded research and training programs, and has published supplementary documents to assist transmission pipeline operators, emergency response personnel, and others in developing emergency response plans. For more information, local governments and property developers/owners can contact the PHMSA Community Assistance and Technical Services representatives. Information will also be available as part of ongoing public awareness efforts by transmission pipeline operators.

References:

- NFPA 1: Fire Code
- NFPA 99: Standard for Health Care Facilities
- NFPA 101: Life Safety Code
- NFPA 5000: Building Construction and Safety Code
- International Code Council (ICC): International Building Code
- ICC: International Fire Code
- 49 CFR 192.616, § 192.903, § 192.905, 49 CFR 195.440
- American Petroleum Institute (API) Recommended Practice (RP) 1162, Public Awareness Programs for Pipeline Operators

ND21 Reduce Transmission Pipeline Risk through Design and Location of New Public Safety and Enforcement Facilities

Practice Statement New development of emergency responder facilities within a transmission pipeline planning area (see PIPA Recommended Practice BL06) should be designed and the facilities located and constructed to reduce the consequences that could result from a transmission pipeline incident. Such facilities should also be designed and located to avoid the potential of interference with pipeline operations and maintenance. Planning for these facilities should include emergency plans that consider the effects of a transmission pipeline incident.

Audience Local Government, Property Developer/Owner

Practice Description

Facilities that house and serve emergency responders and critical emergency response communications that are located within a transmission pipeline planning area (see PIPA recommended Practice BL06) should be designed and located to minimize the impacts of a transmission pipeline incident on their emergency response capabilities. Police, fire, hazardous materials, emergency rescue and other emergency responder facilities, including structures, parking lots, offices, communications and dispatch centers, serve a critical role in public welfare during emergencies, including transmission pipeline incidents. Access to and egress from such facilities should be planned and implemented to avoid any impairment of the ability of emergency personnel to respond to pipeline incidents in order to address public safety issues.

If such facilities or utilities necessary for operation of such facilities are located within the planning area, then in order to reduce the risk of a transmission pipeline incident affecting the facilities (i.e. impair/interrupt capabilities), specific emergency response plans should be developed and integrated with existing overall emergency and/or relocation plans for these sites. The emergency response plans for the site should be developed in coordination with the transmission pipeline operator, as necessary.

Enhanced fire protection of buildings (i.e. automatic sprinklers, water screens, exposure protection, air handling/ventilation systems, etc.) and/or enhanced fire endurance (non-combustible construction, window limitation, etc.) may also be implemented to further mitigate the impact of a potential pipeline incident. NFPA 1, Uniform Fire Code™, provides minimum standards for separation distances for various occupancies based on fire endurance (in hours) and incorporates many other NFPA codes and standards (by reference) for fire protection. NFPA 5000 and IBC provide minimum standards for fire endurance of various buildings.

Local government agencies or developers may consider modeling of fire, explosion, or toxic release impacts that could occur during an incident for the specific land use under consideration. Egress models may also be considered. If appropriate, facility design should take this modeling into account to minimize potential impacts. The model should be fit-for-purpose and the model user should have appropriate expertise.

It should be noted that transmission pipeline operators are required to provide emergency liaison and consultations by existing pipeline safety regulations. Gas and liquid transmission pipeline operators must

maintain, modify as appropriate, and follow the plans, procedures and programs they are required to establish under Title 49 Code of Federal Regulations, Parts 192 and 195, respectively.

In addition, the Pipeline and Hazardous Materials Safety Administration has formed partnerships, funded research and programs, and has published supplementary documents to assist transmission pipeline operators, emergency response personnel, and others in developing an emergency response plan.

References:

- NFPA 1: Fire Code
- NFPA 101: Life Safety Code
- NFPA 1201: Standard for Providing Emergency Services to the Public
- NFPA 5000: Building Construction and Safety Code
- International Code Council (ICC): International Building Code
- ICC: International Fire Code
- 40 CFR 355
- 49 CFR 192 and 49 CFR 195

ND22 Reduce Transmission Pipeline Risk through Design and Location of New Places of Mass Public Assembly (Future Identified Sites)

Practice Statement New development of places of potential mass public assembly within a transmission pipeline planning area (see PIPA Recommended Practice BL06) should be designed and the facilities located and constructed to reduce the consequences of a potential transmission pipeline incident, the risk of excavation damage to the pipeline, and the potential of interference with transmission pipeline operations and maintenance. Planning for these facilities should include emergency plans that consider the effects of a potential pipeline incident.

Audience Local Government, Property Developer/Owner

Practice Description

Places of potential mass public assembly (e.g., amusement parks, stadiums, amphitheaters, highway rest stops, churches, and other large public assemblies), should be constructed or located to mitigate the impact of a potential transmission pipeline incident and provide emergency plans for potential pipeline incidents.

Large public assembly areas and facilities may not lend themselves to a timely evacuation. Specific emergency plans addressing transmission pipeline incidents should be developed and/or integrated with existing overall emergency and/or relocation plans for these sites. The emergency plans should include coordination with the transmission pipeline operator, as necessary.

In the event of a transmission pipeline incident, evacuation or shelter-in-place may be warranted. Evacuation routes should be considered during the design of the development to ensure that the potential impacts of a transmission pipeline incident will not compromise a necessary evacuation. For example, buildings should have a safe means of egress with exits located where they would not be made inaccessible by the impacts of a pipeline incident.

Several codes have been issued to address these concerns, including:

- NFPA 1 – National Fire Protection Association (NFPA): Fire Code
- NFPA 101 – NFPA: Life Safety Code
- NFPA 5000 – NFPA: Building and Construction Safety Code
- IBC – International Code Council (ICC): International Building Code
- IRC – ICC: International Residential Code
- IFC – ICC: International Fire Code

Enhanced fire protection of buildings (i.e. automatic sprinklers, water screens, exposure protection, air handling/ventilation systems, etc.) and/or enhanced fire endurance (non-combustible construction, window limitation, etc.) may also be implemented to further mitigate the impact of a potential transmission pipeline incident. NFPA 1 provides minimum standards for separation distances for various occupancies based on fire endurance (in hours) and incorporates many other NFPA codes and standards

(by reference) for fire protection. NFPA 5000 and IBC provide minimum standards for fire endurance of various buildings.

Areas covered under this recommended practice should include "identified sites" per the gas transmission pipeline integrity management regulations (49 CFR 192.903), such as an outside area or open structure that is occupied by twenty (20) or more persons on a regular basis (50 days or more in any 12-month period). Such identified sites may include, but are not limited to, beaches, playgrounds, recreational facilities, camping grounds, outdoor theaters, stadiums, recreational areas, parks, areas outside a rural building such as a religious facility, amusement parks, stadiums, amphitheaters, agricultural gathering areas, and other large public assemblies.

Local government agencies or developers may consider modeling of fire, explosion, or toxic release impacts that could occur during an incident for the specific land use under consideration. Egress models may also be considered. If appropriate, facility designs should take this modeling into account to minimize potential impacts. The model should be fit-for-purpose and the model user should have appropriate expertise.

It should be noted that transmission pipeline operators are required to provide emergency liaison and consultations by existing pipeline safety regulations. Gas and liquid transmission pipeline operators must maintain, modify as appropriate, and follow the plans, procedures and programs they are required to establish under Title 49 Code of Federal Regulations, Parts 192 and 195, respectively.

In addition, the Pipeline and Hazardous Materials Safety Administration has formed partnerships, funded research and programs, and has published supplementary documents to assist transmission pipeline operators, emergency response personnel, and others in developing an emergency response plan.

Owners and operators of areas covered under this practice, whether public or private, should inform area users of the transmission line operator's public awareness message as well as any specific site emergency plan required by local public authorities for the area.

References:

- NFPA 1: Fire Code
- NFPA 101: Life Safety Code
- NFPA 102 Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures
- NFPA 5000: Building Construction and Safety Code
- International Code Council (ICC): International Building Code
- ICC: International Fire Code
- 49 CFR 192.903, 49 CFR 195.450

ND23 Consider Site Emergency Response Plans in Land Use Development

Practice Statement Emergency response plan requirements should be considered in new land use development within a planning area (see PIPA Recommended Practice BL06) to reduce the risks of a transmission pipeline incident.

Audience Local Government, Property Developer/Owner

Practice Description

Effective emergency response planning can reduce the risk of a potential transmission pipeline incident by providing for timely response and situational control. Site emergency response plans should include coordination with the transmission pipeline operator. The property developer/owner should consider emergency response needs when planning land use development in proximity to a transmission pipeline right-of-way to ensure that emergency response is not impeded during a pipeline incident. Emergency response requirements include but may not be limited to the following:

Access to shutoff valves

Transmission pipeline operator access to shutoff valve(s) ensures that the transmission pipeline can be shutoff to mitigate the impact (duration and volume of release) from a pipeline incident. Development plans should clearly indicate the access to transmission pipeline shutoff valves. Valve access routes should be coordinated with the transmission pipeline operators and should consider access to areas that may be locked or gated for security and privacy purposes (i.e. private or gated communities, secured facilities, etc.).

Access for emergency response personnel/equipment

Development plans should include emergency access and turnabouts, as needed. The emergency response access route should be of appropriate width to accommodate emergency response equipment. Street turnabouts should be of adequate turning radius to facilitate forward or reverse hose lays and/or exit of any emergency response equipment. Access routes should consider access to areas that may be locked or gated for security and privacy purposes (i.e. private or gated communities, secured facilities, etc.). Standards NFPA 1, “Fire Code”, and International Fire Code provide minimum standards for the plans, construction, specifications, and maintenance of access routes for emergency responders.

Location/capacity of fire hydrants (as appropriate)

Although water is not typically used to extinguish flammable liquid or gas fires, it may be used to cool exposed structures to prevent a fire from spreading. If the possible use of fire hydrants is anticipated, their location and capacity should be evaluated to ensure that there are an adequate number of hydrants available, that they are located adequately, that they are of adequate capacity, and that they are maintained to be accessible and reliable. NFPA 1 and IFC provide minimum standards for the location and supply of fire hydrants.

Potential ICS, triage, and staging areas (as appropriate)

It may be beneficial to ensure that there is ample amount of room in the vicinity for incident command systems, triage, and staging areas. These may be included in the local government's master plans. (Some local governments develop master plans - long-range plans used to guide where and in what form physical development occurs in the community.)

It should be noted that transmission pipeline operators are required to provide emergency liaison and consultations by existing pipeline safety regulations. Gas and liquid transmission pipeline operators must maintain, modify as appropriate, and follow the plans, procedures and programs they are required to establish under Title 49 Code of Federal Regulations, Parts 192 and 195.

In addition, the Pipeline and Hazardous Materials Safety Administration has formed partnerships, funded research and programs, and has published supplementary documents to assist transmission pipeline operators, emergency response personnel, and others in developing an emergency response plan.

References:

- NFPA 1: Fire Code
- NFPA 1141: Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas
- NFPA 1142: Standard on Water Supplies for Suburban and Rural Fire Fighting
- International Code Council: International Fire Code
- 49 CFR 192.615 and 49 CFR 195.402
- Hazardous Materials Emergency Response Guide Bookwww.safepipelines.org
- www.pipelineemergencies.com

ND24 Install Temporary Markers on Edge of Transmission Pipeline Right-of-Way Prior to Construction Adjacent to Right-of-Way

Practice Statement The property developer/owner should install temporary right-of-way (ROW) survey markers or fencing on the edge of the transmission pipeline ROW or buffer zone, as determined by the transmission pipeline operator, prior to construction to provide a clearly defined boundary. The property developer/owner should ensure that the temporary markers or fencing are maintained throughout the course of construction.

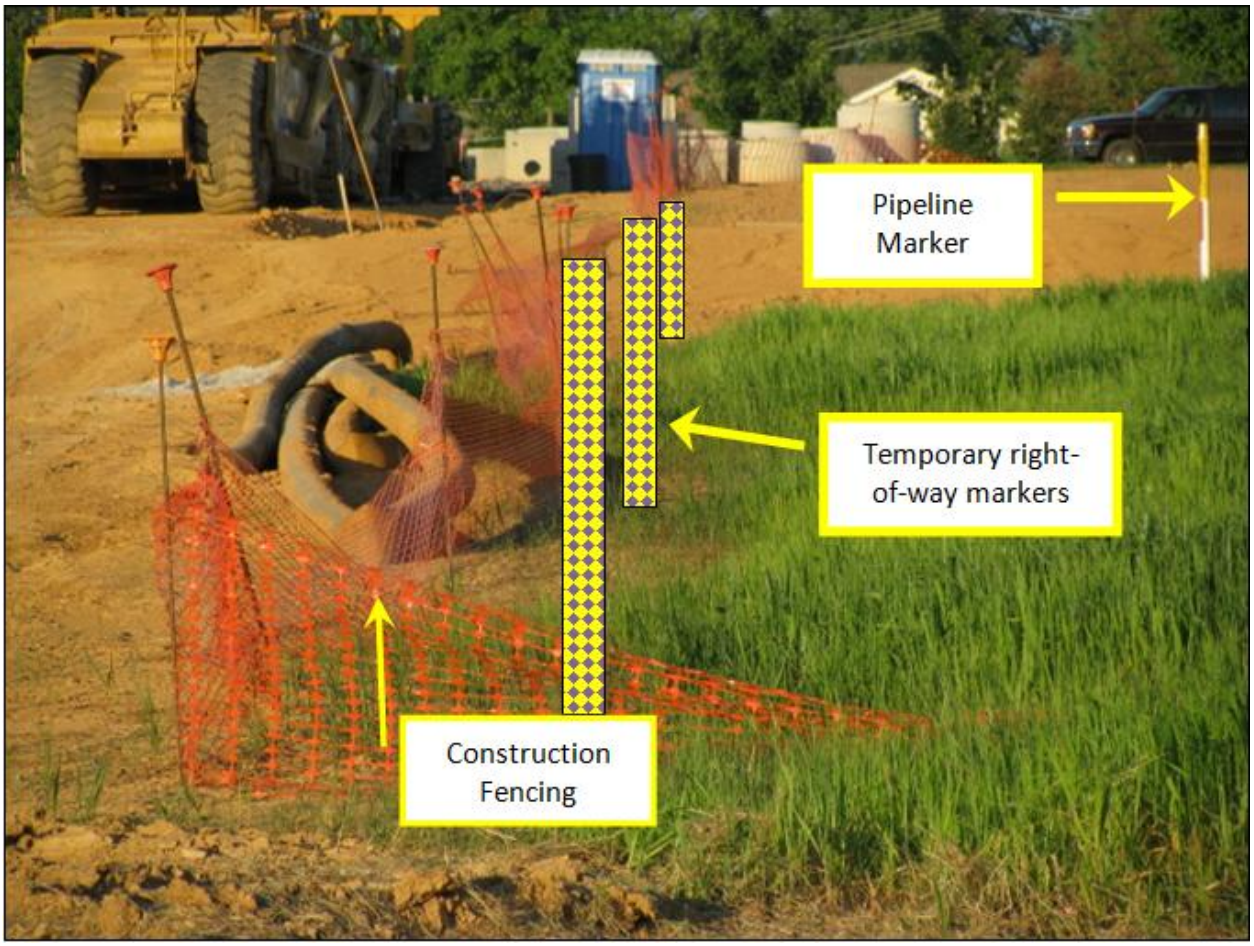
Audience Local Government, Property Developer/Owner

Practice Description

Excavators must always call the one-call center prior to beginning any excavation and must respect the locate marks showing where underground facilities are located.

In addition, to mitigate the risk of excavation damage or overburden to the transmission pipeline due to heavy construction equipment or material storage, temporary edge-of-the-ROW markers should be installed by the property developer/owner to alert construction personnel of the extent of the transmission pipeline ROW. Placing temporary ROW markers can enhance awareness of the presence of the pipeline and assist in visualizing the proximity of structures and landscaping to the edge of the pipeline ROW. Temporary fencing or temporary ROW markers can be used to mark the edge of the pipeline ROW. The ROW markers should be easily distinguishable from utility, survey and proposed excavation markers.

Local governments should consider the installation of the markers as a condition of the excavation permit. The markers should be installed before work begins and remain in place until construction is complete. The local government or other entity responsible for construction inspections could verify that the fencing is properly installed and maintained. (See example below.)



Construction site adjacent to transmission pipeline right-of-way – Example of use of temporary right-or-way markers and construction fencing – The markers along the left edge of the right-of-way are temporary right-of-way markers. The other marker is a transmission pipeline marker which indicates the location of the pipeline within the right-of-way. Notice the concrete pipe and heavy equipment located outside the right-of-way.

ND25 Contact Transmission Pipeline Operator Prior to Excavating or Blasting

Practice Statement Anyone planning to conduct excavating, blasting and/or seismic activities should consult with affected transmission pipeline operators well in advance of commencing these activities. Excavating and blasting have the potential to affect soil stability or lead to movement or settling of the soil surrounding the transmission pipeline.

Audience Local Government, Property Developer/Owner, Transmission Pipeline Operator

Practice Description

Transmission pipelines are dependent upon the stability of the surrounding soil to ensure that they are adequately supported and not over-stressed. Excavations (blasting, boring, digging, trenching, drilling, etc.), especially those that are deeper or down-gradient from a transmission pipeline, must be planned and conducted to ensure that they do not undermine the soil supporting the pipeline. Undermining of the soil can occur either at the time of the excavation or later due to soil subsidence or settling.

Notification of transmission pipeline operators through the one-call system is required prior to all excavations. Property developers/owners planning excavation or blasting should determine if transmission pipelines may be affected by the activities. If such pipelines are identified, the property developer/owner should coordinate with the transmission pipeline operator and provide information about the planned activities.

Appropriate local government agencies should be engaged in the permitting or licensing process for blasting, well in advance of the actual blasting operation, when transmission lines may be impacted. Transmission pipeline operators should be notified of the planned blasting operation as part of the permitting or licensing process by local government.

Seismic testing or land uses near transmission pipelines that involve regular or periodic blasting (e.g., quarrying, mining) may require enhanced communications and coordination between the property developer/owner and the transmission pipeline operator. During excavation or blasting activities, the transmission pipeline operator should continually evaluate any movement of the pipeline to ensure that acceptable stress levels in the pipeline are not exceeded.

References:

- API RP 1117, Recommended Practice for Movement in In-Service Pipelines, 3rd Edition, 2008.
- 49 CFR 192.614
- Common Ground Alliance Best Practices
- www.call811.com

ND26 Use, Document, Record and Retain Encroachment Agreements or Permits

Practice Statement Encroachment agreements should be used, documented, recorded and retained when a transmission pipeline operator agrees to allow a property developer/owner or local government to encroach on the pipeline right-of-way for a long or perpetual duration in a manner that conflicts with the activities allowed on the easement.

Audience Local Government, Property Developer/Owner, Transmission Pipeline Operator

Practice Description

A property developer/owner, local government, or utility may desire to encroach on a transmission pipeline right-of-way (ROW) for a long or perpetual duration in a manner that conflicts with the activities allowed by the easement agreement. Examples of such encroachment activities or uses include but are not limited to street and road crossings, ornamental fencing, heavy equipment crossings, large diameter utility crossings, pipeline casing extensions, blasting or use of explosives in the vicinity of pipeline facilities, pipeline cathodic protection facilities, driveways, residential lines (water, sewer, television, electric), golf course, biking trail, fencing, and sprinkler systems.

The property developer/owner, local government or utility should contact the transmission pipeline operator and provide information about the proposed encroachment. Necessary information may include a legal description of the land, a description of the desired activity or use in the right-of-way, surveys, plans and drawings.

After the encroachments and acceptable uses of the right-of-way are agreed upon, they should be documented in an encroachment agreement by the landowner and the easement owner. Documenting the agreement will help ensure land use activities are not conducted in a manner that could be detrimental to pipeline integrity and public safety

Some examples of common terms and conditions that may be included in an encroachment agreement are: 1) location of said activity or use, 2) indemnity of the operator for damage arising from the encroaching activity or use, 3) operator right to remove landowner facilities for future pipeline construction or maintenance, 4) landowner activity or use must be in compliance with all laws and regulations, 5) transferability/binding nature of agreement to future landowners, 6) landowner financial responsibility, and 7) landowner abides by state one-call requirements.

Examples of special provisions a transmission pipeline operator may require involve: 1) depth of cover and prohibition of heavy equipment over the pipeline, 2) hand digging and hand compaction near pipeline, 3) exposure of pipeline if boring, and 4) minimum clearance of facilities from the pipeline.

Pipeline operator recording practices vary but the agreement should be recorded if the rights and obligation of the encroachment may be transferrable. Recording an encroachment agreement would also serve to make the agreement available to the public. An encroachment agreement identifies and provides notice of encumbrances attached to the property. Access to such records and information is necessary to identify issues that may arise in planning the development and changes in use of the land. Identification of acceptable land uses provides the opportunity to proactively resolve conflicts and

issues. Encroachment agreements should be retained by both parties for the duration of the encroachment.

References:

- American Petroleum Institute (API) Recommended Practice (RP) 1162, Public Awareness Programs for Pipeline Operators

ND27 Use, Document and Retain Letters of No Objection and Conditional Approval Letters

Practice Statement Transmission pipeline operators may use, document and retain ”letters of no objection” in agreeing to land use activities on or near a transmission pipeline right-of-way. Such land uses may or may not be temporary.

Audience Local Government, Property Developer/Owner, Transmission Pipeline Operator

Practice Description

When agreements are executed between a property developer/owner and a transmission pipeline operator, a “letter of no objection” or a “conditional approval letter” confirms that the pipeline operator has reviewed certain land use and development plans provided by the property developer/owner and does not object to them. The operator’s approval may be predicated on compliance to any conditions set forth in the letter of no objection. The document may provide details of allowable temporary land use, as well as the terms and conditions for such use.

In some cases, a letter of no objection may be included as a requirement in local government development regulations. A letter of no objection can serve to document that communication between the transmission pipeline operator and property developer/owner and/or local government planner has occurred early in the planning phase to help ensure that activities that could adversely affect transmission pipeline safety are identified.

Letters of no objection are generally not recorded but are retained by the operator.

ND28 Document, Record and Retain Partial Releases

Practice Statement Partial releases may be used to allow some part of the transmission pipeline right-of-way to be released from certain easement conditions, and should be documented, recorded and retained.

Audience Property Developer/Owner, Transmission Pipeline Operator

Practice Description

An existing transmission pipeline easement may encumber an area of the pipeline right-of-way that is not occupied by transmission pipeline facilities or is not needed to perform pipeline related activities now or in the future. If requested by the landowner, the transmission pipeline operator, at its discretion, may agree to nullify the easement to this part of the land through a "partial release". This may occur when a larger tract of land is subdivided and sold off to be developed.

A partial release allows land to be released from an easement that is no longer needed for the purposes of the easement. Partial releases should be recorded at the appropriate statutory office (i.e. county recorder, parish clerk) and retained for the life of the easement.

Appendix A: PIPA Participants

Steering Group

Representative Participant	Representing	Position or Title at PIPA Inauguration
Jack Alexander	NASFM	Kansas State Fire Marshal
Bruce Boncke	NAHB	President, BME Associates
Betty Dunkerley	NLC	Mayor Pro-Temp, Austin, TX
Stacey Gerard	PHMSA	Deputy Administrator and Chief Safety Officer
Lee Leffingwell	NLC	Mayor, Austin, TX
Lauren O'Donnell	FERC	Director, Division of Gas – Environment & Engineering
Pat Oshie	NARUC	Commissioner, Washington Utilities and Transportation Commission
Richard Rabinow	Industry	Retired
Mark Sidran	NARUC	Chairman, Washington Utilities and Transportation Commission
Julie Ufner	NACo	
Carl Weimer	PST	Executive Director, PST, and County Council Member, Whatcom County, WA
Jeff Wiese	PHMSA	Associate Administrator for Pipeline Safety

PHMSA and Cycla Project Support

Representative Participant	Organization
Benjamin Cooper	PHMSA
Kimbra Davis	PHMSA
Steve Fischer	PHMSA
Blaine Keener	PHMSA
David Spangler	PHMSA
Julie Galante	Cycla Corporation
Andy McClymont	Cycla Corporation
Herb Wilhite	Cycla Corporation
Paul Wood	Cycla Corporation

Task Team 1 – Protecting Communities

Representative Participant	Organization
Edward Abrahamson	TX RRC
Jack Alexander	NASFM
Glenn Archambault	PST
Douglas Ball	Township of Branchburg, NJ
Carolyn Berndt	NLC
Paul Biancardi	Pipeline Consultant
Bruce Boncke	BME Associates

Kate Brady	Leon County, FL
Patrick Brady	El Paso
DeWitt Burdeaux	Quicksilver Resources, Inc.
Bill Byrd	Regulatory Compliance Partners (RCP) Inc.
Bruno Carrara	New Mexico Public Regulation Commission
Gerry Dawes	AGA
Galen Denio	Southwest Gas
Denise Desautels	PHMSA
Mark Dinneen	ICC
John Erickson	APGA
Tony Fleming	Clarke County, MS
Greg Ford **Task Team Co-chair**	Williams Gas Pipeline
Nick Hofmann	Atmos Energy Corporation
Kevin Hollins	Hollins Partners
Melissa Huffman	NAIOP
John Jacobi	PHMSA
David Johnson	Panhandle Energy
Andrew Kohout	FERC
Jim Krohe	Kinder Morgan
Lee Leffingwell	City of Austin, TX
Chuck Lesniak	NLC, City of Austin, TX
Catherine Little	Hunton & Williams
Maggie Manco	FERC
Joe Mataich	PHMSA
Rob McElroy	New Century Software
Nancy McNabb	NFPA
James Mergist	LA DNR
David Nemeth	Panhandle Energy & GITA
Alex Osborne	TransCanada
Jim Pates	PHMSA
Raymond Paul	AOPL
Cathy Pratt **Task Team Co-chair**	City of St Peters, MO
Richard Rabinow	PIPA Steering Committee
Bob Rackleff	Leon County, FL
Ross Reineke	PHMSA
Nelson Rivera	HUD
Bill Sanders	Explorer Pipeline
Steven Sandy	Montgomery County, VA
Buddy Secor	TSA
Julie Ufner	NACo
Russell Verba	IRWA

Task Team 2 – Protecting Transmission Pipelines

Representative Participant	Organization
Pamela Alley	Shell Pipeline Company LP
Eric Amundsen	Panhandle Energy
Bob Archey	PST
Thais Austin **Task Team Co-chair**	NAHB
Darin Burk	Illinois Commerce Commission
Alex Dankanich	PHMSA
Reid Demman	Salt Lake County, UT
Kevin Docherty	Buckeye Partners
Ruth Garcia	Buckeye, AZ
John Garrison	ConocoPhillips Pipe Line
Robert Hill	Brookings County, SD
Duane Hobart	Explorer Pipeline
Patrick Hodgins	Genesis Energy, Inc.
Jeannette Jones	DCP Midstream
Neal Jones	ONEOK NGL Pipeline
Benjamin Kanoy	Vectren
John Lupo	Xcel Energy
David Lykken	Washington Utilities and Transportation Commission
Paul Maldonado	Texas SFM Office
Terry Mock	Colonial Pipeline
Daron Moore	El Paso Pipeline Group
Nate Muehl	Marathon Pipe Line LLC
Steve Patton **Task Team Co-chair**	Williams Gas Pipeline
Rick Pevarski	VUPS
Julia Pulidindi	NLC
Elizabeth Reed	Columbia Gas Transmission Corp
Lindsay Sander	Texas Pipeline Association
James Sanford	NuStar Energy LP
Randy Smith	Southwest Gas Corporation
Narasi Sridhar	DNV CC Technologies
Dave Swearingen	FERC
Alaine Watson	Environmental Protection Commission, Hillsborough County, FL
Kyle Webster	Enterprise Products
Lois Wells	Koch Pipeline Company LP
Harold Winnie	PHMSA
Monty Zimmerman	APWA

Task Team 3 - Communications

Representative Participant	Organization
Debbie Bassert	NAHB
Terry Boss	INGAA

Karen Butler	PHMSA
David Clouser	Township Manager, Lancaster (PA) Township
Thomas Correll	Northern Natural Gas
James Davenport	NACo
Gerry Dawes	AGA
Jim Doherty	Municipal Research & Services Center
Patty Errico	ExxonMobil Pipeline Company
Neil Fuchs	Marathon Pipe Line LLC
Rebecca Garber	AOPL
Danny Gibbs **Task Team Co-chair**	Spectra Energy
Gina Greenslate	Panhandle Energy
Jim Hartman	Tennessee Gas Pipeline
Kevin Hollins	NAIOP
Cindy Ivey	Williams Gas Pipeline
David Jones	David Jones Group LLC
Jungus Jordan	City of Fort Worth, TX
Michelle Joseph	Smalley Foundation
Lori Keeter	EPCO, Inc.
Jerry Kenerson	PHMSA
Gary Kent	American Land Title Association
Bob Kipp	CGA
Terri Larson	Enbridge
Erika Lee	CGA
Brett Lester	Celeritas
Ryan Martin	Texas Excavation Safety System
Dan Maschka	Northern Natural Gas
David McAtee	DCP Midstream
Frank McGarry	NASFM
Steve McNulty	TransCanada US Pipelines West
Gina Meehan	Ameren
Jerry Milhorn	Kinder Morgan
Cynthia Munyon **Task Team Co-chair**	Iowa Utilities Board
Claudia Rapkoch	NorthWestern Energy
Russell Riggs	NAR
Greg Saia	Xcel Energy
Larry Schall	APWA
Larry Springer	Enbridge
Jon Taylor	Sempra Energy Utilities
Eric Tomasi	FERC
Carl Weimer	Pipeline Safety Trust
Bob Weiner	NACo
Leslie Wollack	NLC
Michael Wood	PECO Energy Company
Jeff Zidonis	Dominion East Ohio

Other Participants

Representative Participant	Organization
Patrick Brady	El Paso Corporation
Paul Connor	NALGEP
Gerry Dawes	AGA
Jim Fahey	APWA
Belinda Friis	TransCanada
Melissa Huffman	NAIOP
Jennifer Imo	NATaT
Peter Lidiak	API
Laurie Markoe	Contract Land Staff, LP
Chris Mason	Williams Gas Pipeline
Edward Miller	American Land Title Association
Shirley Neff	AOPL
Raymond Paul	AOPL
Laurie Reichler	Southern California Gas Co
Charles Schroeder	Lincoln-Lancaster County Health Department
Antoinette Sebastian	HUD
Karen Simon	API
Douglas Sipe	FERC
Mike Stackhouse	OneOK
Matt Ward	NATaT
Brad Watson	TransCanada

Appendix B: Model Ordinance

The following model ordinance may be used by cities or other jurisdictions with planning authority (e.g., counties, townships, villages) as a starting point for development of an ordinance to incorporate or promote recommended practices for protecting communities and underground utility infrastructure. Although the model ordinance as written refers directly to transmission pipelines located in a *city*, it may be used by other jurisdictions (with appropriate changes). It is expected that each specific jurisdiction would change the text of the ordinance to fit the circumstances of that jurisdiction.

Bill No. _____

ORDINANCE NO. _____

AN ORDINANCE PROVIDING FOR MINIMUM REQUIREMENTS PERTAINING TO LAND USE, CONSTRUCTION, AND PUBLIC SAFETY NEAR GAS TRANMISSION AND/OR HAZARDOUS LIQUID TRANSMISSION PIPELINES WITHIN THE CITY

WHEREAS, the United States economy is heavily dependent on gas transmission and hazardous liquids pipelines to transport and distribute energy and raw materials; and

WHEREAS, gas transmission and/or hazardous liquid transmission pipelines extend through portions of the City of; and

WHEREAS, these pipelines, if ruptured or damaged, may pose a risk to public safety and/or the environment; and

WHEREAS, new development in proximity to pipelines should incorporate design features to minimize possible public safety and/or environmental risks; and

WHEREAS, the [Board of Aldermen] [City Council] wishes to minimize risk of rupturing or damaging these pipelines; and

WHEREAS, the National Transportation Safety Board has recognized that third-party damage and pipeline right-of-way encroachment are significant threats to pipeline safety; and

WHEREAS Title 49, Code of Federal Regulations, Parts 192 & 195 provide regulations for transmission pipelines; and

WHEREAS, the City has been encouraged by the U.S. Department of Transportation to adopt policies and regulations intended to reduce the likelihood of accidental damage to gas and hazardous liquid pipelines and to reduce adverse impacts of pipeline failures located within its jurisdiction; and

WHEREAS, the City desires to amend the City Code by adopting policies and regulations intended to reduce the likelihood of accidental damage to the gas and hazardous liquid pipelines and to help reduce adverse impacts in the event of a pipeline failure; and

[WHEREAS, the City held a Public Hearing on these proposed City Code amendments; and]

[WHEREAS, at the Public Hearing, all interested persons and citizens were given an opportunity to be heard on these proposed amendments to the City Code; and]

NOW THEREFORE, BE IT ORDAINED BY THE [BOARD OF ALDERMEN] [CITY COUNCIL] OF THE CITY OF_____ , AS FOLLOWS:

SECTION 1. That Section of the City Code shall be and is hereby amended by adding the following definitions:

CONSULTATION ZONE means an area within _____ feet of a transmission pipeline. See Section 2 below. [Refer to PIPA Recommended Practice BL05.]

DEVELOPMENT PERMIT means, for the purposes of the consultation zone requirements, any permit for activity that involves construction, grade modification, excavation, blasting, land clearing, or the deposit of earth, rocks or other materials that places an additional load upon the soil. Construction that involves work totally within an existing building footprint, such as residential remodeling projects, is specifically exempted from these consultation zone requirements.

GAS TRANSMISSION PIPELINE means a "transmission line" as defined by Title 49, Code of Federal Regulations, Section 192.3.

HAZARDOUS LIQUID PIPELINE means a pipeline designed for the transmission of a "hazardous liquid", as defined by Title 49, Code of Federal Regulations, Section 195.2.

PERSON means any individual, firm, joint venture, entity, partnership, corporation, association or cooperative.

PIPA REPORT means a report prepared by the U. S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) through the Pipelines and Informed Planning Alliance (PIPA) initiative with support from many participating stakeholders. The report was initially released in 2010 and will be updated as needed. It is available on the PHMSA Pipeline Safety Stakeholder Communications web site at http://primis.phmsa.dot.gov/comm/.

PIPELINE means the same as is defined by Title 49, Code of Federal Regulations, Sections 195.2 and 192.3.

PIPELINE FACILITY means the same as is defined by Title 49, Code of Federal Regulations, Sections 195.2 and 192.3.

PLANNING AREA means an area around a transmission pipeline that is defined, based on characteristics of the pipeline and the surrounding area, to determine where the requirements of Section 6 below apply. [Refer to PIPA Recommended Practice BL06.]

TRANSMISSION PIPELINE means gas transmission pipeline or hazardous liquid pipeline as defined above.

SECTION 2. That Section _____ of the City Code shall be and is hereby amended by adding Subsection thereto, which Subsection shall read as follows:

CONSULTATION ZONE

a. Consultation Zone Distance

A consultation zone is hereby established for any parcels within _____feet of the centerline of a transmission pipeline. [Refer to PIPA Recommended Practice BL05.]

b. Consultation Zone Notification

At application for a development permit, staff at the permit counter shall notify the individual they are within the consultation zone, explain the relevant application procedures, and provide contact information for the applicable pipeline operator(s). This same procedure shall be followed whenever an individual inquires about development regulations or zoning restrictions for property within the consultation zone.

c. Application Process within Consultation Zone

Complete application for development permit within a designated consultation zone must include written verification from applicant that:

1. Applicant has contacted the pipeline operator(s) and has provided them with documentation detailing the proposed development type and place of the activity; and

2. The pipeline operator(s) has reviewed the documents.

3. The written verification required by this section can be in any form acceptable to the City, including electronic communications, so long as it is clear that the pipeline operator(s) has received and reviewed documentation showing the proposed information concerning any impact the activity will have upon the integrity of the transmission pipeline(s). The verification should include all comments received from the operator or a notice from the operator indicating that the operator has no comments.

4. If the operator does not respond within 30 days after being contacted and provided information by the developer pursuant to c.1 above, then the City may waive the requirement for written verification given under c.3 above.

SECTION 3. That Section _____ of the City Code shall be and is hereby amended by adding Subsection thereto, which Subsection shall read as follows:

PLANNING AREA

a. Planning Area Distance

Planning areas are hereby established within the following distances of the pipeline centerlines, for the following transmission pipeline(s).

Pipeline A – YYY feet

Pipeline B – ZZZ feet

Pipeline C –Etc. [See PIPA Report Recommended Practice BL06]

b. Applicability of Planning Area

At application for a development permit, staff at the permit counter shall notify the individual they are within the planning area and explain the relevant requirements.

Development within the planning area shall meet the requirements under Section 6 below.

SECTION 4. That Section _____ of the City Code shall be and is hereby amended by adding Subsection thereto, which Subsection shall read as follows:

The plat must provide a note that all existing gas transmission and/or hazardous liquid pipelines or pipeline facilities through the subdivision have been shown, or that there are no known existing gas transmission and/or hazardous liquid pipelines or pipeline facilities within the limits of the subdivision.

The location of all transmission pipelines and related easements shall be shown on all preliminary plat, zoning, building, and record plat maps when proposed development is within the planning area.

For proposed development within the consultation zone around pipeline(s), developer shall forward all site or subdivision plans for review comments to the Pipeline Operators by certified mail, return receipt requested, to be supplied to the City as proof of notification prior to plan approval.

SECTION 5. That Section _____of the City Code shall be and is hereby amended by adding Subsection thereto, which Subsection shall read as follows:

[Insert selected PIPA Recommended Practices for protecting transmission pipelines]

SECTION 6. That Section of the _____ Code shall be and is hereby amended by adding Subsection thereto, which Subsection shall read as follows:

[Insert selected PIPA Recommended Practices ND11 through ND23, as appropriate, indicating requirements within the planning area]

SECTION 7. Severability. If any term, condition, or provision of this Ordinance shall, to any extent, be held to be invalid or unenforceable, the remainder hereof shall be valid in all other respects and continue to be effective and each and every remaining provision hereof shall be valid and shall be enforced to the fullest extent permitted by law, it being the intent of the Board of Aldermen (or City Council) that it would have enacted this Ordinance without the invalid or unenforceable provisions. In the event of a subsequent change in applicable law so that the provision that had been held invalid is no longer invalid, said provision shall thereupon return to full force and effect without further action by the City and shall thereafter be binding.

SECTION 8. Effective Date. This Ordinance shall be in full force and take effect from and after the date of its final passage and approval.

SECTION 9. Savings. Nothing contained herein shall in any manner be deemed or construed to alter, modify, supersede, supplant or otherwise nullify any other Ordinance of the City or the requirements thereof whether or not relating to or in any manner connected with the subject matter hereof, unless expressly set forth herein.

Read two times and passed this _____ day of _____, 2___.

_____

As Presiding Officer and as Mayor

Attest: _____

City Clerk

Approved this _____ day of _____, 2008.

_____

Mayor

Attest: _____

City Clerk

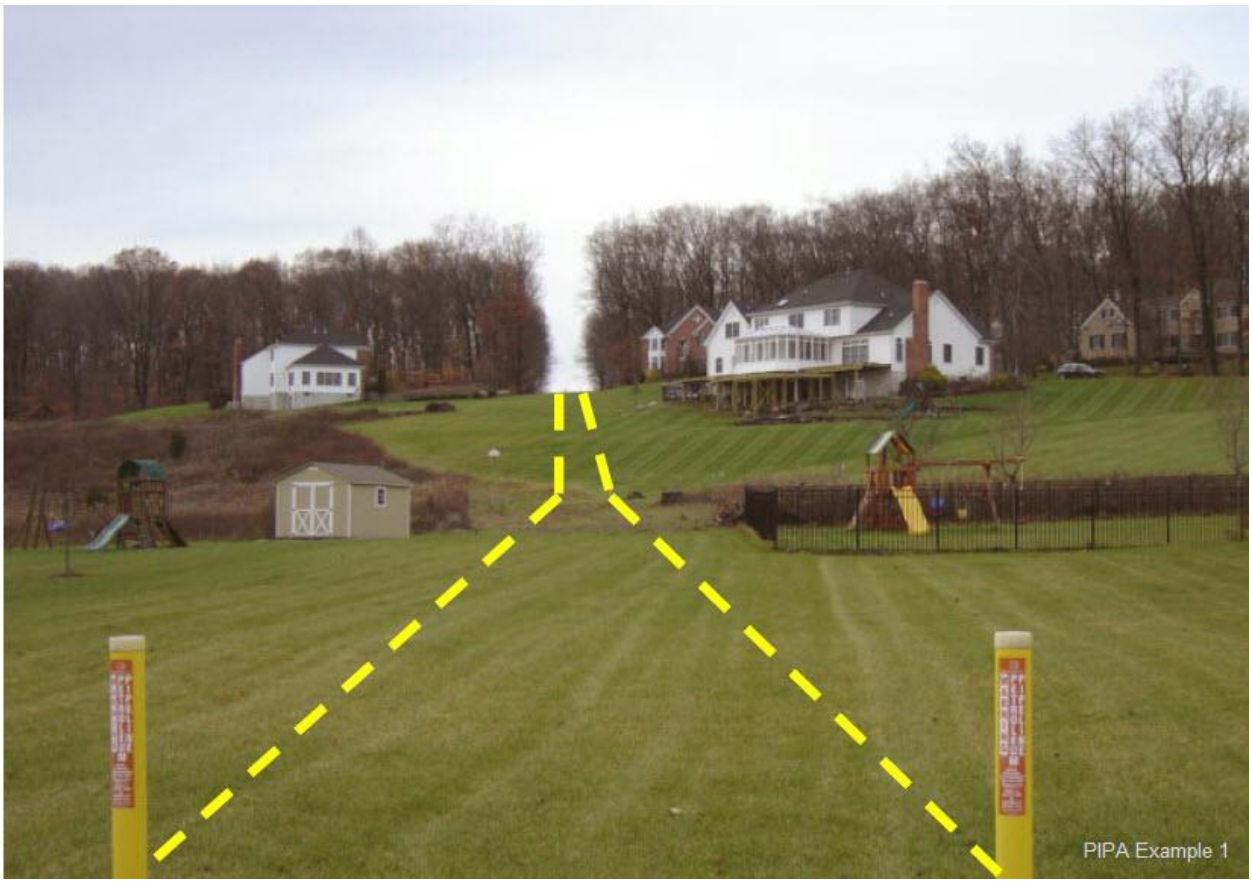
Appendix C: Incorporating Transmission Pipeline ROW in New Developments

Rural, Suburban and Urban

The following pictures provide examples of successful, collaborative efforts to incorporate transmission pipeline rights-of-way (ROW) into developments, as well as some situations to avoid. Since ROW practices vary among transmission pipeline operators, activities that may not be acceptable to some operators are noted in each picture's description. The dashed yellow lines indicate the approximate location of the transmission pipeline in each picture.

Example 1 – Rural: Green Space Development

This picture illustrates development that commonly occurs as suburbs extend into rural areas. This transmission pipeline right-of-way is clearly defined yet blends with the surrounding area. The shed and playground are outside the right-of-way but the landowners are able to enjoy its use of the land.



Example 2 – Rural: Agricultural

The use of the transmission pipeline rights-of-way to grow crops is important for farmers to optimize use of the land. Seasonal crops such as corn, soybeans and cotton may be grown in the pipeline right-of-way. However, deep tilling, certain other farming practices and erosion may damage the transmission pipeline and should be discussed with the pipeline operator.

Example 2a

Example 2b

Example 3 – Rural: Bridge crossing

The aboveground transmission pipeline creek crossing was modified to accommodate a pedestrian bridge connecting walking trails. The transmission pipeline indicated in these pictures is located between the girders under the walkway.

Example 3a

Example 3b

Example 4 – Rural: Soft Surface Walking Trail

This rural transmission pipeline right-of-way has been transformed into a soft surface walking trail. The soft surface is beneficial for unimpeded access to the pipeline facilities. Trees are outside of the right-of-way and clearly define it. The bench is an example of an encroachment that may be acceptable to some transmission pipeline operators but not to others.

Example 5 – Suburban: Shared utility corridor with asphalt walking path

As development encroaches on previously rural areas, land for utilities becomes scarcer. At times, multiple utilities may share a single utility corridor. In shared right-of-way space, the need for coordination increases. The additional facilities create the potential for cathodic interference and increase the potential for excavation damage to facilities. This photo illustrates a transmission pipeline right-of-way that is shared with an electric utility and a hard surface walkway. Some transmission pipeline operators only allow soft surface walkways on the right-of-way. The tree is an example of landscaping that generally would not be allowed in the transmission pipeline right-of-way.

Example 6 – Suburban: Green space

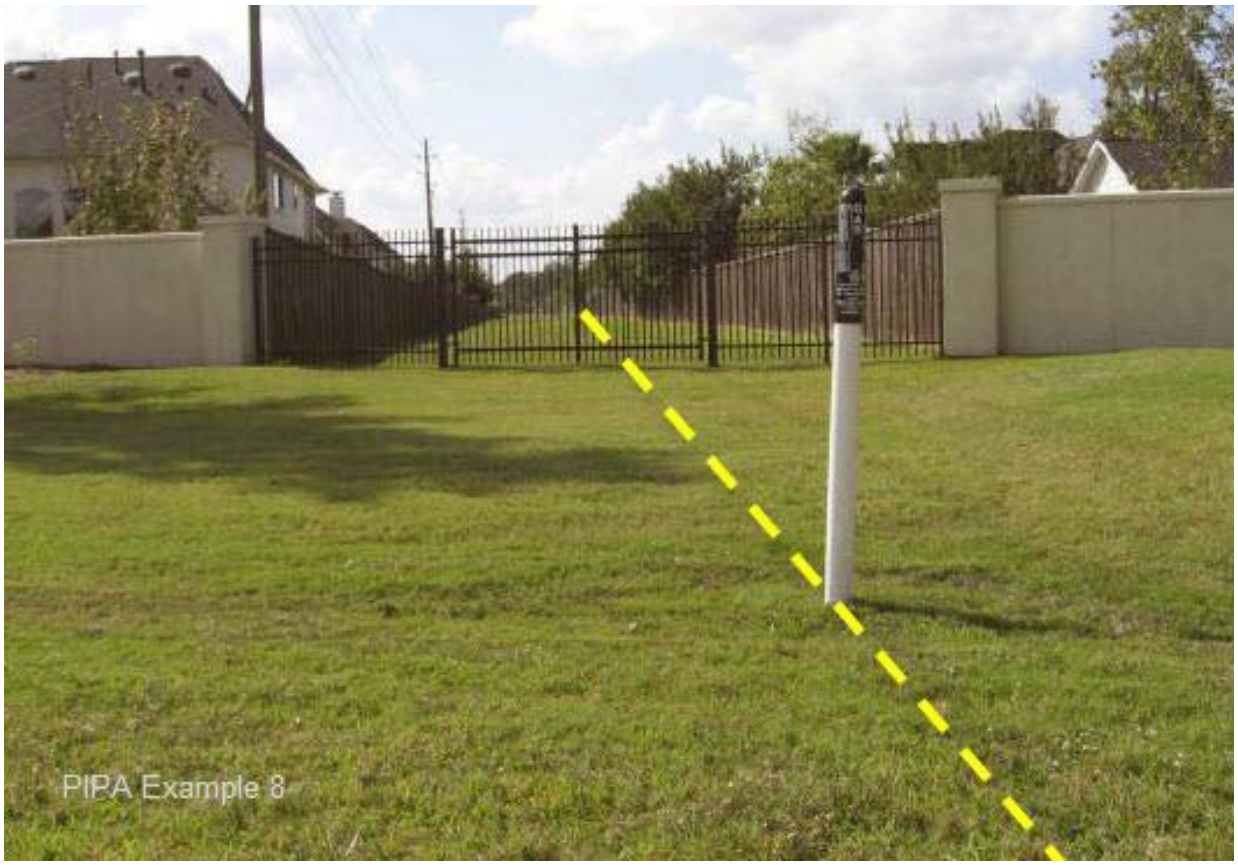
This transmission pipeline right-of-way is clearly defined, free of large vegetation, and easily accessible by the pipeline operator. Fences have been placed parallel but outside of the right-of-way.

Example 7 – Suburban: Walking Trail

The trees have been planted inside the transmission pipeline right-of-way and should be removed. Lighting for the path should be located outside of the right-of-way.

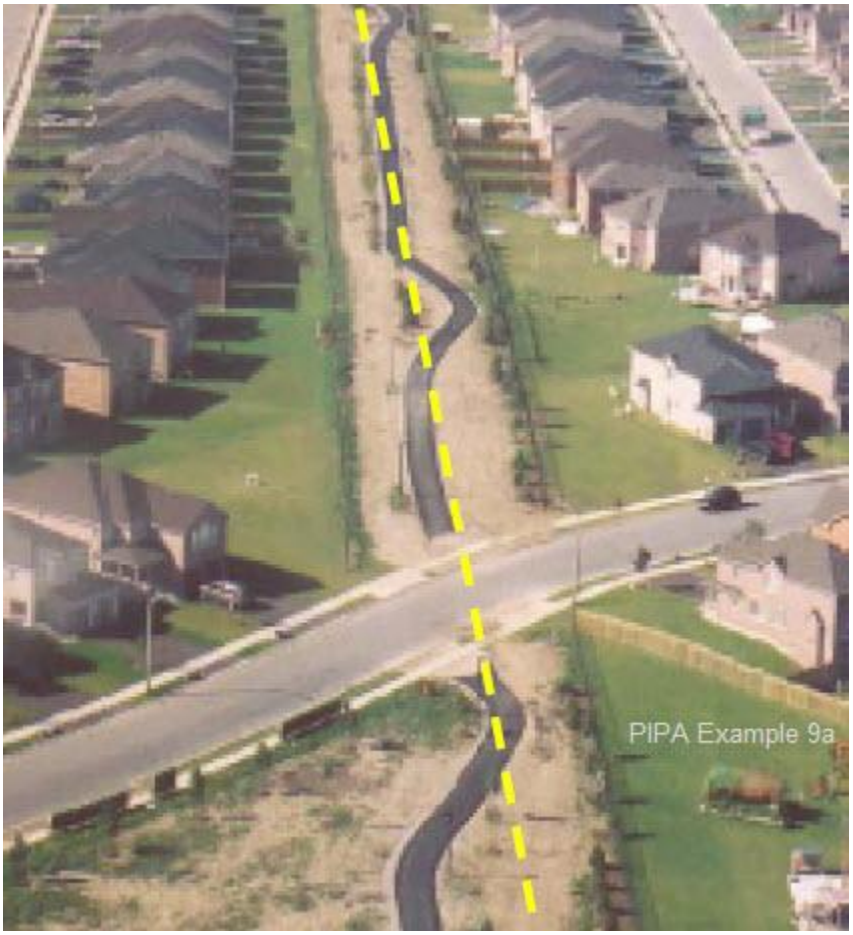
Example 8 – Suburban: Green space

Note that the gate is large enough for right-of-way maintenance vehicles, is removable, and does not obstruct the view of the right-of-way for patrolling by the transmission pipeline operator.



Examples 9a, 9b and 9c – Suburban: Walking Trails

Walking trails are a popular option for enhancing a community. Trees and lighting should be placed outside of the transmission pipeline right-of-way.




PIPA Example 9b


PIPA Example 9c

Example 10 – Suburban: Formal garden with shallow rooted plantings

The transmission pipeline operator may need to remove some of the plantings to access the pipeline. An encroachment agreement should address restoration. The bench is free standing. A transmission pipeline marker is located in an open space near the path that traverses the right-of-way.

Example 11 – Suburban: Playground equipment and removable sport court

While free standing playground equipment or removable equipment such as the sport court with removable panels may be acceptable, this swing set should not be allowed because the footings may be deep enough to reach the transmission pipeline and the swing set is not easily movable in case emergency access to the right-of-way is needed. The fence along the basketball court also should not be allowed for the same reason.

Example 12 – Urban: Formal garden with shallow rooted plants.

This is a good example of land owner and operators working together. The transmission pipeline right-of-way marker is not visible in this picture. Some pipeline markers lie flat to the ground. The signs promote awareness of the presence of the transmission pipelines.

Example 13 – Urban: Church

The church shown in this picture is situated on the opposite side of the lot, as far as possible from the transmission pipeline. The shrubbery should be cut back further around the pipeline marker.

Example 14 – Trees in the right-of-way

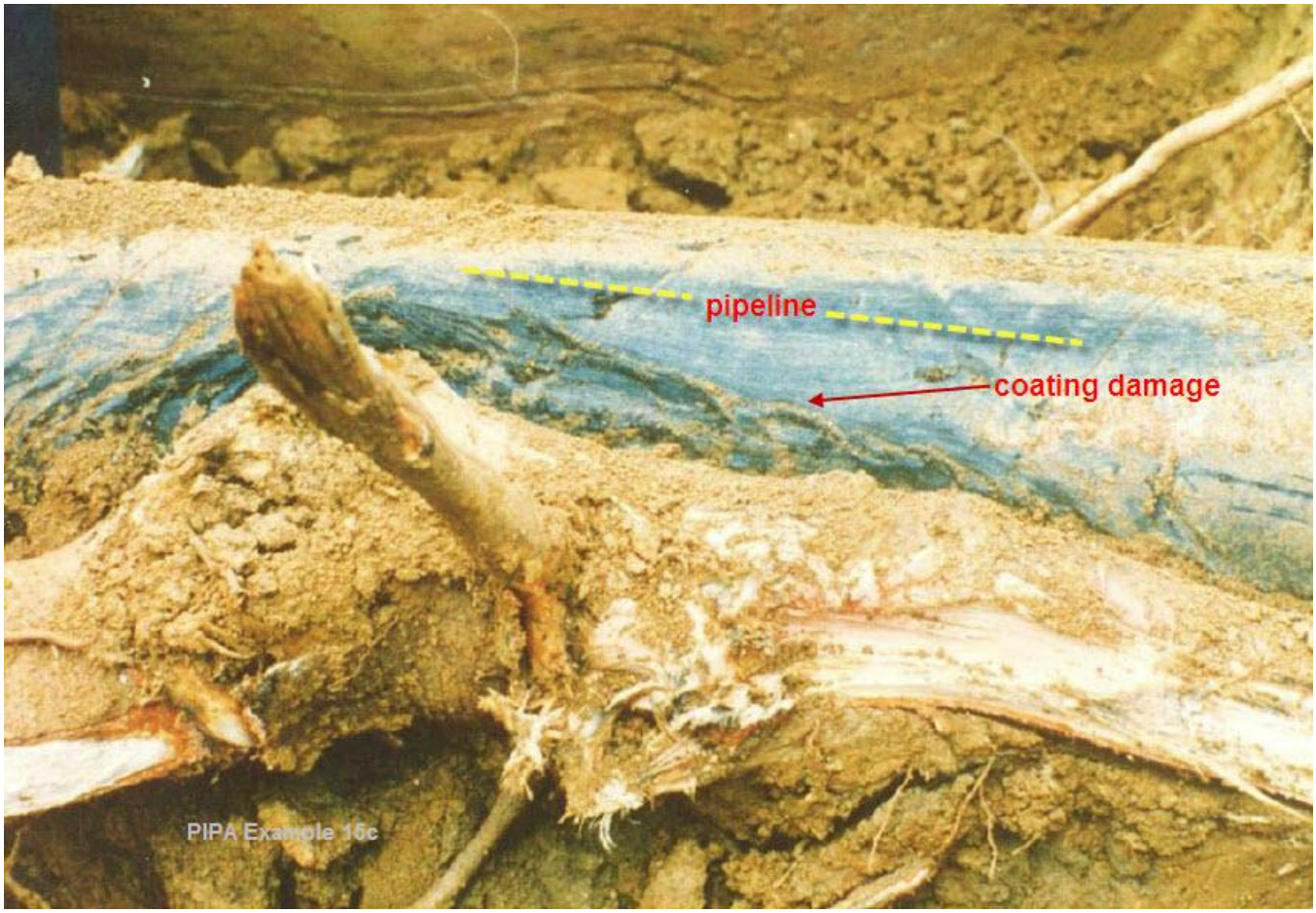
This is an example of development on the transmission pipeline right-of-way that ***should be avoided***. This tree was planted in the right-of-way between two transmission pipelines. It may impede access to the right-of-way and the pipelines. Fortunately, the transmission pipelines were not damaged during planting.

Examples 15a, 15b and 15c – Tree roots may damage transmission pipelines.

These pictures illustrate situations on the transmission pipeline right-of-way that ***should be avoided*.**

These pictures illustrate why trees should not be allowed in the right-of-way. The tree roots have impeded the pipeline operator's ability to access and evaluate the condition of the transmission pipeline. Pipeline coatings may also be damaged by tree roots. Coatings need to remain intact to protect the transmission pipeline from external corrosion.


PIPA Examle 15b
pipeline
pipeline


pipeline
coating damage
PIPA Example 16c

Examples 15d, 15e and 15f – Tree Roots May Damage Transmission Pipelines

These additional pictures also illustrate why trees should not be allowed in the right-of-way. They show indirect tree root damage caused by lightning striking a tree whose roots were close to the pipeline. The lightning passed down the tree and through the wet clay. The moisture in the clay instantly vaporized. In the region where the current passed through the soil, an instant and violent expansion of the moisture in the soil occurred creating the crater in the ground around the perfectly smooth dent in the top of the pipe. The resulting tension in the pipeline initiated a crack in a girth weld a few feet away.

Example 16 – New Development Built to the Edge of the Right-of-Way

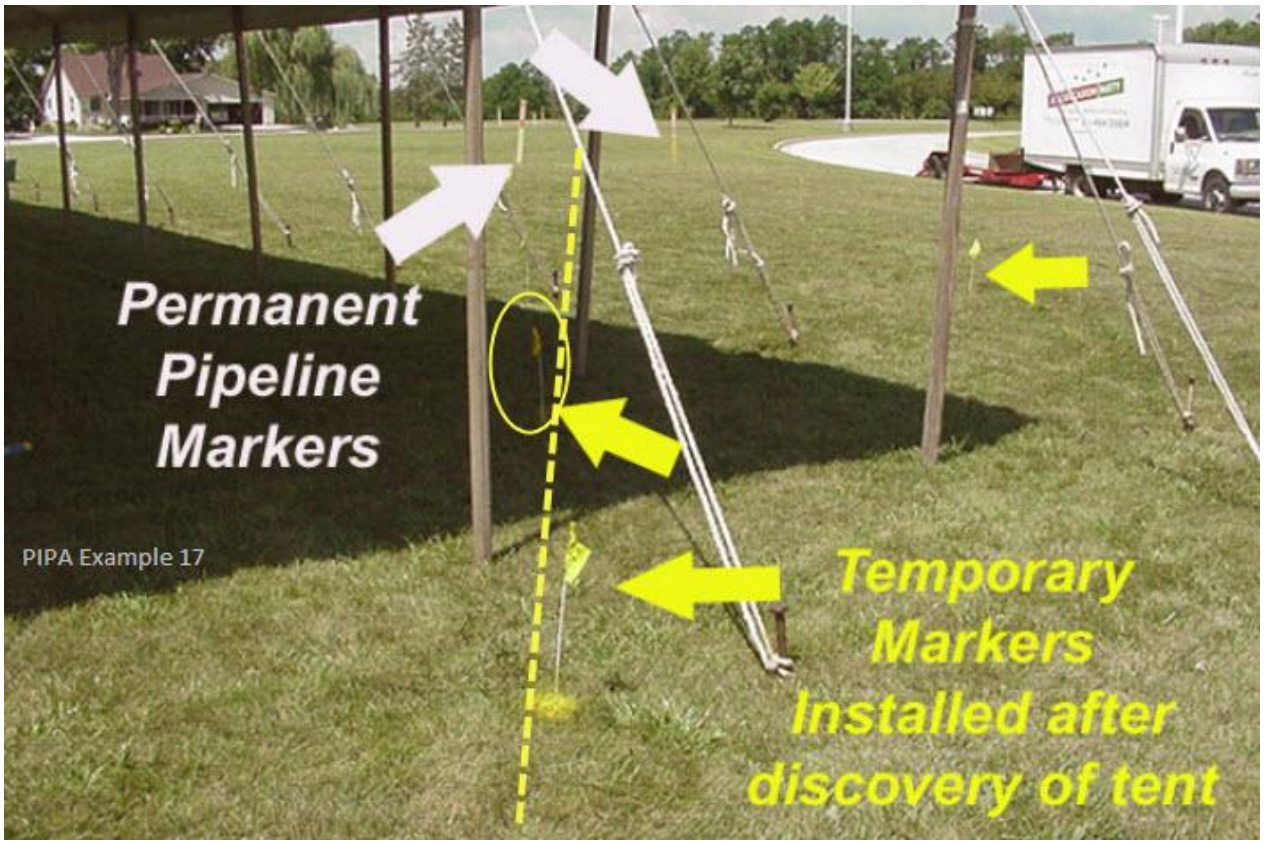
*This picture illustrates a situation on the transmission pipeline right-of-way that **should be avoided**.*

Example of impact of transmission pipeline maintenance on development built in close proximity to the edge of the pipeline right-of-way. Structures adjacent to the ROW, such as the wooden fence, have been damaged as a result of the limited amount of workspace for large equipment.

Example 17 – Temporary Structures in the Right-of-Way

*This picture illustrates a situation on the transmission pipeline right-of-way that **should be avoided**.*

This picture illustrates the need to contact the transmission pipeline operator prior to changing the use of a pipeline right-of-way. A hospital engaged a company to set-up a large tent. The ROW contained two transmission pipelines that pre-date construction of the hospital, a 10-inch active line and an 8-inch idle line. There are several permanent pipeline markers on the lawn. The tent was set up without notification to the transmission pipeline operator and without a one-call locate request being placed. The pipeline operator determined that a 42-inch long tent stake was driven into the ground within 5-inches of one of the pipelines, but there was no damage to the pipelines. The tent was relocated out of the right-of-way. The tent company was instructed to call the one-call center in the future and was given pipeline awareness materials.



Appendix D: Proposed Land Uses for Transmission Pipeline ROW

Guidance in Determining if Proposed Land Use of the Right-of-Way is Acceptable

The purpose of this table is to increase awareness and encourage early communication among key stakeholders when considering changes to an existing land use or new land use development on an existing transmission pipeline right-of-way (ROW). This table should not be interpreted as guidance for the construction of new pipelines amongst existing land uses as they may require different considerations or limitations. Managing land use activities is a challenge for all stakeholders. Land use activities can contribute to the occurrence of a transmission pipeline incident and expose those working or living near a transmission pipeline to harm should an incident occur.

This table provides a list of common land use activities and is only meant to provide guidance to help in determining whether the proposed land use is acceptable or not. There will be variances in the application of these rules from operator to operator based on site-specific conditions, operator practices, and evolving safety regulations and concerns. Therefore, this table should be referenced only for general informational purposes. Stakeholders should consult with the appropriate pipeline operator for acceptable land uses within a pipeline ROW.

Encroachment agreements are encouraged to ensure communication occurs and all parties have appropriate and complete information. Most ROW agreements address potential disturbance of the ROW for pipeline repairs. The need to disturb the right-of-way may factor into the acceptability of a use or activity.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Agriculture - (Seasonal Agricultural Crops - excludes orchards and vineyards)	Yes, but consent is required	Activities related to the growing of crops or the raising of animals need no consent, provided the activity does not involve installation of permanent structures or an increase or decrease in the cover over the transmission pipeline. Facilities such as underground and overhead irrigation systems must be reviewed for compatibility.	With prior approval from the transmission pipeline operator, grass and certain types of shrubs or seasonal crops may be permitted within the right-of-way (ROW), provided that the plantings do not interfere with the maintenance, inspection and operation of the pipeline and related facilities.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Airstrip - Private (perpendicular crossing to pipeline)	Yes, but consent is required	Permission to use the ROW for an airstrip may be granted, provided it is for the private use of the property owner, and does not involve any increase or decrease in the cover over the pipeline or the installation of any permanent structures, including paving, on the ROW.	These airstrips are considered to be dirt. This use can lead to a decrease in ground cover.
Airports - Public	No		These runways are constructed of concrete. Therefore, the need for access for transmission pipeline maintenance and emergency response activities preclude this use. In addition, most airports have restricted access for security reasons.
All-Terrain Vehicle (ATV) Use	No	Occasional use such as farm equipment may be acceptable.	This use can lead to a decrease in ground cover.
Athletic Stadium (e.g., baseball field, football field, running tracks, etc.)	No		Even fields with no permanent structures may define the area as a high consequence area (HCA), thus imposing additional integrity management requirements for the gas transmission pipeline operator.
Automobile Wrecking Yards	No		Access for transmission pipeline maintenance and emergency response activities preclude this use.
Bioretention Cell	No		Access for transmission pipeline maintenance activities preclude this use

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Blasting	No	Not allowed on easements or fee land where any transmission pipeline facilities are installed. Exceptions are for construction of another approved activity, subject to pipeline operator's engineering review for technique, size of holes, spacing, etc.	Blasting activities may cause stresses on nearby transmission pipelines which may lead to leaks.
Buildings	No	No type of permanent structure permitted. See also "Structures".	No structures are allowed because they interfere with emergency response, maintenance, inspection, and repair activities.
Campsites	No		This use may impose additional integrity management requirements for the transmission pipeline operator. In addition, no fires would be allowed for safety reasons.
Canals (For irrigation purposes)	Yes, but consent is required	Canals or ditches may be allowed to be built across the ROW provided adequate precautions are taken to protect transmission pipeline facilities. Plans must be approved by the pipeline operator's engineering or operations.	This use is categorized as being for irrigational purposes only. Canals must be constructed in a manner to allow for maintenance, inspection, and emergency response activities to occur.
Canopies / temporary (Categorized as party tents, canvas awnings, or portable coverings for group gatherings)	No		This use could involve driving large stakes into the ground near the transmission pipeline, exposing it to potential damage and future leaks.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Canopies / permanent (Categorized as weather and environmental shelters such as those over gas stations and emergency room/ hospital entrances, and drive-through covers for banks, pharmacies, fast-food restaurants, etc.)	No		Structures may interfere with emergency response, maintenance, inspection, and repair activities. Canopies may entrap gases and vapors that could find ignition sources from vehicle or pedestrian activities. Concrete under canopies could cause gas to migrate to building in the event of a failure.
Carports, permanent	No	No type of permanent structure permitted. See also "Structures".	Access for transmission pipeline maintenance, inspection, and repair activities preclude this use.
Catch Basins (Storm sewer inlet)	No		Access for transmission pipeline maintenance, inspection, and repair activities preclude this use.
Cathodic Protection Devices	Yes, but consent is required	Cathodic protection facilities may be installed provided they are coordinated with other utilities and all interference problems are eliminated. Their use should be approved by the transmission pipeline operator's cathodic protection department.	To ensure adequate cathodic protection for all transmission pipelines, routine testing should be scheduled and performed by qualified personnel to prevent interference issues.
Cemetery	No		Access for transmission pipeline maintenance, inspection, and repair activities preclude this use.
Concrete Slabs (Categorized as for foundation, typically poured for permanent structure, equipment, or storage location)	No	Not recommended except where they may be installed to provide for transmission pipeline protection from third-party damage (submit plans for review) or for easement across ROW (such as for driveways or roads). (See also Roads, Driveways, Road Crossing, and Structures)	Access for transmission pipeline maintenance, inspection, and repair activities preclude this use.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Construction Equipment	Yes, but consent is required	When excavation is to take place within the operator's specified distance, the excavator exercises such reasonable care as may be necessary for the protection of any underground facility in or near the excavation area. Methods to consider, based on certain climate or geographical conditions, include: hand digging when practical (pot holing), soft digging, vacuum excavation methods, pneumatic hand tools, other mechanical methods with the approval of the facility owner/operator, or other technical methods that may be developed. Hand digging and non-invasive methods are not required for pavement removal. Provide for transmission pipeline operator supervision while work is in progress. Give 48 hours prior notice before performing work. Call one-call number for utility locating.	The transmission pipeline operator should perform an engineering evaluation to determine the effects of any proposed equipment use. Placement of additional dirt cover and/or mats, timber bridges or other protective materials over the pipeline facilities, as deemed necessary by the pipeline operator, may be required for the duration of any loading to ensure the pipeline does not incur damage.
Culverts	Yes, but consent is required	Separation per operator policy must be maintained between transmission pipeline and culvert, with culvert above pipeline. Plans must be approved by transmission pipeline operator's operation or engineering.	Transmission pipeline operator should require additional safety measures to protect transmission pipeline during culvert installation, including hand-digging when in transmission pipeline vicinity.
Cuts and Fills	Yes, but consent is required	Some cutting and filling may be permitted over transmission pipeline. Review with transmission pipeline operator's operations or engineering department as applicable.	Cut and fill material must not interfere with transmission pipeline maintenance, inspection, or repair activities. Cut and fill material must not lead to erosion issues.
Dams	No		Access for transmission pipeline maintenance, inspection, and repair activities preclude this use.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Driveways	Yes, but consent is required		Transmission pipeline operator engineering review required for all proposed streets, roads and driveways to ensure transmission pipeline cover is adequate to support the load from the road crossing. Additional cover, concrete, or other forms of mechanical protection may be required to ensure the transmission pipeline does not incur damage as a result of this use and traffic loads.
Dumps	No		This use would not allow transmission pipeline operator easy access for transmission pipeline maintenance, inspection, and repair activities
Erosion Control	Yes, but consent is required	Structures or materials to prevent soil erosion due to wind or water may be located on the transmission pipeline ROW provided: 1) They do not interfere with the installation, operation or maintenance of the transmission pipeline. 2) The design has been approved by the transmission pipeline operator's engineering and environmental departments. 3) The facilities have taken into account the effect of the environment of the area.	Placement of structures and material must allow for transmission pipeline maintenance, inspection, and repair activities to be conducted by the operator, as well as allow for emergency response access.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Exploration - Geologic and Geophysical	Yes, but consent is required	Subject to proper indemnification and site cleanup. Must be approved by transmission pipeline operator's operations or engineering department. Also see Blasting, Construction Equipment, and Wells.	3D seismic studies, depth of cover, transmission pipeline operating stress levels, and other factors must be considered. The vibrations used to create the sound waves for these exploration activities are quite intense and may compromise the integrity of the transmission pipeline, leading to leaks if not properly evaluated.
Fences - Parallel to ROW	Yes, but consent is required	(general) No masonry or brick fences are allowed. In addition, fences and transmission pipeline should be separated by adequate distance to allow for potential future repairs. Adequate access to and around transmission pipeline facilities must be maintained.	Fences must not interfere with access for transmission pipeline maintenance, inspection, and repair activities.
Fences - Perpendicular to ROW	Yes, but consent is required	(general) No masonry or brick fences are allowed. Adequate access to and around transmission pipeline facilities must be maintained. Transmission pipeline company retains the right to require the installation of a gate in the fence with a corporation lock where necessary to maintain such access. Gates should be wide enough to allow transmission pipeline operator's equipment to gain access for repairs and emergencies. Fence posts must not be installed directly over transmission pipeline. Fences should be installed to allow for easy removal during emergency response. One-call notification required for fence construction.	Fences must not interfere with access for transmission pipeline maintenance, inspection, and repair activities. Additional requirements may be imposed to protect transmission pipeline from damage during construction.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Flammable Material	No	Managed burns for controlling vegetation may be performed by organizations such as BLM or DNR or by farmers, but this activity must be coordinated with transmission pipeline operator to ensure public safety. No combustible material is to be stored on the easement.	For safety reasons no flame or fire associated with an incineration process or with flammable material storage is allowed due to the combustible material transported in the transmission pipelines.
Flood Control	Yes, but consent is required		Transmission pipeline operator engineering review can be made to consider buoyancy and ensure transmission pipeline is adequately protected.
Flooding	Yes, but consent is required	If there is a possibility of periodic flooding, buoyancy of transmission pipeline must be considered.	Intentional flooding is prohibited because it can cause stresses on the transmission pipeline leading to integrity issues; buoyancy must be considered.
Golf Courses	Yes, but consent is required	May be allowed if no permanent structures are placed on ROW.	Cover must be adequate and must allow for maintenance, inspection, and repair activities.
Highways	Yes, but consent is required	Easements should be granted for highway construction although operator may request reimbursement for the cost of protecting, upgrading or relocating the pipeline so that it complies with all applicable regulations and requirements. Where a highway is widened to take in an area where the transmission pipeline operator has a prior ROW, the pipeline operator may require reimbursement for that portion of the work that falls in the area where the company has prior rights.	Pipeline cover must be adequate to support the load from the highway to ensure the transmission pipeline does not incur damage. Review by the transmission pipeline operator's engineering group is required for all proposed streets, roads, and driveways to ensure transmission pipeline cover is adequate to support the load from the road crossing. Additional cover, concrete, or other forms of mechanical protection may be required to ensure the transmission pipeline does not incur damage as a result of this use and traffic loads.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Hiking Trails	Yes, but consent is required	Provided reasonable access to facilities is maintained. See also Landscaping and Cuts and Fills.	Trails must be placed to allow transmission pipeline maintenance, inspection and repair activities to be conducted.
Horseback Riding Trails	Yes, but consent is required	Provided adequate access to facilities is maintained. See also Cuts and Fills.	Trails must be placed to allow transmission pipeline maintenance, inspection and repair activities to be conducted.
Incinerators	No		For safety reasons, no flame, fire, or flammable material is allowed.
Junk Yards	No		This use would not allow transmission pipeline operators easy access for pipeline maintenance, inspection, and repair activities
Landscaping	Yes, but consent is required	Provided reasonable access to transmission pipeline facilities is maintained. See Cuts and Fills for earthwork requirements. In addition, shrubs should not interfere with transmission pipeline patrolling or inspection activities. See Tree Farms for tree limitations.	With prior approval from transmission pipeline operator, flower beds, lawns, and gardens may be permitted within the ROW, provided that the plantings do not interfere with the maintenance, inspection and operation of the transmission pipeline and related facilities.
Leach Fields	No	(General) Piping leading to leach field may cross the transmission pipeline (see Pipelines). The entire leach field must be outside of the ROW. Before being granted permit for piping, owner must show proof of permit that installation will meet all State and local water quality requirements.	Leach field would be subject to damage by passage of heavy equipment. Therefore, repair activities preclude this use. Also, there are integrity concerns that water can cause transmission pipeline corrosion and lead to failures.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Loading Ramps	No	See also Concrete Slabs	Stresses on transmission pipeline can lead to integrity issues; also, this use does not allow for transmission pipeline maintenance and inspection activities.
Marinas	No	Marinas may not be installed on transmission pipeline ROW at river crossings.	This use would not allow the transmission pipeline operator access for pipeline maintenance, inspection, and repair activities.
Masonry Work	No		This use does not allow for access for transmission pipeline emergency response and maintenance.
Mini Golf Courses (putt-putt courses)	No	May be allowed with prior consent if no permanent structures are placed on ROW and green space for transmission pipeline easement is included.	Use must not interfere with transmission pipeline maintenance and inspection activities. This use may define the area as a HCA, thus imposing additional integrity management requirements for the gas transmission pipeline operator. In addition, no permanent structures are to be placed on the ROW.
Mobile Home Parks	No		Structures are not recommended because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities. Also, they increase the risk for transmission pipeline operators.
Mobile Home – Single Unit	No	No permanent structure may be installed on ROW.	No structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities. Also, they increase the risk for transmission pipeline operators.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Model Airplanes	Yes, but consent is required	Model airplanes may be flown over the ROW, but no permanent facilities may be located on the ROW.	Transmission pipeline operator must know of this activity to ensure there is no interference or danger when performing aerial leak patrols.
Orchards	No		Tree root structures may be deep and extend beyond tree canopies. These roots can be severe and damage transmission pipeline coating, leading to corrosion and leaks.
Parking	Yes, but consent is required	A private property owner may park vehicles used in his work (such as farm equipment) on the transmission pipeline ROW but not over the pipelines. Use of the easement as a commercial or other publicly used parking lot, whether paved or unpaved, should be discouraged and not be allowed without review. The transmission pipeline company will not accept liability for damages to the parking facility caused by the exercise of its rights under the easement, and reserves the right to prohibit vehicular parking on its easement at any time.	Transmission pipeline companies conduct maintenance activities on a frequent basis. Parking vehicles on the ROW may interfere with some of these maintenance practices.
Parks	Yes, but consent is required	The ROW may be used as part of a park area, but permanent structures may not be located on the ROW. Specific plan review required.	Use must not interfere with transmission pipeline maintenance and inspection activities. This use may define the area as a HCA, thus imposing additional integrity management requirements for the pipeline operator. In addition, no permanent structures are to be placed on the ROW.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Patios	No		No structures are allowed because they interfere with transmission pipeline emergency response and repair activities and increase risk for transmission pipeline operators.
Pipelines	Yes, but consent is required	Permits generally are granted for other pipelines to cross a transmission pipeline ROW, provided: 1) Crossing is kept as close to a right angle as possible. 2) The crossing pipeline maintains clearance approved by operator above the transmission pipeline below the transmission pipeline. Pipeline crossings above the transmission pipeline should be strongly discouraged. 3) Installation makes provisions for future use of transmission pipeline ROW. 4) Precautions are taken to protect both facilities from interference problems due to cathodic protection. 5) Crossing pipeline meets all Federal, State and local requirements with respect to safety and environment. 6) Parallel encroachments are not allowed. (See "Utilities Parallel")	Significant design, construction, and maintenance code activities are performed to ensure the safety of the public and employees near transmission pipelines. These design, construction, and maintenance activities also ensure the integrity of the pipelines. Additional construction requirements may be imposed to protect the transmission pipeline and allow future maintenance activities to be performed.
Play Equipment	Yes, but consent is required	No permanent structure may be installed on ROW. Play equipment without embedded footings or foundations may be allowed.	Use must not interfere with transmission pipeline maintenance and inspection activities. This use may define the area as a HCA, thus imposing additional integrity management requirements for the pipeline operator. In addition, no permanent structures are to be placed on the ROW.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Ponds	No		This use would not allow the pipeline operator access for transmission pipeline maintenance, inspection, and repair activities
Porches	No		No structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities. Also, they increase the risk for transmission pipeline operators.
Power Lines	Yes, but consent is required	Power lines may be installed across the ROW provided: 1) Poles or towers are not located on the ROW. 2) Wires have adequate clearance to permit working on the transmission pipeline. 3) Parallel encroachments of above or below ground power lines are not allowed (See "Utilities – Parallel"). 4) Power lines are not located within 200 feet of a blow-down stack. 5) Buried power lines meet transmission pipeline operator standards.	Engineering review and field monitoring can be performed to ensure no corrosion issues develop and lead to failures.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Private Landowner Crossing of Pipeline	Yes, but consent is required	Where a private landowner crosses the transmission pipeline with a buried structure, a consent letter usually will be required. Permits usually will be granted for crossing provided: 1) Crossing structure is kept as close to a right angle as possible. 2) Crossing structure maintains at least one-foot clearance above the transmission pipeline or two feet below the transmission pipeline. Crossings above the transmission pipeline should be strongly discouraged. 3) Installation makes provisions for future use of the ROW. 4) Precautions are taken to protect both facilities from interference problems due to cathodic protection. 5) Crossing structure meets all Federal, State and local requirements with respect to safety and environment. 6) Parallel encroachments are not allowed. (See "Utilities Parallel").	Additional construction requirements may be imposed to protect the transmission pipeline and allow future maintenance activities to be performed.
Pumps	No		Failure of equipment could elevate risks; permanent structures do not allow for easy access for transmission pipeline emergency response.
Pump Islands (Categorized as fuel pumps for automobile service stations - general transportation refueling stations)	No		No structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities. Also, they increase the potential consequences if a failure occurs.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Quarries and Strip Mining	No	Quarrying activities not on but in proximity to the ROW should be brought to the attention of the transmission pipeline company for assessment of potential impacts to the integrity of the ROW and transmission pipeline facilities. (See Blasting)	This activity limits access for transmission pipeline emergency response.
Railroads	Yes, but consent is required	Railroad crossings are permitted, provided the railroad company agrees to pay the cost to upgrade or protect the transmission pipeline. Clearances must be provided as required in Cuts and Fills.	Transmission pipeline cover must be adequate to support the load from the railroad crossing to ensure the pipeline does not incur damage; vibrations need to be properly evaluated for cyclic fatigue to ensure the integrity of the pipeline is not compromised, leading to leaks. Review by the transmission pipeline operator's engineering group is required for all proposed railroad crossings to ensure the pipeline cover is adequate to support the load from the crossing. Additional cover, concrete, or other forms of mechanical protection may be required to ensure the pipeline does not incur damage as a result of this use and traffic loads.
Recreation Areas	Yes, but consent is required	ROW may be used for general recreation that does not require the use of any permanent structures or facilities.	Use must not interfere with transmission pipeline maintenance and inspection activities. This use may define the area as a HCA, thus imposing additional integrity management requirements for the pipeline operator. In addition, no permanent structures are to be placed on the ROW.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Retaining Walls	Yes, but consent is required	Provided adequate access to facilities is maintained and Cuts and Fills criteria is maintained. All retaining walls on the ROW must be approved by transmission pipeline operator's operations or engineering department.	Transmission pipeline cover must be maintained to protect the pipeline, and the use would have to allow for pipeline maintenance and emergency response activities to be completed.
Rifle Ranges	No	Limited use may be allowed to access rifle range area across the ROW but no permanent facilities may be located on the ROW.	Transmission pipeline systems include above ground facilities that may incur damage from rifle range fire.
Road - Parallel	Yes, but consent is required	Plans must be approved by the transmission pipeline company's operations or engineering groups. Road easement is subordinate to the transmission pipeline company's easement. In addition, road and pipeline should be separated by adequate distance to allow for potential future repairs.	Use must allow for transmission pipeline maintenance, inspection, and emergency response activities.
Road Crossings – Private	Yes, but consent is required	Consent usually will be granted for private roads across the ROW provided: 1) Assurance is given the road will remain a private road. It must be so marked and signs must be maintained. 2) Road must not be given a hard surface. 3) Cut and Fill requirements must be maintained. 4) Road owner must agree to pay cost of protecting or upgrading the transmission pipeline if the road should be paved or status is changed to a public road.	Review by the transmission pipeline operator's engineering group required for all proposed streets, roads, and driveways to ensure pipeline cover is adequate to support the load from the road crossing. Additional cover, concrete, or other forms of mechanical protection may be required to ensure the transmission pipeline does not incur damage as a result of this use and traffic loads.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Road Crossings - Public	Yes, but consent is required	Consent generally will be granted for a public road or street across the ROW provided: 1) Developer pays for cost of protecting, upgrading or relocating the transmission pipeline. 2) Pipeline company retains prior rights on roads dedicated to the state, county or city.	Review by the transmission pipeline operator's engineering group required for all proposed streets, roads, and driveways to ensure pipeline cover is adequate to support the load from the road crossing. Additional cover, concrete, or other forms of mechanical protection may be required to ensure the pipeline does not incur damage as a result of this use and traffic loads.
Septic Tanks	No		Access for pipeline repair activities preclude this use
Service Stations	No		No structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities.
Signs	No	Signs, except pipeline markers, are not permitted on the ROW.	Foundation or embedded footings could damage the transmission pipeline coating, leading to integrity and corrosion issues.
Sprinkler Systems (underground)	Yes, but consent is required	Crossings of transmission pipeline must be kept to a minimum. Sprinkler heads should be set outside of the ROW. Due consideration must be given to cathodic protection interference.	There is concern that water can cause corrosion and lead to failures (transmission pipeline operator's operator engineering department review and field monitoring is necessary to ensure no corrosion issues are identified). There is concern that third-party damage will result and sprinkler systems will interfere with pipeline maintenance and vegetation management activities.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Stock Piles - Storage of Earth	Yes, but consent is required	See Cuts and Fills.	This material storage can't interfere with transmission pipeline maintenance, inspection, repair, or emergency response activities. In addition, stock piles must not lead to erosion issues.
Storage	No	The ROW cannot be designated as storage area. However, small amounts of non-combustible materials or equipment may be stored on the ROW by the property owner provided it does not interfere with access to the transmission pipeline.	This material storage can't interfere with transmission pipeline maintenance, inspection, repair, or emergency response activities. In addition, storage must not lead to erosion issues.
Structures	No	Permanent structures (i.e. any facility or structure, the foundation or any other portion of which lies below the ground surface, or is otherwise not readily moveable) are not allowed. Small outbuildings (e.g. sheds, playhouses) on blocks or without foundations may be permitted on a case by case basis.	No structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities.
Subdivisions	Yes, but consent is required	The area over the transmission pipeline ROW may be subdivided provided: 1) No permanent structures may be located on the ROW. 2) Streets or roads are laid out to cross the pipeline at a right angle. Parallel encroachments are not acceptable. 3) The requirements for Road Crossings, either private or public, are met. 4) The ROW is not used for a utility corridor. 5) Developer or person subdividing the property submits approved subdivision plans. 6) Necessary consents are issued by the transmission pipeline operator.	Transmission pipeline operators can work with planners and developers to minimize risks to transmission pipelines and communities within green spaces; early communication between all stakeholders is critical to ensure all factors are considered.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Swimming Pools (built-in and above ground)	No	Small, plastic "kiddy" type pools would be allowed. These types of portable pools are considered temporary and can be easily moved for pipeline activities if necessary.	No permanent structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities.
Tanks	No	Above or underground.	Access for transmission pipeline maintenance, inspection, emergency response, and repair activities preclude this use
Temporary Material Storage Non-earth Material	Yes, but consent is required		This material storage can't interfere with transmission pipeline maintenance, inspection, emergency response, or repair activities. In addition, storage must not lead to erosion issues.
Tennis Courts	No		Access for transmission pipeline maintenance, inspection, and repair activities preclude this use
Trails	Yes, but consent is required	Adequate precautions should be taken to prevent erosion. See Cuts and Fills.	Trails must be placed to allow transmission pipeline maintenance, inspection and repair activities to be conducted.
Trash Burners	No		For safety reasons, no flame, fire, or flammable material is allowed.
Tree Farms	No	Must provide access to transmission pipeline facilities. In addition, shrubs should not interfere with pipeline patrolling or inspection activities.	Trees have root structure that may damage transmission pipeline coating or pipeline integrity; tree canopy may interfere with aerial leak patrol activities.
Underground Structure	No	Other than “other” pipelines and related facilities. (See Pipelines)	Access for transmission pipeline repair activities precludes this use.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Utilities – Crossing Perpendicular	Yes, but consent is required	Consent to common use generally will be granted for crossings of overhead or underground utilities provided: 1) Overhead lines must provide adequate clearance for working on the transmission pipeline. Poles, anchors or supports may not be located on the ROW. 2) All underground lines must be installed with minimum one foot of clearance between the pipeline and the utility if crossing is above the pipeline and two feet of clearance if crossing is below the pipeline and must be at same depth completely across the ROW. Crossings above the pipeline are strongly discouraged. Underground electric lines of less than 600 volts and all buried telephone lines, must be encased in plastic conduit across the entire width of the ROW. Underground electric lines of over 600 volts must be encased in rigid steel pipe across the entire width of the ROW. 3) The crossing utility operator must pay for any protection or upgrading of the pipeline facilities, and a temporary relocation clause may be used to allow construction or maintenance of the pipeline. 4) Utility crossings must be designed to meet all applicable federal, state and local codes and requirements, and assurance provided that due consideration has been given to the effect of the project on the surrounding area. 5) Buried electric cables, splices should be discouraged within the ROW.	Adequate separation and interference protection with other utility activities and the transmission pipeline must be performed. Interference protection that is not effective may lead to transmission pipeline corrosion and integrity issues. Activity must allow transmission pipeline maintenance, inspection, emergency response, and repair activities to be conducted.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Utilities – Running Parallel	No	Parallel encroachment of any utilities, either overhead or underground may be allowed in some cases for short distances. In general, parallel encroachments are to be strongly discouraged. Easement agreements may not allow absolute prohibition of such encroachments.	Interference protection that is not effective may lead to transmission pipeline corrosion and integrity issues.
Utilities – Crossing in Operator Easement	Yes, but consent is required	The transmission pipeline company generally will grant rights of way for utilities across company-owned lands provided: 1) Easement will not interfere with present or future use of land by the pipeline company. 2) The pipeline company retains the right to have the crossing utility relocate at its own expense at a future date, if such relocation becomes necessary to permit utilization of the land by the pipeline company. 3) Crossing utilities must be installed and maintained in accordance with all applicable codes and requirements. 4) Adequate consideration must have been given to the effects of the crossing utility on the environment of the area. 5) Buried electric cables, splices should be discouraged within the ROW	Adequate separation and interference protection with other utility activities and the transmission pipeline must be performed. Interference protection that is not effective may lead to transmission pipeline corrosion and integrity issues. Activity must allow transmission pipeline maintenance, inspection, emergency response, and repair activities to be conducted.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Utilities - Crossing Outside of Operator Easement	Yes, but consent is required	Where a utility crosses the transmission pipeline on a public road, the utility normally has equal rights with the pipeline facility. However, every effort should be made for the pipeline company and the utility company to work together to provide a minimum of one foot of clearance between the utility and the transmission pipeline if the utility crosses above the pipeline or two feet if the utility crosses below the pipeline, and that the same depth be maintained completely across what would normally be the transmission pipeline ROW. The same criteria for underground electric lines as set forth in "Utilities – Crossing" should also be requested. Engineering review by the transmission pipeline company is required even if no consent is issued.	Adequate separation and interference protection with other utilities and transmission pipelines must be performed. Interference protection that is not effective may lead to transmission pipeline corrosion and integrity issues. Activity must allow transmission pipeline maintenance, inspection, emergency response, and repair activities to be conducted.
Vaults	No		No structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities.
Wading Pools	No	Small, plastic "kiddy" type pools would be allowed. These types of portable pools are considered temporary and can be easily moved for pipeline activities if necessary.	No permanent structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities.
Weighing Stations	No		No structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities.

Use/Activity	Acceptable Use or Activity?	Additional Restrictions or Comments	Origin/ Rationale for Determining Acceptable Activity
Wells	No		Drilling activity could damage transmission pipelines and lead to integrity issues.
Wrecking Yards	No		No structures are allowed because they interfere with transmission pipeline emergency response, maintenance, inspection, and repair activities.

Appendix E: Seven-Step Communication Model

Seven-Step Model for Communicating Acceptable Uses and Activities on Transmission Pipeline Rights-of-way to Land Owners and Other Stakeholders

Introduction

Typical communications from transmission pipeline operators to stakeholders regarding rights-of-way (ROW) activities occur for one of three reasons: 1) information exchange; 2) education opportunity; or 3) to cause a change in behavior. However, in reality most communications regarding ROW activities or uses are performed with the intention of causing certain behaviors to happen. Consider the following examples for various stakeholder audiences and the associated behavior expectation.

- Landowners**:** When letters regarding anticipated ROW clearing are sent to the landowner, the purpose of the communication is to inform the landowner ahead of the actual event occurring. This in turn should:
  - Prevent the landowner from being surprised by the presence of individuals on their property;
  - Provide appropriate contact information;
  - Prompt landowners to think about fencing or gates that may have to be accessed;
  - Help the landowner think about children or planned family activities; and
  - Allow the landowner to prepare appropriately for domestic and farm animals that could be impacted by the event.
- Excavators: Communications to excavators to educate them about 811 or Call Before You Dig are intended to ensure they will call for facility locates before digging.
- Real Estate Agents/Brokers: Communications to real estate agents and brokers about pipeline facilities identified by pipeline markers are intended to promote information about pipeline location early so that potential buyers can receive appropriate information. Potential buyers should then make more informed decisions, including contacting the pipeline company for more information.
- Local Government Planning and Zoning Organizations (including permitting, public works, emergency officials, elected officials, etc.): Information or education events for these audiences are meant to allow them to factor the relevant pipeline information into their activities and cause them to change their behavior accordingly or as necessary.

Education can help lay a foundation for heightened awareness and increased knowledge. However, better training, media or advertising efforts will only go so far in many cases. While persuasive communication campaigns can prompt action and should be utilized, these efforts may not sustain desired actions. It is important to understand that information can lead to awareness, but awareness may not lead to a behavior change. According to subject matter experts, if you are communicating for a change in behavior, a concept called *social marketing* should be used. Social marketing utilizes various research components:

- Formative research

- Pretest research
- Monitoring research
- Evaluation research

Social marketing provides a few more strategies to overcome or reduce barriers to behavior change, and is used to change perceptions and to help build a new social norm. Social marketing is:

1. Using product-marketing strategies to promote ideas like safety, health and conservation;
2. Influencing a target audience to voluntarily accept, reject, or modify an action; and
3. For the benefit of individuals, groups, or society as a whole.

Understanding what behavior is expected and what currently exists is important to changing the behavior. In order to maximize the opportunity created with each communication, considerable thought should be given to what behavior needs to change on the transmission pipeline ROW, what behavior is desired, or what behavior on the ROW should be maintained by the specific stakeholder.

The PIPA Communications Task Team efforts included a focus on researching the art and science of effective communication techniques. As various techniques were considered for communicating a particular message, it became apparent that each technique required a basic understanding of why the message is necessary, who will receive it, and what will be communicated, in concert with other considerations.

A model or process was developed for communicating acceptable uses and activities on pipeline rights-of-way to stakeholders. This seven-step model is applicable in any circumstance related to transmission pipelines, including a new or existing transmission pipelines being constructed or operated in either newly developed areas or in rural areas. The model is for use when communicating acceptable ROW uses and activities to land owners and other stakeholders. Generally throughout this discussion, examples are given from the perspective of a transmission pipeline company. However, the same tools and guiding principles of the model can be used by any stakeholder, for example:

- Fire marshals may use it as they communicate to other fire marshals or emergency responders;
- Trade associations, such as the Associated General Contractors of America (AGC) or the National Utility Contractors Association (NUCA), may use it to communicate more effectively within their organization and among their members;
- Local government planning and zoning organizations may use it to communicate with developers; and
- Regulatory agencies and others may use it when communicating to public stakeholders.

The seven steps of an effective communications model include:

1. Identify the problem (or need) the communication will solve (or address).
2. Determine which stakeholder/s receives the communication.
3. Identify draft message to be communicated.
4. Develop final message and delivery system based on marketing strategy best suited for the desired outcome.
5. Implement communications.
6. Measure effectiveness.
7. Identify and implement changes if necessary.

Seven Step Communication Model

Step 1 – Why?

1.00 Identify the problem (or need) the communication will address.

Step 1 in the PIPA seven-step communication process specifically addresses "why" the communication is needed. Before effective communication can occur, one must identify the problem or need that the communication will address. This "begin with the end in mind" approach lays the foundation for an effective communication effort and defines why stakeholder communication is necessary.

Transmission pipeline companies utilize many types of communication in an effort to protect the public, the environment, and their pipeline assets. Their communication methods include such things as direct mailers, radio and television spots, personal contact, and group meetings. While all of these methods can be effective, without careful design and delivery, they typically will not cause the desired change in behavior. Facilitating behavior change requires a socially-engineered message that targets a specific audience over an extended period of time. For example, it is not unusual for direct mailers to be discarded without being read. Mailers from transmission pipeline operators may satisfy regulatory guidelines or mandates, but they do not necessarily serve the intended purpose of increasing transmission pipeline awareness and safety, which is why they were distributed in the first place.

The PIPA participants sought input regarding the best practices in communication techniques from various authors and consultants.

- Gary Melling (President & CEO; EPIC Software Corporation) and Sarah McCaffrey (USDA Forest Service) addressed the importance of understanding the audience and defining the purpose of the communication program, answering the stakeholders' frequently asked question, "What's in it for me?"
- Greg Winter (Cornerstone Strategies, Inc.) defined "social marketing" steps which include describing the background, purpose, and focus of the communication program.
- Martha Monroe (University of Florida – Communications Research) echoed many of the communication points noted by the others and added that in order to communicate more effectively, barriers to behavior change must be identified. Once initially identified, messages and communication strategies can be crafted to promote the ideal behavior, which gives all stakeholders a role in transmission pipeline protection.
- Ms. McCaffrey also suggested a central depository to ensure easy access to information, consistent message and information exchange, and to promote a sharing of effectiveness lessons (i.e., a lessons learned center).

Many other professional and technical publications were found to provide similar insights into best communication practices. For example, the "Damage Prevention Best Practices", published

by the Common Ground Alliance (www.commongroundalliance.com), identify that an effective damage prevention program must include a comprehensive strategic marketing and advertising plan. Without a plan, and the budget to support it, the intended messages will likely be lost in today's information overload.

Stephen Covey's "7 Habits for Highly Effective People" suggests that we begin with the end in mind. By doing so we satisfy the first communication element of why the communication is necessary in the first place. Transmission pipeline companies want to effectively communicate acceptable right-of-way activities and uses, to help ensure pipeline reliability and engage all stakeholders in that effort. Right-of-way communication promotes safety and reduces risks to people and the environment.

Step 2 – Who?

2.01 Determine Which Stakeholders Receive the Communications.

The second step of the seven step communication model is defining who should receive each type of communication. Who is the audience? There's no such thing as the "general public." Each group of stakeholders has different concerns, belief systems, perceptions and misconceptions. The priorities of each group will affect and help determine the most effective message.

2.02 Compile Information.

Knowledge about your audience is very important. Begin by compiling all the information available about your stakeholders. This information can help identify behavioral clues and barriers to communicating with them. Review your stakeholders' behaviors to ensure that your information about them remains accurate. Priorities change, economies rise and fall and new personalities come into the mix. The right message delivered to the wrong person will not be effective.

Stakeholders are motivated by different factors and may be motivated by multiple issues. For example, a landowner may be concerned about the loss of trees on his property. Another may be concerned about the quality of the restoration activities following ROW maintenance. Others may be concerned about financial impacts on property values, lost crops and the security of their livestock. Emergency responders are concerned about adequate training and appropriate emergency response information.

Be sure to look at all the factors before categorizing stakeholders by a single issue. If your stakeholder audience is too broad, it can impact your effectiveness. Narrowing your stakeholder audience may be required to improve your chance of success. This may be why transmission pipeline operators such as El Paso, Northern, Marathon, and Williams report initial success with specifically designed publications for specific audiences, such as handbooks for developers. Knowing the concerns of your audience and specifically identifying the barriers that may prevent your audience from understanding your message can be time well spent.

If individual stakeholder contact is possible, using information resources readily available can enhance your success. For example, you might research the following:

- Has the specific stakeholder attended meetings before?
- Has the stakeholder raised specific issues in other meetings? If so, what are those issues?
- Are there financial or other topical issues specific to this individual?
- Is the stakeholder a community leader, law enforcement officer or emergency responder? If the stakeholder is a community leader, could they be impacted socially by their response to the communication?
- Has the stakeholder received media attention regarding ROW issues in the past?
- What methods of communication delivery have been used for this stakeholder before?

Step 3 – What?

3.00 Identify the draft message to be communicated.

Start to formulate your draft message. Think about the end result. Do you want a behavior change or do you simply want to provide information? Ask yourself, what is the purpose of the message? What is the goal? What do you want to accomplish?

Create several messages, then review and refine them. Pick the one that works best for you. Try the selected message on several associates. Value their opinion and feedback. Keep in mind that this is only a draft, a place to start. There will be more refinement through the process.

Remember, the objective of the message needs to be identified and then related to the audience. Philip Kotler calls this the "Positioning Statement". He defines it as "the act of designing the organization's actual and perceived offering in such a way that it lands on and occupies a distinctive place in the mind of the target market – where you want to be."[9]

Step 4 – Strategy

4.01 Develop the final message and delivery system based on a marketing strategy best suited for the desired outcome.

Once the need (the why), the audience (the who), and the basic message (the what) have been identified, then it is time to get into the details of designing a strategy to refine the message and deliver it in a way that the audience will understand and pay attention to it. This is the critical step that can either make or break any communication effort. For relatively simple efforts, such as notifying a property owner that work will be done on the transmission pipeline right-of-way on their property on a certain date, developing a communication strategy may be easy and straightforward. For more complex efforts it may be necessary to hire outside consultants to help design the strategy. For example, outside consultants may be needed to ensure that

[9] Greg Winter, SME, Social Marketing, Cornerstone Strategies, Handout entitled "Quick Reference Guide" by Nancy Lee and Philip Kotler

municipalities know the location of the transmission pipelines that run through their jurisdictions and how this could impact future planning decisions.

Below are some of the basic parts of a strategy that should be considered. As with the design of any good strategy, each piece can potentially affect all the other pieces, so a process to revisit each decision should be in place.

4.02 Identify budget needed compared to budget allocated.

In a perfect world a communication strategy would be designed to ensure the best possible outcome, then the money necessary to implement that strategy would be allocated. In the real world, however, budget constraints often require decisions to be made about how to implement the best possible strategy with the money that is available. The difference between the basic budget needed to communicate successfully and the budget available needs to be kept in mind so more money can be sought if necessary, or so that the communication can be cancelled if a basic successful strategy cannot be afforded.

4.03 Identify audience barriers and benefits.

It is very important to understand the targeted audience. Knowing barriers and misconceptions that can affect your specific stakeholder audience is essential. Understanding how the stakeholder may perceive risk can also provide insight to assist with more effective communication messages. Significant questions, such as whether or not there are barriers that make it difficult for the audience to receive the message, impact the understanding of the message, prevent trust in the person delivering the message, or affect whether or not the stakeholder will do what the message asks, should be answered. Identifying whether or not there are benefits that the audience may receive through this communication that they may not realize or understand could be helpful. Knowing whether or not incentives should be built into the effort to help overcome the barriers or increase the benefits could add value to the communication effort.

These types of questions or barrier determination efforts need to be considered and addressed. For more complex projects it may be necessary to undertake surveys or focus groups to make sure that the communicator's assumptions about the audience are correct. It is important to try to bring forward any hidden issues.

4.04 Determine how the message is to be delivered.

How the message is delivered is an important consideration for the success of the communication program. Research indicates that one of the most effective methods for behavior change is one-on-one interpersonal communications with a person the stakeholder trusts. The use of interactive demonstrations is a delivery method that will appeal to most adults and heighten their learning experience. The use of expert information coupled with stories and examples that relate to the audience member is also effective. Communicating the message to the stakeholder multiple times in different formats (direct mail, radio ad, news story, presentation at professional association, etc.) can help get the message noticed and understood, and reinforce its importance. This may have been one of the reasons that a

Marathon Pipeline Company radio talk show addressing ROW clearing efforts, in which multiple callers could ask questions of multiple people, appears to have been successful. However it is important to employ media methods that the specific stakeholder audience actually uses. [10]

There are several methods of implementation that can be considered in communicating to inform stakeholders regarding right-of-way (ROW) activities and uses. Some of those listed below can be used in combination.

Written	**Verbal**	**Graphic**
Letters	Face-to-Face meetings	Billboards
Magazines	Telephone Calls	Bus Signs/Bus Stand
Brochures	TV Spots	Banners
Door Hangers	Radio	Pipeline ROW Markers
Emails	Trade Show Booths	Signs at excavation sites
Bill stuffers/Mailers	Professional presentations	Mascots
Pipeline ROW Markers	Town Hall meetings	
Newspaper Notices	Specific stakeholder meetings	
Give-A-Ways		

Information about methods of delivery that increases the likelihood that the information will reach a reader should be used. For example, subject matter experts indicate that graphics used in documents and presentations should be vivid, visually interesting, and relevant to the subject. Recognition and incentives can enhance the effectiveness of the communication[11]. An actual example of recognition being successful was demonstrated when the CEO of Explorer Pipeline met on the ROW with stakeholders. Williams Pipeline Company indicates initial success with website information through the use of incentives. Another approach shows that some members of the public may open mail that comes in a handwritten envelope more readily than other methods of addressing.

4.05 Determine where and when the message is delivered.

The timing and setting in which a message is delivered also should be accounted for. Once the audience is well understood, these decisions should be easier to make. For example, if audience research shows that a local community has a general lack of trust for local government, but universally supports their state champion basketball team, the decision on whether to hold a public meeting in the city council meeting room or the high school gymnasium may be easier and more important. Similarly, if your message is targeted at an agricultural audience you would know that a message delivered during the height of the harvest season (whether at the

[10] Sarah McCaffrey, SME, USDA, Forest Service Researcher
[11] Martha Monroe, SME, University of Florida and Sarah McCaffrey,USDA

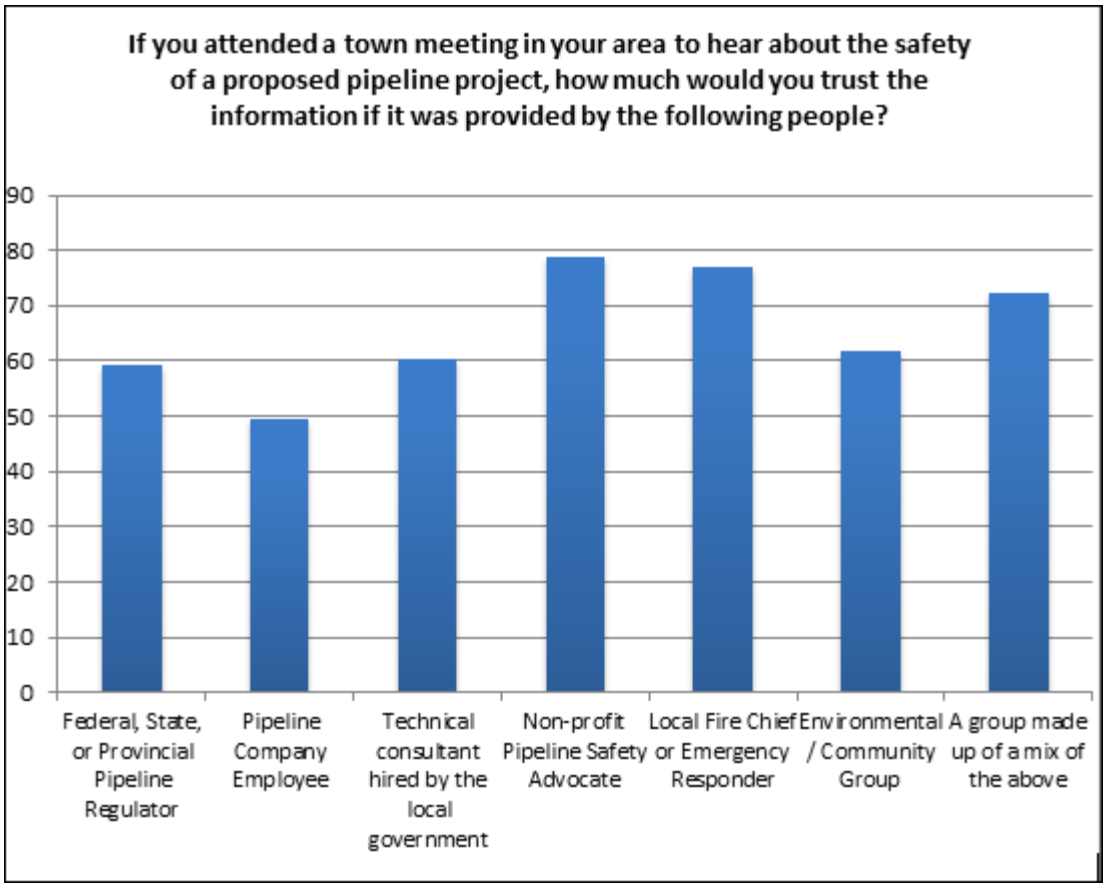
gymnasium or the city council room) has little chance of success. Historical pipeline performance in the area can also affect communication needs.

4.06 Determine who should deliver the message.

One factor that is essential for stakeholder communications is trust. Research shows that people trust and feel most comfortable when talking to other people most like themselves. This is especially so if those delivering the messages are also recognized as community leaders with "expert" knowledge related to the subject[12]. A message from a trusted source, such as a community leader, resonates with most stakeholders. Enlisting these individuals can mean the difference between communications that succeed and those that fail. That is why, when possible, it makes most sense to have contractors talk to other contractors, emergency responders talk to emergency responders, planners talk to other planners, etc.

Audience research can also help decide who would be the best person to deliver the message. For example, the graph below shows the results of an actual survey question asked of people concerned with a proposed pipeline in Arizona. If you were a pipeline company trying to deliver the message, these results would help you understand that having your own employees deliver the message may be a problem or a waste of valuable resources. But, holding the town meeting with a mix of communicators, including your employees, may help increase the acceptance and understanding of the message. Research indicates that few surveys that focus on determining landowner perceptions regarding ROW activities or preferred methods of contact have been performed by transmission pipeline operators through industry trade groups.

[12] Terri Larson, Subject Matter Expert,Fleishman-Hillard



4.07 Select a measurement strategy and measure success.

It is imperative for the success and continued funding of any communication strategy to measure whether the effort is being successful. An evaluation process should be incorporated and planned in advance. The definition of success (i.e., metrics) should be clear and understood. If the measure of success is real behavior change (for example – using the one-call system), then the method designed as part of the strategy should measure that behavior change and not measure items that are not indicators of success (for example – the level of stakeholder attendance at a damage prevention workshop). Awareness of what one should do may not necessarily translate into doing it. Often, people will say they support something but then turn around and behave in a totally different manner. However, research does indicate that asking for a commitment from the stakeholder audience member can elevate action to the desired behavior[13].

Measurement strategies can be employed in a variety of ways. Some examples are:

- Surveys
- Focus Groups
- Feedback Cards

[13] Martha Monroe, SME, University of Florida

- Telephone Calls
- Personal Contact
- Interviewing
- Case Studies
- Conversations before/after presentations
- Exercises
- Observations

Several measurement strategies, including focus groups, provide the opportunity to test the message and explore how the message is understood by the target audience. Measured results on the quality or effectiveness of the message can then be obtained. From the measured results, message and delivery methods can be tailored, edited and adjusted to better reach and impact the intended audience.

For major efforts it is also important to make sure that the measurement can take place in a timeframe that allows the communication efforts to be changed if not successful. This will help avoid wasting time, good will and money. Whenever possible, the strategy should be test marketed on a small subset of the intended stakeholder audience to verify desired results.

4.07 Modify the draft message to final form based on marketing analysis, recommended practices, specific areas of concern, or other resources.

Once all of the above considerations have been thoroughly researched and decided upon the initial draft message can be reshaped and packaged to ensure that it best fits the strategy of who, where, when, and how.

Step 5 – Communications

5.00 Implement Communications

Up to this point the focus of the communication effort was to determine “why”, “who”, “what” and the strategy (“the how”, when, where, and who delivers) of the message. Keep in mind, the audience or stakeholder has already been identified as you drill down through the steps in the communication model.

It is important to determine the most effective way to communicate the message. You should consider what barriers have been identified, how the stakeholder will perceive risk, and how these elements will affect your implementation strategy. The decision to select one or several communication methods has been based upon the audience, the change in behavior desired, cost of the communication and what barriers will impact the manner in which the message is received. Obviously, the implementation must be effective. The message must be heard and understood for the desired action to be taken and implemented by the intended recipient. The change in behavior (whatever behavior you have identified) needs to be achieved for an effective use of resources.

The method used to communicate will depend primarily on the message to be sent. For instance, if a transmission pipeline company has a routine excavation activity planned on your

property or in your community, they will most likely send a letter or give the landowner a quick call on the telephone. If, however, the pipeline company has a large transmission pipeline project planned, they may hold town hall meetings, meet with local officials, allocate special websites, create special brochures and prepare news bulletins or press releases.

Remember, good communicators are trustworthy, engaging, caring of their audience and accessible. There are many different ways to communicate. The differences depend on many things, including the audience receiving the message the strategy and the purpose and goal of the message.

Step 6 – Metrics

6.00 Measure Effectiveness.

Peter Drucker was a writer, management consultant and social ecologist who explored how humans are organized across all sectors of society. He stated, "Efficiency is doing things right; effectiveness is doing the right things." The practice of measuring effectiveness is all about making sure that you are doing the right things, in the right way, and that you continue to do so. Mr. Drucker also noted, "There is nothing so useless as doing efficiently that which should not be done at all". If you are doing communications in a manner that should not be done at all, you waste both the stakeholder's and your own resources.

Measurement is needed for several reasons, including to:

1) Identify what is working well or poorly with the communication
2) Verify that the purpose of the objective is or can be met
3) Ensure effective use of resources

Identifying what is working well or poorly with the communication will help you know the culprits (or barriers) getting in the way of the communication or the learning experience. It also determines whether or not the learning process is effective.

Too often in developing a purpose for a communication, the objectives or measurement methods are not made "SMART". SMART program effectiveness measurements and metrics are those that are[14]:

S – Specific (to your target)
M – Measurable
A – Attainable or Actionable
R – Relevant
T - Timely

When you can measure and review what may or may not need to be changed through the use of metrics, you can improve how you use your resources. For example, if feedback determines the

[14] Dave Trimble, ProSci Senior Partner, "How to Measure Success: Uncovering The Secrets of Effective Metrics" and Georgia Bozeday, Rush Neurobehavioral Center, "Executive Function Skills", University of California TV learning series by Tribune Media Service.

specific message to be unclear, changes to the message can be shared with multiple users, such as transmission pipeline trade associations, trade agencies, or others using the message, thus assuring a more effective use of resources. In the same way, you may be able to: improve the type of consultant resources utilized for specific items; eliminate waste by sending out more effective documents, including letters or calendars; share lessons learned; and cause a change in behavior that lasts.

Several specialized techniques or recommended practice consensus documents have indicated the importance of measuring effectiveness. Some of these include:

- Common Ground Alliance (CGA) Best Practice 8-9 emphasizes the need to measure public education success; Section 9.0 of the CGA Best Practices addresses Reporting and Evaluation.
- Steps 10 and 11 in the American Petroleum Institute's Recommended Practice (RP) 1162, "Public Awareness Programs for Pipeline Operators", address tracking progress and program evaluation. Information included with the API document appendices also provides guidance on obtaining meaningful measurement data.
- Social marketing to facilitate a change in behavior includes effectiveness metrics, testing of these metrics, and monitoring.
- Practical program evaluation includes measuring effectiveness.

Step 7 – Continuous Improvement

7.00 Identify and Implement Changes If Necessary.

As Hunter Thompson, author, journalist, and creator of "Gonzo Journalism" put it: "Anything worth doing is worth doing well!" So it is with communicating.

Communicating well in a formal setting requires a well thought out plan that essentially follows the first six steps of this seven-step model. The seventh step is designed to implement identified changes, if necessary, based on the result of those first six steps.

If the monitored results indicate that the communication effort was effective, then there would be no need for further changes. Or in other words, if the recipients clearly heard and understood the message, then the communications model efforts are complete and no further communication may be required. But given the nature of both communicators and recipients, and the fact that all human communication activities are impacted by the weaknesses of the human condition (communication barriers), changes to the communication may be and are likely to be required. A complete implementation of Step 7 will need to be undertaken in all but a few cases.

The recommended practices for carrying out Step 7 of sound communications efforts are as follows: [15]

[15] cf. M. Monroe; S. McCaffrey; G. Winter

- Monitor all measured results. If the communication was successful, great! No need to proceed further. If it was not successful, then proceed to the following additional recommended practices:
- Develop a feedback loop to compare measured results with assumptions on which initial decisions were based. (E.g.: Was the problem correctly identified? Were the correct recipients identified? Was the correct message chosen? Was the delivery system appropriate?)
- Identify changes needed to correct initial assumptions
- Implement the necessary revisions
- Re-communicate the message and continue to re-measure

Conclusion

To communicate effectively, you should make each of these 7 steps part of your routine habits. Aristotle said "We are what we repeatedly do. Excellence, then, is not an act but a habit." Practicing these steps repeatedly, over and over again, until they become second nature, will help improve your effectiveness. Your stakeholders will be more likely to receive and understand your information and educational messages that are designed to change their behavior.

While reviewing effective communications, it was also noted that several elements need to be implemented in the PIPA effort in order to make the most of the PIPA resources. To implement these items would help ensure that all of the PIPA resources were well spent. Thus, it is suggested that:

1) A centralized repository for PIPA information that can found through the internet easily and by any individual or stakeholder be developed and maintained.
2) A graphics specialist be employed to assist with the final PIPA document.
3) A marketing and communications agency be employed to serve as a consultant for writing the final PIPA report and test messages and findings.
4) Professional services be engaged to develop a formalized plan dedicated to educating each of the stakeholder audiences on the outcome of this PIPA initiative and to sustain future PIPA efforts. This is especially needed for the larger property developers, contract ROW agents, and local government stakeholder audiences.

Appendix F: Barriers to Effective Communication

For communication to be effective it must be a two-way dialogue. However, personal experiences affect the way messages are received, making it essential to understand barriers to effective communication and how to better communicate with key stakeholders. The following section looks at communication barriers from the perspective of a transmission pipeline company communicating with key stakeholder audiences. You may find that some, all, or none of these communication barriers are present in your actual situation. You are encouraged to communicate openly with stakeholders around transmission pipeline development.

The following sections will provide tactics and tools to potentially address these following communication barriers.

Local government planning and zoning organizations (including permitting organizations, public works, emergency officials, elected officials, etc.)

1. Disinterest
2. Lack of resources
3. Lack of authority
4. Political pressure
5. Competing interests or projects
6. Information overload, clutter
7. Inadequate information regarding pipeline safety
8. Method/manner of communication (e.g., face-to-face versus mass mailing)
9. Lack of time and/or is too busy to pay attention
10. Difficult to reach

Property developers (including subcontractors/excavators, architects and designers)

1. Disinterest or lack of priority
2. Don't want to present reality of easements
3. Lack of knowledge
4. Information overload, clutter
5. Misinformation
6. Difficult to reach; method/manner of communication (e.g., face-to-face versus mass mailing)
7. Lack of time and/or is too busy to pay attention
8. Lack of coordination with pipeline companies in planning process

Real Estate Agents/Brokers (residential and commercial)

1. Disinterest or lack of priority
2. Don't want to present reality of easements
3. Lack of knowledge
4. Information overload, clutter
5. Misinformation
6. Difficult to reach; method/manner of communication (e.g., face-to-face versus mass mailing)

7. Lack of time and/or is too busy to pay attention

Home Owners/Buyers/Sellers (including landowners and farm owners)

1. Disinterest
2. Information overload, clutter
3. Inadequate information regarding pipeline safety
4. Misinformation (e.g., word of mouth from uninformed, biased neighbors)
5. Mistrust of government, authorities, companies, etc.
6. Method/manner of communication (e.g., face-to-face versus mass mailing)

Leading Practices for Transmission Pipeline Operators to Engage Stakeholders

Pipeline operators should create internal ambassador programs to train personnel about the importance of working with stakeholders and other pipeline operators. The safety of a transmission pipeline, a company's reputation, and the success of a project depend upon a good working relationship with all key stakeholders. Effective outreach can in turn advance communication among all stakeholders. Following are suggested leading practices for transmission pipeline operators to engage stakeholders.

Local government planning and zoning organizations

1. Offer continuing education credits to certified planners through existing association workshops, such APA. (Their certification is voluntary, so not all planners are certified; but they need CEUs to maintain certification).
2. Target and educate planners through trade show booth and speaking engagement opportunities at annual association conferences, such as American Planning Association, National Association of Counties, and National League of Cities.
3. Look at outreach opportunities through local and state chapters of planning associations, such as workshops, conferences, etc.
4. Consider enlisting the use of an elected official, with established credibility to reach stakeholders.
5. Inform planning and zoning officials about the National Pipeline Mapping System (NPMS).

Property developers

1. It is in the best interest of transmission pipeline operators and property developers to begin working together as early as possible. In fact, it's never too early for a transmission pipeline operator to approach a property developer. Often times, the transmission pipeline company is not brought into the communication loop until very late in the project. This can lead to project scope and design changes and costly delays. Transmission pipeline companies should get on local government planning department notification lists and contact developers as soon as projects are announced.

2. Encourage property developers that when scoping property for potential development, they should look specifically for transmission pipeline facilities/easements/markers on the property.

Real estate Agents/Brokers (residential and commercial)

1. Target and educate the real estate community through trade show booths and speaking engagement opportunities at annual conferences of trade associations, such as the National Association of Realtors.
2. Use regular realtor association meetings and newsletters (local, regional and national) to educate the real estate community about the benefits of full and early disclosure of transmission pipeline easements.
3. Invite real estate agents in a community to attend breakfast or lunch workshops on transmission pipeline easement disclosure. Coordinate with the national association to offer CEUs if/where possible.

Home Owners/Buyers/Sellers

In addition to information already delivered to homeowners through public awareness programs and other stakeholder outreach, transmission pipeline operators should:

1. Target local area newspaper real estate sections with pre-written articles on how to know where transmission pipeline easements and other encumbrances are located on the property.
2. Determine if there are centralized websites for all MLS listings in affected communities, such as www.har.com in Houston. Determine if there is a checklist of items for homeowners to use before buying property. If so, ask to add a new bullet item – "Have you checked to see if there are transmission pipeline easements located on the property?"
3. Conduct direct mail campaigns targeted to specific events or seasons. For example, in the early spring consider a campaign focused on digging, planting, etc.
4. Work with homeowner associations to include articles/information in association newsletters.
5. Purchase ads in local newspapers; point readers to a website for more information.
6. Host emergency response drills along highly visible transmission pipeline rights-of-ways (ROWs) to increase awareness.

CGA Best Practices Version 6.0

The Common Ground Alliance (CGA) has identified and validated existing best practices performed in connection with preventing damage to underground facilities. The collected best practices are intended to be shared among stakeholders involved with and dependent upon the safe and reliable operation, maintenance, construction and protection of underground facilities. The following best practices could be applied when attempting to engage stakeholders. As noted, some of them could be applied when attempting to effectively communicate risk, as discussed in the next section. However, not all practices are appropriate in all situations.

- To Engage Stakeholders:

  7-2: Incentives - Damage prevention programs include incentives to promote compliance with laws and regulations.

- To Engage Stakeholders and Effectively Communicate Risk:

  8-1: Use of a Marketing Plan - An effective damage prevention education program includes a comprehensive, strategic marketing/advertising plan.

  8-2: Target Audiences and Needs - An effective damage prevention education program includes identification of target audiences and their individual needs.

  8-3: The Use of Structured Education Programs - An effective damage prevention education program is structured to accommodate the needs of individual audiences.

  8-4: Target Mailings - An effective damage prevention education program communicates vital damage prevention, safety, and emergency response information to target audiences through periodic mailings.

  8-5: The Use of Paid Advertising - An effective damage prevention education program includes paid advertising to increase damage prevention awareness and practices.

  8-6: The Use of Free Media - An effective damage prevention education program utilizes all available free media.

  8-7: The Use of Giveaways - An effective damage prevention education program uses promotional giveaway items to increase damage prevention awareness.

  8-8: Establishing Strategic Relationships- An effective damage prevention education program establishes strategic relationships.

  8-9: Measuring Public Education Success - An effective damage prevention education program includes structured annual or biennial (every two years) measurement(s) to gauge the success of the overall program.

Guidance for Communicating with Transmission Pipeline Companies

Property Developers, Real Estate Agents and Local Government Officials

Some stakeholders have reported challenges in communicating with transmission pipeline companies. Whether real or perceived, they are valid concerns and should be addressed. As an example, some developers don't know where to start if they need information from a transmission pipeline operator. Additionally, they may get different responses from each operator.

This guidance was developed primarily for property developers, real estate agents and local government officials (i.e., professional staff rather than elected officials) to use when communicating with transmission pipeline companies. However, other audiences could possibly benefit from this information as well.

1. It is important to recognize that various transmission pipeline companies are structured and organized differently. There are small companies and large companies; some large companies may own multiple transmission pipeline systems in many different states.

   There are independent transmission pipeline companies, as well as publicly-owned companies. There are intrastate transmission pipelines (wholly within a state) and interstate transmission pipelines (traversing state boundaries); both are regulated by different entities and may have different regulations and requirements.

   Different department names and titles can add to some confusion. While one transmission pipeline operator may refer to a department as "the land department", another operator may refer to the same function as "the right-of-way group." A transmission pipeline company many have a company headquarters, with regional division offices and many field compressor or pump station locations.

   Frequently, transmission pipeline ownership changes as pipeline systems are sold from one company to another. Regardless of the company name listed on the transmission pipeline marker, the emergency phone number noted on the marker should always work.

2. Don't know who to contact in the transmission pipeline company? Your best bet is to start by calling the land or right-of-way department. If they are difficult to reach, an alternative is to contact the local area operations office. You should ask for a supervisor or operations manager. If that person cannot address your question, he/she can direct you to the appropriate office and provide contact information.

   If you can't locate the main company phone number, look on the transmission pipeline marker for the emergency contact number. This phone number is answered around the clock, and, while the operations control personnel won't be able to answer your specific questions, they should be able to provide the main company phone number.

3. If you're considering developing property that has a transmission pipeline on it, you should ask for a copy of the construction and property guidelines. Most transmission pipeline companies will provide a brochure on construction and property guidelines and, in some cases, it may be found on the company's website. Generally, the brochure addresses the requirements for crossing a transmission pipeline easement and your legal and professional responsibilities with respect to underground facilities. A transmission pipeline company land or right-of-way agent can provide this information.

4. Often, you may receive different information from different transmission pipeline operators. Please remember that transmission pipeline companies are willing to work with property developers and local government officials; however, they may not be obligated to disclose private, sensitive or confidential business information.

5. Lastly, and most importantly, transmission pipelines companies are dependent on the property developer to make the initial contact when the developer is pursuing property with a transmission pipeline easement. Transmission pipeline companies ask that you call at the

earliest possible opportunity. (It's never too early.) To avoid costly project delays, a property developer should contact the transmission pipeline company before bidding/selling a project.

Communicating Pipeline Risk and How Risk is Managed

All activities involve a degree of risk – from walking outside during a lightning storm to driving in rush-hour traffic. Risk is inherent, including in pipeline transportation. In fact, no form of energy transportation is completely without risk. However, transmission pipelines are the safest, most reliable mode of transportation for energy products, according to the National Transportation Safety Board.

Transmission pipeline development that impacts a stakeholder's property can be a very personal issue, and may quickly escalate feelings of anger, fear and distrust if not addressed in a timely manner by the transmission pipeline company. The communications vehicle and messaging needs are different for each audience; everyone filters situations based on their own personal history and involvement. There is no cookie-cutter approach to communicating risk.

Risk Communications:

Successful communication of risk combines the ability to explain the probability (likelihood) and the potential consequences of an incident, and to then build upon that explanation to address concerns. Risk communication can be defined as a science-based approach for communicating effectively in high-concern, high stress, emotionally charged, or controversial situations. The probability of an incident may be extremely low, whereas the potential consequences may be very high; therefore, successful risk communication[16] illustrates both ideas and stresses the value in providing information to stakeholders that they need to make their own informed decisions about transmission pipeline safety.

Perception is an important part of reality for most of us. If a stakeholder perceives a risk is present, then that perception leads to concerns. It's therefore important to engage in open, transparent communications with stakeholders. Do not deny or minimize the presence of risk, and do not ignore the impact that emotions can have on the perception of risk. Stakeholders are more likely to trust others when the communication lines are open and moving in both directions.

The more concerns that are present, the harder the challenge of communicating risk. Overcoming that challenge requires:

- Two-way communications
- Communicating project risk
- Anticipating public reactions and preparing accordingly

[16] For more information about risk communications, go to www.petersandman.com.

Leading Practices to Communicating Risk

Whether or not a hazard is actually dangerous, people are likely to react and respond more strongly if the hazard is considered unfamiliar or unfair, and if the people behind the hazard are perceived as untrustworthy or unresponsive. Following is a list of factors that may impact a stakeholder's perception of risk.[17]

1. Controllability – Almost everybody feels safer driving a car as opposed to riding in the passenger seat. When prevention and mitigation are in the individual's hands, the risk (though not the hazard) is much lower than when they are in the hands of someone else.
    - Nearby neighbors can help ensure the transmission pipeline ROW remains secure by keeping a watchful eye. Enlist their support by asking them to inform the transmission pipeline company of any unusual activities.
    - Consider forming a citizen's advisory board to help build trust between community and transmission pipeline operator. Ideally facilitated by a third party, these forums provide transmission pipeline operators with direct input from the community. Refer to the American Chemical Council's Responsible Care website (see the Responsible Care link at http://www.americanchemistry.com). Guidance is provided on how to set-up a citizens advisory board.
    - Transmission pipeline operators should provide company ambassador training to land agents, given their prominent role in communicating with the community.
2. Familiarity – Exotic, high-tech facilities tend to provoke more concern than familiar risks (your home, your car, the food in your kitchen). Transmission pipeline operators should:
    - Participate in community events. Go to events where the people are, such as county fairs. While open houses at transmission pipeline company facilities are helpful, more people are likely to be reached at a community event than at a pre-arranged event hosted by the transmission pipeline operator.
    - Become a familiar sight in the community. Participate in community relations, such as sponsoring the local little league and awarding local scholarships.
    - Add the company name and logo to transmission pipeline company vehicles so residents will become more accustomed to seeing the name in the community.
3. Fairness – People who perceive that they must endure greater risks or property impacts than their neighbors, without access to greater benefits, naturally feel they have been put into an unfair situation — especially if the rationale for so burdening them looks more like politics than science.

[17] Factors adapted from (Sandman, P., August 2004. Risk communication: Evolution and Revolution; www.petersandman.com)

- Neighbors are an important part of doing business. Transmission pipeline companies realize they wouldn't be able to operate their pipelines without the tacit consent of communities. While transmission pipeline companies compensate landowners for land use, it is often times not enough to satisfy all neighbors. Transmission pipeline companies should strive to be reasonable and endeavor to communicate verbally and with action how much they care about being good neighbors. They should also strive to communicate the benefits of pipeline transportation and safety statistics as compared to other modes of transportation.

4. Catastrophic potential – Risks from activities viewed as having the potential to cause a significant number of deaths and injuries grouped in time and space (e.g., deaths and injuries resulting from an airliner crash) are judged to be greater than risks from activities that cause deaths and injuries scattered or random in time and space (e.g., automobile accidents).

   - Although it may seem counter-intuitive to many, when a transmission pipeline operator provides more information to stakeholders – including information about the potential hazards related to a release of some pipeline products into the environment – it promotes a solution-oriented dialogue.

   - Transmission pipeline operators should be willing to fully outline the consequences of an incident, to discuss the likelihood of an incident, and to explain in plain language all the measures being taken to mitigate or eliminate those factors that could lead to a release of transmission pipeline products into the environment. Further, stakeholders have a right to know an operator's safety record and what that operator is doing to correct any deficiencies that may have contributed to past incidents.

5. Understanding – Poorly understood risks (such as the health effects of long-term exposure to low doses of toxic chemicals or radiation) are judged to be greater than risks that are well understood or self-explanatory (such as pedestrian accidents or slipping on ice).

   - Stakeholders are often afraid of the unknown and what they don't understand. Transmission pipeline operators should:
     - Develop a communications campaign to educate stakeholders.
     - Host an open house and invite stakeholders to tour company facilities.
     - Use the media as an outlet to reach, communicate with and educate stakeholders.

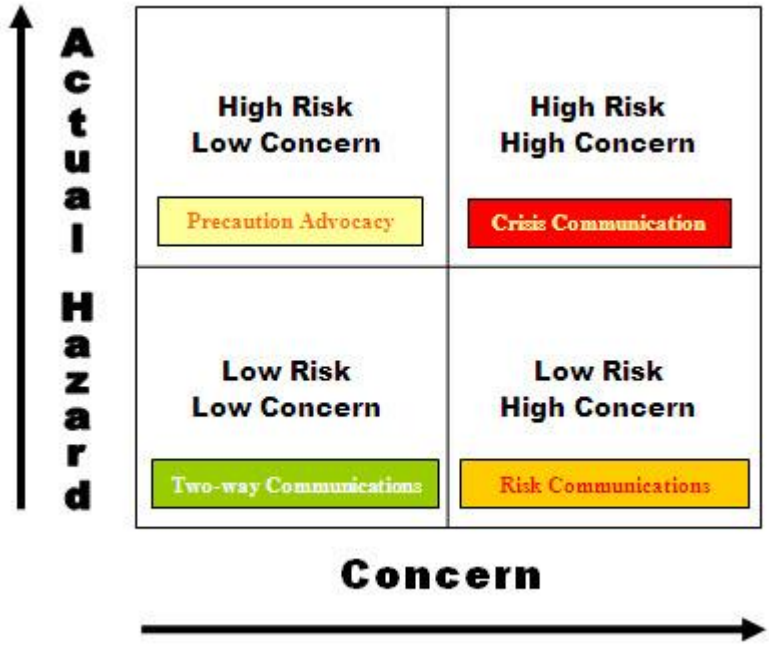
6. Uncertainty – Risks from activities that are relatively unknown or that pose highly uncertain risks (e.g., risks from biotechnology and genetic engineering) are judged to be greater than risks from activities that appear to be relatively well known to science (e.g., actuarial risk data related to automobile accidents). Transmission pipeline operators should:

   - Address how transmission pipelines are operated and the steps that operators take to manage and mitigate risk. (Refer to examples below.)

   - Point to National Transportation Safety Board statistics on various modes of transportation. Cite studies that show transmission pipelines are the safest form of transportation.

   - Emphasize operational history (i.e. operated safely since 1965 without incident).

7. Effects on children – Risks from activities that seem to pose a threat to future generations (e.g., adverse genetic effects due to exposure to toxic chemicals or radiation) are judged to be greater than risks from activities that do not (e.g., skiing accidents).
    - Transmission pipelines near schools and day care centers will attract more attention. Be prepared to talk about what is being done to manage and mitigate risk.
    - Implement an on-going school program to educate students about pipeline operations and safety.
    - Develop working relationship with school administrators. Offer to jointly develop emergency evacuation plans.
8. Trust – Risks from activities associated with individuals, institutions or organizations lacking in trust and credibility (e.g., industries with poor environmental track records) are judged to be greater than risks from activities associated with those that are trustworthy and credible (e.g., regulatory agencies that achieve high levels of compliance among regulated groups). See the figure below.
    - Transmission pipeline companies should demonstrate that they are a part of the community too. Particularly, if their employees live and work in the community.
    - Trust has to be earned. Transmission pipeline companies should build trust before it is needed. Ideally, companies should bank trust so that it is available when needed.
    - Residents are more likely to trust their neighbors versus transmission pipeline companies.
    - Face-to-face communication is more believable than mass mailings or other impersonal communications.
    - Build trust and credibility by partnering with advocacy groups and associations, such as the Smalley Foundation or the Pipeline Safety Trust.



9. Media attention – Risks from activities that receive considerable media coverage (e.g., transmission pipeline incidents or leaks at nuclear power plants) are judged to be greater than risks from activities that receive little media coverage (e.g., on-the-job accidents).

    - The media often helps set the public agenda. It can also help educate transmission pipeline stakeholders. Given its broad reach, media attention also causes others outside the project area to become an active participant.
    - To balance media coverage, transmission pipeline companies should still perform other outreach, such as speaking engagements, neighborhood newsletters, etc.
    - Put a face on the story. Transmission pipeline companies are no better than their people. Managers and field personnel who are involved in their communities and strive to put themselves in the shoes of transmission pipeline neighbors are more likely to be treated fairly in media coverage than a company spokesperson with no connection to the host communities.
    - Reach out to newspaper editorial boards. They can serve a useful role and offer statements of opinion on issues that are beneficial.

10. Accident history – Risks from activities with a history of major accidents or frequent minor accidents (e.g., leaks at waste disposal facilities) are judged to be greater than risks from those with little or no such history (e.g., recombinant DNA experimentation).

    - Good or bad -- honesty is an absolute must. The transmission pipeline operator should know and acknowledge its safety history.

- If the transmission pipeline operator has a less than perfect safety record, the operator should explain what has been done to address past incidents.

11. Personal stake – Risks that personally and directly affect individuals (or their families) (e.g., living near a waste disposal site) are judged to be greater than risks from activities that appear to pose no direct or personal threat (e.g., disposal of waste in remote areas). The transmission pipeline operator should:
    - Understand stakeholder viewpoints and concerns. They will vary greatly within a community. Listen to all and respect their opinions.
    - Don't marginalize neighbors with concerns as being simply NIMBY ("not in my back yard"). Address their concerns and provide information that is as free as possible of jargon and transmission pipeline industry "shop talk."
12. Human vs. natural origin – Risks generated by human action, failure or incompetence (e.g., industrial accidents caused by negligence, inadequate safeguards, or operator error) are judged to be greater than risks believed to be caused by nature or "Acts of God" (e.g., exposure to geological radon or cosmic rays). The transmission pipeline operator should:
    - Educate stakeholders and help them become familiar with transmission pipeline operations.
    - Encourage company personnel to become a part of the community and get involved.
    - Address how transmission pipelines are operated and the steps that operators take to manage and mitigate risk. (Refer to examples below.)
    - Host an open house and invite stakeholders to tour company facilities.

Additional resources for transmission pipeline operators

Defer to the experts. Bring in skilled and trained communicators, such as skilled public relations practitioners and public relations agencies, as necessary to train company leaders and managers in effective response during a crisis situation. This training might also include field employees.

Also, there are a host of resources on the internet. Two notable experts, include:

- www.petersandman.com – Peter M. Sandman is a risk communication speaker and consultant in the United States and has also worked extensively in Europe, Australia, and elsewhere.
- www.centerforriskcommunication.com – The Center for Risk Communication is a pioneer in the development and use of advanced communication methods based on decades of university-level behavioral-science research and practice. Research and experience clearly prove that one of the most important keys to communication success is an organization's ability to establish, maintain, and increase trust and credibility with key stakeholders, including employees, regulatory agencies, citizen groups, the public and the media.

Some companies have developed software in which you can plug in assessment factors and it will help you figure out how to reduce stakeholders' concern. Peter Sandman and others have risk management software products available which can be found on the Internet.

Mitigating/Managing Risk: Common Ground Alliance Best Practices 5.0

As noted above in the section entitled "Leading Practices for Transmission Pipeline Operators to Engage Stakeholders", the CGA has identified and validated existing best practices performed in connection with preventing damage to underground facilities. Several of those best practices are noted to have potential for application when attempting to effectively communicate risk. However, as noted, not all practices are appropriate in all situations.

Overarching Recommendations

1. There isn't a one-size-fits-all communications campaign that will work for all situations. As the situation changes, the communications program will need to change as well. For instance, if the project is controversial, you will likely need to change your communications strategy to acknowledge and address stakeholder concerns before you can delve too deeply into details about the actual project.
2. In this 15-second attention span world, messages must communicate clearly, concisely and quickly to each unique audience. Given that the message is designed to respond to existing perceptions, it must be believable, persuasive and compelling. Communication materials should be:
    a. Simple yet memorable
    b. Professionally designed
    c. Highly visual and engaging
3. It generally takes about seven exposures before someone actually "receives" a message. Repetition of a consistent message is an effective way to influence and change behavior. While the message remains consistent, it should be conveyed in a variety of ways to help ensure the receiver doesn't tune out.
    a. Instead of developing another brochure, consider using untraditional/new forms of communications, such as digital media. You can create blog conversations to reach specific stakeholders.
    b. Broaden the variety of communications tactics you use. Rely on various forms of communications; don't just use one form of communication. Select the best communication method based on the audience you are trying to reach. Following are examples of communications tactics that transmission pipeline operators might use for each audience.

        Local Government Planning and Zoning Organizations

        - Have right-of-way agents conduct face-to-face visits with planning and zoning departments or other local government contacts (e.g., county clerk in smaller

counties). In smaller communities/counties, those may be contracted or volunteer positions.

- Identify state chapter of national associations, such as of National Association County Offices (NACO) and American Planning Association (APA). Participate in annual meetings, host hospitality suites or secure booth space.
- Reach members in these associations through electronic publications, websites and e-mail blasts.
- Implement transmission pipeline industry public awareness communications required by federal regulations (e.g., API RP 1162).

Property Developers

- Participate in home builders' association meetings, especially in smaller communities.
- Although it may be difficult to identify property developers who might impact transmission pipeline facilities, visit the places where you know they must visit for information (e.g., planning offices). Have communications materials on display and accessible.
- Work with local government planning departments to intersect with developers when project documents (e.g., plats) are filed.
- It is a highly recommended that face-to-face communications be used for this audience, although it may initially be difficult if a developer is not located locally.
- Utilized targeted mailings.
- Develop collateral materials to use in engaging stakeholders (e.g., brochures, web-sites, newsletters, etc.
- Approach national associations, such as the National Association of Home Builders (NAHB), the Society of Industrial and Office Realtors (SIOR), and the National Association of Industrial and Office Properties (NAIOP), for conference/trade show opportunities, speaking engagements and including articles in their trade publications.

Real Estate Agents/Brokers

- Participate in monthly realtor association meetings, especially in smaller communities.
- Present information on upcoming projects and on recommendations.
- Visit major local real estate offices, answer questions and provide communications materials.
- Work with national, regional and local realty associations to include articles.
- Have presence at national, regional and local real estate association trade shows.
- Utilize targeted mailings.

Home Owners/Buyers/Sellers

- Recognize that face-to-face communication is preferred.
- Place key messages in homeowner association (HOA) newsletters. Attend HOA monthly meetings and pursue speaking opportunities.
- Hold open houses.
- Utilize local media.
- Participate in and have presence in local community events (e.g., community fairs); Pick events to match the community (i.e., pick the right tool to reach the audience). For example, a county fair in a large county is probably a useful venue. Go to their community events, where the people are, instead of hosting a transmission pipeline event.
- Recognize audience characteristics and situations (e.g., existing development, recent incidents, etc.).
- Implement transmission pipeline industry public awareness communications required by federal regulations (e.g., API RP 1162).

4. Make the PIPA effort successful. To ensure a successful outcome, an organized entity should be established to lead the PIPA effort beyond the final report. The momentum should be continued in order to truly affect change. The initial PIPA effort should be viewed as a long-term project, with on-going outreach and education. It will take time to influence opinions and shift outcomes. Developing and publishing a report is only the first step.

   To that end, efforts should be made to ensure that partnerships and the collaborative spirit developed during the initial PIPA effort continue. The transmission pipeline industry should continue to collaborate and partner with various organizations such as property developers and real estate agents and brokers. Together, stakeholders are better positioned to achieve more effective results than would otherwise be possible. Establishing a unified entity to facilitate this recommendation will help to ensure that all parties remain focused on the pursuit of common goals.

   Resources should be allocated to “mind the store”. Having one focused entity will ensure that someone is responsible for managing continuation of the initiative. It will also provide a centralized location to serve as an information depository and a recognized primary point of contact in these matters, and it will help to ensure that all stakeholders share a common and consistent message.

Appendix G: ROW Acquisition and INGAA Commitment

Summary Example of a Transmission Pipeline Operator's Right-Of-Way Acquisition Process

The following summary is one example of a transmission pipeline operator's right-of-way acquisition process, but practices may vary among transmission pipeline companies. At the end of this Appendix is a commitment by member companies of the Interstate Natural Gas Association of America (INGAA) to land owners describing the negotiation values the INGAA members strive to employ and which landowners can expect.

General Route Evaluation - Project Feasibility Analysis Phase

In the initial phase of a transmission pipeline project, the pipeline company will gather necessary geographical, environmental, jurisdictional, and land records data to identify and evaluate potential routes. The data is mined from various mapping systems, statutory agencies, local government's planning and zoning departments, as well as aerial and ground reconnaissance. The pipeline operator will analyze the needs of end users and supply sources to determine the type, size and operating pressure of the transmission pipeline. They will also develop a preliminary cost estimate and schedule for the project. This phase ends with an evaluation of the project's feasibility.

A transmission pipeline project connects an energy supply to an energy market. Simply stated, they connect point "A" to point "B". To evaluate potential routes from "A" to "B", the company collects this data:

1. **Origination and Termination Points** – The type of facilities, the type and amount of product to be transported and the pressure at which they operate are critical to determining the size and physical requirements of the transmission pipeline as well as the need for ancillary facilities such as aboveground valves, metering stations, underground storage, surge tanks and compressor stations. The product transported, the size of the line, and the type of facilities will dictate the size of right-of-way and whether additional property needs to be purchased.
2. **Identification of Terrain** – The type of terrain can impact the type of construction equipment, the construction schedule, and the need for special permits such as environmental, waterway jurisdiction, road jurisdiction, and foreign utility crossings. The permits may place certain requirements on how and when the transmission pipeline is constructed.
3. **Preliminary Cost Estimate** – In order to evaluate the project's feasibility, a preliminary cost estimate is created. This estimate includes the cost of the pipe, construction forces needed for installation, compressor stations or pump stations to move the product, and many other costs related to safely building the pipeline and placing it in service. The costs related to acquiring easements for various routes are also considered. The fair market value of the required property is typically used during the preliminary cost estimate.

4. **Scheduling –** The acquisition of right-of-way, the constructability of the route, the lead time to obtain permits, and public opposition have the greatest impact on the duration of the project. The required in service date may influence route selection.
5. **Project Feasibility –** The routes are evaluated for constructability, risk, and return on investment. The pipeline company decides whether to go forward with a transmission pipeline project.

Operator's Due Diligence Phase

If the pipeline company decides to move forward with the project, they engage in a more detailed phase by validating the preliminary cost estimate on a limited number of routes. At this point, they walk the route and their Land Agent reaches out to landowners. They also perform records research, a title search, land surveys, in depth environmental evaluations, and archeological evaluations.

1. **Records Research and Development -** Right-of-way acquisition requires expert records research. The quality, format, and recording practices of land documents vary depending on when and where they were created. The development of accurate, legally binding land documents is vital since the terms and conditions of the agreement between the transmission pipeline company and landowner continues in perpetuity. Good recordation practices are key to preventing future issues.
2. **Title Research and Curative Matters –**A title search involves obtaining a legal description of the property and determining the chain of title to identify all records that may affect the title. Records that may affect the title include but are not limited to mortgage, lien, tax payments, flood zone status, property leases, copy of the deed and property zoning. When there is a lien holder with a significant financial interest or the property is at risk, there is the potential for mortgage subordination. The transmission pipeline operator may be required to satisfy and make payments to the lien holder. The operator will obtain a limited title certificate which identifies the owner of the property and any liens against the property discovered in the search.
3. **Land Surveys –** Generally, before an easement agreement is negotiated, the land is surveyed in order for the parties to have a legal description and plat of the location and size of the desired right-of-way on the property. Of the survey types listed below, the last three are mainly used for transmission pipeline route selection.

    - ALTA Survey or Extended Title Insurance Coverage Survey
      This type of survey is made for the purpose of supplying a title company and lender with survey and location data necessary for the issuing of title and/or mortgage insurance. A detailed map is required to be done to American Land Title Association (ALTA) specifications. Specifications of this type of survey include (but are not limited to) determining property lines, location of improvements, identifying all easements, utilities and other conditions affecting the property. ALTA surveys are very comprehensive surveys and typically cost thousands of dollars and take weeks to complete. The ALTA Survey is most often performed on commercial properties.

- Boundary Survey
  A boundary survey establishes the true property corners and property lines of a parcel of land. Boundary surveys are typically performed to obtain building permits, to resolve property disputes, and for erecting fences. Easement lines may also be located, if requested, with this type of survey.
- Elevation or Floodplain Survey
  Elevation surveys determine the elevation of various sections of a building or land. Typically these are used to aid in building plans and to determine if a property is in a flood zone.
- Lot Survey, (aka Site Plan Survey or Plot Plan Survey)
  This is a combination of boundary and topographic surveys for preparation of a site plan to be used for designing improvements or developments, and obtaining government building permits.
- Route Survey
  This is a reconnaissance survey, preliminary survey, and location survey for a linear type feature, such as a road, railroad, canal, pipeline, or utility line.
- Topographic Survey
  A topographic survey is a land survey locating natural and manmade features such as buildings, improvements, fences, elevations, land contours, trees, streams, etc. This type of survey may be required by a government agency, or may be used by engineers or architects for the design of improvements or developments on a site.
- Wetlands Delineation & Location Survey
  A wetlands delineation and location survey is completed when construction work is to be done on or near a site containing defined wetlands. Depending on the local, state, or federal regulations, wetlands are usually classified as areas that are completely inundated with water more than two weeks during the growing season.

Environmental, Archeological Studies & Endangered Species

Based on site conditions, additional environmental, archeological or endangered species studies may be required. A wetland is an example of an environmental condition that requires additional evaluation and permits. Depending on Local, State, or Federal regulations, wetlands are usually classified as areas that are completely inundated with water more than two weeks during the growing season. The site specific definition for wetlands in a given geographical region can be obtained from the Local or State Conservation Commission or Wetlands Regulatory Commission. If the area is delineated as a wetland, a Wetlands Delineation & Location Survey is required.

The site may require an archaeological study to determine if the construction may directly or indirectly affect archeological and historic properties/structures. Geotechnical borings are taken in the areas of archaeological sensitivity for information about the soil and fill layers. The information is used to identify the archaeologically sensitive areas for the current alignment and screen out areas of prior disturbance that would have no potential for intact remains.

If the area contains species on the federally endangered or threatened species list, additional studies and permits may be required.

Permit requirements will be reviewed in depth. The operator may begin contacting permitting jurisdictions and collecting necessary information for permit applications. The permits may require the operator to access the land to acquire the data.

Land Agent Background

Solid preparation of all stakeholders leading up to the negotiation phase creates an atmosphere of mutual understanding of the party's current and future needs. In order to be effective, land agents background should include knowledge of:

- Transmission pipelines
- Agriculture and ranching practices
- Land title and condemnation laws
- Land values
- Documents and Instruments
- Right-of-way easement and special provisions and clauses
- Typical landowner concerns, reactions and responses during acquisition process
- Negotiating with all types of people
- Company policies
- Company code of conduct & rules of negotiations

Condemnation Process

Eminent domain law and legal procedures vary, sometimes significantly, between jurisdictions. Usually, the condemnation process follows steps similar to these:

- The operator attempts to negotiate the purchase of the easement for fair value.
- If the landowner rejects the offer, the operator files a court action to exercise eminent domain, and serves or publishes notice of the hearing as required by law.
- A hearing is scheduled, at which the operator must demonstrate that it engaged in good faith negotiations to purchase the easement, but that no agreement was reached. The operator must also demonstrate that the easement is for a public interest, as defined by law. The landowner is given the opportunity to respond to the operator's claims.
- If the operator is successful in its petition, proceedings are held to establish the fair market value of the easement. Payment to the landowner may first be used to satisfy any mortgages, liens and encumbrances on the property, with any remaining balance paid to the landowner. The operator obtains an easement. In certain jurisdictions, right of entry may be granted prior to the landowner receiving payment.
- If the operator is not successful, or if the landowner is not satisfied with the outcome, either side may appeal the decision.

Public Relations

Public relations are an important element to successful land acquisition. Valuable public relations build a community's understanding of the purpose and status of the transmission pipeline project. Operators are wise to know the general attitude of the landowners and the community near the pipeline. They can tailor their communications to provide information that addresses their concerns. Providing timely and focused educational pipeline safety and project information can improve an operator's reputation and acceptance as a good neighbor. Providing material in languages identified among stakeholders may improve acceptance for the project. Pipeline operator's communication with respect to land acquisition should follow the PIPA seven-step communication model (BL10) to be most effective.

Landowners often reach out to government officials for objective information and support. Government officials should be contacted as early as reasonable in the acquisition process. Depending on the scope and visibility of the project, local officials who may be contacted include:

- Elected County Representatives
- County Road Department Head
- County Planning and Zoning Department Head
- Elected City Representatives (Mayor, City Manager, City Council, etc…)
- Municipal Road Department Head
- Municipal Planning and Zoning Department Head

INGAA Member Company Commitment to Landowners

Interstate Natural Gas Association of America

Recognizing the importance of building a good relationship with landowners, a transmission pipeline association, Interstate Natural Gas Association of America (INGAA), gathered a team of member companies to develop a document describing the negotiation values they strive to employ and which landowners can expect.

The following text is from INGAA's web site, http://www.ingaa.org/?ID=6845

Given the unprecedented level of energy infrastructure development that is occurring across the United States, it now is more important than ever that pipeline companies engage with landowners in a respectful, informative and clear manner. INGAA is committed to leading an industry that builds and maintains strong positive relationships with landowners.

In order to address these landowner issues the INGAA Board of Directors endorsed a document entitled "America's Natural Gas Transporters' Commitment to Landowners." In doing so, each INGAA member company embraced the following core principles:

1. **Respect and Trust -** Positive, lasting relationships are built on mutual respect and trust. We will strive to understand issues from the Landowners' perspective and help them understand ours.
2. **Accurate and Timely Information -** Providing natural gas transportation and storage services to the nation may create concerns. We will provide Landowners with information regarding the importance of energy infrastructure, the reason and need for the proposed project, and the processes in place governing easement acquisition, certification, construction, operation and maintenance of our facilities, and the particulars of individual projects.
3. **Negotiate in Good Faith -** We will listen and strive to understand, and negotiate in good faith. We will make every attempt to reach agreement with landowners in an honest, fair and reasonable fashion.
4. **Respect the Regulatory Compact -** Final approval for a project is not a certainty and our interactions with landowners will reflect that understanding. Prior to a Federal Energy Regulatory Commission decision, actions taken to negotiate easements or options are at the company's risk as there is no guarantee the project will be approved. We will communicate clearly that federal eminent domain cannot be exercised unless a Certificate is granted by the Federal Energy Regulatory Commission and will distinguish clearly when, and if, eminent domain is exercised pursuant to state law.
5. **Responding to Issues -** We will respond to Landowner concerns in a timely fashion. To enhance direct communications and timely responses, we will provide Landowners with a single point of contact within the company to answer any question or concern and to provide general or project-specific information.

6. **Outreach -** We will engage with and promote awareness on the part of affected stakeholders early in the planning process. In broadening our outreach, we will develop relationships with, and introduce our industry to, those who might not have otherwise known about its benefits to the community and our dedication to safely providing these services.

7. **Industry Ambassadors -** Each company employee and representative is an ambassador for the industry. We will ensure our employees and representatives interact with stakeholders in accordance with these commitments.

8. **Ongoing Commitment to Training -**We believe in continuous improvement in all aspects of our business. With the demand for natural gas increasing and many new people entering the industry, we will train our representatives to interact positively and productively with Landowners and other stakeholders.

Appendix H: Acronyms

Acronym	Name
AGA	American Gas Association
AGC	Associated General Contractors (of America)
ALTA	American Land Title Association
AOPL	Association of Oil Pipe Lines
APGA	American Public Gas Association
API	American Petroleum Institute
APWA	American Public Works Association
ASME	American Society of Mechanical Engineers
ATV	all-terrain vehicle
BLM	U. S. Department of Interior, Bureau of Land Management
CEO	Chief Executive Officer
CEU	continuing education unit
CFR	Code of Federal Regulations
CGA	Common Ground Alliance
CSA	Canadian Standards Association
DNA	deoxyribonucleic acid
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
GPA	Gas Producers Association
HCA	high consequence area
HUD	U. S. Department of Housing and Urban Development
ICC	International Code Council
INGAA	Interstate Natural Gas Association of America
IRWA	International Right of Way Association
LA DNR	Louisiana Department of Natural Resources
MLS	multiple listing service
NACo	National Association of Counties
NAHB	National Association of Home Builders
NAIOP	National Association of Industrial and Office Properties
NALGEP	National Association of Local Government Environmental Professionals
NAPSR	National Association of Pipeline Safety Representatives
NAR	National Association of Realtors
NARUC	National Association of Regulatory Utility Commissioners
NASFM	National Association of State Fire Marshals
NATaT	National Association of Towns and Townships

NFPA	National Fire Protection Association
NLC	National League of Cities
NIMBY	not in my backyard
NPMS	National Pipeline Mapping System
NTSB	National Transportation Safety Board
NUCA	National Utility Contractors Association
NPDES	National Pollutant Discharge Elimination System
PHMSA	Pipeline and Hazardous Materials Safety Administration, U. S. Department of Transportation
PIPA	Pipelines and Informed Planning Alliance
PIR	potential impact radius
PST	Pipeline Safety Trust
ROW	right-of-way (or, rights-of-way)
TRB	Transportation Research Board of The National Academies
TSA	Transportation Security Administration, U. S. Department of Homeland Security
TX RRC	Texas Rail Road Commission
USDA	U. S. Department of Agriculture
USFS	U. S. Forestry Service
USFWS	U. S. Fish and Wildlife Service
VUPS	Virginia Utility Protection Service
WUTC	Washington Utilities & Transportation Commission

Appendix I: Calculation of Site-Specific Planning Area Distances

The information in this Appendix is intended to provide local governments with some concept of the basic criteria used by transmission pipeline operators for pipeline integrity management. Transmission pipeline operators mitigate the probability portion of the risk equation through implementation of design, operation, maintenance and integrity management practices on pipeline facilities that they control (see 49 CFR 192, especially Subpart O, 49 CFR 195.450 and 195.452).

The recommended default distance for a planning area is 660 feet on either side of the centerline of a natural gas transmission pipeline, and a range of from 660 feet to 1,000 feet on either side of the centerline of a hazardous liquids transmission pipeline. However, it is recommended and communities are encouraged to develop and utilize site-specific distances for planning areas, based on the unique characteristics for the pipeline and the surrounding environment (topography, population density, vegetation, structures, etc.).

Different approaches to determining site-specific planning area distances should be considered for gas and hazardous liquid transmission pipelines, as described in the sections below. These engineering methods are best done through consultation with the pipeline operator, as they require pipeline-specific information and other information necessary for risk-informed decision making by local governments. For example, if multiple pipelines are located in a right-of-way, then the characteristics of each pipeline should be considered in calculating the site-specific planning area. Similarly, the pipeline operator is likely to already have site-specific topographical data to use in determining the flow paths for release liquids.

Planning Area: Natural Gas Transmission Pipelines and Other Gas Transmission Pipelines

A site-specific planning area for a natural gas transmission pipeline may be defined using the *potential impact radius* (PIR) model used in the gas transmission pipeline integrity management regulations (49 CFR 192.903). The PIR is defined as the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property.

Note that the PIR model is based only on a simple and defendable approach to sizing the ground area potentially affected by a worst-case ignited rupture of a high-pressure natural gas pipeline, wherein the dominant hazard is thermal radiation from a sustained fire. Based on this model, a simple equation has been developed that relates the diameter and operating pressure of a pipeline to the size of the area likely to experience high consequences in the event of an ignited rupture failure. (See Gas Research Institute GRI-00/0189)

A PIR is determined by the formula:

[$r = 0.69 * (\text{square root of } (p*d^2))$] – **or** – [$r = 0.69 (\sqrt{(pd^2)})$]

[read: “r is equal to 0.69 times the square root of (p times d squared)”], where:

> ‘r’ is the radius, in feet, of a circular area surrounding the point on the pipeline of a potential failure

'p' is the pipeline's maximum allowable operating pressure (MAOP) in the pipeline segment, in pounds per square inch

'd' is the nominal diameter of the pipeline in inches

Note that 0.69 is the factor for natural gas. This number will vary for other gases depending upon their heat of combustion. An operator transporting gas other than natural gas must use section 3.2 of ASME/ANSI B31.8S–2001 (Supplement to ASME B31.8; incorporated by reference, *see* §192.7) to calculate the impact radius formula.

Using the formula noted above, the following table provides PIR distances (in feet) for natural gas transmission pipelines, based on different combinations of pipeline diameters and MAOP. For example, a 30-inch pipeline with MAOP of 1,000 psig has a PIR of 655 feet. In this case, a site-specific planning area could be defined extending 655 feet on either side of the pipeline.

	Pipeline Diameter (inches)								
Pipeline MAOP (psig)	6	8	10	12	16	24	30	36	42
	PIR or Planning Area Distance from Pipeline Centerline (in feet)								
200	59	78	98	117	156	234	293	351	410
400	83	110	138	166	221	331	414	497	580
600	101	135	169	203	270	406	507	608	710
800	117	156	195	234	312	468	585	703	820
1000	131	175	218	262	349	524	655	786	916
1200	143	191	239	287	382	574	717	860	1004
1400	155	207	258	310	413	620	775	929	1084

Planning Area: Liquid Pipelines

Determining a site-specific planning area for a hazardous liquid pipeline is potentially much more complex because of the flow characteristics of released liquids and the effect of the terrain surrounding the pipeline on the flow path of the release. A site-specific planning distance for hazardous liquid pipelines may be defined based on a pipeline- and location-specific analysis considering the following three elements:

1. How much liquid might be spilled?
2. Where would the spilled liquid go?
3. What locations would be impacted?

The fundamental factors to be considered in an analysis to establish the planning area distance for hazardous liquid pipelines are listed below.

1. "How much liquid might be spilled?" – This can be derived from pipeline flow rates, spill detection time, pipeline shutdown time, and drain down volume from various locations along the pipeline (the pipeline operator should be consulted for this information).

2. "Where would the spilled liquid go?"

   - Overland flow – this can be affected by factors such as:
     - Soil cover type / vegetation (flow resistance)
     - Soil absorption / permeability (seepage and retention)
     - Topography / contour / elevation (direction of flow, speed of flow, retention areas and volumes)
     - Drainage systems such as culverts, streams, gullies, farm tiles, roadside ditches
     - Flow barriers such as railroad and road embankments, curbs, dikes, bulkheads
     - Fluid properties such as viscosity, density, vapor pressure
   - Vapor cloud extent, if any – especially for highly volatile liquid pipelines – this can be affected by considerations such as:
     - Heavier than air vapors settling in low spots
     - Vapor dispersion – dangerous for how far downwind?

3. "What locations would be impacted?" – The answer to this question is affected by factors such as:
   - thermal impact from fire,
   - blast overpressure from explosion,
   - toxicity, asphyxiation effects, etc.,
   - environmental effects from spill
   - water supply impacts

Various engineering models and computer software programs have been developed to support analysis based on these elements. The hazardous liquids pipeline operator may utilize one or more models to determine the effects and impact areas of a pipeline release. These models consider a multitude of site-specific factors, which should be evaluated in their as-modified (i.e. post-development) condition. The user of the model should have expertise in hazard analysis. Assembling the information needed to perform an analysis needed to define a site-specific planning area should be a collaborative effort by the pipeline operator and local community government. There may also be other sources for information and impact models that a community may use.

References:

- Gas Research Institute GRI-00/0189, A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines, 2000.
- 49 CFR 192, subpart O (Gas Transmission Pipeline Integrity management)
- 49 CFR 195. 450, 195.452 (Liquid Pipeline Integrity Management)

- ASME B31.8-2004, *Managing System Integrity of Gas Pipelines,* 2005.
- NISTIR 6546 Thermal Radiation from Large Pool Fires http://www.fire.nist.gov/bfrlpubs/fire00/PDF/f00177.pdf

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September 2, 2020

Wes Crail, P.E.
Manager, Pipeline Services
Pacific Gas & Electric Company
6030 West Oaks | Rocklin, CA | 95765
RE: Appeal of CEQA Revised Final Mitigated Negative Declaration

San Francisco City and County (CCSF) Planning Case No. 2013.1383ENV
Building Permit Application Nos. 2013.12.16.4318 and 2013.12.16.4322
3516 and 3526 Folsom Street

Dear Mr. Crail:

My office has been retained to advise residents of the Bernal Heights in San Francisco regarding an existing PG&E 26-inch diameter gas line, known as L109, which runs through the neighborhood. In particular, I have been asked to consult regarding L109's safety in light of the proposed construction of two houses and a new street extension at 3516-3526 Folsom Street in San Francisco, California; the project will be directly over L109.

Thank you for your August 12, 2020 email addressed to two affected residents concerning the proposed construction project. During our review of this letter, it was obvious that some of the information was not current and would not provide stakeholders with an accurate picture of the site and surrounding areas. Unfortunately, the analysis presented in your e-mail is based on information developed by the CCSF Planning Department that relied on outdated and incomplete information provided by the developer, which failed to address key safety issues.[1] **In particular, PG&E's analysis relies on materially incomplete and inaccurate information provided by the developer. It also omits a number of special considerations that affect the site and the project.**

[1] The August 12, 2020 email is primarily a restatement of a March 30, 2017 PG&E letter sent to Joy Navarette at the CCSF Planning Department. That letter likewise relied on materially incomplete information supplied by the developer and neglected to consider the most significant project activities and site conditions.

Inaccurate and Omitted Information

- *Omission of Road Construction Heavy Equipment from Vibration Analysis*

  PG&E's March 30, 2017 letter states, "A PG&E Gas Transmission Standby Inspector must be present during any demolition or construction activities within 10 feet of the gas pipeline(s). This includes all grading, trenching, gas line depth verifications (potholes), asphalt or concrete demolition/removal, removal of trees, signs, light poles, etc. This inspection can be coordinated through the Underground Service Alert (USA) service at 811 or 1-800-227-2600. A minimum notice of 48 hours is required. This is absolutely required for your grading project."

  PG&E acknowledges that grading will be required and indicates this is a grading project. Therefore, why would PG&E allow for the evaluation of excavation and drilling equipment and not the evaluation of grading and compaction equipment on such a steep site? In order to construct a road that meets CCSF standards, excavation of native soils and compaction of imported materials and pavement, up to 20 inches is needed. PG&E and Illingwood & Rodkin (I&R) did not accurately evaluate the construction requirements to determine if construction over their gas pipeline is feasible and safe.

  PG&E and I&R did not take into account the type of equipment required for a grading project. The equipment needed for a grading project, including roadway excavation, placement and compaction of fill, concrete and asphalt paving placement and compaction, were ignored. Road construction requirements, and their proximity to the pipeline, would result in equipment being closer than previously evaluated and would dramatically increase the vibration the pipeline is being exposed to. This reduced proximity was never evaluated or calculated.

- *PG&E's Wheel-Load Limits Would be Exceeded*

  PG&E's March 30, 2017 letter states, "To prevent damage to the buried gas pipelines, there are weight limits that must be enforced whenever any equipment [gets] within 10 feet of traversing a pipeline… Wheel loading calculations will need to be determined, and the pipeline may need to be potholed by hand in a few areas to confirm the depth of the existing cover. These weight limits also depend on the support provided by the pipeline's internal gas pressure. If PG&E's operating conditions require the pipeline to be depressurized, maximum wheel loads over the pipeline will need to be further limited. For compaction, please use walk-behind compaction equipment if within 2 feet of the pipeline… Referencing the chart below, for wheeled equipment only (excludes tracked equipment and vibratory rollers), for a depth of cover of 2ft over top of the 26" pipeline, the pipe may be subjected to a maximum half-axle wheel load of 4580 lbs. Specific to this project, the 17,500 lb. Takeuchi TB175 excavator and 8,000 lb. Bobcat Excavator

are approved for use."

PG&E again acknowledged that its location information was likely inaccurate and requested potholing by hand to confirm depth of cover. The Planning Department and the developer failed to grasp the serious situation when working around high-pressure transmission lines and only potholed two locations (and not the 90° elbow on this line).

PG&E directed the developer to consider walk-behind compaction equipment, but this was not done in the I&R study. Moreover, the referenced chart was for wheeled equipment only, but the Takeuchi TB175 and Bobcat excavator are tracked equipment; the PG&E approval violates the table's requirements.

The wheeled compaction equipment specified in the CCSF Street and Highway construction specification would exceed the PG&E approved wheel-load chart discussed above, which also does not address vibratory rollers.

- *The Prescribed Vibration Management Strategies Do Not Ensure the Protection of L109*

PG&E states that it has reviewed previous patrol, leak survey, cathodic protection, and integrity assessments, and all of which reflect that the pipeline is operating normally with no issues. However, PG&E has not provided these documents for independent assessment and review.

Similarly, PG&E states that the prescribed vibration limits were acceptable from a pipeline integrity standpoint per review by internal and external subject matter experts. However, PG&E has not provided documents concerning internal review findings. Undoubtedly, PG&E has been involved with roadway construction in San Francisco and knew what types of equipment would be needed. It is concerning that PG&E and the external subject matter experts did not consider grading- or compaction-related vibrations caused by that commonly used specialized equipment, especially when such equipment would exceed their maximum wheel load, and the chart does not address vibratory equipment.

The developer, with input from PG&E, developed a vibration monitoring plan to ensure limits set forth in the studies were not exceeded. But the developer's plan does not address the grading and compaction work which PG&E believed defined this project. Excavation, placement of fill materials, compaction of fill materials, and placement of surfacing and compaction of surfacing require specialized equipment, especially when working on a steep slope, over an active gas transmission line and with only two feet of cover.

It is inconceivable that PG&E management, having a chance to review the documents prepared by the developer, did not immediately trigger a review and

complete evaluation of this project. Ground movement differs significantly from vibration.

Special Considerations Affecting the Project/L109

- *L109's Precise Location is Unknown*

  PG&E's March 30, 2017 letter states, "Any existing pipeline markers can be temporarily relocated to accommodate construction work (with written PG&E approval), however markers must be reinstalled once construction is complete. It is unknown at this time how accurate the pipeline marker locations are at this specific site." (Emph. added.)

  It is our opinion the pipeline has not been accurately located and may be affected by construction improvements made to construct the two new buildings. The site slopes steeply and yet only two test pits were constructed to determine the top and condition of the pipe. No investigation of the condition of the 90-degree elbow was performed.

- *The Prescribed Two-Foot Exclusion Zone Cannot be Accurately Located*

  "PG&E requires a minimum of existing grade or 36 inches of cover over gas lines (whichever is less), and a maximum of 7 feet cover. Current records show that the depth of cover (top of grade to top of pipe) could be as shallow as 24", however potholing would be required to confirm this. Any excavations, including grading work, above or around the gas transmission facilities must be performed while a PG&E inspector is present. Please follow PG&E Work Procedure TD-4412P-05 Excavation Procedures for Damage Prevention when working in the vicinity of the gas transmission pipeline. Any plans to expose and support a PG&E gas transmission pipeline across an open excavation need to be approved by PG&E Pipeline Engineering in writing PRIOR to performing the work. Any grading or digging within 2 feet of a gas pipeline must be dug by hand."

  PG&E has acknowledged it does not know the exact location of this pipeline (L109), and in keeping with company policy, must follow an established set of procedures to pothole and locate the pipe. Some potholing has been performed, but questions remain as to the depth of the pipe, which slopes steeply at values of up to 40.3%; the condition of the pipe; and the condition of the 90° elbow near where it joins Bernal Heights Blvd. In addition, a two-foot exclusion zone around the pipe was established, which prohibits any intrusive activity close to the pipe. No discussion was found indicating where the two-foot zone begins and how that zone can be determined without establishing the location of the pipe.

  PG&E did not prepare any cross-sections showing their pipeline in relation to the

Folsom Street extension or the driveways and did not require potholing for the 90° elbow.

- *A 30-Foot-Tall Pine Tree Grew Atop or Adjacent to L109 in this Location*

  PG&E's March 30, 2017 letter states, "Trees or deep rooted shrubs shall not be located within 10 feet of edge of pipe (pipe zone). Trees less than 12 inches in diameter with non-intrusive root structures can be placed outside of the 10 foot pipe zone."

  However, there was a large tree within the right-of-way near Bernal Heights Blvd, which was removed on January 22, 2018. We are informed that the stump and tree roots remain because, according to a PG&E spokesperson, it is too dangerous to remove them.

  Additionally, we note that the developer's design drawings dated 9/28/16 show four street trees to be planted nearly on top of the pipeline.

- *The Project Site Does Not Provide Sufficient Space to Meet PG&E's Stated Requirements*

  PG&E's March 30, 2017 letter states, "No parallel fencing will be allowed within 10 ft. of the pipeline, and any perpendicular fencing will require 14 foot wide [access gates] secured with PG&E corporation locks."

  Additionally, "Permanent structures must be located a minimum distance of 10 ft. from edge of pipe. Additionally, for pipeline maintenance, future construction, emergency response provisions, etc., we need a total width of 45 ft. to access the location."

  The proposed residences are located about 11.5 feet from the pipeline, and the width of Folsom St. is only 39.5 feet wide. The location of the 90° elbow is also believed to be nearby, although its exact location is unknown.

Conclusion

The statement that "Based on the above requirements, construction method and engineering review special considerations were not triggered in regards to ground movement" indicates that PG&E, given another opportunity, did not scrutinize the developer's information to determine if the developer's conclusions, and those of the Planning Department, were accurate.

It is clear from the record that PG&E does not know the location of the gas line and their keeping records on the condition and testing of the line confidential is erroneous, at best.

During the planning process, PG&E did not ensure the Planning Department and the developer's consultant, Illingwood & Rodkin, correctly evaluated the type of equipment that would be used on a grading and paving project. Moreover, **PG&E incorrectly assumed that no roadway excavation would occur over the gas line, which would result in vibrations being nearly 2 feet closer to the line**. Finally, how would the two-foot exclusion zone be determined if there were no profiles plotted and the location of the line is unknown?

PG&E's internal and external experts conducted a flawed reevaluation of the potential vibration the gas line would encounter, and failed to discover the glaring omissions concerning the type of equipment that was used in the analysis.

Given these obvious shortcomings, special considerations should have been triggered, and the standard of care implemented by PG&E was inappropriate. At the very least, a major rewrite of the March 30, 2017 letter is required.

It is my considered engineering opinion, based on 43 years of experience, including in San Francisco, that serious equipment vibration concerns were not properly addressed in this Negative Declaration process and must be re-evaluated. The information and issues must be identified, located and carefully vetted in a follow-up process which fully reviews the project information prior to approval of the proposal.

If you need further information, please call me at 916-952-8503.

Sincerely,

Steven P. Viani P.E.
Civil Engineer C30965 exp. 3/31/22