1.0. PURPOSE

1.1. The purpose of this guideline is to communicate natural gas pipeline tie-in practices that promote worker safety (see *Guidance Document CS-G-9: Guidance for Serious Injury and Fatality Prevention*) to the highest degree.

1.2. These guidelines are not meant to supersede, replace or be all-inclusive of applicable regulatory or company requirements. Instead, the guidelines are intended to reflect industry-wide *consensus* and support and complement operating requirements.

2.0. SCOPE

2.1. These guidelines identify recognized, consistent safe work practices regarding pipeline tie-in safety in all tie-in scenarios.

3.0. RESPONSIBILITIES

3.1. **Project Owner Responsibilities** (includes, as appropriate, Pipeline Owner/Operator, Engineering, Procurement, and Construction (EPC) Contractor, Prime Contractor, etc.)

3.1.1. Provide accurate and timely site-specific tie-in information.

3.1.2. Each situation must be carefully evaluated and a detailed hazard assessment completed to determine the safest and most appropriate tie-in method for that situation.

3.1.3. When a tie-in is at a foreign line crossing, coordinate job with foreign line operator.

3.1.4. Request and review the Contractor's tie-in plan, ensuring it adheres to job specifications and identifies resources and equipment needs.

3.1.5. Maintain adequate workspace for workers and equipment.

3.1.6. Request and review the Site-Specific Safety Plan (SSSP) created by the Contractor regarding the tie-in scope of work. *(See Guideline Documents CS-G-4: Site Specific Safety Plans).*

The SSSP provides essential information, including identification and analysis of risks and potential hazards, together with detailed measures to mitigate or eliminate them. (See the CS-G-4 Appendix for an SSSP outline).

3.1.7. Other SSSP components with respect to tie-ins may set out safety guidelines for trenching and excavation, hot tapping, welding, cutting, and brazing and other job activities.

3.1.8. Monitor Contractor's compliance to contract-specific work safety plan(s) and procedures.

3.1.9. Confirm that Owner's Representatives and/or Inspectors collaborate with the Contractor Management team throughout the job.

3.1.10. Provide initial review of applicable control measures during engineering and design phases. (Trench Shoring, Excavation Depths, Tie-In location, foreign obstructions nearby, etc.). Adapt locations and address other issues as possible per review results.

3.2. **Contractor Management / Supervisor Responsibilities** (includes all personnel on site with a supervisory role)

3.2.1. Enforce guidelines governing the safety of pipe tie-in including, but not limited to:

- Completion of an SSSP or Job Safety Analysis (JSA), confirming that controls have been implemented to remove, reduce or mitigate identified hazards to an acceptable level. Update if conditions change.
- Designated safe work procedures have been communicated to, and are being followed by, all personnel involved with the job (e.g., via checklists), and are available for general review.).
- Verification that all equipment is inspected and in good working order per regulatory and manufacturer requirements.
- Ensure equipment (e.g., cranes, booms, etc.) placements are included in tie-in plans.

3.2.2. Participate in the development of tie-in safe work plans and procedures.

3.2.3. Ensure personnel and resources are sufficient, appropriate and available to safely carry out the tie-in activity and any associated tasks, including worker competencies, training and applicable certifications, based on their qualifications and required Operator Qualifications (OQs).

3.3. **Health and Safety Representative Responsibilities**

3.3.1. Assist with developing tie-in procedures and hazard mitigating controls (e.g., air monitoring, excavation shoring designs, hot-work permits, radiation safety when working with X-ray sources, etc.), including SSSP, JHA and JSA development.

3.3.2. Perform periodic audits of the tie-in procedures, work activities and

hazard mitigating controls.

3.3.3. Review inspection reports for completeness and closure of deficiencies.

3.3.4. Assist Management/Supervisors in the development and enforcement of Safe Work Practices (SWPs), training programs and OQs, and compliance with applicable regulations.

3.4. **Site Personnel / Employee Responsibilities**

3.4.1. Follow established procedures and protocols associated with tie-ins, and participate in JSA.

3.4.2. Visually inspect all tools, materials and rigging prior to use, reporting any identified deficiencies and only using items in good working condition.

3.4.3. Report any unsafe conditions to their supervisor, utilizing their Stop Work Authority if and when necessary.

3.4.4. Wear all proper Personal Protective Equipment (PPE), including air monitoring equipment, as required by the pre-task hazard assessment.

3.5. **Visitor Responsibilities**

3.5.1. Visitors are required to follow instruction provided at the orientation and remain alert and attentive to their surroundings at all times. Visitors must review and sign the JSA to acknowledge they are aware of the safety matters

3.5.2. Avoid placing themselves (or vehicles/UTVs) in the “line of fire” of materials and/or equipment, and immediately report any apparent safety concerns or potentially hazardous situations to site supervision or project owner representatives.

4.0. HAZARD ASSESSMENT

4.1. **Personal Protective Equipment (PPE)**

4.1.1. See *Guidelines* Document *CS-G-1: Basic Personal Protective Equipment (PPE)* for guidelines on PPE to be worn by all individuals during and in the vicinity of construction-related activities.

4.1.2. Hearing protection should be worn when noise levels exceed 85 decibels A (dBA). In general, if you have to elevate your voice to talk to someone standing beside you, hearing protection is needed.

4.1.3. Fire-retardant PPE and Flame Resistant Clothing (FRC) should be worn when conducting hot work or when the potential exists for a

flammable atmosphere at the job site.

4.1.4. Respiration protection requirements and use should be addressed in the SSSP and provided to each worker as necessary. Training regarding the donning, doffing, and maintenance of respiratory protection equipment should be provided.

4.1.5. In determining respiratory and general health protection needs, consider protecting against contaminated soil(s) in addition to airborne hazards.

4.2. **General**

4.2.1. All employees involved in tie-in work must remain alert and work to prevent anyone from being harmed by tie-in operations. This includes awareness of potential hazards associated with extended working hours, if applicable to the job.

4.2.2. Employees responsible for operating equipment should be trained, qualified and have the experience necessary to safely operate the equipment being used.

4.2.3. Slip, trip, and fall hazards must be avoided. Hazards include, but are not limited to, excavation egress points, ladders, power cords, welding leads, mud/gravel, ice, water and uneven surfaces.

4.2.4. Employees should avoid pinch areas and maintain the situational awareness to be able to work without placing themselves in any potential “line of fire”.

4.2.5. Use caution when working around mobile equipment. Always maintain eye contact with the operator and only approach the equipment when the operator and/or spotter has communicated it is safe to do so. Be familiar with, and attentive to, the exclusion zones for each piece of equipment.

4.3. **Excavations**

4.3.1. Develop a safe work plan for each excavation. Details should be given on length, width, and depth of excavation and the method for producing a safe excavation for personnel to enter and to conduct tasks such as pipe joint welding. (*See Guidelines Document CS-S-12: Trenching and Excavation Safety)*.

4.3.2. Daily inspection of an excavation prior to its entry must be completed by a person competent to do so. Hazards must be properly mitigated prior to entry.

4.3.3. Adequate excavation ingress and egress must be provided while an

excavation is occupied.

4.3.4. Shoring, benching, or sloping should be used to protect employees from trench collapse while working in the excavation.

4.4. Hazardous Atmosphere

4.4.1. On a job where a potentially hazardous atmosphere may occur, a Hazardous Atmosphere work plan should be established well in advance. (Employees who wear respirators must be medically qualified and participate in the employer's respiratory protection plan).

4.4.2. Work area air quality monitoring must be carried out, especially in spaces where the potential exists for unsafe breathing conditions and/or if flammable or toxic vapors may be present.

4.4.3. Hot-work, confined space entry and general work permits may be required to work where potentially hazardous atmosphere exists.

4.4.4. Proper PPE (FRC) and respiratory protection should be worn while working in potentially flammable work areas.

4.5. Hot-Work / Fire Prevention

4.5.1. Working in or near a potentially flammable atmosphere may require a Hot-work Permit to be completed before commencing work.

4.5.2. In cases where natural gas is has been displaced with air to enable tie-in work, a slug of inert gas such as nitrogen is to be introduced to prevent formation of an explosive mixture at the gas/air interface.

4.5.3. Fire watch (staged upwind with extinguisher activated, tested and ready to use) should be used during and immediately following hot-work activities.

4.5.4. Fire extinguishers and fire-suppression equipment should be inspected and in good working order before commencing hot-work activities.

5.0. DEVELOPING A TIE-IN PLAN

5.1. Tie-in Plan

5.1.1. Every tie-in scenario is unique, so developing and following a job-specific tie-in plan is critical to job safety. The tie-in plan must consider and may include:

- Ensuring pipeline integrity and continuity as part of worker safety, such as the implementation of measures to minimize structural stresses or sudden pipe movement during pipe alignment, to

mitigate the potential for worker injury risks and damage to the pipe or pipe coating.

- Drawings showing the piping system involved when making a tie-in in a congested area.
- Valve locations and whether each is open or closed.
- Isolation points and method to complete necessary isolation.
- Lock Out Tag Out (LOTO) procedures and requirements.
- Shut down plan, developed in coordination with Gas Control.
- Communication plan including communication methods.
- Air mover/nitrogen connection points (if applicable).
- Gas monitoring requirements.
- Tie-in activities as planned do not create a hazard to the public or the environment.
- Required permits needed to perform the work.
- Safety precautions necessary to ensure a safe work environment (e.g., PPE, excavation support system(s), hoisting and rigging equipment, fire watch, etc.).
- Responsible parties for each task documented.
- Training requirements for each party/task.
- Emergency response.
- Equipment needs.

5.2. Training

5.2.1. Prior to commencing tie-in activities, employees involved must possess proper training and a full understanding of the work to be performed. Training and job familiarization should include, but is not limited to:

- Details of the tie-in plan and associated procedures, including review of applicable drawings and engineering data.
- PPE requirements and how to put on, use and maintain the PPE.
- Hazard awareness training for applicable hazards such as excavations, confined space, hot work, fire prevention, air monitoring, welding and cutting, gas handling, LOTO, etc.

- Roles and responsibilities.
- Emergency response and notification protocols.

6.0. REFERENCES

- INGAA Foundation website: Construction Safety & Quality Guidelines (various)
- INGAA Foundation video: Quality Pipeline Tie-Ins
- INGAA Foundation: CS-G-9: Guidance for Serious Injury and Fatality Prevention
- INGAA Foundation CS-S-12: Trenching and Excavation Safety
- OSHA 29 CFR Occupational Safety and Health Standards
- OSHA Trenching and Excavation Safety
- American Petroleum Institute (API). Recommended Practice 2009, 7th Edition (Safe Welding, Cutting, and Hot Work Practices in the Petroleum and Petrochemical Industries)
- U.S. Environmental Protection Agency. Using Hot Taps for In-Service Pipeline Connections
- American Society of Mechanical Engineers (ASME). Industry Best Practices for Hot Tap Branch Connections

7.0. HISTORY OF REVISIONS

Revision	Date	Description
0	5/11/2022	Initial Issue