
HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

1.0 PURPOSE

- 1.1. Westlake, Plaquemine Operations, has developed this Hot Tap Permit Program to eliminate potential accidents, injuries, and to enhance employee protection.
- 1.2. To provide for the maximum personnel safety and to prevent the loss of productivity all hot tap operations must have prior approval of Department Manager or his designee in charge of the area involved and be conducted in strict accordance with this Procedure. This procedure begins with any hot work associated with the hot tap to the line.

2.0 SCOPE

- 2.1. This program applies to the entire Westlake, Plaquemine Operations.
- 2.2. This procedure also includes fillet welds (e.g., overlays, saddle welds, reinforcing pads, etc.)

Note: A Management of Change is required for all Hot Taps.

3.0 DEFINITIONS

- 3.1. **Fire Watch** – A person assigned to a hot work project whose sole responsibility is the safety of the open flame hot work activity. This individual must be trained in the use of a portable fire extinguisher.
- 3.2. **Hot Tap** - The technique of attaching a welded branch fitting to piping or equipment as it remains in service, and then creating an opening in that piping or equipment by drilling or cutting a portion of the piping or equipment within the attached fitting. Hot Tapping by definition involves Hot Work on equipment “in service.”
- 3.3. **Hot Tap Permit** – An authorization permit used as a safety planning tool to ensure necessary safety precautions have been addressed prior to conducting Hot Tap operations.
- 3.4. **Safe Work Permit** – a multifaceted safety planning tool, to ensure that the necessary safety precautions have been addressed prior to beginning work on site.
- 3.5. **Hot Work** - Any operation that can produce a spark, arc, flame, or sufficient heat hot enough to cause the ignition of ordinary combustible materials, combustible dusts, flammable gasses or vapors.

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

- 3.6. **Regular Work** - Any servicing, opening, or maintenance of process equipment and machinery. Regular work does not involve any hot work, hot taps, excavations, and/or confined space entry.
- 3.7. **Engineer** - An employee through education and experience qualified to properly evaluate the hot tap, perform the required calculations and implement the requirements of this procedure.
- 3.8. **Spark Producing Operations** - Operations such as using jackhammers and sandblasting are considered hot work. Department Supervision should consider the possibility of sparks resulting from scraping, hammering, and other operations, and the advisability of obtaining a hot work permit to cover such work.

4.0 RESPONSIBILITIES

4.1. Health and Safety (H&S)

- 4.1.1. Train employees on the proper implementation of this program.
- 4.1.2. Notify contractors of Westlake's Hot Work Permit Program during initial Safety Orientation.
- 4.1.3. Ensure that safe work permit procedures are reviewed at least every three years.
- 4.1.4. Maintain review records.

4.2. Department Supervision

- 4.2.1. Learn, understand, and follow this program.
- 4.2.2. Issue appropriate safe work permits (e.g., hot work, hot tap, excavation, confined space).
- 4.2.3. Provide specific safe work details, unique to the job or area, to production employees or the Maintenance Crew Leader involved with the covered work.
- 4.2.4. Gives authorization for hot tap operations within the department.
- 4.2.5. List required personal protective equipment necessary for the work on all permits.

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

4.2.6. Ensures all calculations

4.3. **Area Technician**

4.3.1. Learn, understand, and follow this program.

4.3.2. Perform atmospheric monitoring.

4.3.3. Review work area prior to issuing permit.

4.3.4. Complete applicable portions of Safe Work Permit.

4.3.5. Consult with Department Supervision to identify proper safe work procedures.

4.3.6. Review the hot work permit with Maintenance Crew Leaders and verify that all permit specifications have been met.

4.3.7. Ensure a trained fire watch is assigned to the project with an appropriate fire extinguisher.

4.4. **Maintenance Supervisor**

4.4.1. Learn, understand, and follow this program.

4.4.2. Consult with operations to identify proper safe work procedures.

4.4.3. Review and provide a copy of all permits to maintenance crew before work commences.

4.4.4. Ensure that maintenance crews follow plant requirements, including specifications outlined HSP-201.

4.5. **Contractors Involved in Hot Taps**

4.5.1. Learn, understand, and follow this program.

4.5.2. Provide all pertinent information to Operations regarding the hot tap work to be performed.

4.5.3. Review and comply with all permit requirements.

4.5.4. Provide coupon to Stationary Equipment Inspection Group once the Hot Tap procedure is complete.

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

5.0 PROCEDURE

- 5.1. It should be emphasized that a hot tap is always a calculated risk; and, this risk must be weighed against the problems and hazards involved in making the connection in some other manner.
- 5.2. Any hot top outside of the scope of this procedure will require site manager approval.
- 5.3. It is better to isolate, purge, and clean the equipment before making connections. Where this is impractical, the following Hot Tap Permit Procedure will be used to enhance job safety.
- 5.4. No person shall issue a Hot Tap Permit to themselves.

5.5. **Determination of Safe Hot Tap**

- 5.5.1. The Hot Tap table (see Appendix B - Hot Tap Table) lists three classes of product lines:
 - 5.5.1.1. Those that can be hot tapped with routine safety precautions;
 - 5.5.1.2. Those that can be hot tapped with special permission from the Department Manager; and
 - 5.5.1.3. Those that cannot be hot tapped under any conditions.
- 5.5.2. Additions or modifications to this table will require written permission from the Department Manager involved and with appropriate consultation with the Engineering Manager and Health and Safety.
- 5.5.3. The line operating pressure and temperature must not exceed that of the hot tap machine.
- 5.5.4. The line thickness must be sufficient to permit a safe weld without danger of burning through the line. (See Appendix C - Calculation for a Hot Tap Connection.)
- 5.5.5. Non-destructive thickness tests will be made on the area surrounding the proposed welding connection. Line pressure must be considered before a minimum wall thickness requirement can be determined.

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

5.6. Investigation Prior to the Hot Tap

5.6.1. Investigation prior to a hot tapping operation will include, but not be limited to the following:

- 5.6.1.1. Safety requirements;
- 5.6.1.2. Metal thickness;
- 5.6.1.3. Physical material characteristics of the line or equipment;
- 5.6.1.4. Compatible metallurgy of welding material and material welded;
- 5.6.1.5. Pressure-temperature conditions;
- 5.6.1.6. Material flow through the line or equipment;
- 5.6.1.7. Liquid level of at least 3 feet established if on a tank;
- 5.6.1.8. Hot tap equipment pressure-temperature limitations;
- 5.6.1.9. The exact plant site location of the hot tap must be positively identified (such as marking with felt marker, paint, tag, etc., with initials and date) by the operating department;
- 5.6.1.10. The location must be communicated to the personnel doing the work, not only to supervision, but also to the person who will be welding;
- 5.6.1.11. Welding requirements;
- 5.6.1.12. Design requirements;
- 5.6.1.13. A qualified engineer is required to perform the hot tap investigation and provide calculations.
- 5.6.1.14. Stationary Equipment Inspection Group (SEI) is required to assist in the metal thickness and welding requirements of the hot tap investigation.

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

5.7. Necessary Precautions Prior to Hot Tap

5.7.1. Required Approvals

- 5.7.1.1. Operations Supervisor shall notify the Incident Commander on duty of all Hot Taps to be made on lines with flammable contents.
- 5.7.1.2. Before any hot work begins, a safe work, hot work, and hot tap permit will be issued to the Maintenance Supervisor who will oversee the hot tap job. (See Appendix A - Hot Tap Permit.)
- 5.7.1.3. The hot tap must be approved by the Operating Unit Superintendent and Department Manager or designees, having ownership responsibility for the line.

5.7.2. The equipment used must be designed for the pressure and temperature involved.

5.7.3. The material's corrosive, toxic, or flammable characteristics may require suitable protective clothing be worn by personnel making the hot tap.

5.7.4. Consideration should be given to tying down or taping of sleeves at the wrist to prevent accumulation of flammable or toxic gases under employee clothing.

5.7.5. Shut-off valve locations, both upstream and downstream from the welding location, will be determined so that the valves may be closed quickly in an emergency.

5.7.6. Operating personnel must be stationed near shut-off valves during welding on lines carrying flammables or steam.

5.7.7. Operating personnel will have adequate communications with the job site, and have authority to close off the line in the event of a burn through.

5.7.8. Pressure in the line to be tapped should be reduced to the lowest possible pressure that will allow continued operation.

5.7.9. Pressure-temperature requirements must be established for each job.

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

- 5.7.10. On jobs where a fire hazard exists during welding or tapping, adequate fire protection equipment must be available for immediate use at the jobsite.
 - 5.7.11. Where the connection is to be made below ground level, the ditch or trench must be large enough to permit the welder to move out of a direct line with the welding arc or leak in the event of a burn through.
 - 5.7.12. Ample space should be available for the employee and hot tap machine.
- 5.8. **Safe Procedure for the Hot Tap**
- 5.8.1. Only qualified and experienced craftsmen will be used for the welding and tapping operation.
 - 5.8.2. The Maintenance Department's Stationary Equipment Inspection Group will provide welding procedures and qualification of welders.
 - 5.8.3. When welding the nozzle or connection to the main line, the initial pass will be made with a 3/32" welding rod using the lowest possible amperage.
 - 5.8.4. Time will be allowed between each pass for the line to cool to prevent line or product overheating.
 - 5.8.5. Material flow through the equipment or line must be maintained during the welding operation.
 - 5.8.6. Before line tapping, the valve will be opened, the cutter run down to the main trunk line then backed up into the machine, and the valve closed. This is to check machine operation before cutting into the line.
 - 5.8.7. Proper PPE must be worn by the person drilling and welding into lines.
 - 5.8.8. An Operating Department designated representative must be present during the entire hot tap operation, both welding and tapping.
 - 5.8.9. All hot taps on lines under pressure should have some form of nozzle reinforcement. This may be weld-o-let, repad, or full encirclement hot tapping tee. (Refer to Westlake Engineering Standard 3004 - Appendix 6, Westlake Engineering Standard 3006 - Page 4, and

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

Standard Details 3005-256, 257, 258, and 259.)

- 5.8.10. The hot tap permit must be completed and signed by the Maintenance Supervisor or designee before the welding or hot tapping operations have begun.

5.9. Materials Not on Hot Tap Table (Appendix B)

- 5.9.1. To perform hot taps on equipment containing materials not listed on material chart (hot tap with Site Manager approval), the following is required:

- 5.9.1.1. Research available data from sources such as Engineering Department, knowledgeable contacts, and material suppliers;
- 5.9.1.2. Prepare written procedure listing special precautions; and
- 5.9.1.3. Acquire Site Manager approval

6.0 TRAINING

- 6.1. All employees who are involved in hot tap procedures will receive appropriate hot tap permit training prior to performance of any hot tap-related tasks.
- 6.2. Employees will be re-trained in the hot tap permit program for any updated procedures or whenever changes in job assignment or process equipment and machinery occur.
- 6.3. Retraining will be conducted whenever a periodic inspection reveals that employees are not fully aware of, or are not following established procedures, or if regulatory requirements change.

7.0 RECORDKEEPING

- 7.1. Hot Tap Permits will be kept for one year along with the accompanying Safe Work Permit following work completion by each department.

8.0 PROGRAM REVIEW

- 8.1. This Hot Tap Permit program will be reviewed in conjunction with the Safe Work Permit Program at least every three years. Health and Safety will ensure this review is performed.

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

9.0 REFERENCES

- 9.1. American Petroleum Institute (February, 1983). "Safe Maintenance Practices in Refineries," API Publication No. 2007, Washington, D.C.
- 9.2. American Petroleum Institute (August, 1988). "Safe Welding and Cutting Practices in Refineries, Gasoline Plants, and Petrochemical Plants," API Publication No. 2009, Washington, D.C.
- 9.3. Occupational Health and Safety Administration's 29 CFR 1910.119 (August 26, 1992). "Process Safety Management of Highly Hazardous Chemicals."
- 9.4. API PR2201

10.0 APPENDICES

- 10.1. **Appendix A** - Hot Tap Permit
- 10.2. **Appendix B** - Hot Tap Table
- 10.3. **Appendix C** - Calculation for Hot Tap Connection

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

Revision History

Rev	Changes	Approved	Date
9	The following definitions were added to meet PEMS review requirements: Fire Watch, Hot Tap Permit, Safe Work Permit. Also added section 4.3.7 & 5.4 MOC #: PLQ8.EHSSPSM.123123.77323	H. Garner	02/2024
8	Westlake Branding. Review Cycle. Added revision history. Clarification of HOTWORK Requirements, differentiate between natural gas above and below 100psig, HSE audit frequency removed, qualified engineer, removed liquid ammonia, added definition for engineer	H. Garner	1/2019

HEALTH AND SAFETY PROCEDURE 201 – HOT TAP PERMIT

10.1 APPENDIX A

HOT TAP PERMIT

**Hot Tap Permit
HSP – 201
Appendix A (10.1)**

General Information

1. Equipment to be Hot Tapped
2. Equipment Location
3. Equipment Contents

Description of Work

1. Weld procedure to be used:

2. Line thickness as indicated by thickness check: _____ Thickness (original) _____
3. Pressure limit established for this job: _____
4. Temperature limit established for this job: _____
5. Minimum flow requirement established for this job: _____

6. Do mechanical requirements meet Engineering Specs?
7. Are operating personnel stationed at shut-off valves?
8. Has adequate communications been established between the job and department supervision?
9. Is the exact point of the Hot Tap identified and visibly marked?
10. Has a Management of Change been completed?

YES	N/A

Personnel and Production Facilities Protection

Specify any special personnel protection, fire equipment, protective devices, precautions, and/or any other comments:

Signature

Date

Person who Engineered the Hot Tap		
Department Superintendent (Line Owner)		
Maintenance Supervisor		
Department Manager		
Site Manager (or designee)		
Safety Professional		

10.2 APPENDIX B

HOT TAP TABLE

Hot Tap Permit
HSP – 201
Appendix B (10.2)

Hot Tap Table

HOT TAP WITH TOP SITE MANAGER APPROVAL	HOT TAP WITH DEPARTMENT MANAGER APPROVAL	REMARKS
Steam (>150 psi) Ethylene Hydrogen Chlorine Oxygen Any Oxide Liquid Ammonia Acetylene Carbon Steel Below 32Deg F Caustic VCM		All of these materials will react with steel at welding temperatures or some may detonate. Can cause weld embrittlement or cracking
Methane Natural Gas > 100psig. Propylene Propane Butane <u>NOTE:</u> This list is not all-inclusive. Check with Westlake Engineering for products not on this list.	Natural Gas < 100psig	Maintenance and Operations must check and agree on procedure. Plant Supt. must sign and approve Safe Work Permit. Engineering and Plant Supervision must approve type of nozzle reinforcement to be used. Consider metal embrittlement or cracking
	Potable Water Process Water Brine (Not Containing Caustic) Nitrogen Steam (<150 psi) Air & Condensate	These products require Safe Work Permit signed by Plant Supt. Operations representative and Maint. Supervisor must both check line and agree that the proper line is being tapped and that the procedure is safe.

10.3 APPENDIX C
CALCULATION FOR HOT TAP CONECTION

**Hot Tap Permit Procedure
HSP – 201
Appendix C (10.3)**

Calculation for a Hot Tap Connection

Material: _____

Nominal Wall Thickness: Minimum _____ inch; Maximum _____ inch

Ultrasonic thickness measurement equipment accuracy +/-10% _____ inch

Presume Minimum Case

Calculate useful wall thickness:

Thickness measurement = x	_____ inch
Less .010 accuracy of meter	<u>-.010</u> inch
Less diameter of weld rod	<u>-.094</u> inch
<i>(for depth of weld puddle (3/32 rod))</i>	

Usable wall thickness = $X - .010 - .094 = (X - .104 \text{ inch})$

Allowable pressure for hot tap with a minimum safety factor of 1.5:

$$P-1 = \frac{2(S) (X - .104 \text{ in})}{D (1.5)}$$

P-1 = Maximum allowable pressure during hot tap operations

S = Specified minimum yield strength of header pipe

D = Outside diameter of header pipe

If the pressure cannot be lowered to = P-1, a hot tap is not recommended.

Actual Case:

The above calculations should be made using actual field measurements.

Engineer	Date