

FACT SHEET

2020 MAP Guide Acceptable Separation Distance, Fall Hazards and Pipelines

Acceptable Separation Distance

1. **HUD’s Acceptable Separation Distance process requires assessment of both existing and planned above-ground tanks. Where can I find good information on planned tanks near my project site?**

Answer:

- Potential information sources for planned ASTs may include:
- Local government planning office: Planning staff may be aware of sites that have applied for AST permitting or are zoned for industrial development that will utilize ASTs.
- State Emergency Response Commission (SERCs) or Local Emergency Planning Committees (LEPCs) under the Emergency Protection Community Right-to-Know Act (EPCRA) (<https://www.epa.gov/epcra/local-emergency-planning-committees>)
- Fire Department

2. **Current information on planned tanks may be incomplete or may change as development of facilities handling these hazardous materials moves forward. How do I deal with such contingencies in my HUD review?**

Answer:

The environmental review determines project impacts and compliance based on the information available at the time of the environmental review. For sites outside of the control of the HUD applicant or partner, such as nearby planned hazardous facilities, the environmental review must assess the impact of the planned facility based on the information available at the time the review is completed.

Fall Hazards and Pipelines Applicability

3. **How does HUD define the terms “ancillary facilities” and “common areas” as they apply to fall hazards and pipelines analysis?**

The restrictions on fall hazards and pipelines apply to buildings, ancillary facilities, structures, or common areas. HUD defines ancillary facilities as facilities ancillary to housing. This would include onsite areas that are not residential buildings, but are there to support or complement residential buildings and are used by people, including private balconies, front or back yards, divided green space or patios, carports, garages, sheds and pergolas or buildings like gyms, pool houses, etc. Ancillary facilities would also include “common areas,” which are the non-private ancillary spaces on the housing site that residents are allowed or expected to access. Common areas are areas where people would likely congregate, and include playgrounds, and outdoor recreation areas. Parking lots included within the site boundaries of, and designed to serve the

residents of, a HUD-insured residential or mixed-use development are covered under this definition.

Walking trails, pathways and sidewalks that include items such as sitting benches, tables, pergolas, or gazebos are always considered common areas of congregation. Walking trails, pathways and sidewalks without these amenities may be excluded on a case-by-case basis (for example a trail in a natural area that is not actively managed or monitored by the property, or a trail segment and connects to a larger biking or walking trail network.)

Pipeline Assessment

4. What pipelines should I assess under 9.6.19.A?

Answer:

All projects at the CEST or EA level review must identify all pipelines within the site boundaries or immediately adjacent to the property that transport flammable or combustible liquids or gases at a pressure exceeding 200 psig in order to confirm that no structures, ancillary facilities, common areas, parking areas or like related improvements are within 10 feet of the easement of a pressurized pipeline. This does not apply to distribution lines supplying only the facility itself.

If not already identified on the site survey or site plan, these pipelines can be identified using the National Pipeline Mapping System and other sources such as state databases. If these resources do not provide adequate detail on all areas within 10 ft of site improvements, all available resources, including 811, should be used to ensure compliance.

5. What pipelines should I assess under 9.6.19.B?

For new construction projects and rehabilitation projects where residential density is increased, the environmental review must consider 9.6.19.A (specific pipeline resources discussed in question 4) and Section 9.6.19.B, which requires assessment of above-ground and below-ground pipelines within a mile of the property that transport flammable or combustible liquids or gases at a pressure exceeding 200psig. This includes onsite or immediately adjacent pipelines outside of the 10-foot setback from the easement.

For the one-mile baseline impact radius assessment, HUD's primary reference is the National Pipeline Mapping System (NPMS) Pipeline Information Management and Mapping Application (PIMMA) and the site survey, as corroborated by site observation-

For projects near fracking sites, the requirement at 9.6.19.D.6.b to analyze hazards from above ground fracking operations within 1000 feet of the property includes above ground pipelines associated with the fracking operation that are above 200 psi. These may be identified through the agency that regulates the oil and gas industry in the jurisdiction (in Texas, for example, The Railroad Commission of Texas).

6. According to the definition of “hazard” at 24 CFR 51.201, underground pipelines are specifically excluded from coverage under 24 CFR 51C. If this is the case, what is the basis for the required pipeline assessment under MAP Guide 9.6.19.B?

Answer:

The MAP guide has always considered hazards and risks as part of the underwriting process and has included a safe distance from pipeline easements for decades. In 2016, the MAP guide added a risk analysis for pipelines, and the 2020 updates clarify what is involved in that risk analysis.

The risk analysis clarifications are based on a study HUD commissioned in 2016. HUD determined that there was a need to establish specific criteria for pipeline impact radius risk analysis based on the incidence of fires or explosions caused by leaking or damaged lines and the need for criteria that take into account the difference in risk associated with pipelines of larger diameter or greater pressure. HUD also took into account EPA guidelines for siting school facilities and state regulations and local ordinances on pipelines.

7. Due to terrorism concerns, gas providers tend to not provide information on pipeline diameter and operating pressure. Are there any suggestions or recommendations on how to obtain that information?

Answer:

- Step one: Request information on the pipeline attributes (pipeline diameter and operating pressure) from the pipeline owner. Identify yourself as requesting this information for a federal project environmental review. Usually, the pipeline operator for the company owning the pipeline will provide the attribute information for the assessed pipeline.
- Step two: If the pipeline operator does not provide the pipeline diameter or operational pressure, the person looking for the information should contact the HUD field or Regional environmental officer for the location where the pipeline is being assessed. You can find the appropriate contact here:
<https://www.hudexchange.info/programs/environmental-review/hud-environmental-staff-contacts/#region-i-regional-and-field-environmental-officers>

8. What pipeline pressure should be used for the calculation?

Answer:

Assessments should use the “Maximum Allowable Operating Pressure” (MAOP) for the relevant pipeline segment. MAOP is defined in the Code of Federal Regulations as the maximum internal pressure permitted during the operation of a pipeline.

9. Can HUD provide the equations used to create the BPIR/ASD tables for each product and scenario (thermal radiation and blast overpressure)? This would allow reviewers to interpolate between values more accurately in the table when pipeline diameter or operating pressures are in between those listed.

Answer:

A. Liquids

Screening distances¹ for pipelines carrying flammable or combustible liquids were derived using a pool fire analysis that models the volume of liquid contained in a ten-mile section of pipeline, based on diameter, in a pool with an area estimated using a correlation for a standard spill developed by other federal regulatory agencies, and pool depth corresponding to spilled volume and area. The dimensions of this theoretical pool were then processed using the HUD ASD Calculator to determine an Acceptable Separation Distance used as a screening value. HUD has determined that it is not practicable to reproduce this calculation to screen individual liquid-carrying pipelines. For pipelines with a diameter between given values in the screening table, interpolation may be used to determine the intermediate distance.. Alternatively, you may use distance for the next higher diameter or pressure provided. However, this may substantially overstate the pipeline impact radius.

B. Gases

i. Thermal Radiation

The PIR calculations were modified to determine the impact radius based on a thermal radiation threshold of 450 Btu/ft²/hr, in keeping with the HUD regulations. The calculation uses the following formula:

$$r = [C * P * D^2 / I_{th}]^{0.5}$$

Where:

r = Potential impact radius [ft]

C = Material-specific constant [natural gas: 2348; hydrogen: 1599; ethane: 3539; syngas: 1667]

P = Pipeline pressure [psi]

D = Pipeline diameter [in]

I(th) = Thermal heat flux threshold [450 Btu/ft²/hr]

The material specific constant is multiplied by the pipeline pressure times the pipeline diameter squared, all that divided by the thermal heat flux threshold. The square root of the result will be the PIR.

Modified according to contents, the formulas are:

Natural gas: $r =$

$2.28(P * D^2)^{0.5}$ Ethylene: $r =$

$2.80(P * D^2)^{0.5}$ Hydrogen: $r =$

$1.88(P * D^2)^{0.5}$

¹ Distances are measured from the center of the pipeline to the site boundary.

$$\text{Syngas: } r = 1.92(P * D^2)^{0.5}$$

ii. **Blast Overpressure**

Distances for blast overpressure were derived using the NOAA/EPA ALOHA dispersion model and applying HUD overpressure limits assuming full combustion of the release. HUD has determined that it is not feasible to reproduce this calculation case by case for diameters and pressures not listed on the chart. Where only one value (diameter or pressure) is known, users may estimate intermediate values using linear interpolation. Alternatively, you may use distance for the next higher diameter or pressure provided. However, this may substantially overstate the pipeline impact radius.

10. Can you discuss the qualifications required for the engineering report needed to assess the thermal radiation and blast overpressure hazard?

Answer:

The person producing the report must have the following qualifications:

- A. Be licensed as a Professional Engineer (P.E.) and
- B. Have familiarity with pipeline industry safety standards.

For the purposes of evaluating the pipeline hazards, HUD does not require the engineer to be licensed in the state where the project is located, but they must affix their seal to the report. The engineer would need to be licensed in the state where the project is located for any proposed barriers or building features designed as mitigation under 9.6.19.B.4.

Beyond HUD requirements, a professional engineer or registered architect or other professional subject to state licensure or regulation of professional practice is always expected to meet the requirements for the state in which the property of concern is located. States may vary in both the degree of and the process for extending reciprocal recognition to professionals licensed in other states.

11. What are the requirements for the engineering report required by section 9.6.19(B)(3)(a), when property improvements are located within distances listed in the tables in Appendix 9?

Answer:

For high pressure pipelines carrying flammable or combustible liquids or gases, when site improvements proposed as part of the HUD-insured transaction are to be located within the screening distances listed in the tables in A.9.1.1, the engineering report may assess the likelihood of a pipeline release and projected resulting thermal radiation and blast overpressure risk to the project that are likely to occur based on factors including, but not limited to:

- Conditions of the pipeline such as corrosion, damage, defects, or deferred maintenance

- Pipeline depth² or pipeline aboveground exposure
- Historical incidents such as releases or leaks
- Operation and maintenance schedules for the pipeline as available
- Information provided by the pipeline operator
- Geological or other conditions along the pipeline route or alignment
- Site observation

If this assessment is undertaken and determines, as evidenced by the engineering report affixed with the signature and seal of a qualified engineer, that the pipeline does not pose a risk to the HUD-insured project, no further mitigation is required.

If further assessment of the pipeline is not undertaken or cannot determine that the pipeline does not pose a risk to the project, the engineering report must identify measures that will mitigate the risk from thermal radiation, which, unless contraindicated by the engineering report, is assumed to exceed the goal of 450 Btu/ft²/hr within the distances listed in the tables in A.9.1.1.

12. The BPIR tables in Appendix A.9.1 cover diesel, gasoline, crude oil, natural gas, hydrogen, and ethane. Are these the only substances that would warrant further analysis?

Answer:

The requirements at 9.6.19.B apply to any pressurized pipeline transferring flammable or combustible liquids and gases that exceed 200 psi operating pressure. The substances listed in the BPIR tables in Appendix A.9.1 of the MAP guide are those that are encountered most frequently, but other substances may also require analysis.

Common substances³ that could require analysis if they exceed 200 psi operating pressure include: natural gas; liquid petroleum (including crude oil and refined products made from crude oil such as gasoline, home heating oil, diesel fuel, aviation gasoline, jet fuels, and kerosene); liquefied ethylene; propane; butane; hydrogen; and some petrochemical feedstocks (ethylene, propylene butadiene, benzene, toluene, xylene, hexane, heptane).

² In some cases, pipeline depth may be an adequate basis on which to determine that the facility does not pose a risk to the HUD-assisted site, depending on the amount and makeup of pipeline overburden. For initial screening based on pipeline depth prior to completion of a full engineering report, reviewers may contact Nelson Rivera directly at Nelson.A.Rivera@hud.gov, with a cc to Sara Jensen at Sara.Jensen@hud.gov.

³ For assistance with calculation of screening distances for high-pressure pipelines carrying substances not listed here, please contact Nelson Rivera directly at Nelson.A.Rivera@hud.gov, with a cc to Sara Jensen at Sara.Jensen@hud.gov.