

3745-104-10      **Hazard assessment: worst-case release scenario analysis.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see paragraph (C) of rule 3745-104-01 of the Administrative Code titled "Referenced materials."]

(A) The owner or operator shall analyze and report in the RMP:

- (1) For program one processes, one worst-case release scenario for each program one process;
- (2) For program two and three processes:
  - (a) One worst-case release scenario that is estimated to create the greatest distance in any direction to an endpoint provided in the appendix to rule 3745-104-09 of the Administrative Code resulting from an accidental release of regulated toxic substances from covered processes under worst-case conditions defined in rule 3745-104-09 of the Administrative Code;
  - (b) One worst-case release scenario that is estimated to create the greatest distance in any direction to an endpoint defined in paragraph (A) of rule 3745-104-09 of the Administrative Code resulting from an accidental release of regulated flammable substances from covered processes under worst-case conditions defined in rule 3745-104-09 of the Administrative Code; and
  - (c) Additional worst-case release scenarios shall be reported if a worst-case release from another covered process(es) at the stationary source potentially affects public receptors different from those potentially affected by the worst-case release scenario developed under paragraph (A)(2)(a) or (A)(2)(b) of this rule.

(B) Determination of worst-case release quantity. The worst-case release quantity shall be the greater of the following:

- (1) For substances in a vessel, the greatest amount held at any time in a single vessel, taking into account administrative controls that limit the maximum quantity; or
- (2) For substances in pipes, the greatest amount at any time in a pipe, taking into account administrative controls that limit the maximum quantity.

(C) Worst-case release scenario: toxic gases.

- (1) For regulated toxic substances that are normally gases at ambient temperature and handled as either a gas or handled as a liquid under pressure, the owner or operator shall assume that the quantity in the vessel or pipe, as determined under paragraph (B) of this rule, is released as a gas over ten minutes. The release rate shall be assumed to be the total quantity divided by ten unless passive mitigation systems are in place at the covered process.
  - (2) For gases handled as refrigerated liquids at ambient pressure:
    - (a) If the released substance is not contained by passive mitigation systems or if the release is contained and the contained pool would have a depth of one centimeter or less, the owner or operator shall assume that the substance is released as a gas in ten minutes;
    - (b) If the released substance is contained by passive mitigation systems in a pool with a depth greater than one centimeter, the owner or operator may assume that the quantity in the vessel or pipe, as determined under paragraph (B) of this rule, is spilled instantaneously to form a liquid pool. The release rate shall be calculated at the boiling point of the substance and at the conditions specified in paragraph (D) of this rule.
- (D) Worst-case release scenario: toxic liquids.
- (1) For regulated toxic substances that are normally liquids at ambient temperature, the owner or operator shall assume that the quantity in the vessel or pipe, as determined under paragraph (B) of this rule, is spilled instantaneously to form a liquid pool.
    - (a) The surface area of the pool shall be determined by assuming that the liquid spreads to one centimeter deep unless passive mitigation systems are in place at the covered process that serve to contain the spill and limit the surface area. Where passive mitigation is in place, the surface area of the contained liquid shall be used to calculate the volatilization rate.
    - (b) If the release would occur onto a surface that is not paved or smooth, the owner or operator may take into account the actual surface characteristics.
  - (2) The volatilization rate shall account for the highest daily maximum temperature occurring in the past three years, the temperature of the substance in the vessel, and the concentration of the substance if the liquid spilled is a mixture or solution.
  - (3) The rate of release to air shall be determined from the volatilization rate of the liquid pool. The owner or operator may use the methodology in the "RMP Offsite Consequence Analysis Guidance" or any other publicly available techniques that account for the modeling conditions and are recognized by

industry as applicable as part of current practices. Proprietary models that account for the modeling conditions may be used provided the owner or operator allows the director or the director's representative access to the model and describes model features and differences from publicly available models to local emergency planners upon request.

- (E) Worst-case release scenario: flammable gases. The owner or operator shall assume that the quantity of the substance, as determined under paragraph (B) of this rule and the provisions below, vaporizes resulting in a vapor cloud explosion. A yield factor of ten per cent of the available energy released in the explosion shall be used to determine the distance to the explosion endpoint if the model used is based on TNT equivalent methods.
- (1) For regulated flammable substances that are normally gases at ambient temperature and handled as a gas or as a liquid under pressure, the owner or operator shall assume that the quantity in the vessel or pipe, as determined under paragraph (B) of this rule, is released as a gas over ten minutes. The total quantity shall be assumed to be involved in the vapor cloud explosion.
- (2) For flammable gases handled as refrigerated liquids at ambient pressure:
- (a) If the released substance is not contained by passive mitigation systems or if the contained pool would have a depth of one centimeter or less, the owner or operator shall assume that the total quantity of the substance is released as a gas in ten minutes, and the total quantity will be involved in the vapor cloud explosion.
- (b) If the released substance is contained by passive mitigation systems in a pool with a depth greater than one centimeter, the owner or operator may assume that the quantity in the vessel or pipe, as determined under paragraph (B) of this rule, is spilled instantaneously to form a liquid pool. The volatilization rate (release rate) shall be calculated at the boiling point of the substance and at the conditions specified in paragraph (D) of this rule. The owner or operator shall assume that the quantity which becomes vapor in the first ten minutes is involved in the vapor cloud explosion.
- (F) Worst-case release scenario: flammable liquids. The owner or operator shall assume that the quantity of the substance, as determined under paragraph (B) of this rule and the provisions below, vaporizes resulting in a vapor cloud explosion. A yield factor of ten per cent of the available energy released in the explosion shall be used to determine the distance to the explosion endpoint if the model used is based on TNT equivalent methods.
- (1) For regulated flammable substances that are normally liquids at ambient temperature, the owner or operator shall assume that the entire quantity in the vessel or pipe, as determined under paragraph (B) of this rule, is spilled

instantaneously to form a liquid pool. For liquids at temperatures below their atmospheric boiling point, the volatilization rate shall be calculated at the conditions specified in paragraph (D) of this rule.

- (2) The owner or operator shall assume that the quantity which becomes vapor in the first ten minutes is involved in the vapor cloud explosion.
- (G) Parameters to be applied for all covered processes. The owner or operator shall use the parameters defined in rule 3745-104-09 of the Administrative Code to determine distance to the endpoints. The owner or operator may use the methodology provided in the "RMP Offsite Consequence Analysis Guidance" or any commercially or publicly available air dispersion modeling techniques, provided the techniques account for the modeling conditions and are recognized by industry as applicable as part of current practices. Proprietary models that account for the modeling conditions may be used provided the owner or operator allows the director or the director's representative access to the model and describes model features and differences from publicly available models to local emergency planners upon request.
- (H) Consideration of passive mitigation. Passive mitigation systems may be considered for the analysis of worst case provided that the mitigation system can withstand the release event triggering the scenario and would still function as intended.
- (I) Factors in selecting a worst-case scenario. The owner or operator shall select as the worst case for flammable regulated substances or the worst case for regulated toxic substances, a scenario that would result in a greater distance to an endpoint, as defined in paragraph (A) of rule 3745-104-09 of the Administrative Code, beyond the stationary source boundary. These scenarios shall be based on the following:
- (1) Determination of worst-case release quantity as defined in paragraphs (B)(1) and (B)(2) of this rule;
  - (2) Smaller quantities handled at higher process temperature or pressure; and
  - (3) Proximity to the boundary of the stationary source.

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