

Refinery MACT I – Residual Risk Data Survey

Links

[Blank survey form \(templates\) \(click here for PDF version\)](#)

[Workshop Slides](#)

[Workshop Notes](#)

Required Deliverables ([see the General Notes of the Survey Form](#))

All data requested on the survey forms (templates)

Scaled Plot Plan (either electronic or hard copy)

Process Diagram (if available)

Q&A by Topic

[EPA's exposure and health risk modeling \(incl. UTM to lat-long conversion\)](#)

[Scope of the Survey \(general questions\)](#)

[Cooling Towers](#)

[Fugitive Equipment Leaks](#)

[Storage Tanks](#)

[Wastewater Treatment System](#)

[Miscellaneous Process Vents](#)

[Marine Vessel Loading](#)

[Gasoline Loading Racks](#)

[Other \(non-RMACT1 sources of benzene\)](#)

EPA's exposure and health risk modeling:

- 1) Model. What program will EPA use to model the risk?

EPA intends to use **HEM-3**. HEM-3 generates chronic cancer risk and chronic and acute hazard estimates for one facility at a time. This model uses the Industrial Source Complex Model (Short-term), Version 3 (ISCST3), dispersion model.

- 2) Availability. Is a copy of this model available?

The HEM-3 model that EPA will use can be downloaded from:

www.epa.gov/ttn/fera/human_hem.html

- 3) Toxicity values. What toxicity values will EPA use?

The toxicity values that EPA will use are those found at:

www.epa.gov/ttn/atw/toxsource/summary.html

- 4) Meteorological data. Where will EPA obtain meteorological data for each site, and will EPA accept site-specific data?

EPA intends to use meteorological data from the nearest NWS station. EPA will consider site-specific data, when at least one year of such data is provided by the facility.

- 5) Census Data. What census data will EPA use?

HEM-3 uses 2000 census data. If changes to the surrounding population since the 2000 Census are known (such as a section of residences having been bought out by the facility), EPA will consider such information, if documentation of it is provided by the facility.

- 6) Dispersion model source types. Which types of emission points are to be modeled as area sources, and which are to be modeled as point sources?

Cooling towers, miscellaneous process vents, and loading racks (both marine and gasoline) are assumed to be *point* sources. Equipment leaks, storage tanks, and wastewater facilities are assumed to be *area* sources. If a facility believes that a given emission point would be more appropriately modeled with a different type of source than is assumed by the template, the facility may state the type of source to be used, and provide the corresponding input data.

- 7) Building downwash. Will building downwash be considered when running the models?

No, the survey does not solicit the information that would be needed to support considering downwash in the model.

- 8) Terrain effects. How will terrain effects be accounted for in the model?

EPA will use information sources such as online topo maps or satellite images to estimate terrain. If a reasonable judgment can not be made, then flat terrain will be assumed. If a facility would like to supply information relative to terrain at their site, it would be helpful to EPA in their determination of appropriate terrain parameters.

- 9) Rural vs urban. How will EPA determine whether to use the urban or rural dispersion coefficients?

Satellite images may help make the urban/rural determination, but with no information EPA typically assumes rural. Again, a facility may help EPA by supplying information.

- 10) Other defaults. Is it possible to obtain a list of default parameter/assumption values for the HEM-3 model that will be used in addition to those listed above?

EPA does not have a list of default parameters for this refined assessment. The purpose of API's survey is to gather site-specific information such that defaults will not be necessary. If, in reviewing the data and setting up the model, EPA discovers that they have made some assumptions about a given facility, they will attempt to verify the accuracy of those assumptions with API or the facility prior to running the model.

- 11) UTM to Lat-Long Conversion. Is there a preferred method for converting UTM coordinates to latitude and longitude?

~~Locations of emission points should be given in terms of the latitude and longitude. See the [attached letter](#) for guidance on how to convert from UTM to lat-long. Note that this guidance indicates a decision to use degrees-minutes-seconds, rather than the decimal degree system that had been discussed previously.~~

The suggestion to use CONCOR for the conversion from UTM to lat-long is hereby rescinded! There is no recommendation for a preferred method at this time, but the [attached memo](#) contains links to some conversion programs available from the internet. Bear in mind that the coordinates need to end up in decimal degree lat-long, for input to HEM-3.

ADDITIONAL NOTES FROM 6/30/2005 MEMO:

CONCOR is not used in HEM-3, and it is not recommended because it does not allow the user to designate the NAD to be used (the difference between NAD27 and NAD83 can be over 100 meters).

A suggested conversion program is the Corps of Engineers CorpsCon program (<http://crunch.tec.army.mil/software/corpscon/corpscon.html>)

When converting UTM coordinates to lat-long, designate the NAD that was used to generate the UTM coordinates in the first place. If the UTM coordinates came from a NAD83 map, then use NAD83. However, if the coordinates came from a NAD27 map then use NAD27. {I suspect that this is the tough part for some of you - finding out which NAD was used to generate your UTM coordinates.} **YOU SHOULD IDENTIFY THE NAD IN YOUR SUBMITTAL.**

NOTE TO EPA (and other HEM-3 users): Even though the HEM-3 instructions indicate that the NAD is only required when inputting locations as UTM coordinates, one user found that the NAD should be entered when inputting lat-long as well (if the lat-long were obtained by converting from UTM).

- 12) Health Risk Basis. Is the health risk threshold assessed with respect to the “Maximum Individual Risk” output or the “Average cancer risk to an individual” output from HEM-3?

EPA will apply the health risk threshold to the Maximum Individual Risk (MIR). In the HEM-3 model, the location used to evaluate the MIR for a given census block is the centroid of the census block (*i.e.*, HEM-3 assumes that everyone in the census block lives at the census block centroid).

- 13)

Scope of the Survey:

- 1) Emission points to include. How much of my facility does the survey apply to?

The survey applies to all significant sources of benzene emissions that are located at the *plant site*, as that term is defined in the Refinery MACT 1 rule (RMACT 1):

Plant site means all contiguous or adjoining property that is under common control including properties that are separated only by a road or other public right-of-way. Common control includes properties that are owned, leased, or operated by the same entity, parent entity, subsidiary, or any combination thereof. [40 CFR Part 63 Subpart CC Section 63.641 }

Emission points located at the plant site are to be included, regardless of the MACT rule that they may be subject to, and regardless of whether or not they are controlled.

- 2) RMACT 1 emission points. What's special about RMACT 1 emissions points?

The templates request reporting of RMACT 1 emission points separately from Other emission points (*i.e.*, those that are not RMACT 1). For purposes of this survey, RMACT 1 emission points are those that belong to the Petroleum Refining *source category*, regardless of whether they are part of the RMACT 1 *affected source* and regardless of whether they are subject to controls (*i.e.*, Group 1 or Group 2 under RMACT 1). Thus, in addition to the categories of emission points that are covered by RMACT 1, cooling towers and marine loading operations have been included on the templates as types of RMACT 1 emission points.

- 3) Other emission points. What about emission points that are not RMACT 1?

All other sources of benzene emissions at the plant site are to be reported on the survey templates as 'Other.' This would include sources that are subject to a MACT rule other than RMACT 1. Examples include emission points that are part of OLD (organic liquids distribution) MACT operations, boilers and process heaters, and emission points associated with a HON unit.

- 4) Emission points with zero (or *de minimis*) benzene emissions. What about emission points with no significant benzene emissions?

Emission points that have zero (or *de minimis*) benzene emissions do not have to be listed. However, listing them would show that they were considered and found to be insignificant. The templates would then present a more complete record of the facility's benzene emissions inventory, and the listing would avoid future questions such as, "But what about that unlisted cooling tower?"

If these emission points are listed, all that needs to be shown is the identification of the emission point and an indication of zero or *de minimis* benzene emissions (preferably show the criteria used for classifying as *de minimis*, such as "< 0.5 tpy benzene"). All of the other columns may be left blank for these emission points.

If these emission points are not listed, then a record should be kept of the finding of zero (or *de minimis*) benzene emissions, so that if the contribution of these emission points is subsequently questioned, an answer will be readily available.

- 5) Emission point(s) routed to control device. What about emission points that are routed to a control device?

If vapors from an emission source are routed to a control device, the location and quantity to report for that emission source are the location of the control device and the quantity emitted from the control device. The intention is to model the actual quantity of vapors emitted and the location from which they are released to the atmosphere. Therefore, report the location of the control device, rather than the location of the emission source from which the vapors were generated, and report the quantity of vapors emitted from the control device, rather than the quantity generated by the emission source.

6)

Cooling Towers:

- 1) Cooling tower cells. Are cooling tower cells to be grouped together, or listed separately?

List each cell of a cooling tower individually.

- 2) Height of the cooling tower. What are the reference elevations to be used in determining the height of the cooling tower?

The height to be recorded is that of the fan plane above grade.

- 3) AP-42 emission factors. Should the AP-42 emission factors for cooling towers be used?

The AP-42 emission factors for cooling towers are not viewed favorably by EPA. If other methods are available, they would be preferable.

- 4) Zero or *de minimis* benzene emissions. If best estimates conclude that no benzene is emitted from a cooling tower, are the data requested by the templates still required?

If the estimated benzene emissions are zero (or *de minimis*), then simply list the identification of the cooling tower and show the estimated emissions as zero. The other columns may be left blank for that cooling tower.

When there are benzene emissions, we had asked that each cell of a cooling tower be listed separately. In the case of 0 benzene emissions from the entire cooling tower, however, make just one listing for the entire cooling tower (and do not list cells separately). {see question 4 under Scope of the Survey}

- 5) Representative exit velocity. Should an average exit velocity be reported, or the maximum discharge velocity?

If the cooling tower fans are operated at varying speeds, an average exit velocity may be calculated and submitted. In such cases, the average exit velocity is more appropriate for calculating representative cooling tower emissions than is the maximum velocity. The intent is to report representative emissions.

- 6)

Fugitive Equipment Leaks:

- 1) Height of a group of equipment leaks. What height should be used to representative a group of equipment leaks?

The height to be recorded for a given group of equipment leaks is a height that is representative of that group (*i.e.*, roughly average). The HON reportedly has a default height of 2 meters.

- 2) Grouping of equipment leaks. Which groups of equipment leaks should be lumped together?

The templates request that grouping of equipment leaks be limited to grouping by process unit area. Equipment components within a process unit area may be further divided into subgroups, at the discretion of the facility, when doing so would better characterize a particular cluster of components.

- 3)

Storage Tanks:

- 1) Listing individually. How should storage tanks be listed individually on the templates?

The template seems to be set up for reporting storage tanks in a group, in that it has fields for Length and Width of the area. It would be preferable to list tanks individually, rather than group them, in which case the Diameter of each tank should be given in one of these columns (and the other column left blank).

- 2) de minimis concentration. What about tanks with benzene content ≤ 0.1 wt.%?

The template indicates that data are required only for tanks with a benzene content > 0.1 wt.%. Tanks with a lower benzene content do not have to be listed. If tanks with a lower benzene content are listed, then " ≤ 0.1 wt.%" may be entered in the Benzene Emissions column, and the other columns may be left blank for that tank. {see question 4 under Scope of the Survey}

- 3) Routed to a control device. What about storage tanks that are routed to a control device?

Report the location of the control device, rather than the location of the tank(s) from which the vapors were generated, and report the quantity of vapors emitted from the control device, rather than the quantity generated by the tank(s). {see question 5 under Scope of the Survey}

- 4) Tank turnover emissions. What about emissions resulting from tank turnovers?

Floating roof landing losses should be estimated in addition to the emissions estimated by the TANKS program. There is not a routine in TANKS for estimating floating roof landing losses. For guidance, refer to the following API publication:

Evaporative Loss from Storage Tank Floating Roof Landings
Technical Report 2567
April 2005

Turnovers of fixed-roof tanks, and turnovers of floating-roof tanks that do not result in landing the floating roof, are accounted for in the TANKS program (as a function of tank capacity and throughput) and should not be modeled as additional turnovers.

- 5)

Wastewater Treatment Systems:

- 1) Additional Changes to Reduce Emissions. What is meant by the question requesting descriptions of “additional changes . . . to reduce benzene emissions”?

This question should be read as referring only to control measures beyond any required for compliance with the BWON (40 CFR Part 61 Subpart FF).

- 2) Routed to a control device. What about wastewater treatment units that are routed to a control device?

Report the location of the control device, rather than the location of the wastewater treatment unit(s) from which the vapors were generated, and report the quantity of vapors emitted from the control device, rather than the quantity generated by the wastewater treatment unit(s). {see question 5 under Scope of the Survey}

- 3)

Miscellaneous Process Vents:

- 1) de minimis concentration. How should those vents that are below the 20 ppmv organic HAP cutoff be handled in the survey?

Do not list vents that are excluded from the RMACT 1 definition of a miscellaneous process vent (*i.e.*, less than 20 ppm by volume of listed organic HAP – see the RMACT 1 definition for additional exemptions). {see question 4 under Scope of the Survey}

- 2)

Marine Vessel Loading

- 1) Routed to a control device. What about loading berths that are routed to a control device?

Report the location of the control device, rather than the location of the loading berth(s) from which the vapors were generated, and report the quantity of vapors emitted from the control device, rather than the quantity generated by the loading berth(s). {see question 5 under Scope of the Survey}

- 2)

Gasoline Loading Racks

- 1) Routed to a control device. What about loading racks that are routed to a control device?

Report the location of the control device, rather than the location of the loading rack(s) from which the vapors were generated, and report the quantity of vapors emitted from the control device, rather than the quantity generated by the loading rack(s). {see question 5 under Scope of the Survey}

- 2)

Other (non-RMACT1 sources of benzene)

- 1) Routed to a control device. What about emission sources that are routed to a control device?

Report the location of the control device, rather than the location of the emission source(s) from which the vapors were generated, and report the quantity of vapors emitted from the control device, rather than the quantity generated by the emission sources(s). { *see question 5 under Scope of the Survey* }

- 2) Boilers and process heaters. What about benzene emissions from boilers, heaters, and compressors?

Any significant benzene emissions from boilers, process heaters, and compressors should be reported as “Other” emissions.

- 3) Spills. What type of source should be applied to emissions from spills?

Spills are preferably modeled as an area source. Evaporation of the spill occurs across the surface of the puddle or wetted ground, and thus would not have a vertical depth component. Even for those sources which do occur over a vertical depth, such as equipment leaks from components at various elevations, the survey allows modeling as an area source at a representative (average) elevation. On the other hand, EPA can accept volume source inputs, if data are submitted in that format.

- 4)