

6.2 Evaluation of Media for Inclusion into a Risk Assessment

From the combustion unit, chemicals may be transported through storm-water runoff, volatilization, wind-suspended particulates, and infiltration and percolation. Direct releases to the soil also are considered. The media potentially affected by those release mechanisms are surface water, sediments, air, groundwater, and soil. Both human and ecological receptors may be exposed to each medium through a variety of exposure pathways. For example, air emissions may present a direct exposure (by inhalation), as well as several indirect exposures (through deposition to soil, subsequent contact with the soil, or ingestion of plants affected by the deposition). The importance of identifying potentially affected media, therefore, is that their identification determines in part the

completed exposure pathways and the potential risks associated with the combustion unit.

As described in previous sections, measured or modeled concentrations of chemicals can be used to evaluate potentially affected media. For some units, data may be available from such past activities as soil samples or air monitoring. Coupled with the historical records of the combustion unit, that data may provide for establishing accurate release parameters and, therefore, risks associated with the planned combustion activity. However, even if site data are available, modeling may be necessary to estimate runoff to surface water bodies or leaching to groundwater.

The evaluation of on-site areas in close proximity to the combustion unit begins with examination of analytical data obtained from air and soil samples, if available. Results of air modeling also can be used to assess direct exposures. As described in Chapter 5, air modeling also predicts deposition rates, and therefore soil concentrations, at areas downwind of the combustion site. Although field measurements generally are preferable to modeled concentrations, the cost of sampling usually limits the amount and extent of sampling that the permit applicant performs. Should the permit writer find that the amount of sampling data is insufficient to support the model operation or provides information counter to model outputs, they must prepare an NOD indicating the deficiencies and requiring additional sampling.

Surface water and groundwater also may be affected by combustion operations through deposition of airborne particulates or leaching and runoff of contamination. These transport pathways are affected by the amount of rainfall in a region, the distance to the surface water body, the depth to groundwater, the type of soil, and local geological and hydrogeological conditions. Another consideration related to the transport of chemicals that may be included in a detailed risk assessment is chemical degradation. Sunlight, the organic content of the soil, and natural microbial biodegradation all can attenuate concentrations of chemicals between

the point of release and the point of contact with the receptor.

Although air and on-site soil are affected by combustion operations, the occurrence of effects on off-site soil, surface water, and groundwater vary from site to site. For example, if no surface water bodies are located within the extent of the air plume, groundwater is extremely deep, and the area receives little precipitation, effects on surface water or groundwater are unlikely. The following list presents general concerns that should be addressed when identifying media of concern.

- Does the application demonstrate that the combustion unit is sufficiently distant from surface water bodies to have no effect from air emissions on surface water (that is, surface water bodies are outside the maximum extent of the air plume)?
- Do the results of air modeling submitted with the application indicate significant off-site deposition?
- Does the annual amount of rainfall indicate the potential for runoff to a surface water body or to off-site soils?
- Does the description of site geology, hydrogeology, and rainfall indicate a potential for leaching of chemicals from soil to groundwater?
- If the application indicates that groundwater is likely to be affected by leaching of chemicals, does the description of the hydrogeology indicate probable migration of groundwater to surface water bodies?

A permit writer must ascertain whether all potentially affected media will be included in the risk evaluation. Justification of exclusion of any medium from the risk evaluation should be well documented, with convincing reasons presented to indicate that the medium will not be affected or that receptors will not come into contact with the medium.