Haul Road Workgroup Report Out

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Haul Road Concerns

- Modeled Impacts Substantial
- Sources Difficult to Characterize
- Lack of State-to-State Consistency

Actvities

- Workgroup identified issue and scope.
- Gathered information on existing state approaches for modeling haul roads.
- Conducted AERMOD sensitivity modeling to better understand critical variables.
- Examined available journal articles and field study information.

Variety of Modeling Approaches

- Volume Source Ex.
  - Volume Height
    - ≈ vehicle ht x 2
    - ≈ vehicle ht x 1.7
    - ≈ 1 m
  - Sigma z based on volume height
  - Width
    - Truck width + 6 m
    - Road width x 2
    - Set width (1 lane each way = 10m)
- Area Source Ex.
  - Release height
    - ≈ 0 m
    - ≈ 0.5 x vertical extent
  - Width
    - ≈ width of driving lane

Sensitivity Analysis
Matrix of Values for Analysis

	Range of Values					
Top of Plume Ht	0m	1m	3m	5m	7m	10m
Sigma Z	Top of Plume Height / 2.15					
Sigma Y	3m / 2.15	10m / 2.15	16m / 2.15			
Release Height	Top of Plume Height / 2					

General Conclusions for Sensitivity Analysis Runs

- Increasing RH (release height) led to lower concentrations.
- Increasing Sigma Y for alt. and adj. volume sources lowered concentrations.
- For area source – increasing X dimension lowered concentrations at 0 and 0.5 RH, at 1.5 and 3m RH, had little impact on concentrations.
- For area source – adding a sigma z lowered concentrations for 0 RHs, but usually increased concentrations at 1.5 and 3.5 RHs, mixed results for 0.5m RH.

Cont.

- For volume source runs, adjacent gave higher concentrations than alternate.
- Point Source – limited modeling showed sensitivity to stack height; little sensitivity to stack diameter.
- On-site met data runs showed same trends as NWS, although concentrations higher with on-site.

Volume Source

- A volume source characterization is recommended for all haul roads, except for cases where ambient air receptors are within the volume's exclusion zone.
- Rationale -
  - Volume source contains meander algorithm.
  - Limited study using Cordero Rojo Mine measured data supports volume source use over area source.

Volume Source - Configuration

- Top of Plume Height - 1.7* x vehicle height
- Release Height - 0.5 x top of plume height
- Plume width - vehicle width + 6m^ for single lane : road width + 6m for two-lanes
- Initial Sigma Z - Top of plume / 2.15
- Initial Sigma Y - Width of plume / 2.15
- Adjacent volumes

- * Gillies, et.al. Atmospheric Env. Paper 2005
- ^ EPA 1992 Guideline for siting monitors.

Area Source

- Recommended for cases where ambient receptors are located within source dimensions.
- Length – length of roadway
- Width – VW + 6m for single lane : Road width + 6m for two-lane.
- Top of plume height – 1.7 x vehicle height
- Release height – 0.5 x top of plume height
- Sigma Z - top of plume / 2.15

Future Efforts

- Encourage more field studies examining initial plume dimensions, including the impact of vehicle speed.
- Point source modeling has some potential benefits, such as the ability to consider the influence of facility structures near roadways, and the workgroup supports further study of this approach.
- New line source work may eventually replace need to model fugitive roadway dust as either volume or area source.

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