EXECUTIVE SUMMARY

A total of 644 worst dust days, defined as 20% worst visibility days when the sum of extinction from coarse mass (CM) and (FS) was larger than any other component, were observed during the period 2001-2003. We provide a summary of the findings of the overall findings of the study. For detailed results Table 9 shows on a site by site basis the confidence levels with which each event type was identified as a primary source of the worst dust day. Table 10 enumerates every worst dust day for the sites considered in this study over the 2001 – 2003 period and provides an indication of the event type that was identified as the primary source of dust. Maps are also available for every worst dust day and should be consulted for additional detail.

Using the tools described in this report, it was found that:

(i) approximately 50% (318 cases) of worst dust days were attributable, with a moderate (***) to high (*****) degree of confidence, the following events/classes:

- Transcontinental transport from Asia: 48 cases (7.5%);
- Windblown dust (generated locally in the vicinity – nominally within 10 km - of the site): 125 cases (19.4%);
- Upwind transport (does not involve significant windblown dust from sources local to the site): 145 cases (22.5%);

(ii) Approximately 30% (190 cases) of the remaining days were attributed to the following events/classes with a low (*) to moderate (***) degree of confidence:

- Transcontinental transport from Asia: 7 cases (1.1%);
- Windblown dust: 76 cases (11.8%);
- Upwind transport: 107 cases (16.6%);

(iii) The remaining 21% of worst dust days (136 case) were not attributable to any events/classes using the tools employed in this study.

A number of temporal trends were also observed, both in terms of frequency of event occurrence and in terms of worst dust days resulting from undetermined sources. The impact of transcontinental transport from Asia was only observed during spring (100% of 48 cases). Windblown dust as a dust causing event was most important in spring (56.8% of 125 cases), while transport from upwind sources did not vary significantly by season except for a notable decrease in the winter months (spring: 35% of 145 cases, summer: 28%, fall: 31%, winter: 6%).

For states with more than 12 worst dust days during the 2001-2003 period, a large percentage of worst dust days was explained by one of the three event types with a moderate (***) to high (*****) degree of confidence for the sites in New Mexico (70% of 106 cases), Colorado (57% of 60 cases), Utah (56% of 41 cases), Nevada (56% of 16 cases), Wyoming (79% of 14 cases), Oregon (54% of 13 cases), and Idaho (69% of 13 cases). A comparatively smaller percentage was explained with the same degree of confidence for sites in Arizona (38% of 238 cases), California (38% of 73 cases), Texas (37% of 30 cases) and Montana (47% of 19 cases). For states with less than 12 worst dust days during the 2001-2003 period, events were associated with specific days with a moderate (***) to high (*****) degree of confidence for sites in South Dakota (78% of 9 cases), Alaska (40% od 5 cases), Washington (34% of 6 cases), and North Dakota (50% of 2 cases).

For the sites considered in this study, worst dust days exhibited a seasonal pattern, with the most frequent occurrences in summer (246 out of 644) and spring (241). The fall (115) and winter (43) were associated with significantly fewer worst dust days. Of the 644 total worst dust days, a total of 136 were a result of events/sources that could not be determined using the tools employed in this study. The greatest number of undetermined events occurred in the summer, corresponding to 79 cases (32% of summer worst dust days), followed by spring (23 cases, 10% of all spring worst dust days) and fall (22 cases, 19% of all fall worst dust days), and winter (12 cases, 28% of all winter worst dust days).