NATURAL EVENTS ACTION PLAN (NEAP)
FOR PM10 EXCEEDANCES DUE TO HIGH WIND EVENTS
IN DOÑA ANA COUNTY

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EXECUTIVE SUMMARY

PURPOSE OF THIS REPORT

On some days in recent years, levels of airborne particulate matter during dust storms have reached unhealthful levels in Doña Ana County. This report describes an opportunity for local groups and citizens to play a major role in designing and carrying out responses to this problem that are appropriate for local environmental and economic conditions. Citizens, local governments, civic groups and businesses are invited to participate in a Task Force that will develop reasonable, common-sense measures to protect public health and mitigate the problem where feasible. Federal policy provides for the approach described here as an alternative to federally-imposed requirements that may be unnecessarily restrictive and inappropriate for air quality problems resulting from natural forces and non-industrial sources.

REPORT SUMMARY

Particulate matter less than 10 microns in diameter (PM10) is one of the air pollutants for which the Environmental Protection Agency (EPA) has set National Ambient Air Quality Standards. These standards limit the allowable concentration of the pollutant in the ambient air, which is the outside air near ground level that people breathe. The standards are set at a level to prevent adverse health effects, which for PM10 may include aggravation of asthma and other respiratory diseases.

For PM10, there are standards for both short-term (24-hr) and long-term (annual) average concentration. At a number of locations throughout New Mexico, the Air Quality Bureau of the New Mexico Environment Department (NMED) routinely monitors the ambient concentration of PM10 and other pollutants for which ambient standards have been set.

In most cases, violation of a federal air quality standard results in the area being classified as nonattainment. The state must then submit a plan for reducing pollution levels. Such plans must include stringent controls on industrial and other sources of the pollutant. During 1994-1996, numerous exceedances of the 24-hr average concentration limit for PM10 were measured at NMED monitoring sites in Doña Ana County. Although air quality in relation to PM10 was Good to Moderate on most days, the number of days when the standard was exceeded was greater than the federal air quality standard allows.

The NMED Air Quality Bureau has analyzed conditions that caused the recent exceedances and found that a small fraction of the exceedances were caused by exceptional events such as an industrial accident and active construction work adjacent to the monitors. EPA Policy allows for such exceptional events to be excluded from determinations of attainment status. The remaining majority of the exceedances resulted from high winds lifting dust into the air from areas of exposed soil (that is, from dust storms).

Federal law and policies recognize that declaring an area nonattainment and requiring stringent pollution controls on industrial sources is not an appropriate response when an ambient standard is violated because of natural events such as blowing dust from high winds. EPA's Natural Events Policy describes common-sense alternative steps that States may take to avoid

nonattainment status in such cases. The policy calls for States to develop a Natural Events Action Plan (NEAP) to protect public health by:

1) educating the public about the problem and what is being done to respond to it;
2) issuing advisories when PM10 levels are unhealthful;
3) taking reasonable measures to control sources of windblown dust that are the result of human activities and that contribute significantly to the problem.

In considering what dust control measures are reasonable, both cost and effectiveness should be taken into consideration. Local stakeholders and the state have considerable freedom in deciding what measures are reasonable under the local environmental and economic conditions.

Stakeholder involvement in developing and carrying out the NEAP will ensure that it meets local needs. The New Mexico Environment Department invites Doña Ana County citizens, local governments, businesses and other parties that may be affected to participate in a Task Force to address the problem. The Environment Department envisions that its role, after coordinating the initial formation of the Task Force, may be limited to providing advice and technical assistance and serving as liaison to the Environmental Protection Agency.

As an initial step in creating this Task Force, the NMED Air Quality Bureau is compiling a mailing list for those who would like to receive additional information, and a list of parties who are interested in participating on the Task Force. Any person or group wishing to be on these lists should contact Brad Musick (505-827-0335) of the Air Quality Bureau.

BACKGROUND

FEDERAL AIR QUALITY STANDARDS FOR PM10

PM10 refers to suspended particles less than or equal to 10 microns in diameter. PM10 is a mixture of materials that can include dust, smoke, and soot. PM10 particles are small enough to be inhaled deep into the lungs. High levels of PM10 can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. People most vulnerable to these effects include infants and children, the elderly, adults who are exercising (because they breathe in more air), and those suffering from asthma or bronchitis.

The Federal Clean Air Act provides for the establishment of National Ambient Air Quality Standards (NAAQS) to protect the public from harmful levels of the most common pollutants in the ambient air. Ambient air is the outside air near ground level that people breathe. State and local agencies regularly monitor the concentration of these pollutants for which national ambient standards have been set.

In 1987, the federal Environmental Protection Agency (EPA) set standards for both short-term (24-hr) and long-term (annual) average concentration of PM10. Concentration of PM10 is measured in units of micrograms of particulate matter per cubic meter of air ($\mu g/m^3$). The standards set in 1987 are:

24-hour standard:

To attain this standard, the daily 24-hr concentration must not exceed **150 $\mu g/m^3$** more than once per year, averaged over three years. If measurements are not taken daily, the observed number of exceedances is adjusted upwards to account for the possibility that exceedances may have occurred on days when no measurement was made.

Annual standard:

To attain this standard, the arithmetic average of the 24-hr samples for a period of 1 year, averaged over 3 consecutive years, must not exceed **50 $\mu g/m^3$**.

The distinction between an exceedance and a violation of a standard is important. Violation of a standard ordinarily results in the area being declared "nonattainment" and being required to take steps to reduce pollutant levels.

An exceedance is when the measured concentration of the pollutant is greater than the concentration limit specified in the standard. A measurement of over 150 $\mu g/m^3$ in a 24-hr period is an exceedance of the 24-hr standard, and a measurement of over 50 $\mu g/m^3$ in any one year is an exceedance of the annual standard.

A violation of the 24-hr standard is when the average number of exceedances per year, averaged over three years, is greater than one. An example would be if there were four exceedances in one year, even if there were no exceedances in the preceding or following two years. Similarly, the annual standard level would be violated only if the average of three

consecutive annual averages was greater than concentration limit of 50 µg/m^3. This could result from one year with an average very much exceeding the limit, followed by two years that did not exceed the limit but were high enough that the three-year average was over the limit.

RECENT REVIEW OF THE STANDARDS FOR PARTICULATE MATTER

EPA recently reviewed the scientific data on health and environmental effects of particulate matter to determine if the existing standards were sufficient to protect public health. In July 1997, following the recommendations of this review, EPA retained the standards for PM10 and issued new ambient standards for fine particulate matter less than 2.5 microns in diameter (PM2.5).

The new PM2.5 standards have been the subject of much press coverage and controversy. Issues regarding the recent exceedances of the PM10 standard in Doña Ana County (described below) are not related to the new PM2.5 standards. The particulate matter standards which have been exceeded in Doña Ana County are the PM10 standards which have been in existence since 1987.

EPA's review concluded that there are differences in origin, composition, and health effects between the fine fraction (less than 2.5 microns in diameter, PM2.5) and the coarse fraction (2.5 to 10 microns) of PM10. Particles in the fine fraction (PM2.5) are produced primarily by fuel combustion, consist of both solid and liquid droplets of sulfates, nitrates, and organic compounds, and are hazardous to health in lower concentrations than the coarse fraction of PM10. The coarse fraction commonly originates from dust, often consists mostly of mineral particles found in earth, rock and soil, and causes adverse health effects only at higher concentrations than the fine fraction. In discussing the rationale for retaining a PM10 standard, EPA stated that:

> "Although the role of coarse fraction particles in much of the recent epidemiological results is unclear, limited evidence from studies where coarse fraction particles are the dominant fraction of PM10 suggest that significant short-term effects related to coarse fraction particles include aggravation of asthma and increased upper respiratory illness. In addition, qualitative evidence suggests that potential chronic effects may be associated with long-term exposure to high concentrations of coarse fraction particles."

EPA retained both the short-term and long-term PM10 standards, with a slight change in the manner of calculating the 24-hr standard. To attain the revised standard, the 99th percentile of the distribution of the 24-hr concentrations for a period of 1 year, averaged over 3 years, must not exceed 150 µg/m^3.

VIOLATIONS OF THE PM10 STANDARD IN DOÑA ANA COUNTY

In 1994 through mid-1997, the National Ambient Air Quality Standard (NAAQS) for 24-hr average PM10 concentration was violated at most air quality monitoring sites in Doña Ana County (see Attachment 2 for site locations). Details of the PM10 monitoring results are given in Attachment 1 and Attachment 2. Following is a summary of the results.

In 1994, the 24-hr standard concentration of 150 $\mu g/m^3$ was exceeded on 3 days at one site, Sunland Park City Yard. In 1995, exceedances were again recorded at Sunland Park City Yard (2 days) and at Anthony Elementary School (6 days). In 1996, exceedances were recorded at 7 of 8 sites in the county. At the sites in the southern part of the county, the number of exceedances ranged from 10 to 18, and two sites recorded values approximately 10 times higher than the standard. Two sites on the eastern edge of Las Cruces rccorded 6 and 8 exceedances and had maximum values of 1,065 and 806 $\mu g/m^3$.

The only site not recording any exceedances in 1996 was the NMED office near downtown Las Cruces. The monitor at this site is operated only on every 6th day. By chance, this monitor was not operating on any of the 11 days when exceedances were recorded by at least one of the two continuously-operated monitors in the Las Cruces area. In view of the number and severity of exceedances at the other Las Cruces area sites, it is likely that exceedances occurred at the Las Cruces NMED offices on one or more of the days when the monitor was not operated.

There were so many exceedances in 1996 that all sites are in violation of the 24-hr standard for PM10, regardless of how many exceedances might be recorded in 1997 and 1998.

CAUSES OF THE RECENT EXCEEDANCES

NMED Air Quality Bureau staff have analyzed weather conditions and other circumstances associated with recent exceedances and issued a report, included here as Attachment 1. Following is summary of that report.

Considering all sites from January 1995 through March 1997, a total of 106 exceedances were measured. Exceedances occurred on 47 different days. A few of the exceedances were found to have been caused by an industrial accident (2 exceedances) and by construction activities adjacent to the monitor (13 exceedances). The industrial accident was a start-up problem with an acid plant at the ASARCO smelter in Texas. A plume of smoke from the smelter caused exceedances at the Sunland Park City Yard site. Some of the exceedances due to construction activities occurred at Chaparral when the school yard next to the monitor was under construction. Other construction-related exceedances were at the Santa Teresa Border Crossing site. The NMED Air Quality Bureau has requested that EPA exclude these exceedances from determination of attainment status, in accordance with EPA policy on exceedances caused by unusual, non-recurring events.

The remaining exceedances (91 out of 106) were found to have been caused by windblown dust raised by high winds. Evidence for this conclusion included weather records of high winds, time-lapse video photography, and news reports of major dust storms on the exceedance days. During dust storms, high winds cause dust to become airborne from areas with exposed dry soil, including the surrounding desert, dirt roads, and areas disturbed by construction or other earth-moving activities. The reason that dust storms were especially frequent and severe in 1996 was likely the extreme drought in this area from Fall 1995 through Spring 1996. The NMED Air Quality Bureau requested that these exceedances caused by high winds also be excluded by EPA from determination of attainment status, in accordance with EPA's Natural Events Policy described below.

EPA POLICY ON NATURAL EVENTS

EPA NATURAL EVENTS POLICY— BACKGROUND

EPA policy regarding violations of the PM10 NAAQS due to natural events was set forth in a memorandum dated May 30, 1996. Following is a summary of the policy as it applies to high wind events.

By law, the usual consequence when pollutant levels in an area violate one of the NAAQS is that the area is declared nonattainment for that pollutant. The state must then develop and implement a plan for measures that will be taken to reduce emissions of the pollutant and bring the ambient levels of the pollutant back within the standards. Such plans must include stringent pollution control measures for new and existing industries and other sources of the pollutant.

Federal law and policies recognize that declaring an area nonattainment and requiring stringent controls on industrial sources is not an appropriate response where natural events contribute significantly to exceedances of the standard. EPA's policy memorandum of May 30, 1996 sets forth requirements for a more appropriate approach to such natural events. The focus of this alternative approach is protection of public health.

EPA NATURAL EVENTS POLICY— GUIDING PRINCIPLES

The guiding principles of the Natural Events Policy are:

1. Protection of public health is the highest priority of Federal, State, and local air pollution control agencies.

2. The public must be informed whenever the air quality in an area is unhealthful (that is, whenever the 24-hr ambient air quality standard for PM10 is exceeded)

3. All valid ambient air quality data should be submitted to the EPA's national database and made available for public access.

4. State and local agencies must take appropriate reasonable measures to safeguard public health regardless of the source of PM10 emissions.

5. Emission controls should be applied to sources that contribute to exceedances of the PM10 NAAQS when those controls will result in fewer violations of the standards.

DEFINITION OF PM10 NATURAL EVENTS

Three kinds of PM10 Natural Events are defined in the EPA policy memorandum: volcanic and seismic events, wildland fires, and high winds. Only high wind events will be discussed here, as these are kind of events relevant to the recent exceedances in Doña Ana County. The policy defines high wind events as follows.

> "Ambient PM-10 concentrations due to dust raised by unusually high winds will be treated as due to uncontrollable natural events under the following conditions: (1) the dust originated from nonanthropogenic sources, or (2) the dust originated from anthropogenic sources controlled with best available control measures (BACM)."

The term "anthropogenic" means strongly influenced by the activities of humans. Examples of anthropogenic sources would include vehicular traffic on or off roads, and construction activities. Best Available Control Measures (BACM) for PM10 are techniques that achieve the maximum degree of emissions reduction from a source as determined on a case-by-case basis considering technological and economic feasibility.

Although dust storms are referred to as "natural events", it should be recognized that dust storms require not only high winds, but also areas of soil that can serve as sources of dust. Areas where the soil is loose, dry, and barren of rock, vegetation or other cover are highly susceptible to blowing. Some such susceptible areas exist naturally in the desert climate of southern New Mexico, but others may be created or made to emit more dust by human activities.

DOCUMENTATION OF NATURAL EVENTS

In New Mexico, the state Environment Department is responsible for identifying exceedances of the NAAQS caused by high winds. The Environment Department must first mark the exceedances due to high winds with a special notation (called a "flag") in EPA's national database of ambient monitoring data. The NMED must then prepare a document clearly showing, by analysis of weather data and other information, that the exceedances would not have occurred if not for the high wind events. The state's documentation of these high wind events and their impact on air quality must be made available to the public. The public may review and comment on whether the documentation convincingly shows a causal relationship between the high wind events and the exceedances.

Attachment 1 is the documentation prepared and submitted for high wind events that occurred during January 1995 through March 1997.

NATURAL EVENTS ACTION PLAN (NEAP)

If including ambient concentrations of PM10 during natural events in attainment determinations would result in a violation of a NAAQS, the state has two choices: 1) allow the area to be declared nonattainment, or 2) develop and submit to EPA a plan describing what will be done to address future events. A Natural Events Action Plan (NEAP) should include commitments to:

1. Establish public education programs.

Such programs may be designed to educate the public about the short-term and long-term harmful effects that high concentrations of PM10 could have on their health and inform them that: (a) certain types of natural events affect the air quality of the area periodically, (b) an advisory system (see #2 below) will warn them when a natural event is imminent, and (c) specific actions are being taken to minimize the health impacts of events.

2. Minimize public exposure to high concentrations of PM10 due to future natural events.

Programs to minimize public exposure should: (a) identify the people most at risk, (b) notify the at-risk population that a natural event is imminent or currently taking place, (c) suggest actions to be taken by the public to minimize their exposure to high concentrations of PM10, and (d) suggest precautions to take if exposure cannot be avoided.

3. Abate or minimize appropriate contributing controllable sources of PM10.

There are several steps in determining which sources might need controls and in identifying the appropriate control measures for those sources:

a) identify sources of fugitive dust that are the result of human activities;

b) for each type of source, determine whether it contributes significantly to the number or severity of PM10 exceedances during high wind episodes;

c) for sources which contribute significantly to exceedances, identify candidate control measures for which effectiveness and feasibility have been demonstrated (if no appropriate measure has previously been identified for a particular kind of source, step 4 below is required). Measures previously shown to be effective for reducing windblown dust include paving or application of chemical dust suppressants to unpaved roads, parking lots and open areas; dust suppression at construction sites; use of conservation farming practices on agricultural lands; tree rows and other physical wind breaks; restricting recreational off-road vehicle activities; and use of surface coverings.

d) evaluate the effectiveness, technological feasibility, and cost of candidate control measures on a case-by-case basis and produce a rationale for selection of control measures;

e) implement the selected control measures and monitor their effectiveness.

If exceedances occur after the NEAP has been implemented, the state's documentation of natural events must include evidence that Best Available Control Measures were being implemented when the exceedances occurred.

4. Develop and implement new control measures if necessary.

The NEAP may include commitments to conduct pilot tests of new emission reduction techniques to determine their feasibility and effectiveness. The plan must include a timely schedule for conducting such studies and implementing measures that are technologically and economically feasible.

5. Periodically reevaluate: (a) the conditions causing violations of a PM10 NAAQS in the area, (b) the status of implementation of the NEAP, and (c) the adequacy of the actions being

implemented. The State should reevaluate the NEAP for an area at least every 5 years and make appropriate changes to the plan.

Those who own, manage or use land may be concerned about requirements for dust control measures. It should be emphasized that the policy calls for such measures only if several conditions are met. Controls should not be required if the source type does not contribute significantly to the number or severity of exceedances, or if the source is not significantly impacted by human activities, or if the measures would be unreasonably costly or only minimally effective. Control measures should be limited to those that specifically address the problem of dust levels during high wind episodes — that is, some restrictions or requirements might apply only during periods of high wind or during the season when high winds are most common. Requirements for control measures should not be decided upon until all affected parties have had ample opportunity to express their concerns and all those involved have tried to reach a reasonable solution. The NMED anticipates that requirements for control measures, if any are found to be needed, will most likely take the form of local ordinances rather than state regulations.

STAKEHOLDER INVOLVEMENT IN DEVELOPING THE PLAN

The EPA Policy Memo states that the NEAP should be developed by the State air pollution control agency in conjunction with stakeholders affected by the plan. The plan should include documented agreements among the stakeholders as to planned actions, the implementation schedule, and the parties responsible for carrying out those actions.

FAILURE TO SUBMIT OR IMPLEMENT A PLAN

If an adequate Natural Events Action Plan is not submitted or implemented, EPA will notify the Governor of the State that the area in question should be redesignated as nonattainment. This action would be authorized under the Clean Air Act based on the conclusion that the health of citizens affected by such events was not being protected by the State. As described earlier, the State would then be required to adopt a federally-enforceable revision to its State Implementation Plan (SIP) to address the sources of PM10 emissions. The SIP revision would likely include the same mitigative measures that could have been included in a NEAP, in addition to new and burdensome federal requirements for local industries that would result in little or no improvement in air quality.

ANTHONY — THE CURRENT PM10 NONATTAINMENT AREA

A small portion of Doña Ana County has been a PM10 nonattainment area since 1990. The area is less than two square miles containing most of the community of Anthony (the New Mexico portions of Sections 35 & 36 of Township 26 South, Range 3 East). The area was designated nonattainment because of exceedances of the PM10 standard in 1988-1990, and the State submitted a revision to the State Implementation Plan to the EPA in 1991. In its analysis of the 1988-1990 exceedances, the NMED concluded that these resulted from windblown dust during episodes of high wind.

EPA policy would allow the Anthony nonattainment area to be included in the NEAP for Doña Ana County. In this way, the area could eventually be redesignated as attainment if the monitoring data showed no exceedances (excluding those flagged and documented as natural events) for 3 years.

FRAMEWORK FOR IMPLEMENTING THE PLAN

The New Mexico Environment Department will create a public involvement process to identify the issues regarding implementation of the plan and to carry out the details of the plan. The Department has begun this process by identifying potential stakeholders and interested parties.

The Department plans to hold a public informational meeting before the end of March 1998. The meeting will be announced by press release and through mailings to potential stakeholders. The announcement will state that copies of the present document and other related information (e.g., EPA Fact Sheets) are available upon request. Stakeholders will be invited to join a Task Force which will undertake to carry out the components of the Natural Events Action Plan as previously described. Any person or group that wishes to receive informational mailings or is considering participation on the Task Force is encouraged to contact Brad Musick (505-827-0335) of the New Mexico Air Quality Bureau.

Although the Task Force may continue to meet after 1998, it is the Department's hope that the following could be accomplished by the end of 1998:

a) public education material prepared and distributed;

b) public advisory system established to warn when episodes of high PM10 are imminent;

c) completed analyses to determine which sources contribute significantly to exceedances.

HOW TO GET ADDITIONAL INFORMATION

Printed copies of the following documents are available from the New Mexico Air Quality Bureau at:

Air Quality Bureau
New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502-6110

Phone: (800) 810-7227
Facsimile: 505-827-0045

Check the NMED Web site at www.nmenv.state.nm.us for an updated list of documents and downloadable versions of some documents.

1. "Natural Events Action Plan (NEAP) for PM10 Exceedances Due to High Wind Events in Doña Ana County" *(this document)*

2. "Analysis of PM10 Exceedances, January 1995-March 1997, Doña Ana County, New Mexico" *(Attachment 1 to this document)*

3. "Summary of PM10 Monitoring Data: Doña Ana County, New Mexico" *(Attachment 2 to this document)*

4. EPA Memorandum on Natural Events Policy *(also on the Internet at http://www.epa.gov/ttn/caaa/t1/memoranda/nepol.pdf)*

5. EPA Fact Sheet: EPA's Natural Events Policy for Particulate Matter *(also on the Internet at http://www.epa.gov/ttn/caaa/t1/fact_sheets/nefact.pdf)*

6. EPA Fact Sheet: Health and Environmental Effects of Particulate Matter

7. EPA Fact Sheet: EPA's Revised Particulate Matter Standards

ACRONYMS & ABBREVIATIONS

BACM	Best Available Control Measures
NMED	New Mexico Environment Department
EPA	U.S. Environmental Protection Agency
NAAQS	National Ambient Air Quality Standards
NEAP	Natural Events Action Plan
PM2.5	Particulate Matter less than 2.5 microns in diameter
PM10	Particulate Matter less than 10 microns in diameter
$\mu g/m^3$	micrograms per cubic meter