AIR QUALITY DATA
REQUIRES PUBLIC SCRUTINY

Clifford E Carnicom
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SUMMARY OF FINDINGS

A recent analysis indicates that the need for independent testing and verification of current atmospheric particulate counts now exists. Direct access to air quality data from independent sources requires scrutiny by the public in comparison to established US Environmental Protection Agency threshold values. Visibility of the atmosphere is directly related to particulate concentrations. The repeated lay observations of perpetually decreased visibility and omnipresent haze support the need for direct access to independent air monitoring data, despite the claims by federal sources of environmental improvement trends that have been made to the contrary. The demonstrated unwillingness of the U.S. EPA to adequately address the concerns of countless citizens regarding atmospheric degradation by aircraft aerosol operations adds to this need.

In addition, the reduction of visibility reporting standards from a maximum of 40 miles to a maximum of 10 miles by the National Weather Service requires further explanation. The wholesale passiveness by the so-called environmental organizations of this country, including the Sierra Club, Greenpeace International and others to the aerosol operations stands as an equal disservice to the public welfare. The apparent limitations of access to post 1998 public data base files that involve direct atmospheric monitoring (e.g., via nephelometers), such as the Climate Monitoring and Diagnostics Laboratory (NOAA) site, also require further investigation or explanation. In addition to this source, a basis for essentially real-time access to data by the public is now established. The direct visibility of excessive particulate matter by both the corona and high level candlepower light methods requires a formal accounting, as well as the recent concentrated rain samples that reveal extraordinary levels of metallic particulates.

Furthermore, the recent proclamation issued on April 20 2001 by a Walter M. Washabaugh, Colonel, USAF, Chief, Congressional Inquiry Division, Office of Legislative Liason that "The term "chemtrail" is a hoax that began circulating approximately three years ago…" and that "The 'chemtrail' hoax has been investigated and refuted by many established and accredited universities, scientific organizations and major media publications." is also entitled to an eventual reckoning with its author.

Readers may also wish to become familiar with the recently (belatedly?) released 1999 U.S. mortality statistics, which show an increase in chronic lower respiratory deaths. The category of "chronic lower respiratory disease" now ranks as one of the five leading causes of death within the United States.

All data under examination, including federal sources, now requires

corroboration and independent verification to assure its validity.

The United States EPA air quality standards now permit 50 micrograms of particulate matter of size 10 microns or less per cubic meter of air. As a point of reference for size, a human hair is approximately 60 -100 microns in thickness. This standard was apparently previously set at 75micrograms / m^3 and the current regulations can be viewed at the EPA web site. Mass quantities of particulate matter 2.5 microns or less are restricted to 15 micrograms / m^3.

An analytical case will be presented on this page to establish the need for direct access of particulate data counts by the public. Such data will need to become available in the raw format. Post processed data will need to be reviewed by independent sources. The approach taken in formulating this case is intended to be conservative, and it is only intended to point out the need for further investigation and independent analysis of raw data results. Any revisions to this presentation will be made as is appropriate.

The goal of this presentation is to arrive at an estimate of the amount of particulate mass in the atmosphere under current conditions, based upon certain relationships, analysis and data that are available at this time.

RELATIONSHIPS EXAMINEDIn the absence of direct and independently verified particulate count data, the theories of light scattering can be used to form at least an initial estimate of the atmospheric concentrations of particulate data. The results of this analysis can establish whether further investigation of particulate counts may or may not be justified. The study is not intended to lend finality to the question in any manner; only to examine the legitimate questions which have now surfaced regarding the degradation of atmospheric quality in direct correlation to the presence of aircraft aerosol operations. The results of this analysis indicate that such concerns are warranted.

This analysis uses the common and simplifying assumptions of particle single-scattering, non-absorbing spherical forms.

This analysis will use three relationships that have been established in the field of light scattering theory:

1. The exponential decay law : I(z) / Io= exp (-gz) where g is the extinction coefficient, z is the path length, and I(z) / Io is the light intensity ratio. (Waves and Grains, Mark Silverman 1998)

2. The extinction coefficient per unit length for a system of particles (N) of a single radius *a* per cubic centimeter (cm3) given as g = pi * a^2 * N * Q where Q is the efficiency factor for extinction, as derived from Mie scattering theory. (Light Scattering by Small Particles, H.C. van de Hulst, 1981)

3. Koschmeider's relationship, z =3.912 / extinction, which may be derived from the exponential decay law. The path length of visibility is z in this case.

In addition, a derived relationship from the previous relations will be used, along with an equation involving mass summation.

Relations 2 and 3 may be combined to form:

4. N = 3.912 / (z * pi * a^2 * Q)

and involving the mass of the particles:

5. Mt = N * mp where Mt is the total mass per unit volume (spherical particles assumed) and mp is the mass of an individual particle.

and since mass = density * volume

6. Mt = (4 * pi * a^3 * d * N) / 3 where d is the density per unit volume.

EXAMPLE CASESThe need at this point is to establish representative values for use in the relationships and equations that are outlined above. A conservative approach to these values will be taken.

The first goal is to solve for N, the estimated number of particles assumed to be of constant radius per unit volume. The following quantities are necessary to estimate:

z, *a* and Q.

Let us assume z, or the visibility in this case is 20 km (~12.4 miles). In light of the visibility report recently presented, this value is not unreasonable under many conditions that are now frequently encountered. Within this page, it is now observed that visibility is frequently reported as being less than 10 miles, and that 10 miles is now the registered maximum visibility of interest within climatic database sources. The change of standards from 40 miles to 10 miles in October of 1997 deserves additional consideration and review by all citizens.

Another method can also be used to establish a reasonable starting point for z, or the visibility. If the reader will notice the extinction coefficient data obtained by recent nephelometer readings at the University of Maryland, it will be noticed that the extinction coefficient for the current year appears to be generally increasing. The general relationship that exists (#3, Koschmeider described above) is that the higher the extinction coefficient, the lower the visibility. This increase corresponds to the general deterioration of atmospheric visibility that is described by current researchers and countless citizens on the aerosol issue. It is noticed that the readings have recently been peaking commonly at 0.35 to .37 / km. It is

of interest that this value corresponds quite well with the values stated to accompany specified meteorological conditions at this site that concerns nephelometers. Hazy skies are stated to begin occurring at this level. Let us therefore choose a more conservative value of 0.2 km. From Koschmeider, or from direct derivations of the exponential decay law, the expected visibility in this case would would be 3.912 / 0.2 km = 19.6 km. This agrees therefore, with both measured data and real world observations at a fairly conservative level. Note that an increased value used for the extinction coefficient (also justifiable in certain cases being witnessed) would only lead to an increase in the mass concentrations estimated from this study.

Note also from *The Nature of Light and Colour in the Open Air*, M. Minnaert, 1954, that visibility is expected to be better in the summer months than in the winter months. This expectation is at odds with the nephelometer data thus far available, as the increasing extinction coefficient that is shown depicts an environment of decreasing visibility in the summer months.

The value of *a*, the constant particle radius assumed in this case is an important quantity, and will lead to highly variable results. It is therefore important to arrive at a reasonable and conservative value for this radius. The method of selecting this radius can be chosen to be dependent upon the color of the haze that is now commonly pervasive. Fortunately, the color of the haze can be used as a significant indicator of the particle size within the atmosphere.

Let us consider first a certain statement made by Vincent Schaefer (Atmosphere, 1981) where blue haze characteristics are described: Note that this statement refers to the diameter of the particle as opposed to the radius.

"This effect is caused by the nearly uniform scattering of light from particles just above the threshold of visibility (0.1 to 0.3 micron in diameter)".

Next, consider statements by H.C. van de Hulst (Light Scattering by Small Particles, 1981):

"Scattering by the aerosol (haze and dust) .. is due to scattering by a large variety of particles, usually with radii < 1 micron".

and in regard to larger particles,

"The drops of clouds, fog and rain are very much larger than those in the haze described in the preceding section. …the radii of the drops that dominate the extinction and scattering characteristics are in the range of 5 microns to 20 microns".

The size of the particles evaluated is a critical factor, and must be considered in detail and in correspondence with observed visual characteristics of the atmosphere. There are, in fact, established relationships between the size of particles in the atmosphere and the corresponding colors of light observed.

A conservative estimate of particle size radius in this case being examined will be 0.3 micron. This would equate to a diameter of 0.6 microns. The blue haze described does little to impair visibility, and a value of less than 0.3 microns for the radius would likely be inappropriate. If the reader accepts a whitish haze as characteristic of the current conditions, it would be both reasonable and conservative to select a value for *a* at the size stated. If a larger value for *a* would be chosen for this example, it will only increase the mass estimates that have been arrived at. A conservative value for this radius is deliberately being chosen for this example, in an attempt to introduce no skews into the final results.

The efficiency factors, developed by Mie, are dependent upon the particle radius, and are tabulated within the source by van de Hulst. For a particle size of 0.3 microns, Q is tabulated as approximately 2.1 and it does not vary significantly over the expected size range to be considered.

We can now arrive at an estimate for N, the number of particles per unit volume. Units will be chosen to lead to a volume concentration of grams per cubic centimeter, and will subsequently be converted to EPA standards of micrograms per cubic meter. Using the chosen values:

N = 3.912 / (z * pi * a^2 * Q) = 3.912 / (2E6cm * 3.14 * (.3E-4cm)^2 * 2.1) = 329 particles / cubic centimeter.

Choosing a larger value for *a* (e.g., 1 micron) would significantly reduce the particle count. The mass concentration, however, will be significantly increased due to the cube relationship of volume.

Continuing with a mass concentration estimate for the current example:

Mt = (4 * pi * a^3 * d * N) / 3 where d is the density per unit volume,

and again choosing a conservative density estimate of 1.6 gms /cm^3,

This leads to a mass concentration estimate of:

Mt = (4 * pi * (.3E-4cm)^3 * 1.6 * 329) / 3 = 5.95E-11 gms / cm^3 = 5.95E-5 gms / cm^3 = 59.5 micrograms / cubic centimeter.

Note that this would exceed the EPA particulate thresholds under the conditions that have been described.

These results, along with the corresponding conservative values chosen, provide some level of justification for further scrutiny of the EPA threshold values contrasted with current observations, analysis and data that are now readily available. Independent data sources are now a requirement due to the disenfranchisement of citizens by the EPA and their lack of investigation.

Additional Notes:

Readers may wish to review the results of an earlier study completed by this researcher entitled:

MICROSCOPIC PARTICLE COUNT STUDY NEW MEXICO 1996 -1999

completed on Mar 23 2000. This study was completed at the time without any awareness or knowledge of EPA particulate threshold values. Analysis was made strictly from a statistical difference viewpoint. It is of considerable interest to note that an average level of 46 micrograms per cubic meter resulted from this study. This is surprisingly close to the threshold value even though the study concerns 1999 and pre-1999 data.

Most observers would agree that there has been a significant and further deterioration in the visual characteristics of our atmosphere since the time this study was completed.

It may also be recalled that a willful attack on the credibility of the earlier report was made by a certain "individual" shortly after the original presentation. Readers may wish to assess the value of the current report of this page and the referenced past report as well as any opposing claims. The use of original NM state data vs. the use of processed EPA data from a subsequent counter-study by the independent party may be relevant to the evaluation. The original study remains as presented without cause for revision.

A summary of that report is as follows:

APPENDIX:

Source of data : New Mexico Environment Department – Air Quality
No. of observations from five monitoring stations 1996-1998 : 129410
No. of observations from five monitoring stations 1999 : 43449
Measured quantity : PM10(<=10microns)
Mean of observations 1996-1998 : 39.42 micrograms/cubic meter
Mean of observations 1999 : 45.70 micrograms/cubic meter
Standard deviation of observations 1996-1998 : 111.69micrograms/cubic meter
Standard deviation of observations 1999 : 134.57micrograms/cubic meter
Zm Statistic : 11.65
F Statistic : 1.45
