



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL EXPOSURE RESEARCH LABORATORY  
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF  
RESEARCH AND DEVELOPMENT

MEMORANDUM

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SUBJ: Alternative WINS Oil

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TO: Lee Ann Byrd  
MQAG/OAQPS

As you know, some monitoring agencies have reported occasional solidification or "crystallization" of the oil in the WINS impactor of PM<sub>2.5</sub> reference method samplers, usually associated with sampling during cold and damp weather conditions. Although propensity for solidification seems to clearly increase at colder temperatures, the actual conditions that cause this effect are noted to be quite variable and also appear to include factors other than temperature and humidity. Some monitoring agencies report no evidence of this phenomena, while others (mostly in cold-weather areas) may observe it occasionally or repeatedly. Observation of solidified oil in a WINS impactor naturally raises concerns about its possible adverse effect on the integrity of the associated PM<sub>2.5</sub> sample(s).

Several field and laboratory tests have indicated that the size separation characteristics of the WINS impactor are affected only very slightly, if at all, by the occurrence of oil solidification. Nevertheless, an alternative oil has been identified that is much more resistant to such solidification. This alternative oil, identified as **dioctyl sebacate (DOS)**, is otherwise very similar to the originally specified oil (trimethyltetraphenyltrisiloxane, DOW 704) in its physical and mechanical attributes, and it presents no safety concerns to sampler operators. Both field and laboratory tests comparing the particle performance of the WINS with the two oils have indicated no detectable difference. Field testing of the alternative oil is continuing in Connecticut during the coming winter season to make sure that the alternative oil performs properly.

Monitoring agencies that have observed oil solidification or have monitoring sites that may be subject to occurrence of the solidification effect due to cold-climate conditions are encouraged to use the alternative oil in their PM<sub>2.5</sub> samplers, at least during the seasons when solidification of the oil is most likely. The DOS oil may be substituted for the originally

specified oil with no change in the installation procedure. Substitution of the DOS oil is hereby authorized as a generic user modification (under section 2.8 of Appendix C to 40 CFR Part 58) to the reference method oil specification in section 7.3.4.3 (Impactor oil specifications) of Appendix L to 40 CFR 50, until such time as the latter specification may be formally changed to include the DOS oil.

The DOS oil is available from several sources, including these:

Structure Probe Incorporated (SPI)  
569 East Gay St.  
West Chester, PA 19380  
1-800-242-4774

Sigma-Aldrich  
3050 Spruce St.  
St. Louis, MO 63103  
1-800-325-3010

Firefox Enterprises  
P.O. Box 5366  
Pocatello, CA 83202  
1-208-237-1976

Agencies that elect to use the DOS oil should notify the AMMB/NERL and MQAG (see contacts below). We also solicit each agency's experiences, both positive and negative, with use of the alternative DOS oil. This feedback from user agencies during this probationary testing period will be carefully considered before any final approval for use of the DOS oil will be issued.

Contacts for questions, notification, or experiences regarding use of the alternative WINS oil:

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