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Project Summary

Problem POHC Reference Directory

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The hazardous waste incineration program is highly dependent on the regional permit writers and their knowledge of analytical methods for determining Principal Organic Hazardous Constituents (POHCs). Every trial burn plan must be approved by the regional permit writer. Because of the myriad of compounds that are proposed as test chemicals and because of the ever-changing status of analytical methodology for trace organic analysis, a tremendous burden is placed on the permit writer to stay abreast of the developments in the field. Currently, there is no means to keep permit writers informed of advances in measurement technology.

Measurement methods for many of the Appendix VIII compounds have been developed only in the last few years. Many compounds are designated "problem POHCs" because they are difficult to determine or cannot be determined at all with current technology. The purpose of this report was to assemble data on the Appendix VIII compounds relative to their analytical method status, physical properties, and combustion properties. The objective is to provide regional hazardous waste permit writers with immediate access to these data to assist them in their review of trial burn sampling and analysis plans. Access to these data will allow permit writers to foresee potential problems in the plans and to specify method modifications or to suggest alternate POHCs that are similar in chemical and physical characteristics but easier to determine. This should accelerate the permitting process by allowing a quicker review of trial burn plans and by reducing the number of tests that must be repeated because of analytical problems. The directory has also been made available in disk form for storage and access on personal computers.

This Project Summary was developed by EPA's Atmospheric Research and Exposure Assessment Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

Regional hazardous waste incineration permit writers frequently need assistance in evaluating the validity of sampling and analysis procedures for Principal Organic Hazardous Constituents (POHCs). Individual assistance is being provided, but is inadequate to meet the needs of the permit writers. A great deal of responsibility is still placed on the individual permit writer.

Currently, there is no mechanism to keep permit writers informed of recent advances in measurement technology. There is also no mechanism to provide them with quick access to pertinent data for specific compounds of interest. This situation critically hinders the successful implementation of the hazardous waste incineration regulatory program. Assistance in "packaged" form, such as guidance documents and personal computer disks, is potentially of great value because of the immediate accessibility of the information.

Sampling and analysis procedures for many of the Appendix VIII compounds have been developed only in the last few years. There are even some POHCs for which methods are still unknown and others that present special problems in sampling and analysis. The data base of measurement methods is expanding rapidly. Permit writers and other users would greatly benefit if easy access to this information is provided. Therefore, communication of this information to the permit writers in a useful form is particularly important.

The objective of this project was to assemble a data base containing information concerning problem POHCs and to suggest solutions to the difficulties associated with sampling or analyzing them. Use of the updated reference material will be quicker and easier than contacting resource people and should be used as a supplement to their assistance. It will greatly aid the permit writers in avoiding pitfalls in the selection of POHCs or sampling and analysis methods for them. This information will also be quite valuable to engineering research and development programs and the technical community in general.

Research Approach

The goal of this task was to assemble a data base containing information pertaining to the availability and reliability of sampling and analysis methods for Appendix VIII compounds. Compounds known to be difficult to determine were to be flagged, and if possible, solutions to these problems were to be suggested. Another goal of the task was to provide physical and chemical data on the compounds and to provide searching capabilities for retrieving the names of compounds with specified physical or chemical properties. This would allow the permit writers to suggest similar alternate compounds in cases where a substitute is needed for the designated POHC.

The format of the directory was designed to provide the permit writers with easy access to as much information as is available for the Appendix VIII compounds. Many of the fields are simply entries of common physical and chemical properties of the compounds. These include the molecular weight, compound class, boiling point, melting point, flash point, heat of combustion, and water solubility. Also included are a ranking of heat of combustion from lowest to highest for the compounds for which values were available.

Because the objective of this data base is to assist permit writers, we have included two fields dealing with thermal stability and two with heat of combustion. The data for thermal stability include a numerical ranking of 320 compounds and a subdivision of the compounds into seven classes based on the ranking.

We have included toxicity data and the Chemical Abstract Service registry number when available.

The remainder of the record includes information concerning the appropriate sampling and analysis methods for the POHC and the validity of the methods. We have listed the suggested sampling method and analysis method. When appropriate, we have used SW-846 methods. In many cases, the methods suggested have not been evaluated for the specific compound, but have been evaluated for compounds with similar physical properties or similar functional groups. We have included a memo field entitled "Validation Status" which discusses the degree of scrutiny the compound has undergone with regard to the suggested methods.

We have also described specific known problems in one field and possible solutions in another. This would include, for instance, discussions of compounds that are reactive, water soluble, or that might break through the sampling media. We have also listed the common general and specific problems encountered with each compound.

The general problems categories relate to: (1) analysis, (2) the hazardous nature of the POHC, and (3) sampling. Specific problems are subdivided under each of these three general categories. Sampling problems include blank effects, breakthrough, and reactivity. Analysis problems include interferences, recovery, sensitivity, and solubility in water.

Identification of problem POHCs was accomplished through a literature survey and through discussion with experts in the field. Specific properties and problems are entered in the data base records. The records also contain memo fields to allow discussion of problems and recommended solutions.

Conclusions

The compilation of this data into an easily accessible directory should accelerate the review process for trial burn plans. It should also reduce the number of retests needed because the sampling and analysis problems encountered could have been avoided if the information on the particular POHC had been available prior to the burn. The directory is easy to use and will greatly assist the research and development community as well as the permit writer.

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The complete report, entitled "Problem POHC Reference Directory," (Order No. for paper copy PB91-201061/AS; Cost: $15.00; Order No. for diskette PB91-507749/AS; Cost: $180.00; both costs are subject to change) will be available only from:

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