



Project Summary

Air Emissions from the Treatment of Soils Contaminated with Petroleum Fuels and Other Substances

Bart Eklund, Patrick Thompson, Adrienne Inglis, and Whitney Dulaney

This document summarizes available information on air emissions from the treatment of soils contaminated with fuels. It is intended to guide state and local air pollution control agencies in the evaluation of the air emission potential of treatment of contaminated soil and the cost-effectiveness of applicable emission control technologies. The scope was limited to the emissions of volatile organic compounds (VOCs); however, due to the limited data that were available, information was also included for the emissions of other organic compounds. This additional information is primarily from the treatment of soils contaminated with hazardous wastes.

This Project Summary was developed by EPA's Air and Energy Engineering Research 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

Seven general approaches for the disposal or treatment of soils contaminated with gasoline, oil, or diesel fuel were identified:

- Excavation and removal;
- Thermal desorption;
- Soil vapor extraction (SVE);
- In-Situ biotreatment (e.g., land treatment);
- Ex-Situ (batch) biotreatment;

- On-site incineration; and
- Soil washing/solvent extraction.

Each general approach may include several options. For example, thermal desorption may be performed in portable units designed for soil treatment or in rotary drum aggregate dryers that are part of asphalt plants or other industrial facilities.

Literature pertaining to the emissions of VOCs for each remediation approach was identified and reviewed. The summarized information was organized into the same ten-part format for each approach:

- Process description;
- Identification of air emission points;
- Identification of typical air emission species of concern;
- Summary of published air emissions data;
- Identification of applicable control technologies;
- Cost data for the overall remediation approach;
- Cost data for the emission controls;
- Equations and models for estimating VOC emissions;
- Case study of the use of the remediation approach; and
- References.

For most of the technologies examined, VOC emission estimates or measured data were found. Emission factors, in grams per hour, were identified or developed that are based on available data as well as assumed "typical" operating conditions for



the remediation of relatively large sites. Cost data, in dollars per ton or cubic yard of soil treated, were obtained from a variety of sources, but data from prior to 1986 were generally avoided due to changes in remediation technology, standard operating practices, and regulations in recent years. All cost data were converted to 1991 dollars using a 5% annual escalation factor.

Certain limitations of the data presented in this document should be considered before extrapolations are made to a specific site. Any generalized guidance has inherent limitations due to the variety of site- and process-specific factors that may be encountered. Many of the cleanup processes are emerging technologies and have short operating histories. For these technologies, data on air emissions, treat-

ment effectiveness, and costs are very limited. Furthermore, each site has its own unique obstacles to cleanup that may force modifications to the cleanup hardware or operating conditions. The development of typical air emission rates and emission factors applicable to the maximum number of site conditions and site locations required assumptions regarding the rate and scope of the cleanup effort, the type of fuel being treated, the number and nature of emission release points, etc. The more a specific site differs from the assumed conditions, the less likely that the generalized air emissions data will be applicable.

Data gaps were identified and future research topics were suggested. In general, only limited information was found for air emissions from the treatment of

contaminated soil. The need for more data is greatest for emerging technologies and those that are area sources of VOC emissions. The general needs are for more emissions data, more control cost and effectiveness data, and accurate emission models. The most important research needs that were identified during this study were:

- VOC emission rate data for excavation;
- Theoretical models to estimate VOC emissions from excavation;
- Cost and effectiveness data of area source emission controls; and
- Fate studies for VOCs in biotreatment systems.

B. Eklund, P. Thompson, A. Inglis, and W. Dulaney are with Radian Corp. Austin, TX 78720-1088.

Susan A. Thorneloe is the EPA Project Officer (see below).

The complete report, entitled "Air Emissions from the Treatment of Soils Contaminated with Petroleum Fuels and other Substances," (Order No. PB92-212 976/AS; Cost: \$35.00; subject to change) will be available only from:

National Technical Information Service

5285 Port Royal Road

Springfield, VA 22161

Telephone: 703-487-4650

The EPA Project Officer can be contacted at:

Air and Energy Engineering Research Laboratory

U.S. Environmental Protection Agency

Research Triangle Park, NC 27711

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Cincinnati, OH 45268

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