

OVERVIEW OF THE INCINERATOR OFFGAS SYSTEM STUDY

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ABSTRACT

The wide range of incineration designs under development or in operation for treatment of a variety of radioactive wastes has resulted in numerous offgas cleanup systems. A study has been undertaken to review current incineration and offgas systems, categorize the waste-incinerator-effluent cases, identify common offgas treatment problems and criteria, and establish a class of readily available and required technology. This presentation discusses the general approach of the study and preliminary results from the incinerator and offgas systems review efforts.

INTRODUCTION

Incineration of radioactive wastes for volume reduction, mass reduction, resource recovery, waste stabilization, or other reasons is recognized as an effective waste treatment method. Several incineration systems are currently in various stages of development, testing, or operation. For each of these systems a unique offgas cleanup system has been designed. The characteristics of each incineration system and the offgas requirements of each system are somewhat different due to site-specific applications and varying waste compositions. Even considering the multiplicity of waste characteristics, incineration systems, and offgas treatment options, there are many common problems which

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must be solved. The purpose of the initial phase of the incinerator offgas systems study is to review the current incineration system designs as well as current offgas treatment options and to identify these common problems. The ultimate objective of the study is to identify potential generic offgas treatment systems and components to solve the common problems of radioactive waste incineration. Where feasible, such a system will use currently available technology. In areas where current technology is not sufficient to handle the problems presented, recommended Research and Development paths will be devised for needed technology.

GENERAL APPROACH

The general approach being taken to the overall offgas treatment systems study is a subjective review of current status and technology availability. This approach is best described in a line drawing shown in Fig. 1.

INCINERATION SYSTEMS REVIEW

A review of incineration systems in operation or under development for treatment of combustible radioactive waste is underway. The numerous systems can be grouped by basic incinerator type and are: Single Hearth, Controlled Air, Rotary Kiln, Fluidized Bed, Slagging Pyrolysis, Cyclone, Molten Salt, and Electromelt. These basic incinerator techniques can be subdivided using other criteria such as direct or indirect firing, type of fuel, and configuration. Offgas system requirements also vary from system to system and depend on the specific waste being treated.

The objective of the incinerator system review is to categorize the various waste-incinerator-effluent cases and to identify common offgas requirements revealed by each case. Preliminary findings from the review have revealed no unexpected problems. In varying degrees, all of the incinerator systems require offgas treatment for particulates, inorganic acid gases, and vaporized compounds. Depending on the particular waste being incinerated, the vaporized species may be metallic compounds, volatile radioisotopes or other materials which need to be removed in the offgas treatment system.

OFFGAS TREATMENT OPTIONS REVIEW

The scope of the offgas treatment options review covers both

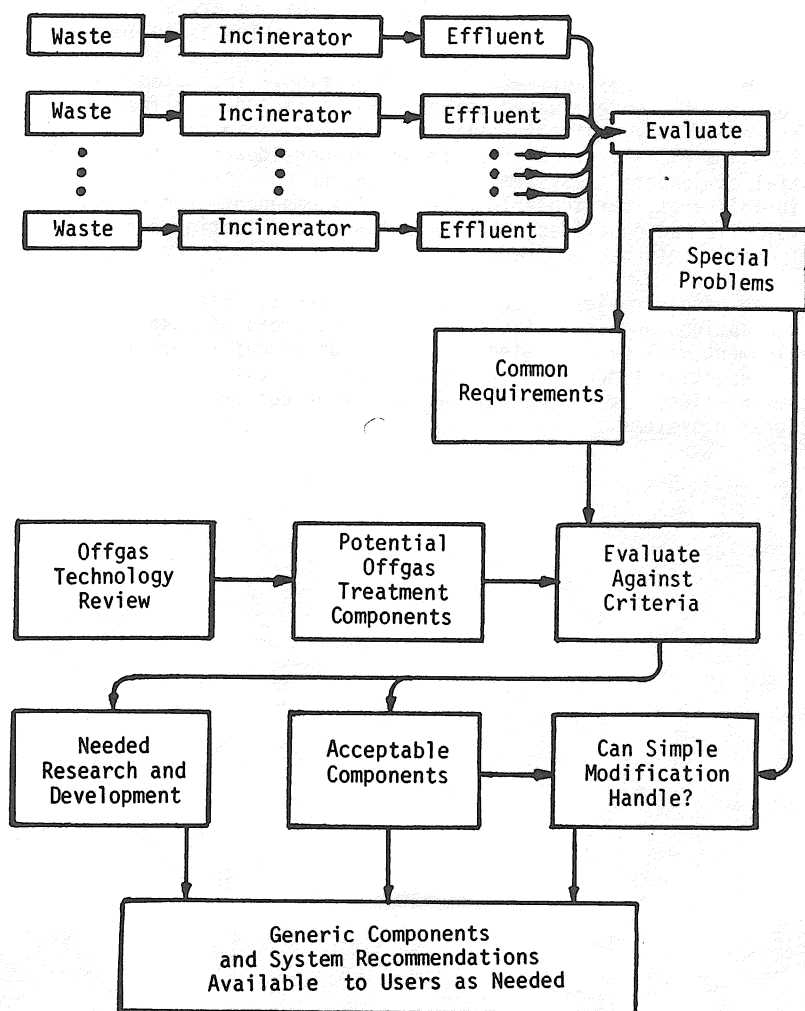


Fig. 1. Subjective Evaluation of Offgas Requirements and Technology.

systems and components currently being used in radioactive service and recent technology developed in the commercial pollution control industry. The objective of the review is to identify potential offgas systems components for treatment of the common problems in radioactive waste incineration. The potential components will be evaluated using criteria including effectiveness, reliability, maintainability, secondary waste generation, cost, and flexibility. Another important consideration for potential components is system interaction and compatibility and it is in this area, particularly relating to components for removal of volatile radionuclides, that development and testing efforts will most likely be required.

The offgas review is currently in progress. Final analysis of the options and identification of needed areas of research and development will be completed by the end of fiscal 1980. The final report will document the results of the review and detail recommendations for generic offgas treatment components and integrated systems.