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WSRC-TR--90-533

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

DE91 006581

Keywords: CIF, off-gas
Retention: Lifetime

CC: W. L. Tamosaitis, 773-A
S. T. Wach, 703-H
H. Holmes Burns, 703-H
E. A. Brown, 703-H
S. A. Lorah, 703-H
W.S. Carnes, 707-H
IWT File 4430
SRL Records (4)

November 1, 1990

TO: M.G. Looper, 676-1T

FROM: D.B. Burns, 676-T

CIF OFFGAS COMPONENTS TEST FACILITY (U)

Summary

The Consolidated Incineration Facility (CIF) is planned for start-up at the Savannah River Site in 1993. The CIF has a unique offgas system design utilizing state-of-the-art technology and experience gained from other radioactive/hazardous waste incinerators. A high efficiency steam-atomized offgas scrubber with separate quench and scrubber liquid recirculation loops will be used. The Offgas Components Test Facility (OCTF), a 1:10 scale CIF offgas system, will evaluate operating performance of the proposed CIF system design. The primary objectives for the OCTF include demonstration of system operability, equipment performance evaluation, and CIF start-up support. The OCTF will also demonstrate to the public our commitment to operate the CIF in a manner that meets all environmental emission requirements.

Introduction

The CIF will treat solid and liquid RCRA hazardous and mixed wastes, and reduce the volume of low-level beta-gamma contaminated wastes. This facility can process 560,000 ft^3/yr of solid waste and 98,500 gal/yr of liquid waste. Due to the variability in physical and chemical characteristics of the waste feed, a rotary kiln with a secondary combustion chamber and wet offgas scrubbing system was selected. This design will insure maximum processing versatility.

Facility Description

The OCTF is a 1:10 scale mock-up of the proposed CIF offgas system design. Individual equipment components and instruments were designed and fabricated by the same vendors selected for the full-scale CIF facility. A schematic of the OCTF is shown in Figure 1. Hot offgas is produced in a 3 MM Btu burner chamber. Particulate and HCl are metered into the gas stream to simulate particulate carry-over and acid gas produced during chloride waste incineration. The gas is cooled in a downflow quench before entering a high efficiency steam-atomized scrubber. The scrubber removes particulates and neutralizes acid gases. The scrubbed offgas enters a cyclone separator where liquid and solid particulates are removed from the gas stream. After exiting the cyclone, the offgas enters a mist eliminator to remove any residual moisture. A reheater upstream of the HEPA filters prevents condensation in the filter housing.

TEST PROGRAM

The OCTF test program is designed to demonstrate operability of the current CIF offgas system design. The performance of all system components will be evaluated as a function of operating parameters. Operation of this system will prove invaluable during operator training, and facility start-up and trouble shooting. The important technical issues to be investigated on the OCTF are discussed below.

Particulate removal and acid gas neutralization efficiency will be measured in the quench and scrubber as a function of equipment operating parameters. The effect of solids and salt concentrations in the scrubber liquid, steam/offgas ratio, and offgas flowrate, will be measured.

The offgas system must be operated to provide acceptable HEPA filter life. Parameters affecting HEPA life include salt concentrations in the quench and scrubber solutions, flue gas rate through the scrubber, and condensation in the HEPA housing. Operating ranges will be determined to ensure adequate HEPA life.

The pH and pressure control systems will be evaluated in the OCTF. The instrumentation and the proposed control schemes will be tested for stability and reliability. Pressure control in the system is of primary importance. The unique 2-loop pressure control strategy will be evaluated.

The materials of construction selected for the CIF will be tested in the OCTF. Operation of this pilot scale equipment at actual CIF process conditions will allow accurate determination of material corrosion rates.

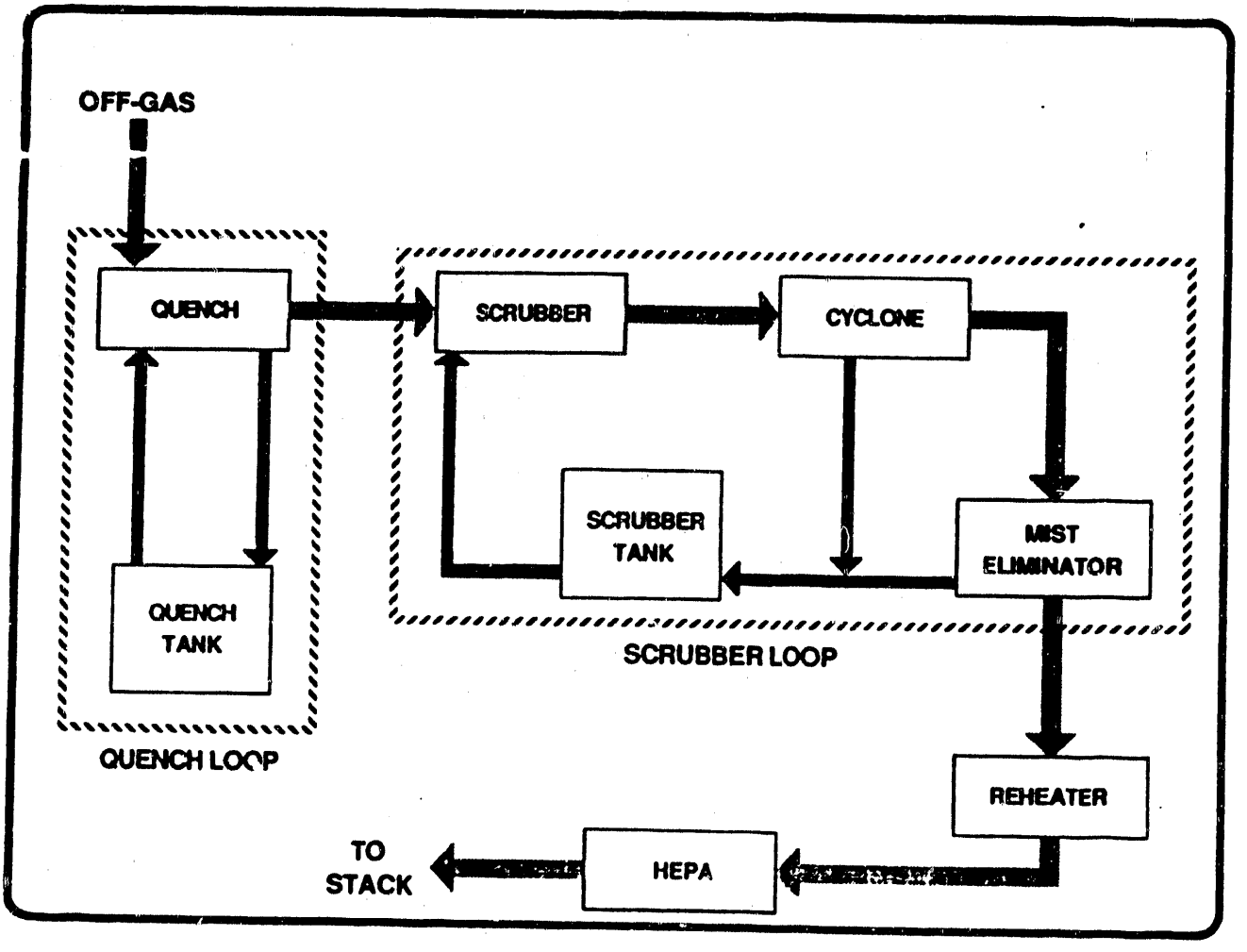

Figure 1 - OCTF Flow Schematic

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DATE FILMED

03/05/91