

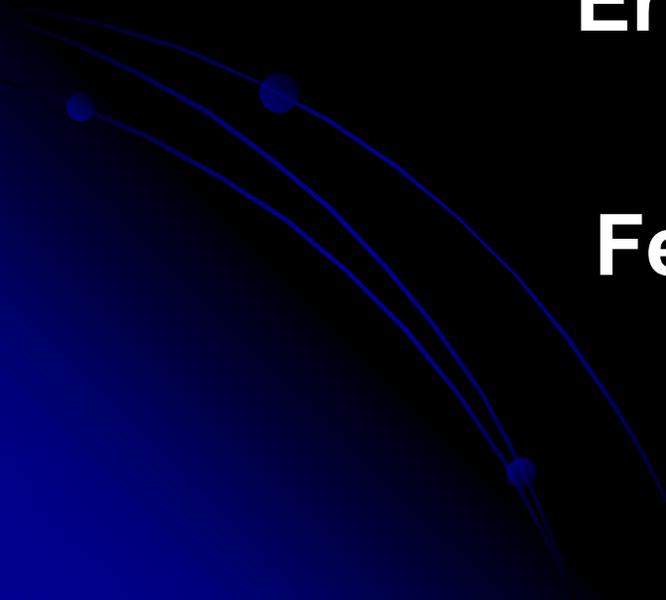
US EPA ARCHIVE DOCUMENT

GAS COLLECTION FROM BIOREACTOR LANDFILLS

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SCS ENGINEERS

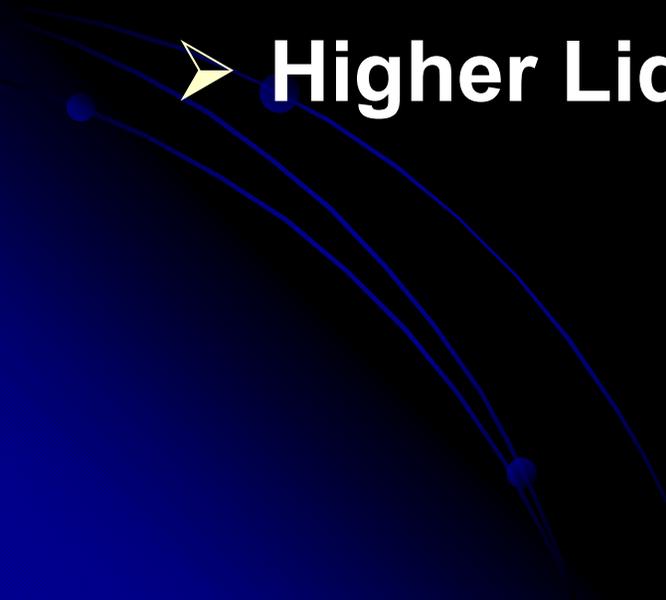
February 28, 2003



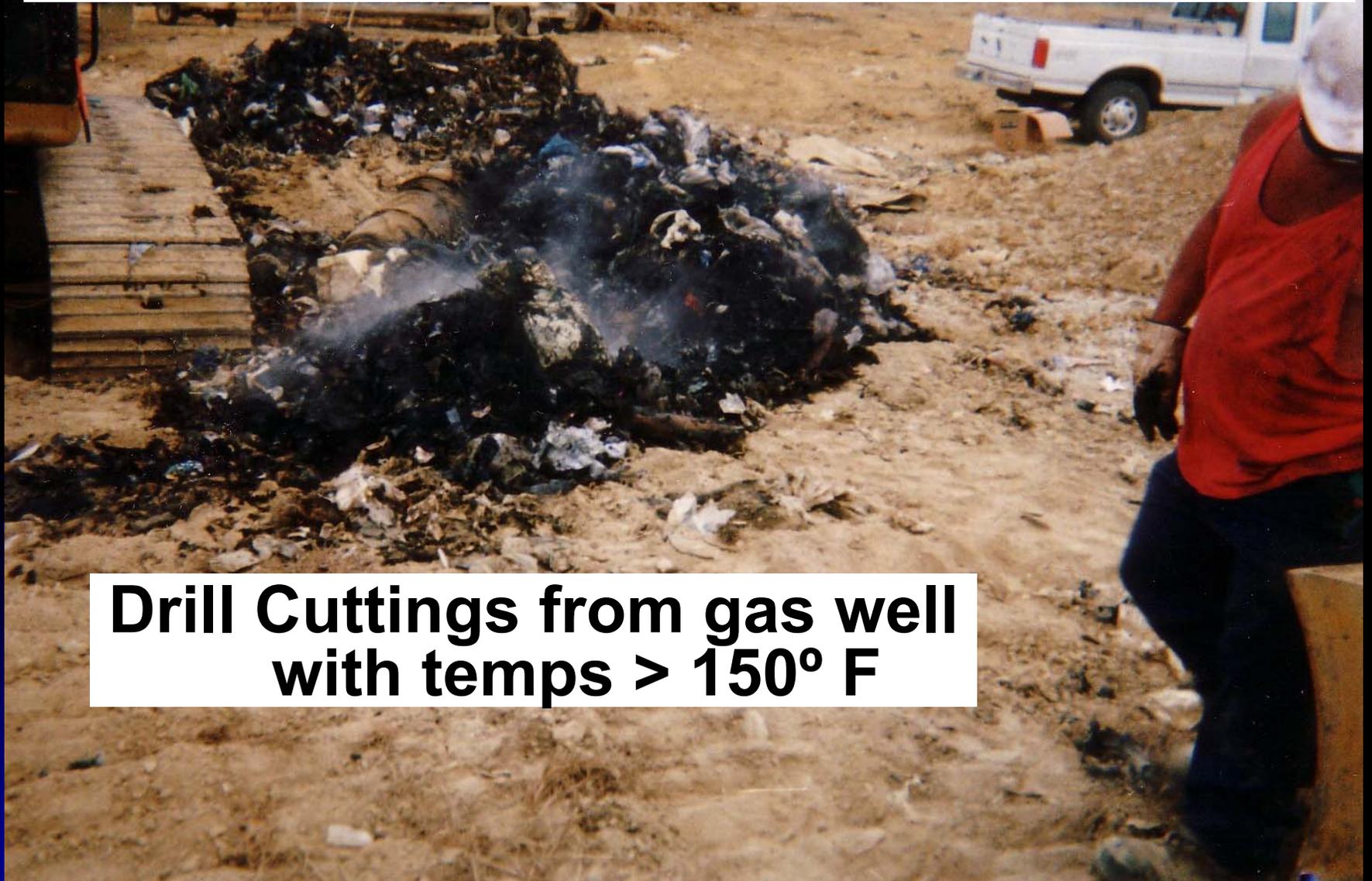
INTRODUCTION

- **Gas Collection Challenges**
- **Gas Collection Options**
- **Regulatory Issues**

GAS COLLECTION CHALLENGES

- **Higher Gas Temperatures**
 - **Higher Gas Production Rate (more gas more quickly)**
 - **Higher Liquid Levels**
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HIGHER TEMPERATURES



**Drill Cuttings from gas well
with temps > 150° F**

**LEACHATE
FILLED
EXTRACTION
TRENCH**

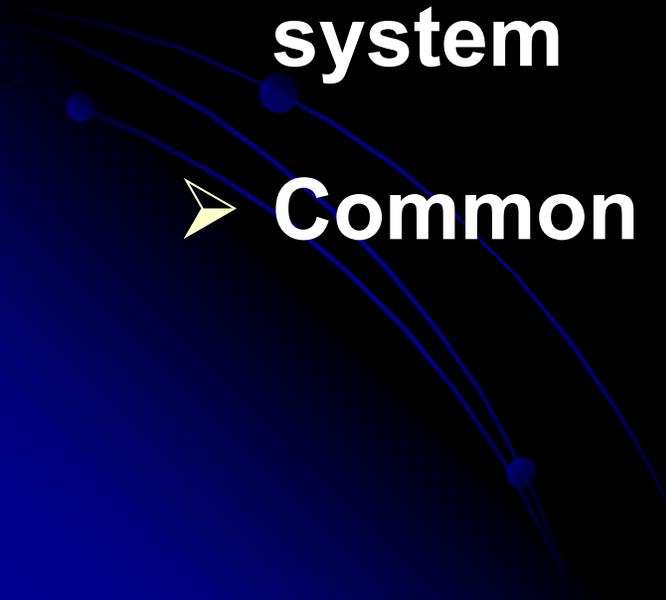




GAS PRESSURE



GAS COLLECTION OPTIONS

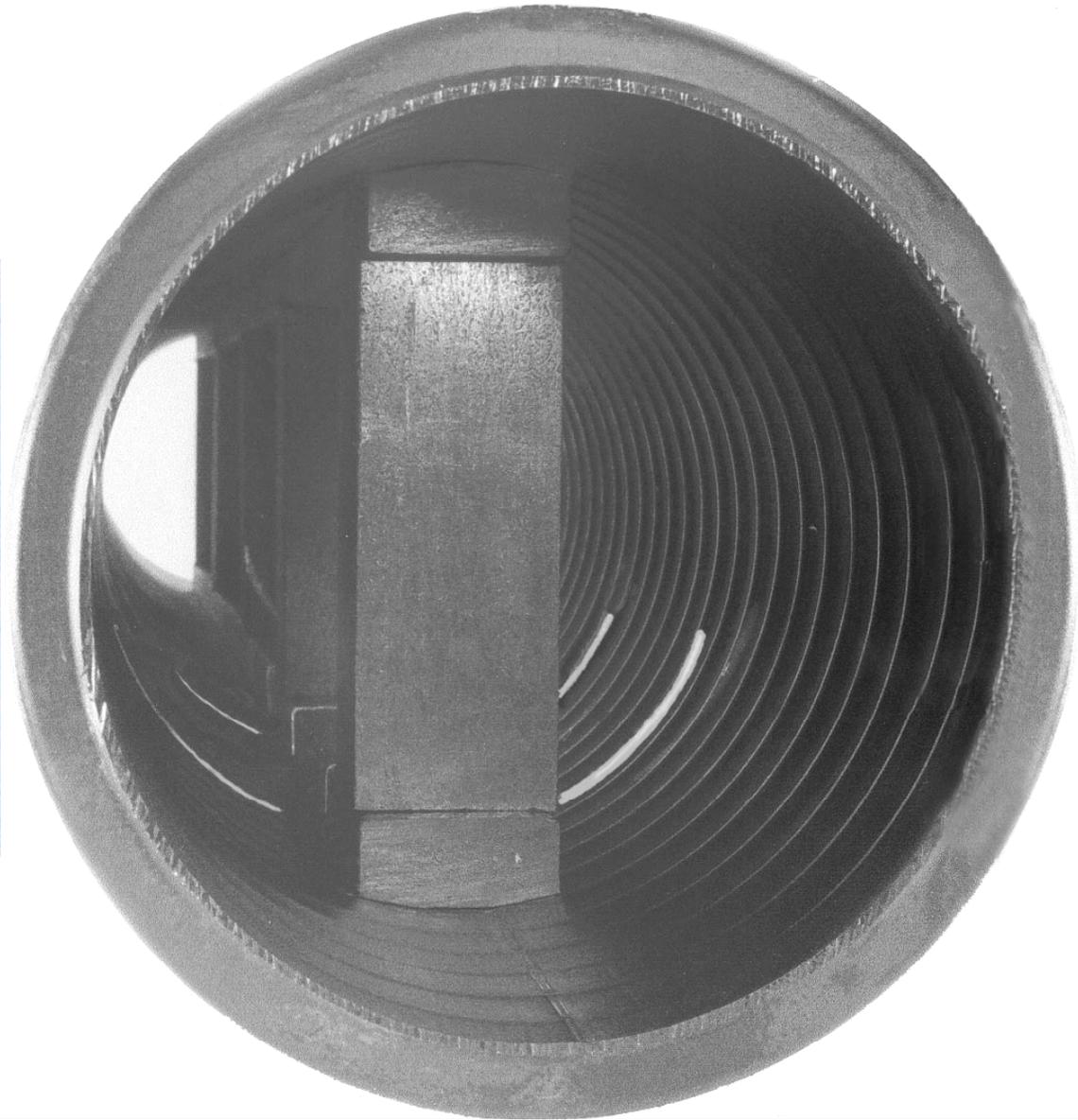
- **Vertical Wells**
 - **Horizontal Collectors**
 - **Interconnection with leachate system**
 - **Common Conduit - HYEX® System**
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DUAL CONDUIT

- **Common trench or piping for gas collection and liquids addition**
- **HYEX® System uses common carrier drain pipe for separate liquid injection and gas collection pipes.**
- **Demonstration at Ste. Sophie Landfill, Quebec and Fauquier County, VA**

**Interior of
HYEX
reinforced
landfill
conduit;
12 inch ID**



**Terminal end
of HYEX
conduit with
liquid and gas
lateral lines
and optional
CCTV
insertion
lateral.**



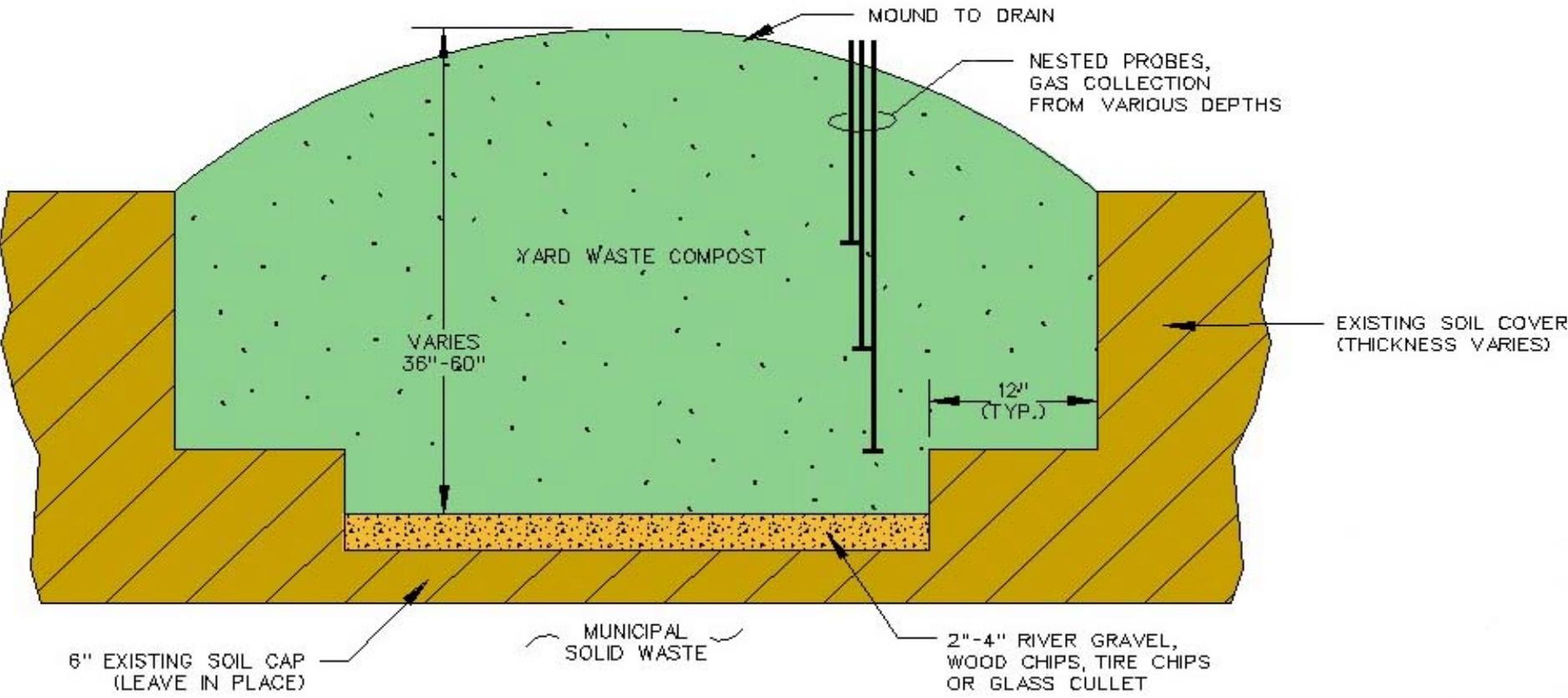


SYSTEM MODIFICATIONS

- Model gas generation with higher k value
- Increase header pipe sizes accordingly
 - More flow
 - More settlement
- Larger well pipe diameter for pumping
- High temperature materials for wells - CPVC, Fiberglas

OTHER TECHNIQUES

- **Emissions control via biocovers**
 - **Compost cover material**
 - **Oxidizes methane as gas passes through**
 - **Aerobic reaction**
 - **EREF Funded research ongoing at Outer Loop Landfill**



**BIOLOGICAL PERMEABLE COVER
CROSS SECTION**

N.T.S.

MACT RULE APPLICABILITY

- **NSPS sites with >50Mg NMOC**
- **Major Source or co-located with major source**
- **Additional requirements for bioreactors, defined as taking liquids besides leachate and achieving moisture content of 40%**

MACT RULE REQUIREMENTS

➤ New Sources (after 11/7/2000)

- Install gas collection system prior to liquid addition.
- Start collecting gas within 180 days of liquid addition OR
- Within 180 days of reaching 40% moisture content.

MACT RULE (CONT.)

➤ Existing Sources

- If already adding liquids, install gas collection system within 3 years of 1/16/2003.
- If not, install gas system before adding liquids.
- Start collecting gas within 180 days of liquid addition or achieving moisture content of 40%

MACT Rule (cont.)

- **Prepare and maintain a SSM plan**
- **Comply with other NSPS requirements**
- **Extend gas collection into new cell or area of bioreactor before initiating liquids injection.**