

# Heuristic Evaluation of Potential Impact of Organic Additions to SRS Waste Tanks

By

Tue Le and Thomas Britt

Washington Savannah River Company

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# Heuristic Evaluation of Potential Impact of Organic Additions to SRS Waste Tanks

## Agenda

- ❖ Background and Introduction
- ❖ Challenges of Developing the Evaluation Process
- ❖ Strategies to Employ
- ❖ Previous Experience in Such Evaluations
- ❖ Summary of Effort to Date
- ❖ Questions / Answers

## Introduction and Background

- ❖ PISA (Potential Inadequacy in the Safety Analysis) Issued on Organics
- ❖ Organics are restricted in SRS Waste Tanks
  - Limited to a contribution of  $\leq 5\%$  CLFL at 100 °C
  - Material Compatibility
  - Chemical Reactions (includes radiolysis)
  - Downstream Impacts
- ❖ Administrative Controls Require Assessments of Materials that Might Contribute Significant Quantities of Flammable Gases

## Introduction and Background, Continued

- ❖ DSA (Documented Safety Analysis) Assessment of Chemical Compatibility
- ❖ DSA Ensure no New Deleterious Reactions
- ❖ Interactions between Chemicals and Tank Farm Components and Materials
- ❖ Issue considered Important Enough to Analyze Nature of Organics in the Late 90s
  - Hanford Concerns
  - Flammability Concerns
  - Maintain “Non-Organic” Tanks

## Objectives

- ❖ Numerous Requests to Assess Materials (e.g. Solvents, Lubricants)
- ❖ Most Benign due to Chemical Characteristics and/or Small Quantities
- ❖ Reliance Placed in Individual Assessments
- ❖ Simple Method to Assess by Facility with Less Reliance on Engineering

## Challenges of Assessments

- ❖ Since the Late 90s Assessed All Organics/Inorganics Used in The Tank Farm
- ❖ Limited Resources to Conduct A Detailed Laboratory Analysis for Many of these Chemical
  - Wide Scope of Effort – Too Many to Analyze
  - Wide Range of Potential Environments to Consider
    - Temperature
    - Alkaline
    - Processes
    - Potential Consequences of Concern

## Challenges of Assessments, Continued

### ❖ Limited Time to Assess

- Operating Facility
- Chemicals Crucial to Operation
- Limited Flexibility (e.g. Biocide)

### ❖ Limited Basis Data

- Specialty Products – Limited Data (e.g. BoBCalixC6 for MCU)
- Proprietary Products – Data Restricted
- Wide Mixture of Materials and Additives

## Previous Experience in Assessments

- ❖ Conducted on a Case-by-Case Basis
- ❖ No Formal Integration of these Assessments
- ❖ Consequently, Repeat Similar Assessments
- ❖ Fail to Develop a “Database” of Experience
- ❖ Leads to Reliance on the Talent of the Engineer, not on a Structured Institution
- ❖ Desire to Develop a Methodology by which the Facility Can Assess the Potential Impact of a Chemical

## Strategy

Objective is to Develop a Formalized Methodology that can:

- ❖ Efficiently Evaluate the Proposed Chemical
- ❖ Reasonable and Defendable Results
- ❖ Minimize Need for Detailed Laboratory Support
- ❖ Clear Demarcation of Where Engineering/Laboratory Support Required, so that
- ❖ Methodology can be Implemented by Facility Operations

## Impediments to be Overcome to Build a Methodology

- ❖ Develop a Database on Previous Assessments
  - Screen on the Basis of Earlier Assessments
  - Screen on the Basis of Similar Materials
  - Screen on the Basis of Potential Consequences
  
- ❖ Open Literature Available: Provide Guidance in Use of MSDS, Merck Index, etc. in Evaluating Materials
  
- ❖ Chemical Reactivity Guidance: Devise a Set of Criteria to Permit a “Go-No Go” response.

## Impediments to be Overcome to Build a Methodology, Continued

- ❖ Radiolysis Guidance: More Difficult
  - Open Literature
  - SRNL Researches
- ❖ If Criteria Fails: Get Engineering or SRNL Assistance
- ❖ In Essence Need to Develop the detail Means to Screen Materials

## Summary

- ❖ Beginning to Develop Methodology
- ❖ Starting to Coordinate Assessments
- ❖ Preparing Logic for Assessments and Application to Future Chemicals
- ❖ Drafting Criteria --- When does the Facility need to get Engineering/SRNL Help
- ❖ Goal to Complete late 2007.