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## Evaluation of HCFC AK 225 Alternatives for Precision Cleaning and Verification

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## *HCFC AK 225 Critical Surface Cleaning and Verification Alternatives*

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### **REGULATORY IMPACTS:**

Requirements imposed by the Louisiana Department of Environmental Air Toxic Regulations and the Clean Air Act have combined to limit/restrict the use of critical cleaning and verification solvents such as Freon 113 (PCA)

Interim replacement of HCFC AK 225 has been qualified; however, toxicity and future phase-out regulations necessitate longer term solutions

## *HCFC AK 225 Critical Surface Cleaning and Verification Alternatives*

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### **BACKGROUND:**

Maintaining qualified cleaning and verification processes are essential in an production environment. Environmental regulations have and are continuing to impact cleaning and verification processing in component and large structures, both at the Michoud Assembly Facility (MAF) and component suppliers.

The goal of this effort is to assure that the cleaning and verification proceeds unimpeded and that qualified, environmentally compliant material and process replacements are implemented and perform to specifications.

## *HCFC AK 225 Critical Surface Cleaning and Verification Alternatives*

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### **OBJECTIVE:**

Implement environmentally friendly cleaning and verification processes for critical surface hardware

#### Short Term Alternatives

- HCFC 225

#### Long Term Alternatives

New cost effective, less toxic alternatives  
Supersonic Cleaning Applications  
Surface Verification Technology

## *LOX Critical Surface Cleaning and Verification Alternatives*

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### **APPROACH:**

Selected Supersonic Gas - Liquid Cleaning System for evaluation in FY '97

Selected and evaluated three (3) cleaning and verification solvents as candidate alternatives to HCFC 225

- Vertrel 423 (HCFC)\*
- Vertrel MCA (HFC/1,2-Dichloroethylene)
- HFE 7100DE (HFE/1,2-Dichloroethylene)

Product removed from market place

Evaluated an analytical instrumental post cleaning verification technique

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### **FY98 ACTIVITIES:**

#### **Perform qualification of LOX compatible and environmentally friendly critical cleaning and verification alternatives**

- Support the validation of HCFC 225 in Clean Room and Verification Wipe Applications
- Continue pre-qualification of solvent alternatives such as Vertrel MCA, or those recommended or approved by:
  - SNAP (Significant New Alternatives Program)
  - RT2 (Replacement Technology Team)
- Continue pre-qualification testing of Supersonic Gas-Liquid cleaning system
- Support design modifications of surface verification technology

## *HCFC AK 225 Critical Surface Cleaning and Verification Alternatives*

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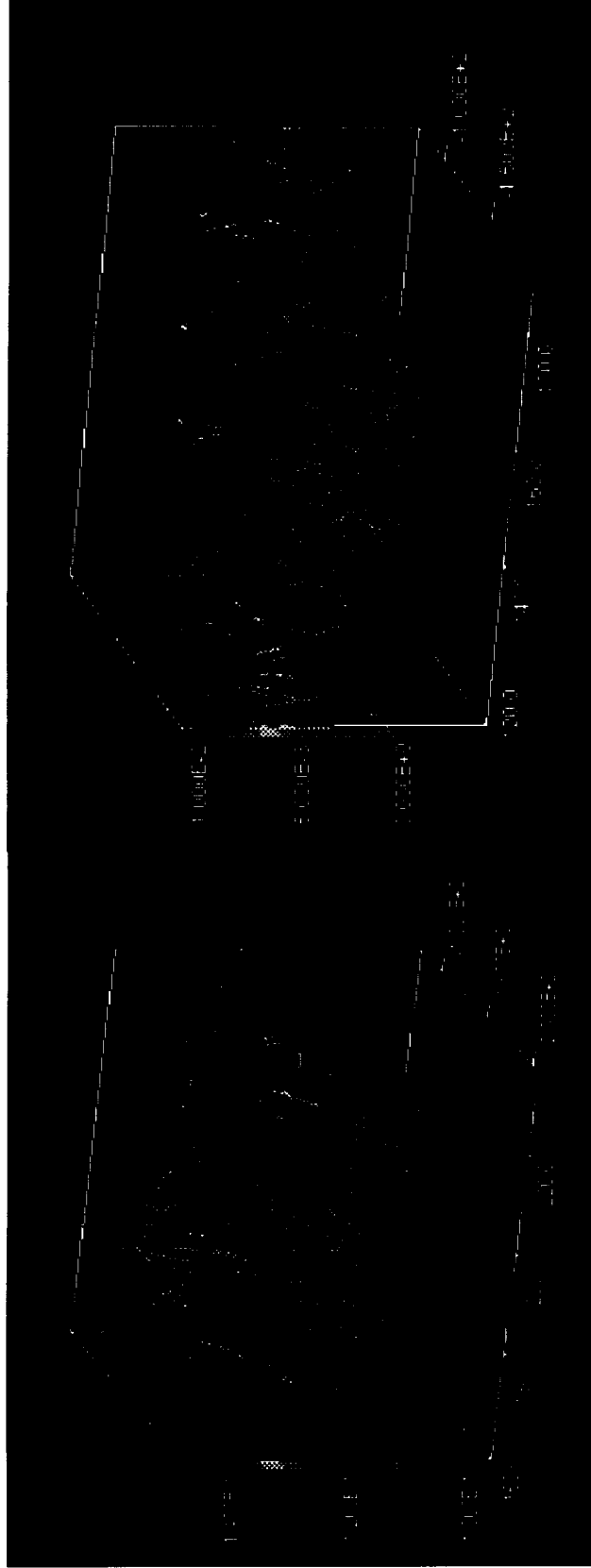
### **Average % Cleaning Efficiency of Twenty Test Panels**

Solvent	Safe-Tap	CRC 2-26	J-414
Vertrel MCA	54.6	88.6	58.8
Vertrel 423	95.2	94.3	79.5
3M HFE71DE	45.1	78.7	55.1
Gas-Liquid	98.06	70.0	0.0
HCFC AK 225	96.6	91.8	31.5

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**Surf-Map Results of Safe-Tap Lubricant Cleaned Test Panels with Vertrel MCA**



**Before**

**After**



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## Optical Schematic of the Surf-Map II Apparatus

