DUST ABATEMENT PROGRAM

YUMA HELIPAD DUST ABATEMENT TEST

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SPONSORED BY:
U.S. MARINE CORPS SYSTEMS COMMAND
PROJECT DESCRIPTION AND APPROACH

➢ Laboratory Evaluation of Commercial-Off-The-Shelf (COTS) Dust Palliatives:
  - Compare Index Performance of Dust Palliatives Under Simulated Conditions
  - Screen 7 COTS Products To Date Versus 5 PAM Combinations
  - Use Laboratory Index Test to Differentiate Potential of Products
  - Select Products, Dilution Ratios, and Application Rates for Field Demonstration

➢ Develop Expeditionary Palliative Distribution System:
  - Evaluate Commercial Technologies for Applying Dust Palliatives
  - Demonstrate Application Technologies
  - Compare COTS Palliative Performance Under Field Conditions
  - Prepare Specifications for Application Equipment
    - Type of Equipment
    - Application Process
  - Prepare Recommendations for COTS Palliative Use:
    - Product
    - Dilution Ratio
    - Application Rate
LABORATORY TESTING FOR DUST ABATEMENT

SIMULATE ENVIRONMENTAL CONDITIONS:
- 4-in.-diameter by 6-in.-high Specimens
- Yuma Sand Used for Initial Specimens, Silt to Follow
- Molded to Dry-of-Optimum Moisture
- 7 COTS Products and 5 PAM Variations
- 0.25 – 2 gallons per square yard
- Sun Lamps for Curing in Desert @ 120-130°F
- Air Impingement Test for Rotorwash – 150 mph for 10 seconds
- 200 grams of Ottawa Sand in the Air stream for Erosion
- Measure Weight Loss Due to Erosion of Sample
- Qualitative Evaluation of Sample Stability

REMAINING ITEMS:
- Evaluate Other COTS Products
- Evaluate Different Application Rates
- Evaluate Spray-On Versus Admix Application
- Evaluate Different Cure Times
LABORATORY TESTING FOR DUST ABATEMENT

Dust Palliatives Laboratory Index Test
Yuma Sand - 24 Hour Cure Time

Weight Loss (g)

- Control
- Powdered Polyacrylamide
- Super Absorbent and Aluminum Chlorohydrate
- Polyacrylamide Emulsion
- Tri-PAM
- Powdered Polyacrylamide with Calcium
- EK-35

0.0 50.0 100.0 150.0 200.0 250.0 300.0 350.0 400.0 450.0

- No Improvement
- Good Improvement
- Marginal Improvement

0.3% 0.1% 1 gsy 2.0 gsy 0 gsy 0.3% 0.5 gsy
Dust Palliatives Laboratory Index Tests
Yuma Sand - 24 Hour Cure Time

- **Control**: 191.0 g
- **Enviroleen**: 117.1 g
- **Road Oyl**: 9.2 g
- **Liquid Dust Control**: 1.6 g
- **Envirotac II**: 4.0 g
- **Dustac**: 1.0 g
- **TerraTac Polymer**: 1.8 g

**Categories**:
- No Improvement
- Marginal Improvement
- Good Improvement
LABORATORY TESTING FOR DUST ABATEMENT
EXPEDITIONARY PALLIATIVE DISTRIBUTION SYSTEM

APPROACH:
- Evaluate COTS Equipment for Product Application
  - Dry Palliative Techniques
  - Liquid Palliative Techniques
- Evaluate Efficiency of Different Processes
- Evaluate Logistical Footprint
  - CH-53 Transportable
  - Weight and Volume
  - Cost
- Use Field Demonstrations to Down Select
- Develop Final Modifications for USMC Use
Demonstration of Application Technologies

EXPEDITIONARY PALLIATIVE DISTRIBUTION SYSTEM
Yuma, AZ, Feb-Mar 2004

Aux 2 Landing Zone

Dustac B

9
LDC

130

8 7 6 5 4

ECO-110 Envirotac II TerraTac B TerraTac A Envirotac

3 2 1

18

Untreated Control

10 11 12

Tri-PAM Polyplus NRL-B

17

Soil-Sement Dustac A Dustac B

16 15 14 13

Envirotac A Envirotac B

11

NRL-A
PRODUCT APPLICATION IN YUMA, AZ
PRODUCT APPLICATION IN YUMA, AZ
ROTARY-WING TESTING IN YUMA, AZ

- Evaluation
  - Controlled Helicopter Landings
    - Approach/Land/Hover/Land/Depart
  - Pilot Feedback
  - Visual Observations of Ground Crew
  - Stationary Dust Collectors
  - Surface Evaluation Tests
EXPEDITIONARY DISTRIBUTION SYSTEM DEPLOYED

Distribution Equipment Procurement
- Specifications provided to MARCORP SYSCOM
- 3 Units - 900-Gallon Easy Lawn® Tandem-Axle Trailer Hydroseders
- 3 Units - 1,200-Gallon Easy Lawn® Skid-Mounted Hydroseders for MTVRs
- Training Video Produced
### Table 14. Weighted Palliative Ratings

<table>
<thead>
<tr>
<th>Helipad</th>
<th>Palliative</th>
<th>Rotor Wash Resistance (Rating x 5)</th>
<th>Palliative Durability (Rating x 2)</th>
<th>FOD Potential (Rating x 2)</th>
<th>Surface Condition (Rating x 1)</th>
<th>Weighted Rating (Up to 100)</th>
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1Ratings are based on CH-46 and CH-53 flight tests conducted on 18-19 February 2004 with a cure time of 29 to 31 days. Original CH-46 flight tests conducted on 21 January were incomplete, but indicated better performance of NRL helipads and TerraTac Polymer after short cure time of 3 days and before rainfall event.
### Procurement

- TerraTac
- Envirotac II®
- Envirokleen®

### Dust Palliative Recommendations for Topical Application for Helipads

<table>
<thead>
<tr>
<th>Palliative</th>
<th>Quantity for 115-ft by 130-ft Pad</th>
<th>Application Rate gsy</th>
<th>150-ft Square Helipad Gallons</th>
<th>GSA Number</th>
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<tbody>
<tr>
<td></td>
<td>Product Gallons</td>
<td>Water Gallons</td>
<td>Total Gallons</td>
<td>Dilution Ratio</td>
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<td>275</td>
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<td>960</td>
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<td>800</td>
<td>1200</td>
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<td>Envirotac III®</td>
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<td>1000</td>
<td>1400</td>
<td>2.5:1</td>
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</tbody>
</table>

*Recommendations based upon rotary-wing tests conducted at MCAS Yuma on 18-19 Feb 2004. These recommendations are for topical application for helipads in sandy soil conditions.*
QUESTIONS