
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

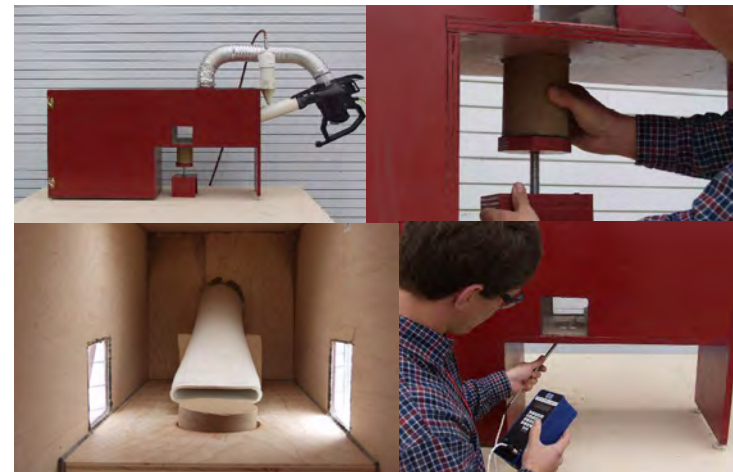
➤ SIMULATE ENVIRONMENTAL CONDITIONS:

- 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

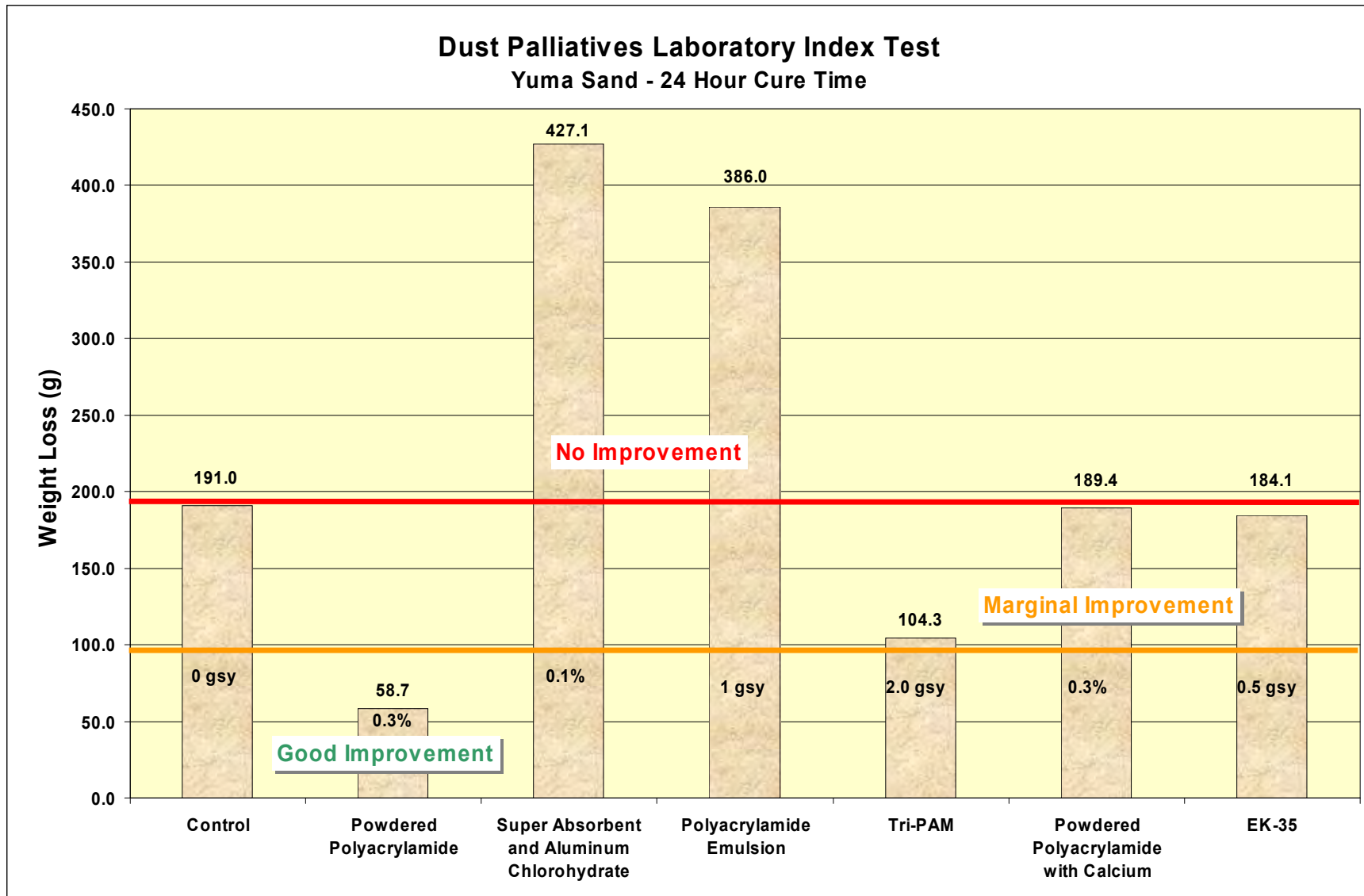


➤ REMAINING ITEMS:

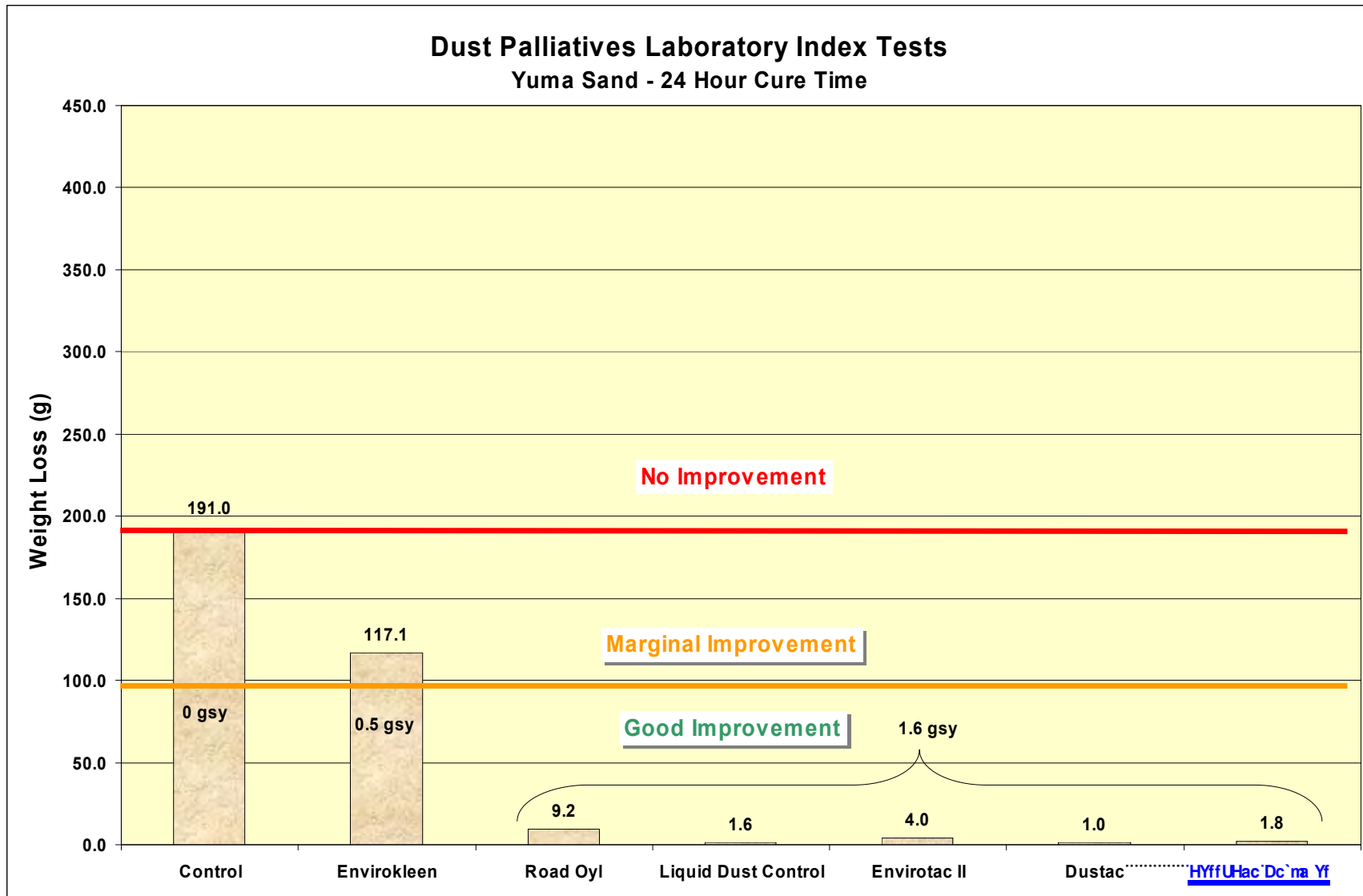
- Evaluate Other COTS Products
- Evaluate Different Application Rates
- Evaluate Spray-On Versus Admix Application
- Evaluate Different Cure Times



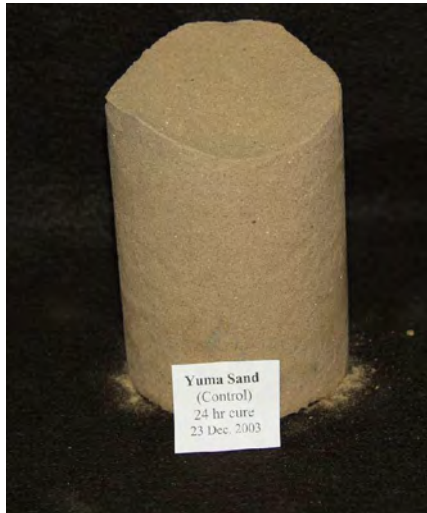
LABORATORY TESTING FOR DUST ABATEMENT



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Control



Tri-PAM



Calcium PAM



EK-35



Envirotac II



TerraTac



Road Oyl

EXPEDITIONARY PALLIATIVE DISTRIBUTION SYSTEM

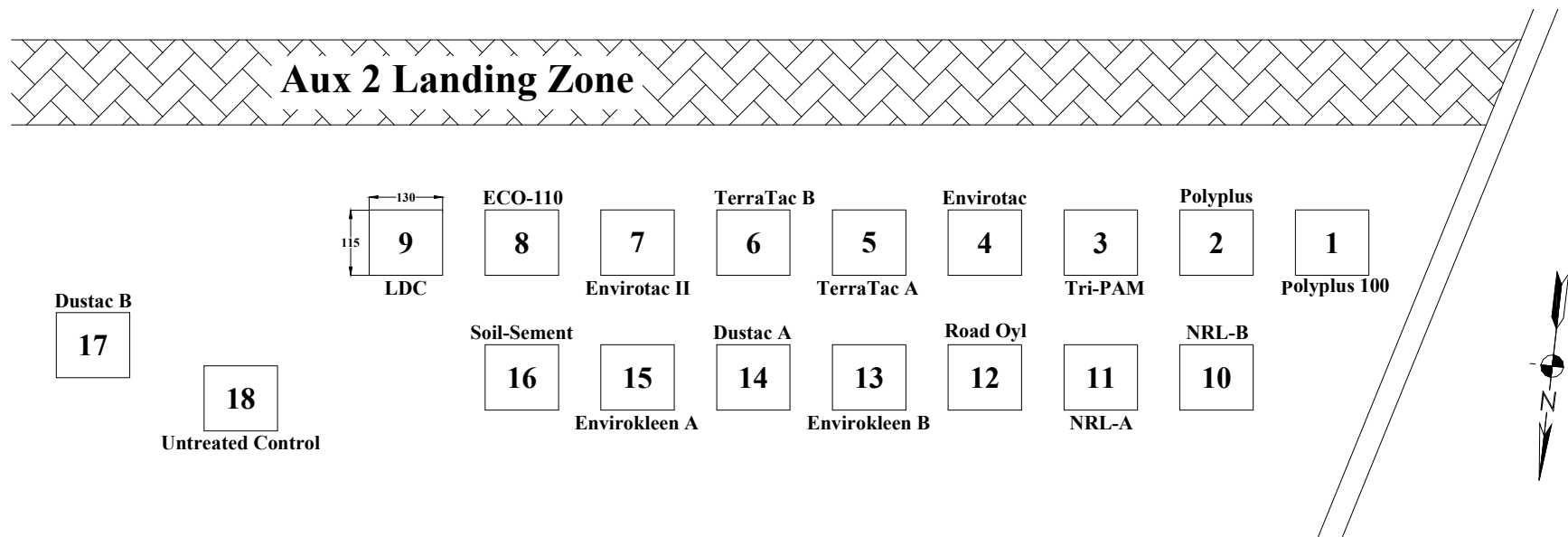
➤ APPROACH:

- 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



PRODUCT APPLICATION IN YUMA, AZ



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 Hydroseeders
- 3 Units - 1,200-Gallon Easy Lawn® Skid-Mounted Hydroseeders for MTVRs
- Training Video Produced



Recommended Palliatives for Helipad Applications

Table 14. Weighted Palliative Ratings¹

Helipad	Palliative	Rating Factors				Weighted Rating (Up to 100)
		Rotor Wash Resistance (Rating x 5)	Palliative Durability (Rating X 2)	FOD Potential (Rating X 2)	Surface Condition (Rating X 1)	
15	EnviroKleen A	50	20	20	10	100
13	EnviroKleen B	45	15	20	10	90
4	Envirotac A	40	20	15	10	85
5	TerraTac A	40	20	15	10	85
7	Envirotac B	40	20	15	10	85
9	LDC	40	20	15	10	85
1	PolyPlus 100	35	20	15	7	77
2	PolyPlus	35	20	15	7	77
16	Soil-Sement	40	20	10	7	77
8	ECO 110	30	20	15	10	75
6	TerraTac B	30	15	10	7	62
3	Tri-PAM	20	20	10	7	57
12	Road Oyl	20	10	5	5	40
10	NRL A	5	5	5	7	22
11	NRL B	5	5	5	7	22
17	Dustac B	0	0	0	3	3
14	Dustac A	0	0	0	2	2
18	Untreated	0	0	0	0	0

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.



Recommended Palliatives for Helipad Applications

Procurement

- TerraTac
- Envirotac II®
- Envirokleen®

Palliative	Quantity for 115-ft by 130-ft Pad				Application Rate gsy	150-ft Square Helipad Gallons	GSA Number
	Product Gallons	Water Gallons	Total Gallons	Dilution Ratio			
EnviroKleen®	650	0	650	Neat	0.39	975	GS-07F-0235M
Liquid Dust Control®	275	700	975	2.5:1	0.59	1475	None
Soil-Sement®	240	960	1200	4:1	0.72	1800	GS-07F-0235M
TerraTac Polymer	400	800	1200	2:1	0.72	1800	GS-07F-5364P
Envirotac II®	400	1000	1400	2.5:1	0.84	2100	None

*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



Romeo Gacad / AFP