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
  - Use Laboratory Index Test to Differentiate Potential of Products
  - Select Products, Dilution Ratios, and Application Rates for Field Demonstrations

- **Develop Expeditionary Palliative Distribution System:**
  - Evaluate Commercial Technologies for Applying Dust Palliatives
  - Demonstrate Application Technologies
  - Prepare Specifications for Application Equipment
    - Type of Equipment
    - Application Process

- **Field Evaluation of Dust Palliatives on Helipads:**
  - Evaluate Dust Palliatives Under Helicopter Traffic
  - Evaluate Application Methods

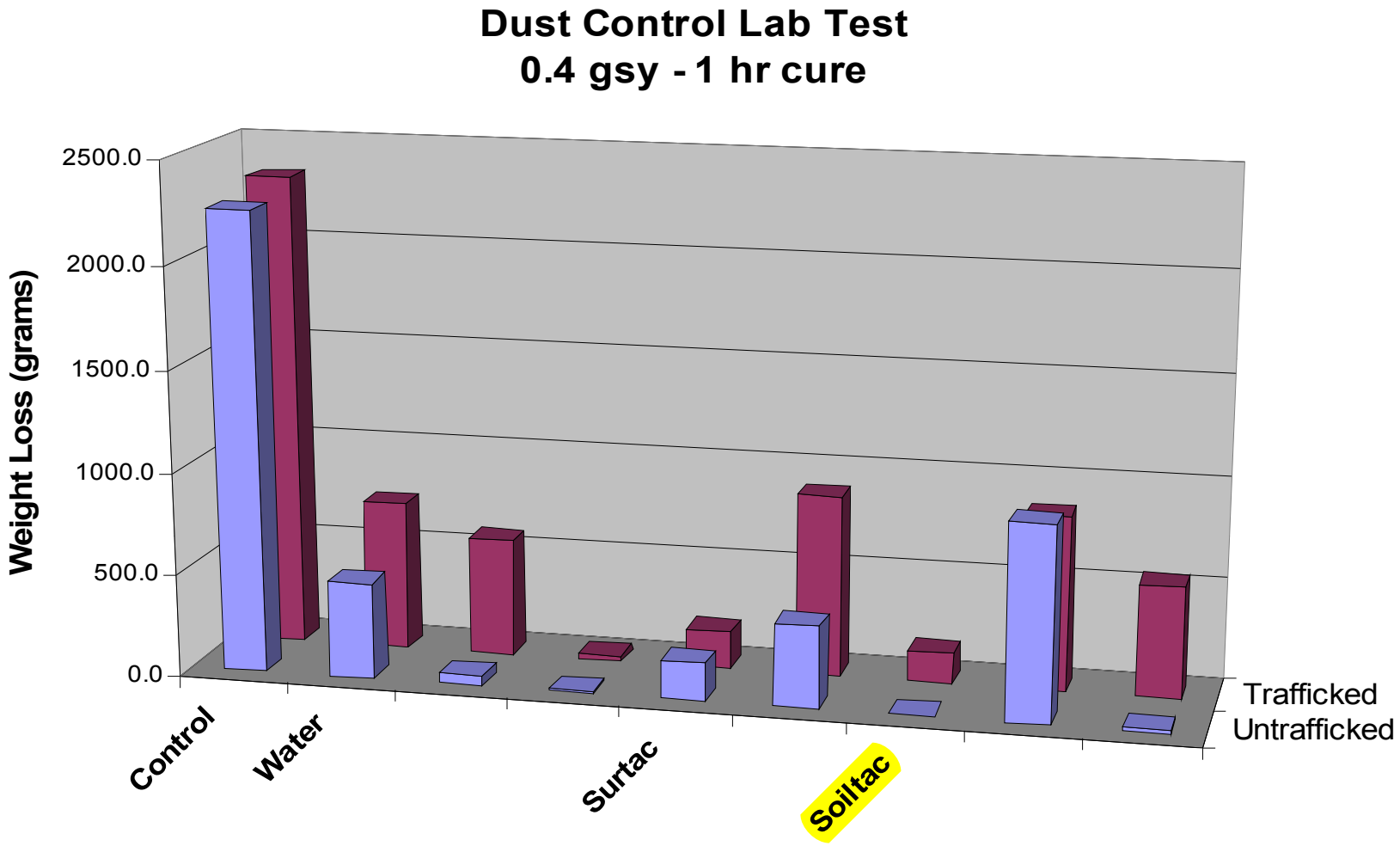
- **Field Evaluation of Dust Palliatives on Lines-of-Communication (Roads):**
  - Evaluate Dust Palliatives Under Truck Traffic
  - Evaluate Application Methods

LABORATORY TESTING FOR DUST ABATEMENT

- **Evaluate COTS Products Under Simulated Conditions:**
  - 18 COTS Products
  - 3 Different Soil Types (SM, SP, ML-CL)
  - Variable Dilution Ratios & Application Rates
  - Traffic Versus Non-Traffic Areas
  - Variable Cure Times

- **ANALYSIS ITEMS:**
  - Evaluate Airborne Dust Generation
  - Evaluate Penetration/Crust Thickness
  - Evaluate Sample Erosion/Weight Loss

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
- Develop Final Modifications for USMC Use

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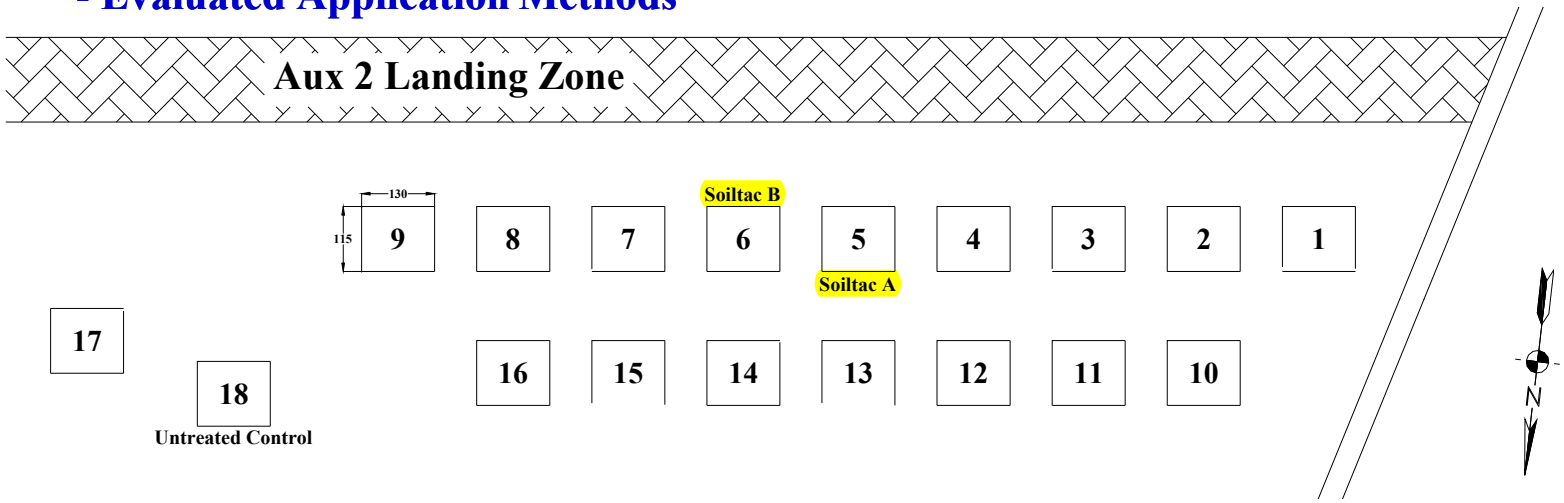
FIELD EVALUATION OF DUST PALLIATIVES ON HELIPADS

➢ YUMA FIELD TEST 2003:

- 18 Helipads
- Evaluated Application Methods



➢ YUMA FIELD TEST 2005:

- 16 Chemical and 7 Non-Liquid Helipads

FIELD EVALUATION OF DUST PALLIATIVES ON HELIPADS

➢ YUMA FIELD TEST 2003:

- Application Methods

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FIELD EVALUATION OF DUST PALLIATIVES ON HELIPADS

- **YUMA FIELD TEST 2003:**
  - Controlled Helicopter Landings
    - Approach/Land/Hover/Land/Depart
  - Pilot Feedback
  - Visual Observations of Ground Crew
  - Stationary Dust Collectors
  - Surface Evaluation Tests

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FIELD EVALUATION OF DUST PALLIATIVES ON HELIPADS

➢ YUMA FIELD TEST 2003:

- Specifications provided to MARCORP SYSCOM
- 3 Units - 900-Gallon Easy Lawn® Tandem-Axle Trailer Hydroseeders
- 3 Units - 1,200-GallonEasy Lawn® Skid-Mounted Hydroseeders for MTVRs
- Training Video Produced

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FIELD EVALUATION OF DUST PALLIATIVES ON HELIPADS

➢ YUMA FIELD TEST 2003:

Table14. Weighted Palliative Ratings[1]

Helipad	Paliative	Rating Factors: Rotor Wash Resistance (Rating x 5)	Palliative Durabilty (Rating X 2)	FOD Potential (Rating X 2)	Surface Condition (Rating X 1)	Weighted Rating (Up to 100)
5	Soiltac	40	20	15	10	85
18	Untrated	0	0	0	0	0

[1]Ratings 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 21January were incomplete, but indicated better performance of NRL helipads and Soiltac after short cure time of 3 days and before rainfall event.

- Soiltac®

Table 16. Dust Palliative Recommendations for Topical Application

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

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

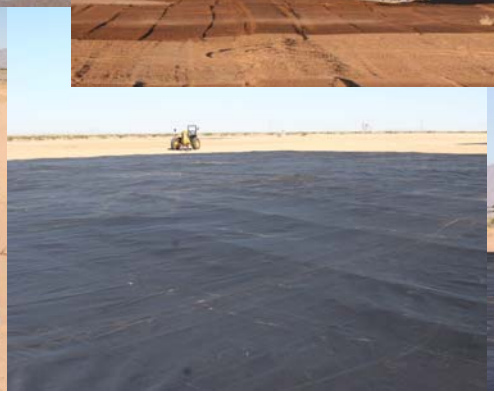
FIELD EVALUATION OF DUST PALLIATIVES ON HELIPADS

- **YUMA FIELD TEST 2005:**
  - **Durasoil®**





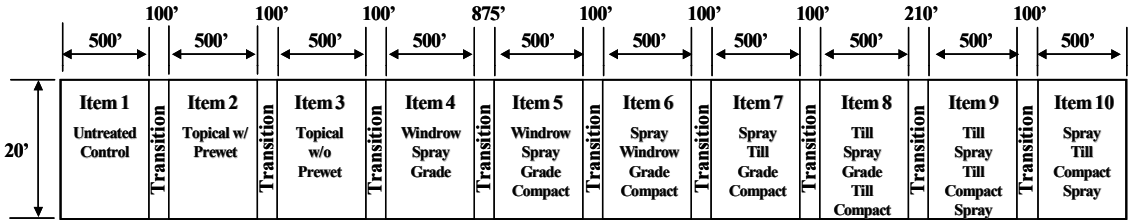


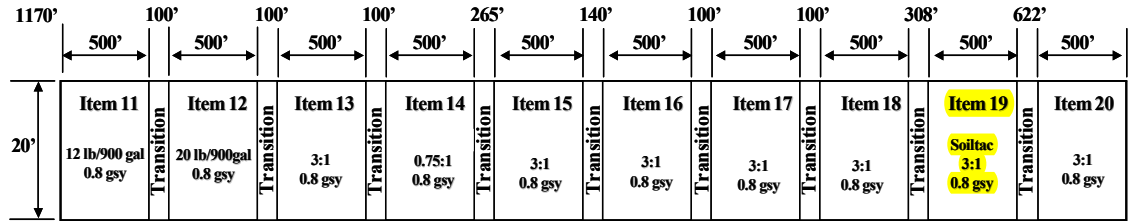

FIELD EVALUATION OF DUST PALLIATIVES ON ROADS

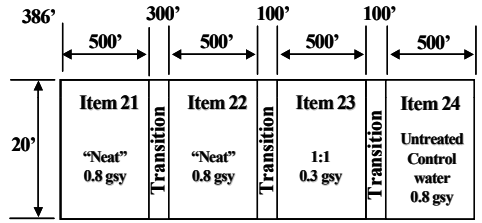
FIELD DEMONSTRATION - Douglas, AZ, March - 2004

- Evaluate Commercial Technologies for Applying Dust Palliatives for Large Areas
- Develop Process for Efficient Product Distribution and Sustained Effectiveness
- Construct Test Sections Using Chosen Distribution Method
- Compare Results of Mobile and Stationary Dust Collection Systems
- Identify Most Effective Products to Meet Military Needs



CONSTRUCTION PROCESSES PLAN





PALLIATIVE EVALUATION PLAN

Not To Scale

RECOMMENDED CONSTRUCTION PROCESS

- Spray half of product onto surface
- Immediately till to a depth of 3 in. with a rotary mixer
- Follow with compactor
- Spray remaining product

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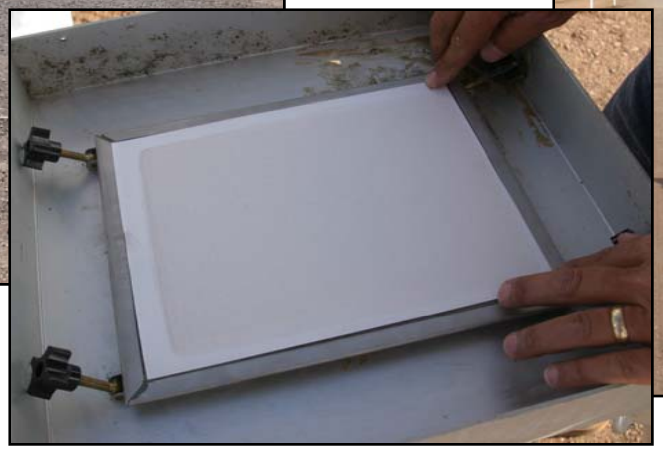
ERDC DATA COLLECTION

- Stationary dust collectors positioned on the downwind side of test section
- Ten passes with test vehicle traveling at 30 mph
- In-situ soil property measurements



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DUST PALLIATIVE EFFECTIVENESS RATING

Product	Surface Ravelling (20%)	Visual Dust Rating (30%)	ERDC Dust Reduction (25%)	MRI Dust Reduction (25%)	Total
Soiltac	5	8	9	9	**79**
	5	8	8	9	**77**
	4	7	9	9	**74**
	2	8	7	9	**68**
	0	6	3	7	**43**
	1	5	4	6	**42**
	1	4	5	5	**39**
	2	4	4	4	**36**
	1	5	3	4	**35**
	0	4	0	4	**22**
	0	2	6	0	**21**
	0	3	0	0	**9**
Control	0	2	0	0	**6**

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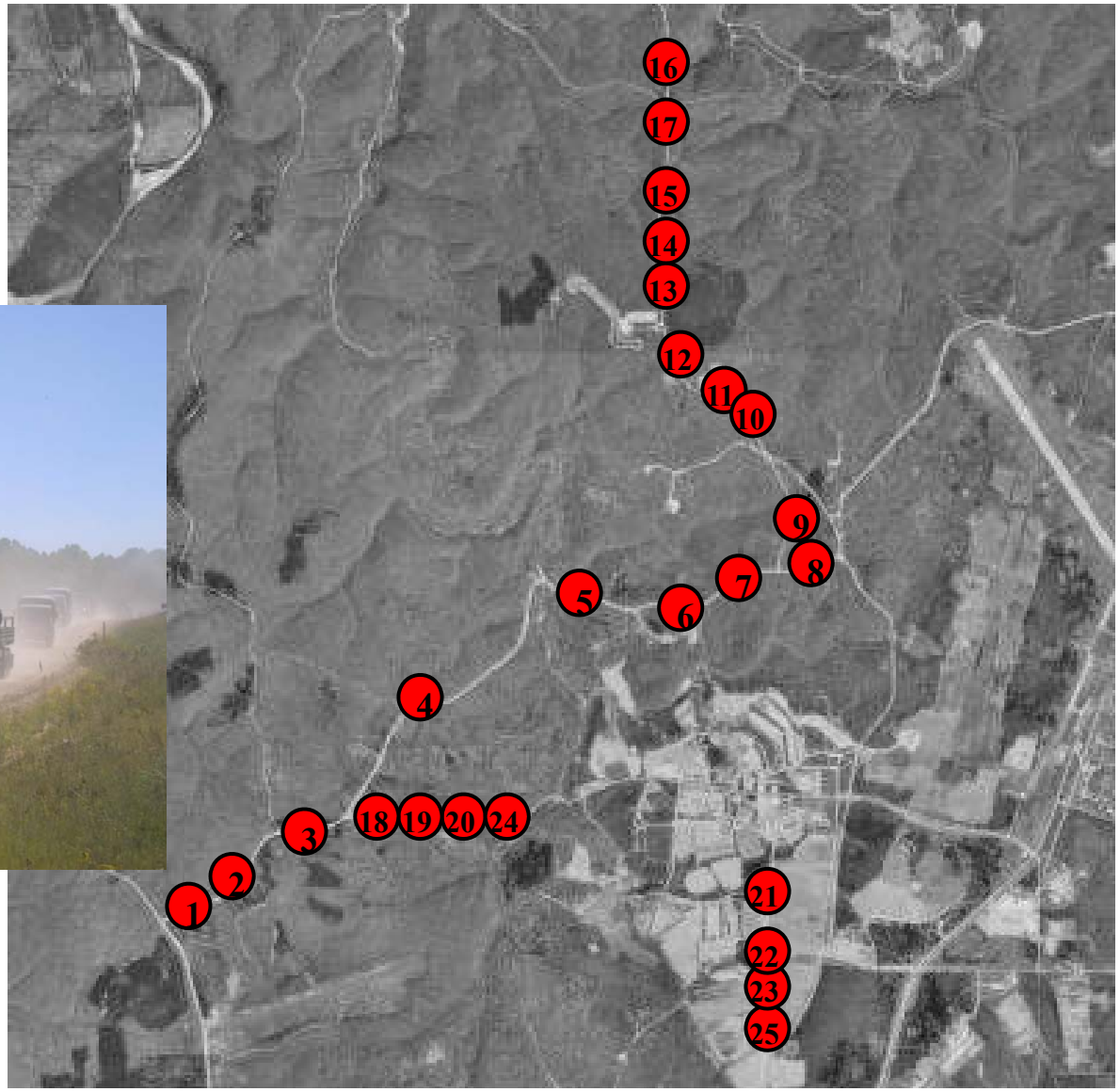
FORT LEONARD WOOD ROAD TEST

- 27 Test Sections
- 8 Dust Palliatives
- Evaluation of Construction Processes
- Evaluation of Product Effectiveness



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DUST COLLECTION SYSTEMS

Mobile

- Mounts to Receiver on Pickup
- Remote Controlled by Driver
- Continual Data Collection

Stationary

- Two Collectors Placed on Downwind Side of Road
- Collects Dust as Vehicle Passes

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CONSTRUCTION EQUIPMENT

Etnyre Asphalt Emulsion Distributor

- Spray Bar Width – 12 ft.
- Flow Rate - 110 gal/min

TEREX Reclaimer/Stabilizer

- Carbide Teeth (175)
- Cutter Depth – 2 in.

Caterpillar CS-563D

- Single-Drum, Vibratory Roller
- Weight – 26,680 lbs
- Vibration – 3000 vpm

PALLIATIVE RANKING

Section	Palliative	Application Method	Stationary Dust Collection Data		Mobile Dust Collection Data		Visual Rating
			Dust Collected (g)	Reduction from Pretreatment Data (%)	Dust Collected (g)	Reduction from Pretreatment Data (%)	
6		Admix	0.033	97	0.034	86	10
21		Topical	0.047	95	0.027	89	10
19	Durasoil	Admix	0.055	95	0.020	92	10
11		Admix	0.079	92	0.052	78	9
2	Soiltac	Admix	0.100	90	0.048	80	9
23	Surtac	Topical	0.143	86	0.047	80	9
18	Surtac	Admix	0.151	85	0.084	65	9
8		Admix	0.161	84	0.031	87	9
14	Durasoil	Topical	0.165	84	0.052	78	9
22	Durasoil	Topical	0.181	82	0.055	77	9
12	Surtac	Admix	0.187	82	0.055	77	9
7	Durasoil	Admix	0.198	81	0.038	84	9
5	Surtac	Admix	0.159	85	0.039	84	8
4		Admix	0.319	69	0.066	73	7
13		Topical	0.326	68	0.148	39	7
10	Soiltac	Admix	0.456	56	0.055	77	7
1		Admix	0.580	44	0.102	58	7
20		Topical	0.409	60	0.092	62	6
17		Topical	0.431	58	0.121	50	6
3		Admix	0.732	29	0.076	68	6
16	Water	Topical	0.724	30	0.085	65	5
15		Topical	0.764	26	0.066	73	5
25		Topical	0.486	53	0.092	62	4
24	Water	Topical	0.634	38	0.175	27	3

QUESTIONS

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