New Caltrans Tools to Implement Compost-Based BMPs

By:

Ron Alexander

Co-Manager, US Composting Council Seal of Testing Assurance Program

1212 Eastham Drive, Apex, NC 27502

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Many feedstocks,
production methods
/technologies,
test methods,
units of measure,
lab result forms….

The ‘industry’ and end users need continuity !

US COMPOSTING COUNCIL

Seal of Testing Assurance

If it isn't STA Compost…… What is it?

WHAT IS IT?

- Compost testing and information disclosure program (logo program)

PURPOSE…

- To improve customer confidence in compost selection
- To enhance compost's position as a mainstream horticultural, agricultural and retail product

GOALS:

- To improve customer confidence in compost selection (and utilization)
- To improve overall customer satisfaction, as well as ‘field’ results
- To improve compost purchasing decisions
- To promote customer-oriented composters
- Move industry towards standardized test methods

Promoting…..

…the appropriate product for a particular project, allowing for optimal ‘field’ results

Promoting
the proper use
of compost products,
reduces failures
in the ‘field’ –

Which hurts
end users and
composters !

BASICS - *Participating Composters will:*

- **Complete on-going product testing**

  -operate on-going sampling/testing regime

  -using uniform sampling and analytical testing methods (from the TMECC)

  -using only STA Program certified labs (list on website)

- **Disclose test data results (lab analyses) and provide appropriate end use instructions to end users**

  **** Treat compost like any other retail, horticultural, agricultural product marketed in the U.S.***

KEY PROGRAM ELEMENTS:

- **Specific compost information will be disclosed to customers (and the USCC) using a uniform label *(Compost Technical Data Sheet)***
  - **Compost test analysis results**
  - **List of compost ingredients**
  - **End use instructions**

US COMPOSTING COUNCIL

Seal of Testing Assurance

Barnes – Regional Composting
3511 West Cleveland Ave.
Huron, OH 44839
Telephone: 800-421-8722
Fax: 419-433-3555

Sample Date: 8/14/02

COMPOST TECHNICAL DATA SHEET

Compost Parameters	*Reported as (units of measure)*	*Test Results*	*Test Results*
Plant Nutrients:	%, weight basis	*%, wet weight basis*	*%, dry weight basis*
Nitrogen	Total N (TN or TKN+NO_3-N)	.72	1.12
Phosphorus	P_2O_5	.13	.21
Potassium	K_2O	.32	.50
Calcium	Ca	2.34	3.64
Magnesium	Mg	.57	.89
Moisture Content	%, wet weight basis	42	
Organic Matter Content	%, dry weight basis	31.31	
pH	unitless	7.4	
Soluble Salts *(electrical conductivity)*	dS/m (mmhos/cm)	3.49	
Particle Size	screen size passing through	½"	
Stability Indicator *(respirometry)* CO_2 Evolution	mg CO_2-C/g TS/day, AND	.14	
	mg CO_2-C/g OM/day	.5	
Maturity Indicator *(bioassay)* Percent Emergence, AND Relative Seedling Vigor	average % of control, AND	92	
	average % of control	86	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

Directions for Product Use:

New Lawns: Apply a 1-2" layer to soil and incorporate to a depth of 5-7", apply seed, then rake and water.

Flower Beds: Apply a 1-2" layer to soil and incorporate to a 6-8" depth. Condition soil this way every year to 2 years. Plant flowers and water.

Trees & Shrubs: Dig a hole 2/3 the depth of the root ball and at least twice as wide. Mix 1 part compost with 2 parts soil obtained from the planting hole. Place the tree or shrub in the planting hole and apply amended soil around the root ball. Firm soil occasionally and water.

Topsoil Manufacturing/Upgrading: Mix 1 part compost with 2 parts existing or purchased soil and blend uniformly.

Growing Mixes: Planter box or raised bed mixes can be produced by mixing 1 part compost to 1 part pine bark and 1 part soil, sand or expanded shale. Potting mixes should contain 1 part compost, 1 part peat moss or pine bark, and 1 part perlite, vermiculite, styrofoam, or other aggregate.

Mulching: Spread a 2-3" layer around trees, shrubs, and flowers. Always avoid placing mulches against plant trucks and stems.

Garden Beds (food crops): Apply a 1-2" layer to soil and till to a 6-8" depth. Reapply each year, or as per soil test recommendations.

NOTE: The USCC does not assess whether or not, or to what extent, these directions are sound, sufficient or otherwise appropriate. It is the participant's responsibility alone to ensure that they are.

Compost Ingredients:

Yard trimming, food by-products

This compost product has been sampled and tested as required by the Seal of Testing Assurance Program of the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by calling Barnes Nursery at 800-421-8722. The USCC makes no warranties regarding this product or its contents, quality, or suitability for any particular use.

For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing Assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at http://www.tmecc.org.

US COMPOSTING COUNCIL

Seal of Testing Assurance

Composter
Sample Report
Address
Texarkana
TX 75504-2008
Product Identification: Compost
Distribution Pile D-22

Date Sampled/Received: 04 Nov. 02 / 05 Nov. 02

COMPOST TECHNICAL DATA SHEET for Texas DOT

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 *tel:* 831.724.5422 *fax:* 831.724.3188

Compost Parameters	*Test Results*	*Reported as (units of measure)*	*TMECC Test Method*
Organic Matter Content	45.8	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)
pH	6.28	Unitless	04.11-A 1:5 Slurry pH
Soluble Salts (electrical conductivity)	2.98	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis
Particle Size	97.0 94.9	%, dry weight passing through 5/8th inch screen and 3/8th inch screen	02.02-B Sample Sieving for Aggregate Size Classification
Stability Indicator (respirometry) CO2 Evolution	0.43	mg CO2-C/g OM/day	05.08-B Carbon Dioxide Evoultion Rate
Maturity Indicator (bioassay) Percent Emergence	100	average % of control	05.05-A Germination and vigor Evolution rate
Relative Seedling Vigor	100	average % of control	05.05-A Germination and vigor
Select Pathogens (Fecal Cliform)	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms
Trace Metals	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	04.06-Heavy Metals standard, and Hazardous Elements

Laboratory Batch Number: Nov.-3-02 Laboratory Number: 167917112934

Analyst: Frank Shields

US COMPOSTING COUNCIL

Seal of Testing Assurance

Composter Name:

Washington State Department of Transportation

Sample Identification:_____

Date sampled/received:_____

COMPOST TECHNICAL DATA SHEET for Washington State DOT Projects

Compost Parameters	Specification Requirements	Test Results
Size Classification TMECC 02.02-B	%, dry weight passing through Sieve Size / Fine / Coarse 3" / / 100 2" / 100 / 1" / 99 – 100 / 90 – 100 ¾" / / 70 – 100 5/8" / 90 – 100 / ¼" / 75 - 100 / 40 – 60 **Maximum Particle Length 6"**	Sieve Size 3" 2" 1" ¾" 5/8" ¼" **Maximum Particle Length**
pH TMECC 04.11-A "1:5 slurry pH"	**6.0 min. and 8.5 max.**	
Manufactured Inert Material TMECC 03.08-A "% Dry weight basis"	**Less than 1.0%**	
Organic Matter Content TMECC 05.07 A "Loss-on-ignition Organic Matter Method"	**40% min.**	
Soluble Salt TMECC 04.10-A "Slurry Method, Mass Basis"	**Less than 4.0 mmhos/cm***	
Maturity Indicator TMECC 05.05 A "Germination and Vigor"	**Germination: 80% or greater** **Vigor: 80% or greater**	**Germination:**_____ **Vigor:**_____
Stability Indicator TMECC 05.08-B "Carbon Dioxide Evolution Rate"	**7 or below**	
Laboratory Batch Number: Laboratory Number:	Analyst:	

8-06

** Check for special provisions in Columbia River basin*

Customized for DOT inspectors, project managers ….

KEY PROGRAM ELEMENTS:

- **Participants will regularly sample and test their product using standardized protocols**
  - **Testing frequency is based on the volume of compost produced**
    - **1-6,250 tons — 1 per quarter**
    - **6,251-17,500 tons — 1 per 2 months**
    - **17,501 tons and above — 1 per month**

KEY PROGRAM ELEMENTS:

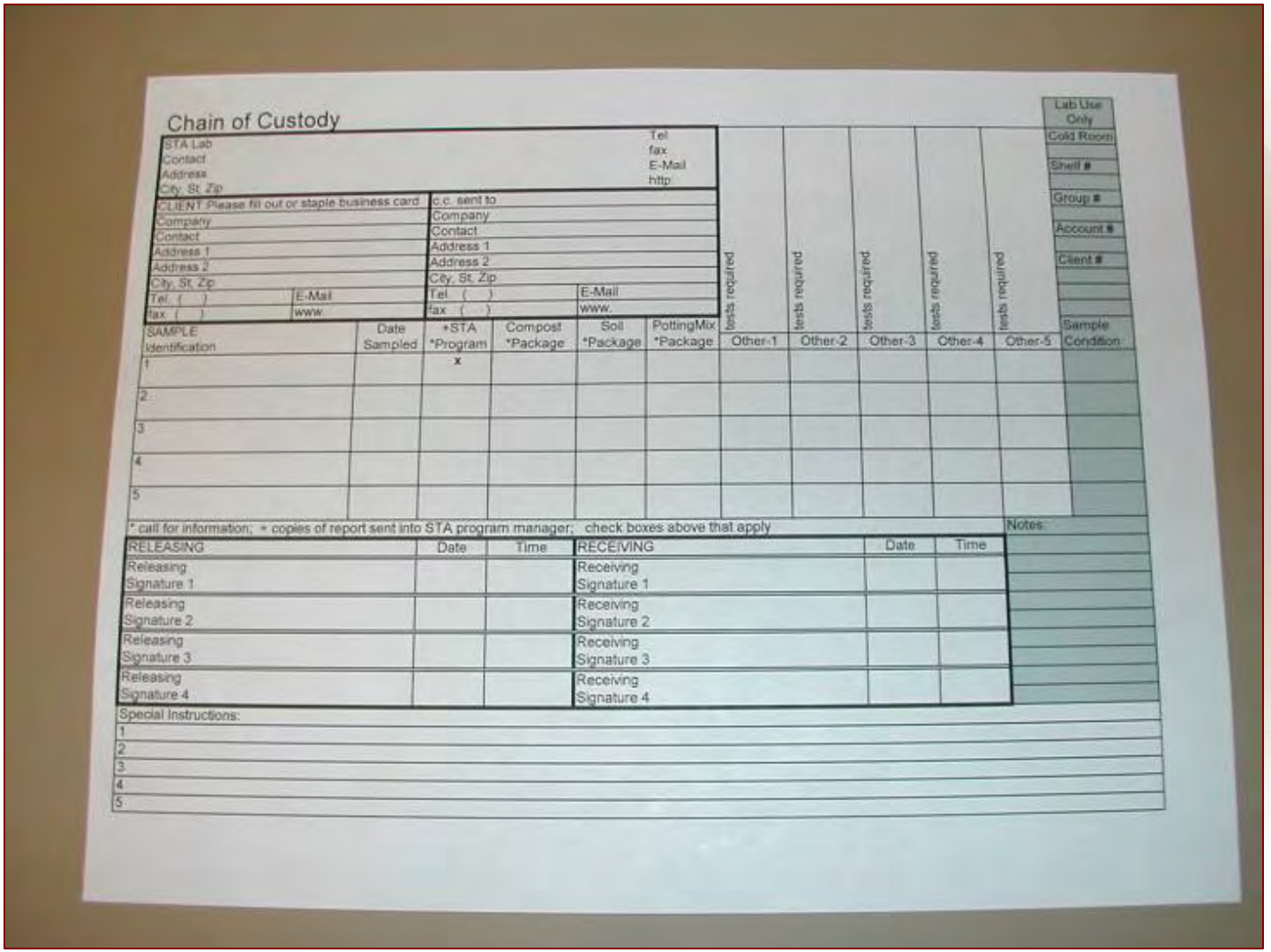
- **Participants will test for various parameters**
  - **pH, soluble salts, nutrients (N,P,K,Ca,Mg), moisture, organic matter, maturity (bioassay), stability (respirometry), particle size, pathogens & trace metals**
  - **All products will be required to meet 503 pathogen and trace metal requirements, as well as any state requirements**

KEY PROGRAM ELEMENTS:

- Compost testing will be performed at STA Program approved labs
- Approved labs are required to use test method protocols from the TMECC manual and participate in the Compost Analysis Proficiency Program
  - Administered by Utah State University and managed by Bob Miller of Colorado State University

STA Approved Labs

- Ag Analytical Services Lab – State College, PA
- A&L Canada Labs – London, Ontario
- A&L Great Lakes Labs, Inc. – Ft. Wayne, IN
- Colorado Analytical Lab – Brighton, CO
- Energy Laboratories, Casper, WY
- Soil Control Laboratory – Watsonville, CA
- Tarleton State University, Stephenville, TX
- Woods End Research Lab – Mt. Vernon, ME



Chain of Custody

STA Lab
Contact
Address
City, St, Zip
Tel
fax
E-Mail
http

CLIENT Please fill out or staple business card
Company
Contact
Address 1
Address 2
City, St, Zip
Tel. ( )
fax ( )
E-Mail
www.

c.c. sent to
Company
Contact
Address 1
Address 2
City, St, Zip
Tel. ( )
fax ( )
E-Mail
www.

SAMPLE Identification	Date Sampled	+STA *Program	Compost *Package	Soil *Package	PottingMix *Package	tests required Other-1	tests required Other-2	tests required Other-3	tests required Other-4	tests required Other-5	Sample Condition
1		x									
2											
3											
4											
5											

Lab Use Only
Cold Room
Shelf #
Group #
Account #
Client #

* call for information; + copies of report sent into STA program manager; check boxes above that apply

Notes

RELEASING	Date	Time	RECEIVING	Date	Time
Releasing Signature 1			Receiving Signature 1		
Releasing Signature 2			Receiving Signature 2		
Releasing Signature 3			Receiving Signature 3		
Releasing Signature 4			Receiving Signature 4		

Special Instructions:
1
2
3
4
5

Use proper sampling procedures, chain of custody form

TMECC History

- 1st Draft of TMECC: 1995
  - Developed during MN-CUP Project, 1993
- TMECC Enhancement
  - Added methods and parameters
    - Final draft contained over 100 pages
- Peer-Review of TMECC: 1998-2000
  - Recruited 9 experts as team leaders
  - 71 experts participated in review
- USDA's Working Draft: August 2001
  - USGPO editorial review completion: 2002

KEY PROGRAM ELEMENTS:

- Participants can use the program logo in their in-house promotional activities
- Participants will be included in program sponsored educational activities

Work with Specifying Organizations and Companies

RMRC / AASHTO

EPA

DOTs

Articles

Other Benefits

- Acts as a framework to allow the implementation of established numerical product specifications
  - State DOTs, other
- Assists in the implementation of an inspection or quality verification program
- Can serve a quality control function (and provide promotional benefits) for composters
- Standardizes a set of test parameters (and methods) for use in evaluating compost product quality
  - Some composters have been reluctant to spend money on testing

Seal of Testing Assurance Program

Program 'Stats' – 8/06

- Companies in the STA Program = 103
- Compost Products in the STA Program = 137
- Compost volume in the STA Program =
  Approx. 2,429,290 tons, or
  Approx. 4,858,580 cubic yards
- States with STA participants = 29
- Labs in STA Program = 8

California Participants

- BFI of Northern California – Milpitas
- CCL Organics LLC – Benicia
- Engel & Gray, Inc. – Santa Maria
- Grover Environmental – Modesto
- Norcal Waste Systems – Marysville, Vacaville, Gilroy
- San Joaquin Composting Inc. - Lost Hills
- Sun-Land Garden Products - Watsonville
- Synagro – Corona
- Z-Best Products - Gilroy

DOTs Requiring STA Certification

- California
- Georgia
- Iowa – pending
- New York State – pending
- Pennsylvania
- Texas
- Washington State

Are other specifying entities, too

US Composting Council
Seal of Testing Assurance Program

If it isn't STA Compost…what is it?

Contact: Al Rattie, 215-258-5259

Ron Alexander, 919-367-8350

Program Managers

You're Not Alone !

- Compost use by DOTs in landscaping and erosion control applications has become widespread
  - Have been excellent field results
- STA requirement is becoming more popular with 'specifying' agencies

EXAMPLES

DOT ‘Soil Amendment’ Compost Use Data

- 31 states with compost, or related, specs
- 26 spec for soil amending and topsoil manufacturing, 11 for planting backfill
- Specify by name (compost) or through “special provisions”
- Allow various feedstocks (some restrict)

(2001 data)

Many Applications

DOT 'Erosion Control' Compost Use Data

- 10 states allow compost, and related products, for erosion control
  - CA, CT, ID, ME, MI, MT, OR, TX, VA, WA
- Allow various feedstocks
  - Yard trimmings (7), biosolids (5)
  - Food, manure, agricultural residuals (3)
  - Wood, forestry residuals, unspecified (on list) (2)
  - MSW (1)

(2001 data)

California Erosion Control Research

- 1993 – Evaluation of Compost on Landscaped Freeway Roads (Caltrans)
- 2000-2005 – Various Roadside Vegetation and Management Studies (Cal Poly State University)
- 2002 Use of Compost and Co-Compost as a Primary Erosion Control Material (Univ. of California, Davis)

Is a lot of research to justify/back-up the use of compost in erosion control (and many other roadside) applications

PROGRESSION…

Successful Compost Erosion Control States

- California
- Iowa
- Maine
- Minnesota
- Oregon
- Texas
- Virginia
- Washington

Compost Usage of Compost in Erosion and Sediment Control

Started with Compost Blanket Applications

Clyde Walton

Maine DOT – Maintenance & Construction responsibilities

Compost Filter Berms, then Socks

Standard Specifications for

Compost for Erosion/Sediment Control

- **Compost Blankets MP-10**
- **Filter Berms MP-9**

American Association of State Highway and Transportation Officials
444 North Capitol Street N.W., Suite 249
Washington, D.C. 20001

Landmark Dates

- Maine DOT – usage dates back to 1989 (RCS)
- Portland Metro research and report (W&H Pacific) – 1993/4
- University of CT berm research – 1998-2001
- AASHTO blanket and berm specifications (RMRC report) – 2003
- USEPA endorse specifications – 2006
- AASHTO filter sock specification - 2006

The Texas Experience

Barrie Cogburn
Landscape Architect
TxDOT Design Division

Scott McCoy
Program Specialist
TNRCC

Item 1027:
“Furnishing & Placing Compost”

- Erosion Control Compost
- General Use Compost
- Compost for Manufactured Topsoil

Item 1034:
“Mulch/Compost Filter Berm for Erosion & Sedimentation Control”

Texas Department of Transportation

TNRCC

2001

Special Specification Item 1027: "Furnishing & Placing Compost"

- Erosion Control Compost
- General Use Compost
- Compost for Manufactured Topsoil

Having great success,
and wanted to protect it

Dallas/Spur 408 Demonstration August 1999 / May 2000

Changes to the TxDOT Specification

- **No more Solvita field test**
- **TMECC test methods**
- **All compost must be Seal of Testing Assurance certified**

Item 1058 Compost
2. Materials.

Provide compost meeting all applicable United States Code of Federal Regulations (CFR), Title 40, Part 503 standards for Class A biosolids and Texas Commission on Environmental Quality (TCEQ) health and safety regulations as defined in the Texas Administrative Code (TAC), Chapter 332, including the time and temperature standards in Subchapter B, Part 23. Meet the requirements of the USCC Seal of Testing Assurance (STA) program.

Before delivery of the compost, provide QC documentation that includes the following:

- the feedstock by percentage in the final compost product,
- a statement that the compost meets federal and state health and safety regulations,
- a statement that the composting process has met time and temperature requirements,
- a copy of the producer's STA certification, and
- a copy of the lab analysis, performed by an STA-certified lab, verifying that the compost meets the requirements of Table 1.

ABC Compost Specialist
123 Compost Way
Anyplace Texas 12345

Dear Sirs/Madam,

In accordance with the Texas Department of Transportation (TxDOT) Special Specification Item 1027, "Furnishing and Placing Compost", I affirm the following un
(3) Documentation.

(A) The compost contains a minimum of 65% by volume of recycled materials.

(B) A list of feedstock by percentage in the final compost product:
1.
2.
3.
4.

(C) The compost meets federal and state health and safety regulations.

(D) The compost meets time and temperature requirements.

(E) A copy of the lab analysis less than 3 months old and that the compost meets th
physical requirements described in Table 1 in Special Specification Item 1027.

Scott Compost, President ABC Compost Specialist Date:
Signature Before a Notary Public

Notary Public Signature and Seal Date:

US COMPOSTING COUNCIL
Seal of Testing Assurance

Composter
Sample Report
Address
Texarkana
TX 75504-2008

Product Identification: Compost
Distribution Pile D-22

Date Sampled/Received: 04 Nov. 02 / 05 Nov. 02

COMPOST TECHNICAL DATA SHEET for Texas DOT

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 *tel:* 831.724.5422 *fax:* 831.724.3188

Compost Parameters	*Test Results*	*Reported as (units of measure)*	*TMECC Test Method*
Organic Matter Content	45.8	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)
pH	6.28	Unitless	04.11-A 1:5 Slurry pH
Soluble Salts (electrical conductivity)	2.98	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis
Particle Size	97.0 94.9	%, dry weight passing through 5/8th inch screen and 3/8th inch screen	02.02-B Sample Sieving for Aggregate Size Classification
Stability Indicator (respirometry) CO2 Evolution	0.43	mg CO2-C/g OM/day	05.08-B Carbon Dioxide Evoultion Rate
Maturity Indicator (bioassay) Percent Emergence	100	average % of control	05.05-A Germination and vigor Evolution rate
Relative Seedling Vigor	100	average % of control	05.05-A Germination and vigor
Select Pathogens (Fecal Cliform)	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms
Trace Metals	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	04.06-Heavy Metals standard, and Hazardous Elements

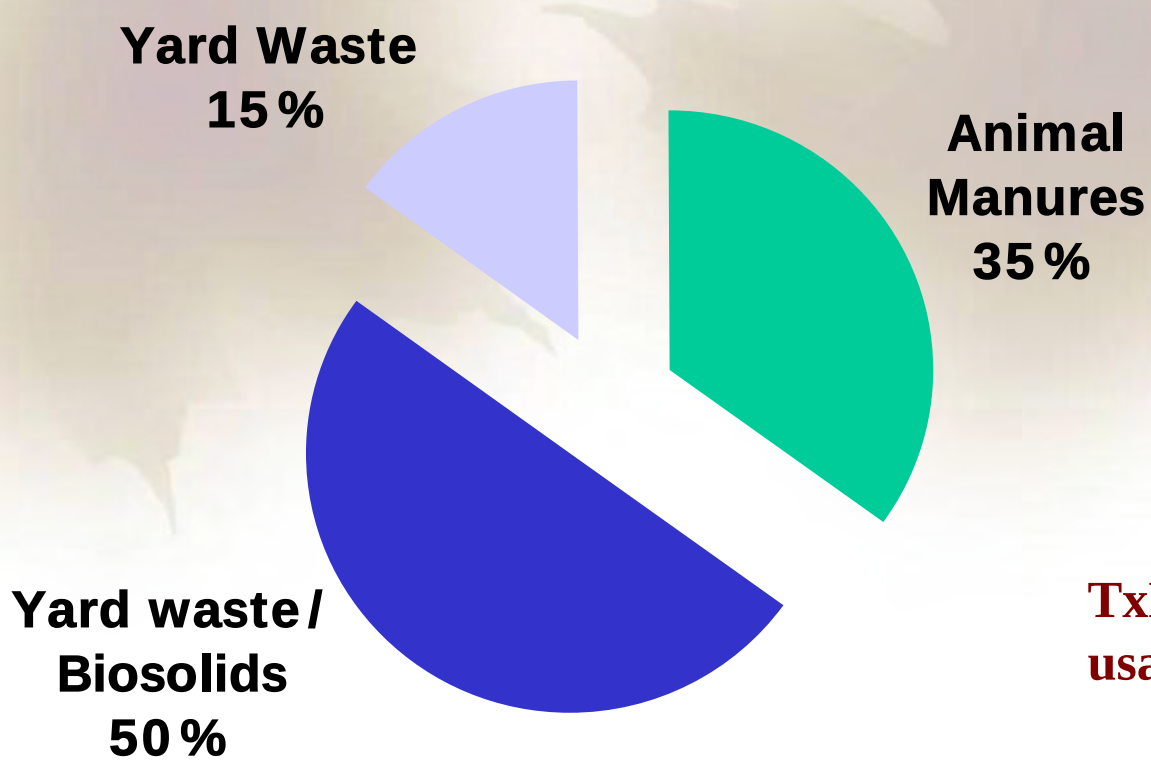
Laboratory Batch Number: Nov.-3-02 Laboratory Number: 167917112934
Analyst: Frank Shields

STA Certified Compost Suppliers in Texas

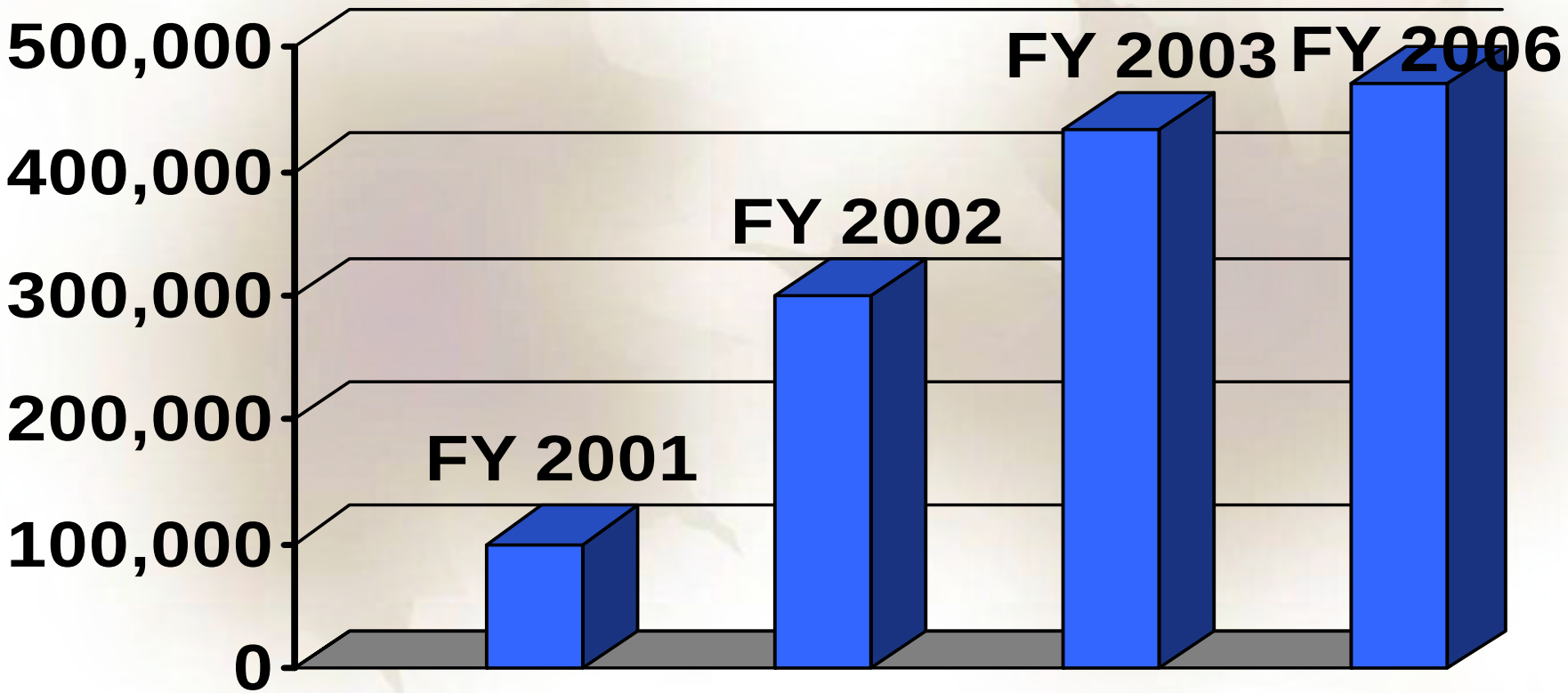
Angelina & Neches River Authority
Back to Nature, Inc.
Black Gold Compost
City of Denton
City of Plano
Garden Success, Inc.
Garden-Ville
Geosource, Inc.
Living Earth Technologies
Natural Fertilizer Company
New Earth LLC
O'Neal's Compost
Organic Residuals Reclamation, LLC
R.J. Smelley Company
Texarkana Water Utilities

**Composter Certification is Tracked by TxDOT on USCC/STA websites*

Types of Composts Being Utilized by TxDOT



TxDOT tracks usage and success



Cubic Yards of Compost Specified (FY)

Seal of Testing Assurance Program

TEXAS GROWTH

2000 – 2002

- 4 composters

2003

19 new

23 total

2004

- 8 new
- 31 total

2006

8 new

39 total

2002 AASHTO President's Transportation Award

Build it and they come (join)

Taking similar steps in CA..

- BFI of Northern California – Milpitas
- CCL Organics LLC – Benicia
- Engel & Gray, Inc. – Santa Maria
- Grover Environmental – Modesto
- Norcal Waste Systems – Marysville, Vacaville, Gilroy
- Rossi Transport Service – Templeton
- San Joaquin Composting Inc. - Lost Hills
- Sun-Land Garden Products - Watsonville
- Synagro - Corona

US COMPOSTING COUNCIL
Seal of Testing Assurance

#REF!
#REF!
#REF!
#REF!
#REF!

Product Identification: #REF!

Caltrans

Date Sampled/Received: #REF!

COMPOST TECHNICAL DATA SHEET for Caltrans

LABORATORY:

Compost Parameters	*Test Results*	*Reported as (units of measure)*	*TMECC Test Method*
pH	0.00	Unitless	04.11-A 1:5 Slurry pH
Soluble Salts (electrical conductivity)	#DIV/0!	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis
Moisture content		%, dry weight basis	03.09-A - Total Solids and Moisture (at 70+/- 5C)
Organic Matter Content	0.0	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)
Maturity Indicator (bioassay) Percent Emergence Relative Seedling Vigor		 average % of control average % of control	05.05-A Germination and vigor
Stability Indicator	NA	mg CO2-C/g OM/day	05.08-B Carbon Dioxide Evolution Rate
Particle Size		%, dry weight passing through	02.02-B Sample Sieving for Aggregate Size Classification
Pathogens		PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms
Pathogens		PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.02 Salmonella
Physical Contaminants		%, dry weight basis	02.02-C - Man-Made Inerts Total content
Physical Contaminants		%, dry weight basis	02.02-C - Man-Made Inerts Sharps content
Heavy Metals Content	#DIV/0!	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3	04.06-Heavy Metals standard, and Hazardous Elements

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Laboratory Batch Number: May-1Misc.-06 Laboratory Number:

Analyst:

Costs for Participation

- Annual participation fee of $650/non USCC member, $500/member + testing costs ($300 - $400/sample)
  - Participation fee covers program management and promotional activities
- Cost estimates
  - 10,000 yd3 composting facility - $.12 - .20/yd3
  - 50,000 yd3 composting facility - $.05 - .10/yd3

US COMPOSTING COUNCIL

15TH ANNUAL CONFERENCE AND TRADESHOW
THE WYNDHAM ORLANDO RESORT
ORLANDO, FLORIDA | JAN 21–24, 2007

MAKE PLANS NOW TO ATTEND THE 15TH ANNUAL CONFERENCE IN ORLANDO, FLORIDA! JANUARY 2007!

The Largest Composting Conference and Exhibition Targeted for the Composting, Wood Waste, and Organics Recycling Industry in North America

The Only Composting Conference and Exhibition Run by and for Composting and Wood Waste Professionals

Exhibitor Information, Equipment Demonstration Opportunities, Sponsorship Opportunities & Registration Forms are available at www.compostingcouncil.org or call the USCC at 631-737-4931

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Specialized Environmental Technologies
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Scarab Manufacturing
Filtrexx International
Amadas Industries
Scotia Machinery
EKO Compost
A-1 Organics
ALLU Group
Synagro
Garick Paygro Division
Barnes Nursery, Inc
ROTO-MIX

USCC 15th ANNUAL CONFERENCE & TRADE SHOW

WYNDHAM ORLANDO RESORT | ORLANDO, FLORIDA

JANUARY 21-24, 2007

Membership and other information

US Composting Council

4250 Veterans Memorial Highway, Suite 275

Holbrook, NY 11741 | 631-737-4931 | 631-737-4939 fax

uscc@compostingcouncil.org | www.compostingcouncil.org

US Composting Council

Voice of the US Composting Industry