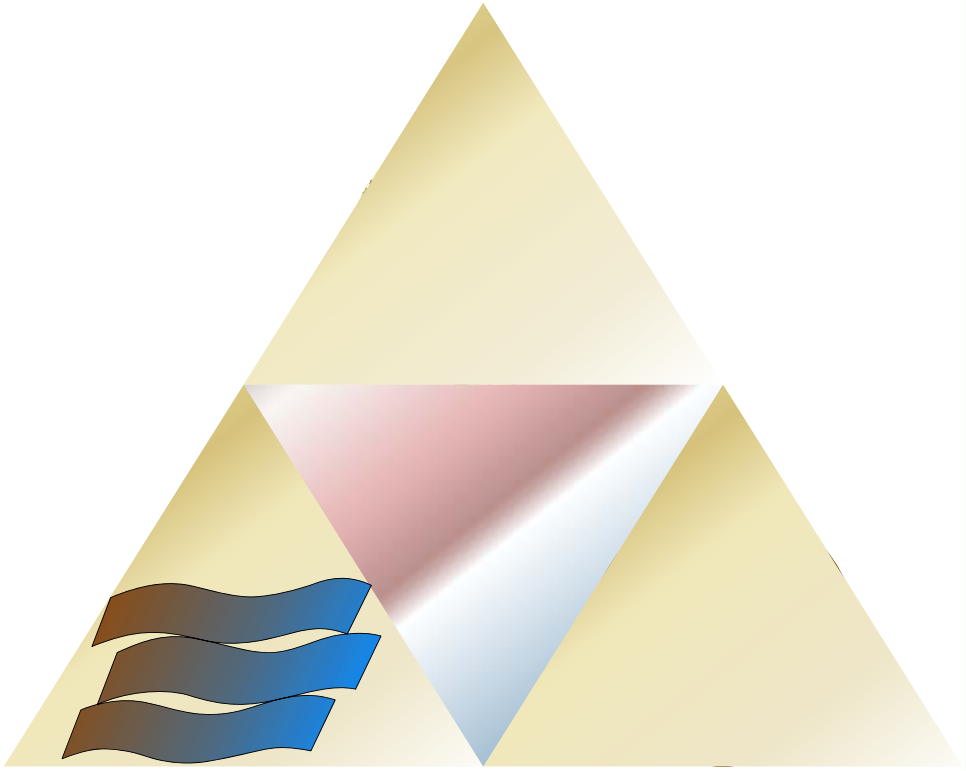
PIMA COUNTY BIOSOLIDS YESTERDAY, TODAY AND TOMORROW

SUSTAINABILITY FOR A SUCCESSFUL COMMUNITY



JACKSON JENKINS

DEPUTY DIRECTOR

TREATMENT DIVISION - RWRD

HOUSSAM ELJERDI

TECHNICAL SERVICES MANAGER

CRAO - RWRD

MAY 20TH, 2010

RWRAC

PIMA COUNTY REGIONAL WASTEWATER RECLAMATION DEPARTMENT

COMPLIANCE AND REGULATORY AFFAIRS OFFICE

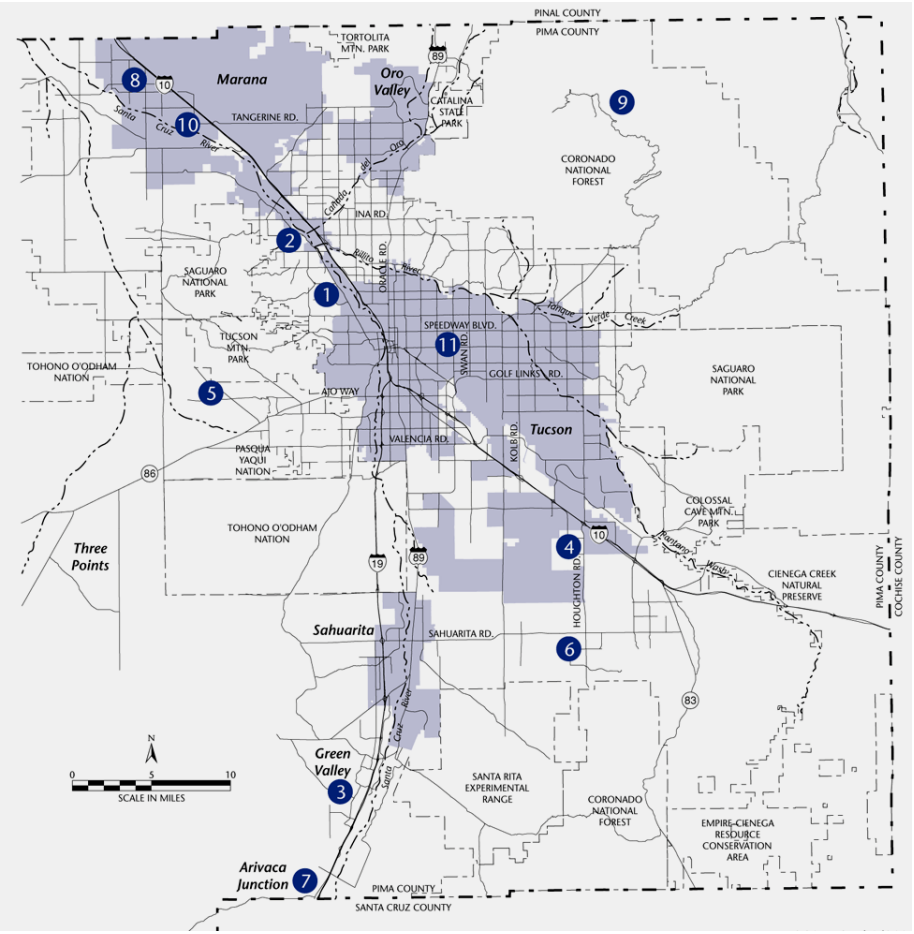
- Here Is Where We Are
- Today And Yesterday
- Chemical Make-up of Our Biosolids
- Pima County Compared to Arizona
- Pima County Compared to Nation
- “Regulations” A Driver
- Concerns
- Tomorrow
- Discussion

Here Is Where We Are

Total Capacity: 91.7 MGD

1. Roger Road WRF	41 MGD
2. Ina Road WRF	37.5 MGD
3. Green Valley WRF	4.1 MGD
4. Fairgrounds WRF	0.02 MGD
5. Avra Valley WRF	4 MGD
6. Corona de Tucson WRF	1.3 MGD
7. Arivaca Junction WRF	0.1 MGD
8. Marana WRF	0.7 MGD
9. Mt. Lemmon WRF	0.0125 MGD
10. Rillito Vista WRF	0.015 MGD
11. Randolph Park WRF	3.0 MGD

Total Daily Influent: 65.3 MGD
71% of Existing Capacity

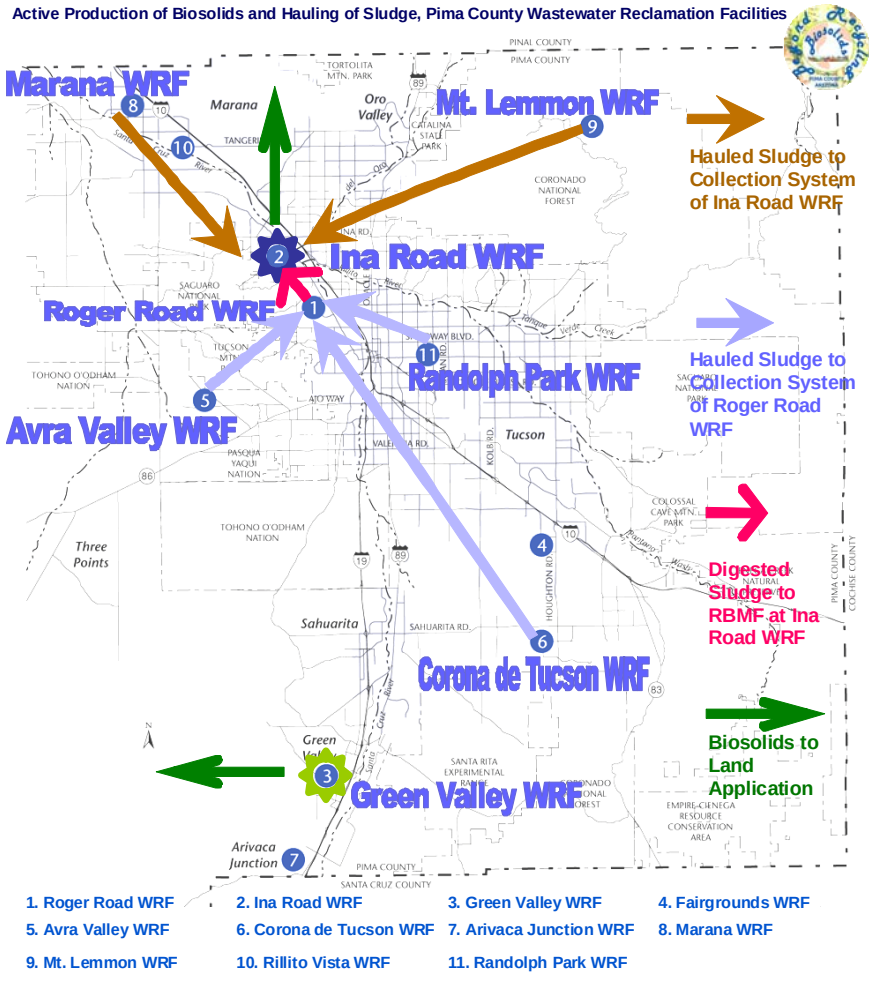


May 2010

Here Is Where We Are

Two (2) Facilities Actively Producing Biosolids:

- **Regional Biosolids Management Facility at Ina Road WRF.**
- **Green Valley WRF**



May 2010

Here Is Where We Are

10,329 Dry Tons; 32 MG
5,289 Tanker Loads

54 Dry Tons
1.6 MG
350 Tanker Loads

< 1 Dry Ton
0.05 MG
11 Tanker Loads

556 Dry Tons; 29 MG
Pipe Conveyance

352 Dry Tons
8.5 MG
1,862 Tanker Loads

31 Dry Tons
0.9 MG
197 Tanker Loads

ASARCO
Mine Tailing Reclamation

298 Dry Tons
39 Dump Truck Loads
410 Cubic Yards

May 2010

Here Is Where We Are

10,329 Dry Tons
32 MG
5,289 Tanker Loads

438 Dry Tons
11.1 MG
2,420 Tanker Loads

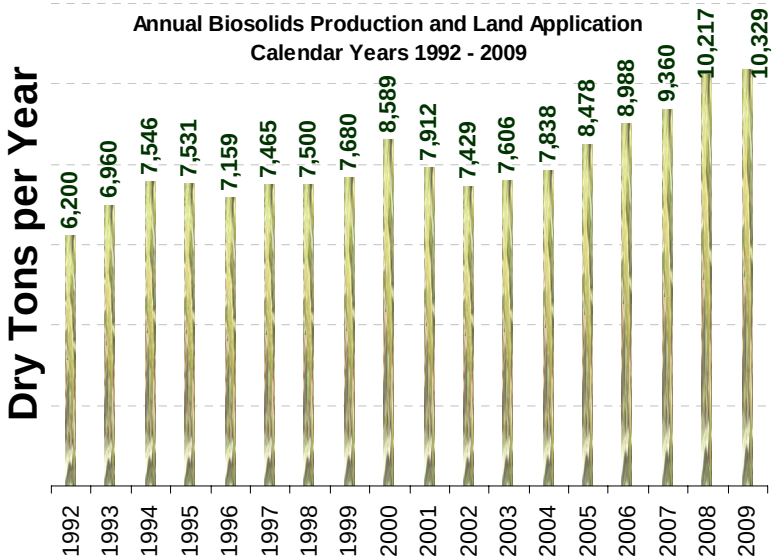
556 Dry Tons
29 MG
Pipe Conveyance

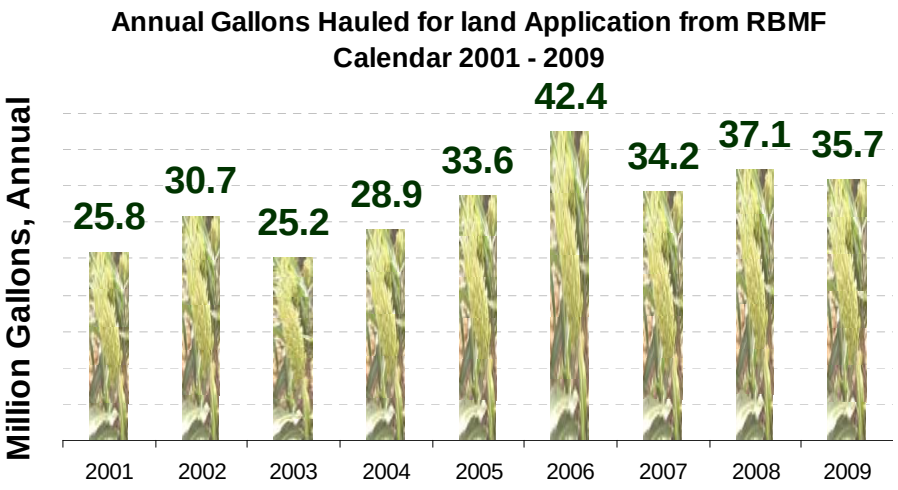
298 Dry Tons
410 Cubic Yards
39 Dump Truck Loads

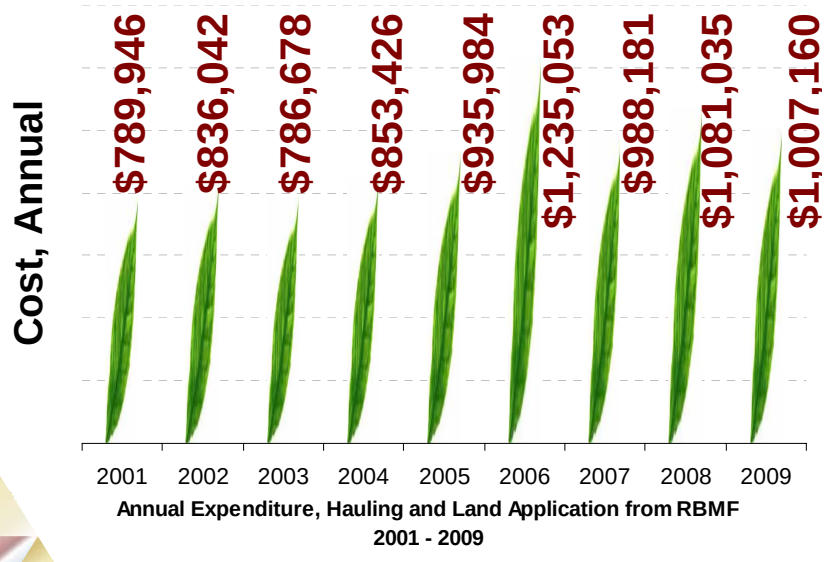
May 2010

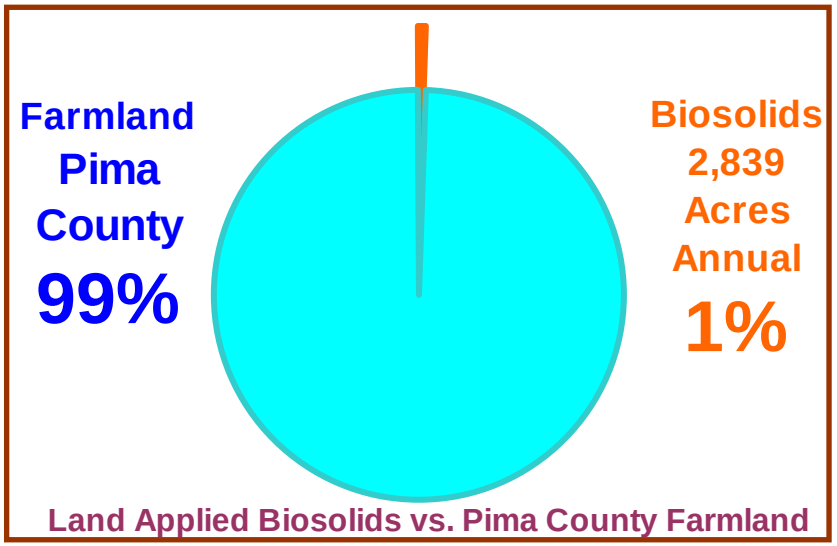
Today and Yesterday

Agricultural Land Application







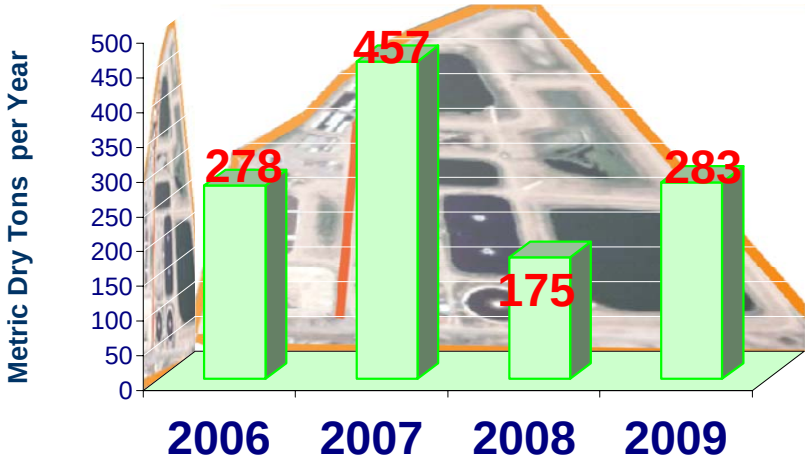


May 2010

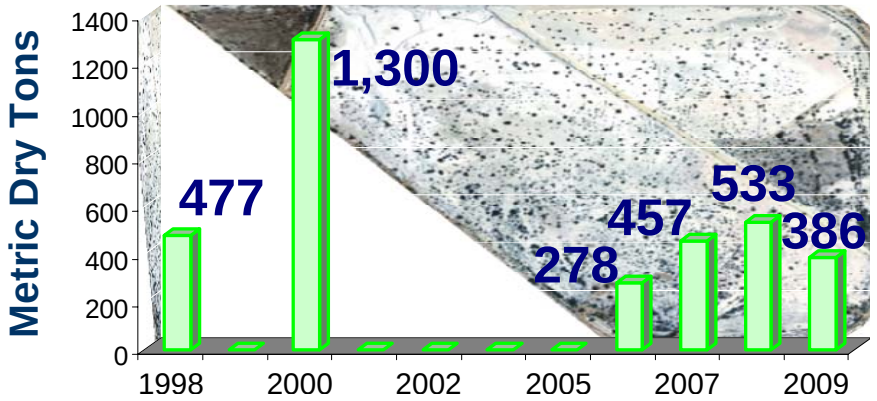
Today and Yesterday

Mine Tailing Reclamation

Production Biosolids, Green Valley BNROD; 2006 - 2009



Mine Tailing Reclamation Activity; 1998 - 2009
Impoundment #5 Mission Complex - ASARCO



Mine Tailing Reclamation Activity; 1998 - 2009
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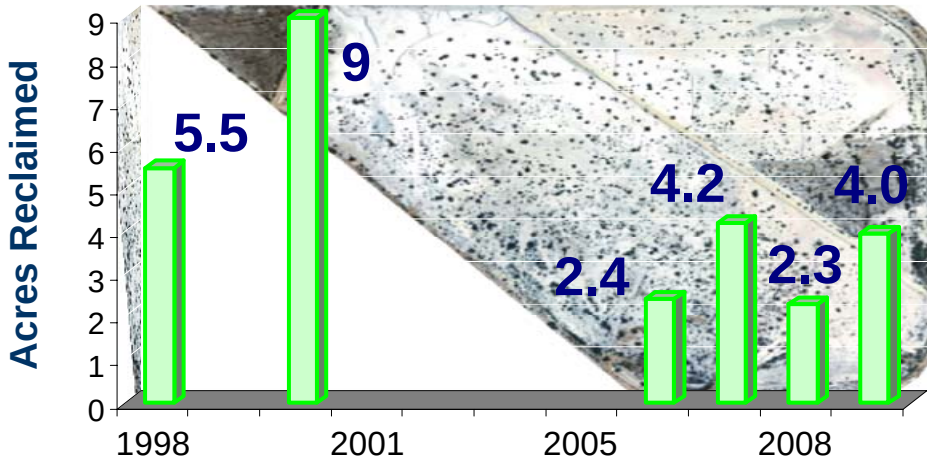
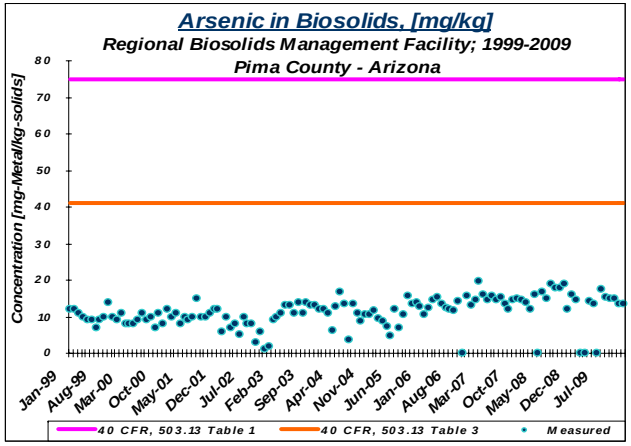
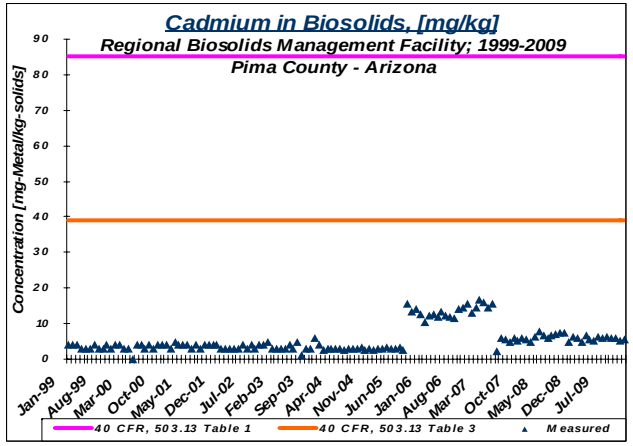
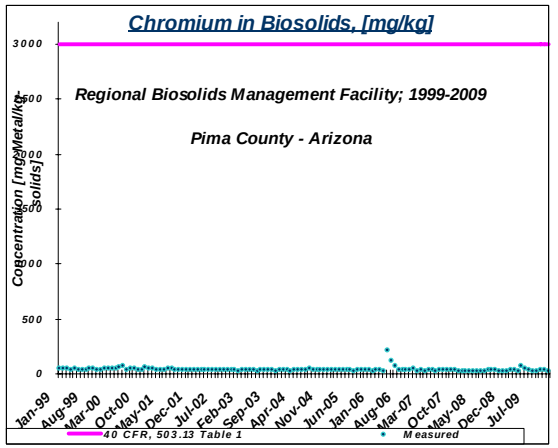


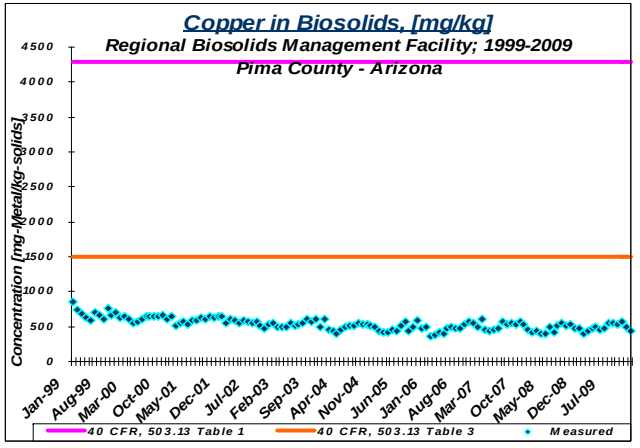
May 2010

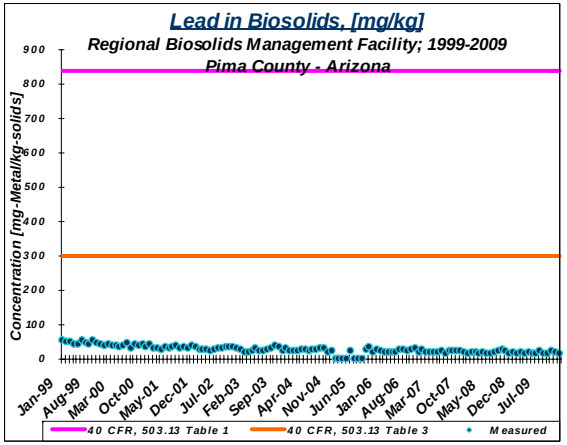
Chemical Make-up of Our Biosolids

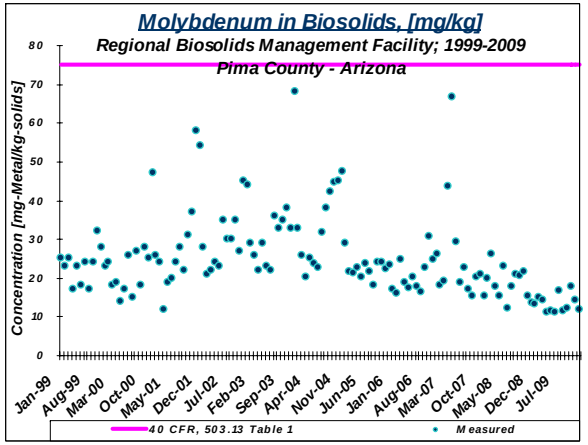






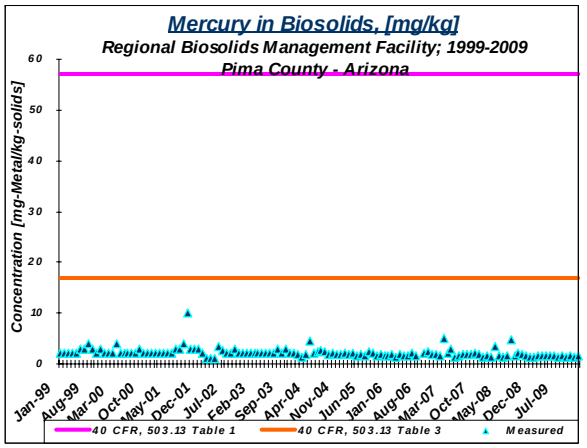


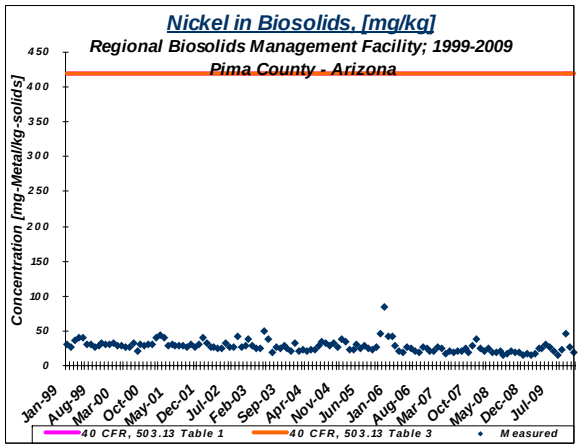


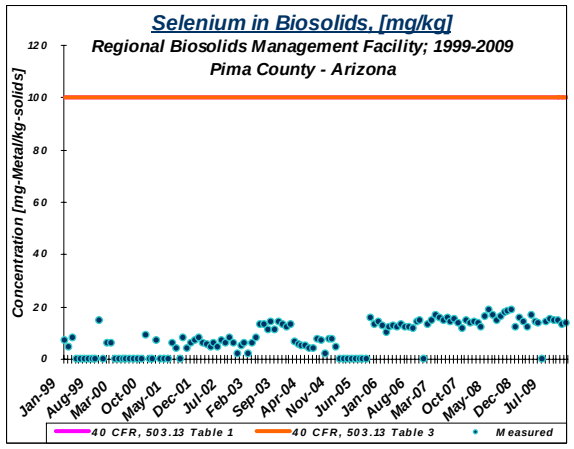


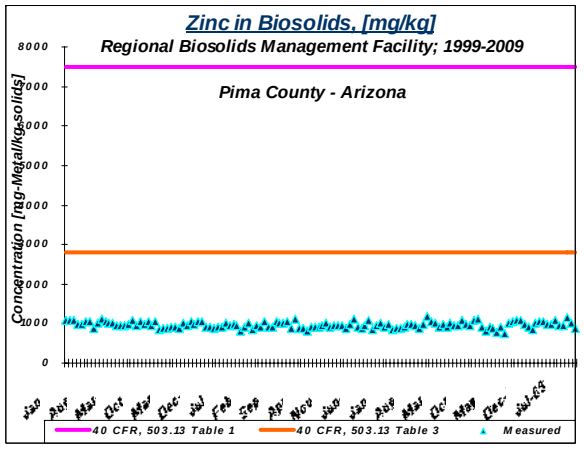
May 2010

Chemical Make-up of Our Biosolids









The Biosolids Quality

Pathogen Reduction

- Class B biosolids.
- Anaerobic digestion > 15 days at ≥ 35° C.

Vector Attraction Reduction

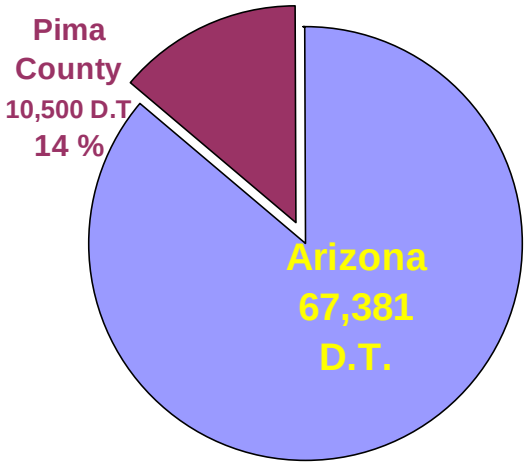
- Reducing volatile solids ≥ 38%.

Constituents in Biosolids; RBMF
March 1, 2010

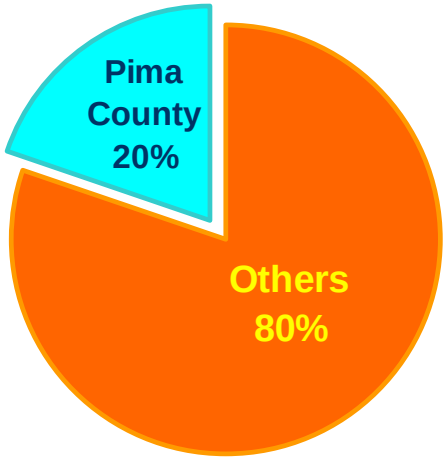
	mg/kg
Aluminum	12800
Boron	50
Calcium	49100
Chloride	2080
Iron	8200
Magnesium	4460
Manganese	150
Ammonia, Nitrogen	39100
Nitrate and Nitrite, Nitrogen	1
Nitrogen, TKN	77600
pH	7.58
Phosphorus	23300
Potassium	2550
Silver	14
Sodium	2930
Sulfur	10800

May 2010

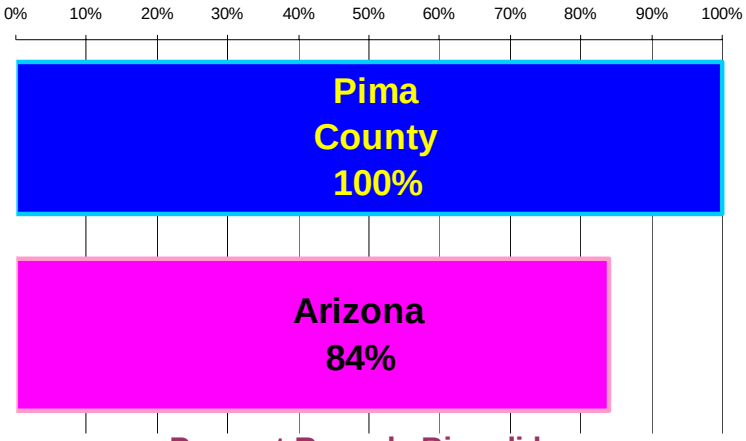
Pima County Compared To Arizona



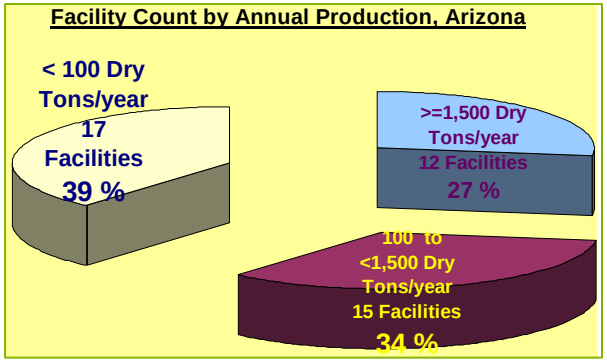
Pima County Annual Production vs. Arizona
Dry Tons per Year

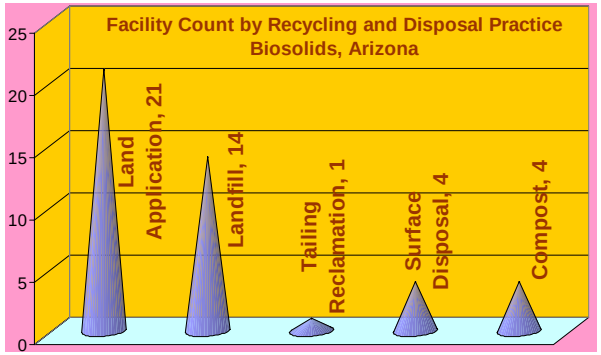


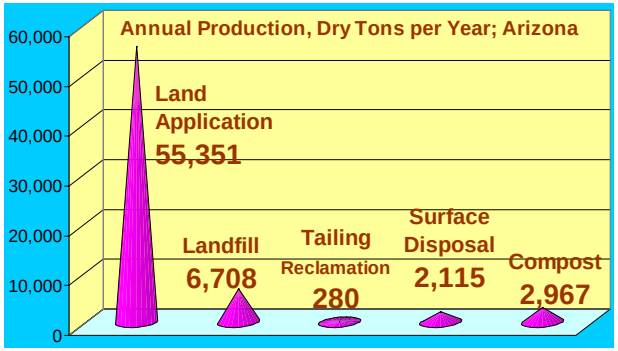
Land Application Practice
Pima County vs. Arizona



Percent Recycle Biosolids
Pima County vs. Arizona

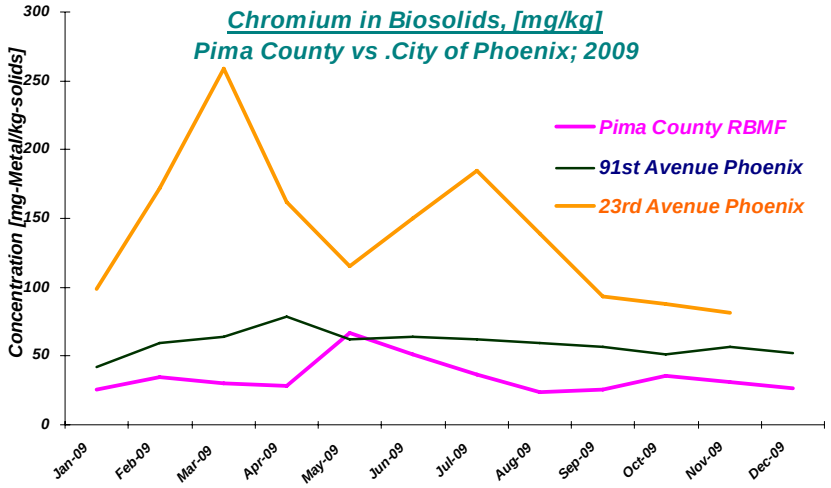


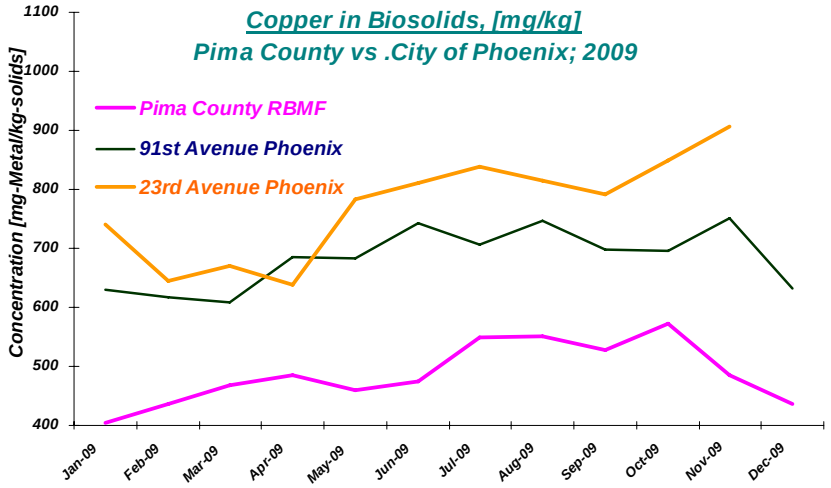


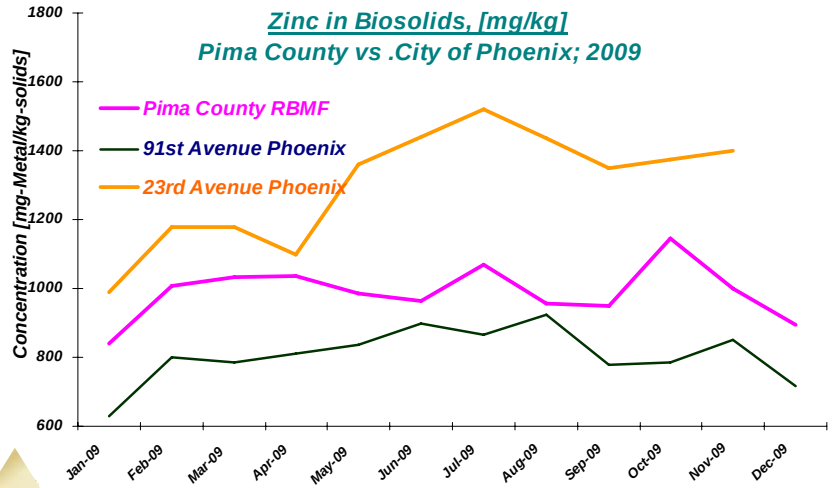


May 2010

Pima County Compared To Arizona





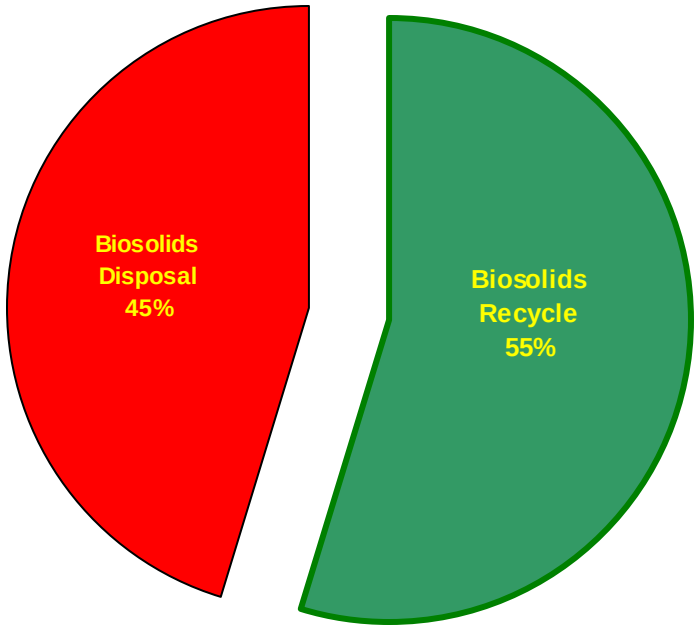


Nitrogen (Total) in Biosolids, [mg/kg]
Pima County vs .City of Phoenix; 2009

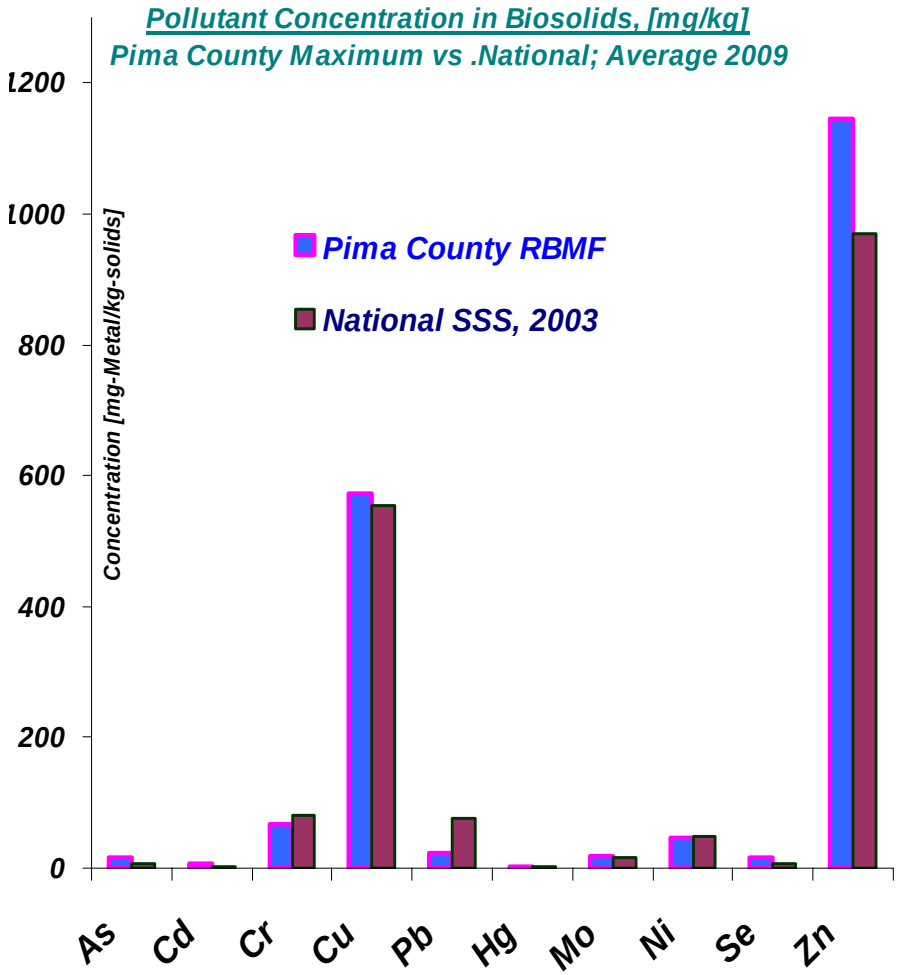
Pima County RBMF	91st Avenue Phoenix	23rd Avenue Phoenix
60,413 mg/kg	59,083 mg/kg	47,875 mg/kg

May 2010

Pima County Compared to Nation



National Annual Production
End use or Disposal
7.18 Millions D.T. per Year



"Regulations" A Driver

- Regulations are one Driver of Biosolids Process Upgrades and Management Options Changes
- Public Perception is a Driver of Regulations, especially on the Local and State levels
- EPA 2009 Targeted National Sewage Sludge Survey: Samples from POTWs in 35 states analyzed for 145 analytes, including: four anions (nitrite/nitrate, fluoride, water-extractable phosphorus), 28 metals, four polycyclic aromatic hydrocarbons, two semi-volatiles, 11 flame retardants, 72 pharmaceuticals, and 25 steroids and hormones.

Priority

EPA is Collecting Additional Information on nine Analytes:

Nitrate, Nitrite, Barium, Beryllium, Manganese, Silver, Fluoranthene, Pyrene, 4-Chloroaniline

Concerns

HEALTH

- **NATIONAL ACADEMY OF SCIENCE** 2003 Study Report "The use of these materials in the production of crops for human consumption when practiced in accordance with existing federal guidelines and regulations, presents ***NEGLIGIBLE RISK*** to the consumer, to crop production and to the environment." It also recommended updating the risk assessment analysis with new tools.

PUBLIC ACCEPTANCE

- ***MAJOR DRIVER*** for Process Upgrades and Management Options
- It All Starts with ***ODORS***
- ***BEST MANAGEMENT PRACTICE*** Helps Credibility of Biosolids Program
- **COMMUNICATION** is the key

REGULATORY

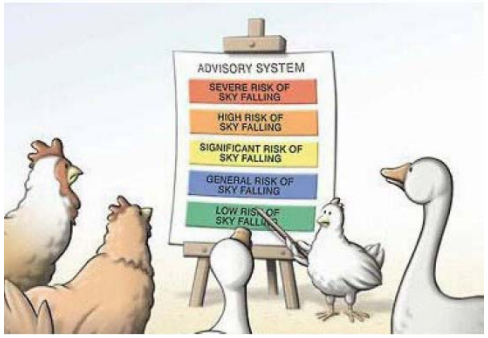
- Ramped-up Regulatory Activity necessitates ***PROACTIVE APPROACH***
- Costly Enforcement Actions avoided through ***VIGILANT COMPLIANCE***
- Ongoing Economic Turmoil requires ***CREATIVE AND LONG-TERM PLANNING***

Concerns

TRACE ORGANIC COMPOUNDS (TOrCs)

- **Thousands** of TOrCs
- Which are high **priority** ?
- TOrCs pose a **risk**?

Bunch of Hype!



The Sky is Falling

Occurrence ✓

Significance

Treatment & Source Control

Fate

Communicating Risk
Open
Transparent
Accurate
Understandable

Concerns

PIMA COUNTY CARES

Advancing the State of Biosolids; 1986 – 2010
Pima County in Partnership with the University of Arizona

- Land application of biosolids, Influence on yield of wheat, cotton and Barley
- Copper phytotoxicity, Biosolids Land Application
- Metals in soil and biosolids, monitoring
- Groundwater monitoring for Nitrogen, Biosolids Land Application
- Sorption studies of organic contaminants
- Compaction studies, Biosolids Land Application
- Agronomic studies on cotton, Biosolids Land Application
- Nitrates in unsaturated zone, Biosolids Land Application
- Copper soil bioavailability studies, Biosolids Land Application
- Pathogen analysis of biosolids for Giardia, enteric viruses and indicator bacteria
- Survival of bacteriophage in soil, Biosolids Land Application
- Survival of indicator organisms in biosolids amended soil
- Denitrification studies, Biosolids Land Application
- Groundwater monitoring for pathogens, Biosolids Land Application
- Fate of pathogens in biosolids applied soil
- Molecular detection of pathogens using PCR, Biosolids Land Application
- Fate of biosolids applied heavy metals in soil and plants
- Groundwater monitoring for indicator organisms, virus, and Salmonella
- Survival studies on virus in biosolids amended soil
- Monitoring biosolids for indicators, Salmonella, and enteroviruses
- Monitoring for helminth, Biosolids Land Application
- Fate of biosolids applied metals in soil and plants
- Molecular detection of viruses in biosolids amended soil
- Biosolids amendment of mine tailings
- Solar drying of Class B biosolids to produce Class A biosolids
- Bio-aerosol studies of pathogens produced during land application
- Transport studies of virus through soil, Biosolids Land Application
- Bio-aerosol studies, Biosolids Land Application
- Re-growth of pathogens in Class B biosolids
- Twenty year ecosystem risk assessment for land application of biosolids
- Re-growth of pathogens in Class A biosolids
- 20 Years of Continuous Land Application: Effects on Soil Chemical Properties
- Aerosol Collection of Estrogens in Enclosed Activated Sludge Systems
- Aging of Class B Biosolids to Produce Class A Biosolids, Proposal
- Anammox for Nutrient Nitrogen Removal from Sludge Liquors
- 20 year ecosystem risk assessment of land application; – revegetation projects; – regrowth in Class A biosolids
- Biosolids Sample Processing for Analyses of Pathogens, Microbial Recovery Efficiencies
- Endocrine Disruptors in Wastewater and Biosolids Occurrence, Fate and Treatment
- Estrogenic and Androgenic Activities in Central Arizona Source Waters
- Prions , Fate of Biosolids Associated Prions Following Land Applications
- Clostridium difficile , Fate of Clostridium difficile in Treated Wastewater Systems
- Fate of Endocrine Disruptors Following Twenty Years of Land Application of Class B Biosolids
- Fate of Prions in Groundwater, Reclaimed Wastewater and Land Applied Biosolids
- Incidence of Pathogens and Indicators in Biosolids: A National Study of Wastewater Treatment Plants
- Microbial Risk Assessment of Pathogens within Biosolids
- New Strategy for Molecular Detection of Vital Pathogens in Biosolids by Real-Time PCR
- Pathogen Monitoring of Irrigation Return Flows from Biosolids Amended Fields
- Pathogen Reduction in Biosolids for Land Application
- PBDEs in Biosolids: Assessment of Relative Risk After Land Application
- Quantification of Airborne Biological Contaminants Associated with Land Applied Biosolids
- Risk Assessment of Land Application of Biosolids vs. Animal Manures
- Prions , Survival of Prions During Wastewater Treatment and Land Application of Biosolids
- Survival of Prions in Class B Biosolids
- Sustainability of Land Application of Class B Biosolids
- Microbial Properties20 Years of Continuous Land Application: Effects on Soil Microbial Properties
- Chemical Properties20 Years of Continuous Land Application: Effects on Soil Chemical Properties
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Findings: Influence of 20 Years Biosolids Land Application on Soils

MICROBIAL PROPERTIES

- Biosolids applications ***enhance soil microbial*** activity and re-vegetation, no pathogens survived and few indicators and Microbial diversity improved

EXPOSURE VIA BIOAEROSOLS

- Community ***risk is insignificant***, the published peer-reviewed papers have removed bioaerosols as a national issue.

METALS, NITRATES AND CARBON SEQUESTRATION

- Metals migration and uptake by plants is ***not significant***
- Limited nitrate leaching can occur seasonally near soil surface, therefore ***no impact on groundwater***
- ***Carbon sequestration*** is significant at approximately 1,670 lbs carbon per Acre

Tomorrow

SOLIDS HANDLING FACILITIES - ROMP

- Comprehensive Odor Management System
- Added WAS Thickeners
- New Digester Complex
- Modernized Centrifuge Building
- Added Dewatering Capability
- Dump Truck Cake Loading Facility
- WAS Equalization and Holding Tanks
- Thickened Biosolids Holding and Loading Facility

BIOSOLIDS MASTER PLANNING

- Sustainable Biosolids Processes
- Diversified Product
- Resource Optimization

Discussion

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http://intranet.wwm.pima.gov/divisions/CRAO/biosolids.htm

PIMA COUNTY BIOSOLIDS - YESTERDAY, TODAY AND TOMORROW
SUSTAINABILITY FOR A SUCCESSFUL COMMUNITY

May 2010

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May 2010

CODE OF GOOD PRACTICE CLUB CERTIFICATE

Code of Good Practice Club

The National Biosolids Partnership
Awards this Certificate To:

Pima County Wastewater
Management Department
Tucson, AZ

In Recognition of their Commitment to Environmental Improvement
and Adoption of Best Biosolids Management Practice.
Presented This 1st Day of April 2005

Robert W. Hite
Chair

National Biosolids Partnership
amsa
Water Environment Federation
Preserving & Enhancing the Global Water Environment