

# Biosolids Emerging Technology Workshop

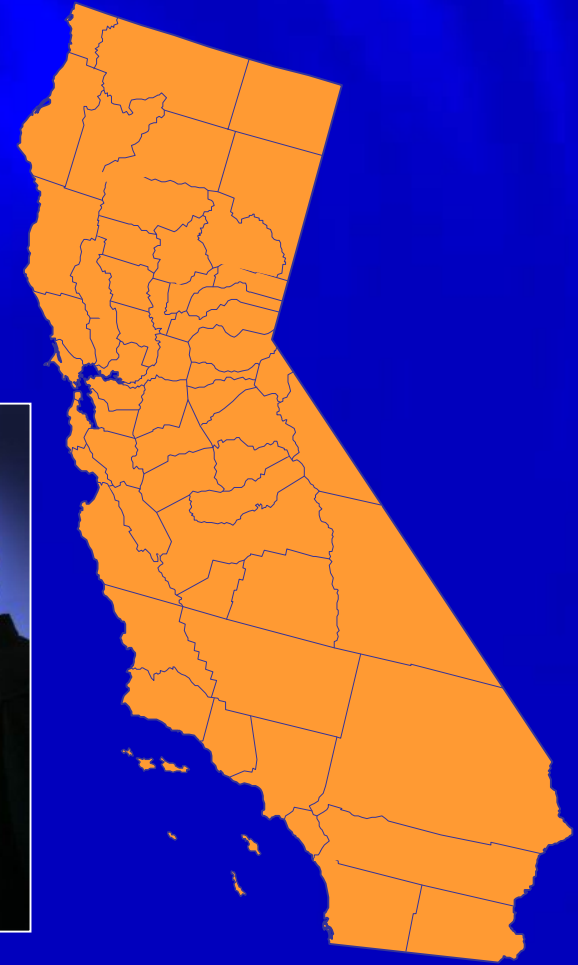


## IPS Composting System & Biosolids Drying Technology

Barbara Petroff  
September 28, 2004

# IPS Composting System

- **Technology**
- **Trends**
- **Timing**





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- **Clean Water**
- **Clean Solids**
- **Innovations – 7% to research**



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# Biosolids Technologies

Stabilization

Thickening

Dewatering

Drying

Composting

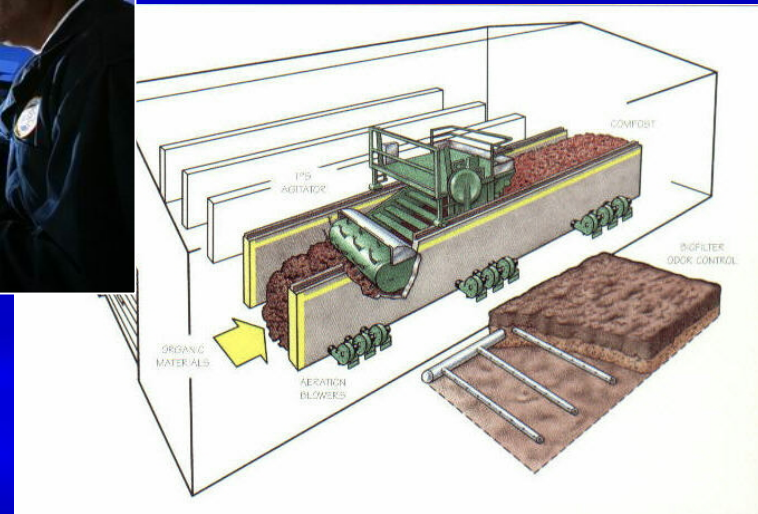
Incineration

Odor Control

Storage and Conveyance

# IPS Composting System

- **Enclosed, Automated, Agitated Bin**

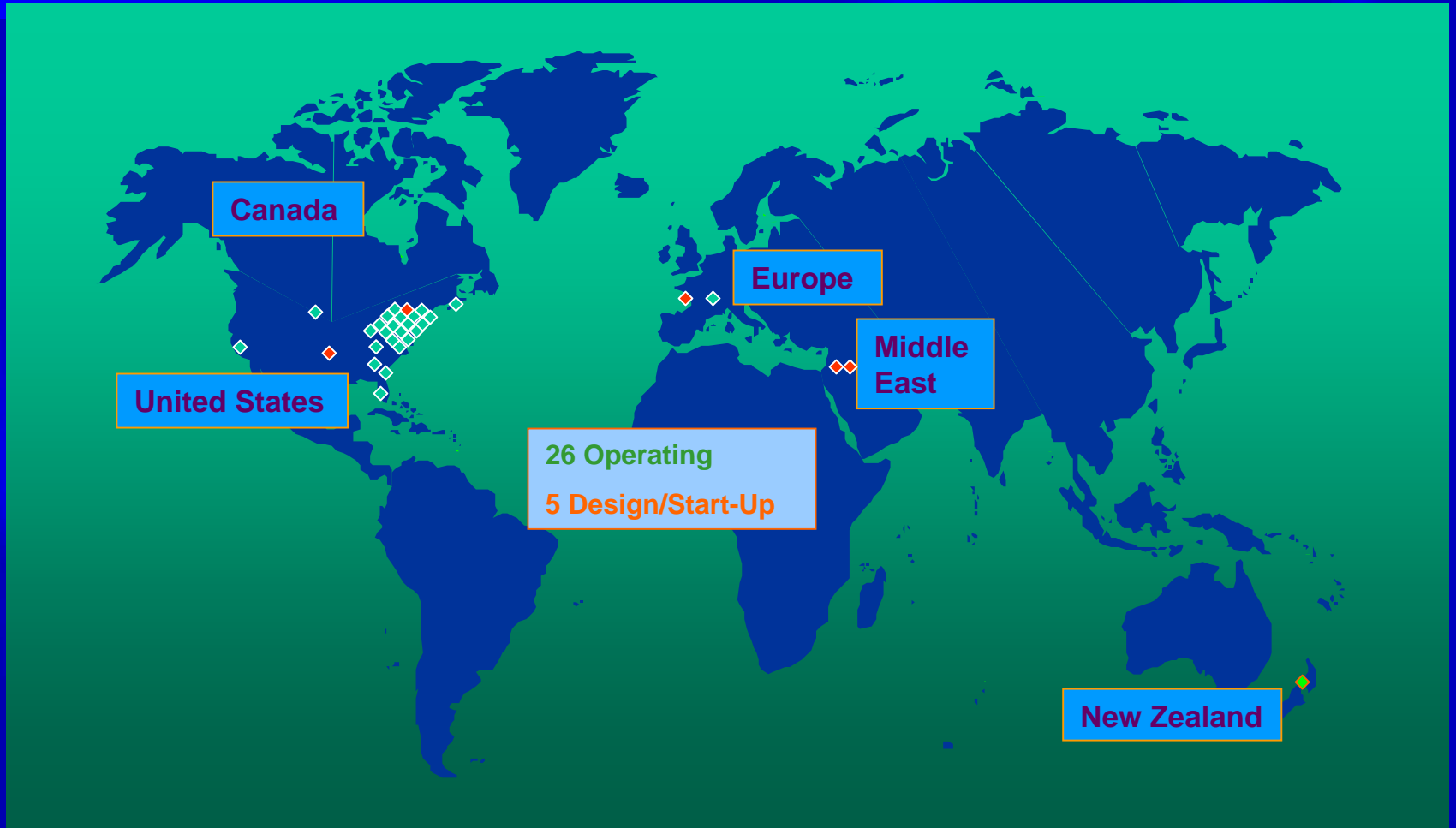


# IPS Composting System

- **Biosolids processing size range**
  - Plymouth, NH (4.5 wtpd)
  - Calabasas, CA (30 wtpd)
  - Burlington County, NJ (200 wtpd)
  - Proposed (700-1500 wtpd)



# IPS Installations

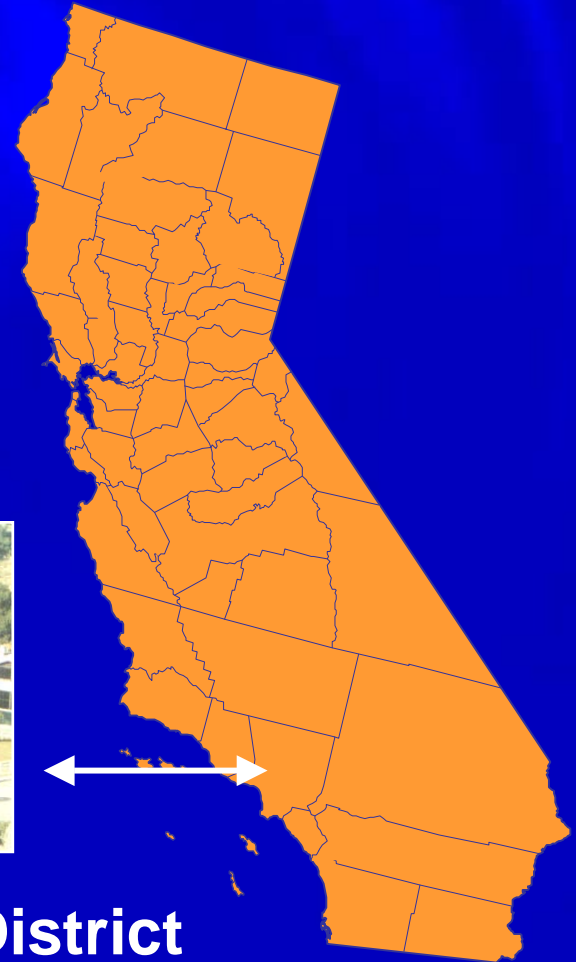
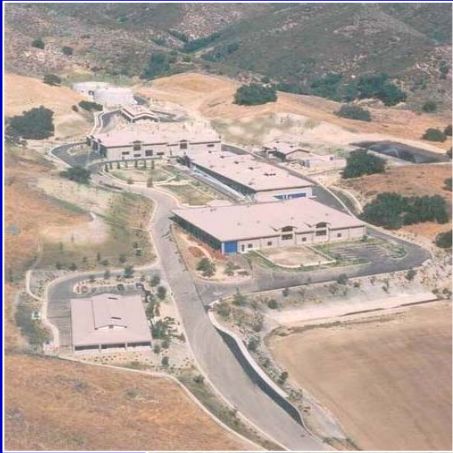


# IPS Composting Trends





# Southern California Composting



**Las Virgenes Municipal Water District**

# Southern California Composting

- **Technologies – Outdoor Vs Enclosed**



**Windrow**



**Aerated Static  
Pile**



**In-Vessel**

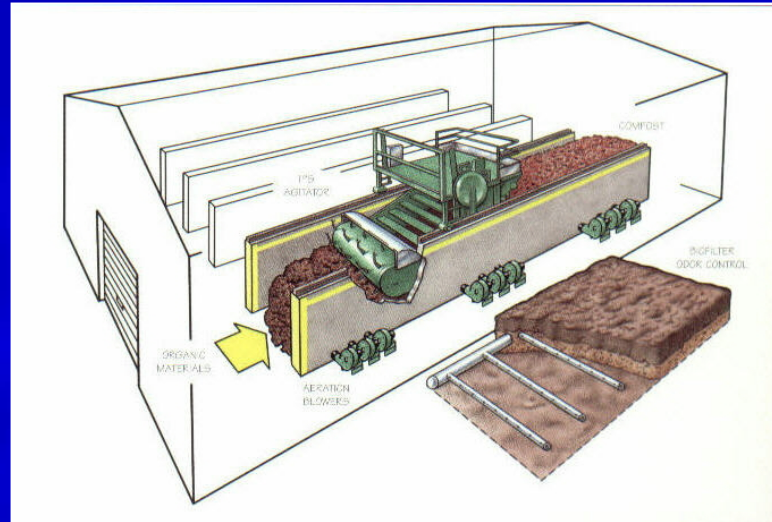
# Southern California Composting

- **SCAQMD Rule 1133**
- **CIWMB recycling goals**
- **Class A and EQ trends**
- **Composting established**



# Southern California Composting

- **IPS and EASP Capital and O&M Costs**
  - **Enclosed**
  - **Odor control**
  - **Amendment**
  - **Compost products**



# Southern California Composting

- **Capacity and Space**



**ASP**



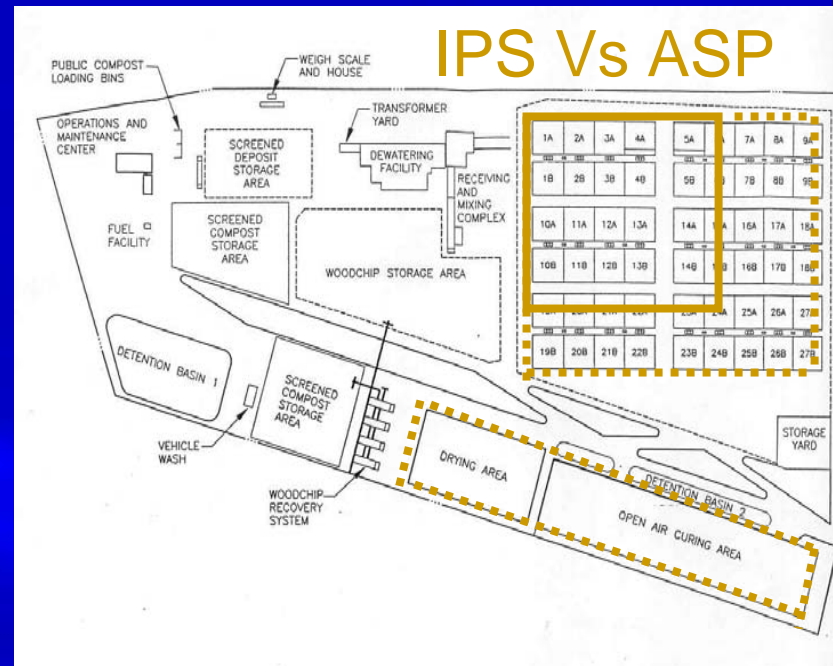
**Windrow**



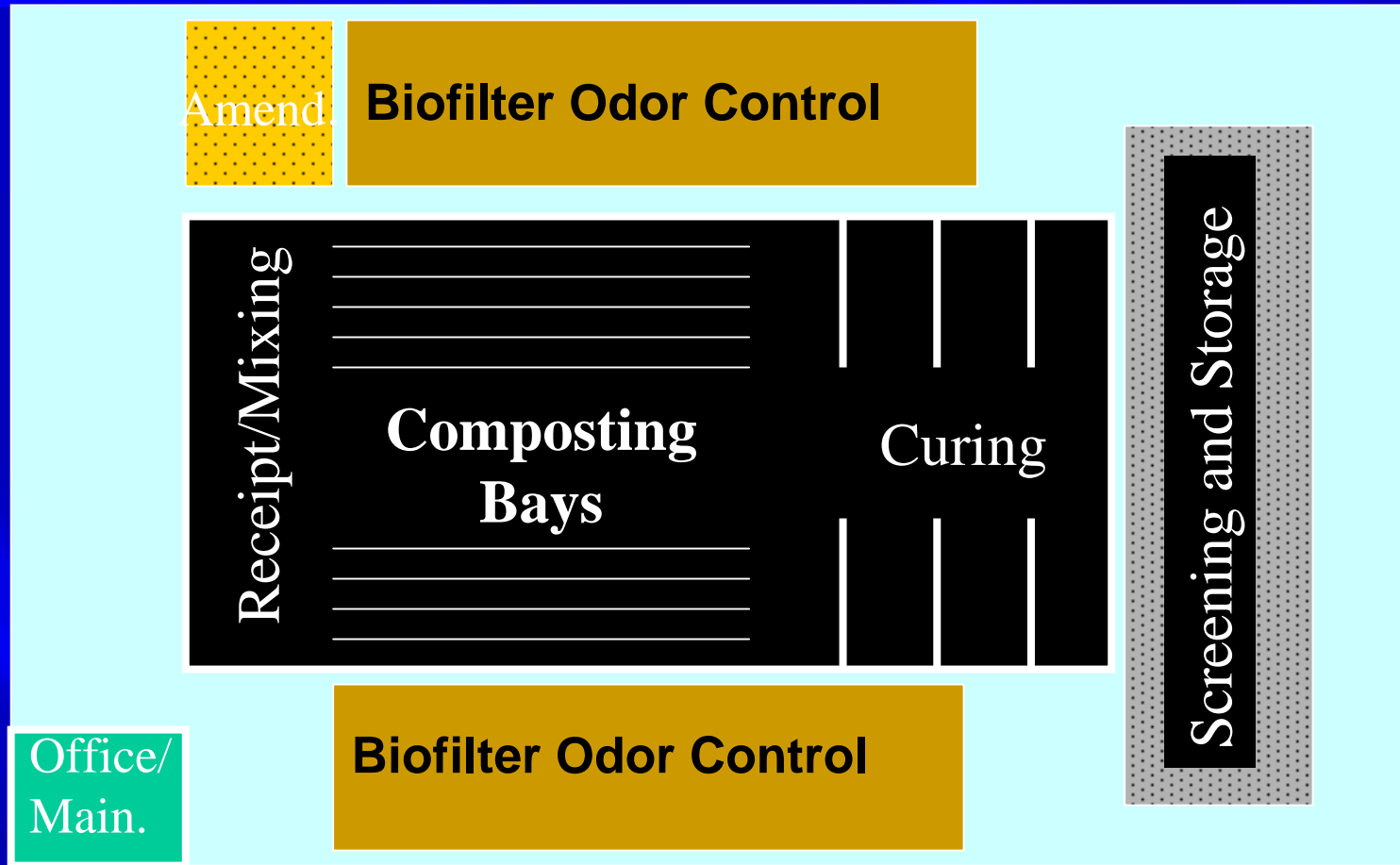
**Agitated Bin**

# Southern California Composting

- **Capacity and Space**
  - 75,000 tons per year biosolids
  - Composting, Curing and Odor Control
  - IPS 9 Acres
  - ASP 24 Acres



# IPS Composting System



# IPS Composting System

- **CIWMB 2004 Diversion Rate 50%**
  - **Municipal Solid Waste**
  - **Green and Yardwaste**
  - **Industrial Residuals**
  - **Food Scraps**
  - **Agriculture**
  - **Biosolids**
  - **Wood**





# IPS Composting System

- **Amendment Flexibility (2 inch minus)**
  - **Woodwaste and pallets**
  - **Agriculture**
    - Tree and vine cuttings
    - Peanut shells
    - Cotton husks
    - Rice hulls
  - **Yardwaste**
  - **Sawdust**



# IPS Composting System

- **Process**
  - **Mixing**
  - **Loading**



# IPS Composting System

- **Process**



# IPS Composting System

- **Agitator Improvements**
  - **Narrow bay 25 to 50 Hp**
  - **Wide bay 75 to 100 Hp**
  - **Level bed device**
  - **Stainless steel drum**
  - **Independent 4 wheel drive**



# IPS Composting System

## ■ **Agitator Improvements**

- **Capacity 8-15%**
- **Efficiency**
  - Short time
  - More bays
- **Las Virgenes**
  - 2 fpm to 5 fpm
- **Rapid City**
  - Load 38 cy Vs 15



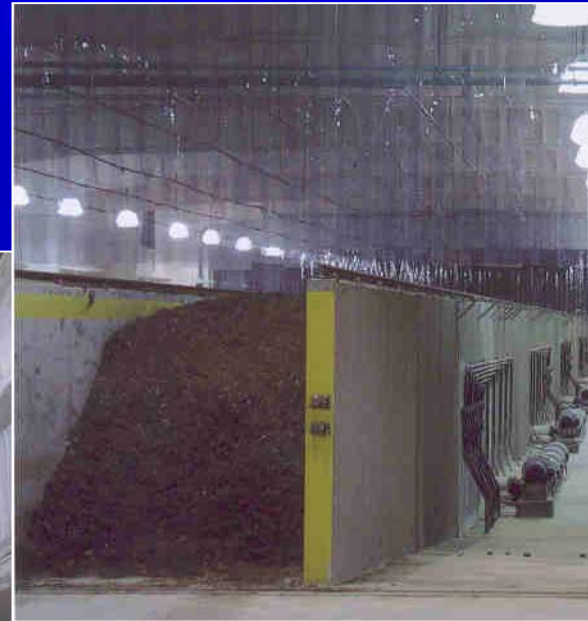
# IPS Composting System

- Bay Temperature and Aeration



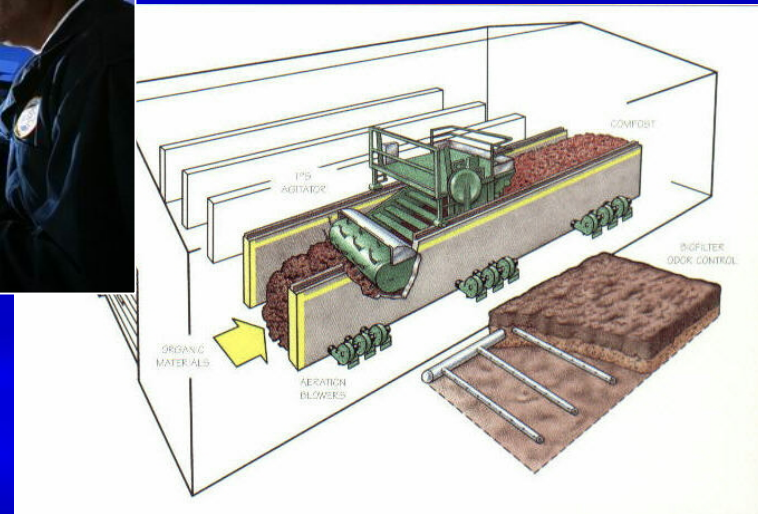
# IPS Composting System

- **Bay Water System Options**
  - **Overhead**
  - **Bay Wall**



# IPS Composting System

- **CompMaster™ Computer Control**





# IPS Composting System

- **Active Composting to Curing**



# IPS Composting System

- **Screening and End Use**



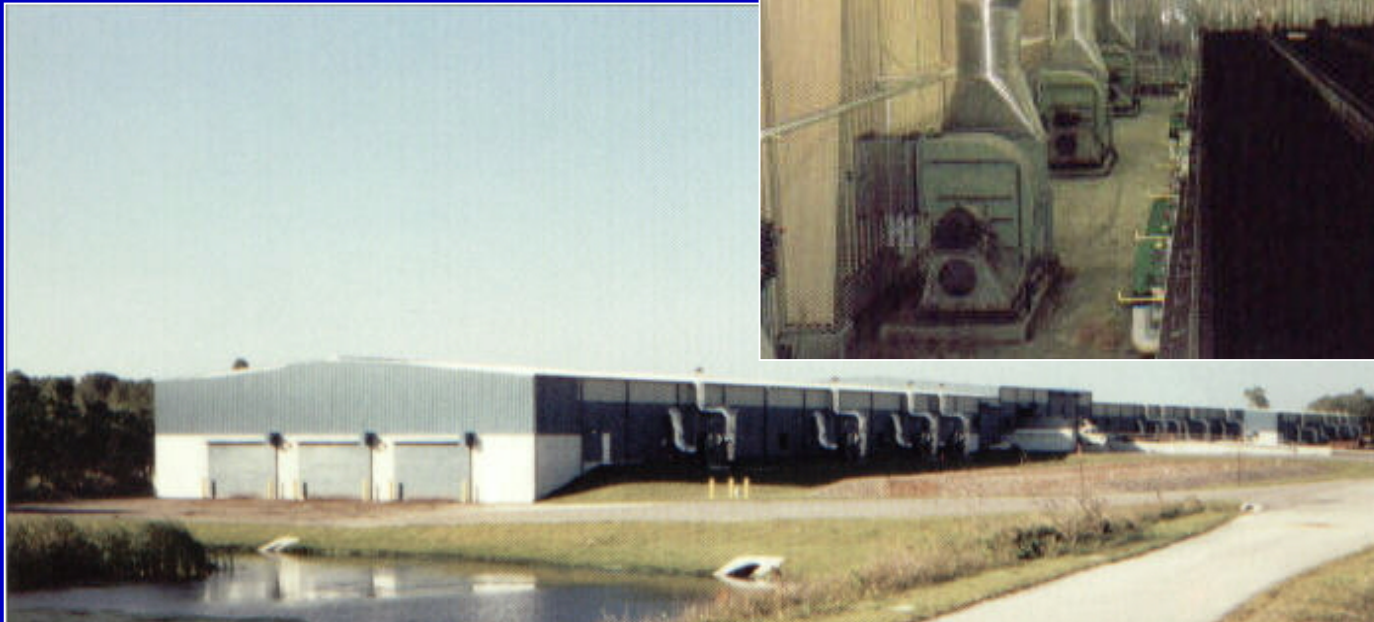
# IPS Composting System

- **End Use Innovations**
  - Landscaping
  - Turf farms
  - Potting soils
  - Soil blending
  - Bagging retail
  - Green roofs
  - Fire control
  - Storm water control
  - Soil erosion and slope protection



# IPS Composting System

- **Air Management**



# IPS Composting System

- **Air Management**



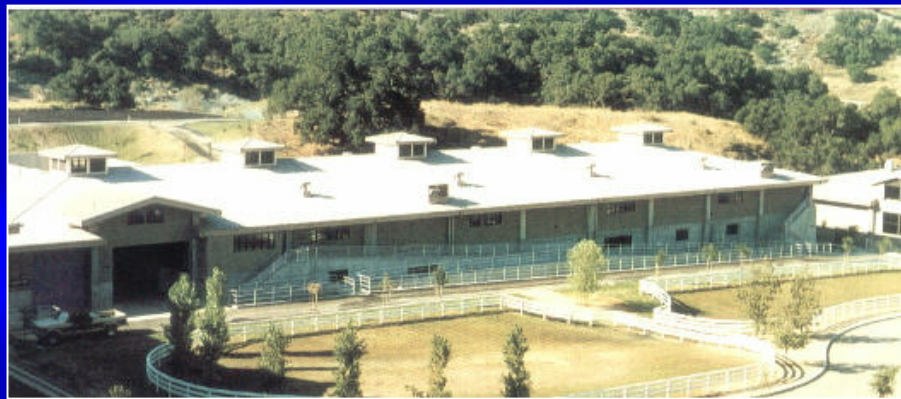
# IPS Composting System

- **Biofilter with moisture addition**



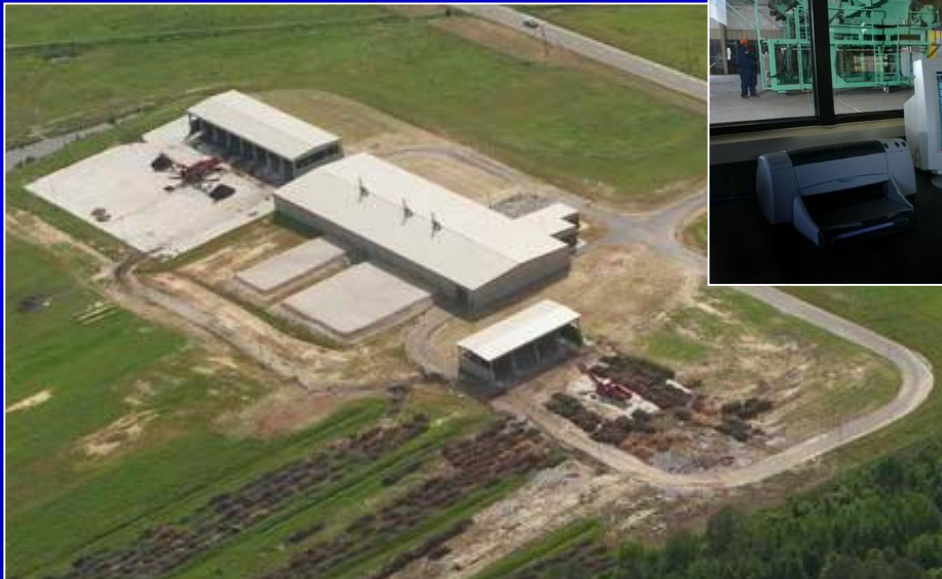
# IPS Composting System

- **Las Virgenes Biofilter Test Results 2004**
  - **BacTee**
  - **Standard Biofilter**
  - **Total reduced sulfur >99.998%**
  - **Ammonia >99.924%**
  - **VOCs 96.15%**



# IPS Composting System

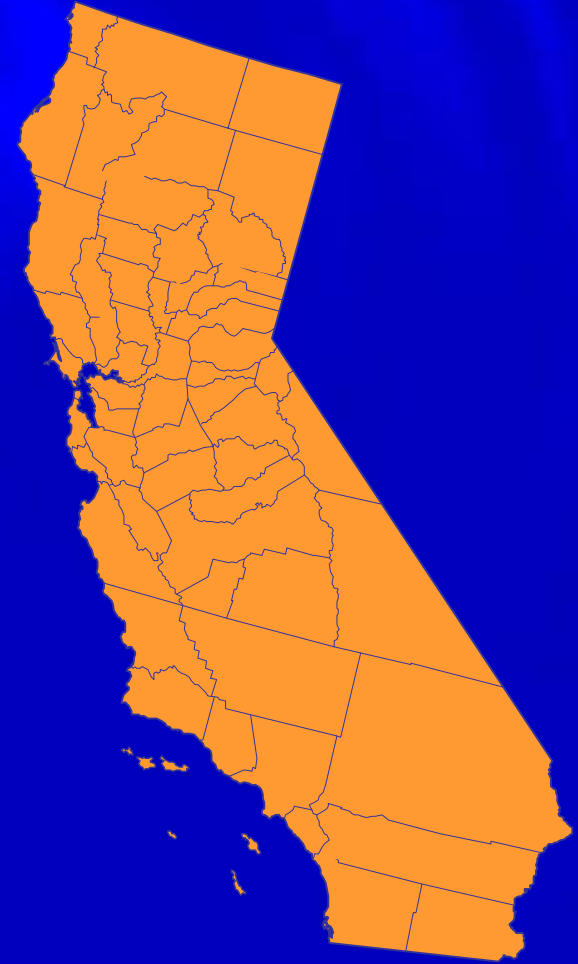
- Facility in Review

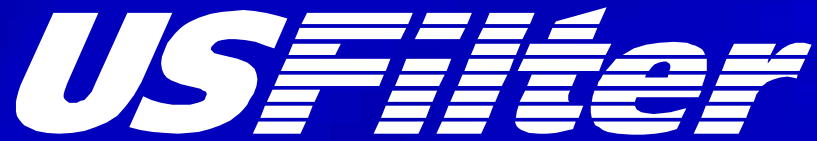




# IPS Composting System

- **Technology**
- **Trends**
  - **Class A and EQ**
  - **Composting established**
- **Timing**
  - **SCAQMD Rule 1133**
  - **CIWMB recycling goals**





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# Drying

Convective Thermal Dryer

Contact Surface Dryer

J-Vap<sup>®</sup>

Dragon Dryer

# Convective Thermal Dryer (CTD)



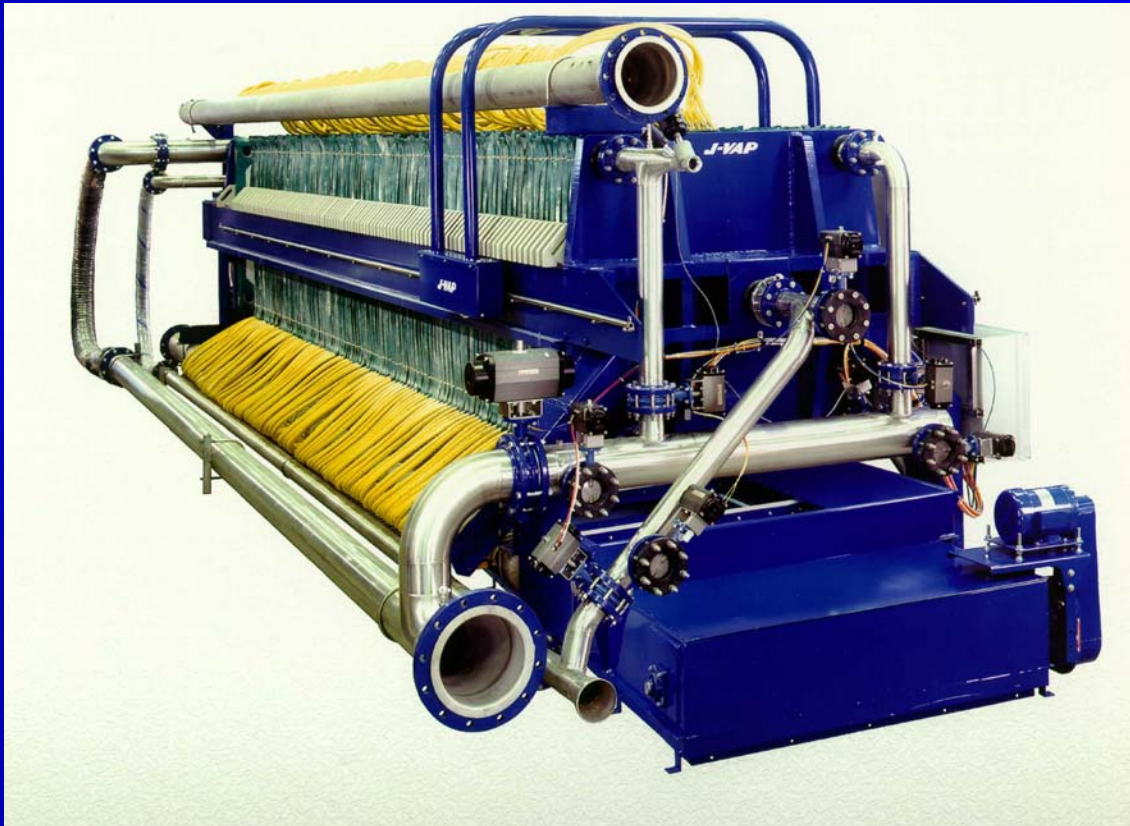
The Convective Thermal Dryer is a complete direct biosolids drying system that produces a 95 percent dry pelletized product and exceeds EPA 40 CFR Part 503 Class "A" requirements.

# Contact Surface Dryer (CSD)



The compact, low maintenance CSD system can be engineered to recycle a portion of the dried sludge or as a single pass dryer for continuous dried sludge discharge.

# J-VAP<sup>®</sup>



By combining traditional filter press and patented vacuum/evaporation technologies, J-Vap achieves up to 99% moisture-free cake with minimal operator or material handling requirements.

# Dragon Dryer™

- **Indirect Dryer**

- **Dual indirect heat source**
- **Continuous single pass**
- **2-4 mm Class A granules**
- **Input 12% to 30% solids concentration**
- **Capacity 0 to 100 wet tons/day per unit**



# Dragon Dryer <sup>TM</sup> Installations

- Forest City, NC
- Loudon, TN
- Mount Holly, NJ
- Newport, TN
- Ocala, FL
- Orange Beach, AL
- Seneca, SC
- Tallahassee, FL



# Dragon Dryer <sup>TM</sup> Installations

- **Ocala, FL (Series 4008)**
  - **Per 24 hours**
  - **20 dry tons**
  - **08 dry tons**





# Dragon Dryer™ Installations

- Newport, TN (Series 4008)



# Dragon Dryer™

- **Trailer Mounted Demo Unit**

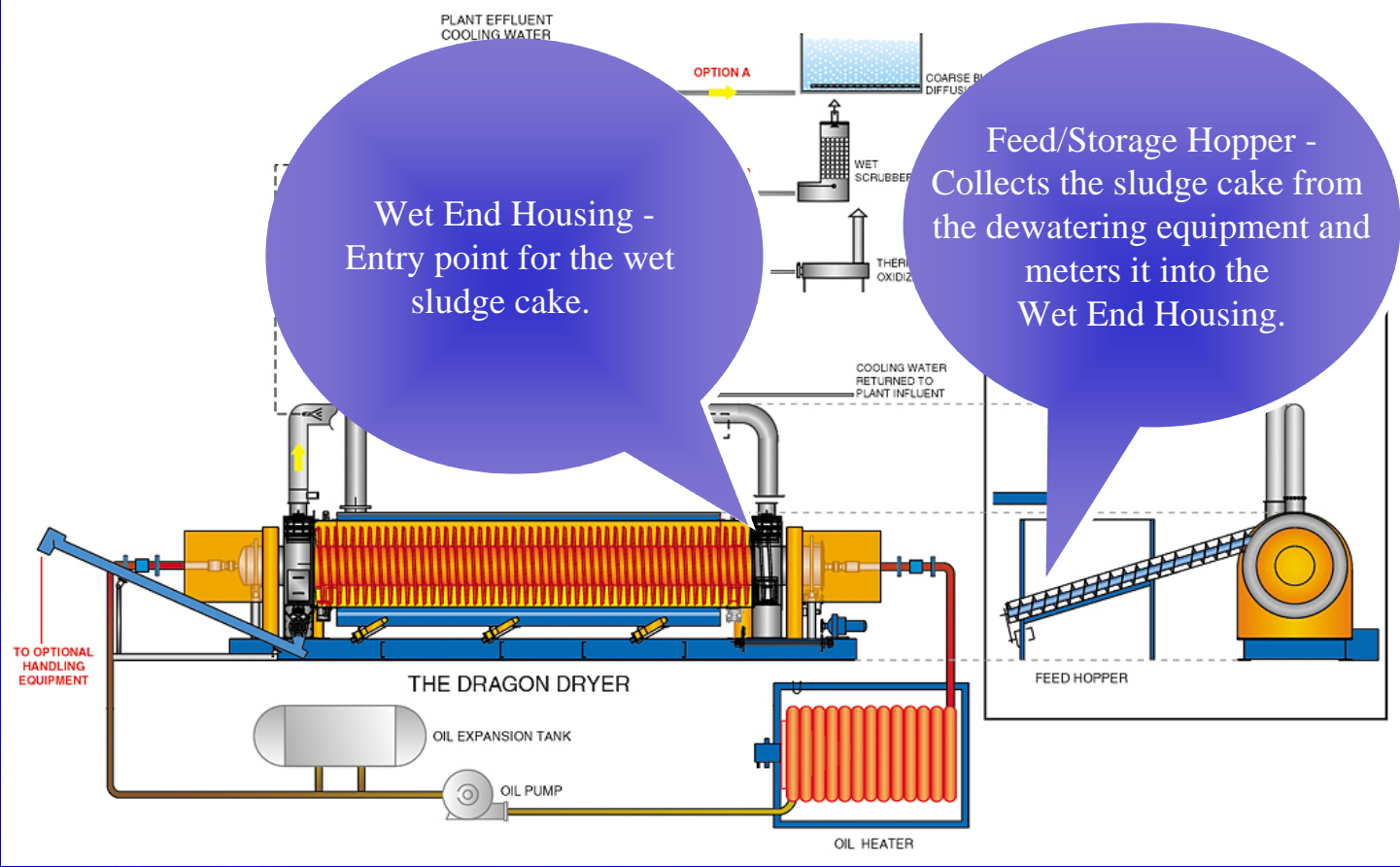


# Dragon Dryer™ Demonstration

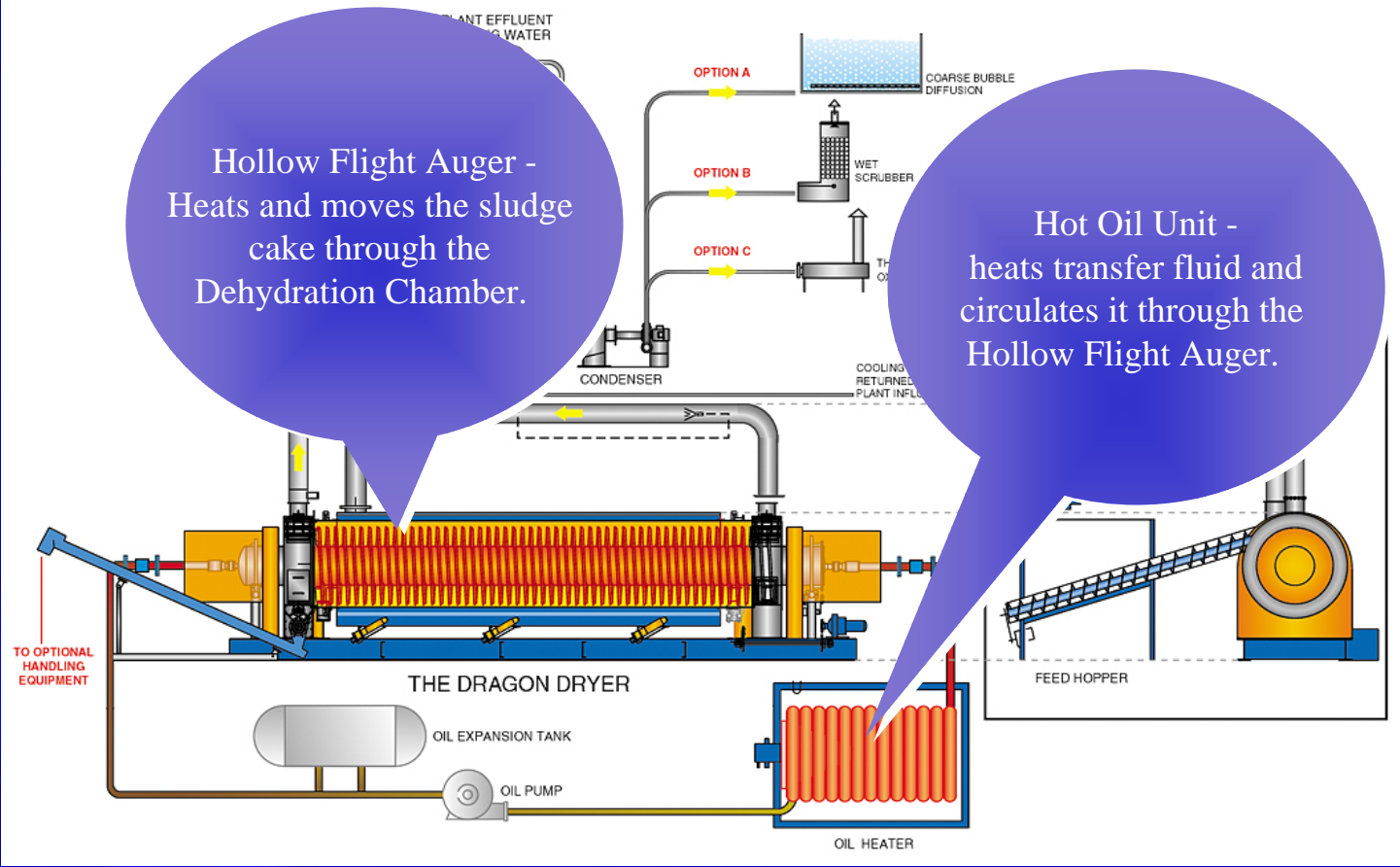
**City of San Bernardino  
Water Reclamation Plant  
399 Chandler Place  
San Bernardino, CA  
2:00 p.m. to 4:00 p.m.**



# Dragon Dryer™



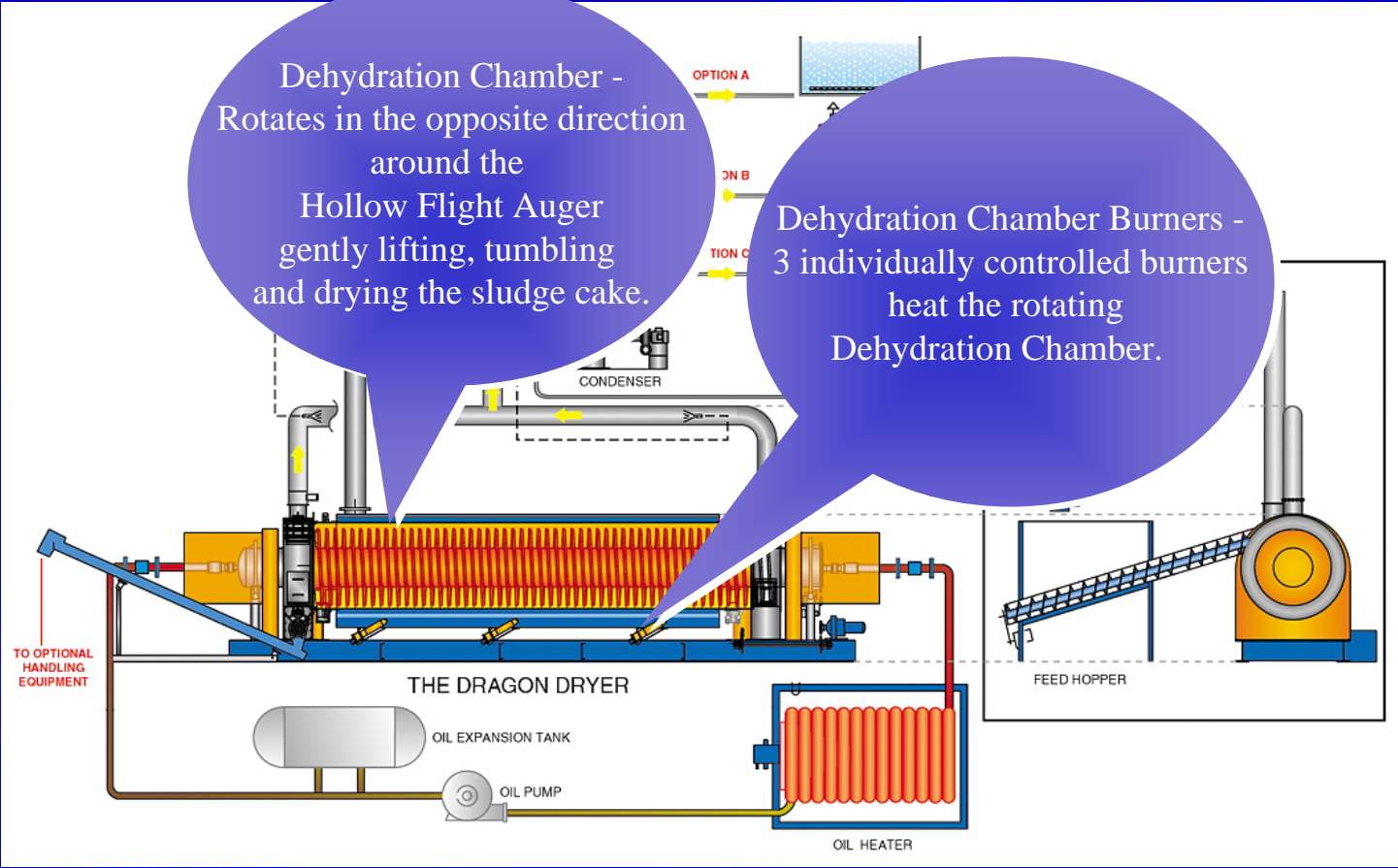
# Dragon Dryer™



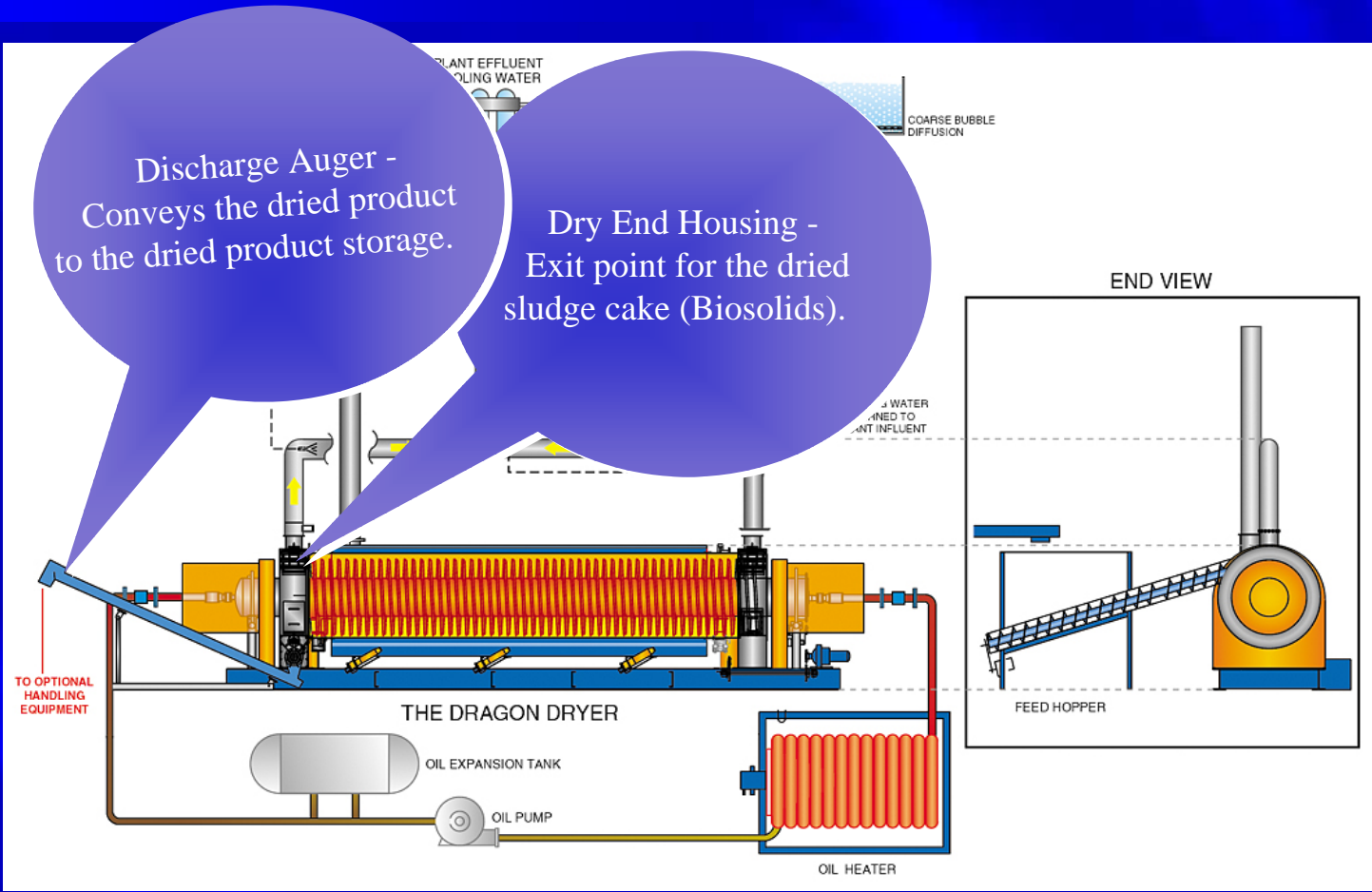
Hollow Flight Auger -  
Heats and moves the sludge  
cake through the  
Dehydration Chamber.

Hot Oil Unit -  
heats transfer fluid and  
circulates it through the  
Hollow Flight Auger.

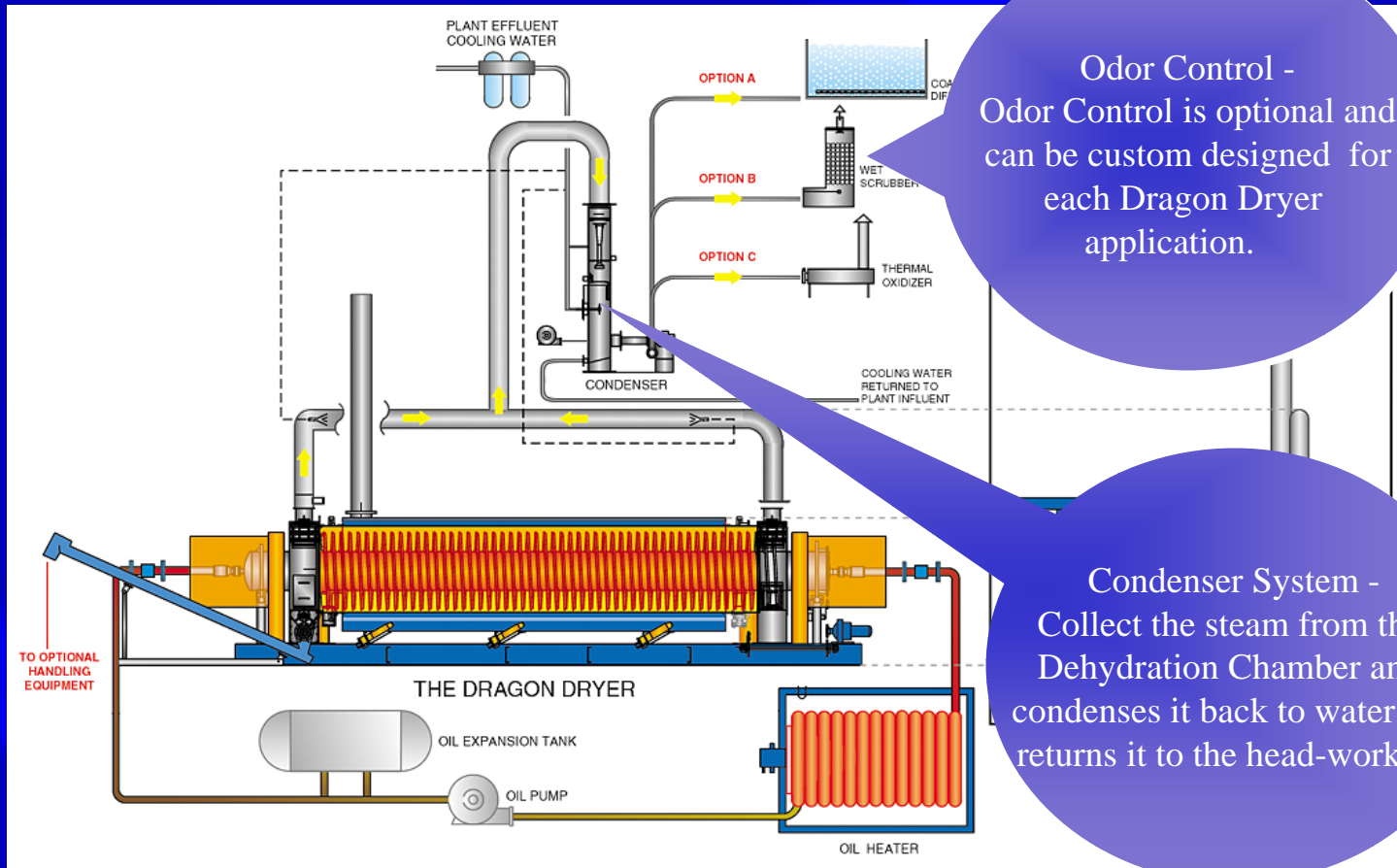
# Dragon Dryer™



# Dragon Dryer™



# Dragon Dryer™



Odor Control -  
Odor Control is optional and  
can be custom designed for  
each Dragon Dryer  
application.

Condenser System -  
Collect the steam from the  
Dehydration Chamber and  
condenses it back to water and  
returns it to the head-works.



# Dragon Dryer™

- **Operator Friendly**
  - PLC controlled
  - Remote monitoring
    - Remote Alarm notification
  - Automatic operation
    - Limited hands-on operation
  - Continuous operation
- **Low pressure system**
  - No Boiler required
  - No danger from high pressure steam
- **Closed system**
  - Clean work area
- **Automatic safety set points**
  - Alarms
  - Automatic cool down
  - Automatic shut down

# Dragon Dryer™

## ■ Advantages

- Safe, easy operation
- Air emission standards
- Beneficial use (income potential)
- Small area requirement
- Proven technology
- Short processing time
- Automatic, continuous operation
- Volume reduction



# Dragon Dryer™

## ■ **Product Characteristics, Average**

- Density, kg/m<sup>3</sup> 720.83 (45 lb/ft<sup>3</sup>)
- Dry Solids Content, percent 90.8
- Color Black
- Appearance Granular
- Volume Reduction, percent 76.8
- Weight Reduction, percent 83.6

