

City of Colton

Regional Biosolids Processing and Renewable Energy Project

Presentation to:
SCAP
Energy Committee
October 22, 2009

Presenters:

Jim Sullivan and Tudor Williams

Biosoils of Southern California LLC

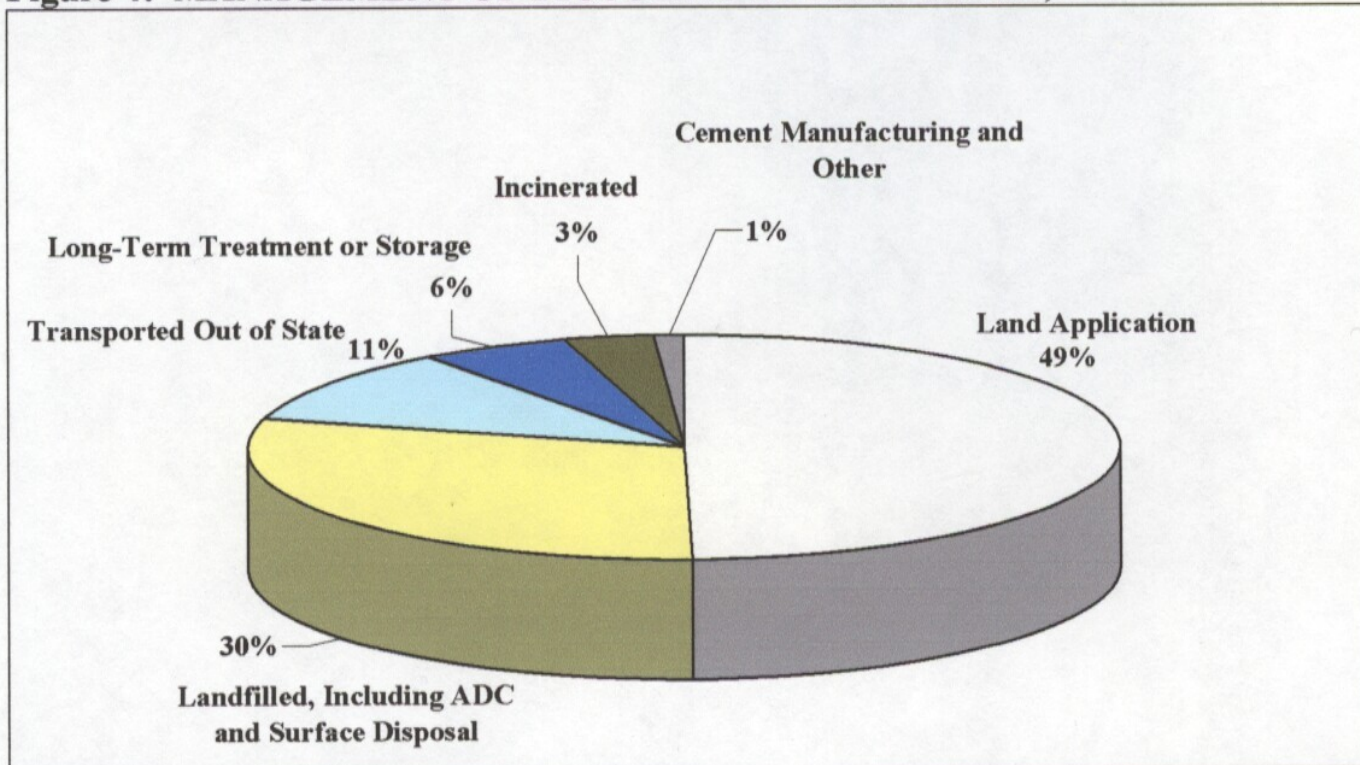
Long-term Biosolids Management Waste to Energy

- Proven Technology
 - No Proprietary or experimental processes
- Green Solution that really works
 - Biosolids and Biogas fuel sources -
- Lowered dependence on Remote locations
 - Colton is within 70 miles of most POTW's
 - Lower Freight and overall costs
- Potentially the lowest cost option ...

Biosolids Disposal

Renewable Energy Power Generation – 0% to date

Figure 4: MANAGEMENT OF BIOSOLIDS IN CALIFORNIA, 2003



Source: Data from U.S. EPA, Region IX, Biosolids Coordinator, San Francisco, California, March 2004, published in Chapter 3 Final Revisions of Final Statewide EIR Report from the California State Water Resources Control Board. Table 2-1a: http://www.swrcb.ca.gov/hearings/docs/finalbio_chap3.pdf.

Why is the Project Unique?

- Regional Solution to a Regional Issue
 - Not exporting our problems other Counties or States
 - Ash residue will be used at neighboring Cement Mill as a raw materials resource.
 - Heavy metal removal – and recycling
 - No future liability from new regulations on contaminated site
 - 100% redundancy for process Backups

Power Generation

- **Steam Turbines**
 - **Steam derived from boiler at the Fluidized Bed**
- **Organic Rankin, bi-phase turbine**
 - **Uses low grade heat to maximize output**
 - **Physically small units that can be added as conditions and requirements may dictate**
- **Heat source Fluidized Bed , using Biosolids and Biogas as fuel sources**

Biosolids Material Delivery and Processing Steps in Biosoils Facility

➤ Delivery of Biosolids

- Biosolids collected from POTW customers and delivered by truck to tipping floor within enclosed building in Facility

➤ Biosolids conveyed to Dryers and Fluidized Bed Thermal Units

➤ Heat Uses in Process

- Captured Heat used to provide heat for Dryers
- Captured Heat used to produce steam that is converted to renewable electric power in Steam Turbine

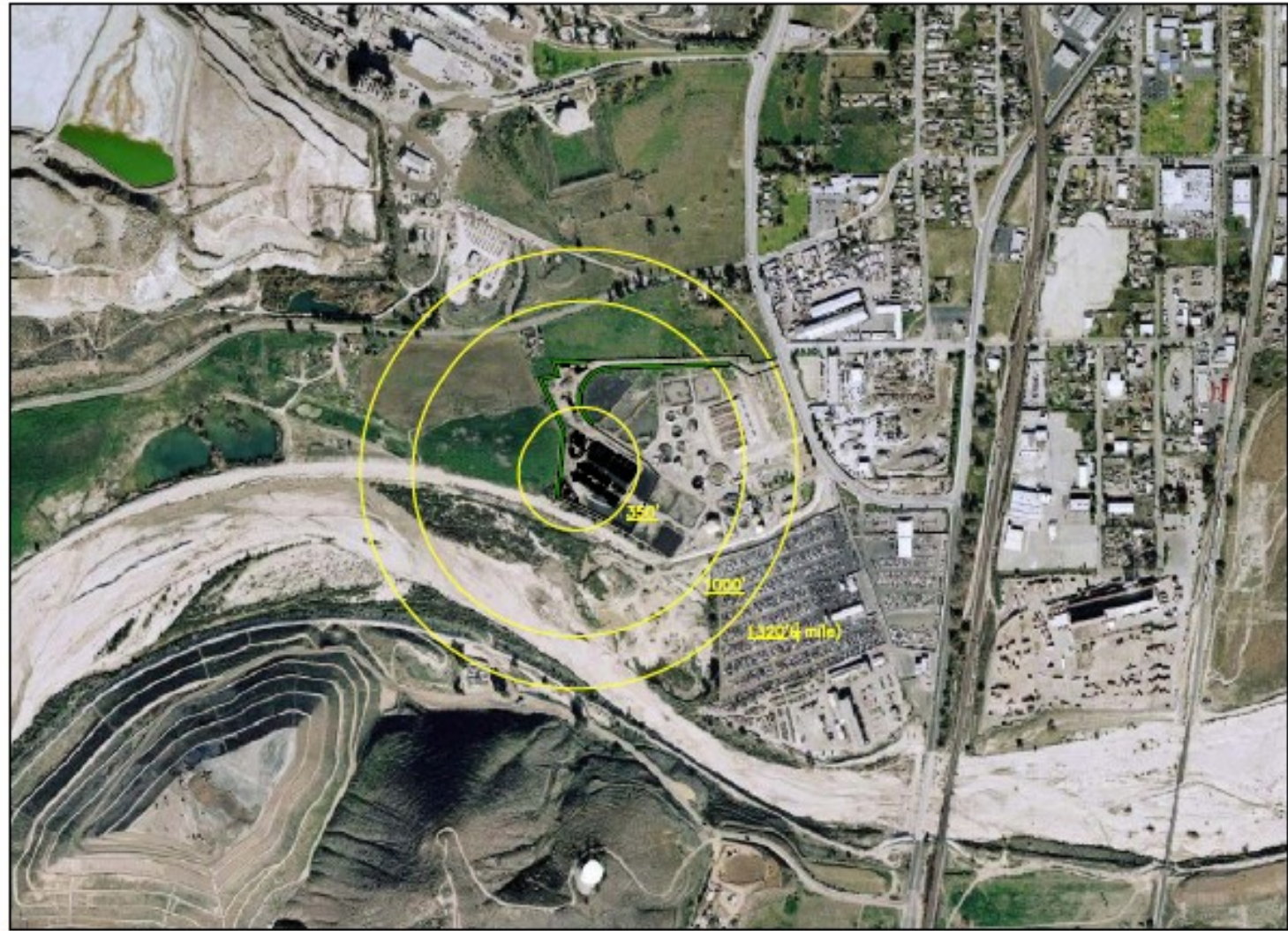
➤ Recovered Ash from Fluidized Bed combustion and air emission devices delivered to cement manufacturers for use as batch material

- Good properties for making cement

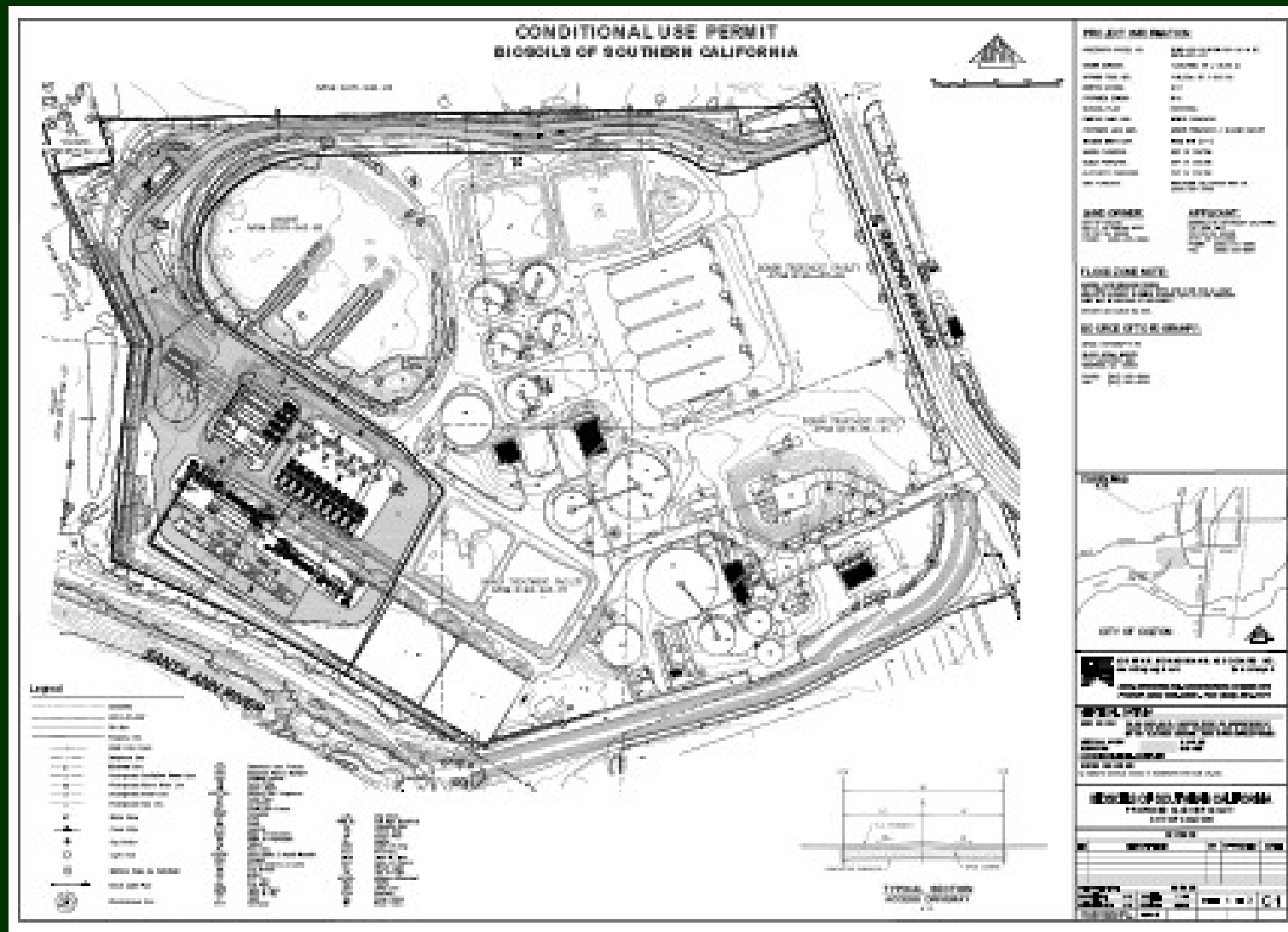
Tipping / Receiving facility



Facility Location



Proposed Facility Site Plan



Biosoils Facility Side Elevation (Without Visual Screening Shown)



Colton Biosoils Facility With Visual Screen



Technology Used in the Facility

➤ Dryers

- Steam operation, use on Biosolids and other waste materials at other locations in the United States. Flexible, redundant system allows for changes in moisture content of Biosolids .

➤ Fluidized Bed Units

- Numerous installations of fluidized bed units worldwide, operating on Biosolids. Drier solids produce more power

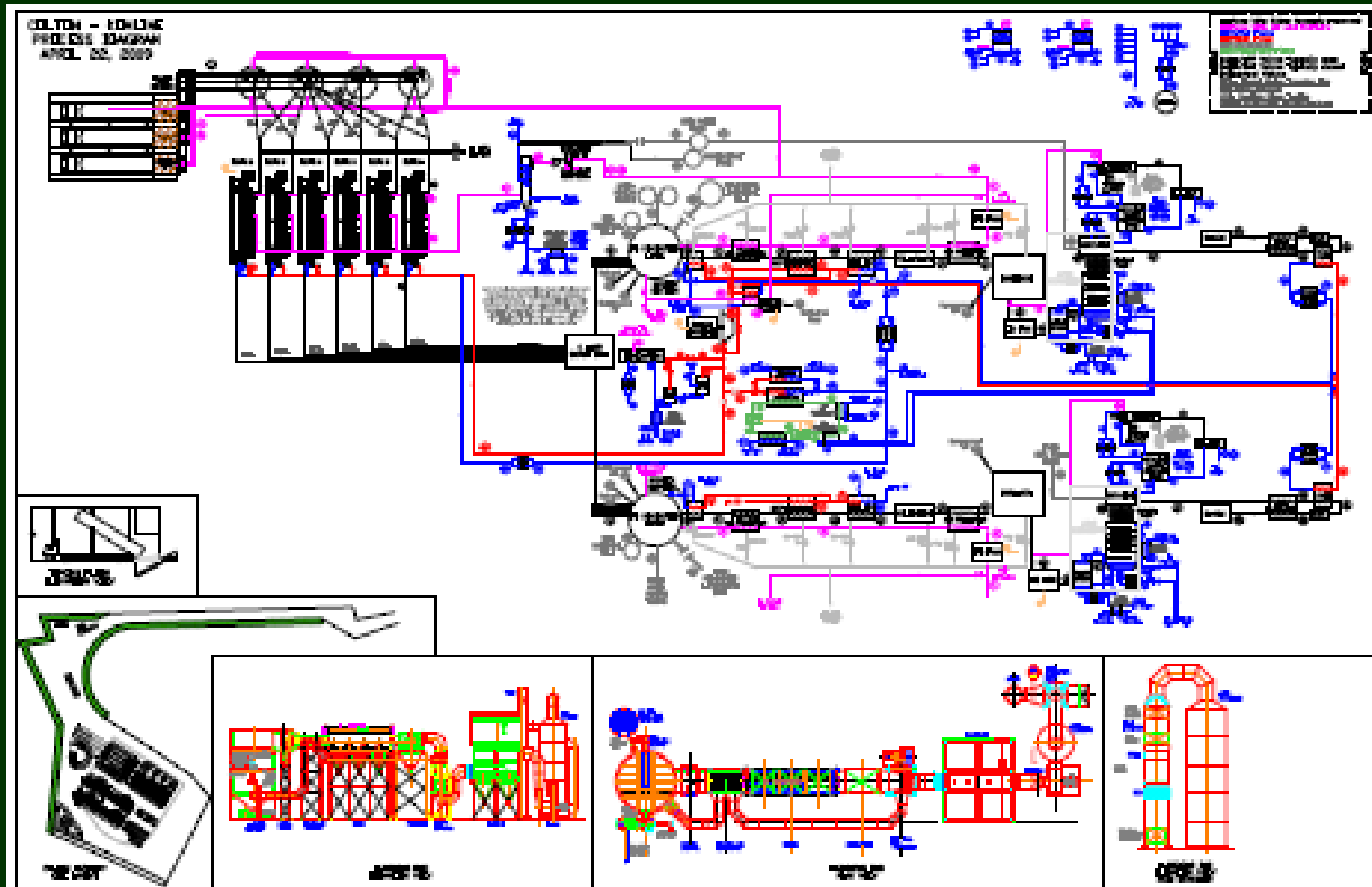
➤ Steam Turbine

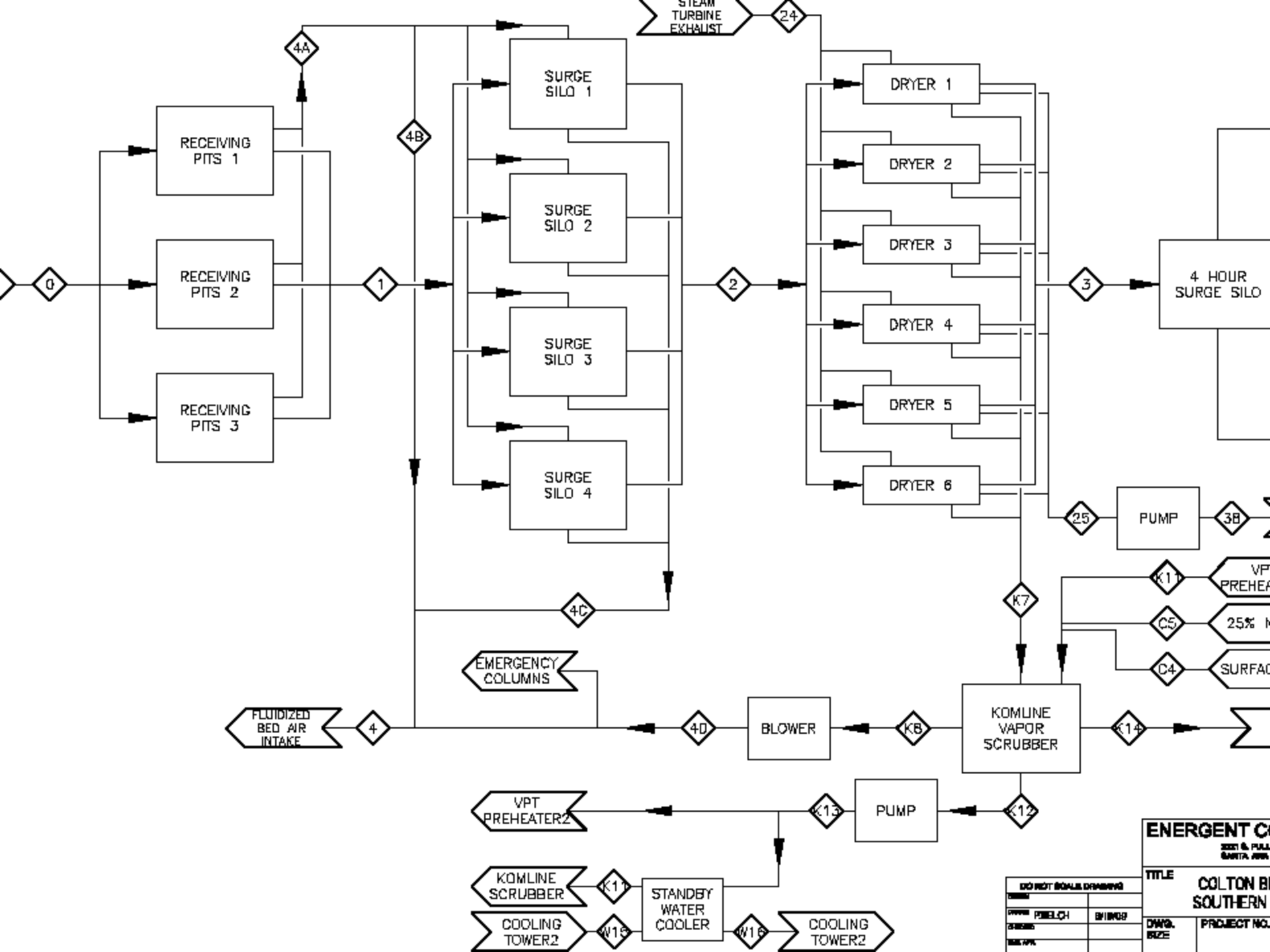
- Experienced Supplier of Steam Turbines. Expandable power plant.
- Rankin-Organic turbines use lower grade heat sources

➤ Special Features of the Biosolids process

- Proven technologies is integrated into the system
- Techniques used to harness and use the available energy in the process
- Equipment used to achieve low emission levels from the Facility.

Biosoils Facility Equipment Placement





ENERGENT C
 2221 & PALL
 SANTA ANA

TITLE
COLTON B
SOUTHERN

DO NOT SCALE DRAWING

DATE		
DRAWN	PMELCH	8/18/09
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DWG. NO.
SIZE
PROJECT NO.

Cleanest Emitting Facility of Its Type in the World

- **When completed Facility will meet most stringent air quality requirements in the world**
 - South Coast Air Quality Management District (SCAQMD)
- **Air Quality is Most Critical Standard Required to be met in Permitting Process**
 - Issued in connection with Amended CUP and Building Permit
- **Facility Will meet Tier 3 Health Risk Assessment Modeling Required by EPA and SCAQMD**
 - Potential Expansion of Facility to 2,400 wet tons per day capacity @ 18.5% solids also projected to meet Tier 3 Health Risk Assessment
 - Environ International conducted Health Risk modeling
 - Key Emissions Evaluated: NO_x, Particulate Matter, SO_x, Metal Compounds

Unique Features of Biosoils Process for Facility to Meet Stringent Requirements of SCAQMD

- **Air and Odors Captured in Tipping Floor Building**
 - All air and odors captured, re-circulated and used as combustion air in Fluidized Bed or captured by emission and odor control device
- **8 separate emission control steps used in Fluidized Bed system**
 - Bed material for H₂S
 - Urea for thermal de nox
 - Multi clone for large particulate removal
 - Bag house for particulate removal
 - Wet scrubber for vapor condensation
 - Electrostatic precipitator for condensed particles
 - Catalyst for Nox polish
 - Activated Carbon for trace metals removal
 - Stack for dispersion

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

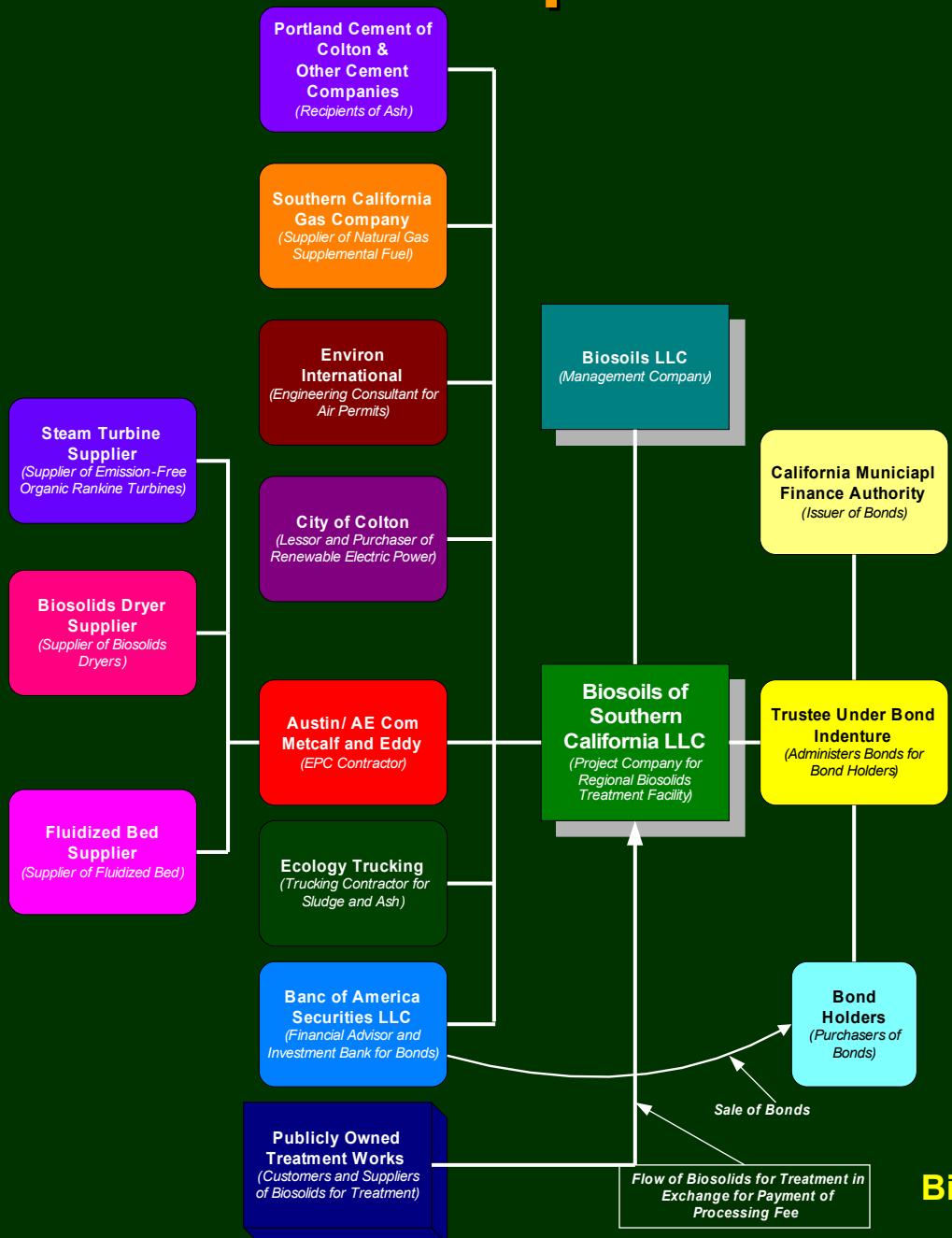
Standard Evaluation Format

APPLICATION EVALUATION AND CALCULATIONSPAGES
17PAGE
7PREPARED BY
Marie E. Cameron, CPP#M6054DATE
04/28/2009SCAQMD use only
APPL NO.

Table 1. Summary of Criteria Pollutant Emissions

Criteria Pollutant	AHU lbs/hr	AHC lbs/hr	MHU lbs/hr	MHC lbs/hr	MDU lbs/day	MDC lbs/day	30DA lbs/day	AA lbs/yr	AA tons/yr	PTE tons/yr
CO	11	11	11	11	266	266	266	96,930	48.46	48.52
NO _x	134	2	134	2	3,221	45	45	16,459	8.23	8.23
VOC	2	1	2	1	56	22	22	7,942	3.97	3.97
PM ₁₀	2,591	1	2,592	1	62,202	22	22	7,955	3.98	3.98
SO _x	799	1	799	1	19,182	22	22	7,941	3.97	3.97

Biosoils Development Team Members



Biosoils of Southern California LLC

Substantial Capability of Biosoils A & E Team

Austin/AE Com and Metcalf & Eddy/Lyles Construction

- \$2.5 billion per year employee-owned architectural, engineering and construction firm – now one of world's largest
- Will become Engineering, Procurement and Construction contractor for Biosoils of Southern California LLC project
- Has the required Performance and Completion bonding capacity for \$100 million project
- Has prior experience in water, wastewater plants and in energy production facilities
- Metcalf & Eddy is 100 year old nationally recognized wastewater engineering firm that is one of AE Com group of companies and that will provide engineering to Austin/AE Com for Biosoils project

The Contract

- **We want to partner with the POTW.**
 - As our costs reduce the savings will be passed through
- **Facility design allows for doubling of capacity without substantial capital costs**
- **20 years and the costs are very low...**

Tipping Fees

Colton Project Economics dollars per ton

Tons/day	1,200	2,400	2400 Project	2400
Power plant size kw	2,634	5,668	22400 year 21	22400
percent solids	18.5%	18.5%	90%	90%
Income per year				
Interest Income	\$ 0.84	\$ 0.42	\$ 0.42	\$ -
power Income	\$ 5.18	\$ 5.18	\$ 21.64	\$ 21.64
carbon credits	\$ 1.25	\$ 1.25	\$ 1.25	\$ 1.25
Tipping fee Income per ton	\$ 60.00	\$ 36.00	\$ 24.00	\$ 4.22
total Income per ton	\$ 67.27	\$ 42.12	\$ 46.67	\$ 27.11
Cost per wet ton				
Interest on reserve	\$ (0.84)	\$ (0.42)	\$ (0.42)	\$ -
power income	\$ (5.18)	\$ (5.18)	\$ (21.64)	\$ (21.64)
carbon credits	\$ (1.25)	\$ (1.25)	\$ (1.25)	\$ (1.25)
Depreciation 15yrs-20yrs	\$ 17.17	\$ 8.58	\$ 8.58	\$ -
operational expenses	\$ 27.57	\$ 22.03	\$ 23.65	\$ 23.65
Bond Interest	\$ 20.89	\$ 10.45	\$ 10.44	\$ -
equity principle	\$ 0.35	\$ 0.17	\$ 0.17	\$ 0.17
equity interest	\$ 0.02	\$ 0.01	\$ 0.01	\$ 0.01
Bond Principal	\$ 5.71	\$ 2.85	\$ 2.85	\$ -
Total expenses	\$ 65.96	\$ 41.22	\$ 42.84	\$ 23.83
pretax profits	\$ (0.97)	\$ 0.20	\$ 3.10	\$ 3.10
Total cost per ton	\$ 59.33	\$ 36.09	\$ 24.06	\$ 4.22
				18.5% equivalent



Thanks for Listening!

Tudor Williams

Jim Sullivan

Biosoils of Southern California LLC

(909)910-0520 or (213) 628-8312

E-mail: Jim@biosoils.com

Biosoils of Southern California LLC

