Working Towards Field Implementation of LF Bioreactors

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Regulatory Drivers

- *RD&D rule, proposed June 2002*

  40 CFR part 258.
- *40 CFR Part 63, NESHAPS Rule, January 16, 2003*

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Transition of Policy Impacting the Research

- *Presently few operating sites with outside liquid addition.*
- *Agency focus on Biosolids Safety in land spreading and landfills.*
- *Need for green energy in the United States.*
- *Trading of greenhouse gas emission credits, establishment of CCX.*

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USEPA/WM CRADA

- *5 year Cooperative Research & Development Agreement.*
- *Rigid QA/QC procedures through a QAPP.*
- *Designed for Statistical Interpretation.*
- *Four LF Bioreactors, Two Control Subtitle D Cells.*

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CRADA Project Objectives

- *To determine the parameters and trends that should be monitored to assess the performance of and control a bioreactor landfill.*
  - *Leachate*
  - *Gas Management/Fugitive Emissions*
  - *Solids Decomposition*
- *Two primary sites*
  - *Area 7 – New fill*
  - *Area 5 – Existing fill to be retrofitted, and will use nitirified leachate to control ammonia levels*
  - *Shared experimental control area*

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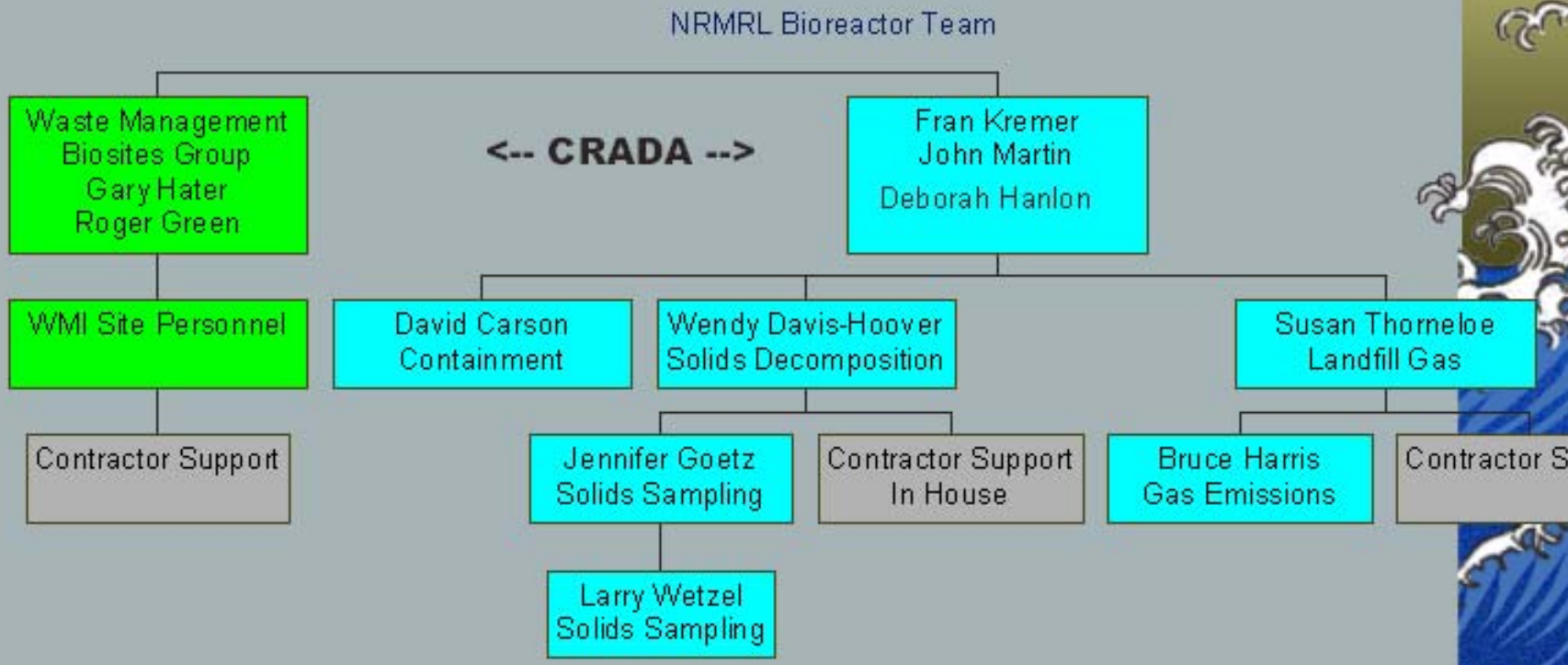
CRADA Team Structure



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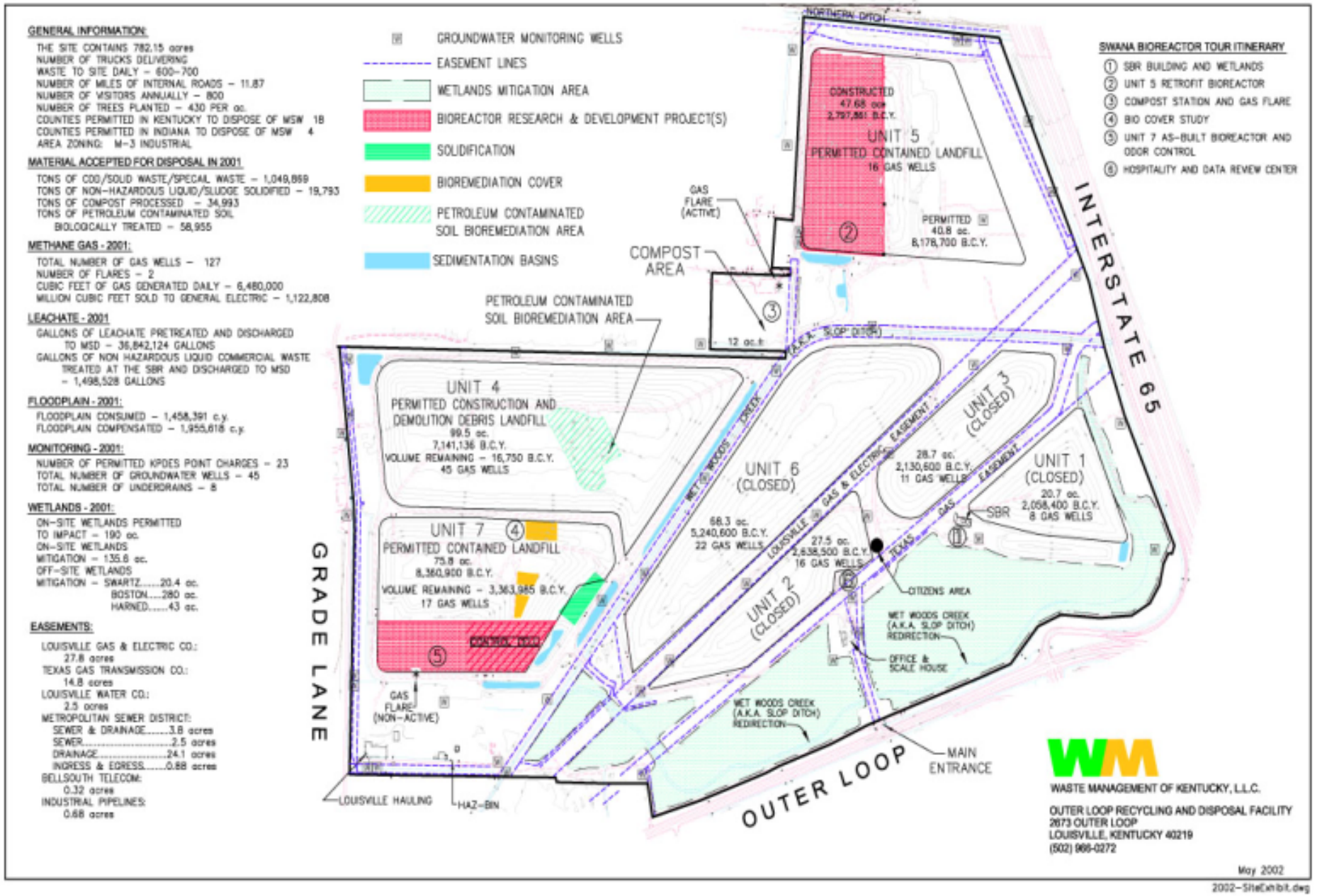
The Site


GENERAL INFORMATION:
THE SITE CONTAINS 782.15 acres
NUMBER OF TRUCKS DELIVERING WASTE TO SITE DAILY – 600–700
NUMBER OF MILES OF INTERNAL ROADS – 11.87
NUMBER OF VISITORS ANNUALLY – 800
NUMBER OF TREES PLANTED – 430 PER ac.
COUNTIES PERMITTED IN KENTUCKY TO DISPOSE OF MSW 18
COUNTIES PERMITTED IN INDIANA TO DISPOSE OF MSW 4
AREA ZONING: M-3 INDUSTRIAL
MATERIAL ACCEPTED FOR DISPOSAL IN 2001
TONS OF CDD/SOLID WASTE/SPECAIL WASTE – 1,049,869
TONS OF NON-HAZARDOUS LIQUID/SLUDGE SOLIDIFIED – 19,793
TONS OF COMPOST PROCESSED – 34,993
TONS OF PETROLEUM CONTAMINATED SOIL BIOLOGICALLY TREATED – 58,955
METHANE GAS - 2001:
TOTAL NUMBER OF GAS WELLS – 127
NUMBER OF FLARES – 2
CUBIC FEET OF GAS GENERATED DAILY – 6,480,000
MILLION CUBIC FEET SOLD TO GENERAL ELECTRIC – 1,122,808
LEACHATE - 2001
GALLONS OF LEACHATE PRETREATED AND DISCHARGED TO MSD – 36,842,124 GALLONS
GALLONS OF NON HAZARDOUS LIQUID COMMERCIAL WASTE TREATED AT THE SBR AND DISCHARGED TO MSD – 1,498,528 GALLONS
FLOODPLAIN - 2001:
FLOODPLAIN CONSUMED – 1,458,391 c.y.
FLOODPLAIN COMPENSATED – 1,955,618 c.y.
MONITORING - 2001:
NUMBER OF PERMITTED KPDES POINT CHARGES – 23
TOTAL NUMBER OF GROUNDWATER WELLS – 45
TOTAL NUMBER OF UNDERDRAINS – 8
WETLANDS - 2001:
ON-SITE WETLANDS PERMITTED TO IMPACT – 190 ac.
ON-SITE WETLANDS MITIGATION – 135.6 ac.
OFF-SITE WETLANDS MITIGATION – SWARTZ.....20.4 ac.
BOSTON.....280 ac.
HARNED.....43 ac.
EASEMENTS:
LOUISVILLE GAS & ELECTRIC CO.: 27.8 acres
TEXAS GAS TRANSMISSION CO.: 14.8 acres
LOUISVILLE WATER CO.: 2.5 acres
METROPOLITAN SEWER DISTRICT:
SEWER & DRAINAGE.....3.8 acres
SEWER.....2.5 acres
DRAINAGE.....24.1 acres
INGRESS & EGRESS.....0.88 acres
BELLSOUTH TELECOM: 0.32 acres
INDUSTRIAL PIPELINES: 0.68 acres
GROUNDWATER MONITORING WELLS
EASEMENT LINES
WETLANDS MITIGATION AREA
BIOREACTOR RESEARCH & DEVELOPMENT PROJECT(S)
SOLIDIFICATION
BIOREMEDIATION COVER
PETROLEUM CONTAMINATED SOIL BIOREMEDIATION AREA
SEDIMENTATION BASINS
NORTHERN DITCH
CONSTRUCTED 47.68 ac.
2,797,881 B.C.Y.
UNIT 5
PERMITTED CONTAINED LANDFILL
16 GAS WELLS
PERMITTED 40.8 ac. 8,178,700 B.C.Y.
GAS FLARE (ACTIVE)
COMPOST AREA
PETROLEUM CONTAMINATED SOIL BIOREMEDIATION AREA
12 ac.ft.
W.K.A. SLOP DITCH
INTERSTATE 65
UNIT 4
PERMITTED CONSTRUCTION AND DEMOLITION DEBRIS LANDFILL
99.5 ac.
7,141,136 B.C.Y.
VOLUME REMAINING – 16,750 B.C.Y.
45 GAS WELLS
UNIT 6 (CLOSED)
68.3 ac.
5,240,600 B.C.Y.
22 GAS WELLS
WET WOODS CREEK
LOUISVILLE GAS & ELECTRIC EASEMENT
UNIT 3 (CLOSED)
28.7 ac.
2,130,600 B.C.Y.
11 GAS WELLS
UNIT 1 (CLOSED)
20.7 ac.
2,058,400 B.C.Y.
8 GAS WELLS
SBR
TEXAS GAS EASEMENT
UNIT 7
PERMITTED CONTAINED LANDFILL
75.8 ac.
8,360,900 B.C.Y.
VOLUME REMAINING – 3,363,985 B.C.Y.
17 GAS WELLS
CONSTR. HOLD
27.5 ac.
2,838,500 B.C.Y.
16 GAS WELLS
UNIT 2 (CLOSED)
CITIZENS AREA
WET WOODS CREEK (A.K.A. SLOP DITCH) REDIRECTION
OFFICE & SCALE HOUSE
GAS FLARE (NON-ACTIVE)
WET WOODS CREEK (A.K.A. SLOP DITCH) REDIRECTION
GRADE LANE
LOUISVILLE HAULING
HAZ-BIN
MAIN ENTRANCE
OUTER LOOP
SWANA BIOREACTOR TOUR ITINERARY
1 SBR BUILDING AND WETLANDS
2 UNIT 5 RETROFIT BIOREACTOR
3 COMPOST STATION AND GAS FLARE
4 BIO COVER STUDY
5 UNIT 7 AS-BUILT BIOREACTOR AND ODOR CONTROL
6 HOSPITALITY AND DATA REVIEW CENTER
WASTE MANAGEMENT OF KENTUCKY, L.L.C.
OUTER LOOP RECYCLING AND DISPOSAL FACILITY
2673 OUTER LOOP
LOUISVILLE, KENTUCKY 40219
(502) 966-0272
May 2002
2002-SiteExhibit.dwg

USEPA/WM CRADA

- *Progress Report is Due out in 2003.*
- *Conference Publish Rate is >4 /year.*
- *Additional Sites to be Added in Future.*

Unique Features:

- *Air Emissions Monitoring.*
- *Outside Liquid Addition.*
- *Compost Cover Study.*
- *High Biosolids Rate.*

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What Designs to Study?

- *As Built vs. Retrofit*
- *Anaerobic*
- *Facultative*
- *Aerobic-Anaerobic*
- *Aerobic*

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Surface Application of Liquids in
a “as built” System.