



Luminant

An Overview of Lignite Mine Reforestation at Luminant's Martin Lake Mines in Eastern Texas



June 11, 2015

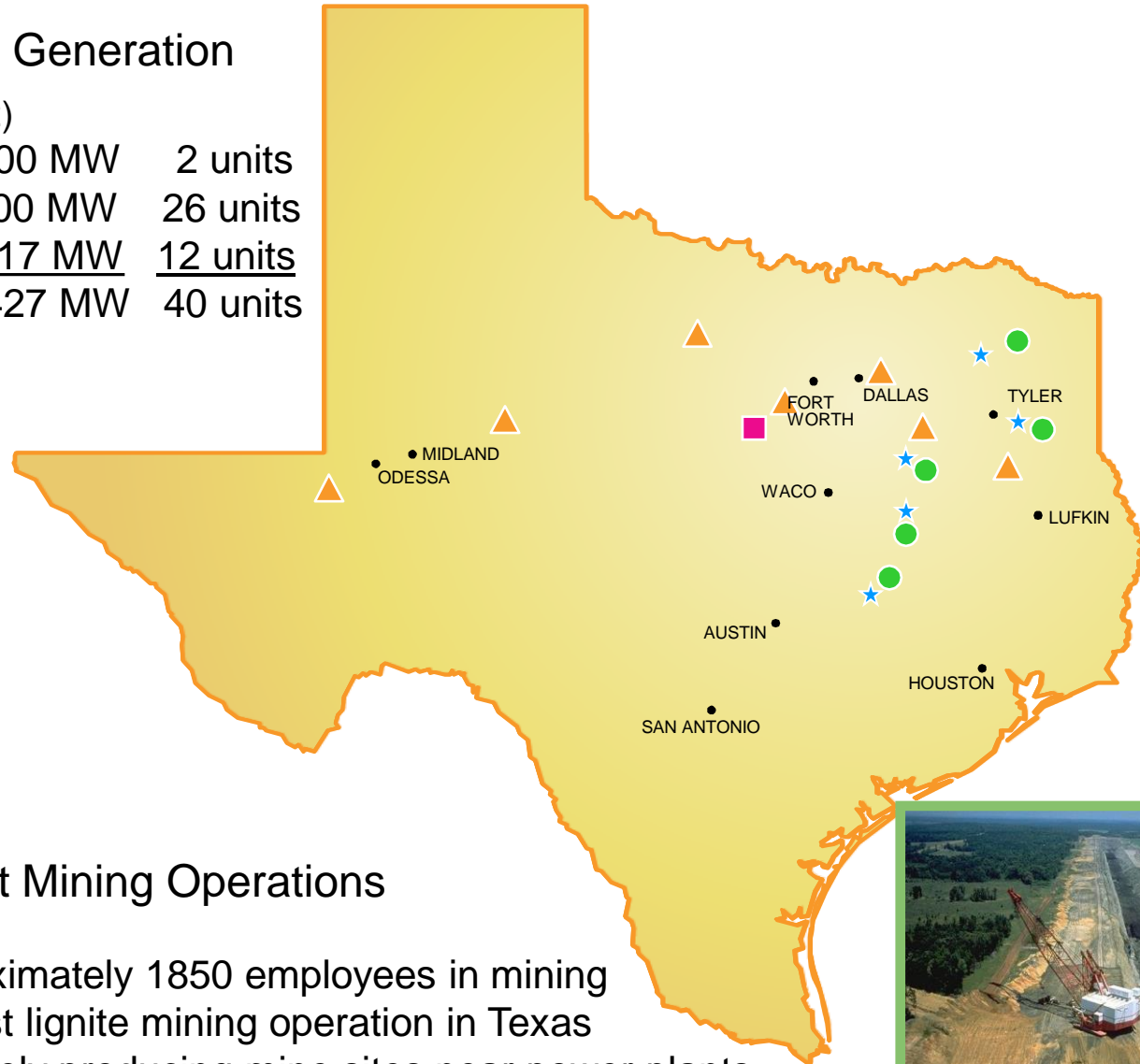


Luminant Power and Mining Operations

Luminant Power Generation

(Assets as of 12/31/12)

■ Nuclear	2300 MW	2 units
▲ Natural Gas	5100 MW	26 units
● Lignite	8017 MW	<u>12 units</u>
TOTAL	15427 MW	40 units



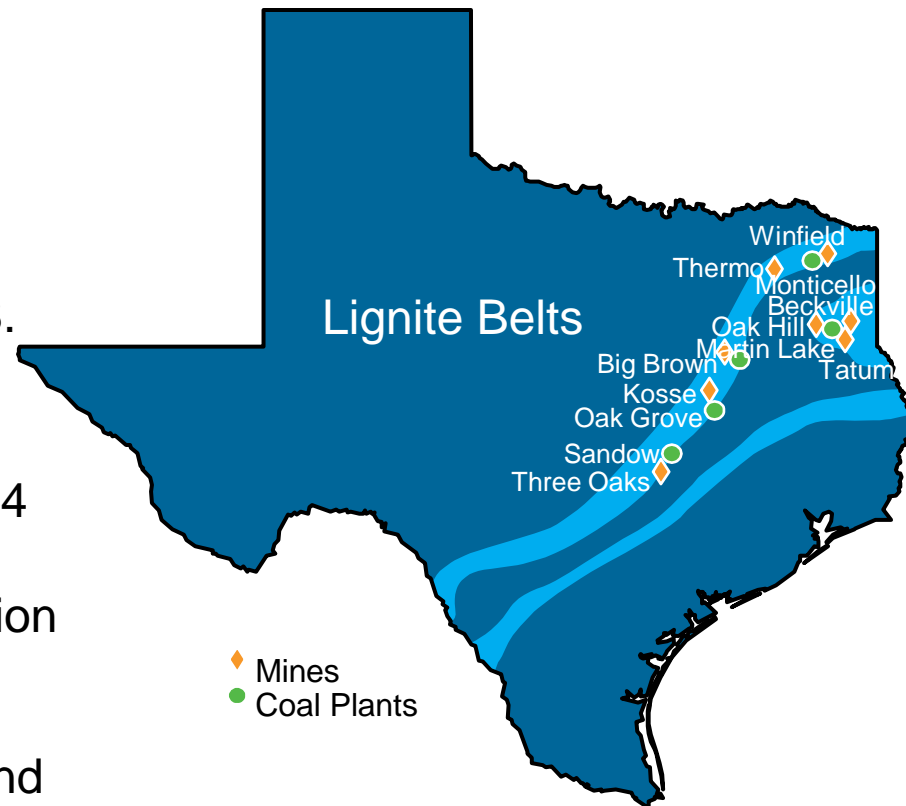
Luminant Mining Operations

- Approximately 1850 employees in mining
- Largest lignite mining operation in Texas
- ★ 8 actively producing mine sites near power plants



Luminant Mining Company LLC

- 9th largest mining company (tons) in U.S.
- 8 Active mines at 5 mine-mouth power plants
- Produced 29.6 million tons of coal in 2014
...all used in Luminant power plants
- 13 mine permits from Railroad Commission of Texas (over 156,000 acres)
- 117 additional permits from Texas Commission on Environmental Quality and U.S. Army Corps of Engineers combined
- Award-Winning Reclamation Efforts



Mine Permits

Railroad Commission of Texas

<u>Luminant Mine</u>	<u>Permit No.</u>	<u>Original Permit Date</u>	<u>Current Permitted Acres</u>	<u>County</u>
Big Brown Mine	3F	10/17/1977	12,910	Freestone
Martin Lake Mine	4K	10/17/1977	30,530	Rusk / Panola
Monticello-Thermo Mine	5G	10/17/1977	4,506	Hopkins
Monticello-Winfield Mine	34F	10/17/1977	26,732	Titus / Franklin
Oak Hill Mine	46C	07/25/1983	26,014	Rusk
Bremond Mine	49A	03/23/2004	3,371	Robertson
Kosse Mine	50A	04/24/2007	15,040	Robertson / Limestone
Leesburg Mine	51	06/10/2008	4,516	Camp
Martin Lake AIV South Mine	53	02/26/2009	2,403	Rusk / Panola
Turlington Mine	54	06/22/2010	10,450	Freestone
Three Oaks Mine	48B	11/30/2010	15,809	Bastrop / Lee
Thermo A-1 Area Mine	56	06/26/2012	286	Hopkins
Liberty	58	12/11/2012	3,866	Rusk
Total Acres			156,148	

Other Environmental Permits



Wetlands - U.S. Army Corps of Engineers

- 38 active Corps permits

Water – TCEQ

- 7 active Wastewater Discharge permits
- 18 Stormwater Permits
- 22 Water Rights Permits



Air - TCEQ

- 32 active permits

Luminant Mining Company

Reclamation Land Uses

Land is reclaimed to premine uses for the area:

- **Improved Pastureland**
 - Livestock
 - Hay Production
- **Forestland** that emphasizes:
 - Quality Wildlife Habitat
 - Commercial Forestland for timber production
- **Water** Resources are significantly increased
- **Industrial/Commercial** uses accommodated



Reclamation Land Use - Pastureland



Reclamation Land Use - Reforestation

- 37 million trees planted since 1975
- 1.4 million per year avg since 1995
- 1.25 million planted in 2015

Commercial Forestland



Wildlife Habitat

Reclamation Land Use - Wildlife Habitat

Reclamation of Wildlife Habitat / Wildlife Protection & Enhancement

Restoration of Wildlife Habitat is a critical part of Luminant's reclamation effort

Wildlife Protection, Enhancement and Reintroduction Initiatives:

- American Bald Eagle
- Interior Least Tern
- Bobwhite Quail
- Eastern Wild Turkey

Grassland Habitat:

- Benefits to one of the fastest declining bird groups in America (grassland birds)



Reclamation Land Use - Water Resources

Ponds, Streams and Wetlands



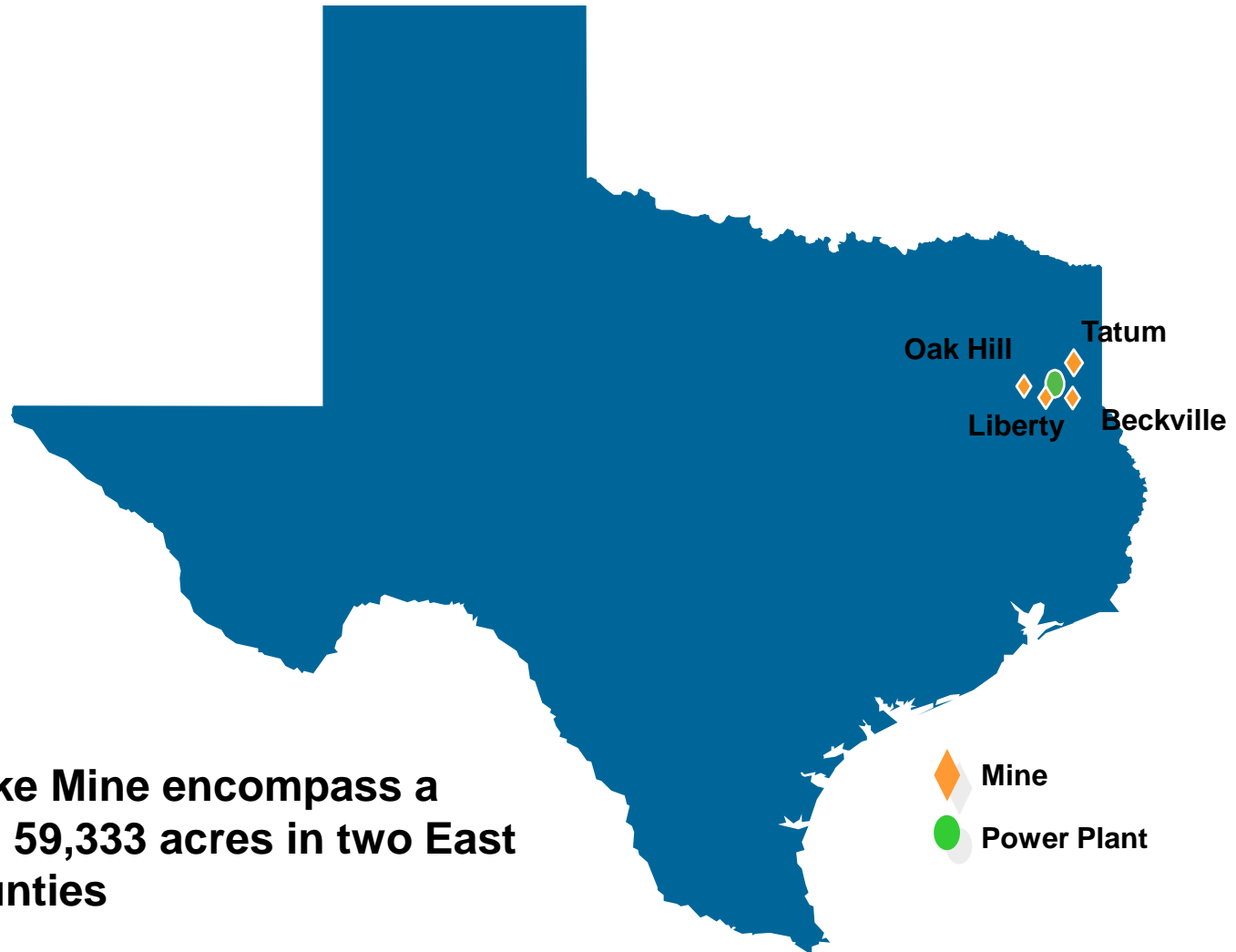
Environmental Stewardship

Luminant Environmental Research Steering Committee

- Began in 1971 and continues today
- Funded by Luminant with student research directed by an Independent Advisory Board of University Professors
- 130 students have entered the program, studying various potential effects of surface lignite mining, electric power generation and electric power delivery on the environment

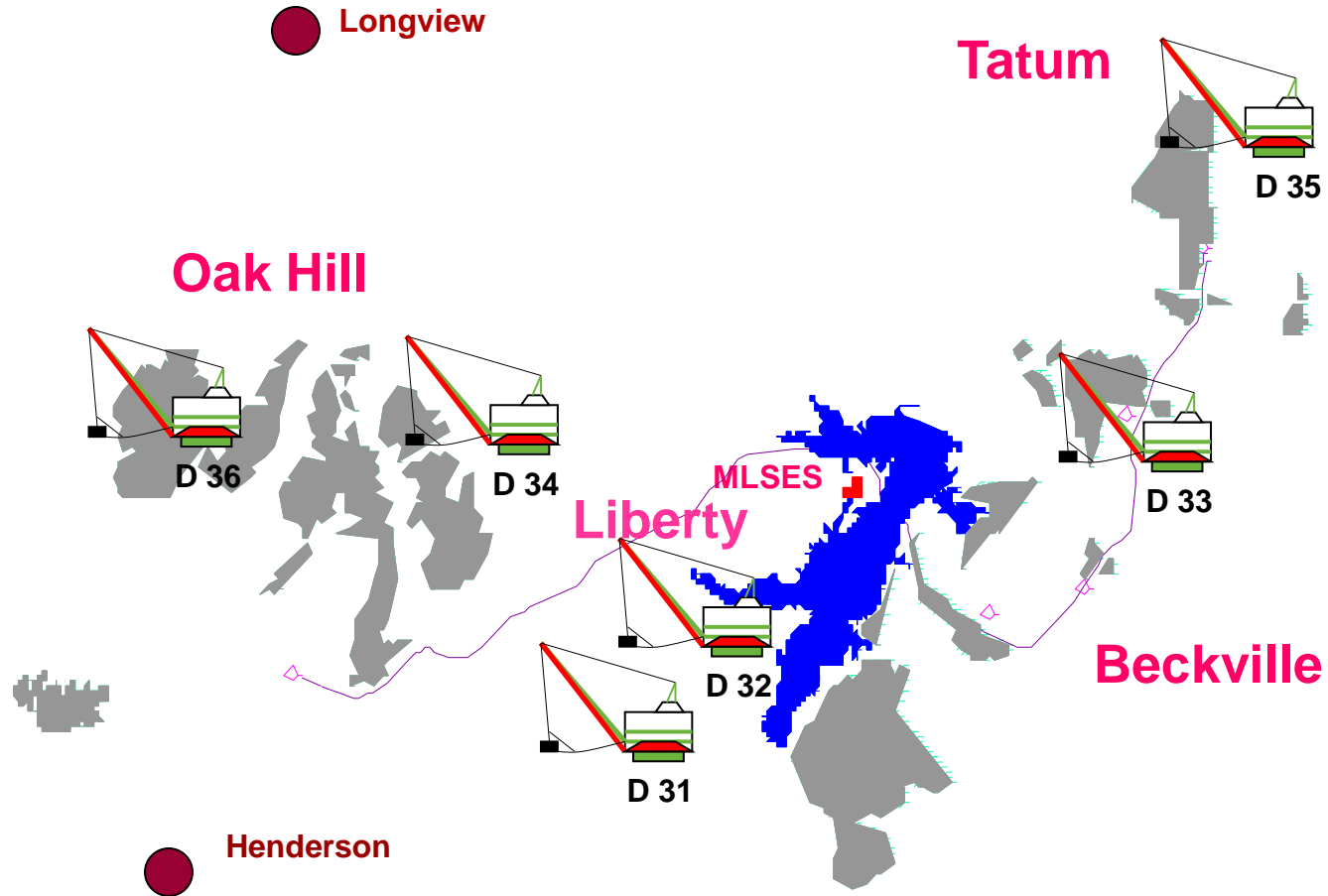


Martin Lake Mines Complex



Martin Lake Mine encompass a combined 59,333 acres in two East Texas counties

Martin Lake Mine Complex



















Post-mine Land Uses

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- **Commercial Forestry** 15,872 ac. (43%)
 - **Fish and Wildlife Habitat** 12,408 ac. (33%)
 - **Developed Water Resources** 2,248 ac. (6%)
 - **Pastureland** 5,463 ac (13%)
 - **Industrial/Commercial** 2,096 ac. (5%)

MARTIN LAKE REFORESTATION

22.1 million trees planted (as of Mar. 2015)



Reforestation Planning

- **Selection of species**
Commercial pine /wildlife habitat
- **Habitat- Upland or Bottomland**
- **Challenges**
Rainfall
Soil texture
Moisture Regime



Pine Varieties



Loblolly Pine - NE Texas (2nd gen)

Longleaf Pine (Vernon Parrish, La.)







Upland and Bottomland Hardwood Establishment



Hardwood Varieties



**Bur Oak
Cherrybark Oak
Chinkapin Oak
Nuttall Oak
Post Oak
Swamp Chestnut Oak
Southern Red Oak
Shumard Oak
Overcup Oak
Water Oak
Willow Oak
White Oak
Bald Cypress**

**Black Walnut
Native Pecan
Persimmon
Water Hickory
River Birch
Plum
Black Tupelo
Water Tupelo
Hackberry
Button-bush
Wax-myrtle**











Longleaf Pine & Tall Prairie Grass Ecosystem

- Sand Lovegrass
- Sand Dropseed
- Switch Grass sp.
- Indian Grass
- Big Bluestem
- Little Bluestem
- Lespedeza sp.



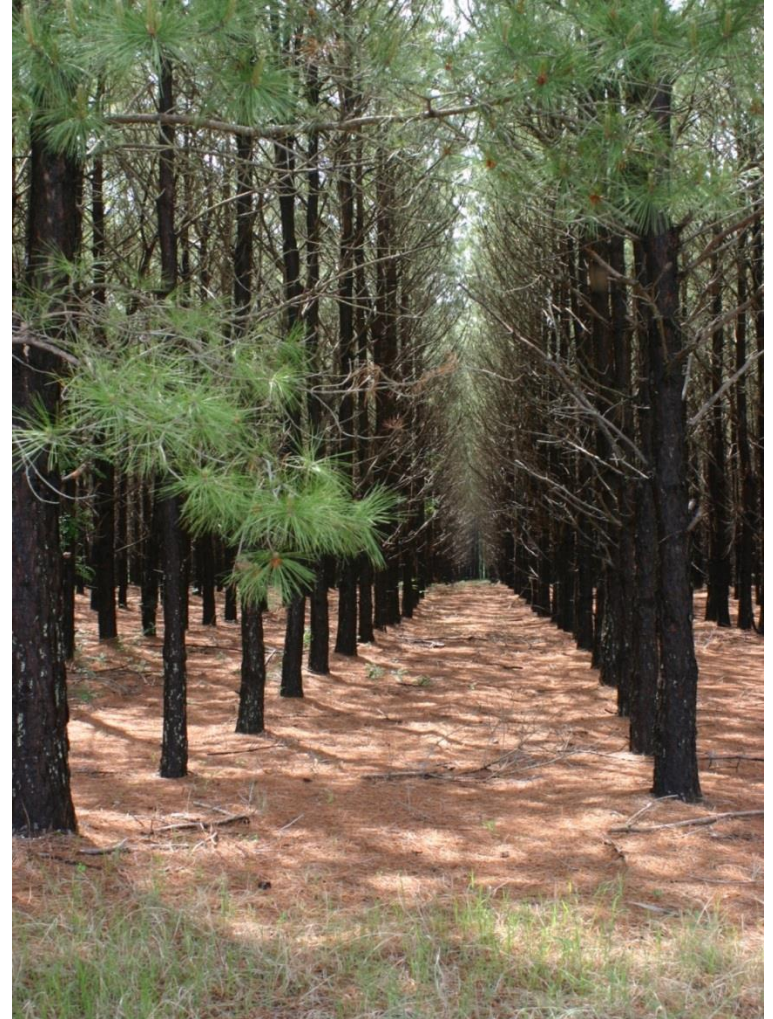




Commercial Pine Thins and Harvests

GOAL: To systematically remove inferior stems within the stand while increasing the quality and value of the residual stand.

- Loblolly pine stands are typically first thinned for pulpwood products at year 15-16
- Conservatively remove every fifth row (20%) for equipment access and then thin the remaining rows to an 80 basal area to improve the health of stand
- Subsequent thinnings at 5-7 year intervals produce chip-n-saw logs
- Final harvest produces larger saw logs













Texas Forest Sector

- **\$30.3 billion to state economy annually**
- **One of Texas' top 10 renewable natural resources**
- **Provides more than 5000 products we use daily**



What is *your* legacy ?

