



# NTMWD 121 HIGH BTU PROJECT

COLLABORATION, PERSEVERANCE, AND SUCCESS

LUKE MORROW, PRESIDENT

MORROW RENEWABLES



# BACKGROUND

- MORROW RENEWABLES HAS BUILT, OWNED, AND OPERATED 10 HIGH BTU PROJECTS ACROSS THE US.
- MORROW IS THE ONLY US COMPANY THAT DESIGNS, MANUFACTURES, CONSTRUCTS, OWNS AND OPERATES HIGH BTU PROJECTS ON LANDFILLS.
- MORROW IS A FOUNDING MEMBER OF THE RENEWABLE NATURAL GAS COALITION



# 121 LANDFILL



- THE 121 LANDFILL IS OWNED AND OPERATED BY THE NTMWD AND SERVES PRIMARILY THE CITIES OF MCKINNEY, ALLEN, FRISCO, PLANO, AND RICHARDSON
- THE 121 LANDFILL IS A NSPS FACILITY, AND COLLECTS APPROXIMATELY 4,000 TONS PER DAY OF WASTE
- AFTER A PUBLIC RFP PROCESS, MORROW WAS AWARDED THE GAS DEVELOPMENT RIGHTS TO THE 121 LANDFILL





# 121 LANDFILL- GAS



- 121 LANDFILL GAS SYSTEM WAS COLLECTING ABOUT 1,800 SCFM OF LFG IN 2017 WHEN MORROW TOOK OVER THE GAS SYSTEM
- MORROW INSTALLED OVER 100 ADDITIONAL WELLS, INCLUDING HORIZONTALS TO REDUCE ODORS AND INCREASE GAS FLOW FOR THE PROJECT
- AS A RESULT, GAS FLOW HAS INCREASED TO 4,000 SCFM AND ODOR COMPLAINTS HAVE BEEN ALL BUT ELIMINATED



# PIPELINE

- ATMOS PIPELINE IS JUST OVER 5 MILES AWAY
- RIGHT OF WAY WAS A COMPLETE NIGHTMARE AND TOOK ABOUT 18 MONTHS TO COMPLETE
- 6 FEET OF PAIN AND SUFFERING





# PROCESS CHALLENGES

- SITE HYDROGEN SULFIDE (H<sub>2</sub>S) HAS CREPT UP TO OVER 1,000 PPM
- PIPELINE HAS A 500 PPM OXYGEN SPEC
- INITIAL PLANT AND COMPRESSION DESIGN IS 4,000 SCFM



# HIGH BTU PLANT

- CONSTRUCTION BEGAN IN MAY OF 2017
- OF 10 PROJECTS MORROW HAS DONE, THE PERMITTING WAS MOST DIFFICULT AT 121
- POWER FOR THE PROJECT ARRIVED IN LATE OCTOBER OF 2017
- PLANT START UP WAS MID-DECEMBER 2017



# 121 LANDFILL GAS PROJECT TODAY

- MORROW IS SELLING ABOUT 3,000 MMBTU PER DAY OF RENEWABLE NATURAL GAS (RNG) FROM 4,000 SCFM OF LFG
- ALL RNG IS GOING TO THE VEHICLE FUEL MARKET UNDER THE RFS2
- BLOWERS ARE BEING ADDED TO THE FRONT OF THE PLANT TO INCREASE CAPACITY TO AROUND 7,000 SCFM
- NTMWD IS ANTICIPATING 5% ANNUAL GROWTH AT THE SITE AS DFW EXPANDS NORTH





# PROJECT LEARNINGS

- RIGHT OF WAY IS BECOMING EVER MORE DIFFICULT TO OBTAIN
- IT IS NEVER TOO EARLY TO PLAN FOR POWER
- GREAT RELATIONSHIPS MAKE GREAT PROJECTS



# UTILITY RECOMMENDATIONS

- THESE PROJECTS WORK
- PAY ATTENTION TO THE SIGNS OF THE TIMES
- RNG IS LIKE FOOD COLORING- A LITTLE GOES A LONG WAY
- TALK TO OTHER UTILITIES

