Partner Experience: Equatorial Guinea

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Natural Gas STAR Implementation Workshop
Equatorial Guinea: Alba Field

- Four offshore production platforms
- Onshore gas/condensate processing facilities
- Current production (gross)
  - 945 mmscf/d gas
  - ~60,000 bpd condensate
- Currently re-injecting 20 mmcf/d (normal operations)
Location of Alba Field

Regional Map

18 miles northwest of Bioko Island

Punta Europa Gas/Condensate Processing Facilities
Location of Punta Europa Facilities

- Equatorial Guinea LNG Operations S.A. (EG LNG)
- Marathon Equatorial Guinea Production Limited (MEGPL)
- Atlantic Methanol Production Company LLC (AMPCO)
Alba Platform Operations

Potential 600 MMSFCD Gas Re-injected

945 MMSCFD Gas Production

60,000 BPD Condensate
Alba Field – History of Operations

- April 1984  Discovery well 13B1-1X drilled
- December 1991  First Production (A platform: Alba 2, Alba 3)
- November 1996  LPG Plant construction complete (2,400 bpd)
- September 2000  Phase 1 Development
  - Offshore re-injection of gas commences
- February 2001  Methanol production begins
- January 2002  Marathon acquires Alba assets
- October 2004  Phase 2A Complete
  - Continuous flaring ceases
- May 2007  LNG Plant begins production
Natural Gas STAR Partnership

- U.S. Natural Gas STAR Partner – 1994
- International Gas STAR Partner – 2006
- MOC was a charter member of both the U.S. and International Natural Gas STAR programs.
- Awarded Production Partner of the Year – 1997 and 2006
- Cumulative methane reductions of 51.6 Bcf between 1994 and 2007
Methane Reduction Projects

- Two categories of projects – all relate to reductions in flaring of natural gas
  - Process Control Modifications
  - Equipment Modifications/Installation
Flaring Reductions

Flare vs Gas Production Ratio

mmcf flared / bcf produced

2004 2005 2006 2007 2008 (est)
Process Control Modifications

- Reviewed emergency shutdown (ESD) settings – too high/low
- Eliminated single-point failure controls (where possible) – reduces affect of “false” data in controls
- Reviewed interconnected controls – allows for quicker/automatic load transitions between redundant equipment
Equipment Modification/Installation

- Installed redundant equipment – increases capacity to allow for maintenance without product loss
- Re-routed vapors away from the flare and back into the process where feasible
- Installed pump to improve water handling capabilities
- Overhead compressors re-routed scrubber liquid to a closed drain system (from pressure process vessel)
Methane Reduction - Economics

- Natural gas is low value commodity for MEGPL under it’s present supply contracts
- Project economics are typically driven by lost production or value of liquid recoveries from the gas
Lessons Learned:

- Improve the quality of data used for emission calculations – lack of meters, documentation, etc. You need to know where your losses are!

- Capture “low hanging fruit” – review ESD set points, control logic, etc

- Operations and maintenance need to be engaged – not just an environmental issue.

- Moving from construction to operation mentality takes time and effort.
MEGPL – Government Interaction

- Limited environmental regulations – don’t address air emissions/greenhouse gases
- Proactive – prepare a “Flaring Philosophy” document each year for review with the Ministry of Mines, Industry and Energy (MMIE)
MEGPL - Social Responsibility

- Malaria Control Project – public/private partnership to reduce malaria rate.
  - Eliminated 95% of disease transmitting mosquitoes and reduced infection rates by 45% reduction in malaria

- Education Scholarships – Texas A&M and University of South Carolina

- Malabo Landfill – Construction of landfill used for waste generated on island. Operation of landfill by Malabo City Hall

- Books for Bioko – employee driven program to provide school supplies for local schools