

Gas Electric Partnership Production Compression Module

Morning Session

Shale Gas Infrastructure Forum

- ▶ 9:00– 9:30 am, Engineering & Economic Challenges in Shale Gas Production
 - Rob Sutton, Marathon Oil Corporation

- ▶ 9:30 – 10:25 am, Shale Gas Infrastructure Challenges – Panel Discussion
 - Anders Johnson, Director– Planning, El Paso Corporation
 - Ray Jachim, Facilities Engineer– Eagleford, ConocoPhillips
 - Dr Alasdair S Brown, North America Region Mgr, Halliburton Consulting & Project Mgt

- ▶ 10:25 – 10:45 am, Break

Technology Updates

- ▶ 10:45 – 11:45 am, Review of New and Updated Compression Technology
 - *Norm Shade (moderator), ACI Services*
- ▶ 11:45 – 12:40, Lunch

Afternoon Session

Application Focus- CO2 Flooding & Carbon Sequestration

– *Robert Crow (moderator), Neuman & Esser USA*

- Compression in CO2 Enhanced Oil Recovery
 - 12:40 – 1:15 pm, US Southwest Region
 - Gordon Moore, Denbury Resources
 - 1:15 – 1:50 pm, Operator Perspective on CO2 Compression
 - Michael Rhoads, Kinder Morgan

- 1:50 – 2:20 pm, CO2 Compression Technology Advances
 - J Jeffrey Moore, Southwest Research Institute

- 2:20– 2:30 pm, Summary

- 2:30 – 2:50 pm, Break

Compression Management

- 2:50 – 3:35 pm, Management of Compression Services
 - Keith Sergent, Conocophillips
 - Bryan Kendig, Marathon Oil Corporation

- 3:35 – 4:05 pm, Compressor Automation
 - Jeffrey Dowdell, Dominion Transmission

- 4:05 – 4:15 pm, Electric Motor Multi-client Study
 - Dr Klaus Brun, Southwest Research Institute

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Management of Compression Services

Introduction

- ▶ Unique aspects of the upstream compression business model

Bryan Kendig

Tips for managing the Upstream Compression Business Model

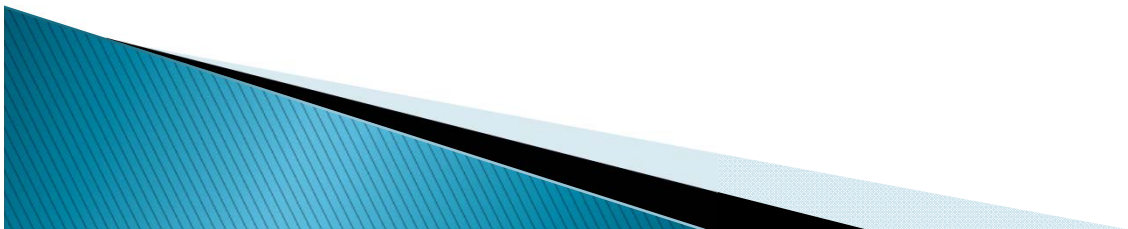
- ▶ Balancing operator specifications with vendor standards
- ▶ Recommendations for sourcing electric compression
- ▶ Translating stated performance objectives into reality
 - Field Improvement Teams
 - Score Cards

Keith Sergent

Bryan Kendig

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Upstream Business Model

Unique Aspects

	Attribute	Gatherers, Transmission & Storage	Upstream Production (mostly wellhead)
1	Management Perception of Compression	Core Requirement	Important, but not Core
2	Risk tolerance for advancement of compression technology	Moderate	Low
3	Senior Level Relationships with Compressor Mfg's	Many	Few
4	Staff with Compression Expertise	Relatively More	Relatively Few
5	Acceptance of 3 rd Party Parts & Services	More Willing	Less Willing
6	Typical Maintenance Approach	Self	Contracted
7	Purchase / Lease	Mostly Purchase	Mostly Lease

Supplier dependency can create control issues for upstream operators

Balancing Operator specifications with Supplier/Industry standards

▶ Supplier Perspective:

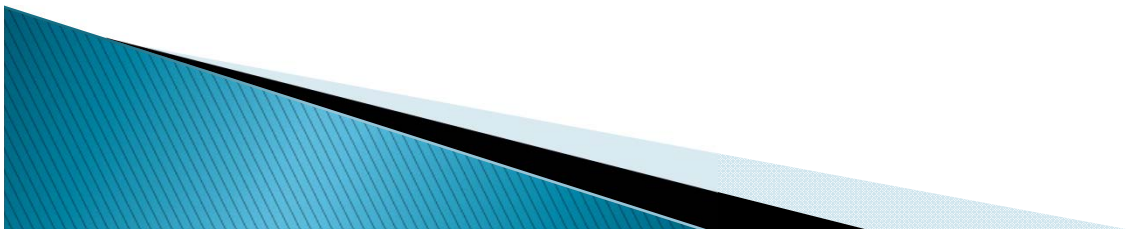
1. If built above industry standard
 - Reduces competitive advantage for rental fleet
2. Reduces options to provide equipment quickly
 - Units require upgrades prior to issue
3. Adds to maintenance costs
 - More stuff, more maintenance cost
 - More parts inventory required
 - Additional Training
4. Requirements may differ by business area within same Producer
5. Trade-off
 - Client customization demand vs. desire for standard fleet & processes



Balancing Producer specifications with Supplier/Industry standards

▶ Producer Perspective:

1. Supplier needs to proactively adjust fleet to meet increasing market requirements
 - Regulatory
 - Safety
 - Operability
2. Cost ultimately paid by Producer anyway
 - One time upgrade charge
 - Amortized over rates
3. Adds to planning/forecasting importance
 - Lead time and cost
 - Maintenance history (fleet entry & existing)



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Tips for managing the Upstream Compression Business Model

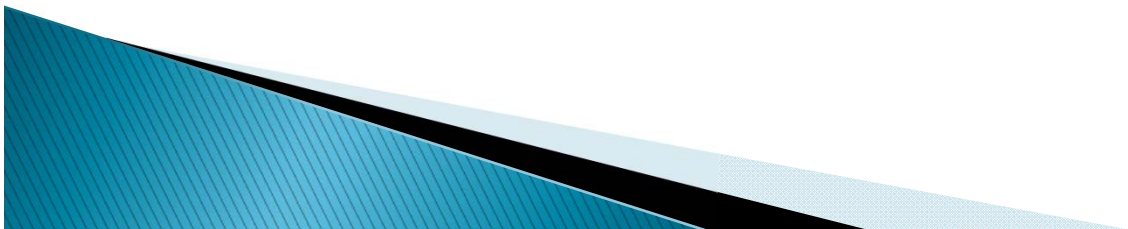
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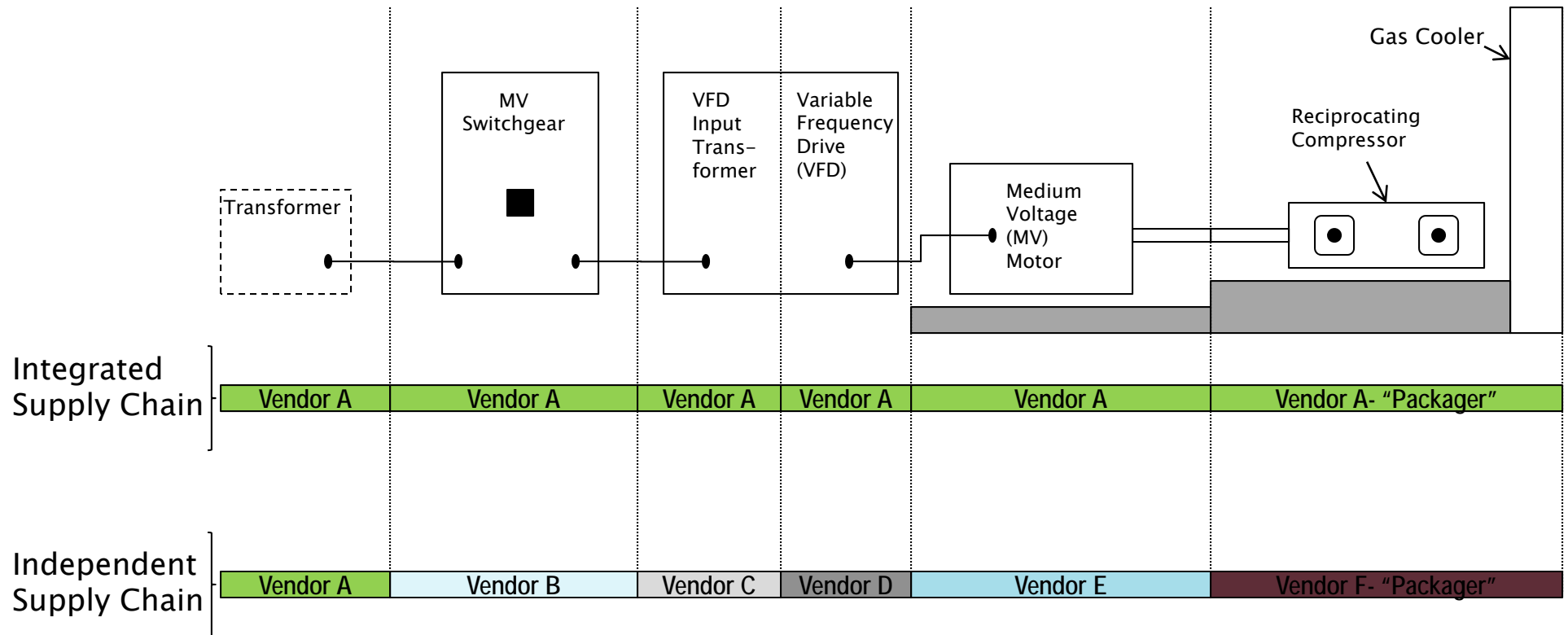
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Recommendations for sourcing electric compression

(VFD Option shown)

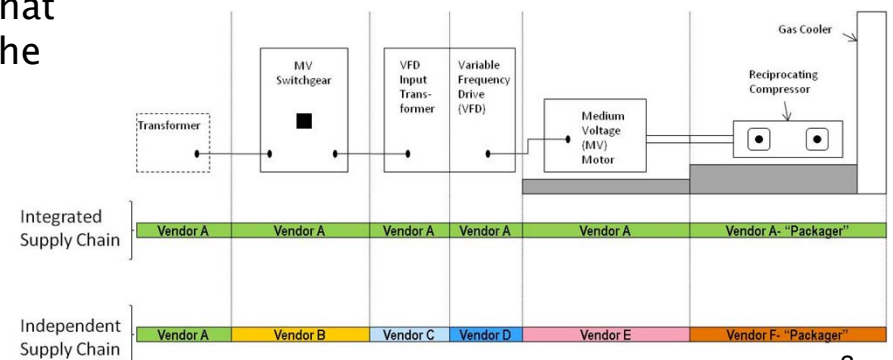


Opposite ends of the continuum shown for "compressor" sourcing

Recommendations for sourcing electric compression

Recommendations

1. Understand qualifications of equipment packager for servicing packaged components
2. Understand maturity of supplier's service support organization
3. Understand geographic or divisional boundaries that could become obstacles for integrated vendors
4. Determine amount of supply chain independence that is acceptable
"Maximum integration may be good for new project development, but could leave you vulnerable during on-going operations"
5. Develop relationships with manufacturers of system components, especially if equipment is critical
6. Consider entering a contract with a supplier that will accept total package responsibility after the warranty expires (maybe a 3rd party)



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Translating stated performance objectives into reality

Field Improvement Teams (FIT)

1. Establish and maintain collaborative networks
 - Operations, Engineering, and Procurement
 - Closer to “coal face” the better
2. Consistent Communication
 - Face to face (preferred) or Teleconference
 - Relaxed forum (neutral site or alternate)
 - Frequency (Scalable)
3. Follow a Standard Agenda & KPI Reporting format
4. Focus on leading indicators vs. historic problems
 - Identify and proactively address small issues prior to growing
5. Work for joint improvement
 - Share each others warts/not finger pointing (trust)



Translating stated performance objectives into reality

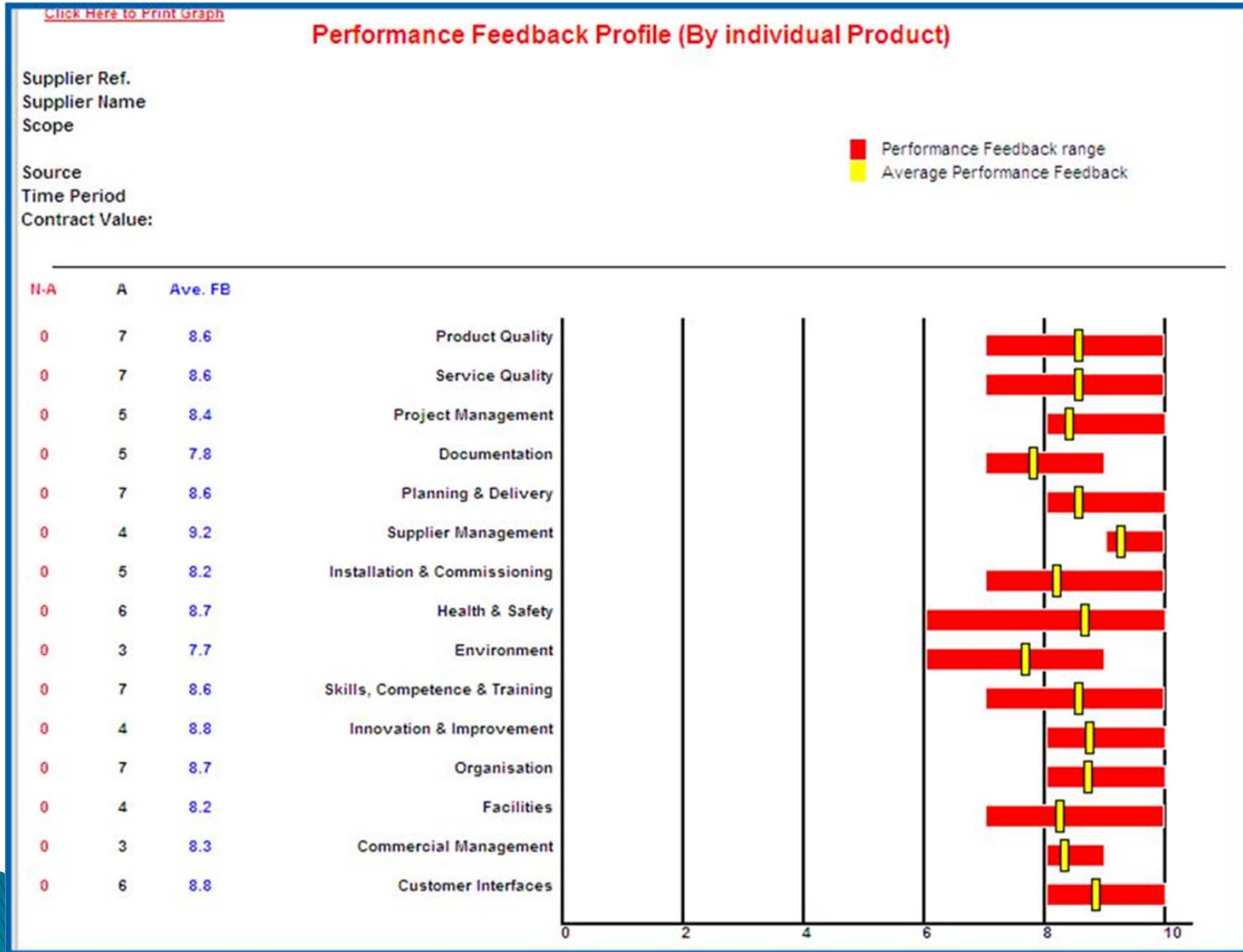
Field Improvement Teams (FIT)

6. Maintain a Scorecard
7. Sample –Key Performance Indicators (KPI's)
 - Safety and Environment
 - Follow up to-do list (from last FIT meeting)
 - Mechanical Availability
 - Utilization/Efficiency
 - Service Levels
 - Resource planning / Forecasting
 - Business – volume / payment issues
8. Challenges
 - Maintaining active/engaged networks
 - Data quality varies (who's data)
 - Not all real time telemetry gathered data – getting there but slowly
9. Success stories



Translating stated performance objectives into reality

Scorecards



Scorecard example

Translating stated performance objectives into reality

Scorecards

Tips for Developing Scorecards

1. Establish effective metrics

Should measure only 3–8 criteria which significantly affect the bottom line

2. Develop the criteria and definitions used to apply the metrics

Collaboration between buyer & supplier

3. Leverage the scorecards to drive relationship improvement

Use of Scorecard Types

1. Personal / ad-hoc

2. Standard template

3. Standardized software solutions

4. Customizable software solutions

5. Recommended –“Horses for Courses”

Use of Scorecards is a Best Practice

Tips for managing the Upstream Compression Business Model

Conclusions

1. Recognize & balance the trade-offs in operator specifications & vendor standards
2. Develop knowledge of and relationships with component suppliers of electrical compression packages
3. Translate performance objectives into reality using:
 - Field Improvement Teams
 - Score Cards

