Application of Remote Real-Time Monitoring to Offshore Oil and Gas Operations

Dissemination Workshop

September 22, 2016

Committee

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Study: Main Tasks

Organize and hold a public workshop that is informed by previous internal and external RTM technical reports and Issue a workshop summary report.

Develop and provide a final report with findings and recommendations on the use of RTM by the offshore oil and gas industry and BSEE that address,

1. **Critical operations and parameters that should be monitored from drilling and producing facilities to manage and mitigate environmental and safety risks**
2. **The role that automation and the use of predictive software tools should play in RTM.**
3. **The role that condition-based monitoring (CBM) should play in RTM and describe how the operating equipment using CBM could be tailored to and/or used for RTM.**
4. **Whether RTM should be incorporated into BSEE's regulatory scheme in either a prescriptive or performance-based manner.**
5. **How BSEE should leverage RTM to enhance its safety enforcement program.**

Outline of Report

1. Background

2. Industry Overview

3. Benefits of and Considerations for Remote Real-Time Monitoring

4. Findings and Recommendations

Background

Real-Time, Real-Time Data, Real-Time Monitoring, Remote Real-Time Monitoring

Committee Site Visits: **Working RRTM centers (5)**
BOP manufacturers (2)
Specialty OEMs (2)

Workshop and additional meetings with broad Industry and BSEE participation

Industry Overview

Variable industry application of RRTM (remote real-time monitoring), but consistent view on role of technology

Strongly held view that decision-making should be offshore

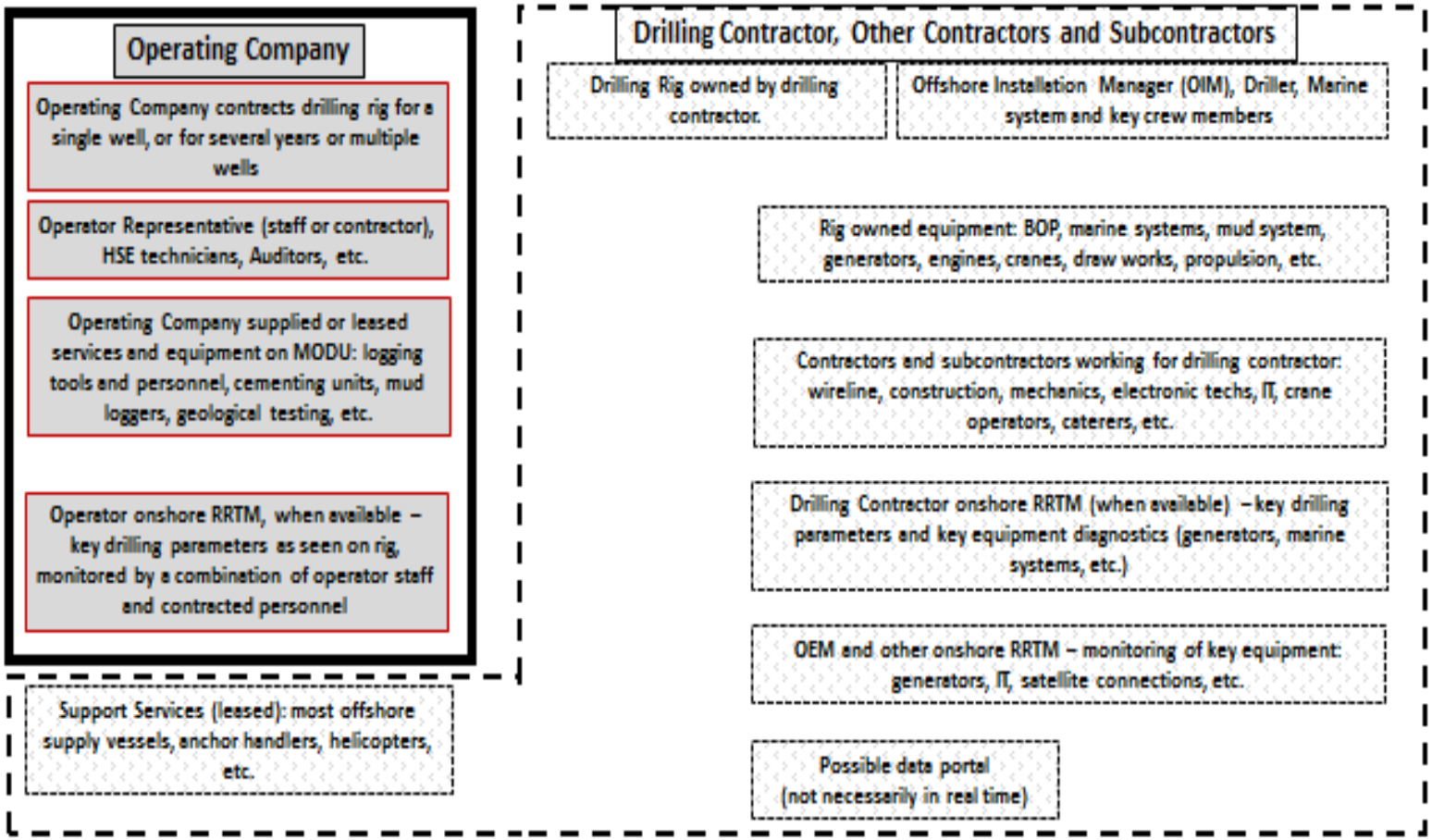
Industry and operational complexity

Current state of technology: communications, automation, predictive software

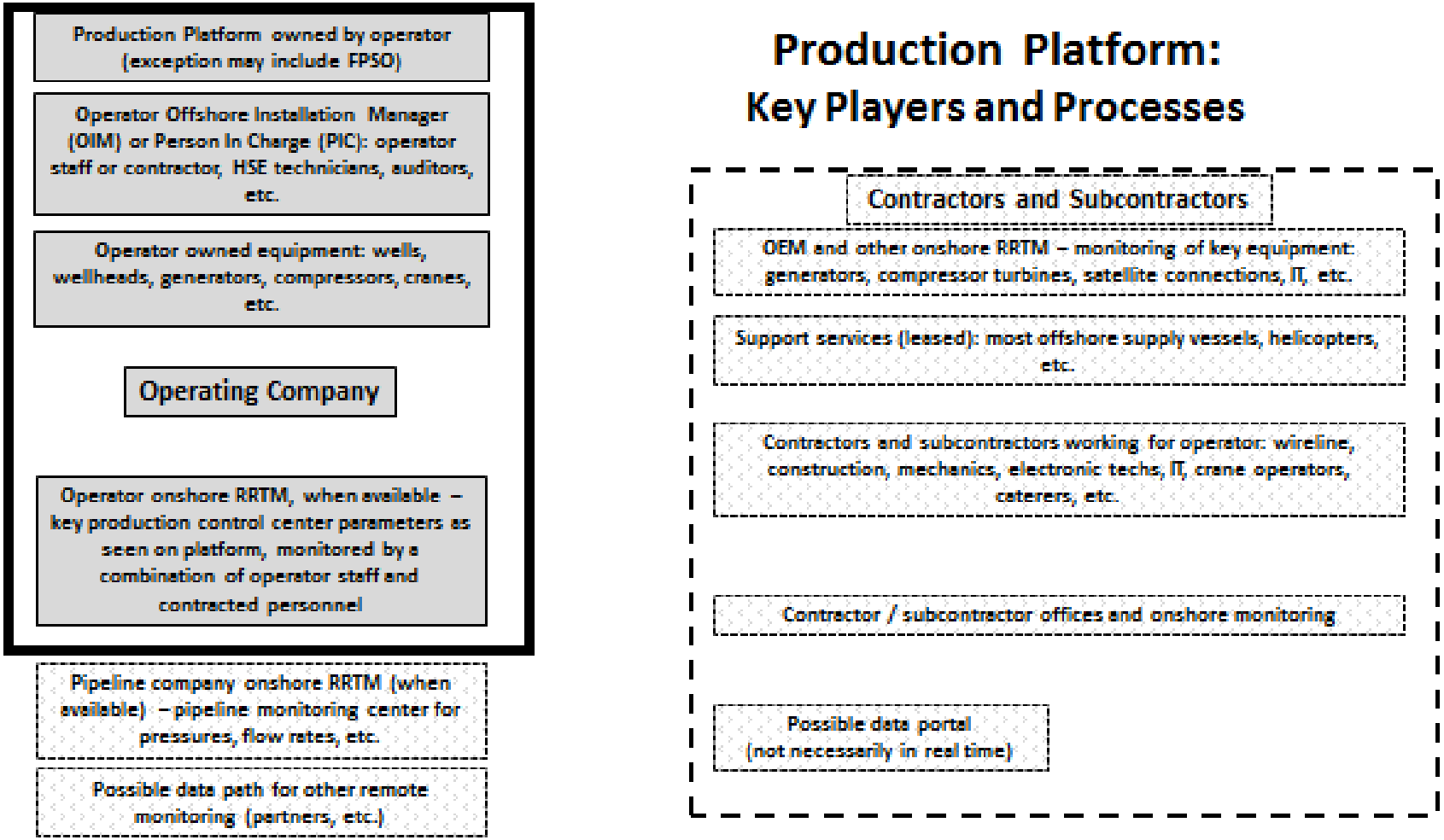
Operational Complexity

Mobile Offshore Drilling Unit:

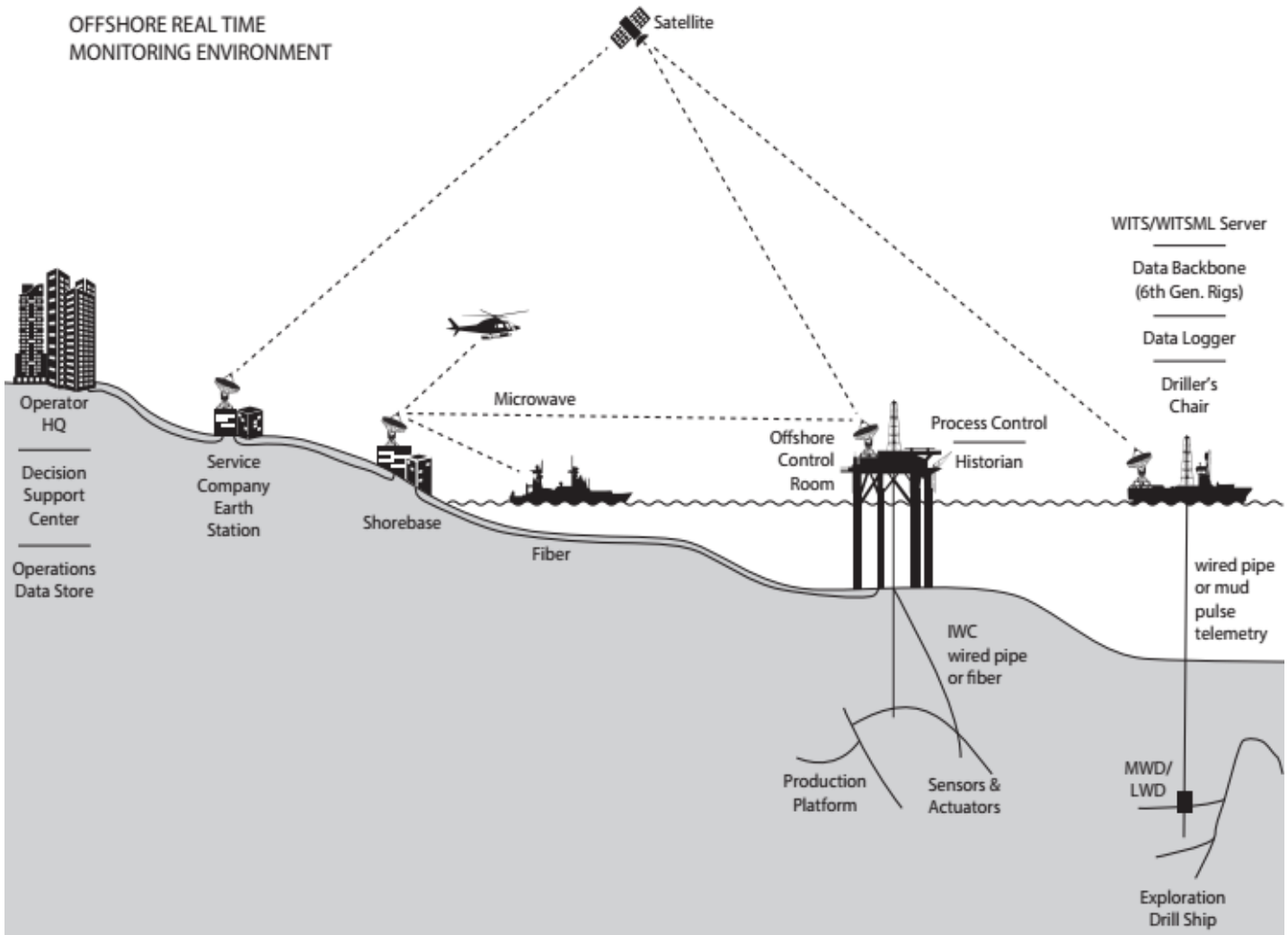
Key Players and Processes



Operational Complexity (cont.)



Communications Environment



Notional Benefits of RRTM: Use Cases

- RRTM, wellbore integrity and early kick detection
- RRTM enabling augmented competencies from onshore
- BSEE regulatory oversight and inspections with the help of RRTM
- RRTM and CBM of critical equipment

RRTM Considerations

Data management and technological concerns

Cybersecurity

Importance of communication protocols

Risk-Based Regulations

Summary of Findings

Finding 1.

Use of RRTM is highly variable; no industry standard or standard practice for implementation. Industry exhibits varying levels of maturity. Operators cite optimization, efficiency, safety, risk.

Finding 2.

Responsibility and accountability for offshore operations reside with the lessee. Responsibility for operational decision making should remain offshore.

Finding 3.

Real-time data are generated and collected offshore and are used in making operational decisions.

Summary of Findings, continued

Finding 4.

In the committee's judgment, appropriate RRTM can be considered BAST.

- **Technologies for BAST can be equipment, support systems, safety systems, control and display systems, and human factors considerations**
- **BAST must be "fit for purpose", not necessarily universally applicable.**
- **Use of BAST consistent with ALARP; availability and "economic feasibility."**
- **RRTM could be a part of industry "tool kit" for monitoring operations and managing risk for complex wells or projects.**

RRTM as BAST?

- **Director of BSEE initiates the BAST Determination Process and makes the final BAST decision.**

- **BAST Determination Process (see BSEE 2015) *will not result in*:**
  - **a. an automatic review of existing systems and technology,**
  - **b. the development of a prescriptive technology list, or**
  - **c. the automatic phase-out of existing technology not capable of meeting new performance levels.**

RRTM as BAST?

- **BAST Determination *could result in*:**

  a. Risk-based discussion between BSEE and operators on the application of RRTM,

  b. A broader application of RRTM in complex wells and a pull for RRTM and ultimately CBM, and

  c. A risk based allocation of industry and BSEE resources.

Summary of Findings, continued

Finding 5.

The committee is not in a position to recommend or validate a standard definitive list of critical operations, sensors, systems, and parameters for RRTM.

Finding 6.

The committee supports API's real-time monitoring study group and encourages industry to work with the regulator to achieve short- and long-term goals related to the use of RRTM.

Summary of Findings, continued

Finding 7.

CBM could increase efficiency of offshore operations and increase reliability of critical equipment.

Finding 8.

Use of automation and predictive software in the offshore is limited due to a lack of instrumentation and relevant data.

Summary of Findings, continued

Finding 9.

Cybersecurity vulnerabilities in the oil and gas industry exist and are increasing as the use of technology expands and evolves.

Finding 10.

The availability of data collected from real-time operations can help BSEE inspectors in preparing for their on-site visits. Data availability could play a role in an improved document and information management process for BSEE.

Summary of Recommendations

Recommendation 1.

BSEE should pursue a more performance-based regulatory framework by focusing on a risk-based regime that allows industry to determine relevant uses of RRTM on the basis of assessed levels of risk and complexity.

BSEE could assess decisions about the monitoring of well parameters or the application of RRTM through review of APD or SEMS plans and challenge operators to apply RRTM to manage risk and complexity.

Summary of Recommendations

Recommendation 2.

Given the promise of RRTM as BAST and the lack of maturity in the industry's use of RRTM, **BSEE should monitor the spectrum of RRTM technologies and best practices by using either an internal BSEE group, such as the agency's proposed Engineering Technology Assessment Center, or an external organization, such as the Ocean Energy Safety Institute.**

Summary of Recommendations

Recommendation 3.

BSEE should continue to encourage involvement of all stakeholders in the development of risk-based goals and standards that govern offshore oil and gas processes.

Specifically, BSEE should work with API, IADC, and other relevant stakeholders with the goal of forming an API standing technical committee on RRTM…to establish minimum requirements for what critical operations (and parameters) are monitored and what data are collected and monitored in real time.

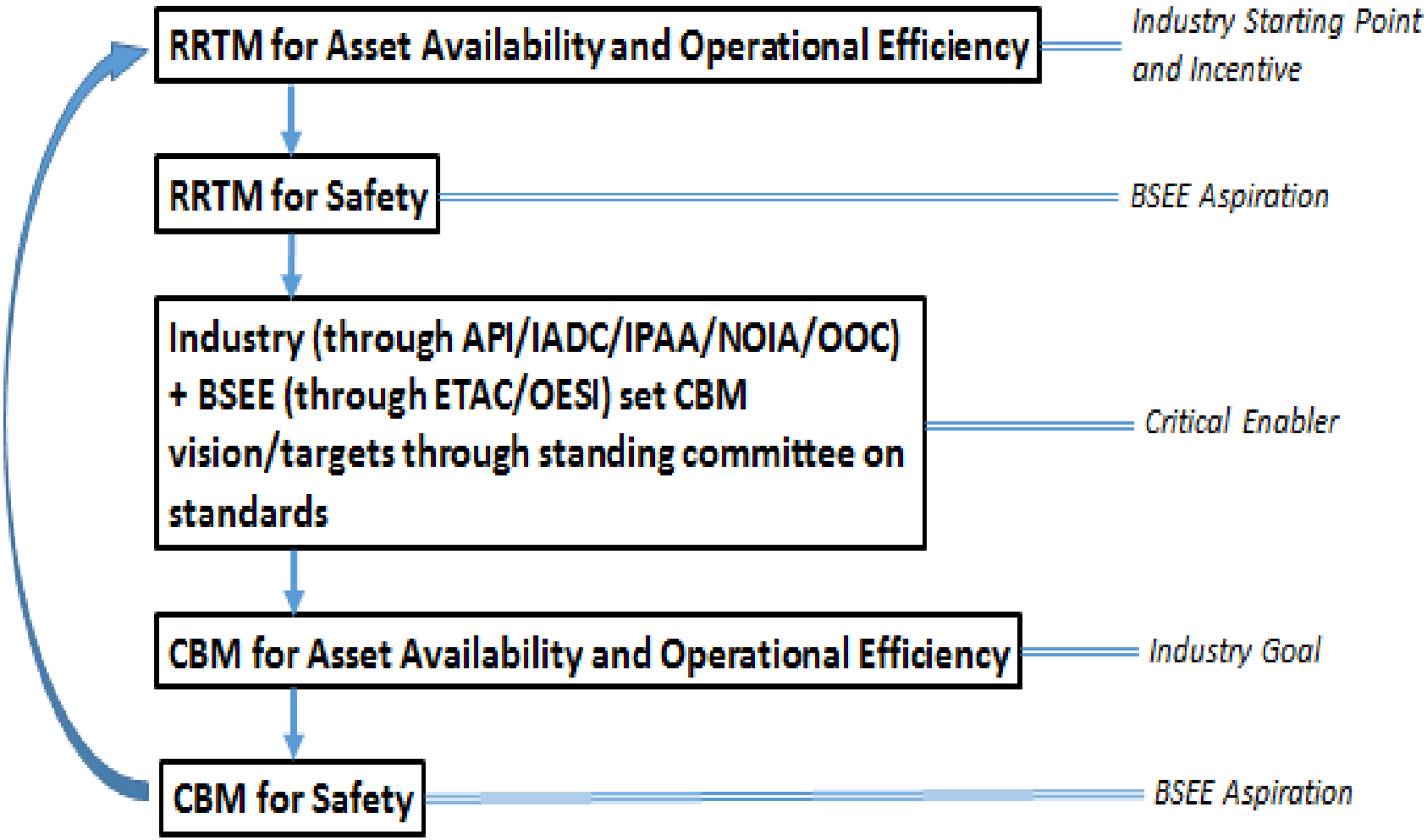
BSEE … could play a leading role in the development of standards for communication protocols when RRTM is used.

Summary of Recommendations

Recommendation 4.

BSEE should encourage API to work with original equipment manufacturers, drilling contractors, and relevant industry trade associations to establish one or more BOP CBM pilot projects, with the goal of an API publication.

Developing CBM through RRTM



CBM Considerations

Significant gap in time, effort, and technology between RRTM and CBM; gap spans across multiple generations of equipment. Components then systems.

RRTM is widely used in many high tech, advanced manufacturing and long-product life-cycle industries; CBM is still in its infancy.

Data access and data reuse enable CBM. Industry just now confronting this at the systems level (data discovery, aggregation, normalization, and readiness).

CBM Considerations

Instrumentation demands increase by order of magnitude over current RRTM; CBM must be designed into equipment. Retrofit frequently not practical.

Performance-based business models are now a competitive reality. CBM supports these business models (Diamond Offshore / GE BOP example).

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