WHY STANDARDS

PLANNING A FRAMEWORK AND ATTAINING BALANCE WITHIN A MATURING UNCONVENTIONAL OIL AND GAS INDUSTRY

FOR

2014 UIC CONFERENCE

NEW ORLEANS, LA

GROUNDWATER PROTECTION COUNCIL (GWPC)

JANUARY 22, 2014
> 7.1 BILLION MOBILE DEVICES
OVERVIEW

• WHAT IS A STANDARD?
• WHO ARE THE STANDARDS ORGANIZATIONS?
• HOW ARE STANDARDS USED?
• WHY STANDARDS NOW?
• WHY ASTM?
• WORK OF ASTM D18.26 HYDRAULIC FRACTURING
WHAT IS A STANDARD?

A STANDARD IS A DOCUMENT THAT PROVIDES REQUIREMENTS, SPECIFICATIONS, GUIDELINES OR CHARACTERISTICS THAT CAN BE USED CONSISTENTLY TO ENSURE THAT MATERIALS, PRODUCTS, PROCESSES AND SERVICES ARE FIT FOR THEIR PURPOSE.
HOW ARE STANDARDS USED?

MOST STANDARDS ARE VOLUNTARY IN THE SENSE THAT THEY ARE OFFERED FOR ADOPTION BY PEOPLE OR INDUSTRY WITHOUT BEING MANDATED IN LAW. SOME STANDARDS BECOME MANDATORY WHEN THEY ARE ADOPTED BY REGULATORS AS LEGAL REQUIREMENTS IN PARTICULAR DOMAINS
WHO ARE THE STANDARDS ORGANIZATIONS

• INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
  • FOUNDED IN 1947, LOCATED IN GENEVA SWITZERLAND
  • VOLUNTARY ORGANIZATION WHOSE MEMBERS ARE RECOGNIZED AUTHORITIES ON STANDARDS, EACH
  ONE REPRESENTING ONE COUNTRY.
  • ISO’S MAIN PRODUCTS ARE INTERNATIONAL STANDARDS.

• AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
  • FOUNDED IN 1918, LOCATED IN WASHINGTON, D.C.
  • ANSI IS THE OFFICIAL U.S. REPRESENTATIVE TO THE INTERNATIONAL ORGANIZATION FOR
  STANDARDIZATION (ISO) AND, VIA THE U.S. NATIONAL COMMITTEE, THE INTERNATIONAL
  ELECTROTECHNICAL COMMISSION (IEC).
  • ANSI’S MAIN PRODUCTS ARE CONSENSUS STANDARDS.
WHO ARE THE STANDARDS ORGANIZATIONS

ASTM INTERNATIONAL (ASTM)

• INTERNATIONAL STANDARDS ORGANIZATION
• DEVELOPS AND PUBLISHES VOLUNTARY CONSENSUS TECHNICAL STANDARDS FOR A WIDE RANGE OF MATERIALS, PRODUCTS, SYSTEMS, AND SERVICES.

AMERICAN PETROLEUM INSTITUTE (API)

• NATIONAL TRADE ORGANIZATION
• SINCE 1924, THE AMERICAN PETROLEUM INSTITUTE (API) HAS BEEN THE LEADER IN DEVELOPING EQUIPMENT AND OPERATING STANDARDS FOR THE OIL AND NATURAL GAS INDUSTRY.
TWELVE GLOBALLY ACCEPTED PRINCIPLES FOR STANDARDS DEVELOPMENT

• TRANSPARENCY
• OPENNESS
• IMPARTIALITY
• EFFECTIVENESS AND RELEVANCE
• CONSENSUS
• PERFORMANCE BASED

• COHERENCE
• DUE PROCESS
• TECHNICAL ASSISTANCE
• FLEXIBLE
• TIMELY
• BALANCED
Balance is the Key to Life
PROMOTE COOPERATION AND COHERENCE WITHIN THE U.S. STANDARDS SYSTEM

The diversity of the sectorally-based, decentralized U.S. standardization system can result in duplicative efforts and sometimes overlapping or conflicting standards. In many cases, apparent overlap or conflict is merely the reflection of different customer needs for different sectors or competitive approaches and solutions to new products. Duplication, where it does not add value, should be discouraged. Tactical initiatives include:

• ANSI and standards developers should work together to eliminate areas of redundancy to make U.S. standardization processes more efficient and coherent. This should include publication of information about their work.

• Industry, consumers and government should be proactively engaged with standards developers to minimize duplication of standards development activities.

• Government should provide timely information on proposed regulatory actions in order to minimize conflict with existing or proposed standards.

HTTP://WWW.STANDARDSPORTAL.ORG/USA_EN/STANDARDS_SYSTEM/STANDARDS_STRATEGY.ASPX
AMERICAN PETROLEUM INSTITUTE (API)

- HF1 WILL BE REPLACED BY RP100-1 (HYDRAULIC FRACTURING: WELL CONSTRUCTION AND FRACTURE CONTAINMENT)
- HF2 AND HF3 WILL BE REPLACED BY RP100-2 (ENVIRONMENTAL ASPECTS ASSOCIATED WITH E&P OPERATIONS INCLUDING HYDRAULIC FRACTURING).
ASTM D18.26:
HYDRAULIC FRACTURING SUBCOMMITTEE

PROPOSED NEW STANDARDS UNDER THE JURISDICTION OF D18.26

• WK42600  NEW TEST METHOD FOR STANDARD TEST METHOD FOR DYNAMIC IMAGE ANALYSIS OF NATURAL SAND, RESIN COATED SAND, CERAMIC AND OTHER MANUFACTURED MATERIALS USED AS PROPPANTS (TECHNICAL CONTACT: THOMAS CANTY)

• WK42803  * NEW GUIDE FOR DATA MANAGEMENT AND REPORTING ASSOCIATED WITH SHALE OIL AND GAS HYDRAULIC FRACTURING OPERATIONS (TECHNICAL CONTACT: CARYL ALFARO)

• WK42923  * NEW GUIDE FOR SAMPLING AND ANALYSIS OF RESIDENTIAL AND COMMERCIAL WATER SUPPLY WELLS (TECHNICAL CONTACT: HANK MITTELHAUSER)
### CHRONOLOGY OF ASTM D18.26.10

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
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<tbody>
<tr>
<td>February 2013</td>
<td>Acceptance as Chair Tech Lead</td>
</tr>
<tr>
<td>March 2013</td>
<td>Initial Meetings and Recruiting</td>
</tr>
<tr>
<td>April 2013</td>
<td>Weekly Meetings Use of Collaboration Area</td>
</tr>
<tr>
<td>April -May 2013</td>
<td>Gap Analysis</td>
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<tr>
<td>June 2013</td>
<td>Scope Development</td>
</tr>
<tr>
<td>July 2013</td>
<td>Work Item Discussion</td>
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<td>August 2013</td>
<td>Official Press Release and Notifications from API and GWPC</td>
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<tr>
<td></td>
<td>Bi Weekly Meetings start</td>
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<td>New Collaboration Area for Writers</td>
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<tr>
<td>September 2013</td>
<td>Writing/Research Assignments</td>
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<tr>
<td>October 2013</td>
<td>Continued Research, Writing, and Meetings</td>
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<tr>
<td>November 2013</td>
<td>Intitial Drafts of Scope, Data Management, Risk and Public Disclosure</td>
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<tr>
<td>December 2013</td>
<td>Review Draft at BiWeekly Meetings</td>
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SCOPE STATEMENT

• THE INTENT IS TO HELP STANDARDIZE DATA, ENSURE PROPER DATA COLLECTION DURING HYDRAULIC FRACTURING OPERATIONS, AND MAKE DATA EXCHANGES, EXTRACTIONS, AND ANALYSIS BY STATE AGENCIES, INDUSTRY AND OTHER STAKEHOLDERS MORE EFFICIENT. DATA COLLECTION, MANAGEMENT, AND EVALUATION IS NECESSARY TO SUPPORT DECISION MAKING EFFORTS THAT ARE NECESSARY TO DESIGN AND IMPLEMENT AN EFFECTIVE AND SAFE HF OPERATION. DECISIONS THAT ARE MADE DURING THE LIFE-CYCLE HF PROCESS MAY INCLUDE THESE CATEGORIES: PLANNING AND PERMITTING; REGULATORY COMPLIANCE; IMPACTS TO HUMAN HEALTH AND THE ENVIRONMENT; AND OPTIMIZING HF OPERATIONS.

• THIS DOCUMENT WILL PROVIDE GUIDANCE ON DATA COLLECTION, MANAGEMENT, AND REPORTING THAT CAN BE USED BY VARIOUS HF STAKEHOLDERS INCLUDING OPERATORS, CONSULTANTS/ENGINEERS, REGULATORY/PERMITTING AGENCIES, LAND OWNERS, AND THE GENERAL PUBLIC TO SUPPORT DECISION MAKING EFFORTS IN THE ABOVE CATEGORIES, AND OTHERS AS APPROPRIATE.
### Top 15 North American Producers (6 months ending 2013):

<table>
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<tr>
<th>2013 Rank</th>
<th>Company</th>
<th>Production (MMcf/day)</th>
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<tr>
<td>1</td>
<td>Exxon (XTO)</td>
<td>3585</td>
</tr>
<tr>
<td>2</td>
<td>Chesapeake Energy</td>
<td>3043</td>
</tr>
<tr>
<td>3</td>
<td>Anadarko</td>
<td>2668</td>
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<tr>
<td>4</td>
<td>Devon</td>
<td>1969</td>
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<tr>
<td>5</td>
<td>Southwestern Energy</td>
<td>1698</td>
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<tr>
<td>6</td>
<td>BP</td>
<td>1553</td>
</tr>
<tr>
<td>7</td>
<td>Conoco Phillips</td>
<td>1526</td>
</tr>
<tr>
<td>8</td>
<td>Encana</td>
<td>1428</td>
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<tr>
<td>9</td>
<td>BHP Billiton</td>
<td>1314</td>
</tr>
<tr>
<td>10</td>
<td>Chevron (Atlas)</td>
<td>1241</td>
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<tr>
<td>11</td>
<td>Royal Dutch Shell</td>
<td>1167</td>
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<tr>
<td>12</td>
<td>WPX Energy</td>
<td>997</td>
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<tr>
<td>13</td>
<td>Cabot Oil and Gas</td>
<td>971</td>
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<tr>
<td>14</td>
<td>EOG Resources</td>
<td>931</td>
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<tr>
<td>15</td>
<td>Range Resources</td>
<td>894</td>
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Source: Natural Gas Association
• **FRAMEWORKS** have many entry and use points. A user often does not know when they are using one. Extension points are part of the design.

• **SYSTEMS** have very well-define entry and exit points. A user tends to know when they are using one. Options for extensions are limited and usually require engineering.

• Modern platforms are built on frameworks

**SYSTEMS VS FRAMEWORK**
BUILDING NEW CONCEPTUAL MODELS

PROJECTS
• INDIVIDUAL
• MULTIPLE
• PROGRAMS
• PORTFOLIOS

DATA
• ELEMENTS
• DATASETS/TABLES
• DATABASES/SHEMA
• MULTIPLE DATABASES
NATIONAL CENTER FOR WEATHER PREDICTION (NCEP)

• IDENTICAL SYSTEMS (PER SITE)
  • – IBM POWER 6/P575/AIX
  • – 73.9 TRILLION CALCULATIONS/SEC
  • – 5,314 PROCESSING CORES
  • – 800 TRILLION BYTES OF STORAGE

• HIGHLY RELIABLE / HIGHLY AVAILABLE
  • – MINIMUM 99.0% OPERATIONAL USE TIME
  • – MINIMUM 99.0% ON-TIME PRODUCT GENERATION
  • – MINIMUM 99.0% DEVELOPMENT USE TIME
  • – MINIMUM 99.0% SYSTEM AVAILABILITY
  • – FAILOVER TESTED REGULARLY

• INPUTS AND OUTPUTS
  • PROCESSES 1.7 BILLION OBSERVATIONS/DAY
  • PRODUCES OVER 15 MILLION PRODUCTS/DAY

• SIGNIFICANCE
  • WHERE OUR NATION’S WEATHER FORECAST
  • PROCESS STARTS FOR THE PROTECTION OF
  • LIVES AND LIVELIHOOD
  • PRODUCES MODEL GUIDANCE AT GLOBAL,
    NATIONAL, AND REGIONAL SCALES

• HURRICANE FORECASTS
  • – AVIATION / TRANSPORTATION
SUMMARY

• ADVANCES IN TECHNOLOGY HAVE LED TO SURGE IN SHALE OIL & GAS SUPPLY

• ROLE OF ASTM STANDARD D18.26.10
  • EDUCATING AND PROVIDING FRAMEWORK FOR DATA AND REPORTING
  • BALANCE CONCERNS WITH ENVIRONMENTAL, NATURAL RESOURCE, SOCIAL PRESSURES
  • PLEASE JOIN US AND ASSIST THE EFFORT
THANK YOU FOR ATTENDING

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caryl@earthresourcesystems.com

Technical Chair, ASTM D18.26.10
Hydraulic Fracturing Reporting Section
Current Work Item:
Proposed *Standard Guide for Data Management and Reporting Associated with Shale Oil and Gas Hydraulic Fracturing Operations*