Canadian Chapter

Roundtable

IRP 21 Update

October 24th, 2018

IRP 21 Update

Introductions

Bailey Epp, Co-chair, IRP 21 Review

IRP 21 Update

Presentation- *Agenda*

- Overview of IRP 21 history
- Goals of the full scope review
- Committee accomplishments to date
  - Well Servicing
  - Fracturing with Coiled Tubing
  - Coiled Tubing Specifications
  - Other sections
- Next steps
- What can ICoTA members do?

IRP 21 Update

Overview- *Who is involved with IRP 21?*

Professional associations that comprise the Drilling and Completions Committee

Logistics administrated by Enform

ENFORM

DACC

Drilling and Completion Committee

IRP 21 Update

Overview- *What is an Industry Recommended Practice?*

- A set of best practices and guidelines prepared by knowledgeable industry and government experts
- Technical topics related to design, construction, and operations in the oil and gas industry, based on safety management principles

An IRP is not…

- A practice manual or SOP
- A regulation, act, or code

IRP 21 Update

Overview- *What is IRP 21?*

Range of Obligations

Term	Usage
Must	A specific or general regulatory and/or legal requirement that must be followed. These IRP statements are bolded for emphasis.
Shall	An accepted industry practice or provision that the reader is obliged to satisfy to comply with this IRP. These statements are bolded for emphasis.
Should	A recommendation or action that is advised
May	An option or action that is permissible within the limits of the IRP
Can	Possibility or capability

IRP 21 Update

Overview- *What was the original scope?*

- This IRP applies to all coiled tubing drilling and coiled tubing well servicing operations performed in a wellbore. Both overbalanced and underbalanced operations are covered.
- Consideration that the hydrostatic head of the fluid column may no longer be the primary method of well control. The well control equipment is considered the primary well control mechanism preventing the escape of wellbore fluids and ensuring the safety of onsite personnel.

IRP 21 Update

Overview- *What was the original scope?*

- The IRP includes pertinent information about coiled tubing operations including recommendations for the following:
  - Operations planning
  - BOP stacks and accumulators
  - Pipe specifications
  - Fluids and circulating systems
  - Well pressure-containing equipment
  - Elastomeric seals
  - Well servicing operations
  - Drilling operations

IRP 21 Update

Overview- *Where does IRP 21 apply?*

- An Alberta publication
- Subject Matter Experts from Western Canada appropriate to the topic
- Referenced across Canada & globally
- Increasingly regarded as the Canadian “best practices” guide
- Draw from global oil & gas industry experiences

IRP 21 Update

Overview- *What was completed in the limited scope Review in 2017?*

- Editorial Review
- Definitions of Well Servicing Pressure Categories
- Update well control equipment configurations requirements
- Update P-testing IRPs to use MASP/MAOP rather than SITHP

Note:

- All comments and feedback that were outside of the limited scope review was captured for future consideration.

IRP 21 Update

Overview- *Why do we need a full scope review in 2018?*

- Although the Limited scope review was sanctioned in 2017, not all major coiled tubing service providers approved.
- It was due for a 5 year full scope review.
- It may take 1-2 years to complete the full review.
- DACC committee asked for a full review.

IRP 21 Update

Overview- *Who is involved with IRP 21 full scope review?*

Committee List

Last Name	First	Company	Association
Alvis	Adam	Balanced Energy Oilfield Services Inc.	PSAC
Bowie	Jim	WorkSafeBC	regulator
Bruce	Rick	Forum Energy Technologies	SME/PSAC
Chapin	Greg		SME
Chizen	Grant	Husky Energy	CAPP
Driscoll	Michael	Lee Specialties	OEM
Eckdahl	Rick	Chevron Canada Ltd.	CAPP
Elliott	Kevin	NOV	OEM
Epp	Bailey	Co-Chair	
Fraser	Ted	Thrutubing Solutions	OEM
Haines	Jason	Jewel Energy	
Henkelman	Dylan	WISE	PSAC
Homer	Brian	Lee Specialties	OEM
Klink	Dale	NOV	OEM
Layton	Ben	STEP Energy Services	PSAC
MacArthur	Nils		SME
McKinnon	Jesse	Balanced Energy Oilfield Services Inc.	PSAC
Meyer	Justin	Calfrac Well Services	PSAC
Morris	Matt	CNRL	CAPP
Nowell	Ben	Element Technical Services Inc.	PSAC
Oliver	Craig	Select Energy Systems Inc.	PSAC
Robb	Sam	Trican Well Service/ Co-chair	PSAC
Sentes	Patrick	Global Tubing	OEM
Sloman	James	Iron Horse Energy Services	PSAC
Smith	Ryan	Nexus Energy	PSAC
Sorensen	Lindsay	Tenaris	SME
Yekta	Kaveh	ECWS	PSAC
Yeung	John	Element Technical Services Inc.	PSAC
Zemenchik	Tyler	ECWS	PSAC
Andrews	Laurie	Energy Safety Canada	
Mass	Michael	Energy Safety Canada	
Pasco	Doug	WorkSafeBC (receive info only)	regulator

IRP 21 Update

Overview- *Current Status of full scope review*

- Kick off meeting in March, 2018
- 7 committee meetings to date
- 5 sub-committee meetings to date
- Completion date is June, 2019

IRP 21 Update

Overview- *Goals of "Full Scope Review"*

- Provide focused sections that are easily referenced:
  - Well Servicing
  - Fracturing with Coiled Tubing (FWCT)
  - Coiled Tubing Drilling
- Align IRP 21 with all other IRP's
  - IRP 2, Completing and Serving Critical Sour Wells
  - IRP 4, Well testing and Fluid Handling
  - IRP 5, Minimum Wellhead Requirements
  - IRP 7, Standards for Competent Supervision to Prevent Critical Outcomes
- Review all other sections for relevance
- Incorporate feedback not captured in Limited scope review

IRP 21 Update

Overview- *Disclaimer*

- All components of this IRP 21 update are currently being reviewed by the committee with general consensus but no committee votes have occurred to date and therefore contents are subject to change.

IRP 21 Update

Overview-*Accomplishments to date*

- Within “Well Servicing” section.
  - Modification of existing definitions and introduction of induced pressure for pressure control selection (MASP, MAOP, MAIP)
  - Updated pressure control categories and ranges (table 4)
  - Currently updating BOP stack configurations
- Near completion of new “Fracturing With Coiled Tubing”, FWCT section (1st sub-committee)
- Beginning review of “Coiled Tubing Specifications” section (2nd sub-committee)
- Initial discussions regarding “Drilling with Coiled Tubing”.
  - Additional committee members or Subject matter experts required

IRP 21 Update

Well Servicing- *Job Planning & Well Classification*

Selection of Pressure Control for Blow out Prevention

MASP- **M**aximum **A**nticipated **S**urface **P**ressure

- is the highest pressure predicted to be encountered at the surface of a well. Base the pressure prediction on formation pressure minus a wellbore filled with native formation fluid at current conditions.
- *If the formation fluid is unknown…assume dry gas (worst case)*

$$MASP = Near\ Wellbore\ Reservoir\ Pressure - Hydrostatic\ Pressure\ of\ a\ Column\ of\ Reservoir\ Fluid$$

- **IRP Calculation of MASP shall use the reservoir fluid and not the workover fluid.**

IRP 21 Update

Well Servicing- *Job Planning & Well Classification*

Selection of Pressure Control for Blow out Prevention

MAOP- **M**aximum **A**llowable **O**perating **P**ressure

- is the highest pressure that wellhead, casing and well control equipment can be subjected to during the execution of the prescribed service.
- Pressure test cannot exceed lowest pressure rated component within stack

$$MAOP = \frac{Pressure\ test\ value}{1.1\ or\ 1.3\ (sour)}$$

IRP 21 Update

Well Servicing- *Job Planning & Well Classification*

Selection of Pressure Control for Blow out Prevention

MAIP- **M**aximum **A**llowable **I**nduced **P**ressure

- is the Maximum Allowable Induced Pressure for well servicing work.

$$MAIP = MAOP - (Reservior\ pressure - Hydrostatic\ pressure\ of\ workover\ fluid)$$

- Accounts for operations where additional pressures are created other than general circulation
  - Acid squeezes
  - Cement squeezes
  - Fracturing with coiled tubing
  - Pumping down coiled tubing/ casing annulus

IRP 21 Update

Original Well Servicing Categories

Classification for IRP 21		Provincial Classifications			
CLASS	DESCRIPTION	Alberta	B.C.	Saskatchewan	Manitoba
CLASS I	Reservoir pressure no less than 5.5 MPa, no H_2S and: (i) Is a gas well, or (ii) Produces heavy oil density >920 kg/m³, GOR< 70 sm³/m³ and produces by primary recovery or is included in a waterflood scheme	CLASS I		N/A	N/A
CLASS II	Pressure rating of casing flange ≤ 21,000 kPa and H_2S < 10 moles/kilomole	CLASS II CLASS IIA	CLASS A	N/A	N/A
CLASS III	Pressure rating of casing flange is (i) > 21,000 kPa, or (ii) ≤ 21,000 kPa and H_2S ≥ 10 moles/kilomole	CLASS III	CLASS B	N/A	N/A
CLASS IV	Based on potential H_2S discharge rate and proximity of public as per ERCB and BC Oil and Gas Commission definition	Critically Sour	CLASS C (Special Sour)	N/A	N/A

IRP 21 Update

Table 4- *From limited Scope Review*

Well Servicing Pressure Categories for Blowout prevention

Well Servicing Pressure Category	MASP	Required Complete Barriers	Recommended Kill Margin	Recommended Rated Working Pressure	Sweet/Sour
Category 0	0 MPa1	1	5.0 MPa	5.2 MPa	Sweet
Category 1A	0.1 - 5.2 MPa	1	7.0 MPa	5.2 MPa	Sweet
Category 1B	5.3 - 10.3 MPa	2	10.0 MPa	20.7 MPa	Sweet
Category 2	10.4 - 24.1 MPa	2	17.0 MPa	34.5 MPa	Sweet or Sour
Category 3	24.2 - 51.7 MPa	2	17.0 MPa	68.9 MPa	Sweet or Sour
Category 4	51.8 - 86.2 MPa	2	17.0 MPa	103.4 MPa	Sweet or Sour
Category 5	86.3 - 103.4 MPa	3	17.0 MPa	137.9 MPa	Sweet or Sour
Critical Sour	Release rate and distance to an urban centre				Sour

IRP 21 Update

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IRP 21 Update

New Table 4- *Simplified*

Well Servicing Pressure Categories for Blowout prevention

Well Servicing Pressure Category	MASP	Minimum Pressure Rating of Equipment	Sweet/Sour	Complete Barriers Required	Annular Barriers Required[1]
Category 1[2]	0 MPa[3]	13.8 MPa	Sweet	0	0
Category 2[2]	0.1 – 5.3 MPa	13.8 MPa	Sweet	1	1
Category 3[2]	5.4 – 31.0 MPa	34.5 MPa	Sweet	2	1
Category 4	31.1 – 62.0 MPa	69.0 MPa	Sweet or Sour	2	2
Category 5	62.1 – 93.0 MPa	103.5 MPa	Sweet or Sour	3	2
Critical Sour	See IRP 2: Completing and Servicing Critical Sour Wells	See IRP 2: Completing and Servicing Critical Sour Wells	Sour	3	2

[1]Annular barriers used in conjunction with flow check assemblies for complete barriers can also be counted as standalone annular barriers.

[2]Category 1, 2 or 3 wells that are sour need to meet the barrier and function requirements of a Category 4 well.

[3]Well is unable to flow under any circumstances.

IRP 21 Update

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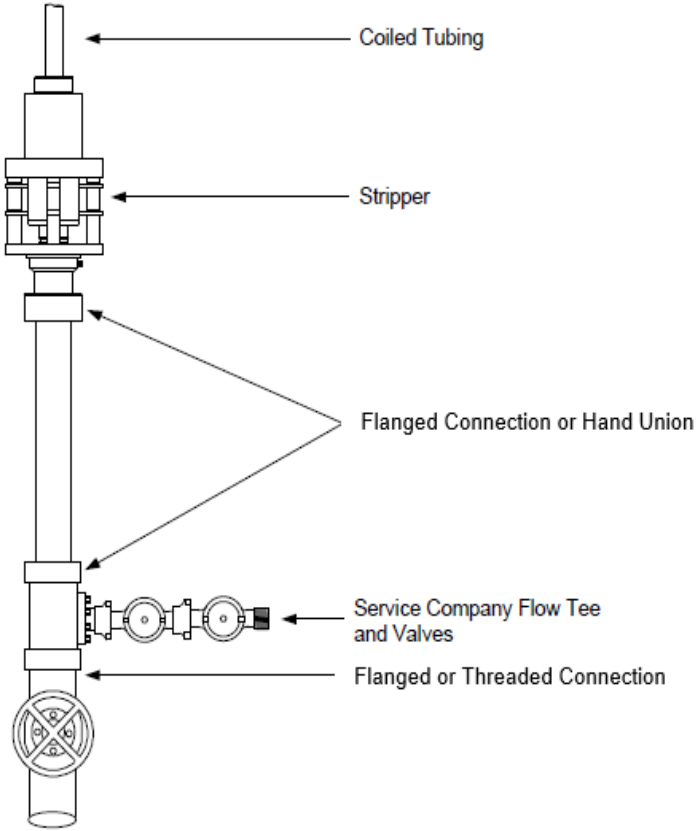
IRP 21 Update

BOP Stack Configurations-*Example drawing*

Category 1, MASP= 0.0 MPa, Zero H2S

13.8 MPa Pressure control

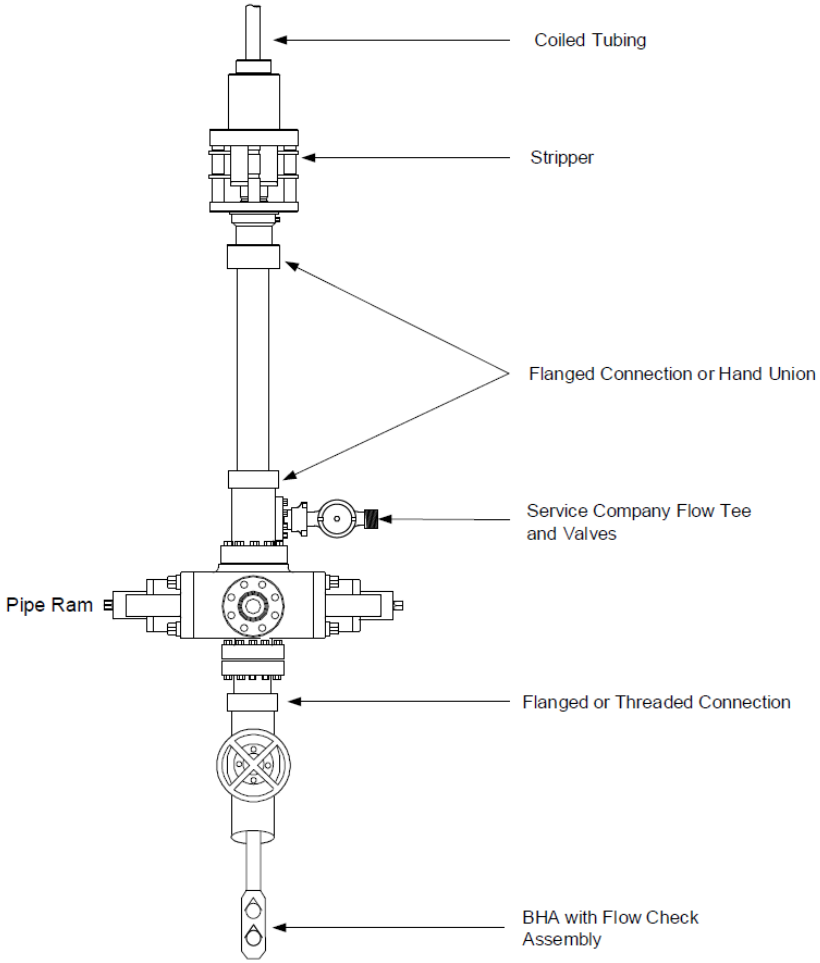


IRP 21 Update

BOP Stack Configurations-*Example drawing*

Category 2, MASP= 0.0- 5.3 MPa, Zero H2S

13.8 MPa Pressure control

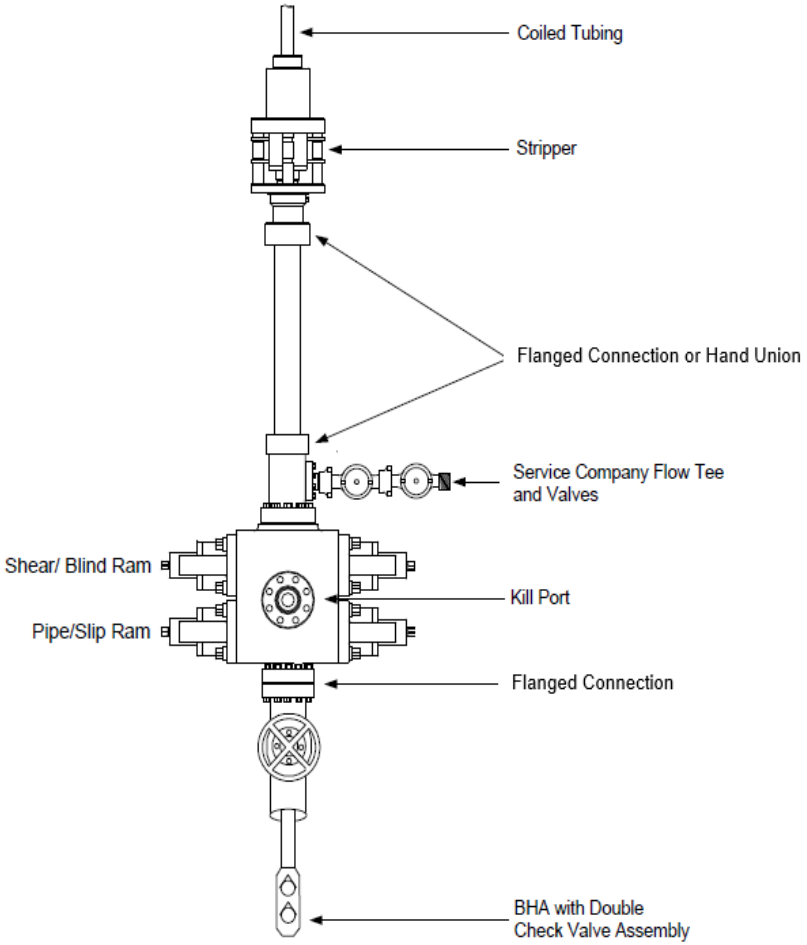


IRP 21 Update

BOP Stack Configurations-*Example drawings*

Category 3, MASP = 5.4- 31.0 MPa, Zero H2S

34.5 MPa Pressure control

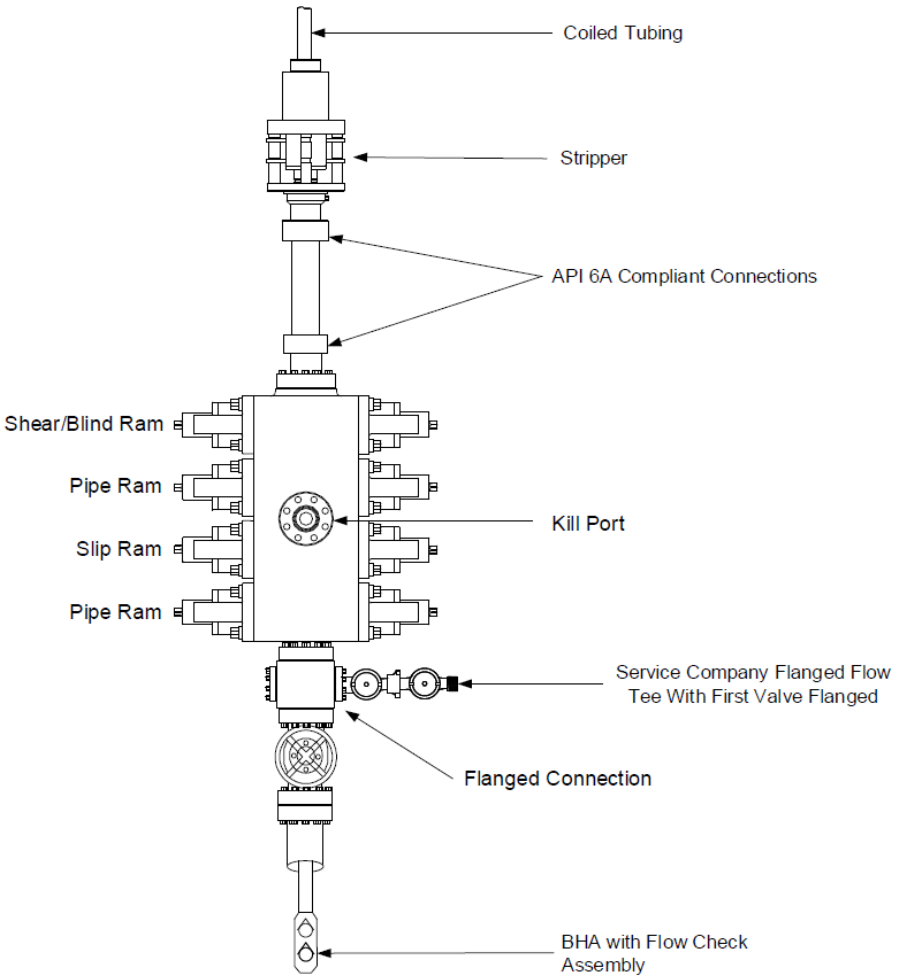


IRP 21 Update

BOP Stack Configurations-*Example drawings*

Categories 1- 3, MASP = 0- 31.0 MPa, H2S

34.5 MPa Pressure control

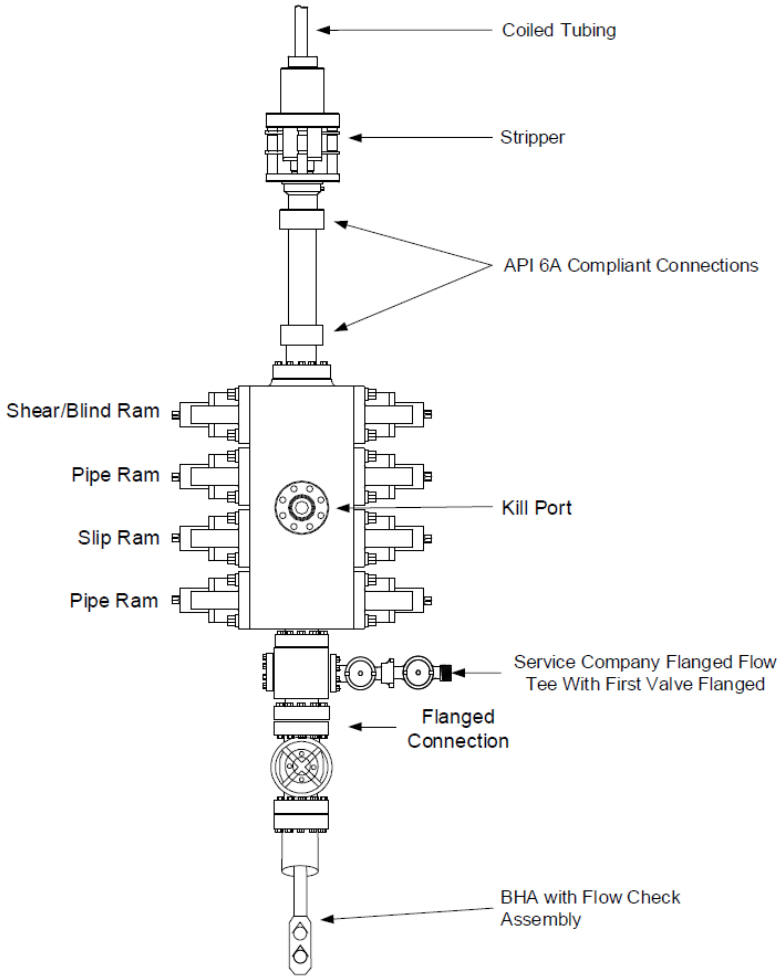


IRP 21 Update

BOP Stack Configurations-*Example drawings*

Category 4, MASP = 31.1- 62.0MPa, Sweet or Sour

69.0 MPa Pressure control

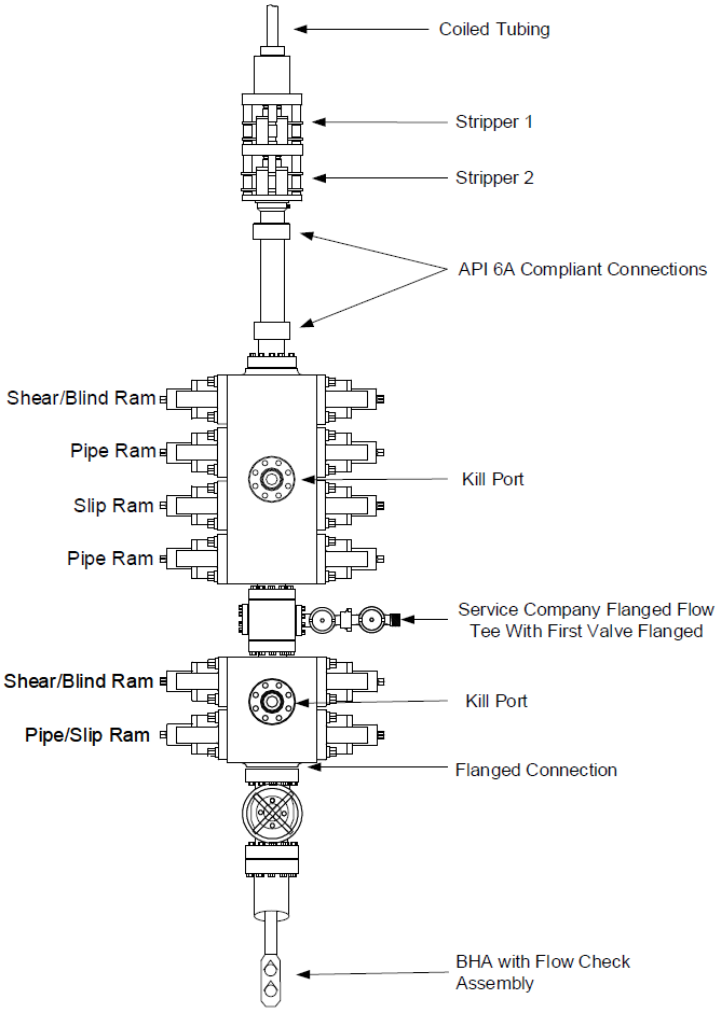


IRP 21 Update

BOP Stack Configurations-*Example drawings*

Category 5, MASP = 62.1-93.0 Mpa, Sweet or Sour

103.5 MPa Pressure control



IRP 21 Update

Well Servicing- Other changes under review

- Industry recommended practice for Pressure Testing
  - Guidelines for frequency (every well or 7 days, under review)
  - Stump testing and Stack testing guidelines including:
    - Test durations
    - Leak off allowances
- Flowline recommendations
  - Placement
  - ESD's or Remotely operated hydraulic valves
  - Aligned with IRP 4
- Winter operations guidelines
- Accumulator Configurations

IRP 21 Update

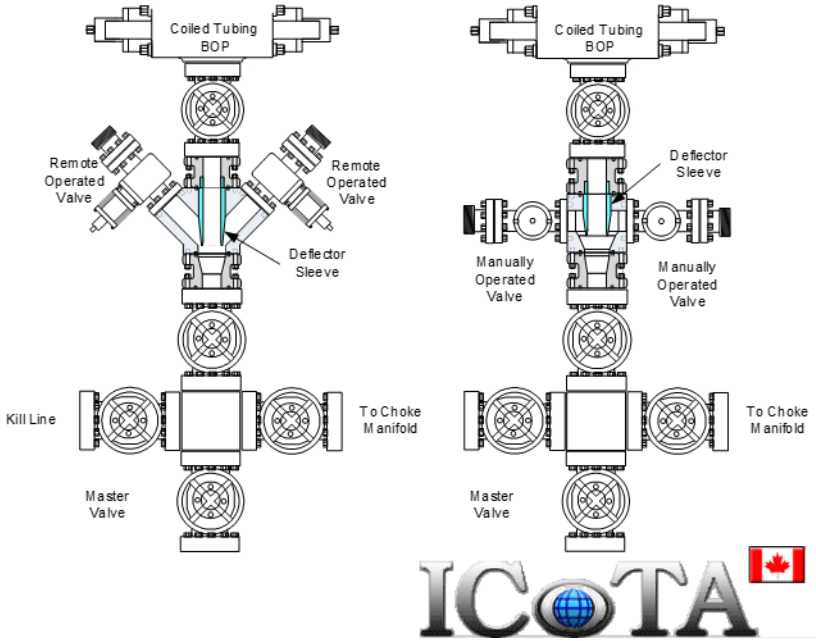
Fracturing with Coiled Tubing "FWCT"

- Introduced due the significant number of FWCT operations in Canada
- Provides recommendations to both Operators & Coiled Tubing providers for FWCT operations
- Highlights the additional knowledge required for FWCT operations versus well servicing operations

IRP 21 Update

Fracturing with Coiled Tubing "FWCT"- Sections

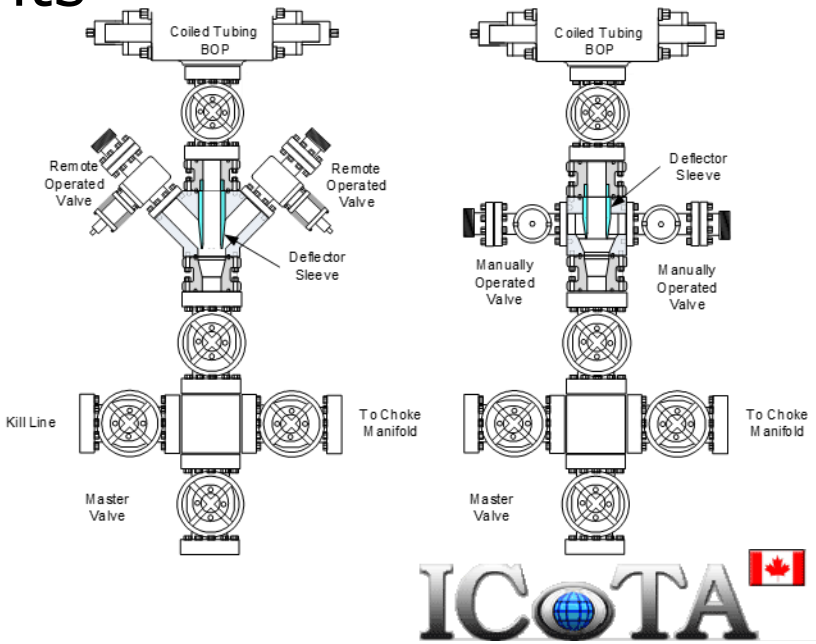
- Planning
  - Pros & Cons of Frac through CT versus Frac down annulus
- Pre-Job Planning
- Initial FWCT Operations
- Contingency Planning
- High Pressure Iron
- Flow back Considerations



IRP 21 Update

Fracturing with Coiled Tubing "FWCT"- Sections

- Well Classification
- Pressure Control Configurations
- Personnel Requirements
- Health & Safety Requirements
- Coiled Tubing Operational Considerations
- Subsurface Integrity Considerations



IRP 21 Update

Other Sections- *Pipe Specifications*

- Changing to "Coiled Tubing Specifications"
- Sub-committee formed
- Key changes include:
  - Adding all new grades of coiled tubing including "Quench & Temper"
  - Reviewing sour service recommendations
  - Sub-section for "New" coiled tubing specifications
  - Sub-section for "Used" coiled tubing
  - Care and maintenance of coiled tubing in service or storage

IRP 21 Update

Other Sections- *Coiled Tubing Drilling*

- Currently there are no SEM's for Coiled Tubing Drilling on the committee
- Review for relevance

IRP 21 Update

What can ICoTA members do to help?

- Engage with committee members within your organization
- Provide feedback when asked
- Ensure to review when document is finalized and sent out to industry for sanction

IRP 21 Update

Summary

- Alignment with other IRP's
- Out of scope comments from LSR incorporated
- Pressure control categories simplification
- Introduction of FWCT section
- Update of Coiled Tubing Specifications section
- Future of Coiled Tubing Drilling Section TBD
  - Committee needs more SME's
- Review of all other sections


Questions?