BSEE DYNAMIC RISER LIFE EXTENSION

DNV Technology Week – Life Extension Session

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New Orleans, Louisiana

BSEE DYNAMIC RISER LIFE EXTENSION AGENDA

- Deepwater Riser Statistics.
- BSEE Pipeline CVA and Life Extension Requirements for Dynamic Risers
- The Role of a Deepwater Pipeline IMP for Life Extension
- Life Extension Assessment Elements
- Deepwater Pipeline Dynamic Riser Life Cycle
- Dynamic Production Riser Life Extension Process
- Pipeline Section Senior Engineers and Support Team.
- On the Horizon.

DEEPWATER PIPELINE DYNAMIC RISER STATISTICS

- ~ 250 dynamic risers have been installed.
- The oldest risers are ~ 25 years old.
- ~ 186 dynamic risers are in service.
- ~ 60 dynamic risers are in some phase or have completed the life extension process.

Dynamic Pipeline Riser – Steel Catenary Riser (SCR), Steel Lazy-Wave Riser (SLWR), unbonded flexible pipe riser, or Free-Standing Hybris Riser(FSHR) having a length of the riser not affixed to the production facility.

BSEE PIPELINE CVA AND LIFE EXTENSION REQUIREMENTS FOR DYNAMIC RISERS

BSEE uses the following regulations to mandate CVA review for Dynamic Risers:

- **§ 250.910 (b)** All new floating platforms are subject to the Platform Verification Program to the extent indicated in the following table:

  (1) Your new floating platform is a buoyant offshore facility that does not have a ship-shaped hull,…the following associated structures…pipeline risers…

  (2) Your new floating platform is a buoyant offshore facility with a ship-shaped hull, …the following structures…pipeline risers…

- **§ 250.916** What are the CVA's primary duties during the design phase?

(a) The CVA must use good engineering judgment and practices in conducting an independent assessment of the design of the platform, major modification, or repair. The CVA must ensure that the platform, major modification, or repair is designed to withstand the environmental and functional load conditions appropriate for the **intended service life** at the proposed location.

THE ROLE OF A DEEPWATER PIPELINE IMP FOR LIFE EXTENSION

IMP based on API RP 1160 and API RP 2RIM Includes

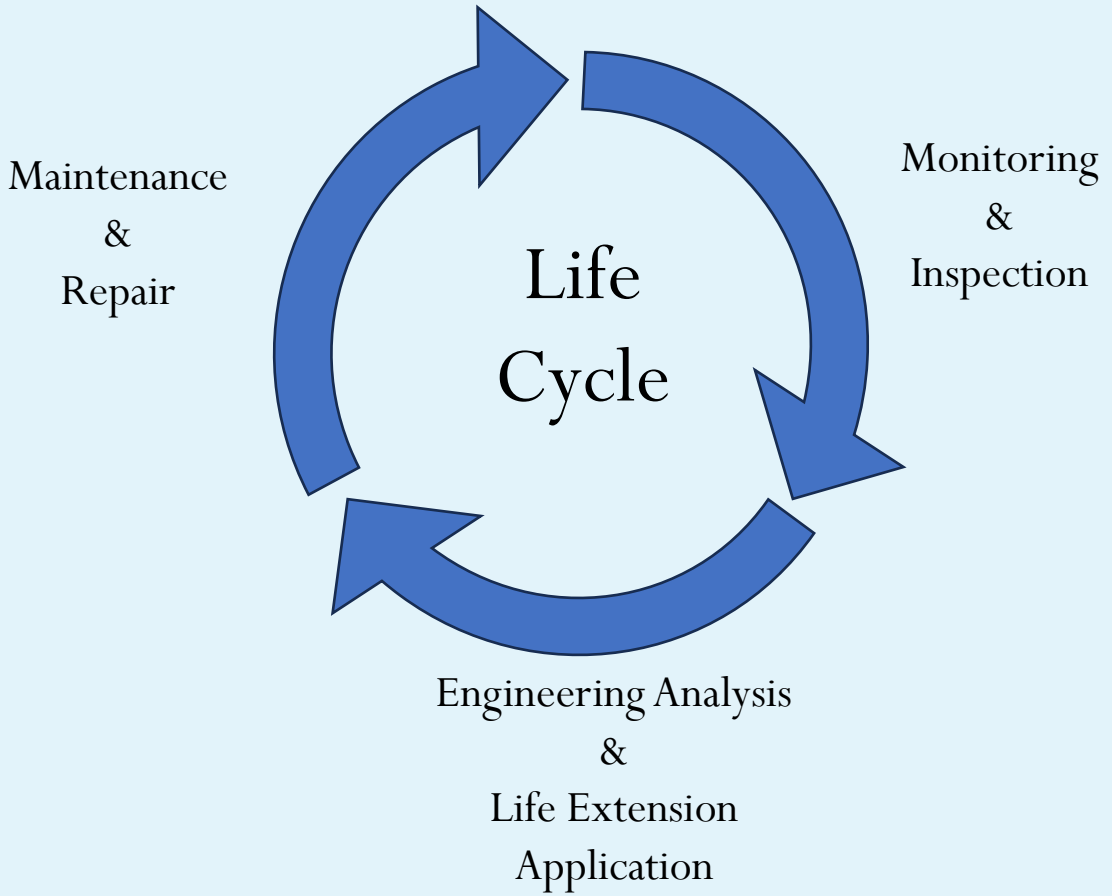
- Assessments based on triggers from inspections.
- Inspection data validates inputs for assessments.
- Record and data management.
  - Operational history.
  - Evergreen assessments during the operational life of riser.
  - Documenting assessment tools and measurement error.
- Modeling based on limited data.
- Or the ideal goal is to develop a Digital twin.

LIFE EXTENSION ASSESSMENT ELEMENTS

CVA Remaining Life Assessment Elements

- Fatigue life analysis based on:
  - corrosion data,
  - local environmental data,
  - storm data,
- Wall thickness must be evaluated by:
  - Inline inspection or
  - Other direct assessment.
- Relevant additional site-specific evaluations and/or data

DEEPWATER PIPELINE DYNAMIC RISER LIFE CYCLE

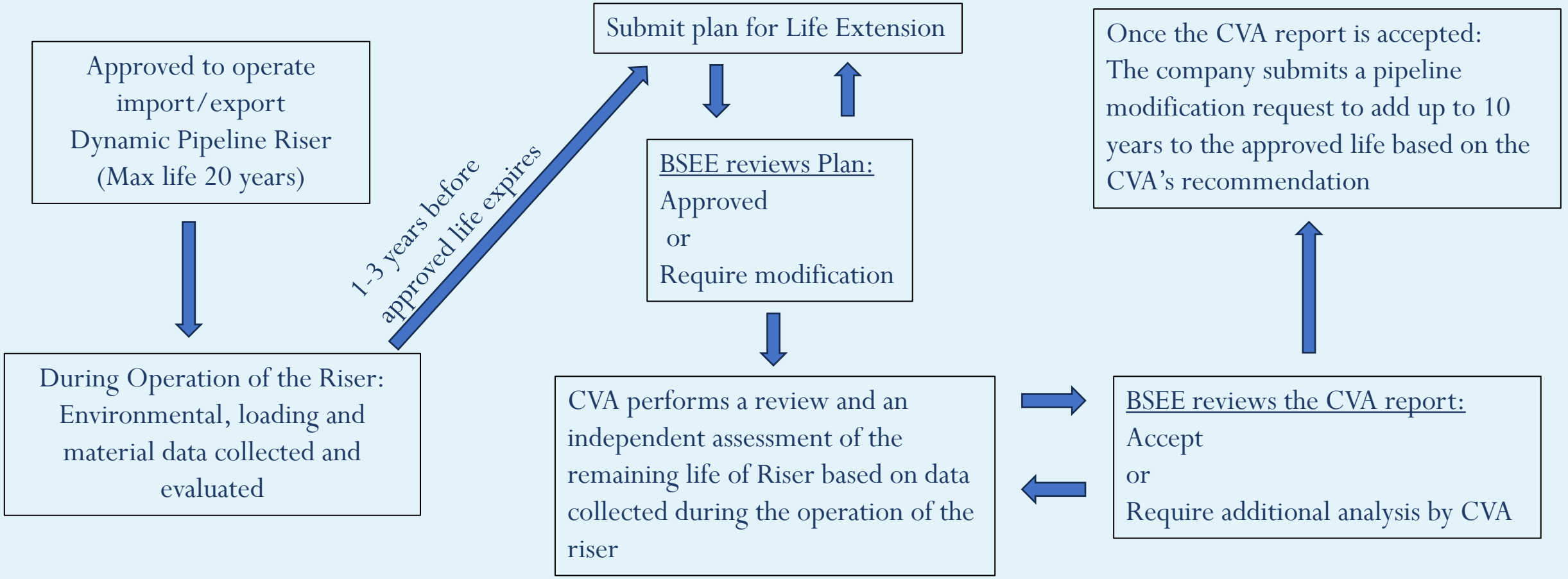


Monitoring	Inspection	Maintenance
Pressure	ILI	Replace VIV Suppression
Flow Rate	External Visual	
Fluid Composition	Ultrasonic	
Corrosion Coupons	Valve Testing	

DYNAMIC PIPELINE RISER LIFE EXTENSION PROCESS

Tasks During life of Dynamic Pipeline Riser	Initial Life	Life Extension
Riser Approved	Up to 20 years	
Company collects and evaluates riser data	During pipeline operations	
Company submits plan for life extension and CVA nomination	1-3 years before end of life	
BSEE reviews life extension and CVA nomination from company:		
Requests Modification OR Approved Plan		
CVA performs a review of the company's assessment plan and performs an independent analysis of remaining riser life.		
CVA makes a recommendation on life extension to BSEE in the CVA report.		
BSEE reviews CVA ‘s report:		
Requires Additional Analysis OR Accepts CVA’s Report		
Company submits pipeline modification application to BSEE		
BSEE reviews pipeline modification application:		
Riser Life Extension Approved Based on CVA Recommendation		Up to 10 years

THE DYNAMIC PIPELINE RISER LIFE EXTENSION PROCESS



SENIOR PIPELINE ENGINEERS AND SUPPORT TEAM

Sr. Petroleum Engineer		Staff Petroleum Engineers		PET	
Name	Years*	Name	Years*	Name	Years*
Stephanie Allen	4.1	Henry Callis	3.3	Lisa Thompson	0.7
Elizabeth Borecki	4.3	Alaina Doss	1.0	Tanesha Wright	3.5
Jason Caraher	13				
Forna Diphicyl	8.3	**Program Specialist**		**Administrative Assistant**	
Christofer Ferguson	1.0	Suzanne Lossi	1.0	Cristin Wilkes	0.7
Richard James	2.5				

* = years in the pipeline group

BSEE

ON THE HORIZON

- Update to Subpart A (General) – The updates for industry standards incorporated by reference comment period has closed and the rule is moving towards final publication.
- Update to Subpart J (Pipelines) – The update to this section is being prepared for public comment and the currently the Notice of Proposed Rule Making (NPRM) and comment period are planned for later this year.
- Update to Subpart Q (Decommissioning) – The update to this section has just started being prepared as a draft proposed rule.

QUESTIONS?

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