



***Alaska Department of Environmental Conservation
Spill Prevention and Response Division
Prevention, Preparedness, & Response Program***

***Kenai/Cook Inlet
Flow Line Compliance Evaluation***

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Timothy Law
Integrity & Engineering Unit
November 2015**



Kenai/Cook Inlet Flow Line Compliance Evaluation

- 1. Compliance Evaluation Program Overview***
- 2. Kenai/Cook Inlet Production Facility & Platform Compliance Reviews***
- 3. Program Achievements***

OLD SPAR*
Prevention & Emergency Response Program (PERP) + Industry Preparedness Program (IPP)



NEW SPAR*
Prevention, Preparedness, & Response Program (PPRP)

Gary Folley
PPRP Manager
SOL

Preparedness &
Response Section
Graham Wood
ANC

CENTRAL ALASKA REGION
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Cook Inlet/Kodiak Unit
Unit Manager: Young Ha

NORTHERN ALASKA REGION
SOSC: TOM DERUYTER

SOUTHEAST ALASKA REGION
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UNDERGROUND TANKS (USTs)
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SAM SAENGSDHAM

SCIENTIFIC SUPPORT
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PROGRAM SUPPORT
BILL STEELE

Interagency Coordination
Section
Steve Russell
SOL

JPO LIAISON
DISASTER COORDINATION
ARRT/UNIFIED PLAN
USCG/EPA/BSEE
MOUs/MOAs
PSBC TASK FORCE
RCACs

* SPAR also includes
Contaminated Sites and
Response Fund
Administration
Programs.

18 AAC 75

Article 1. Oil Pollution Prevention Requirements.

Section

005. Responsibility

007. General oil pollution prevention requirements

015. Waiver

020. Oil Discharge Prevention Training & Recordkeeping

025. Transfer requirements

027. Requirements for laden tank vessels

037. Requirements for laden oil barges

045. Operating requirements for exploration and production facilities

047. Requirements for flow lines at production facilities

055. Leak detection, monitoring, and operating requirements for crude oil transmission pipelines

065. Field-constructed aboveground oil storage tank requirements

066. Shop-fabricated aboveground oil storage tanks

075. Secondary containment requirements for aboveground oil storage tanks

080. Requirements for facility oil piping

085. Requirement for railroad tank cars and operations by rail

090. Repealed

What is a flow line?

18 AAC 75.990(173)

"flow line"

(A) means piping and associated fittings, including all valves, elbows, joints, flanges, pumps, and flexible connectors,

- (i) containing liquid oil;
- (ii) located at a production facility; and
- (iii) that is installed or used for the purpose of transporting oil between a well pad or marine structure used for oil production and the interconnection point with a transmission pipeline; and

(B) includes all piping between interconnections, including multi-phase lines and process piping, except

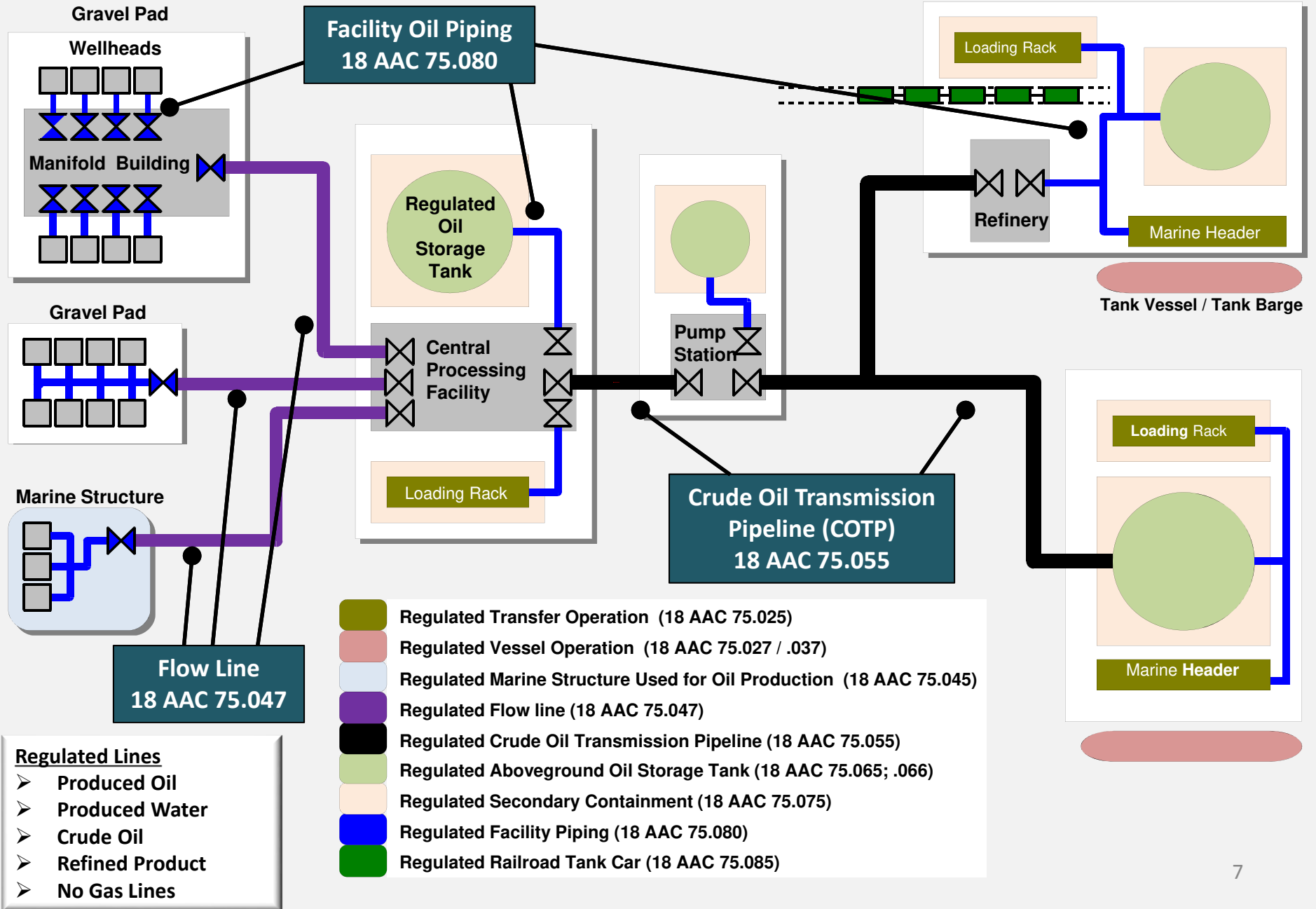
- (i) facility oil piping; and
- (ii) transmission pipelines;



What isn't a flow line?

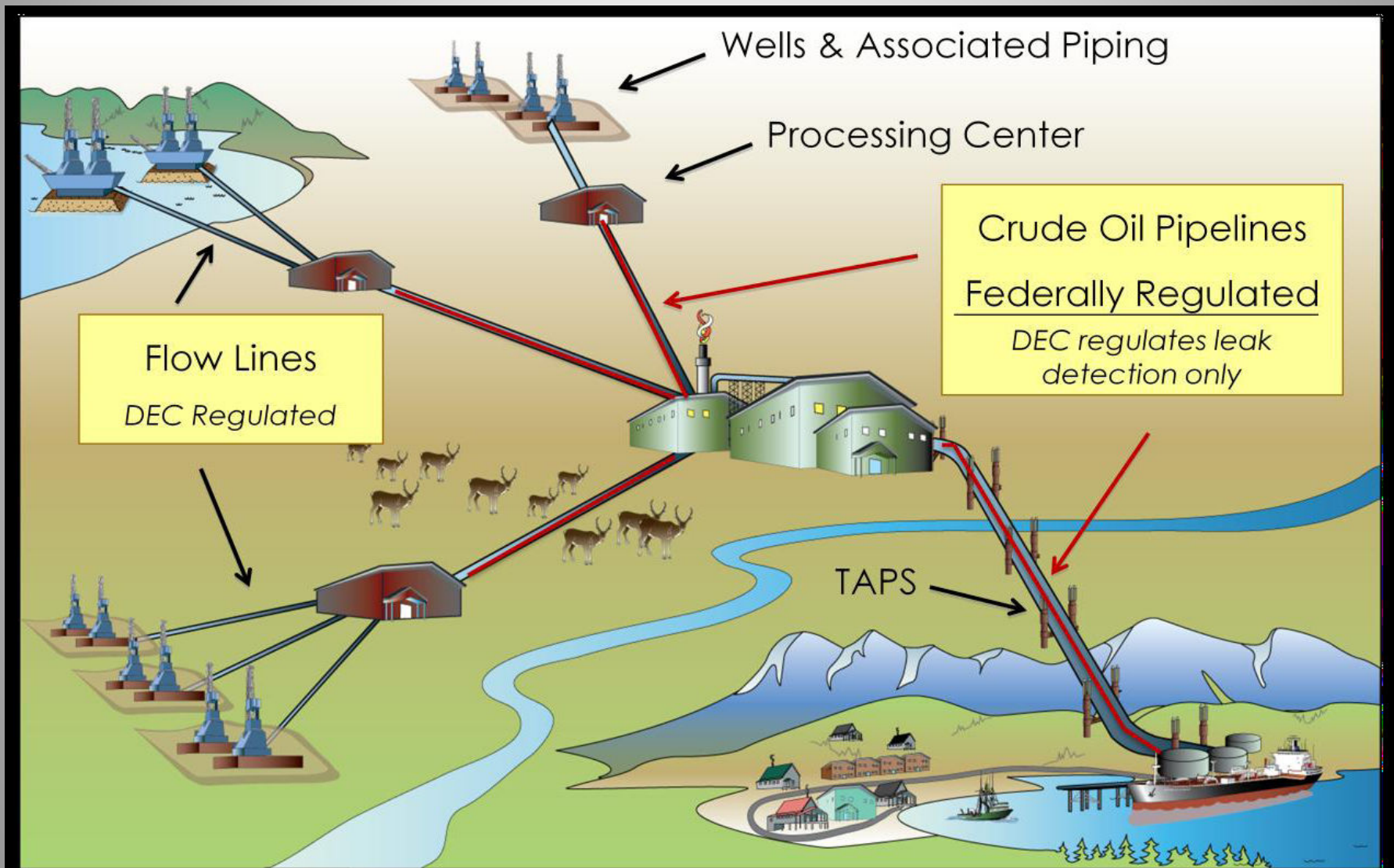
	Crude Oil Transmission Pipeline (COTP)	Flow Line (FL)	Facility Oil Piping (FOP)
Typical size (Outside diameter)	8.625 – 48 inches	6.625– 36 inches	<8 inches
Pipe Contents	Crude Oil (single phase, sale quality)	Multi-phase - Oil/produced water/gas (i.e. production lines)	Oil - include Crude, refined product, or multi-phase (on pad well lines)
ADEC Regulation	18 AAC 75.055	18 AAC 75.047	18 AAC 75.080
Leak Detection	Yes (1% daily throughput)	Single Wall: No Double Wall: Interstice Monitoring	No
Design Standard	No	Yes ASME B31.4, B31.8	Yes ASME B31.3, B31.4, B31.8
Cathodic Protection Standard	No	Yes NACE RP0169	Yes NACE RP0169
Corrosion Control Standard	No	Yes ASME B31.4, NACE RP0169	Yes NACE RP0169
Inspection Standard	No	Yes API 570 (above ground)	Yes API 570
Maintenance Standard	No	Yes ASME B31.4, API 570	Yes API 570
Operation	No	No	No

18 AAC 75 Article 1 Regulatory Boundary Examples



Flow Lines – Parts of Oil Production Facilities

General Concept...



How are flow lines regulated?
Headings of 18 AAC 75.047

- Design & construction standards
- Corrosion monitoring & control
- Preventative maintenance
- Line markers
- Removal from service requirements
- Line supports
- Compliance documentation & recordkeeping

ADEC FLOW LINE REGULATION FRAMEWORK

ADEC REGULATION	DESCRIPTION	STANDARD ADOPTED BY REFERENCE
18AAC75.047(a)	Applicability	
18AAC75.047(b)	Design and Construction Standards <i>(Placed In-Service after December 30, 2008)</i>	ASME B31.4-2002, or ASME B31.8-2003, or Equivalent Approved by Department
18AAC75.047(c)	Corrosion Program	<i>NLT December 30, 2007</i>
18AAC75.047(c)(1)	Corrosion Monitoring and Control	ASME B31.4 -2002, Chapter 8
18AAC75.047(c)(2)	External Corrosion Control Buried and Submerged Flowlines	NACE, RP 0169-2002
18AAC75.047(c)(3)	External Corrosion Control Aboveground Flowlines	
18AAC75.047(c)(4)	Internal Corrosion Control	
18AAC75.047(d)	Preventative Maintenance	<i>NLT December 30, 2007</i>
18AAC75.047(d)(1)	Flow Line Pipe-in-Pipe & Approved Interstice Leak Detection	
18AAC75.047(d)(2)	Preventative Maintenance Program	
	047(d)(2)(A) – Submerged Flowline	ASME B31.4-2002, Chapter 7, 8, & 9
	047(d)(2)(B) – Buried Flowline	ASME B31.4-2002, Chapter 7 & 8
	047(d)(2)(C) – Aboveground Flowline	API 570 - 2003 (Excluding Section 8) and ASME B31.4-2002, Chapter 7 & 8
	047(d)(2)(D) – All Flowlines	
18AAC75.047(e)	Line Markers	
18AAC75.047(f)	Removed from Service Requirements	
18AAC75.047(g)	Aboveground Flowline Supports	ASME B31.4-2002; Paragraph 421
18AAC75.047(h)	Compliance Verification Documentation	Refers to 18AAC75.047 (c) and (d)

Similarities with Federal Requirements – one example

49 CFR 195.581	18 AAC 75.080 (I)	18 AAC 75.047 (c)(3)
<p>(a) You must clean and coat each pipeline or portion of pipeline that is exposed to the atmosphere, except pipelines under paragraph (c) of this section.</p> <p>(b) Coating material must be suitable for the prevention of atmospheric corrosion.</p> <p>(c) Except portions of pipelines in offshore splash zones or soil-to-air interfaces, you need not protect against atmospheric corrosion any pipeline for which you <u>demonstrate by test, investigation, or experience</u> appropriate to the environment of the pipeline that corrosion will-</p> <p><u>(1) Only be a light surface oxide; or</u> <u>(2) Not affect the safe operation of the pipeline before the next scheduled inspection.</u></p>	<p>The owner or operator of aboveground facility oil piping, other than piping specified in (m) of this section, shall ensure that the piping is protected from atmospheric corrosion by the application of a protective coating or by the use of corrosion-resistant material unless the owner or operator <u>demonstrates by test, investigation, or experience</u> appropriate to the environment of the piping segment that the anticipated extent of corrosion will <u>(1) only be a light surface oxide; or (2) not affect the safe operation of the piping before the next scheduled inspection under a program developed under (j) of this section (i.e. API 570);</u></p>	<p>External corrosion control of aboveground flow lines by the application of a protective coating, by the use of corrosion-resistant alloys or by another method approved by the department, unless the operator demonstrates by <u>test, investigation, or experience</u> appropriate to the environment of the flow line segment, that the <u>anticipated extent of corrosion will not affect the flow line's fitness for service;</u> and</p>

3 Types of Flow Lines

(1) Aboveground



(2) Buried



(3) Submerged



Flow Line Compliance Review

I. Program Audit

II. Line Specific Review

- ☐ Record Review
- ☐ Field Inspection

III. Reporting

- ☐ Checklists
- ☐ Follow-up Correspondence
- ☐ Enforcement Actions as necessary



Program Audit

Typically includes review of written guidance, policies, plans, procedures, etc. associated with:

- 1) Corrosion Control Program
(ASME B31.4, NACE RP0169)
- 2) Preventative Maintenance Program
(ASME B31.4, API 570)
- 3) Quality Assurance Program
(API 570)
- 4) Data Management System



Line Specific Record Review

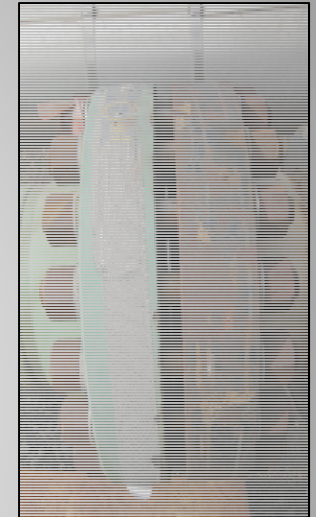
- 1) Maps, Sketches, Diagrams, P&IDs
- 2) Line pressure testing & service history
- 3) Data Management System
- 4) Corrosion Monitoring records
- 5) Maintenance & Repair records
 - Fitness for Service (FFS), remaining life, corrosion rate data and calculations
 - Block valve inspection & maintenance
- 6) Inspection/Testing/Surveying Records
 - Aboveground – API 570 reporting
 - Buried or submerged - Cathodic Protection System monitoring & surveying data
- 7) Spill/Leak History
- 8) Training records (Authorized Inspector (AI), Non-destructive Examination (NDE), Welding, Corrosion Expert)



Line Specific Field Inspections

Involves Visual Examination

- “Ground Truth” Entire Length, Visible Portions
- Vibration, Misalignment
- Damage & Repairs
- Line Structural Support (Saddles, VSM’s, HSM’s, etc)
- Signs of external corrosion
- Insulation systems (CUI)
- No testing involved



Corrosion Under Insulation (CUI)

- ✓ Significant cause of ext. corrosion (primarily North Slope issue)
- ✓ Insulated, non coated, warm pipe + water = corrosion
- ✓ Non sealed insulation = water ingress
- ✓ Difficult to detect
- ✓ Need to strip insulation to evaluate

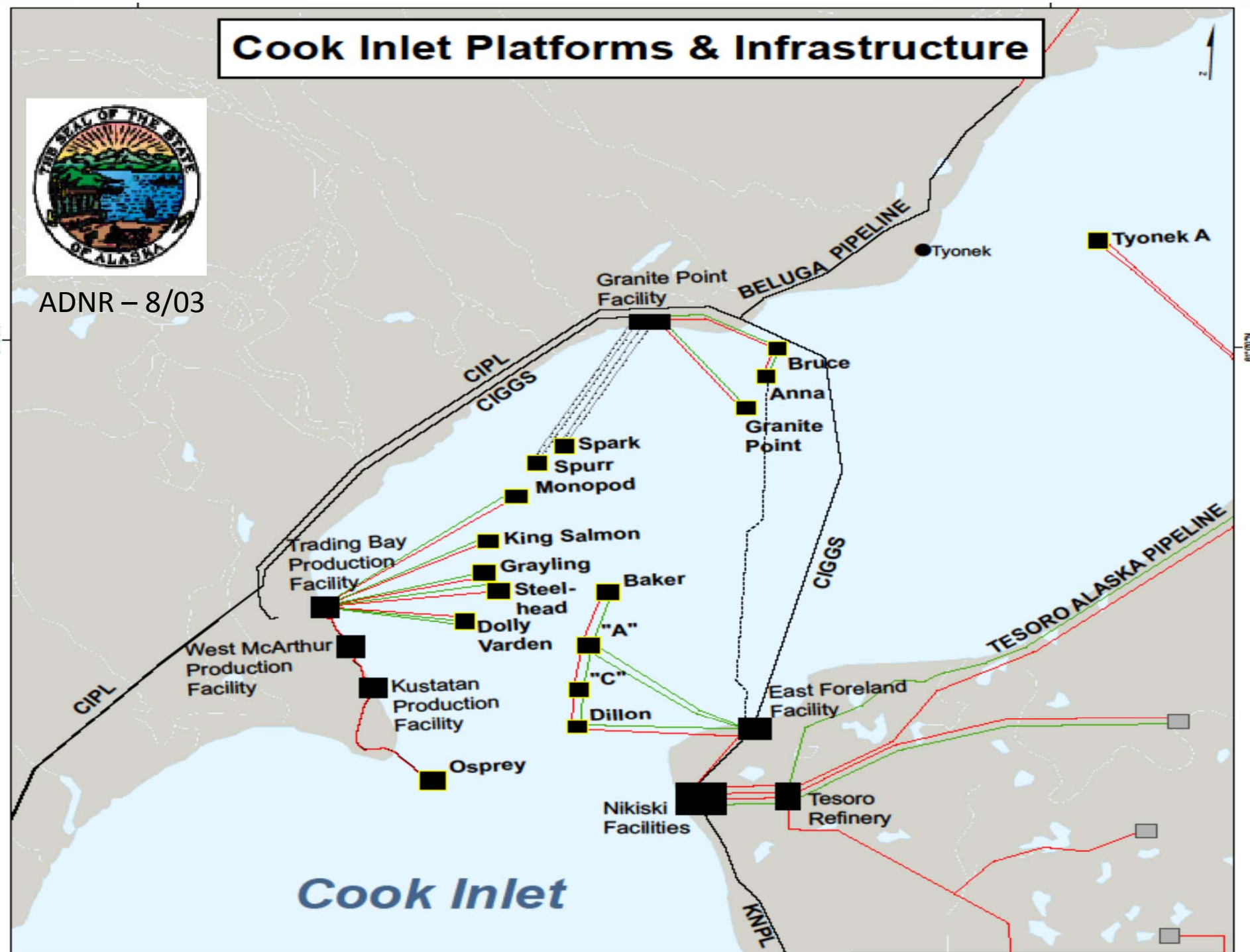


Cook Inlet Platforms & Infrastructure



ADNR – 8/03

NAD 83



NAD 83

Kenai/Cook Inlet Production Facilities



- **Trading Bay Production Facility (Hilcorp)**
- **Granite Point Tank Farm (Hilcorp)**
- **Kustatan Production Facility (Cook Inlet Energy)**
- **West McArthur River Unit (Cook Inlet Energy)**
- **Middle Ground Shoals Production Facility (Hilcorp)**
- **Swanson River Field (Hilcorp)**

ADEC Regulatory Oversight

Cook Inlet Oil Production Platforms



Trading Bay

1. Dolly Varden
2. Grayling
3. King Salmon
4. Monopod
5. Steelhead

Granite Point

6. Anna
7. Bruce
8. Granite Pt

Kustatan

11. Osprey*

Middle Ground Shoals

9. A
10. C



*No production fluids processed at the platform

Scraping/Cleaning Pigs



In-Line Inspection (ILI) “Smart” Pigs



Stock Photo



Stock Photo

Flow Lines

Cook Inlet Platforms

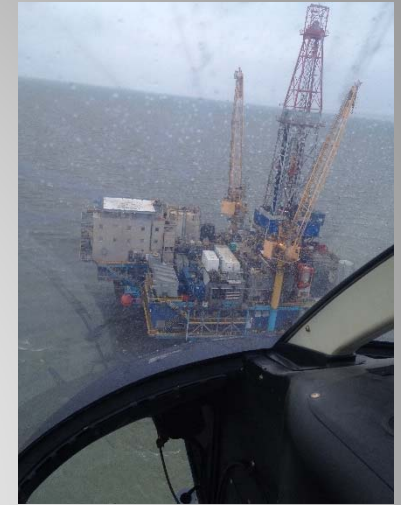
	Operator	Platform	Equip ID	Line Service	Year Online	Line Start	Line End	Length (ft)	NPS	Nom Wall t	Maint Pig	ILI Capable
1	CIE	Osprey	8"PC-3114-FA	3 phase	2002	Osprey	Shore Vault	10,546	8	0.750	weekly	Y
2	CIE	Osprey	8"PC-3126-FA	3 phase	2002	Shore Vault	Kusta	8,638	8		weekly	Y
3	CIE	Osprey	8"PW-3152-GA	PW	2002	Kustatan	Osprey	19,184	8	0.875	weekly	Y
4	Hilcorp	Anna	Anna A	2 phase	1967	Anna	Bruce	8,813	8	0.594	3X week	Y
5	Hilcorp	Bruce	Bruce GP1	2 phase	1974	Bruce	GPTF	28,042	8	0.864	3X week	Y
6	Hilcorp	Granite Pt	Granite Point B	2 phase	1966	Granite Pt	GPTF	32,340	8	0.719	2X week	Y
7	Hilcorp	Dol. Varden	Dolly Varden A	2 phase	1967	Dol. Varden	TBPF	30,352	8	0.719	3X week	Y
8	Hilcorp	Grayling	Grayling A	2 phase	1967	Grayling	TBPF	34,102	10	0.750	3X week	Y
9	Hilcorp	King Salmon	King Salmon A	2 phase	1966	King Salmon	TBPF	37,863	8	0.719	2X week	Y
10	Hilcorp	Monopod	Monopod A	2 phase	1966	Monopod	TBPF	47,624	8	0.719	Daily	Y
11	Hilcorp	Steelhead	Steelhead C	2 phase	1986	Steelhead	TBPF	34,439	8	0.500	3X week	Y
12	Hilcorp	Platform A	A-Line	3 phase	1965	A	MGSP F	36,960	8	0.592	4X week	N
13	Hilcorp	Platform C	B-Line	3 phase	1967	C	A	12,144	8	0.592	4X week	N



Flow Lines

Cook Inlet Platforms

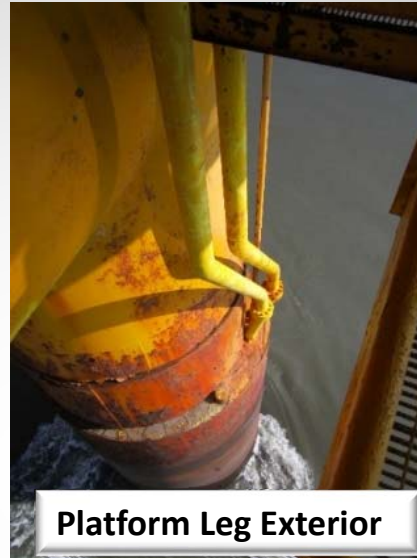
- ☐ Heavy Pipe Wall Thickness (0.500-0.864")
- ☐ Pipe Coatings
- ☐ Routine Line Pigging
- ☐ In-Line Inspection Capabilities (most)
- ☐ Chemical Injection & Corrosion Monitoring
- ☐ Cathodic Protection Systems (submerged & buried)
- ☐ Production Lines to/from Seabed Inside Platform Legs
- ☐ Regulated as flow lines since 2007
- ☐ Federally regulated since mid 1990's



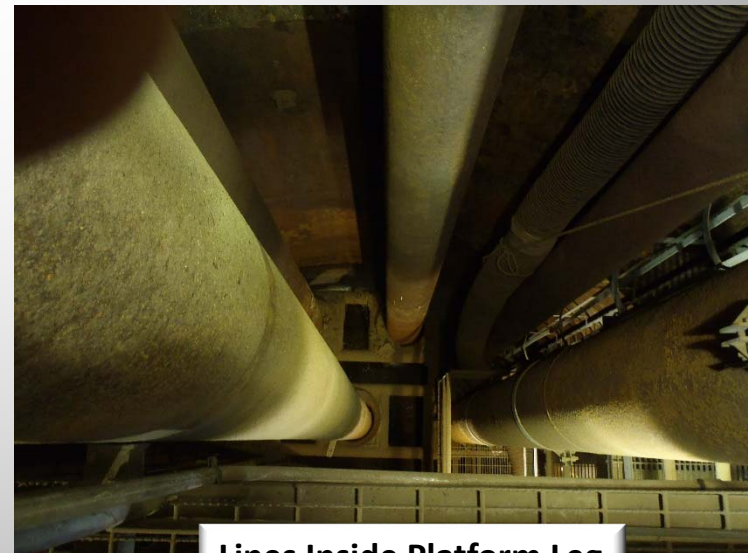
Inspect Visible Portions of Line



**Insulated
Lines on Deck**



Platform Leg Exterior



Lines Inside Platform Leg

Chemical Injection, Monitoring, Transfer, & Storage



Injection

- ☐ Corrosion Inhibitor
- ☐ Oxygen Scavenger
- ☐ Biocides
- ☐ Scale Inhibitor

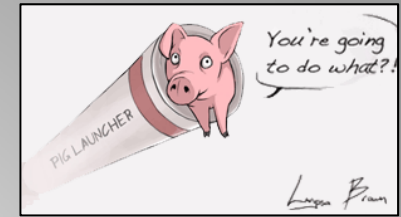


Transfer



Storage

Pig Launcher (platform) Receiver (shore side)



Cathodic Protection



- Impressed Current (IC)
- Monthly Checks
- Annual System Testing



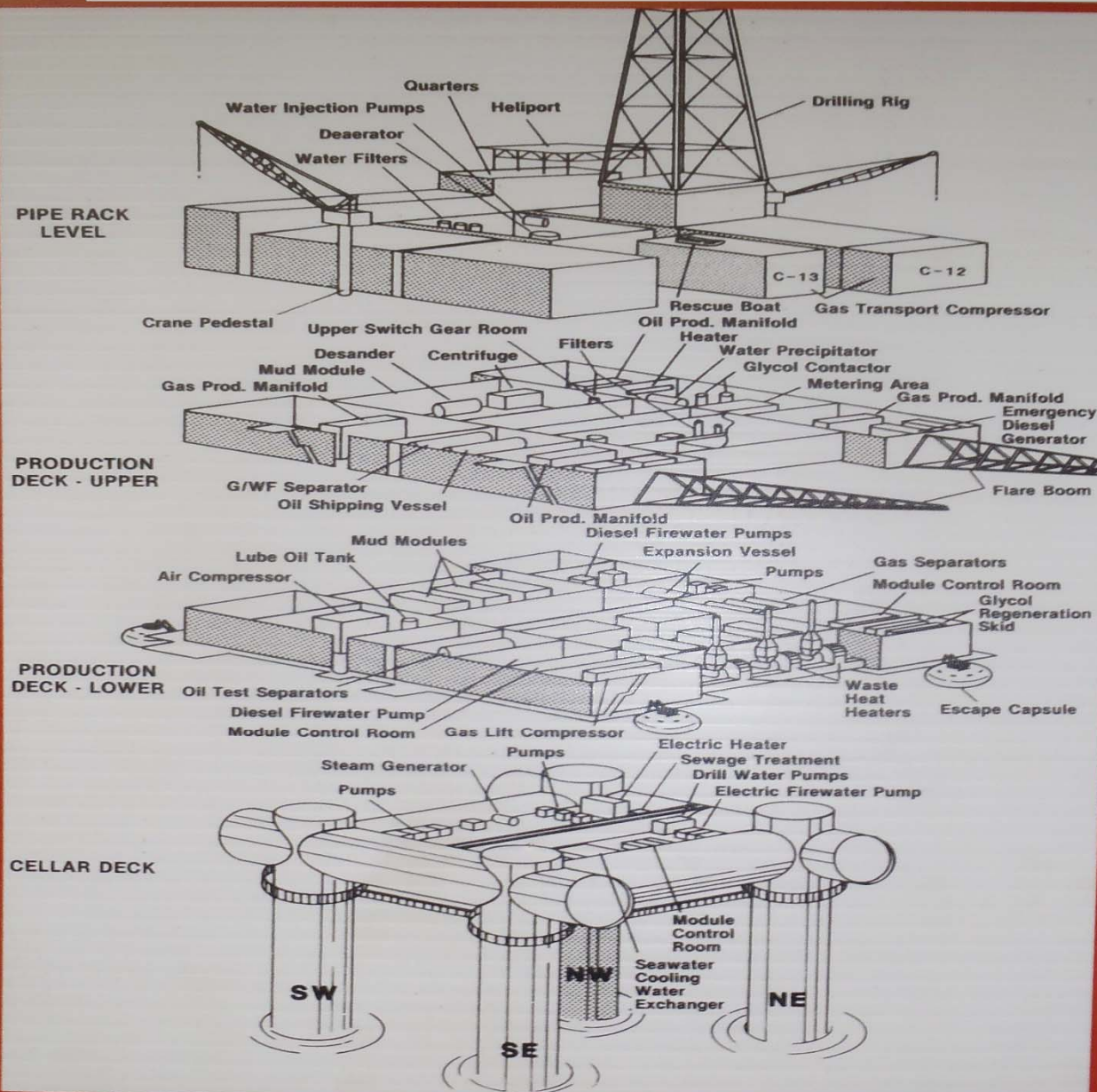
Isolating Valves



- Yearly Maintenance
- Accessible Location
- Protected from Damage



Platform Storage "Girder" Tanks



TO
ALL AUDIBLE ALARMS
THE ALARM TYPE, OF
REPORT TO DRILLING

INCIDENT

EMERGENCY COORDINATOR
Field Superintendent

OPERATIONS CHIEF
Lead Op

RESPONSE TEAM LEADER
On Duty Senior Op

RESPONSE TEAM
On Duty FO #2
On Duty Utility
M-1
M-2
M-1 E
Contract Roustabouts

GENERAL INSTRUCTIONS

1. EACH PERSON MUST FAMILIARIZE THEMSELVES WITH THE ALARM SIGNALS:
 - KNOW WHAT THEY MEAN
 - KNOW WHAT THEY DO
 - KNOW WHERE TO GO
2. EACH PERSON MUST FAMILIARIZE THEMSELVES WITH THE LOCATION AND USE OF PERSONAL PROTECTIVE AND EMERGENCY EQUIPMENT
3. YOU MUST RECEIVE A SAFETY ORIENTATION OF THIS FACILITY BEFORE LEAVING THE QUARTERS WITHOUT AN ESCORT
4. ALL NON-ROUTINE WORK AND ACTIVITIES REQUIRE A SAFE WORK PERMIT

UPON SOUNDING
SHUTDOWN ALL

PERSON

Platform Storage Tanks

**Girder
Tank
Layout**



Cellar Deck



**Radial
Configuration
Monopod**



Platform Storage Tanks



UT Scan Non-Destructive Examination



Girder Tank Testing



Refined Product Storage & Transfer



On-Shore Production Facilities



**Shoreline
Transition**

**Onshore
Vaults**



Soil/Air Interface



**Facility Piping &
Tank Systems**



Pipe Manifolding



On-Shore Production Facilities



**Slop Oil
Storage**

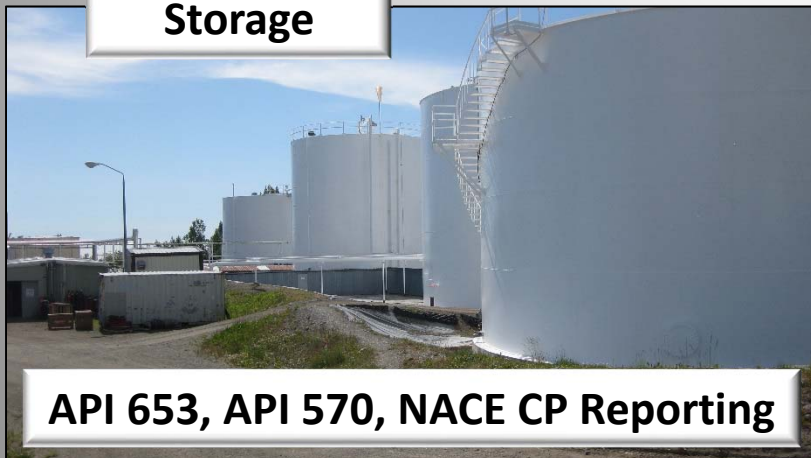


**Crude Oil
Storage**

**Facility Oil
Piping**



**Refined
Product**



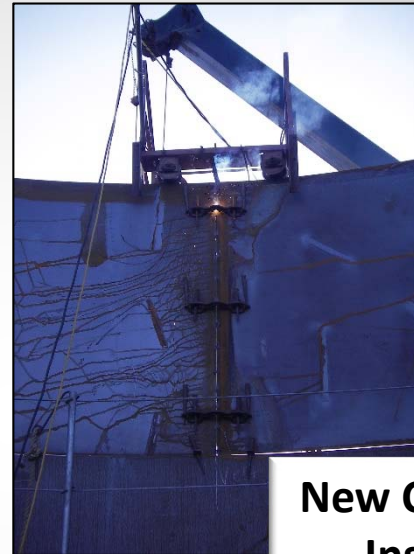
API 653, API 570, NACE CP Reporting



Tank Truck Loading Area

On-Shore Production Facilities

**Upgrade/Replacement
Bolted to Welded Construction**



**New Construction
Inspections**



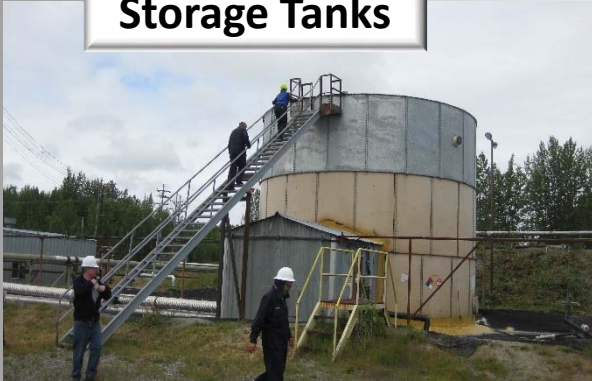
On-Shore Production Facilities

Swanson River Field

42 Flow Lines



**Aboveground
Storage Tanks**



Manifold Bldg

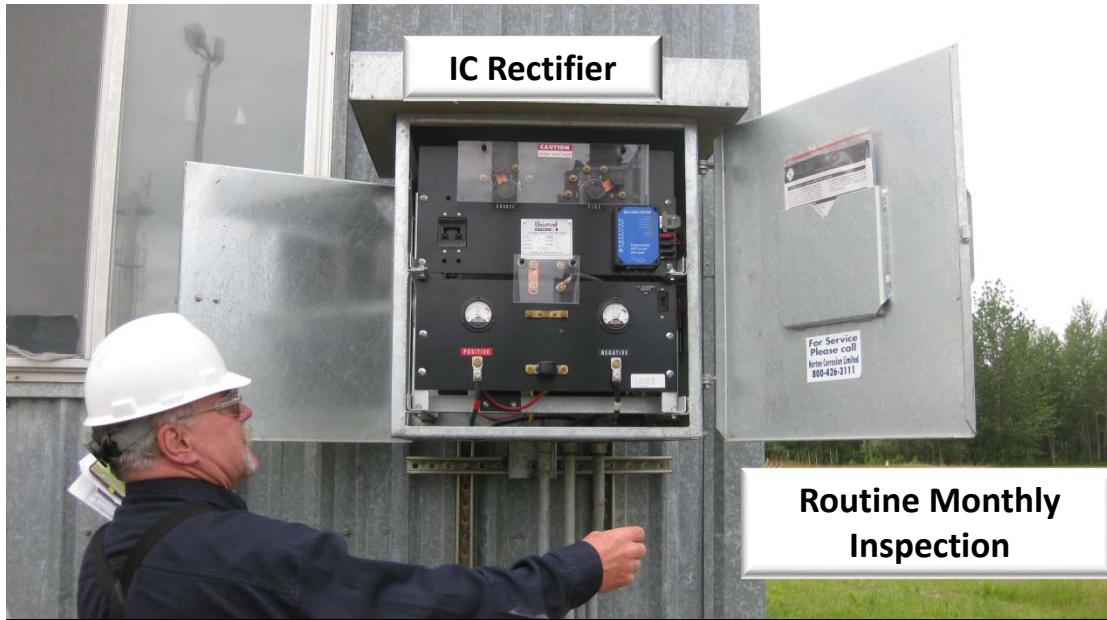


Well Pad



Chemical Storage & Injection





SRF: Extensive Cathodic Protection System (for corrosion control)



Annual System Testing



Flow Line Program Achievements

CY 2009-2015

☐ Compliance Evaluation Program Overview Drafted

☐ Checklists Drafted

- Audit
- Compliance Evaluation (Aboveground, Buried/Submerged)
- Repair Review
- Offshore Platforms
- Construction Inspection

☐ Initial Program Audits Completed

NORTH SLOPE

- BPXA Greater Prudhoe Bay
- CPAI Kuparuk & Alpine
- Pioneer Oooguruk (off-shore)
- ENI Petroleum Nikaitchuq (off-shore)

KENAI/COOK INLET

- Chevron (Hilcorp Alaska) Swanson River Field
- XTO Energy CI Production Facility & Platforms
- Hilcorp Alaska Trading Bay & Granite Point & Platforms
- Cook Inlet Energy Kustatan, West Mac & Platform

☐ Line Specific Compliance Reviews

- 419 Flow Lines = 926 line miles

☐ Repair & Mitigation Reviews

☐ Design Reviews & Construction Inspections

- North Slope area
- XTO MGS

Flow Line Program Achievements

CY2009-2015

Line Specific Reviews

Period State Fiscal Year	North Slope (Total FL's = 371)						Kenai/Cook Inlet (Total FL's = 53)	
	BPXA PBU (FL# = 225)		CPAI KRU (FL# = 137)		Pioneer Oooguruk, ENI Nikaitchuk, CPAI Alpine (FL# = 9)		Hilcorp SRF, Cook Inlet (FL# = 53)	
	# Flowlines Completed	Line Miles	# Flowlines Completed	Line Miles	# Flowlines Completed	Line Miles	# Flowlines Completed	Line Miles
SFY11	41	150	36	124				
SFY12	30	59	49	97	2	16	36	15
SFY13	85	153	15	32	2	7		
SFY14	34	54	18	30	3	0.5	2	9
SFY15	35	99	17	26	2	7	10	48
Totals	225	515	137	309	9	30.5	48	72
% Complete	100%		100%		100%		91%	
	North Slope = 100% (initial review)						Kenai/CI = 91%	

An aerial photograph taken from a high altitude, looking down on a vast, frozen body of water. The foreground is filled with numerous small, irregular ice floes floating on a darker blue surface. In the middle ground, a large, dark, forested island or peninsula juts out into the water. The background shows a range of snow-capped mountains under a pale, hazy sky. The wings of an aircraft are visible at the top of the frame, indicating the photo was taken from a plane.

- END -

- QUESTIONS -