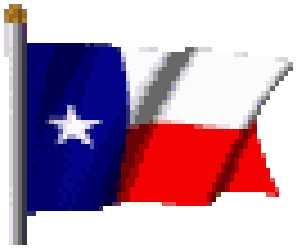


Instructor Skills Conference IX

Making Learning Fun with Group Interaction

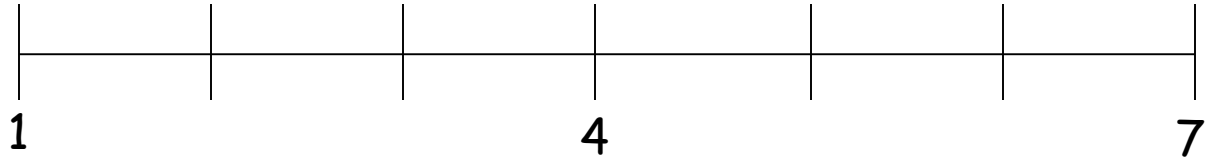
Dennis Link

College of the Mainland

September 27, 2018

"Learning is directly proportional to the amount of fun you're having."
Bob Pike

Making Learning Fun with Interaction
Initial Personal Expectation Ratings



Low **High**

A. How valuable do you feel this workshop will be to you?

B. How participative do you plan to be during this workshop?

Workshop Expectations

Use your learning journal to:

- Write down at least one thing you'd like to learn during this workshop
- Share what you'd like to learn with another participant

Making Learning Fun with Interaction Workshop Agenda

Time	Topic
10 Minutes	Introductions, Expectations and Objectives
15 Minutes	Safety Discussion Table Exercise
15 Minutes	Crude Oil Barrel vs. Refined Barrel Table Exercise
30 Minutes	Process Unit Startup Table Exercise
10 Minutes	Debrief, Action Plan and Evaluations

Learning Objectives

At the end of this workshop you will be able to:

- Share safety tips to help eliminate injuries
- Facilitate interactive learning activities with small groups
- List the key differences in the components of a barrel of crude oil and refined barrel
- Place process unit startup procedure steps in the proper sequence to ensure a safe, environmentally sound and efficient startup

Safety Table Exercise

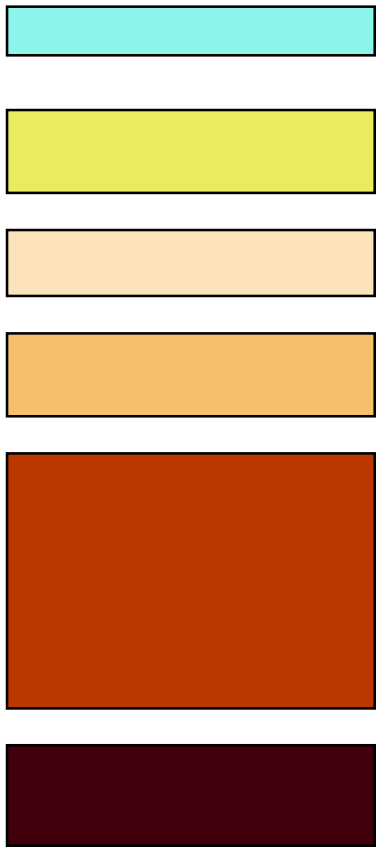
- Discuss the best safety tip you've ever received with your table group.
- How has this tip helped you and others work safe at home, work and play?
- Select a spokesperson from each table to share one safety tip.

Barrel of Crude Oil Table Exercise

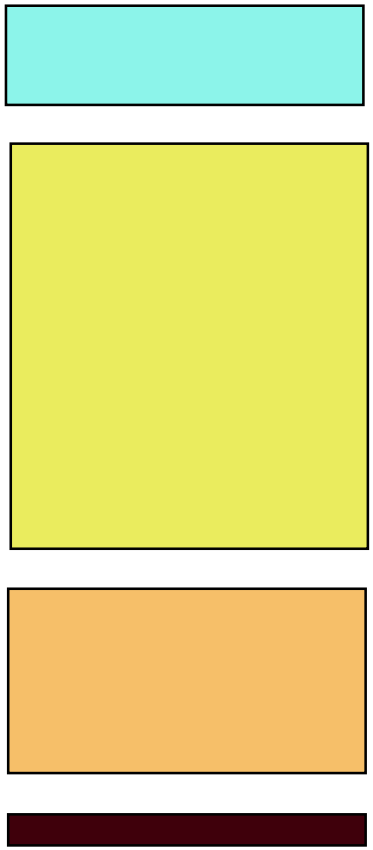
- Work with your table group to identify and compare components in a barrel of crude oil and a barrel of refined crude oil.
- Select a spokesperson to share your work and the key points of your discussion.

What's in a 'Barrel of Crude Oil' and How We Change It

Crude Oil Components

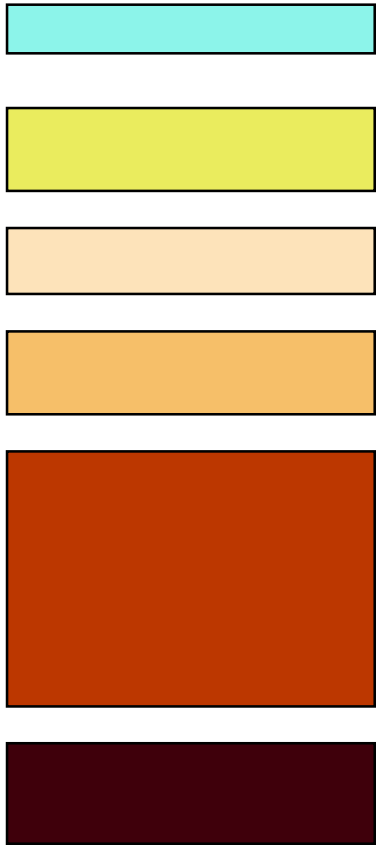


Refined Products



What's in a 'Barrel of Crude Oil' and How We Change It

Crude Oil Components



5% Light Ends

20% Gasoline

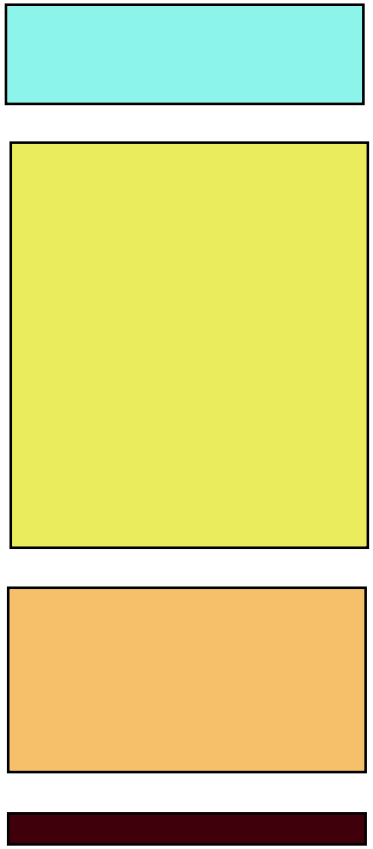
10% Kerosene & Jet Fuel

15% Diesel & Heating Oil

35% Gas Oil

15% Resid

Refined Products



10% Light Ends & Chemical Feed Stocks

60% Gasoline

25% Jet Fuel, Diesel & Heating Oil

5% Resid, Asphalt & Coke

Basic Startup Procedure Steps Table Exercise

- Complete Individual section on worksheet provided
- Complete Group section for each table
- Reach Class consensus regarding proper sequence of basic startup procedure steps

Arrange the following 16 steps in the proper order to ensure a safe, environmentally sound and efficient startup of a refinery process unit.

	Process Unit Basic Startup Procedure Steps	Ind	Group	Class
A	Establish normal operating conditions			
B	Energize electrical equipment switchgear and verify good pump motor meg readings			
C	Pull battery limit feed and rundown blinds and install permanent running blinds			
D	Remove system and purge medium blinds			
E	Verify products are on specification and route to normal rundown lines			
F	Warm up and water free hydrocarbon systems			
G	Check unit equipment for uncompleted turnaround work			
H	Place cooling water, plant and instrument air and steam systems in service			
I	Review safety policies and unit startup procedures			
J	Establish feedstock circulation			
K	De-LOTO unit equipment and remove all chains and locks from valves			
L	Back fuel or natural gas into individual systems			
M	Purge oxygen from individual systems and pressure test each system			
N	Place control valves, instruments and alarms in service and check out			
O	Check individual systems for safe oxygen content			
P	Notify environmental, utilities, oil movements, and upstream and downstream units			

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	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
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D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	1
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	
M	Purge oxygen from individual systems and pressure test each system	
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F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	2
H	Place cooling water, plant and instrument air and steam systems in service	
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J	Establish feedstock circulation	
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P	Notify environmental, utilities, oil movements, and upstream and downstream units	4

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	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
B	Energize electrical equipment switchgear and verify good pump motor meg readings	5
C	Pull battery limit feed and rundown blinds and install permanent running blinds	
D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
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D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	6
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	
M	Purge oxygen from individual systems and pressure test each system	
N	Place control valves, instruments and alarms in service and check out	
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A	Establish normal operating conditions	
B	Energize electrical equipment switchgear and verify good pump motor meg readings	
C	Pull battery limit feed and rundown blinds and install permanent running blinds	
D	Remove system and purge medium blinds	7
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
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H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	
M	Purge oxygen from individual systems and pressure test each system	8
N	Place control valves, instruments and alarms in service and check out	
O	Check individual systems for safe oxygen content	
P	Notify environmental, utilities, oil movements, and upstream and downstream units	

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	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
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I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	
M	Purge oxygen from individual systems and pressure test each system	
N	Place control valves, instruments and alarms in service and check out	
O	Check individual systems for safe oxygen content	9
P	Notify environmental, utilities, oil movements, and upstream and downstream units	

Arrange the following 16 steps in the proper order to ensure a safe, environmentally sound and efficient startup of a refinery process unit.

	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
B	Energize electrical equipment switchgear and verify good pump motor meg readings	
C	Pull battery limit feed and rundown blinds and install permanent running blinds	
D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	10
M	Purge oxygen from individual systems and pressure test each system	
N	Place control valves, instruments and alarms in service and check out	
O	Check individual systems for safe oxygen content	
P	Notify environmental, utilities, oil movements, and upstream and downstream units	

Arrange the following 16 steps in the proper order to ensure a safe, environmentally sound and efficient startup of a refinery process unit.

	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
B	Energize electrical equipment switchgear and verify good pump motor meg readings	
C	Pull battery limit feed and rundown blinds and install permanent running blinds	11
D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	
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	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
B	Energize electrical equipment switchgear and verify good pump motor meg readings	
C	Pull battery limit feed and rundown blinds and install permanent running blinds	
D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	
M	Purge oxygen from individual systems and pressure test each system	
N	Place control valves, instruments and alarms in service and check out	12
O	Check individual systems for safe oxygen content	
P	Notify environmental, utilities, oil movements, and upstream and downstream units	

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	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
B	Energize electrical equipment switchgear and verify good pump motor meg readings	
C	Pull battery limit feed and rundown blinds and install permanent running blinds	
D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	13
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	
M	Purge oxygen from individual systems and pressure test each system	
N	Place control valves, instruments and alarms in service and check out	
O	Check individual systems for safe oxygen content	
P	Notify environmental, utilities, oil movements, and upstream and downstream units	

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	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
B	Energize electrical equipment switchgear and verify good pump motor meg readings	
C	Pull battery limit feed and rundown blinds and install permanent running blinds	
D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	14
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
L	Back fuel or natural gas into individual systems	
M	Purge oxygen from individual systems and pressure test each system	
N	Place control valves, instruments and alarms in service and check out	
O	Check individual systems for safe oxygen content	
P	Notify environmental, utilities, oil movements, and upstream and downstream units	

Arrange the following 16 steps in the proper order to ensure a safe, environmentally sound and efficient startup of a refinery process unit.

	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	15
B	Energize electrical equipment switchgear and verify good pump motor meg readings	
C	Pull battery limit feed and rundown blinds and install permanent running blinds	
D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
K	De-LOTO unit equipment and remove all chains and locks from valves	
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	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	
B	Energize electrical equipment switchgear and verify good pump motor meg readings	
C	Pull battery limit feed and rundown blinds and install permanent running blinds	
D	Remove system and purge medium blinds	
E	Verify products are on specification and route to normal rundown lines	16
F	Warm up and water free hydrocarbon systems	
G	Check unit equipment for uncompleted turnaround work	
H	Place cooling water, plant and instrument air and steam systems in service	
I	Review safety policies and unit startup procedures	
J	Establish feedstock circulation	
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	Process Unit Basic Startup Procedure Steps	Class
A	Establish normal operating conditions	15
B	Energize electrical equipment switchgear and verify good pump motor meg readings	5
C	Pull battery limit feed and rundown blinds and install permanent running blinds	11
D	Remove system and purge medium blinds	7
E	Verify products are on specification and route to normal rundown lines	16
F	Warm up and water free hydrocarbon systems	14
G	Check unit equipment for uncompleted turnaround work	2
H	Place cooling water, plant and instrument air and steam systems in service	6
I	Review safety policies and unit startup procedures	1
J	Establish feedstock circulation	13
K	De-LOTO unit equipment and remove all chains and locks from valves	3
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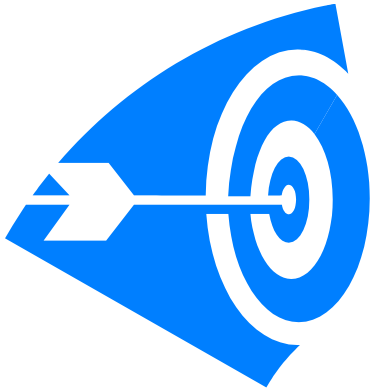
M	Purge oxygen from individual systems and pressure test each system	8
N	Place control valves, instruments and alarms in service and check out	12
O	Check individual systems for safe oxygen content	9
P	Notify environmental, utilities, oil movements, and upstream and downstream units	4

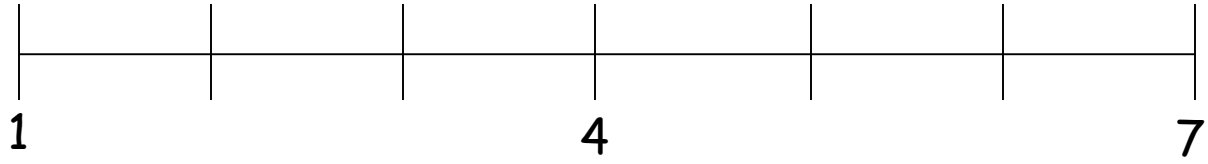
Workshop Action Plan

Use your learning journal to:

- Write down one thing you learned during this workshop
- Write down one thing you will do differently as a result of participating in this workshop
- Share your action plan with another participant



Making Learning Fun with Interaction
Final Personal Expectation Ratings



Low **High**

A. How valuable do you feel this workshop was to you?

B. How participative were you during this workshop?

Making Learning Fun with Interaction
Final Thoughts

Thank you so much for your participation and creating a great learning environment. Please use the information and learnings to make a positive difference for you, your work team and your organization.