Purpose

- **Crude Oil / Condensate**

Key Responsibilities

- Learn the hazards and risks of Crude Oil and Condensate
- Learn what to do if you get Crude Oil or Condensate on your skin
- Wear proper PPE (FRC, Gloves, Safety glasses etc)

Hazard and Risk Identification

- Crude Oil
  - Flammable. Toxic. May cause fire. May cause cancer. May release hydrogen sulfide. Hydrogen sulfide (H2S) has a rotten egg “sulfurous” odor. This odor should not be used as a warning property of toxic levels because H2S can overwhelm and deaden the sense of smell. Also, the odor of H2S in heavy oils can easily be masked by the petroleum-like odor of the oil. Therefore, the smell of H2S should not be used as an indicator of a hazardous condition - H2S meters or colorimetric indicating tubes are typically used to determine the concentration of H2S.
  - Eyes
    - May cause eye irritation
  - Skin
    - Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed. Rare, precancerous warts on the forearms, backs of hands and scrotum have been reported from prolonged or repeated skin contact
  - Ingestion
    - Aspiration hazard if liquid is inhaled into lungs, particularly from vomiting after ingestion. Aspiration may result in chemical pneumonia, severe lung damage, respiratory failure and even death. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death may occur.
  - Inhalation
    - May cause respiratory tract irritation. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death. Irritating and toxic hydrogen sulfide gas may be present.

Greater than 15 - 20 ppm continuous exposure can cause mucous membrane and respiratory tract irritation. 50 - 500 ppm can cause headache, nausea, and dizziness. Continued exposure at these levels can lead to loss of reasoning and balance, difficulty in breathing, fluid in the lungs, and possible loss of consciousness. Greater than 500 ppm can cause rapid unconsciousness due to respiratory paralysis and death by suffocation unless the victim is removed from exposure and successfully resuscitated. Greater than 1000 ppm can cause immediate unconsciousness and death if not promptly revived. After-effects from overexposure are not anticipated except what would be expected if the victim was without oxygen for more than 3 to 5 minutes (asphyxiation). The "rotten egg" odor of hydrogen sulfide is not a reliable indicator for warning of exposure, since olfactory fatigue (loss of smell) readily occurs, especially at concentrations above 50 ppm. At high concentrations, the victim may not even recognize the odor before becoming unconscious.

- Chronic Exposure
  - This material contains poly nuclear aromatic hydrocarbons (PNAs), some of which are animal carcinogens. Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information. Contains benzene, which can cause blood disease, including anemia and leukemia. Suspect reproductive hazard - contains material which may injure unborn child.
- Target Organs
  - :Skin, Eyes, Central nervous system, Respiratory system, Kidney, Liver

- Condensate
  - Highly Flammable
  - May cause irritation or more serious skin disorders. May be harmful if inhaled. May cause irritation of the nose, throat, and lungs, headache, dizziness, drowsiness, loss of coordination, fatigue, nausea and labored breathing. May cause irregular heartbeats. Avoid prolonged or repeated liquid, mist, and vapor contact with eyes, skin, and respiratory tract. If swallowed, do not induce vomiting since aspiration into the lungs may cause chemical pneumonia. Obtain prompt medical attention. Wash hands thoroughly after handling. Sulfur compounds in this material may decompose to release hydrogen sulfide gas which may accumulate to potentially lethal concentrations in enclosed air spaces. Vapor concentrations of hydrogen sulfide above 50 ppm, or prolonged exposure at lower concentrations, may saturate human odor perceptions so that the smell of gas may not be apparent. DO NOT DEPEND ON THE SENSE OF SMELL TO DETECT HYDROGEN SULFIDE! IDLH for hydrogen sulfide is 100 ppm. Hydrogen sulfide is listed as an EPA Extremely Hazardous Substance. Contains benzene, a chemical known to cause cancer in humans. May cause diseases of the blood forming organs, such as leukemia, adverse effects on the immune system and adverse reproductive effects. Benzene may cause irritation to the eyes, skin and lungs, central nervous system effects and irregular heartbeats. IDLH for benzene is 500 ppm.

Risk Assessment

- Risks associated with Crude Oil and Condensate
  - Exposure to high pressure hydrocarbon gas or condensate.
  - Physical exertion required to operate manual process valves or handling pig.
  - Potential loss of containment of hydrocarbons through leaking flanges or opened valves.
  - Risk of igniting released hydrocarbon gas or condensate

E&B OILFIELD SERVICES INC. RISK ASSESSMENT MATRIX – CRUDE OIL / CONDENSATE

CONSEQUENCE					PROBABILITY				
					A	B	C	D	E
Severity	People	Assets	Environment	Reputation	Not Done	Rarely	Once a week	Several Times in a Week	Multiple Times in a Day
0	No health effect	No damage	No effect	No impact					X
1	Slight health effect	Slight damage	Slight effect	Slight impact				X	
2	Minor health effect	Minor damage	Minor effect	Limited impact			X		
3	Major health effect	Localized damage	Localized effect	Considerable impact		X			
4	Single fatality	Major damage	Major effect	National impact	X				
5	Multiple fatalities	Extensive damage	Massive effect	Global impact	X				

Key	Manage for continuous improvement (Low)	Incorporate risk reduction measures (Medium)	Intolerable (High)

Risk Controls/Methods to Ensure Identified Hazards Are Addressed and Mitigated

- Wear proper PPE
  - FRC Clothing
  - Gloves
  - Safety Glasses
  - Hardhat
  - H2S Monitor
  - Do your best to avoid skin contact
- If Crude Oil or Condensate does come into contact with your skin, eyes, or if you inhale it or swallow it follow your SDS that's what they are there for.
- Carry extra PPE (FRC's, Gloves) you can exchange if you get a lot of Crude Oil or Condensate on you

JSA Sample

The following describes how identified hazards are addressed and mitigated:

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Basic Job Step	Potential Injury or Hazards	Mitigation / Tools
Retrieving pig from barrel covered in crude	Flammable on clothing and eye irritation	Don't get on your clothes and wear your Proper PPE (safety glasses) Don't touch your eyes

Other Info