

EN277

Steam Practicum (4th Class Power Engineering)

3 Credits

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EN277 Version: 1



Steam Practicum (4th Class Power Engineering)

Calendar Description

This course is 240 hours of controlled practicum for Heavy Oil Operations Technician students and 1st year Heavy Oil Power Engineering students. This is an industry placement by the college in a minimum 4th class Power plant.

Rationale

This course provides students with the real life application of the theory and lab learned during school year. Students must pass this course to get qualification time towards their 4th class power engineer licenses.

Prerequisites

1. The student must be a HOOT or 1st year HOPE student. The student must have passed EN-110 and EN-114 to qualify for the practicum.
2. Qualifications: The practicum host may have qualifications that must be met before a student is accepted. These may include a criminal records check, immunization records, pre-employment medical screening including drug and alcohol testing. Students must become familiar with the host's company rules and abide by them. Contravention of the rules may result in practicum disqualification.
3. The host site will have personal protective equipment requirements. These could include but not limited to: hard hat, safety glasses, safety toed boots, Fire Retardant outerwear.
4. International students must have a student visa and a work visa to participate in EN277.

Co-Requisites

None

Course Learning Outcomes

Upon successful completion of this course, student will be able to

1. perform work in a plant environment on a regular shift of both dayshift and nightshift.
2. perform simple job functions at the specific plant practicum placement.
3. complete daily logs and basic operation of fired equipment specific to the host plant.

4. explain the process flow of the plant from the raw fuel or material entering the plant to the saleable product leaving the plant.

Resource Materials

Required Text(s):

None

Reference Text(s):

None

Conduct of Course

The 240 hours of controlled practicum is an industry placement by the college in a minimum 4th class Power plant. Under the direction of the shift engineer the student participates in the operation of the power plant. The college provides Workmen's Compensation and Insurance coverage for the duration of the practicum. Practicum agreements are signed by the student, practicum coordinator and the practicum host.

The student is expected to work as would be required of an entry level employee.

The student must show 240 hours of work time. Transportation to the work site is the responsibility of the student.

Evaluation Procedures

This is a pass (P) or fail (F) course.

Assignment: The student must complete an assignment as part of the course. The assignment consists of Process flow drawings of the practicum facility and a daily log of activities the student participated in as part of the practicum.

Documentation:

1. Task check-off list of pertinent task relating to the Lakeland program
2. A detailed timesheet signed by the host Chief Steam Engineer
3. A student work evaluation filled out and signed by the host Chief Steam Engineer
4. An ABSA or TSASK Steam Experience form signed by the host Chief Steam Engineer (AB-66) or (TSK-2021)
5. Students completing practicum in Saskatchewan must also complete ABSA "Out of Province Transfer" form (AB-130)

Grade Equivalents and Course Pass Requirements

This is a pass (P) or fail (F) course. No other grade is assigned.

Attendance

240 hours of practicum time must be completed in the course allotted time period.

Course Units/Topics

Topics vary depending on the work placement

| Raw Water System | |
|--|--|
| Raw water source | Filters and piping |
| Raw water pumps | Backwash system |
| Piping and valves to clarifier | Clarified water pumps |
| Control valves and bypass | Control valves and bypasses |
| Flow control system | Timers |
| Flow recorders | Flow controller to clarifier |
| Clarifier chemicals used | Flow controller to filters |
| Agitator and drive | Flow controller to backwash |
| Treated Water System | |
| Chemicals and tanks | Zeolite regeneration chemicals |
| Valves and bypasses | Control valves |
| Instruments or loops | Automatic timing or sequencing |
| Zeolite system ion exchange | Water quality tests |
| Demineralization system | |
| Deaerator & Heat Recovery | |
| Treated water piping to deaerator | Temperature and pressure control system |
| Blowout heat exchanger | Valves and bypasses |
| Treated water pumps to deaerator | Overflow and the control system |
| Condensate pumps to deaerator | Vent, vent condenser and valve |
| Treated water Valves and bypasses | Treated and cooling water to condenser |
| Deaerator level control | Condensate return system |
| Level control floats and transducers | Chemical treatment to deaerator |
| Temperature recorder | Deaerator water feed pumps |
| Boiler Feedwater System | |
| Feedwater pumps | Control valves and bypasses |
| Feedwater recirculation system | One, two, three element drum level control |
| Feedwater lines to boiler or economizer | Transducers, recorders, controllers for drum level |
| Mass and Continuous Blowdown | |
| Drum and header drain valves | Adjustable CBD valve |
| Piping system to blowdown tank | Heat exchanger |
| Blowdown tank | Valves and bypasses |
| Continuous blowdown Line from steam drum | CBD Line from heat exchanger sewer |

| Combustion Air System | |
|---|--|
| Forced Draft | Induced Draft |
| Air inlet filter | Fan type, single or double inlet |
| Fan type, single or double inlet | Damper type, inlet or outlet |
| Damper type, single or outlet | Type of impeller blades |
| Type of impeller blades | Draft tap at fan, inlet or outlet |
| Ducting to primary and secondary wind-boxes | Horsepower, voltage, amperage |
| Primary and secondary air flow orifices | Drive coupling type |
| Pressure taps from FD fan | Furnace pressure tap |
| Primary or secondary wind-box orifices | Furnace pressure |
| Transducers and pressure lines | Air pre-heater ductwork |
| Drive horsepower, voltage, amperage | |
| Drive coupling type | |
| Boiler Steam and Combustion Control System | |
| Steam Pressure Control | Combustion Control |
| Main steam pressure transducer | Fuel controller |
| Boiler plant master | Primary and secondary air controllers |
| Fuel recorder | Oxygen trim control |
| Primary and secondary air recorder | Primary and secondary Air damper actuators |
| Fuel-air proportional relay | Oxygen recorder |
| Auxiliary Plant Systems & Alarms | |
| Auxiliary Systems Under the Care of the Chief Engineer | Alarm Systems |
| 1. _____ | 1. _____ |
| 2. _____ | 2. _____ |
| 3. _____ | 3. _____ |
| 4. _____ | 4. _____ |



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