

联合国安理会第 2199 号决议文(UNSCR2199)要求所有国家需防止与 ISIL(Islamic State of Iraq and the Levant)或称 ISIS，直接或间接进行任何石油、石油产品、炼油设备及相关材料之交易。

检送美国在台协会 105 年 2 月 5 日提供之伊拉克及沙姆伊斯兰国(ISIL)可能购买用于钻油及炼油设备之产品列表，请各位会员厂商于出口前必须先查核买家、中间商、收货人及最终使用者是否为国际公布之管制实体名单对象，避免违反联合国相关规定。

厂商可利用经济部国际贸易局建置之「企业内部出口管控系统」进行交易对象筛选(<https://icp.trade.gov.tw/ICP/catalog.jsp>)

## COUNTER-ISIL FINANCE GROUP EQUIPMENT LIST

This following list represents the general types of hydrocarbon industry drilling and refinery equipment and spare parts that ISIL may be interested in acquiring. It is for illustrative purposes only and represents neither an exhaustive list nor an official watch list. Recommended priority items are highlighted in yellow.

### Drilling Equipment

Harmonized Tariff Schedule Code (HTS)	Product Description
8207130000	Rock drilling or earth boring tools with working parts of cermets and parts thereof
8207191030	Percussion rock drill bits, core bits and reamers, or base metal, and parts thereof
8207192030	Rotary rock drill bits, core bits and reamers of base metal, and parts thereof
8207195030	Rock drilling or earth boring tools of base metals, nesoi, and part thereof
8413500010	Oil well and oil field pumps, reciprocating positive displacement
8413600050	Oil well and oil field pumps, rotary positive displacement
8413820000	Liquid elevators
8413920000	Parts of liquid elevators
8430498010	Boring or sinking machinery, rotary for oil wells and gas field drilling
8430498020	Boring or sinking machinery for oil wells and gas field drilling, nesoi
8431390050	Parts suitable for use solely or principally with the oil or gas field machinery of headings 8425 and 8430
8431438010	Parts of oil and gas field machinery of subheading 8430.49 except parts of offshore drilling and production platforms
8431438090	Parts of boring or sinking machinery subheading 8430.41 06 8430.49, nesoi
8479899850	Oil and gas field wire line and downhole equipment

8705200000 Mobile drill derricks

8708998175 Parts and accessories for motor vehicles of heading 8705.20, nesoi

7304110000 Line pipe of a kind used for oil or gas pipelines, seamless, of stainless steel

7304191020 Line pipe of a kind used for oil or gas pipelines, seamless, of iron (noncast) or nonalloy steel, with an outside diameter not exceeding 114.3 MM

7304191050 Line pipe for oil or gas pipelines, seamless, iron (noncast) or nonalloy steel, with outside diameter over 114.3 MM but not over 406.4MM

7304191080 Line pipe of a kind used for oil or gas pipelines, seamless, of iron (noncast) or nonalloy steel, with an outside diameter exceeding 406.4 MM

7304195020 Line pipe of a kind used for oil or gas pipelines, seamless, of other alloy steel, not stainless, with an outside diameter not exceeding 114.3 MM

7304195050 Line pipe of a kind used for oil or gas pipelines, seamless, of other alloy steel, not stainless, with an outside diameter > 114.3 MM, but <406.4 MM

7304195080 Line pipe of a kind used for oil or gas pipelines, seamless, of alloy steel, not stainless, with an outside diameter exceeding 406.4 MM

7304220000 Oil well drill pipe of stainless steel

7304233000 Oil well drill pipe of iron or nonalloy steel

7304236000 Oil well drill pipe of alloy steel other than stainless steel

7304241000 Oil well casing of stainless steel

7304246000 Oil well tubing of stainless steel

7304291055 Oil well casing of iron or nonalloy steel

7304293155 Oil well casing of other alloy steel not stainless

7304295000 Oil well tubing of iron or nonalloy steel

7304296100 Oil well tubing of other alloy steel other than stainless steel

7305111000 Line pipe for oil or gas longitudinally submerged arc welded, external diameter more than 406.4 MM, circular cross sections of iron or nonalloy steel

7305115000 Line pipe for oil or gas pipelines, longitudinally submerged arc welded with external diameter over 406.4 MM, of alloy steel, with circular cross section

7305121000 Line pipe for oil or gas other longitudinally welded, external diameter more than 406.4 MM, circular cross sections of iron or nonalloy steel

7305125000 Line pipe for oil or gas pipelines, longitudinally welded with external diameter > 406.4 MM, of alloy steel, with circular cross section

7305191000 Line pipe for oil or gas other than longitudinally welded, external diameter more than 406.4 MM, circular cross sections of iron or nonalloy steel

7305195000 Line pipe for oil or ga pipelines, with external diameter >406.4 MM, of alloy steel, circular cross section, welded/riveted, nesoi

7305203000 Casing oil or gas drilling other than seamless, circular cross section, external diameter over 406.4 MM, iron or nonalloy steel

7305207000 Casing oil or gas drilling other than seamless, circular cross section, external diameter over 406.4 MM, alloy steel

7306110000 Line pipe for oil or gas not seamless nesoi, of stainless steel

7306191000 Line pipe for oil or gas not seamless nesoi, of iron or nonally steel

7306195000 Line pipe for oil or gas not seamless nesoi, of alloy steel other than stainless steel

7311000000 Containers for compressed or liquefied gas of iron or steel

7313000000 Aluminum containers for compressed or liquefied gas

8421398020 Electrostatic precipitators industrial gas cleaning equipment

8421398030 Industrial gas cleaning equipment, nesoi

8421398040 Gas separation equipment

## Refinery Equipment and Chemicals

Crude oil is refined into various products by distilling the crude oil and then separating the fractions or products by temperature ranges. This is accomplished by pumping crude oil into a heater, where the temperature of the crude is raised up to 650 °F. At that temperature, the crude oil is in two physical states – liquid (which is fuel oil) and vapor (which is naphtha (lighter fluid), kerosene, and diesel). The heated liquid and vapor are then routed to the distillation column. When the materials enter the column, the liquid fuel oil falls to the bottom of the tower and is then pumped off by fuel pumps. The vapor rises in the tower and goes through a series of horizontal trays (similar to manhole covers with holes in them). As the vapor rises through the trays, it begins to condense into liquids at various temperature ranges. The lightest vapors exit the top of the column and are then condensed into naphtha, the basic materials generally processed into high octane unleaded gasoline. Naphtha has a low octane number, but can also be used as very low-quality gasoline. The octane of the naphtha can be increased by blending Tetra Ethyl Lead into the naphtha, creating “leaded gasoline.” In the distillation column, the vapors heavier than naphtha, but lighter than fuel oil, are called “distillates.” The lightest distillate is kerosene, which can be further processed into jet fuel. The heavier distillate is diesel. The kerosene and diesel are drawn off the column as separate products. Kerosene can also be blended with the diesel to maximize the amount of diesel produced.

Fuel additives, for both gasoline and diesel, are likely important products for ISIL to improve the quality of fuels produced in pit refineries that are common in Syria. These primitive pit refineries produce poor quality fuels that can damage or destroy engines if not treated with additives to improve their quality. In addition, oilfield chemicals are additives that help prevent operational problems such as the scaling up of wells.

1. Pumps

2. Compressors

3. Valves

4. Thermocouples

5. Pressure gauges

6. Pressure Relief Valves

7. Fuel Additives

8. Oilfield Chemicals

9. Steam Traps

10. Welding Equipment

11. High Pressure Vessels

12 Catalysts for Cat Cracking, Reforming, Hydrocracking, and Hydrotreating

Cat Cracker (FCC) catalyst is replaced a small percentage every day; other catalysts are replaced in bulk at a turnaround

13. Process control computers

14. Control valves

15. Remote sensors

16. Any full or partial refinery units or construction of those units on site;

Reformers

FCCs

Hydrocrackers

Hydro-desulphurizers (Hydrotreaters)

Distillation equipment (crude unit, gas plant equipment, etc)

17. Distillation equipment (either crude distillation or other distillation equipment that might be used to process streams to finished product specification)

18. Computer programs to simulate refinery processes and support for those programs (Refinery linear programs for example or refinery process unit simulation software)

19. Coating Material for wellheads

20. Extinguishing Foam

21. Steel Tubing

22. Heat Exchangers

21. Crude Column (also called a “distillation tower). The crude column is a circular tower of various heights and diameters. The diameter of the tower will determine the volume of crude oil that can be distilled. The height or length of the tower will determine the quality of separation of products that can be obtained. The crude column will have “internals” that are essential for the separation of the products using distillation. The internals will be either trays or “structured packing.” The shorter the tower, the poorer the quality of product separation.



*Crude Column*

22. Diesel Stripper (if required) – is a second, much smaller, column is often adjacent to the larger crude column. This column will receive diesel from the main column and will be operated at a temperature that causes any kerosene in the diesel to vaporize. The liquids pulled from the “diesel stripper” are pure diesel.



*Diesel Stripper*



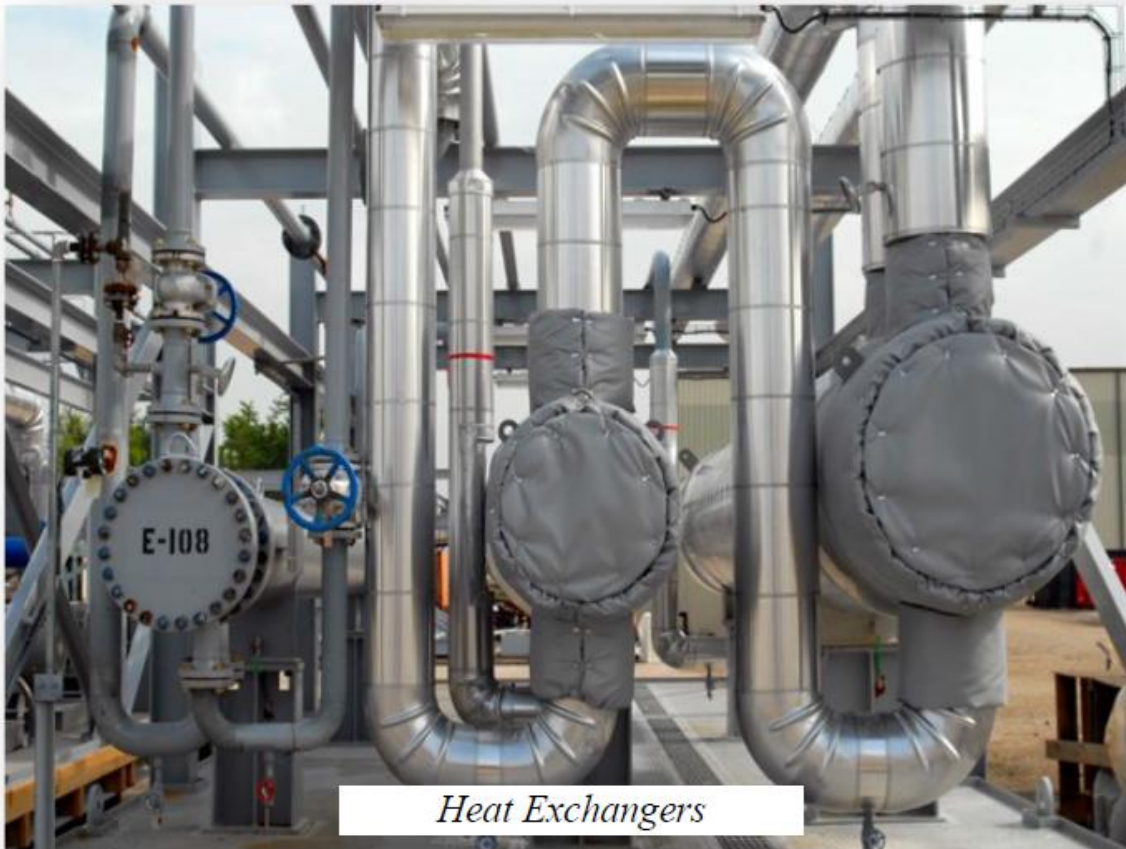
23. Crude Feed Heater can be either horizontal for very small plants (less than 1,500 Barrels Per Day), or vertical, and cylindrical-shaped for larger plants.



24. Accumulator is a vessel that receives condensed naphtha. This vessel will contain both naphtha and any water that was entrained in the crude oil.



25. Crude/Fuel Oil Heat Exchangers are used to transfer heat from hot liquids to cold liquids. The fuel oil exiting the refinery will be approximately 650° F. At the same time, the crude oil that will be sent to the heater is at ambient temperature. A heat exchanger is used to simultaneously cool the fuel oil by transferring much of that temperature to the cooler crude oil. (Transferring that energy also means that the heater will require a little less energy.)



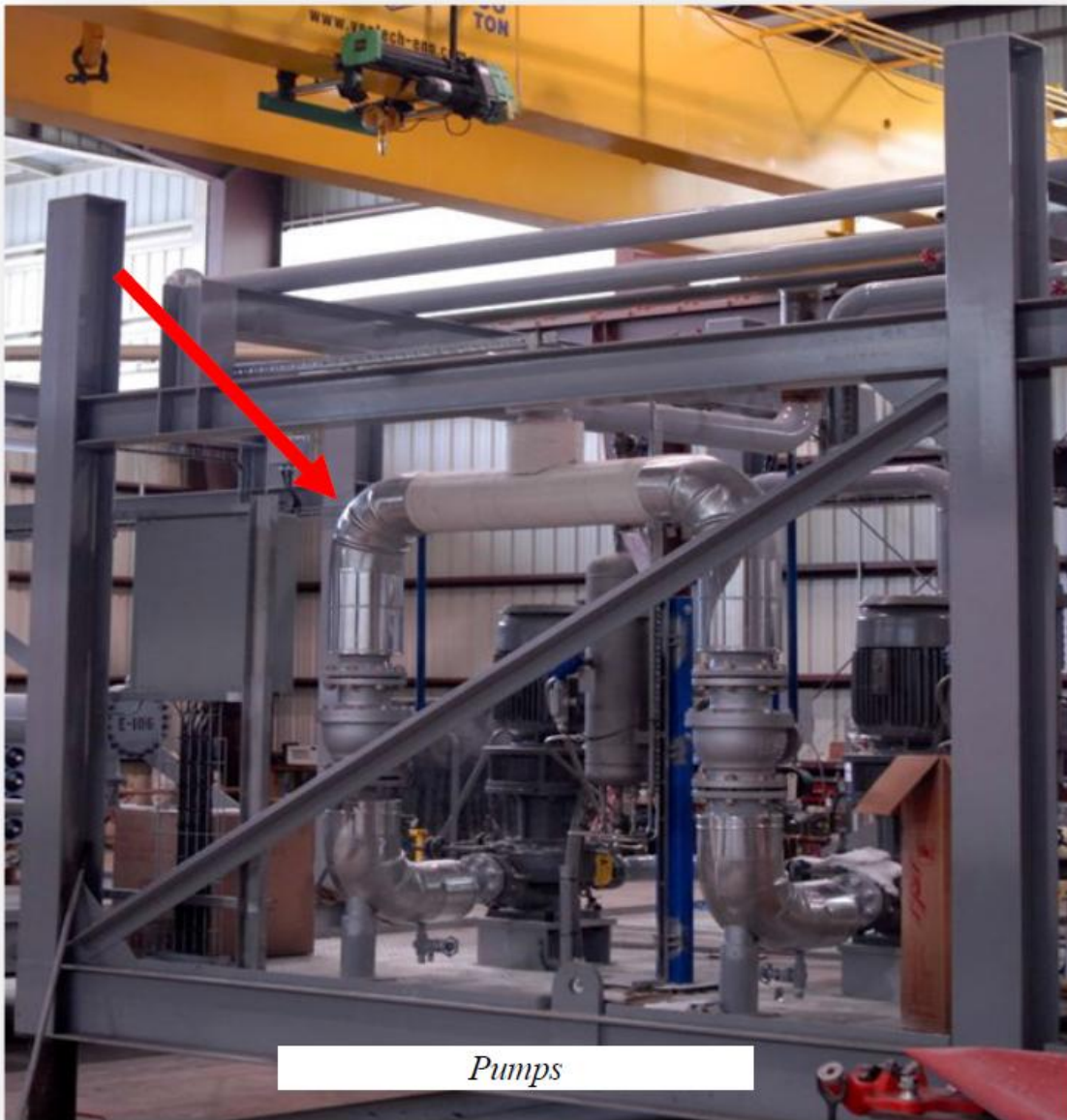
*Heat Exchangers*

26. Naphtha/Fuel Oil Air Cooler. The heated naphtha and fuel oil are pumped through a bank of horizontal tubes. Below those tubes are generally two large fans that blow air up through the tubes to help cool the products.





27. Pumps – The simplest refinery will require a minimum of four pumps (Crude Oil, Naphtha, Diesel, and Fuel Oil). Additional pumps are needed if producing kerosene or if water is entrained in the crude oil. Generally, all pumps are spared, so 8-12 will be installed. Spared pumps allows maintenance to occur without shutting down so that the plant can operate 24 hours a day. Pump services would be for Crude Oil, Water, Naphtha, Kerosene, Diesel, and Fuel Oil.



*Pumps*

## MAJOR EQUIPMENT LIST – Typical Modular Refinery

### 1.1. VESSELS

PHOTO NUMBER	QTY	DESCRIPTION
21	1	<p><b>Crude Fractionating Tower</b>, 11'-0" I.D. x 102'-0" S-S. W/2:1 ellip. heads.            Code: ASME Sec. VIII, Div. I, latest edition            Design Pressure: 75 psi            Design Temp.: 750° F g + 1/4"            Material: SA-516-70 and 316 S.S. C.A.            Trays: 40 Valve type            Manways: 3 - 20" W/davited cover            Nozzles: As required ISO# &amp; 300# ANSI RF            Insulation: 3" w/aluminum jacket caged ladder and platforms.            NOTE:All trays and shells above operating temperature of 500°F will be 316 S.S.</p>
22	1	<p><b>AGO Stripper</b>, 48" O.D. x 16'-0" seam-to-seam and 2:1 ellip. Heads            Code: ASME Sec. VIII, Div. I, latest edition            Design Pressure: 75 psig            Design Temp.: 650° F            Material: 316 S.S.            Trays: 4 - Nutter valve            Nozzles: As required 150# &amp; 300# ANSI RF            Insulation: 2" w/aluminum jacket</p>
22	1	<p><b>Diesel Stripper</b>, 48" O.D. x 15'-0" seam-to-seam, w/ASME Code 2:1 ellip. heads.            Code: ASME Sec. VIII, Div. I, latest edition            Design Pressure: 75 psig            Design Temp.: 650°F            Material: 316 S.S.            Trays: 4 - Nutter valve            Nozzles: As required 150# &amp; 300# ANSI RF            Insulation: 2" w/aluminum jacket</p>
22	1	<p><b>Kerosene Stripper</b>, 48" O.D. x 18' -0" seam-to-seam, w/2:1 ellip. heads.            Code: ASME Sec. VIII, Div. I, latest edition            Design Pressure: 75 psig + 1/8" C.A.            Design Temp.: 650°F            Material: SA-516-70            Trays: 4 - Nutter valve            Nozzles: As required 150# &amp; 300# ANSI RF            Insulation: 2" w/aluminum jacket</p>

PHOTO NUMBER	QTY	DESCRIPTION
22	1	<p><b>Heavy Naphtha Stripper</b>, 48" O.D. x 18' -0" seam-to-seam w/2:1 ellip. Heads  Code: ASME Sec. VIII, Div. I, latest edition  Design Pressure: 75 psig + 1/8" C.A.  Design Temp.: 650°F  Material: SA-516-70  Trays: 4 - Nutter valve  Nozzles: As required I50# &amp; 300# ANSI RF  Insulation: 2" w/aluminum jacket</p>
26	2	<p><b>Air Cooler</b>,  Overhead, carbon steel tubes, fiberglass blades, aluminum fins, fans equipped with adjustable pitch blades, and vibration switch supplied with each motor, (4) 30 hp TEFC electric motors, fan with 3093 sq. ft. of bare surface.</p>
26	2	<p><b>Air Coolers – Overhead Condenser</b>  Surface: 3093 Sq. Ft. Bare  Tubes: C.S. w/Alum. Fins  Fans: 4 – 30 hp TEFC  Fiberglass Blades  Adj. Pitch      Vib. Switches</p>
26	1	<p><b>Air Cooler</b>,  AGO, Diesel and Kerosene, w/carbon steel tubes, fiberglass blades, aluminum fins, fans equipped with adjustable pitch blades, and vibration switch supplied with each motor, (2) 15 hp TEFC electric motors, fan with 85 sq. ft. of bare surface for AGO, 801 sq. ft. of bare surface for Diesel, 412 sq. ft. of bare surface for Kerosene.</p>
26	1	<p><b>Air Cooler – Products Cooler</b>  Surface: AGO – 85 Sq. Ft. Bare  Diesel – 801 Sq. Ft. Bare  Kero – 415 Sq. Ft. Bare  Tubes: C.S. w/Alum. Fins  Fans: 2 – 15 hp TEFC, Adj. Pitch, Vib. Switches</p>
26	2	<p><b>Sample Cooler</b>, 6" I.D. x 1'-8" seam-to-flange, 6" weld cap as lower head, 6"-150# ANSI RFSO flg. w/150# ANSI RF blind top head.</p>

PHOTO NUMBER	QTY	DESCRIPTION
24	1	<b><u>Overhead Accumulator</u></b> , 10'-0" I.D. x 20'-0" S-S w/2:1 ellip. heads and 24" boot. Code: ASME Sec. VIII, Div. I, latest edition Design Pressure: 40 psig + 1/4" C.A. Design Temp.: 400°F Material: SA-516-70 Manway: 1 - 18" w/davited cover Nozzles: As required 150# ANSI RF
23	2	<b><u>Crude Oil Heater</u></b> 48 MM BTU/HR Duty each. Type: Horizontal Direct Fired Flow Arrangement: Single Pass Av. Flux Rate: 10,000 BTU/HR/FT <sup>2</sup> Burners: John Zink FCC-Q-45 Dual Fuel Tube Material: 5% Chrome 1/2% Moly Heater also contains steam superheat portion in the convection section.

## 1.2. SHELL & TUBE HEAT EXCHANGERS

PHOTO NUMBER	QTY	DESCRIPTION
25	2	<b><u>Heat Exchanger Crude/Heavy Naphtha</u></b> Type: BEU Code: ASME Sec. VIII, Div. I, latest edition Size: 21 x 228 Surface Each: 978 sq. ft. Tubes: Matl. - C.S. O.D. In. - 0.750 BWG - 14 Pitch - Square-1"
25	2	<b><u>Heat Exchangers – Crude/ Heavy Naphtha</u></b> Type: BEU Size: 21 x 228 Surface: 978 Sq. Ft. Each Tubes: Mat'l C.S. O.D. In – 0.750                      BWG – 14 Pitch – Square 1” Design Pressure: Shell – 245 psig @ 200° F Tube – 110 psig @ 400° F
25	2	<b><u>Heat Exchanger Crude/Kerosene</u></b> Type: BEU Code: ASME Sec. VIII, Div. I, latest edition Size: 15 x 228 Surface Each: 425 sq. ft. Tubes: Matl. - C.S.



		O.D. In. - 0.750 BWG - 14 Pitch - Square - 1"
25	2	<b><u>Heat Exchanger – Crude/Kerosene</u></b> Type: BEU Size: 15 x 228 Surface: 425 Sq. Ft. Each Tubes: Mat'l C.S. O.D. In – 0.750      BWG – 14 Pitch – Square 1” Design Pressure:    Shell – 245 psig @ 300° F Tube – 75 psig @ 675° F
25	2	<b><u>Heat Exchanger Crude/AGO</u></b> Type: BEU Code: ASME Sec. VIII, Div. I, latest edition Size: 15 x 228 Surface Each: 395 sq. ft. Tubes: Matl. - 5% chrome 1/2 moly. O.D. In. - 0.750 BWG – 14,      Pitch - Square - 1"

PHOTO NUMBER	QTY	DESCRIPTION
25	2	<b><u>Heat Exchanger Crude/AGO</u></b> Type: BEU Size: 15 x 228 Surface: 395 Sq. Ft. Each Tubes: Mat'l 5% Cr, ½% MO O.D. In – 0.750 BWG – 14 Pitch: Square 1” Design Pressure:    Shell – 245 psig @ 350°F Tube – 75 psig @ 675° F
25	2	<b><u>Heat Exchanger Crude/Resid</u></b> Type: BEU Code: ASME Sec. VIII, Div. I, latest edition Size: 29 x 240 Surface Each: 2258 sq. ft. Tubes: Matl. - C.S. O.D. In. - 0.750      BWG - 14 Pitch - Square – 1

25	2	<p><b><u>Heat Exchangers – Crude/Resid</u></b>  Type: BEU  Size: 29 x 240  Surface: 2258 Sq. Ft. Each  Tubes: Mat'l C.S.  O.D. In – 0.750  BWG – 14  Pitch: Square 1”  Design Pressure: Shell – 75 psig @ 500° F  Tube – 245 psig @ 300° F</p>
25	3	<p><b><u>Heat Exchanger Crude/Diesel</u></b>  Type: BEU  Code: ASME Sec. VIII, Div. 1, latest edition  Size: 25 x 228  Surface Each: 1473 sq. ft.  Tubes: Matl. - 5% Chrome 1/2 moly.  O.D. In. - 0.750   Pitch - Square-1"</p>
25	3	<p><b><u>Heat Exchangers – Crude/Diesel</u></b>  Type: BEU  Size: 25 x 228  Surface: 1473 Sq. Ft. Each  Tubes: Mat'l 5% Cr, ½% MO  O.D. In – 0.750            BWG – 14  Pitch: Square 1”  Design Pressure: Shell – 245 psig @ 500°F  Tube – 100 psig @ 600° F</p>

PHOTO NUMBER	QTY	DESCRIPTION
25	2	<p><b><u>Heat Exchanger Crude/Resid</u></b>  Type: BEU  Code: ASME Sec. VIII, Div. 1, latest edition  Size: 27 x 240  Surface Each: 1914 sq. ft.  Tubes: Matl. - 5% Chrome 1/2 Moly  O.D. In. - 0.750  Pitch - Square - 1"</p>
25	2	<p><b><u>Heat Exchangers – Crude/Resid</u></b>  Type: BEU  Size: 27 x 240  Surface: 1914 Sq. Ft. Each  Tubes: Mat'l 5% Cr, ½% MO---237 Tubes Each  O.D. In – 0.750  Pitch: Square 1”  Design Pressure: Shell – 75 psig @ 700° F  Tube – 245 psig @ 700° F</p>

25	2	<p><b><u>Heat Exchanger Water/Salt Water</u></b>  Type: Multi-tube  Code: ASME Sec. VIII, Div. 1, latest edition  Size: 8 x 300  Surface Each: 412 sq. ft.  Tubes: Matl - C.S.</p>
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### 1.3. PUMPS

PHOTO NUMBER	QTY	DESCRIPTION
27	2	<p><b><u>Crude Charge Pump</u></b>  Horizontal 3 x 15A single stage centrifugal pump with mechanical seal, 400 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor. Installed with piping, wiring, and start/stop station complete on crude charge pump skid. One operating, one spare.</p>
27	2	<p><b><u>Residue Pump</u></b>  Vertical inline 1-1/2 x 8W single stage centrifugal pump, with mechanical seal, 30 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor, mechanical seal. Installed with piping, wiring and start/stop station. One operating, one spare.</p>
27	2	<p><b><u>Atmospheric Gas-Oil Pump</u></b>  Vertical inline 1 x 8WL single stage centrifugal pump with integral seal flush, 20 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor, mechanical seal. Installed with piping, wiring and start/stop station. One operating, one spare.</p>
PHOTO NUMBER	QTY	DESCRIPTION
27	2	<p><b><u>Diesel Pump</u></b>  Vertical inline 2 x 8WL single stage centrifugal pump with mechanical seal 40 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor, mechanical seal. Installed with piping, wiring and start/stop station. One operating, one spare.</p>
27	2	<p><b><u>Kerosene Pump</u></b>  Vertical inline 1-1/2 x 7WL single stage centrifugal pump, 15 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor, mechanical seal. Installed with piping, wiring, and start/ stop station. One operating, one spare.</p>

27	2	<b><u>Heavy Naphtha Pump</u></b> Vertical inline 1-1/2 x 8WL single stage centrifugal pump, 30 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor, mechanical seal. Installed with piping, wiring, and start/stop station. One operating, one spare.
27	2	<b><u>Reflux Pump</u></b> Vertical inline 3x8W single stage centrifugal pump, 60 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor, mechanical seal. Installed with piping, wiring, and start/stop station. One operating, one spare.
27	2	<b><u>Desalter Water Pump</u></b> P2BBF single stage centrifugal pump, 20 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor, installed with piping, wiring and start/stop station. One operating, one spare.
27	2	<b><u>Caustic Transfer Pump</u></b> Vertical inline 2 x 1-1/2 x 6 VOC single stage centrifugal pump, mechanical seal, 1.5 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor. Installed with piping, wiring and start/stop station. One operating, one spare.
27	2	<b><u>Caustic Charge Pump</u></b> Metering pump with ball checks in suction and discharge. Stroke adjustment by micrometer screw while pump is running. Wetted parts are 316 S.S.
27	2	<b><u>Caustic Circulation Pump</u></b> Vertical inline 2 x 1 1/2x6 VOC centrifugal pump, mechanical seal, 2 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor. Installed with piping, wiring and start/stop station. One operating, one spare.
27	2	<b><u>Softened Water Pump</u></b> Vertical inline 2 x 1-1/2x6 VOC centrifugal pump, mechanical seal, 1.5 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor. Installed with piping, wiring and start/stop station. One operating, one spare.

PHOTO NUMBER	QTY	DESCRIPTION
27	2	<b><u>Boiler Feedwater Pump</u></b> Centrifugal pump, mechanical seal, 5 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor for primary dryer. Installed with piping, wiring and start/stop station. One operating, one spare.
27	2	<b><u>Desalter Water Booster Pumps</u></b> Vertical inline 1 x 7W centrifugal pump, 7-1/2 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor, installed with piping, wiring and start/stop station. One operating, one spare.
27	2	<b><u>Fuel Oil Pump</u></b> Centrifugal pump, mechanical seal, 5 hp TEFC, 460 volt, 3

		phase, 60 cycle electric motor. Installed with piping, wiring and start/stop station. One operating, one spare.
27	3	<b><u>Chemical Injection Pump</u></b> Metering pump with ball checks in suction and discharge, stroke adjustment by micrometer screw while pump is running. Valve housing and reagent head 316 S.S., valve and seat material 316 S.S.
27	2	<b><u>Caustic Circ. Pump</u></b> Vertical inline 2 x 1-1/2x6 VOC, mechanical seal, 2 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor. Installed with piping, wiring, and start/stop station. One operating, one spare.
27	1	<b><u>Condensate Pump</u></b> Vertical inline 2x1-1/2x6 VOC, mechanical seal, 3 hp TEFC, 460 volt, 3 phase, 60 cycle, electric motor. Installed w/ piping, wiring & start/stop station
27	1	<b><u>Caustic Pump</u></b> 3x1-1/2x8 VOC vertical inline mechanical seal, 10 hp TEFC, 460 volt, 3 phase, 60 cycle, electric motor. Installed with piping, wiring, and start/stop station. One operating, one spare.
27	2	<b><u>Prewash Pumps</u></b> Vertical inline 2x1-1/2x6 VOC, mechanical seal, 1-1/2 hp, TEFC, 460 volt, 3 phase, 60 cycle electric motor. Installed with piping, wiring and start/stop station. One operating. one spare.
27	1	<b><u>Sump Pump</u></b> Vertical 1-1/2x1x6 ESP, mechanical seal, 3 hp TEFC, 460 volt, 3 phase, 60 cycle electric motor. Installed with piping, wiring and start/stop station.
27	1	<b><u>Sump Pump</u></b> Vertical 1-1/2x1x6 ESP, mechanical seal, 1-1/2 hp TEFC, 460 volt, 3 phase, 60 cycle, electric motor. Installed with piping, wiring and start/stop station.
27	1	<b><u>Sump Pump</u></b> Vertical 6x4x10 ESP, mechanical seal, 15 hp TEFC, 460 volt, 3 phase, 60 cycle, electric motor. Installed with piping, wiring and start/stop station.

#### 1.4. ATTENDENT PROCESS EQUIPMENT

QTY	DESCRIPTION
2	Desalters
1	Caustic Settler Vessel
1	Water Wash Treater
1	Monarch Oil/Water Separator
1	Reactor Mixer Vessel
1	Clay Filter
1	Desalter Water Storage
1	Fuel Oil Storage Tank

1	Catalyst Mixing Tank
1	Fuel Gas Caustic Scrubber
lot	Pipe racks and piping

## 1.5 MISCELLANEOUS VESSELS

<b>QTY</b>	<b>DESCRIPTION</b>
2	<b><u>Instrument Air Compressor</u></b> Ingersoll-Rand Model 75T-2 compressor complete with 10 hp TEFC 480 volt, 60 cycle, 3 phase electric motor, belt guard, after-cooler, constant speed control, V-belt drive. Each unit mounted on steel base complete with piping, wiring, and start/ stop station. One operating, one spare.
1	<b><u>Instrument Air Receiver</u></b> Code: ASME Section VIII, latest edition.
1	<b><u>Deaerator</u></b> Horizontal drum with stripping trays in the stack.
1	<b><u>Instrument Air Dryer,</u></b> Heatless dryer for instrument air.
2	<b><u>Steam Boiler</u></b> Scotch Marine Firetube 300 hp 10,000 #/hr steam @ 140 psig ASME Code F.I.A Controls
1	<b><u>Desalter Water Storage</u></b> Vertical carbon steel tank, 10'-0" seam-to-seam, 72" O.D.
1	<b><u>Softened Water Storage</u></b> Vertical tank bolted and galvanized. 22,400 gallon capacity for 24 hour supply.
2	<b><u>Caustic Tank</u></b> Vertical carbon steel tank.
2	<b><u>Water Softener</u></b> Vertical vessels, one operating, one regenerating and standing by.
1	<b><u>Kerosene Dryer</u></b> Vertical carbon steel vessel with salt charge.
1	<b><u>Diesel Dryer</u></b> Vertical carbon steel vessel with salt charge.