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ENERGY EFFICIENCY POTENTIAL DETERMINATION FOR THE OIL TREATMENT UNIT

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Many oil producers are making great efforts to improve the energy efficiency of their systems and reduce greenhouse gas emissions. Oil treatment units are increasing in size and becoming more complex, so there is increasing interest in reducing operating costs, which can be reduced by using the pinch analysis method [1]. In this work, pinch analysis methods are used to reduce specific energy consumption at an oil production and treatment unit [2].

The purpose of this work is to determine of the energy efficiency potential for the oil treatment unit.

During the study of the installation, all technological parameters were determined, data extraction was carried out, material and heat balances were calculated, a process flowsheet was compiled in Aspen Hysys software, and an energy flow diagram was compiled, which later made it possible to construct composite curves in Pinch 2.02 software [3].

Using input data extraction, a traditional diagram for the current heat exchange network in the unit was compiled (Figure 1).

Data extraction and the heat exchange system made it possible to synthesize a flow table with the help of which a grid diagram of the existing heat exchange system was constructed (Figure 2).

Extraction of technological data from the existing heat exchange network made it possible to synthesize a stream data table with the help of which a grid diagram was constructed for the existing heat exchange network (Figure 2).

Using a grid diagram, the heat energy recuperation capacity was determined for the current heat

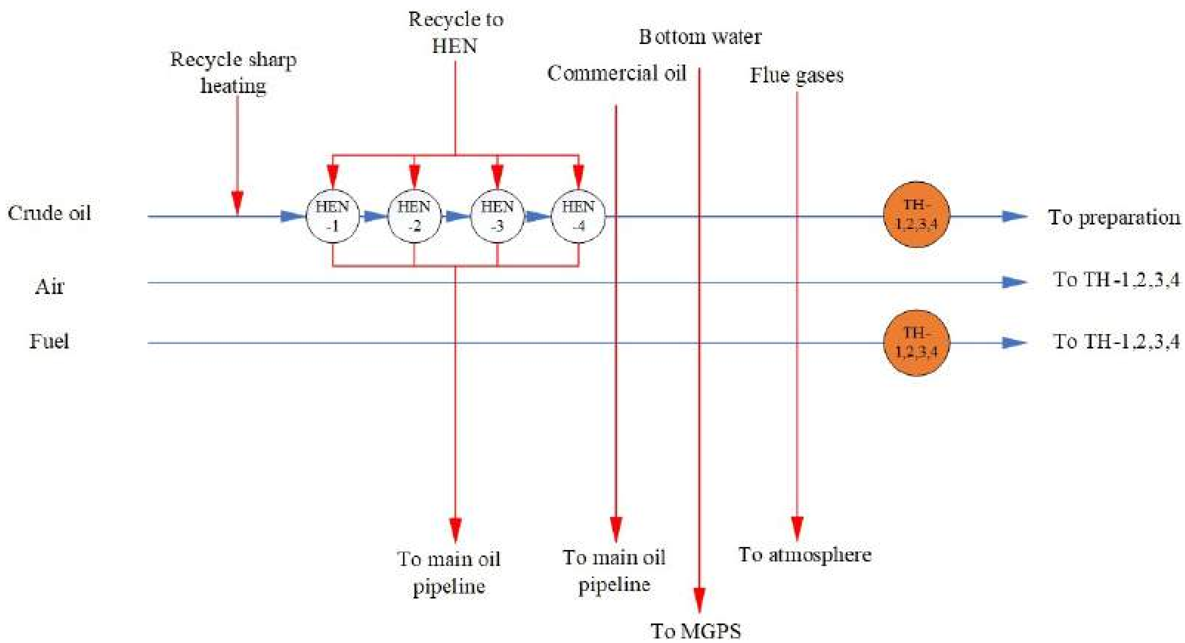

Fig. 1. *Heat exchange network: HEN – heat exchanger; TH – travel heater; MSPS – modular group pumping station*

№	*CP*, kW/°C	Δ*H*, kW
1	156,3	-4108,8
2	11,9	-358,6
3	8,9	-233,4
4	268	-6531,7
5	1,65	-291,1
6	336,7	11346,1
7	1,56	108,9
8	3,3	232,8

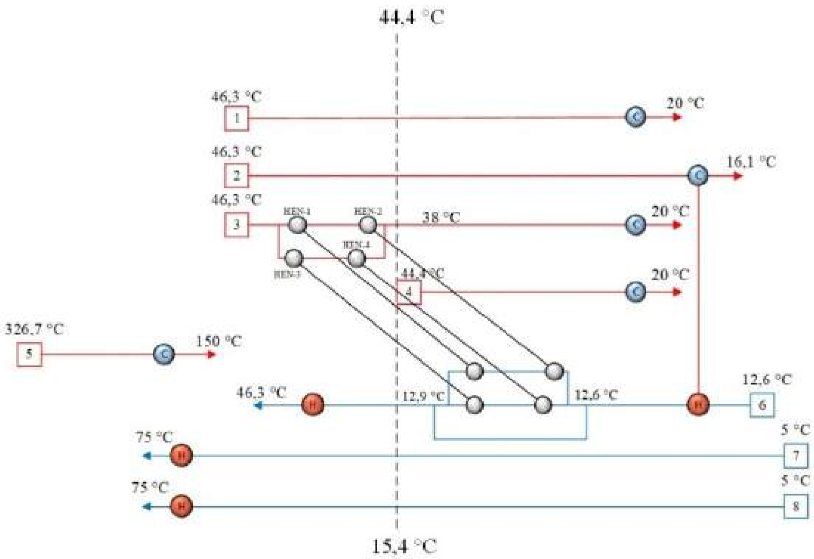

Fig. 2. *Grid diagram for the current heat exchange network*

exchange network, calculations were performed using the expression:

$$Q_{Hres} = \sum_{i=1}^{I} \sum_{k}^{K_i} C_{Pik}[T_{Tik} - T_{Si(k-1)}]$$

where C_{Pik} – heat capacity flow rate for *k*-th interval and *i*-th hot ctream; *I* is the number of hot process streams; K_i is the number of temperature intervals on the *i*-th hot process stream with different values of flow heat capacities, taking into account phase transitions; T_{Tik} is the final temperature of the *k*-th temperature range on the *i*-th hot flow; $T_{Si(k-1)}$ is the initial temperature of the *k*-th interval on the *i*-that hot stream.

The current heat recovery capacity at the plant was 17.1 kW.

When determining the potential for increasing the energy efficiency of the unit, it was calculated that it was possible to increase the recovery capacity to 10 MW, which in turn would reduce the load on hot utilities and the entire unit as a whole, thereby reducing operating costs.

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INCREASING THE EFFICIENCY OF THE ALKYLBENZOSULFONIC ACIDS SYNTHESIS IN REACTORS OF LIQUID-PHASE PROCESSES

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A special place among industrial processes of chemical technology is occupied by processes occurring in the liquid phase. Reactors for liquid-phase processes have a number of advantages: ease separation of products; possibility of using internal and external heat exchangers; possibility of using mechanical means for successful homogenization of mixtures.

A typical example of a technology that combines catalytic and non-catalytic liquid-phase reac-