International Journal of Engineering Research and Development
e-ISSN: 2278-067X, **p**-ISSN : 2278-800X, www.ijerd.com
Volume 4, Issue 12 (November 2012), PP. 48-50

Oil Extraction Factory Crude Oil Heating System Design

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Abstract:-The design of general process is divided into : according to the original material and the data were based on the calculated; calculate the joint station dewatering tank and the sewage tank capacity; then its thermodynamic calculation, hydraulic calculation, selection of pump in heating furnace and to determine the types and quantity of the last of the pipelines; the permitted maximum, minimum throughput and stop lose time to carry out a series of process calculation, also made the hot oil pipeline thermal stress compensation calculation.

Keywords:-calculate; hydraulic; pipeline;minimum throughput

I. INTRODUCTION

Union station is a kind of transfer station, because of its functions, it universal existence in the oil field. The station comprises a dehydrating station, oil transferring station system, system that crude oil stabilization, sewage system, system that injection water , system that processing natural gas. It is Abbreviation of the joint operation station that centralized processing the oil and gas joint operation. Including concentration treatmenting oil and gas.(dehydration of crude oil, natural gas purification, stabilization of crude oil, light hydrocarbon recovery and so on) injection water into the oil field, treatment the sewage、power supply and auxiliary production facilities. Union station was generally built in the transmission system pressure within an allowed range, in order not to affect the layout and adjustment of the development well pattern infill drilling and the oil field in the latter part, should be built on the edge of oil field structure. The station will use crude oil, natural gas and other associated product, which came from the wellhead, for concentration transport and the necessary processing, with primary processing, the qualified crude oil was sent to the long distance pipeline the first station to output, or was sent to the field oil depot by other modes of transport to the refinery or terminal, qualified natural gas was concentrated to gas pipeline station. Union station generally includes the following production function: oil water separation, crude oil dehydration, stabilization of crude oil, natural gas dehydration, light oil recovery, crude oil storage and transport to the field terminal, sewage treatment, sewage treatment reinjection formation, receiving measurement lose to oil and gas mixture, power transformation and distribution, heating and fire, etc. Union Station (Library) is the central of gathering and processing crude oil. Union Station (Library) built oil, dehydrated, and sewage treatment, water injection, assay, substation, boiler and other production equipment, the main role is by means of processing the crude oil, to reach three off (original dewatering, desalination, natural gas dehydration, desulfurization; oil removal; sewage deoiling) three recovery (recovery dirty oil, sewage, lighter hydrocarbon),the four kinds of qualified products (natural gas, cleaning oil, purify sewage, lighter hydrocarbon) and the output of crude oil. The temperature and pressure is high, as well as the station is a flammable and explosive place where is nine hazards of oil field.

II. DESIGN SCHEME

A. Conclusion of the test

The first should according to the test to determine the types of mixed demulsifiers, dosage, best temperature of dehydration , The best time of the first dehydration tank to set dehydration. The best time of the second dehydration tank to set dehydration.To meet the above conditions, dehydrated crude oil content water should less than 1.2%. The oil of Sewage should be 35.3mg/L, and the suspended matter should be 450mg/L.

B. The plan of dewatering

By using two period of heating and two stage of dehydration, the crude oil through a dehydration furnace, after adding demulsifier, into a sedimentation tank for settling and dehydration. After the settlement, oil through the take off pump into two segments dehydration furnace, after mixing demulsifier, into the second period of sedimentation tank for settlement (and good tank), crude oil could be output when it was passed.

III. THE DISCUSS OF SCHEME

A. The description of heating system

The heating system is the key equipment of heating pipelines, is also the main energy-consuming object.The request of oil pipeline heating furnace is high thermal efficiency, small flow resistance, and can adapt to the pipeline throughput changes, can be long-term safe operation. According to that if the oil go through the furnace tube,the heating system of long pipeline can be divided into two group：direct and indirect. The former in the furnace is heating the oil directly, the latter is to make heat medium through the furnace and elevated its temperature, then go into the heat exchanger to heat the crude oil.The furnace that heating Directly, the equipment is simple, investment province, application is very common. But oil in the furnace tube heat directly, once stop or drift, it's easy for furnace tube make crude coking, and even burning through furnace tube and cause serious accidents.

The indirect heating system is comprised of heat medium heater, heat exchanger, heat medium tank, heat medium pump, and detection and control instruments. Indirect heating system has the following advantages: The piped oil does not flow through the furnace tube, it will not be coking of drift and other reasons; heat medium has non-corrosiveness to metals, the pressure of vapor is low. The furnace could be in motion under low pressure. Therefore, the furnace has a long life; suitable for heating a variety of oil, able to adapt to substantial changes in the flow; the heat medium heater has a high overall thermal efficiency. Crude has small pressure to drop through the heat exchanger; its main drawback is it has a complex system, large area, high cost and large power consumption.

Due to union station's oil content ed relatively large water, and the energy consumption is also large. Because of indirect heating furnace has higher cost, and covers a large area, The United stations not suitable, Should use direct heating furnace.

B. The description of Oil extraction factory Layout

Various of equipment in the Joint stations Joint stations , oil and gas emission quantity of buildings, how dangerous the if the fire happen, has the very big difference in the process of production operations, it is necessary to press the production operation, fire risk degree, business management features of partition arrangement, the special regional isolation, limiting the miscellaneous personnel access, is beneficial to safety management. The interval should be path connected, convenient the installation and fire protection work.

（1）crude oil tank area

When the accident occurred, crude oil tank farm can store crude oil. This site consists of seven seat vault tank, tank farm with closed fire dike around , fire dike of the effective volume should be not less than one of the largest in the tank capacity of the half. The rain outlet should be located in the inside of the dam, the rain on the discharge line should be equipped with long closed butterfly valve or valve.

（2）Sewage treatment area

Sewage treatment in union station occupies a very important position. Because the sewage contains a large amount of crude oil and other material after crude oil dehydration, if any sewage discharge will serious pollution of the environment, atmospheric pollution, destruction of the ecological balance, bring serious harm to people's production and life . The sewage that contains oil should be treatment and recycle, become harmful for advantage, improve the utilization rate of water, protect the underground resources, because sewage containl oil in 0.2% ~ 0.8%, to save for crude oil, must recovery it. Oily sewage treatment have to avoid the sewage pollution, ensure that production in safe.

Sewage treatment standard: for the effluent of the oily sewage, you must ensure that oil is not more than 10: for the return of the oily sewage must ensure oil is not more than 30.

（3）Administrative district

Administrative district set a production of comprehensive office building, equipped with control center, office, conference room, room, switchboard room,the station also has a flower bed, green belts, etc greening places， require that green area for yard covers an area of 10% of the total area.

C. Technological process

Adopted from the pump to pump airtight transportation mode, saving energy consumption, realize the comprehensive automation management, in every station: first furnace after pump technology, improve the production efficiency, safety coefficient also improved.Head, and stood at the end of the process is expanding for the following several aspects: Head (joint stand outside lost), standing internal circulation, Flow backward measurement, the serve, high and low voltage protection; At the end of the station: receiving into the tank, measurement,recover the ball, sewage flow.

IV. THE DATE OF THE DESIGN THAT OIL EXTRACTION STATION NEEDS

This paper applies linear system resilient control thought to three-dimensional chaotic system synchronization, the designed controller has certain tolerance for the uncertainty of the controller itself. When the upper bound of the uncertainty is known, the paper gives a design proposal of feedback gain, and does correlative research for this three-dimensional chaotic system. When the upper bound of the uncertainty is unknown, it will be a follow-up research problem.

V. CONCLUSION

The joint station design requirements make a comprehensive consideration for various factors . Based on the basic theory of joint station and basic principle understanding, main design two parts.

（1）Description parts:

this part mainly introduces the engineering general situation,The scheme of design comparison, joint station layout, pipe material selection, layout, auxiliary production equipment, operation and management, etc.

（2）The computation part:

this part mainly on the tank capacity, pipe diameter, hydraulic calculation, and thermodynamic calculation.

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