

Smooth virtualization project increases bp refinery safety



Reliable and safe process control is one of the success factors for companies in the petrochemical industry. For decades, that control was monitored and coordinated from control rooms, which were located close to the process. Safer for personnel and plants is to have the control rooms at a greater distance. Virtualization made control room relocation much easier. Yokogawa offers an off-the-shelf virtualization solution, which was used by bp to relocate one of their control rooms.

Yokogawa Virtualization Platform for Control Room Oil Movements

The relocation of control rooms in the (petro)chemical industry has taken place on a large scale in recent years. The reason for this is the explosion that took place at bp Texas City in 2005. The control room and certainly also the contractor housing were located on the plant premises, close to the production process. The incident caused not only bp but soon the entire industry worldwide to focus on moving control rooms - away from the process environment. Relocation was also initiated at the bp refinery in Rotterdam.

From three decentralized to one central control room

The bp refinery in Rotterdam is one of the largest refineries in Western Europe, processing 400,000 barrels of oil daily (19 million tons annually). Decarbonization plays an increasingly important role in this. For example, bp is currently working with HyCC on a 250MW green hydrogen project, to make the refinery bp and other industries in the port area more sustainable.

The fully continuous company produces a wide range of end products and semi-finished products from oil. These are produced, processed, stored and shipped by the Operations Department. For this purpose, the department is divided into the Crude Distillation Unit, the Fluid Catalytic Cracking Unit and Oil Movements. The latter is responsible for, among other things, the tank farm, wastewater treatment, jetties, and various pipelines. Until 2019, the three departments had their own control room

from which the various processes were managed and monitored. However, the Texas City incident changed that. The various control rooms are now housed in one modern central control room from which all plants and processes are controlled and monitored. For Oil Movements, the beating heart of this virtualization consists of multiple Hyper-V servers, on which the previously physical systems are now run virtualized.

Continuous operation requires special approach

Normally, turnarounds are an ideal time for such a large-scale relocation of equipment and workplaces. But because of the critical function that the Oil Movements department fulfils for all the other assets, a turnaround never takes place here. "In order to be able to make the virtualization move anyway, we called in Yokogawa," says Jeroen Wessels, process control engineer at bp. "Within Oil Movements we use the integrated production control system CENTUM VP. For this, Yokogawa offers a virtualization platform, which we deployed for this project." Through the Hyper-V virtualization environment, it is possible, to update and adapt hardware and software separately as needed. "In this way we were able to move the control room during operation. At the old location, CENTUM VP's Human Interface Stations (HIS) were transferred to the Hyper-V servers. A total of eight operator and engineer stations were thus transferred and shut down. Because of the virtualization, it was possible to move the physical Hyper-V servers to the new control room, while the virtualized operator workstations only had to undergo a short-term switch to another server. Yokogawa performed calculations in advance to determine how much server capacity was needed to make this switch reliable, secure and smooth."



First virtualization project in Europe

For Yokogawa, the virtualization project at bp in 2019 was the first project, which until then had been implemented in Europe. As with all new products deployed within the company, bp first thoroughly tested Yokogawa's virtualization solution before giving the green light for its application. When we ask Jeroen Wessels about his



experiences, he answers enthusiastically: "In addition to the guidance from Yokogawa Europe, we also received a lot of support from Yokogawa headquarters in Japan, which made the project run very smoothly." The transition to a new control room is always exciting. Shortly before the virtualization project, we had switched to a new version of CENTUM VP. After a trial run period, we were then able to make the transition to the Hyper-V server environment."

Improving safety and reducing space

In addition to improved security for control room employees, the virtualization project also translates into other concrete benefits. "For starters - and you notice this already the moment the Hyper-V servers make their appearance - virtualization provides a huge space gain.



Hardware requires 66% less space; space that is quite expensive in our

industry. In addition, the virtualization solution provides for an automatic take-over. If one Hyper-V fails, its functions will be taken over by one of the other servers within minutes. In practice, that means: less downtime."

Three assets are now controlled and regulated from the new modern central control room (NCCR). Anyone entering the control room suddenly realizes what kind of operation was required for this. The size of the room is large and divided into three sections. Television screens show live for each section exactly what is happening in the field. "The central control room has greatly improved communication between the employees of the 3 departments," says Jeroen Wessels. "And that is important, because a problem in the Crude Distillation Unit, for example, also has consequences for Oil Movements or vice versa. You notice in all aspects that a single large team has been created. And from a safety point of view, that's another important step forward."

Asked about his experiences with Yokogawa during the project, Jeroen Wessels explains: "I joined bp in 2011 because I saw that the company was actively investing in the safety of employees and the quality of work. I notice the same commitment at Yokogawa. I have been working with them since 2002. In that time, I have come to know the company as a true partner. The hardware is extremely robust and during this project we were optimally supported with the knowledge and skills of Yokogawa. Everything shows their great commitment and quality."

More information

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