CASE STUDY: MINING – IRON ORE

BHP HYDROCYCLONE SYSTEMS: SIDE BY SIDE

BHP's Wheelarra and Orebody 18 mine sites are in close proximity to one another, about 40km east of Newman. Hydrocyclone based oily water systems were installed at both sites to treat water from the heavy- and light-vehicle wash bays and workshops. The Orebody 18 site installed an Ultraspin system (in 2005), and the Wheelarra mine installed a different hydrocyclone technology around the same time. Both sites need to meet a strict environmental standard of 5mg/L Total Petroleum Hydrocarbons (TPH). While the Ultraspin system at Orebody 18 consistently achieves results averaging 1.5mg/L TPH, the Wheelarra system was averaging 55mg/L TPH which is not in compliance the license conditions, and was exposing BHP to significant risk.

With limited experience in the design of hydrocyclones for industrial use (leading to numerous design failures at multiple sites), the company that supplied the Wheelarra system decided to discontinue support for their hydrocyclone systems, leaving BHP exposed. With the Orebody 18 system running smoothly and effectively, BHP engaged Ultraspin to conduct a study on the issues affecting the performance of the Wheelarra system, and make recommendations to address these shortcomings.

BHP OREBODY 18 MINE SITE

APPLICATION:
HV and LV wash, workshop

DISCHARGE REQ'D:
5mg/L TPH

OILY WATER SEPARATOR:
Ultraspin ES110 hydrocyclone

WATER QUALITY ACHIEVED:
Average 1.5mg/L TPH

OPERATIONAL RESULTS:
Still operational and in compliance

SERVICE AND SUPPORT:
Spare parts as required, scheduled services as required, 24 hr customer support, annual courtesy visit

BHP WHEELARRA MINE SITE

APPLICATION:
HV and LV wash, LV and HV refuelling, workshop

DISCHARGE REQ'D:
5mg/L TPH

OILY WATER SEPARATOR:
Ludowici hydrocyclone

WATER QUALITY ACHIEVED:
Average 55mg/L TPH

OPERATIONAL RESULTS:
Was not in compliance

SERVICE AND SUPPORT:
Vendor no longer supports this equipment or the customer

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CASE STUDY: BHP HYDROCYCLONES

NOT ALL HYDROCYCLONE SYSTEMS ARE THE SAME

Some customers who do not fully understand oily water believe that all hydrocyclone systems are similar in operation and performance. A recent study conducted for BHP showed that there are in fact significant differences between different hydrocyclone systems. Buyers need to pay careful attention to those differences in order to avoid costly upgrades and repair bills.

CASE STUDY: BHP

BHP purchased two different hydrocyclone systems for neighbouring mine sites to treat similar applications. One system was working well; the other wasn't. BHP's Wheelarra and Orebody 18 mine sites are in close proximity to one another, about 40km east of Newman. The Orebody 18 site installed an Ultraspin hydrocyclone system (in 2005) and a different hydrocyclone system was installed at Wheelarra.

Both sites need to meet a strict environmental standard of 5mg/L Total Petroleum Hydrocarbons (TPH). The Ultraspin system at Orebody 18 consistently achieves results averaging 1.5mg/L, but the Wheelarra system was averaging 55mg/L. This is not in compliance with the license conditions, and was exposing BHP to significant risk.

Naturally, BHP contacted the vendor of the Wheelarra system initially. They attended site to investigate the situation, but the vendor could not rectify the problems. Following this, the company withdrew all support for their hydrocyclone systems, leaving BHP exposed with a non-compliant oily water separator.

BHP asked Ultraspin to conduct a paid study into Wheelarra oily water system, and make recommendations to address the faults. Unfortunately, the other vendor's limited experience in designing hydrocyclones for industrial applications lead to multiple fundamental design flaws. Ultraspin had to recommend wholesale changes to the design of the system and surrounding infrastructure.

	ultraspin	ALTERNATE HYDROCYCLONE
APPLICATION	HV and LV wash, workshop	HV and LV wash, HV and LV refuelling, workshop
DISCHARGE REQUIRED	5 mg/L TPH	5 mg/L TPH
WATER QUALITY ACHIEVED	Average 1.5 mg/L TPH	Average 55 mg/L TPH
COMPLIANCE	In full compliance. Still operational	Not in compliance
SERVICE AND SUPPORT	Spare parts as required, schedule services as required, 24 hour customer support, annual courtesy visit	Vendor no longer supports this equipment or the customer

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CASE STUDY: BHP HYDROCYCLONES

The design of any oily water separator must take into account the process, mechanical and practical requirements of the industry and the specific customer.

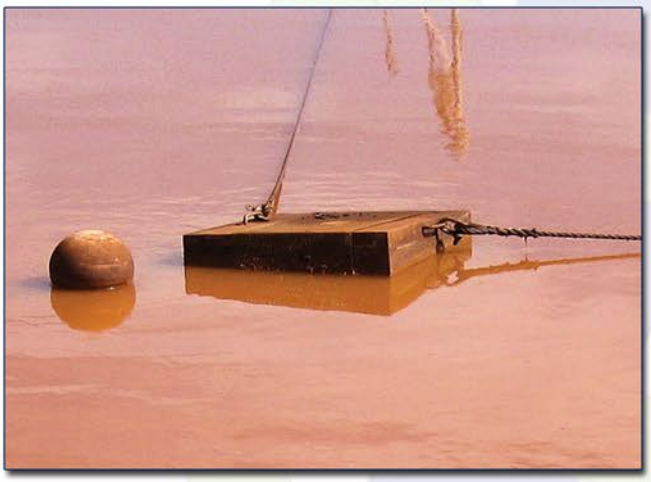
The audit conducted for BHP identified a large number of fundamental design flaws with the hydrocyclone at Wheelarra. Below are some photographs comparing two of the critical process elements (skimmer and strainer) from the high performance Ultraspin hydrocyclone system, and the non-compliant system at Wheelarra.

SKIMMER

The oily water skimmer chosen by the alternate vendor was ineffective at removing oil and prone to blockage by debris. BHP personnel confirm that the alternate skimmer needed to be removed every two weeks to remove debris and clear blockages.

ULTRASPIN HYDROCYCLONE

ALTERNATE HYDROCYCLONE



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CASE STUDY: BHP HYDROCYCLONES

STRAINER

The alternate water strainer was too small and BHP site personnel were forced to clean the alternate basket strainer every two weeks in order for the system to keep operating. In addition, the basket design was poor and cleaning was a very difficult task.

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ALTERNATE HYDROCYCLONE

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