



Industry – Mining

| | |
|--------------|----------------------|
| Location | Kathu, South Africa |
| Client | Confidential |
| Year | 2021 |
| Application | Oil-Water Treatment |
| Contaminants | SS, Fe, Oil Grease |
| Solution | Hydraspin & Hydramix |



Synopsis

African Horizon Technologies conducted a site visit on Wednesday 11th August 2021. On site testing was conducted using the Hydraspin oil-water separator, samples were taken of the inlet, oil outlet and water outlet. The water outlet was further treated using a bench scale version of the Hydramix CWT (Complex Water Treatment) system. The clients’ objective is to re-use the treated water in the wash bay. Our initial assessment of the water was that the Hydraspin removed most of the oil and that further treatment with the Hydramix system will ensure that the water either meets discharge regulations or will be suitable for re-use in the washbay.

Experimental Work

The experimental work was carried out on site with the Hydraspin oil water separator system and thereafter a bench scale test was done with the Hydramix CWT system. The water outlet of the Hydraspin system was used and further treated by the Hydramix bench scale unit.

Results

Visual results are shown in figure 1 below. From left, the first beaker shows the inlet water to the Hydraspin oil water separator, a clear layer of oil is seen on top of the water. The second beaker is the concentrated oil outlet of the Hydraspin oil water separator system, in this beaker a high amount of oil is seen on top of the water. The third beaker shows the Hydraspin oil water separator’s water outlet, here there is no visible oil on top, this water was taken as the inlet to the Hydramix CWT system. The final beaker shows the final treated water after the Hydramix CWT system, no oil can be seen, similarly no suspended solids can be seen.



Figure 1: Visual comparison of the water

The table 1 below shows the lab results of four samples which are:

Inlet 1 HS: Hydraspin oil-water separator inlet.

Oil Outlet 1: Hydraspin oil reject.

Water Outlet: Hydraspin water reject (This water will be used as the inlet to Hydramix system).

Hydramix Outlet: Treated water outlet from Hydramix CWT system.



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Table1: Lab results for the iron mine.



|  | | WATERLAB (Pty) Ltd <small>Reg. No.: 198300918507 V.A.T. No.: 4130107891</small> | |  | | |
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| CERTIFICATE OF ANALYSES GENERAL WATER QUALITY PARAMETERS | | | | | | |
| Date received: 2021-08-13 | | Report number: 102788 | | Date completed: 2021-08-26 | | |
| Project number: 1000 | | | | Order number: | | |
| Client name: African Horizon Technologies | | | Contact person: Mr. J. Steyn | | | |
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| Analyses in mg/l (Unless specified otherwise) | Method Identification | Sample Identification | | | | |
| | | Inlet 1 HS | Oil Outlet 1 | Water Outlet | Hydramix Out | |
| Sample Number | | 136319 | 136320 | 136321 | 136322 | |
| Date/Time Sampled | | N/A | N/A | N/A | N/A | |
| pH - Value @ 25 °C | A | WLAB065 | 7.4 | 7.5 | 8.0 | 8.0 |
| Suspended Solids at 105°C | A | WLAB004 | 5650 | 7640 | 278 | 6.0 |
| Oil & Grease | N | WLAB034 | 37440 | 147688 | 74 | 10 |
| Anionic Surfactants as MBAS | S | --- | | | 45 | 17 |
| Iron as Fe (Dissolved) | A | WLAB015 | 0.706 | 0.271 | 0.244 | 0.045 |

Table2: Results achieved from the iron mine

| RESULTS | | | |
|-----------------------------|------------|--------------------|-------------|
| Analysis in mg/l | Inlet 1 HS | Hydramix Out | % Reduction |
| Suspended solids | 5650 | 6 | 99.89 |
| Oil & Grease | 37440 | 10 | 99.97 |
| Anionic Surfactants as MBAS | - | Down from 45 to 17 | 62.22 |
| Iron as Fe (Dissolved) | 0.706 | 0.045 | 93.63 |

The table shows the percentage reduction of contaminants from the inlet of the process to the outlet. Oil & Grease was reduced by 99.97%, surfactants reduced by 62.22%, dissolved iron reduced by 62.22%.

Conclusion

Based on the results the conclusion was drawn that the water is fit for re-use or discharge as requested by the client. This is achieved by implementing a two-stage treatment cycle. Consisting of (1) the Hydraspin oil water separator followed by (2) the Hydramix CWT system. The treatment was done to ensure water quality meets the requirements while keeping the treatment cost as low as possible.