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# The effects of chrome mining activities on the water quality of the Hex River in the Rustenburg area: case study on Kroondal chrome mine

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**EXEMPTION NUMBER: 2118B**

**EXEMPTEE: XSTRATA SOUTH AFRICA (PTY) LTD**

**EXEMPTION GRANTED IN TERMS OF SECTION 21(4) OF THE WATER ACT, 1956 (ACT 54 OF 1956) IN RESPECT OF THE DISPOSAL OF THE PURIFIED OR TREATED WATER, INCLUDING WATER RECOVERED FROM ANY EFFLUENT**

**CONDITIONS OF EXEMPTION**

3. **QUALITY OF EFFLUENT**

3.1 The impact of the contribution of the Exemptee to the waste load in the Hex River determined upstream and downstream from the mining complex must comply with the target values (or any aother applicable parameters according to the South African Water Quality Guidelines published by the Department *(Department of Water Affairs and Forestry)* below:

| | |
|---|---|
| pH | 6.0 < pH < 8.5 |
| Electrical Conductivity (as EC) | ≤ 70 mS/m |
| Nitrate (as N) | ≤ 6 mg/l |
| Sulphate (as $SO_4$) | ≤ 200 mg/l |
| Fluoride (as F) | ≤ 1.5 mg/l |
| Ortho phosphate (as P) | ≤ 0.025 mg/l |
| Chloride (as Cl) | ≤ 100 mg/l |
| Sodium (as SAR) | ≤ 1.5 |

3.2 Stormwater and effluent discharged into the RWD *(Return Water Dam)* and seepage from the system must comply with the standards below, as well as the quality requirements for parameters (not specified below) as specified in the General and Special Standard for Phosphate as prescribed by the Minister of Water Affairs and Forestry in terms of section 21(1)(a) of the Act *(Water Act, 1956)* and published in Government Notice 991 of 18 May 1984, as amended from time to time:

| | |
|---|---|
| pH | 6.0 < pH < 8.5 |
| Electrical Conductivity (as EC) | ≤ 150 mS/m |
| Nitrate (as N) | ≤ 12 mg/l |
| Sulphate (as $SO_4$) | ≤ 400 mg/l |
| Fluoride (as F) | ≤ 1.5 mg/l |
| Chloride (as Cl) | ≤ 200 mg/l |
| Sodium (as SAR) | ≤ 1.5 |

*Excerpt of:*

***M4.0 Technical Report – Sections 12B and 21 of the water act, 1956 (Act 54 of 1956): Xstrata Rietvly Silica***

"As Rietvly Silica does not contribute primarily to surface water pollution and to a certain extend to ground water pollution, it may not be necessary to be issued with a permit under the above mentioned Act but it may be covered under the General Authorisation in terms of section 39 of the National Water Act, 1998 (Act 36 of 1998)."

***Government Notice 1191 General Authorisations in terms of Section 39 of the National Water Act, 1998 (Act 36 of 1998)***

**Section 3.7: Discharging of domestic and industrial wastewater into water resources**

Wastewater limit values applicable to discharge of wastewater into a water resource *(Table 3.2)*

| SUBSTANCE/PARAMETER | GENERAL LIMIT |
|---|---|
| Faecal coliforms (per 100ml) | 1000 |
| Chemical Oxygen Demand (mg/l) | 75 |
| pH | 5.5 - 9.5 |
| Ammonia (ionised and unionised) as Nitrogen (mg/l) | 3 |
| Nitrate/Nitrite as Nitrogen (mg/l) | 15 |
| Chlorine as Free Chlorine (mg/l) | 0.25 |
| Suspendid solids (mg/l) | 25 |
| Electrical Conductivity (mS/m) | 150 |
| Ortho-Phosphate as phospherous (mg/l) | 10 |
| Fluoride (mg/l) | 1 |
| Soap, Oil and Grease (mg/l) | 2.5 |
| Dissolved Arsenic (mg/l) | 0.02 |
| Dissolved Cadmium (mg/l) | 0.005 |
| Dissolved Chromium (VI) (mg/l) | 0.05 |
| Dissolved Copper (mg/l) | 0.01 |
| Dissolved Cyanide (mg/l) | 0.02 |
| Dissolved Iron (mg/l) | 0.3 |
| Dissolved Lead (mg/l) | 0.01 |
| Dissolved Manganese (mg/l) | 0.1 |
| Mercury and its compounds (mg/l) | 0.005 |
| Dissolved Selenium (mg/l) | 0.02 |
| Dissolved Zinc (mg/l) | 0.1 |
| Boron (mg/l) | 1 |