

Hazard	Probability of Occurrence	Pathway, receptor and consequence	Measures to Reduce the Risk
Accidental spillage of sodium hydroxide, hydrochloric acid during refilling of bulk storage tanks by pumping from a delivery tanker.	Low to Moderate	Run-off into site bunded area which is linked to an interceptor. Any spillages will be contained in interceptor which can subsequently be pumped out and treated	▪ All tanker unloading operations are supervised at all times against a written procedure. ▪ Tank capacity is checked before delivery and the valve on the interceptor closed. ▪ The delivery points and delivery vehicle are located within an area of kerbed hard standing which is provided with slotted drains which would capture any potential spillage. The fall of this area is towards the drains. This area is provided with an isolation valve which is closed before delivery. ▪ The tanks are vented to atmosphere to relieve pressure changes. ▪ Batch metering to a maximum of 1000 litres is used to prevent overfilling. Pipe work that would retain any spillage is of greater than 1000 litres. ▪ The tanks are stored inside the effluent plant in a bunded area. ▪ Condition of kerbing integrity improved at bulk chemical delivery point. Repair of damaged areas has been completed

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Failure of pipe work used to pump sodium hydroxide, hydrochloric acid to the bulk storage tanks and from bulk storage tanks to the process tanks.	Low	Run-off into site bunded area which is linked to an interceptor	- All pipe work, tanks, supports, motors, pumps and filters are visually inspected each month as part of the maintenance management system. - Pipe work renewed 2018
Accidental spillage of waste acid, alkaline and plating solutions during filling of waste collection tanker.	Very Low	Run-off into site bunded area which is linked to an interceptor	- All tanker loading operations are supervised at all times. - The collection vehicle and waste solutions pipe work delivery point are located within an area of hard standing which is provided with slotted drains which would capture any potential spillage. This area is provided with an isolation valve which is closed before delivery. - The tanks are vented to atmosphere to relieve pressure changes. - The waste collection tanks are stored inside the plating line in a bunded area which goes to the effluent plant. - Hardstanding and drain integrity at bulk waste collection point improved.

Failure of the interceptors	Low	Run-off into surface water, potential pollution	▪ Annual inspections of the visual integrity of the interceptors are carried out. ▪ Inspections would also be undertaken in the event of a significant release of chemicals or a physical event (e.g. subsidence) that would prompt a review of the interceptor integrity.
Accidental spillage of small quantities of acids, alkalis and plating chemicals from damage to IBCs or containers during delivery or movement around site.	Low	Run-off into site bunded area which is linked to an interceptor	▪ All IBC's and drums are stored in enclosed chemical stores, which is located within the site bunded area. ▪ Kerbing and drain integrity at chemical storage area has been improved (increased kerbing height and re-surfacing). This includes installation of an isolation valve which, upon closure, would prevent chemicals running off into the drains. ▪ Procedure in place to ensure stores doors are kept shut to stop rainwater ingress. ▪ Site procedures updated to include procedures to close the isolation valve in the event of an accident and also to ensure regular inspection of chemical stores drains. ▪ Portable bunds are used for the transfer of chemicals around site. ▪ Fork lift truck driver training is undertaken to an appropriate level in the transfer of chemicals on site. Training needs are identified and implemented through use of the Training Matrix.

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Release of metal ions to sewer from failure of neutralisation and flocculation process	Low	Metal ions could impact the sewage treatment works via the foul sewer	▪ The pH electrode which controls the neutralisation process is maintained regularly to ensure that they operate correctly. • Meters for both the pH and redox electrodes are situated in the main effluent control room and are monitored regularly to check that the system is operating correctly. There is an alarm setting on the meter which will alert any faults in the system. ▪ There is also the facility to manually dose sodium hydroxide by using a valve on the sodium hydroxide tank, which is located above the neutralisation tank. In the event of a high pH there is the provision to manually dose hydrochloric acid using a valve directly above the neutralisation tank to draw the chemical from the bulk tanks. • A new control system was installed in 2019 giving better regulation of pH control and dosing of other chemistry

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Failure of holding tanks, pipework or pumps in the effluent treatment plant	Low	Run-off into site bunded area which would then be pumped to a tanker for off-site disposal.	▪ Effluent treatment plant is located in site bunded area. ▪ There is restricted access to the effluent treatment plant. ▪ Planting personnel check once per shift the plant and record and report any incidents requiring action. ▪ Detailed inspection of the pump integrity is undertaken as part of the maintenance programme.
Accidental spillage of metal hydroxide filter cake during collection of skip	Low to moderate	Run-off into bunded area within effluent plant.	▪ The removal of filter cake skip takes place within the bunded area in the effluent treatment plant. ▪ Control of the filter cake quality is undertaken to reduce the moisture content of the filter cake which minimises the potential for any release.

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Abnormal emission from discharge point S1 due to failure of decomplexant pump.	Moderate	Discharge to effluent sewer exceeds consent	• Pump has been replaced and regular inspection/testing routines put in place. • Instruction to restart pump in case of power failure
Vandalism resulting in uncontrolled release of oils, chemicals or wastes.	Very Low	Run-off into site bunded area which would then be pumped to effluent treatment plant for treatment.	• All chemical storage and waste storage areas are located inside the site bunded area which is surrounded by a high-level security fence. • There are no public rights of way (footpaths etc) adjacent to the perimeter of the site bunded area. The gate providing vehicle access to the site bunded area is kept locked at all times. • The chemical stores have relocated inside the factory
Fire water	Low	Potential risk of contaminated water from fire control polluting local watercourse.	▪ The outfall from the interceptor adjacent to the chemical storage area can be isolated in the event of a fire. ▪ Emergency procedures include fire water and how to contain in the event of a fire. ▪ All areas are provided with sprinkler protection systems which would reduce the magnitude of a fire and thus reduces the amount of fire water produced for appropriate control.

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Failure of sodium hypochlorite dosing pump – nickel complex not destroyed	Moderate	Levels of nickel in effluent discharge exceed consent	Pump monitoring plan in place
Release of chlorine gas from spillage of sodium hypochlorite into acidic solutions	Low	Release into atmosphere of effluent room	• Effluent room extracted • Volumes used are low and additions to storage tank are monitored