

Summary of representative risk management measures (RMMs) and operational conditions (OCs)

Public version

Legal name of applicant:	Tata Steel UK Limited
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Substance:	Sodium dichromate (EC no. 234-190-3, CAS nos 10588-01-9, 7789-12-0)
Use title:	The use of sodium dichromate for the passivation of electrolytic tinplate (ETP)
Use number:	1

ES1: The use of sodium dichromate for the passivation of electrolytic tinplate (ETP)

ECS and WCS	Task (ERC / spERC or PROC)	Annual amount per site	Technical RMMs	Organisational RMMs	PPE	No. of staff	Frequency & duration	Effectiveness of wastewater and waste air treatment and release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
ECS-1	ERC 5	█████ per year $\text{Na}_2\text{Cr}_2\text{O}_7$ █████ per year Cr(VI) Public range: 10-20 tonnes per year $\text{Na}_2\text{Cr}_2\text{O}_7$	<u>Air:</u> Process control system (automation). Local exhaust ventilation system with air passing to atmosphere via a wet scrubber. <u>Wastewater:</u> All sources of Cr(VI)-containing wastewater are collected and transferred to the wastewater treatment plant (WWTP) and undergo batch reduction. Reducing agents are dosed over-stoichiometrically to ensure full reduction to Cr(III). Level control instruments in the WWTP tank farm prevent overflow. <u>Waste:</u> Single-use disposable PPE and other potentially contaminated materials are disposed of as hazardous waste. Sludge from the filter presses is collected and sent for recycling or disposed of as waste.	<u>Air:</u> Stack emissions monitoring verifying effectiveness of air abatement. LEV interlocked to process operation meaning that if LEV fails, the electric current to the process switches off. LEV subject to regular inspections and annual thorough examination. <u>Wastewater:</u> The Cr(VI) wastewater stream is monitored using a colorimetric analyser before joining other liquid waste entering the WWTP. A composite sampler collects a representative 24-hr sample of treated effluent discharged to the estuary. <u>Administrative:</u> Employee information, instructions and training. Procedures. Emergency response arrangements.	N/A	N/A	N/A	Water: 0% All wastewater potentially contaminated with Cr(VI) is reduced using an over-stoichiometric addition of reductant. Air: 0.1315% Monitoring data from the stack emissions between 2022 and 2025 were used to calculate the release factor using the highest values recorded. Soil: 0% There is no release to soil at the site. All solid waste is collected and either sent for recycling or disposed of as (hazardous) waste.	9.2.1

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WCS 1a	Receipt and storage of sodium dichromate (current delivery procedure) PROC 8b	-	Primary containment: Sodium dichromate is delivered in specially designed IBCs discharged under pressure into a [REDACTED] capacity bunded storage tank. Any spilled material that enters the site drainage system will be routed to the WWTP on pH alarm. The connection to the bulk storage tank is padlocked when not in use, with the key kept with the ECCS4 team leader.	Procedures are in place covering receipt, delivery and transport of sodium dichromate. Only authorised personnel perform this task. The delivery driver will couple and uncouple the transfer hose and a shift team member will monitor the operation. All personnel performing this task receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Firewater is retained. Workers performing this task are subject to health surveillance and biological monitoring.	Standard site PPE: protective clothing, safety helmet, safety footwear, hearing protection, protective eyewear	1	Frequency: [REDACTED] Duration: 20 mins	N/A	9.2.2
WCS 1b	Receipt and storage of sodium dichromate (future delivery procedure) PROC 8b	-	Primary containment: Sodium dichromate will be delivered by road tanker discharged under pressure into a [REDACTED] capacity double skinned storage tank. Any spilled material that enters the site drainage system will be routed to the WWTP on pH alarm. The connection to the bulk storage tank is padlocked when not in use, with the key kept with the ECCS4 team leader.	Procedures are in place covering receipt, delivery and transport of sodium dichromate. Only authorised personnel will perform this task. A shift team member will couple and uncouple the transfer hose with another shift team member monitoring the operation. All personnel performing this task receive appropriate information, instructions and training.	Standard site PPE: protective clothing, safety helmet, safety footwear, hearing protection, protective eyewear	1	Frequency: [REDACTED] Duration: 20 mins	N/A	9.2.2

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			The transfer hose will be purged with air prior to being uncoupled.	Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Firewater is retained. Workers performing this task are subject to health surveillance and biological monitoring.					
WCS 2a	Sampling & analysis: taking samples of electrolyte PROC 9	-	Primary containment: While taking the samples is not itself an enclosed process, once the sample bottles are filled, they are then sealed prior to being taken to the on-site laboratory. Sampling takes place in the sodium dichromate area; roller shutters segregate this area from the rest of the line. While these have to be partially opened on one side to allow access to the passivation tanks for sampling, other workers remain segregated from the area. Secondary containment: any loss from the passivation section on the mill floor level (e.g. small spills) would result in the liquid being channelled back into the sump in the basement, which is itself fully bunded. The floor under the installation is acid-resistant tilework. LEV is present to the passivation tanks and remains operational during sampling activities.	Only small sample volumes are collected. Sampling time is limited. Procedures are in place covering sampling. Only authorised personnel perform this task and all personnel performing this task receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Firewater is retained. Workers performing this task are subject to health surveillance and biological monitoring.	Full chromium PPE: chemical resistant gloves, respiratory protective equipment (RPE), a chemical protective suit (coveralls) and a pair of safety Wellingtons.	1	Frequency: Once per shift (twice per day) Duration: 10 mins	N/A	9.2.3

ECS and WCS	Task (ERC / spERC or PROC)	Annual amount per site	Technical RMMs	Organisational RMMs	PPE	No. of staff	Frequency & duration	Effectiveness of wastewater and waste air treatment and release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
WCS 2b	Sampling & analysis: laboratory analysis of samples PROC 9	-	LEV: The sample bottles are handled inside a fume cabinet.	Analysis involves handling only very small quantities of passivation solution. Following analysis, waste passivation solution is returned to the chrome sump. Procedures are in place covering sampling. Only authorised personnel perform this task and all personnel performing this task receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Workers performing this task are subject to health surveillance and biological monitoring.	Standard site PPE plus lab coat and nitrile gloves.	1	Frequency: Once per shift (twice per day) Duration: 10 mins	N/A	9.2.3
WCS 3	Adding sodium dichromate to the circulation tank PROC 1	-	This process is automated and enclosed. There is no potential worker exposure. Primary containment is maintained at all times throughout WCS 3. The existing bulk storage tank is bunded and the future bulk storage tank will be double-skinned, providing secondary containment. Any spillages in the circulation tank will be channelled into the sump in the basement area which is also bunded, again providing secondary containment.	This process is automated and enclosed. There is no potential worker exposure. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Firewater is retained.	Not applicable to WCS 3. This process is automated and enclosed. There is no potential worker exposure.	N/A	N/A	N/A	9.2.4

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			There is a dosing probe in the circulation tank that alerts the system when additional sodium dichromate is required. The sodium dichromate is then replenished automatically and gravity-fed into the circulation tank in the basement.						
WCS 4	Passivation PROC 13	-	The passivation tanks are mostly (but not wholly) enclosed. This is achieved through the design of the tanks (steel strip passes through openings on the sides) and the LEV (canopy hoods positioned above and below the entire liquid surface of the passivation solution). The passivation section is itself enclosed behind industrial roller shutter doors which physically segregate this area from the rest of the ETL5 line. Secondary containment is provided in that any loss from the passivation section on the mill floor level (e.g. leaks or rupture of line tanks or associated pipework) would result in the liquid being channelled back into the sump in the basement, which is itself fully bunded. The process control systems allow for automated and remote operation of the plating line, almost eliminating the need for operator intervention on the	Only dedicated personnel perform this task. All personnel performing this task receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Firewater is retained. Workers performing this task are subject to health surveillance and biological monitoring.	Standard site PPE.	1	Frequency: Once per shift (twice per day) Duration: 1 hour	N/A	9.2.5

ECS and WCS	Task (ERC / spERC or PROC)	Annual amount per site	Technical RMMs	Organisational RMMs	PPE	No. of staff	Frequency & duration	Effectiveness of wastewater and waste air treatment and release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
			line itself (within the sodium dichromate area), thereby significantly reducing exposure. LEV in the form of receiving (canopy) hoods covers the entire surface area of the top of the tanks and extracts Cr(VI) containing air through a wet scrubber system. Waste scrubber water is directed to the chrome sump and then enters the WWTP where it is treated (over-stoichiometric addition of a reductant).						
WCS 5	Control room activities PROC 0	-	All measures concerning minimisation of emissions and control of exposure described in the various other WCS are relevant for this scenario as well, because control room activities are 'far field'. The operators are in separate rooms (personal enclosure) ca. 20 m (exit end control room) and ca. 100 m (entry end control room) away from any potential Cr(VI) source. The process control systems allow for automated and remote operation of the plating line, almost eliminating the need for operator intervention on the line itself (within the enclosed passivation area), thereby significantly reducing exposure.	Only dedicated and authorised personnel will be present in the control room. Workers in the control room follow specific procedures in which they have been appropriately trained. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Production shift team members are subject to health surveillance and biological monitoring.	Standard site PPE.	9	Frequency: Once per shift (twice per day) Duration: Up to 12 hours	N/A	9.2.6

ECS and WCS	Task (ERC / spERC or PROC)	Annual amount per site	Technical RMMs	Organisational RMMs	PPE	No. of staff	Frequency & duration	Effectiveness of wastewater and waste air treatment and release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
WCS 6	Loading and unloading of steel coils PROC 0	-	All measures concerning minimisation of emissions and control of exposure described in the various other WCS are relevant for this scenario as well, because activities involving the loading and unloading of steel coils are 'far field'. Areas where Cr(VI) emissions can occur are physically segregated and marked as the sodium dichromate area. Offloading of steel coils is an automated process.	Only dedicated personnel perform this task. All personnel performing this task receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Production shift team members are subject to health surveillance and biological monitoring.	Standard site PPE.	2	Frequency: Once per shift (twice per day) Duration: 60 mins	N/A	9.2.7
WCS 7a	Maintenance activities (general maintenance activities) PROC 28	-	Production is stopped during all maintenance activities. The passivation solution containing sodium dichromate is then dropped to the circulation tank in the basement. Secondary containment is provided in that any loss from the passivation section on the mill floor level results in the liquid being channelled back into the passivation sump in the basement, which is itself fully bunded. The passivation line is physically isolated from the circulation tank by means of double valves or blind flanges. The installation is thoroughly flushed with water. Water from flushing is	Maintenance activities are subject to risk assessment which informs the risk management measures required for, and procedures covering, the work. A permit-to-work must be issued before any maintenance activity can commence. The permit will describe the specific preparatory procedures that need to be completed and communicated before maintenance activities can be initiated. All personnel performing maintenance activities receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times.	For maintenance activities within the sodium dichromate area, operators wear full chromium PPE, otherwise standard site PPE.	Up to 4	Frequency: Variable, see Table 67 in CSR Duration: Variable, see Table 67 in CSR	N/A	9.2.8

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			collected in the basement sump prior to wastewater treatment by reduction. Prior to leaving the passivation area all tools and parts are thoroughly rinsed with water. Rinsing water is collected in the basement chromium sump prior to wastewater treatment.	Workers performing this task are subject to health surveillance and biological monitoring.					
WCS 7b	Maintenance activities (cleaning / desludging the basement circulation tank) PROC 28	-	Production is stopped during all maintenance activities. The passivation solution containing sodium dichromate is emptied from the circulation tank and disposed of via the WWTP. All wash water is collected and transferred to the WWTP. Workers will stand outside the circulation tank (no confined space entry). The circulation tank is enclosed and located in a segregated room to the production line. Secondary containment: Any spillages from the circulation tank will be channelled into the sump in the basement area which is bunded.	Maintenance activities are subject to risk assessment which informs the risk management measures required for, and procedures covering, the work. A permit-to-work must be issued before any maintenance activity can commence. The permit will describe the specific preparatory procedures that need to be completed and communicated before maintenance activities can be initiated. All personnel performing maintenance activities receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Workers performing this task are subject to health surveillance and biological monitoring.	Full chromium PPE.	2	Frequency: Once per year Duration: Up to 4 hours	N/A	9.2.8

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WCS 8a	Waste management: sampling and analysis prior to batch reduction PROC 8b, 9	-	Primary containment: The chromic acid bulk tank and the batch reduction tank on the WWTP are enclosed Secondary containment: The bulk tanks on the WWTP are fully bunded. A fume cabinet is present in the WWTP laboratory.	Operators will take samples of a limited volume only, and via a dedicated sampling system, reducing exposure. The only exposure that can arise is from the sampling point itself. Procedures are in place covering sampling. Only authorised personnel perform this task and all personnel performing this task receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Workers performing this task are subject to health surveillance and biological monitoring.	Standard site plus nitrile gloves.	1	Frequency: Once per day Duration: 10 mins	N/A	9.2.9
WCS 8b	Waste management: cleaning of the filter press PROC 8b, 9	-	The reductant (ferrous sulphate) is dosed over-stoichiometrically, to result in full reduction of Cr(VI) to Cr(III) and Cr(0). No Cr(VI) is present in the filter cake, confirmed by weekly analysis.	Procedures are in place covering cleaning of the filter press. Only authorised personnel perform this task and all personnel performing this task receive appropriate information, instructions and training. Emergency procedures are in place. First aiders and first aid equipment and facilities are available at all times. Workers performing this task are subject to health surveillance and biological monitoring.	Standard site PPE.	1	Frequency: Once per day Duration: 45 mins	N/A	9.2.9

Abbreviations: RMM=Risk Management Measures, OC=Operational Conditions, ES=Exposure Scenario, WCS=Worker contributing scenario, ECS=Environmental Contributing Scenario, ERC=Environmental Release Category (or spERC if available), PROC= Process category, LEV=Local Exhaust Ventilation, PPE=Personal Protective Equipment, RPE=Respiratory Protective Equipment