

**Title: D. TI.1.1.4 Teesside Past Metallurgical Site
Deposit, Health and Environment Plan**

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SUMMARY

1	INTRODUCTION.....	3
2	THE CONTROL OF ON-SITE WORK.....	3
2.1	GROUND HAZARDS.....	4
2.2	SAFE SYSTEMS TO WORK.....	5
3	SAFETY PLAN FOR WORK CARRIED OUT AT THE TEESSIDE PMSD.....	6
3.1	DESKTOP INVESTIGATION.....	6
3.2	AVOIDING DANGER FROM UNDERGROUND SERVICES.....	7
3.3	TASK ORIENTED RISKS AND MITIGATION	7
4	REFERENCES.....	7
	APPENDIX A : UK HEALTH AND SAFETY LEGISLATION	9
	APPENDIX B : WORK PERMITS	12
	APPENDIX C : A PERMIT TO WORK MONITORING CHECKLIST	15

The Materials Processing Institute together with its project partners has the objective of achieving a systematic, long-term beneficial outcome from recovery and regeneration of Past Metallurgical Sites and Deposits (PMSD) in the INTERREG region of Europe under an EU funded REGENERATIS project. Its aims are the innovative circularity to recover raw materials while regenerating the polluted sites.

This report is submitted in fulfilment of the requirements of work package TI and deliverable D. TI.1.1.4 for the specification of a safety, health and environment (SHE) plan.

Limitations on the scope and extent of on-site activities exist due to the ongoing process of the Compulsory Purchase Order (CPO) of the land to the South Tees Development Corporation. Until this process has been completed, no rights of access are available to any of the land previously owned by Sahaviriya Steel Industries PLC (SSI).

Access to the previously owned SSI land is currently managed by the South Tees Site Company Limited.

Access to the land owned by South Tees Developments Limited (STDL) is managed by the parent company South Tees Development Corporation (STDC).

South Tees Development Corporation are an Associated Partner of the Regeneratis project and have committed to allow access to the STDL land subject to the granting of an excavation licence and

providing UK health and safety standards and procedures are followed. On completion of the CPO process, the extent of land available to access may be broadened to include the land previously owned by SSI. The details of any extended site access would be subject to agreement with South Tees Site Company Limited and STDC.

The SHE plan has been produced in collaboration with the respective organisations and relate to the undertaking of site activities comprising surveying, core and pit excavations, sampling and pre-processing of sampled materials.

The SHE plan is provisional pending further discussion with South Tees Development Corporation and the outcome of the CPO process.

The impact of COVID-19 has limited the accessibility and timing of information

1 INTRODUCTION

The report provides details of the Safety, Health and Environment plan for the Past Metallurgical Site Deposit (PMSD) site access and work-related activities including land surveying, ground investigation, bore hole and pit excavations, sampling and material pre-processing.

The Teesside PMSD is located on land owned by the South Tees Developments Limited (STDL) and managed by the South Tees Development Corporation (STDC). The land comprises several sites with a 160-year history of iron and steelmaking including areas of Redcar, Lackenby, Grangetown and South Bank to the South of the river Tees.

At present, access to the land previously owned by Sahaviriya Steel Industries PLC (SSI) is restricted due to the ongoing Compulsory Purchase Order still being in the hands of the Official Receiver. This includes a significant area of waste deposits at the South Bank Landfill and Waste Management Facilities area (a site containing iron and steelmaking slag). It also includes the Redcar Works complex (Blast Furnace) and the Lackenby Steelmaking complex (Basic Oxygen Steelmaking and Continuous Casting) sites.

The sites have been used, at varying periods of time, for the storage of feedstock, products, by-products and waste streams. Over the years, due to changes in ownership, regulatory controls and economic conditions, the materials have co-mingled with poor associated recording of the inventories of quantity and quality of materials. The materials have also co-mingled with natural ground materials. This includes dispersal in soil, rock, clay, silt and other materials arising from its tidal estuary location. The subsurface strata are, therefore, varied and complex.

There are large areas of contaminated land arising from coke oven plant operation, oil refining and hydrocarbon processing. Dispersal of the hazardous materials has taken place due to a combination of natural and man-made material movements.

Access to the site locations will be administered either by the South Tees Developments Limited (STDL) or by the South Tees Site Company Limited (STSC). STDL is wholly owned by the South Tees Development Corporation. STSC were appointed by the UK government in December 2016 to ensure the safety, security and cost-effective management of the former SSI steelworks sites. The SSI steelworks sites are COMAH registered.

The owners of the sites have a duty of care to ensure that staff and visitors to the site follow safe systems of working.

2 THE CONTROL OF ON-SITE WORK

The locations and scope of the on-site activities will be agreed between the project partners and the Associated Partner (STDC). The scope comprises site/location access, safe systems of work, details of the ground investigation, bore hole and trial pit excavation, sampling, pre-processing of materials and an impact and remediation strategy.

STDC will provide access to agreed areas and allow ground investigation to be undertaken in compliance of agreed standards.

The following conditions⁽¹⁾ have been stated by STDC in granting the undertaking of pilot tests on STDL owned land covered by Land Registry Title Numbers CE212145, CE175032, CE175031, CE175030, CE175028, CE174027, CE130906, CE48932, CE39540, CE26409 and CE6045:

- Prior to the pilot tests being undertaken, an inception meeting will be organised and held in order to agree and make arrangements on the issues of access, available site areas and test locations, safety, impact and restoration, confidentiality and information exchange.
- The investigation programme on regeneration of past metallurgical sites and deposits being executed in compliance with all necessary procedures as governed by relevant UK standards and regulations.
- The parties engaged in the pilot tests executing a Licence in favour of STDL and STDC, permitting access to the STDL site for the purposes of the pilot tests, such Licence to be provided by STDC.

The on-site safe working procedures for on-site activities will be managed either by the South Tees Developments Limited (STDL) and/or by the South Tees Company Limited (STSCL).

2.1 GROUND HAZARDS

The detailed plan of the site works will be discussed and agreed with the relevant project partners, the Associated Partner and the site owner (the "stakeholders"). This will include the locations, excavation, sampling and pre-processing procedures and the safe systems of work.

The choice of site locations and ground areas will require detailed consideration of the prior use of the land and knowledge of the specific hazards that the site may pose. For example, many sites have significant ground contamination containing materials hazardous to health. Another significant hazard is that arising from any ground disturbance resulting in the triggering of chemical reactions from bringing materials into close proximity. This can result in the onset of fires, explosions and/or the release of noxious gases and particulates. Ground disturbances can also result in the diversion of hazardous materials to watercourses and aquifers resulting in significant pollution and hazards to health.

Consideration is also required of the potential environmental and ecological impact of ground disturbance. This is particularly relevant given the close proximity of sites of special scientific interest of which there are several adjoining the PMSD.

There are known to be large underground voids comprising pits and chambers at several sites. Some of these are buildings that have been partially demolished and covered with material. Others have been created by the bridging of large waste pieces resulting in poor ground compaction and a weak ground structure unable to take the weight of heavy earth moving equipment or ground excavation plant and machinery. Procedures for the avoidance of underground hazards are also addressed in Section 3.2.

In other areas, ground stability is impacted through the action of watercourses (tidal estuary channels and cuts) in proximity to dust and sludge deposits creating earth slip and movement within the ground structure.

Because of the hazardous ground structure, it is necessary to ensure that advice is sought from the Associated Partner and site owner before undertaking any groundworks.

2.2 SAFE SYSTEMS TO WORK

A summary of the relevant UK Health and Safety Legislation is provided in Appendix A.

The safe systems of work will be specified at each specific site but as a minimum the following would be expected:

- Safety Passport
- A General Site Induction
- Site Specific Inductions e.g. COMAH
- Compliance with Management Procedures (Site Specific Requirements)
- Risk Analysis and Method Statement (RAMS)
- Completion of a Work Permit
- PPE Standards for Each Task

Relevant work permits are provided in Appendix B.

An example of a permit to work monitoring checklist is provided in Appendix C.

For sites managed by the South Tees Site Company Limited (STSCCL), there would be the additional requirements of:

- A hazard identification exercise by STSCCL to inform the project partner's RAMS

- The appointment of a Task Owner/Project Co-ordinator within STSCL
- The project partners would be subject to a contractor approval process

The management control of a project must of necessity ensure a safe system of work. No deviations from the work permit scope will be allowed.

Because of this level of control, it is essential that the RAMS be meticulously detailed and stated as clearly as possible.

3 SAFETY PLAN FOR WORK CARRIED OUT AT THE TEESIDE PMSD

Implementation of the project will require site works which will involve extraction of ground samples and minor excavations. It is essential that these activities are carried out in a safe manner and also in accordance with environmental regulations and that disturbed land is returned to a safe condition in accordance with the requirements of the land owners (South Tees Development Corporation).

The work packages undertaken on site are managed by the Materials Processing Institute. All staff undertaking site work for the Institute have a broad training in safe systems of work and competence in the tasks they undertake. For site work, accreditation includes the UK Passport to Safety and Leading a Team Safely.

Detailed excavation work is likely to be undertaken by contractors working under permit.

3.1 DESKTOP INVESTIGATION

The Construction (Design and Management) Regulations 1994 requires a site safety plan preparing before intrusive site investigation work can proceed and that all work is carried out to the safety plan. Ground investigation is included in the listed definitions of construction work. The project is only notifiable if the construction phase is longer than 30 days.

The site safety plan will list all the likely hazardous substances to be encountered and the mitigations to be taken including the choice of personal protective equipment to be used.

A survey of historical data⁽²⁾ of previous industrial activities on the site provides the evidence-based approach to the identification of substances hazardous to health and helps to narrow the choice of potential locations of suitable on-site excavations.

3.2 AVOIDING DANGER FROM UNDERGROUND SERVICES

Guidance is provided by the Health and Safety Executive on managing excavations safely with respect to underground services⁽³⁾. The majority of the sites and locations within the PMSD will have decommissioned, disused or abandoned underground services. However, since several of the locations are adjacent to operational factories and manufacturing sites, the safe assumption should always be first to assume that underground services are live and precautions are taken.

Where underground services are suspected, non-intrusive geophysical surveying should be undertaken first to identify their location. Advice from the Associated Partner and site owner should be sought to impart specific local knowledge.

3.3 TASK ORIENTED RISKS AND MITIGATION

Guidance is provided by the British Standards Institute (BSI) on managing excavations safely with respect to underground excavations⁽⁴⁾.

Where the ground is contaminated further guidance is provided in a BSI code of practice⁽⁵⁾. The known contaminants include contaminated coal, heavy fuel oil, benzole (benzene, toluene, xylene), creosote, absorbing oil, wash oil, coal tar (black viscous liquid denser than water comprising a complex mixture of condensed ring aromatic hydrocarbons, phenolic compounds, aromatic nitrogen bases, alkyl derivatives, paraffinic hydrocarbons, olefinic hydrocarbons), coal tar pitch (black solid residue from the distillation of coal tar).

Some of the materials are pyrophoric (e.g. iron sulphide).

There is also asbestos contamination of the soil.

Guidance is also provided by the Environment Agency. A multi-phased environmental risk assessment is required that requires integration with the site overall assessment strategy. This is managed using the Model Procedures for the Management of Land Contamination⁽⁶⁾.

4 REFERENCES

1. McNicholas, J., A Statement of Commitment to the Regeneratis Project, South Tees Development Corporation, 24 May 2019
2. Capstick, M.A., Regeneratis Report: TI.1.1.1 Teesside Metallurgical Site Deposit Historical Activity Data, INST/LCE/R/28042/1/20/C, 29 June 2020
3. Avoiding Danger from Underground Services, HSG47 (Third Edition), Health and Safety Executive, 2014

4. BS5930, The Code of Practice for Site Investigations, BSI Standards Publications, July 2015
5. BS10175, Investigation of Potentially Contaminated Sites – Code of Practice, BSI Standards Publications, March 2011
6. Stranger, C., Kearney, T., Model Procedures for the Management of Land Contamination, Contaminated Land Report 11, Environment Agency, September 2004

APPENDIX A

UK HEALTH AND SAFETY LEGISLATION

Health and Safety at Work etc Act 1974

Section 2 General duties of employers to their employees

Section 3 General duties of employers and self-employed to people other than their employees

Section 7 General duties of employees at work

The Health and Safety at Work etc Act 1974 (HSW Act) applies to work activities carried out at UK onshore locations.

Construction Design and Management Regulations, HSE, 2015

Confined Spaces Regulations 1997

Regulation 4 Work in confined spaces

Regulation 5 Emergency arrangements

Control of Major Accident Hazards Regulations (COMAH) 1999

Regulation 4 General duty

Regulation 5 Major accident prevention policy

Regulation 7 Safety report

Control of Substances Hazardous to Health Regulations (COSHH) 2002

Regulation 6 Assessment of health risks

Regulation 7 Prevention or control of exposure to substances hazardous to health

Regulation 8 Use of control measures

Regulation 9 Maintenance, examination and test of control measures

Regulation 12 Information, instruction, and training, and training for people who may be exposed to substances hazardous to health

Dangerous Substances and Explosive Atmospheres Regulations 2002

Regulation 5 Risk assessment

Regulation 6 Elimination or reduction of risks from dangerous substances

Regulation 7 Places where explosive atmospheres may occur

Regulation 8 Arrangements to deal with accidents, incidents and emergencies

Regulation 9 Information, instruction and training

Regulation 10 Identification of hazardous contents of containers and pipes

Regulation 11 Duty of co-ordination

Electricity at Work Regulations 1989

Regulation 4(3) General requirement for safe working systems, work activities and protective equipment

Regulation 13 Precautions for work on equipment made dead. Advice on written procedures is given in Memorandum of Guidance on the Electricity at Work Regulations 1989. Guidance on Regulations HSR25.

Lifting Operations and Lifting Equipment Regulations 1998

Regulation 8 Organisation of lifting operations

Management of Health and Safety at Work Regulations 1999

Regulation 3 Risk assessment to determine preventive and protective measures

Regulation 4 Arrangements for effective planning, organisation control, monitoring and review of preventive and protective measures

Regulation 8 Information for employees

Regulation 9 Co-operation and co-ordination

Regulation 10 People working in host employer's undertaking

Regulation 11 Capabilities and training

Pressure Systems Safety Regulations 2000

Regulation 8 Written scheme of examination: measures necessary to prepare the pressure system for safe examination

Regulation 9 Examination in accordance with the written scheme

Provision and Use of Work Equipment Regulations 1998

Regulation 19 Isolation from sources of energy

Regulation 22 Maintenance operations

Relevant Environmental Regulations

Control of Pollution Act 1974

Environmental Protection Act 1990

EU Landfill Directive 1999/31/EC

Hazardous Waste Regulations 2005

UK Waste Regulation 2015

APPENDIX B

WORK PERMITS

It is important to realise that similar terminology may be used at different sites for types of permits which are fundamentally different. Some of the permits listed here may be called certificates. Clarity is essential to prevent confusion of permits-to-work with other kinds of document. It should be noted that in some permit-to-work systems, one permit may be designed to cover all of those described below.

Hot Work

Hot work is usually taken to apply to an operation that could include the application of heat or ignition sources to tanks, vessels, pipelines etc which may contain or have contained flammable vapour, or in areas where flammable atmospheres may be present. Hot work permits, typically coloured red or red-edged, are more generally applied to any type of work which involves actual or potential sources of ignition and which is done in an area where there may be a risk of fire or explosion, or which involves the emission of toxic fumes from the application of heat. They are normally used for any welding or flame cutting, for the use of any tools which may produce sparks and for the use of any electrical equipment which is not intrinsically safe or of a suitably protected type. Some sites or installations distinguish between high energy sources of ignition like naked flames, welding and spark-producing grinding wheels, which are almost certain to ignite flammable atmospheres, and low energy sources like hand tools and non-sparking portable electrical equipment, which are likely to cause ignition only if there is a fault. In some cases, to differentiate between these tasks, fire and naked flame certificates or electrical certificates have been used, to minimise the risk of electric shock to people carrying out any work on electrical equipment.

Cold Work

Cold work permits, typically blue-edged or coloured blue, are frequently used to cover a variety of potentially hazardous activities which are not of a type covered by a hot work permit. The activities for which a cold work permit may be appropriate will vary from site to site but should be clearly defined.

Electrical Work

An electrical permit-to-work is primarily a statement that a circuit or item of equipment is safe to work on. A permit should not be issued on equipment that is live. Further guidance on electrical work permits is given in Electricity at work: Safe working practices HSG85.24

Equipment Disjointing Certificate/Breaking Containment Permit

This type of certificate is used for any operation that involves disconnecting equipment or pipe work that contains (or has contained) any hazardous or high-pressure fluids or other substances. This type

of certificate will normally be used for the insertion of spades into pipe work, and for the removal of such spades. These permits are typically black-edged.

Confined Spaces Entry Certificate

Confined space entry certificates (unless detailed on a hot work or cold work permit) are used to specify the precautions to be taken to eliminate exposure to dangerous fumes or to an oxygen-depleted atmosphere before a person is permitted to enter a confined space. The certificate should confirm that the space is free from dangerous fumes or asphyxiating gases. It should also recognise the possibility of fumes desorbing from residues, oxygen depletion of the atmosphere as a result of oxidation, or the ingress of airborne contaminants from adjacent sources. The certificate should specify the precautions to be taken to protect the enclosed atmosphere against these hazards, e.g. by forced ventilation, physical isolation or by the provision of personal protective equipment including breathing apparatus.

Machinery Certificate

This type of certificate is used for work on large, complex items of machinery to ensure correct isolation before the work is carried out.

Isolation Certificate

This type of certificate may be very similar to a machinery certificate or an electrical certificate. It is usually used as a means of ensuring that the particular equipment is mechanically and electrically isolated before it is worked on. It is possible that a similarly named certificate may be used for chemical isolation of plant before work is done on it or entry is made. If so, these should be cross-referenced to associated permits.

Excavation Certificate/Heavy Equipment Movement Certificate

This may also be called a 'ground disturbance permit' or something similar. It will typically be required whenever any digging, excavation or boring has to be done, to ensure that no underground services or pipe work will be affected e.g. by damage or subsidence. The movement or placing of heavy equipment may also cause damage. Guidance

Diving Certificate

Diving certificate can be used to control the diving activity itself and to ensure that there are no other activities taking place nearby which create unnecessary additional risks (e.g. over-side work, live firewater intake pumps).

Control of Less Hazardous Work

The lowest level of control within a safe system of work involves 'routine duties', where assessed, detailed and approved work instruction or procedures define work that can be undertaken on site (e.g. process operators changing filters). Some offshore sites may use a 'T-card' or other simplified certificate to enable less hazardous work to be integrated with other more hazardous work (e.g. changing filters near hot work).

APPENDIX C

A PERMIT TO WORK MONITORING CHECKLIST

This checklist is intended to be used for the day-to-day monitoring of permits in use.

Date:	Time:	Active:
Permit type:	Reference number:	Complete:
Reviewer:	Position:	Installation:
Appended certificates: (list)		

If any unsafe conditions are found, the work must be stopped and the issuing authority and the performing authority notified immediately.

1.	Is the scope of work clearly specified?
2.	Are necessary risk assessments available for review?
3.	Are identified hazards listed on the permit-to-work?
4.	Are appropriate precautions listed on the permit-to-work (including clearly specified isolations)?
5.	Is the operational time limit of the permit clear? (Are extensions properly authorised?)
6.	Are certificates completed properly and appended to the permit?
7.	Are other area or system activities cross-referenced correctly via the permit?
8.	Are copies of permits, certificates and attachments legible?
9.	Are signatures and initials traceable and legible?
10.	Are copies of permits and certificates posted at correct locations?
11.	Are attachments, drawings etc held at the correct locations?
12.	Are users briefed on the permit-to-work, and have they acknowledged understanding of requirements?
13.	Do people know what to do in the event of emergency?
14.	Are isolations appropriate for the task, clearly specified on the permit or isolation certificate, and correctly implemented?
15.	Are common isolations cross-referenced?
16.	Are the right people aware of isolated equipment?
17.	Is the area authority aware of the work?
18.	Is the work carried out in conformance with the permit?
19.	Are control measures and personal protective equipment appropriate for the task?
20.	Are tools and equipment suitable and in good condition?
21.	Are housekeeping standards satisfactory?