# Safety Engineering Plan and File

## $CO_2$ Capture – BOD & Tender Specifications

**AEB Amsterdam**

12 January 2024

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Advisian
Worley Group

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# Abbreviations

| Abbreviation | Definition |
|---|---|
| AEB Amsterdam | Afval Energie Bedrijf Amsterdam / Waste to Energy Company Amsterdam |
| AEC | Afval Energie Centrale / Waste to Energy Facility |
| ATEX | Atmosphère Explosible |
| CE | Conformité Européenne |
| D | Define-FEED Phase (Engineering Phase) |
| DHSE | Design HSE |
| E | Execute Phase (Detailed Design Phase) |
| EC | Engineering Contractor |
| EEC | European Economic Community |
| FEED | Front End Engineering and Design |
| HAZID | Hazard Identification Study |
| HAZOP | Hazard and Operability (study) |
| HFE | Human Factors Engineering |
| HIPO | High Potential Incident |
| HRC | Hoog Rendement Centrale / High Efficiency (Power) Station |
| HSE | Health, Safety, Environment |
| HSSE | Health, Safety, Security and Environment |
| IEC | International Electrotechnical Commission |
| LOPA | Layers of Protection Analysis |
| MSDS | Material Safety Datasheet(s) |
| NEN | Nederlandse Norm / Netherlands Standardization Institute |
| NFPA | National Fire Protection Association (US) |
| OCAP | Organic CO2 for Assimilation by Plants |
| PCC | Post Combustion CO2 Capture |
| PED | Pressure Equipment Directive |
| PFD | Process Flow Diagram(s) |
| P&ID | Piping & Instrumentation Diagram(s) |
| S | Select Phase (Pre-Define Phase) |

| Abbreviation | Definition |
|---|---|
| TA | Technical Authority |
| WABO | Wet Algemene Bepalingen Omgevingsrecht (integrated environmental & building permit) |

# 1 Introduction

This Safety Engineering Plan covers the organization and activities regarding Health, Safety and Environment related to the design phases of the "Post Combustion $CO_2$ Capture" (PCC) project for AEB Amsterdam, as per details of the project mentioned in Section 3.

In the Netherlands, the local implementation of the European Council Directive 92/57/EEC (minimum safety and health requirements at temporary or mobile construction sites) is applicable ("Arbobesluit"). This Safety Engineering Plan fulfils the requirements resulting from the Arbobesluit that apply to the project design phase. A separate construction HSE plan needs to be developed for the Construction phase before start of site activities.

The Arbobesluit requirements for the pre-design phase of the project are as follows:

- Appointment of an HSE Lead.
- Preparation of a (Design) HSE/ Safety Engineering Plan (shall be updated for each next project phase).
- Risk analysis of the construction work (shall be part of separate Construction HSE plan).
- Set up of Safety Engineering File (shall be updated for each project phase).

The objective of the Safety Engineering Plan is to ensure that HSE in Design will be an integral part of the design and engineering work. The plan contains the following elements:

- A description of the HSE objectives of the project.
- Project description.
- A description of AEB's HSE organization and HSE responsibilities.
- Identified hazards at the start of the project
- List of project specific Design HSE documents and activities.

# 2 HSE Objectives

The following HSE objectives shall be met during this project:

- Assurance that HSE considerations will be an integrated part of the engineering work.

- Project design minimizing the probability and consequences of accidents to safeguard personnel, environment and property during Construction, Commissioning, De-commissioning, Demolition, HIPO incidents and all Operational phases of the installation including Start-up and Shutdown.

- Compliance with, in order of priority (however the most stringent is applicable), all HSE related:
  1. Dutch National Laws, Regulations and National Guidelines.
  2. European Directives.
  3. International accepted norms and standards for design, construction, and commissioning, e.g., NFPA, NEN-EN, IEC.
  4. Project Specific Technical Specifications.

- Additional requirements that imply more stringent boundaries on the project may yield from consultation with the authorities potentially requiring additional safety studies.

# 3 Project Description

This Safety engineering plan and file applies to the facilities involved in the Post Combustion $CO_2$ Capture Project (excl. $CO_2$ liquefaction plant) at AEB Amsterdam.

AEB Amsterdam is a waste processing company located in the Netherlands and currently owned by the City of Amsterdam. AEB is one of the largest waste processing plants in Western Europe processing over 1.4 million tonnes of waste every year. The AEB Amsterdam site has two (2) waste incineration plants namely the AEC (Afval Energie Centrale) and the HRC (Hoog-Rendement Centrale). Waste is incinerated in these two plants to combinedly generate electric power and heat to be supplied to the public grid and the district heating network respectively. The flue gases resulting from the incineration process are at present directly exhausted to atmosphere through 6 flue gas lines by the AEC (4 joint flue gas line lines) and HRC (2 joint flue gas lines) main stacks.

AEB Amsterdam has the ambition to realize a post-combustion $CO_2$ capture (incl. $CO_2$ conditioning) plant (PCC Plant) as part of the AURORA project to capture about 0.5 Mton of $CO_2$ annually from the flue gases of the HRC and AEC units. A $CO_2$ liquefaction plant could also be installed to deliver liquid $CO_2$ to nearby greenhouses. For the previous phase of project development, various pre-FEED activities have been completed for the $CO_2$ capture project and AEB Amsterdam now would like to start the tendering process for a FEED/EPC contract.

*Figure 1-1 AEB waste incineration plant (source: internet/public domain)*

The key elements of the AURORA project:

- $CO_2$ Capture Plant and a $CO_2$ Conditioning Unit, overall called *PCC plant* to deliver gaseous $CO_2$ to the OCAP Grid (backbone) or to potential onsite $CO_2$ Liquefaction Plant.
- Potential $CO_2$ Liquefaction Plant including Liquefaction, Storage, Truck Loading and Evaporation to deliver either liquefied $CO_2$ to Greenhouses or gaseous $CO_2$ to the OCAP Grid.
- All physical interfaces between the new $CO_2$ Capture Plant and a CO2 Conditioning Unit and the existing AEC and HRC installations.

## 3.1 Plot Location/Layout

Figure 3-1 below shows the location of the HRC, AEC and proposed area for the PCC plant. The flue gas stacks for the HRC and AEC plants are also shown. Layouts of flue gas lines in Block 10 (L11, L12) and Block 20 (L23, L24) are in principle mirror of each other.

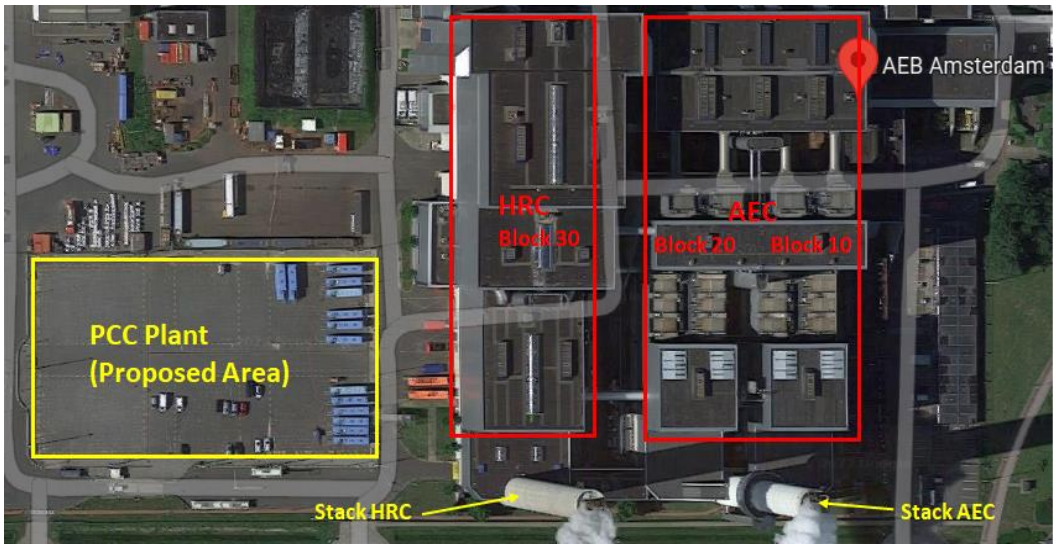
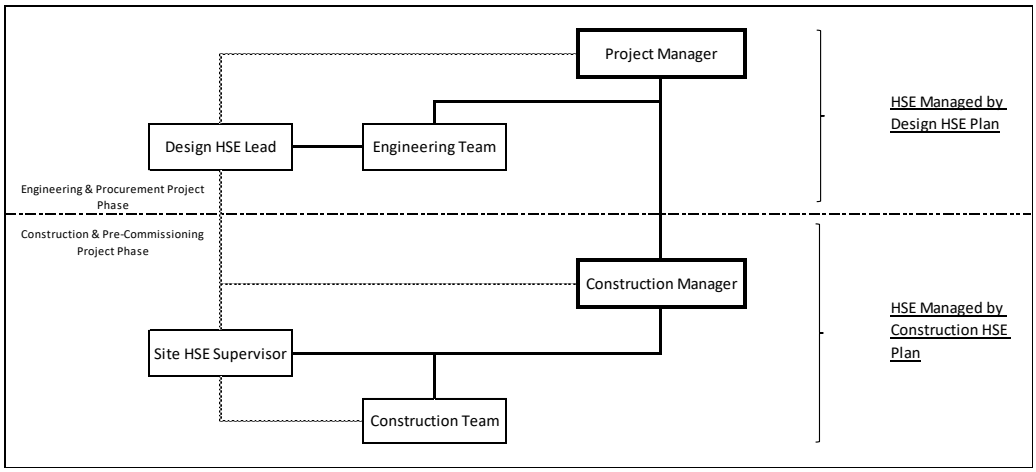



*Figure 3-1 Plot Layout HRC, AEC and PCC plant*

# 4 HSE Organisation and Responsibilities

## 4.1 Project HSE Organisation

The general project organization chart for this project is shown in figure below.




## 4.2 HSE Responsibilities

The Project Engineering Team has the responsibility to ensure that potential hazards are identified and evaluated resulting in a plant design which can be safely constructed & commissioned, safely operated & maintained, and ultimately safely de-commissioned & demolished. This also includes all regulatory compliances aspects of the project.

### 4.2.1 Project Manager

The AEB Project Manager is ultimately responsible to ensure that the HSE objectives of the project are met and that the Design HSE Plan is carried out in accordance with the planning.

Following AEB's Health, Safety and Environment (HSE) Policy it is the Project Manager's responsibility to implement this policy on the project by:

- Appointment of a Design HSE Lead.
- Ensuring that all legal, contractual, and AEB's requirements related to HSE are adhered to and implemented in the project.

### 4.2.2 Safety Engineering Lead

The Safety Engineering Lead reports to AEB's Project Manager.

Besides the responsibilities over the specific HSE deliverables (see chapter 6), the other responsibilities of the Design HSE Lead include:

- Assistance by identification and evaluation HSE hazards during Construction, Commissioning, Operation & Maintenance, and future demolition.
- Create awareness under all project disciplines of the potential health, safety and environmental risks.
- Coordination of the implementation of the HSE aspects during these project phases.
- Advising the Project in HSE matters.
- Being a focal point for Design Safety Concerns.
- Review of HSE related engineering documents.
- Keeping the design HSE Plan updated.

The HSE Lead shall be appointed in conformity with the local implementation of the European Council Directive 92/57/EEC.

### 4.2.3 Site HSE Supervisor

The Site HSE Supervisor shall be responsible to carry out supervise compliance, keep the Construction plan up to date and to report recurring or severe deviations to the Project Manager.

The detailed responsibilities of the Site HSE Supervisor are as defined in the Construction HSE Plan for the Construction phase of the Project.

### 4.2.4 Authority Engineer

The Authority Engineer shall assist in preparing specific documents required to obtain approvals related to the design and construction of equipment, bulk materials, etc. for the project. Other engineering documents necessary or used for Authority Engineering will be prepared by the various engineering disciplines under the overall coordination of the Authority Engineer.

The Authority Engineer shall be the prime contact for the preparation of the "approval" packages for the Authorities and CE-marking e.g., for PED and ATEX certification.

Authority engineering deliverables are not part of the Design HSE activities and the Design HSE File as described in this Design HSE Plan. A specific Regulatory Compliance Project Plan shall be made to manage the regulatory requirements.

### 4.2.5 Competent HSE Assessment Personnel

Certain HSE related activities in this phase (such as chairing HAZID session) shall be performed by competent personnel, approved by AEB. A list of Competent HSE Assessment Personnel is maintained by the Safety Engineering Manager. Typical information included is attended courses, experience level, client specific competencies and software competencies.

### 4.2.6 Other Project Disciplines

All members of the Project engineering Team shall realize that each individual has to contribute in meeting the optimum HSE in design. They can often eliminate or reduce future

risks during Construction, Commissioning, Start-up, Shut-down, Operation & Maintenance, and Demolition.

It is therefore the responsibility of each discipline to be aware of the HSE requirements specific for his discipline and to ensure that the relevant health, safety, and environmental aspects are considered during the design.

The project specific HSE requirements are laid down in the applicable (Dutch) Codes and Laws, the AEB standards and other relevant codes, practices, and engineering standards.

The project member shall record any Design HSE concerns that cannot be directly solved within the project on a Design Safety Concern Report (see Appendix A) and forward the report to the Design HSE Lead.

### 4.2.7 AEB

Activities where AEB shall support include:

- Provision of MSDS.
- Case histories of process-related incidents in existing and similar plants.
- Provide AEB standards/ procedures.
- Participation at HSE reviews.
- Formal approval of safety documents.
- Potential risks from the existing installation and operational activities, including transport

Support in the area of Safety Engineering from AEB will be managed by AEB's Project Manager.

# 5 Hazard Management Philosophy

The extent and nature of the hazard elimination and control methods selected shall be based on the "arbeidshygienische strategie" that is part of the Dutch ARBO law which involves the following brief consecutive steps (in this order):

Step 1: Replace the hazardous substance with a non-hazardous or less hazardous substance

Step 2: Apply technical measures, work processes, equipment and materials that prevent or limit the risks

Step 3: Take collective protective measures at the source or take organizational measures

Step 4: Provide personal protective equipment (if it doesn't introduce new risk) for employees who are (or may be) exposed to hazardous substances

Note: If the hazard cannot be designed out, a combination of hazard controls, safety devices, warning devices, special procedures, and staff training may be required. Staff training will always be required as it is a legal obligation to inform and train.

# 6 Project Specific HSE Hazards

The table below provides a non-limitative listing of the applicable project specific HSE hazards, as identified up to now.

A hazard is defined as the potential of a substance, condition, or activity to generate an uncontrolled situation which could cause damage to people, environment, or assets. All disciplines shall consider these hazards while engineering/designing and try to limit the risk by limiting the probability of occurrence and/or the impact of occurrence.

Furthermore, this list can be used to determine the required HSE activities and deliverables for this Project. Additional hazards identified during the project will be made aware to the project team via the Safety Engineering Lead.

| Hazards | Applicable | Remark |
|---|---|---|
| **Process hazards** | | |
| Flammables (fire, explosion) | ☒ | Transformer and lube oil, NH3, H2 |
| Toxics (poisoning, occupational illness) | ☒ | $NH_3$, $CO_2$. |
| Corrosives (burns) | ☒ | Caustic, Sulphuric acid |
| Oxidizing | ☐ | |
| Asphyxiation | ☒ | Nitrogen, CO2, confined spaces, steam |
| Biological (incl. legionnaires disease) | ☒ | Legionella (raw and cooling water) |
| Ionizing radiation | ☐ | NA |
| Oxygen (fire accelerator) | ☐ | NA |
| Electrification/Electrocution | ☒ | High voltage cables and systems, electrical substation, Confined Spaces |
| High pressure (physical explosion, large leak rates) | ☒ | Gaseous $CO_2$ export system (21 barg) |
| High temperature (burns, ignition source) | ☒ | High process temperatures, hot surfaces. |
| Pyrophoric material | ☐ | NA |
| Odour | ☒ | Odour compounds (e.g., $H_2S$, $NH_3$) |
| **Operational hazards** | | |
| Manual operation (physical strains) | ☒ | Accessibility, repetitive movements |
| Maintenance (physical strains) | ☒ | Accessibility, heavy lifting |
| Elevated levels (falls) | ☒ | Platforms |
| Lifting and hoisting (falling objects) | ☒ | Heavy equipment |

| Hazards | Applicable | Remark |
|---|---|---|
| Sampling/draining/venting (hazardous substances) | ☒ | No double block and bleed applied. |
| Noise (ear damage) | ☒ | Noisy equipment (pumps, compressors), control valves, relief valves |
| **External hazards** | | |
| Permits | ☒ | WABO permit |
| Soil conditions | ☒ | Subsidence, pollution |
| Weather conditions | ☒ | High winds, lightning |
| Adjacent third-party hazards | ☒ | Waternet, BEN |
| **Construction hazards** | | |
| Existing running units | ☒ | Concurrent operations, Piling Operations |
| Space availability | ☒ | Layout areas |
| Lifting and hoisting (falling objects) | ☒ | Heavy equipment, heavy modules, cranes |
| Logistics | ☒ | Interference with operational transports |
| Demolition/Isolation | ☒ | |
| Working above water | ☒ | Nearby Jetty |
| Project Specific | ☒ | Working on heights, confined space works, excavation works, heavy transports, SYMPOS, paving and tarmac works, electrical works, non destructyive testing, hydro or pneumatic testing, risk to trip installation when damaging data cables or due to vibrations caused by piling works, temporary storage of gasses and other hazardous products |

For the actual evaluation of the listed hazards is referred to the Project's HAZID Session Report with doc. no. 416041-47990/G.06/006. Also refer to project Safety Strategy document. 416041-47990/G.06/004 for a detailed discussion.

# 7 Safety Engineering Documents and Activities

The HSE aspects of the Project are recognized and encompassed in a number of HSE related documents. These HSE related documents and activities have been specified in the Safety Engineering File (see Section 8).

A few specific HSE documents are explained in more detail below.

## 7.1 Safety Engineering File

Preparing and maintaining the Safety Engineering File is a legal requirement and part of the Project Scope.

The Safety Engineering File shall be appropriate to the characteristics of the project containing relevant HSE information to be taken in account during any subsequent works.

As a minimum safety engineering file will include but not limited to:

- Project HSE Deliverables
- Manuals, technical data sheets, specifications, as-built plans, EU conformity and other legally required certificates,
- Accessibility (installation of hoists, sufficient space to install temporary equipment and on-site storage of materials)
- Motivation of chosen materials and equipment's

The first version of the Safety Engineering File is a list of all planned HSE related documents and activities and is issued simultaneously with this Safety Engineering Plan.

At the end of the project, the final version of the Safety Engineering File shall contain the actual prepared HSE documents and be handed over to AEB.

## 7.2 Design Safety Concern Report

All project members shall be aware that Design HSE concerns emanating from the proposed design should be recorded on a Design Safety Concern Report in case the concern cannot directly be solved within the project. It is the responsibility of the Design HSE Lead to ensure that all Design Safety Concerns raised are adequately actioned. Where resolution cannot be achieved within the Project, assistance from the Engineering Manager and Design HSE Manager shall be requested.

The Design Safety Concerns must be registered and followed up by means of the HSE Action List.

A template of a Design Safety Concern Report is given in Appendix A.

## 7.3 HSE Action List

A tracking/follow-up system shall be set up to note assumptions, identified problem areas and monitor HSE actions from (HSE) reviews. This monitoring system will be established by means of the HSE Action List, prepared, and maintained by the DHSE Lead.

At the end of each Project phase this HSE Action List will be closed out and remaining HSE issues will be transferred to the HSE Action List of the following Project phase. It is the responsibility of the Design HSE Lead to verify that the responses of the HSE issues are adequate and supported by auditable proof documentation.

# 8 Safety Engineering File

| Document or activity | Applicable | Owner** | Project Stage[1] | Document number / Remark |
|---|---|---|---|---|
| **Design HSE Management** | | | | |
| Safety Engineering Plan | ☒ | HSE | S/D/E | This Document, 416041-47990/G.06/005 |
| Safety Engineering File | ☒ | HSE | S/D/E | This Document, 416041-47990/G.06/005 |
| Applicable Material Safety Data Sheets | ☒ | AEB | S/D/E | To be Stored in SharePoint |
| HSE Awareness Session | ☒ | Project | S/D/E | Safety Moment is part of project meetings |
| HSE Action List | ☒ | HSE | S/D/E | 416041-47990/G.06/007 |
| HSE Close-Out Report | ☒ | HSE | S/D/E | 416041-47990/G.06/007 |
| Design Safety Concern(s) | ☒ | HSE | S/D/E | If raised |
| HSE Audits on other disciplines | ☐ | HSE | | NA |
| **Safety** | | | | |
| Inherently Safer Design (ISD) Review | ☒ | HSE | | Integral part of engineering (Design process) |
| Process Flow Diagram (PFD) Review | ☒ | Process | S/D | PFD review Session part of Select phase design. |
| Hazard Identification (HAZID) Study | ☒ | HSE | S | HAZID Report, 416041-47990/G.06/006 |
| P&ID Review | ☒ | Process | D/E | To be planned in next project Phase |
| Hazard and Operability (HAZOP) Study | ☒ | HSE | D/E | To be planned in next project Phase |
| Safety Integrity Level (SIL) Assessment | ☐ | HSE | D/E | Covered by LOPA |
| Safety Instrumented System (SIS) Design, Verification and Validation | ☒ | Instrumentation | D/E | To be planned in next project Phase |
| Layers of Protection Analysis (LOPA) | ☒ | HSE | D/E | Combined with HAZOP Reports |
| Safeguarding Memorandum (SGM) | ☒ | Process | D | To be planned in next project Phase (if applicable) |
| Quantitative Risk Analysis (QRA) | ☒ | AEB | S | Part of permit application |
| Plot Plan / Model Review | ☒ | Piping | S/D/E | Layout Reviews and finalisation. |
| Hazardous Area Classification Memorandum and Layout | ☒ | HSE | D/E | To be planned in next project Phase |
| Ignition Sources Analysis | ☐ | HSE | | NA |
| Explosion Protection Document (EPD) | ☒ | AEB | | Risk of project specific explosion scenarios including generation of H2, safe use of ammonia, BLEVE caused by $CO_2$ tanks etc. to be reviewed and recorded. |
| Emergency Alarm & Communication Philosophy | ☒ | Instrumentation | D/E | To be planned in next project Phase |

| Document or activity | Applicable | Owner** | Project Stage[1] | Document number / Remark |
|---|---|---|---|---|
| UPS & Emergency Power Philosophy | ☒ | Electrical | S | Part of Electrical Philosophy, 416041-47990/E.06/002 |
| Emergency Shutdown, Isolation and Blowdown Philosophy | ☒ | Process | D/E | To be planned in next project Phase |
| Fire and Explosion Protection Philosophy | ☒ | HSE | S | HSE Strategy, 416041-47990/G.06/004 |
| Fire Safety Assessment | ☒ | HSE | D/E | For Transformer and lube oil locations and E-rooms |
| Fire & Explosion Analysis | ☒ | HSE | D | Risk of project specific explosion scenarios including generation of $H_2$, safe use of ammonia, BLEVE caused by $CO_2$ tanks etc to be reviewed and recorded. |
| Fire Protection Design Basis | ☒ | HSE | D | |
| Fire Water Lay Out | ☒ | HSE | D/E | To be planned in next project Phase |
| Fire, Smoke & Gas Detection Design / Lay-out | ☒ | HSE | D/E | To be planned in next project Phase |
| Safety Layout (incl. alarms, signs, eyewash and safety showers, fire equipment, escape routes) | ☒ | HSE | D/E | To be planned in next project Phase |
| Constructability & Safety Review | ☒ | Construction | S/D/E | 416041-47990/K.06/001 |
| Concurrent Operations Review | ☒ | Construction | D/E | To be planned in next project Phase |
| Facility Siting Analysis (FSA) | ☐ | HSE | S/D/E | NA |
| Pre-Start-Up Safety Review | ☐ | AEB | E | To be checked if applicable |
| **Health** | | | | |
| Human Factors Engineering (HFE) Analysis | ☒ | HSE/AEB | S/D/E | HFE to be addressed during layout and model reviews. |
| Working Environment Philosophy | ☐ | HSE | | As per AEB standards |
| Ergonomic Evaluation | ☒ | HSE | S/D/E | Part of Model Reviews |
| Health Risk Assessment | ☒ | AEB | D/E | To be checked if applicable |
| Working Noise & Vibration Control | ☒ | HSE | S/D/E | To be checked if applicable |
| Safety Effect Calculations (e.g., dispersion, heat radiation calculations) | ☒ | HSE | D/E | To be planned in next project Phase |
| Job Safety Analysis | ☐ | HSE | D/E | To be planned in next project Phase |
| Exposure to hazardous substances. | ☒ | HSE | D/E | To be planned in next project Phase |
| Implementation of proven substitution efforts | ☒ | HSE | D/E | To be planned in next project Phase |

| Document or activity | Applicable | Owner** | Project Stage[1] | Document number / Remark |
|---|---|---|---|---|
| **Environment** | | | | |
| Requirements for Emissions to Air and Water, Soil Protection, Liquid and Solid Waste Streams, Noise | ☒ | AEB | S | Part of permit application |
| Permitting Plan | ☐ | AEB | S | |
| Environmental Impact Assessment | ☒ | AEB | S | Part of permit application |
| IPPC/BAT Compliance | ☒ | AEB | S | Part of permit application |
| Environmental Permit/ Wastewater Discharge Permit/ License to Operate | ☒ | AEB | S | Part of permit application |
| Environmental Emission Calculations | ☒ | AEB | S | Part of permit application |
| Drainage and Sewer Philosophy | ☒ | Process | D/E | 416041-47990/B.02/002 |
| Waste Minimization Study | ☐ | AEB | E | FEED/EPC Design |
| Energy Optimization Study | ☐ | AEB | E | FEED/EPC Design |
| External Noise Study (Permit Compliance) | ☒ | AEB | S | Part of permit application |
| Soil Investigation Report | ☒ | AEB | E | Part of permit application |
| Sustainable Development Review | ☐ | HSE | D/E | |
| **Other Project Specific Studies** | | | | |
| NRB (Nederlandse Richtlijn Bodembescherming) Check | ☒ | AEB | S | Part of permit application |
| PGS 15 Check | ☐ | AEB | S | Part of permit application (if applicable) |
| PGS 31 Check | ☐ | AEB | S | Part of permit application (if applicable) |
| PGS 29 Check | ☐ | AEB | S | Part of permit application (if applicable) |
| Milieu Effect Rapportage (MER) | ☒ | AEB | S | Part of permit application |
| **Other Customer Activities/Studies** | | | | |
| Reactive Hazards Assessment | ☐ | AEB | S/D | Not Applicable |
| HSSE Plan | ☒ | HSE | S | This Document, 416041-47990/G.06/005 |
| HSSE&SP Hazards & Risks identified for Concept Selection | ☒ | HSE | S | HAZID Session Report, 416041-47990/G.06/006 |
| ALARP Demonstration Report | ☐ | HSE | S/D/E | Part of Next Phase (if Applicable) |
| ALARP Demonstration Construction Risks | ☒ | AEB | D/E | SIMOPS/Constructions risks to be developed with Contractor(s) in next phases |
| Process Safety Review | ☒ | AEB | D/E | Refer to activities under 'Safety' |
| Health Risk Management | ☒ | AEB | D/E | To be checked if applicable |

| Document or activity | Applicable | Owner** | Project Stage[1] | Document number / Remark |
|---|---|---|---|---|
| Basis for Design | ☒ | Contractor | S | Generic Basis of Design,416041-47990/B.06/002 |
| Scope of Work and Team Size | ☒ | AEB | S | As per FEED/EPC Tender Specification |
| Project Execution Strategy | ☒ | AEB | S | As per FEED/EPC Tender Specification |
| Construction Contractor's HSSE Management Plan | ☒ | AEB | D/E | |
| Emergency Response Plan | ☒ | AEB | D/E | |
| Operations Management System (OMS) | ☒ | AEB | D | |
| Commissioning and Start-up (CSU) Plan | ☒ | AEB | D | |
| Project and CP Execution Plans and Terms | ☒ | AEB | D | |
| EPC/EPCM Contracts Award | ☒ | AEB | S | |
| Manage Change | ☒ | AEB | D | |

*S= Select, D-Define, E=Execute.

** HSE/Instrumentation/Process/Piping/Projects of Engineering Contractor for that project phase.

# Appendix A
# Design Safety Concern Report

| DESIGN SAFETY CONCERN REPORT | Project No:<br>Report No:<br>Safety Engineering Lead: |
|---|---|

**1: CONCERN:**

| | | |
|---|---|---|
| To: Safety Engineering Lead | From: ..... | Date: ..... |
| | Discipline: ..... | Copied:<br>■ Project Manager<br>■ Safety Engineering<br>■ Department Manager<br>■ Engineering Manager |

**DETAILS OF CONCERN:**

Signature: .....

**2: RECOMMENDATION**

| | | |
|---|---|---|
| From: Safety Engineering Lead | To: .....<br>(Project Manager) | Date: ..... |
| | | Copied:<br>■ Project Manager<br>■ Safety Engineering<br>■ Department Manager<br>■ Engineering Manager |

**DETAILS OF RECOMMENDATION:**

| DESIGN SAFETY CONCERN REPORT | Project No:<br>Report No:<br>Safety Engineering Lead: |
|---|---|

Signature: .....

**3: IMPLEMENTATION**

| From: .....<br>(Project Manager) | To: .....<br>(Discipline) | Date: ..... |
|---|---|---|

Copied:

- Project Manager
- Safety Engineering
- Department Manager
- Engineering Manager

**IMPLEMENTATION APPROVED:**

**(Actions Required)**

**4: CONCERN CLOSED OUT**

**REMARKS:**

Date: .....

Signature: .....
(Safety Engineering Manager)