Reporting of major accident information under the Seveso Directive (eMARS)

Data model documentation

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Contents

1 Introduction

This document describes the data model that has been developed in order to handle the necessary information that European Member States (MS) and other reporting countries are required to report on major accidents under the Seveso-III Directive (Directive 2012/18/EU). The resulting dataflow is hereafter referred to as the 'Seveso major accident reporting'.

This document defines the scope and logic of the Seveso major accident reporting dataflow. In addition to this document, two further related documents will be prepared which address other aspects of the data flow, namely the following:

- The quality assurance of the data submissions: A Quality Assurance / Quality Control (QA/QC) logic and,
- A Manual for Reporters, which will guide reporters on the practicalities of the reporting.

1.1 The legal basis

This data model document tackles the data reporting on major accidents within scope of the Seveso-III Directive and implemented through Commission Decision 2009/10/EC.

1.2 The submission procedure

Countries will submit the Seveso accident reports to the EEA Reportnet 3 platform following a procedure that will be described in detail in a separate Manual for Reporters. Reportnet 3 provides an interface for interacting with the data in tabular form and webforms. The EEA will harvest country data submissions to aggregate a European-wide dataset and release that dataset, excluding any confidential data, for analysis, public access, and support of safety and environmental programmes.

2 Seveso major accident reporting Data Model

2.1   Structure of the data model

The data model presented in this document provides an overview of all the data elements specified by the Commission Decision 2009/10/EC (hereafter, "the CD"), including the data types, the obligatory and confidential status, and their inter-relationships. The content of the reporting is not changing, compared to the reporting currently conducted on eMARS. However, the way the data is represented and stored will not in all cases be the same as in the current system. This document provides the information relevant for the data providers and users, as it indicates the structure of the data and allows to consider how it may be analysed.

The Seveso major accident reporting data model is made up of data fields (i.e. single pieces of information), called attributes and is composed of three main elements:

1. **Feature types**: contains multiple attributes to collect information about a concept (e.g. *AccidentProfile*). A feature type is the core entity in a Unified Modelling Language (UML) data model. It represents a class of data together with relevant attributes. The attributes may refer to data types or be populated with values from code lists or with numeric or text data.
2. **Data types**: used when an attribute has several items of information (e.g. an address).
    A data type is a UML data model element that defines both characteristics of data and which operations can be performed on the data. It will typically contain more than one attribute. The attributes can refer to other data types or be populated with code list values or with numeric or text data. Unless otherwise indicated, the data types listed in the following sections were created specifically for the Seveso major accident reporting data model.
3. **Code lists**: a series of pre-defined values to standardise the information gathered in certain attributes (e.g. a status, a list of substances).

Multiplicity is used to indicate if an attribute is mandatory, in addition to how many times this attribute can be populated. Multiplicity in the data model reflects the optionality detailed in the legal basis (i.e. the Seveso-III Directive and the Commission Decision 2009/10/EC), as well as the current implementation. As an example, multiplicity of [0..*] means a value for a certain attribute need not be reported mandatorily, but it can be reported once, or reported multiple times. Reporting of attributes where no multiplicity is specified in the data model diagrams (Figure 1 to Figure 9) will be mandatory (if the multiplicity were to be listed for such situations, this would be [1..1]).

Details on the reporting platform will be presented in a separate document (Manual for Reporters). However, this document includes examples of possible implementation of the fields in a webform format to illustrate how the structure provided could be converted into a form.

2.2 Access to the data model

During the development phase, all materials related to the Seveso Reporting are published at the project website: https://eionet.europa.eu/reportnet/seveso.

This website will contain the latest version of the following documents as soon as they are ready:

- The Seveso Reporting data models (this document and the corresponding document for establishment information)
- The Manual for Reporters
- The QA/QC manual

When the Seveso major accident reporting dataflow progresses to an operational phase, all materials will be moved to a dedicated location on the reporting platform.

3 Detailed description and considerations

This section presents the general logic of the data structure. Then, it systematically progresses through all the feature types and their attributes. The structure is modelled based on the CD. Each section includes: a diagram, a mapping of each attribute to a relevant item of the CD, and a detailed description of each attribute, including its format and explanation of the content.

The content and description of information uses the wording in the CD to the extent possible.

3.1 The overall structure

The central element in the accident report structure is the accident profile (section I.1 of the CD). It contains the key information about the accident (reporting authority, time of accident and type of establishment). This section contains the top-level information about the event.

This central element links to all the sections required in the accident report (accident description, site and installation, substances involved, causes, consequences, emergency response, lessons learned). Where the elements are linked, the values next to the arrows show if they have a 1 to 1 relationship, or a different multiplicity. For example, each AccidentProfile will be linked to one AccidentConsequences element, indicated with ⟶ . However, AccidentConsequences will have other elements linked to it (ConsequencesHuman, ConsequencesEnvironmental, ConsequencesCost, ConsequencesDisruption). Each of these elements might be used or not depending on the type of consequences the accident has. This is indicated with ⟶ (1 accident consequence element can link to none, 1 or more human consequences and as such, none, 1 or several linked blocks).

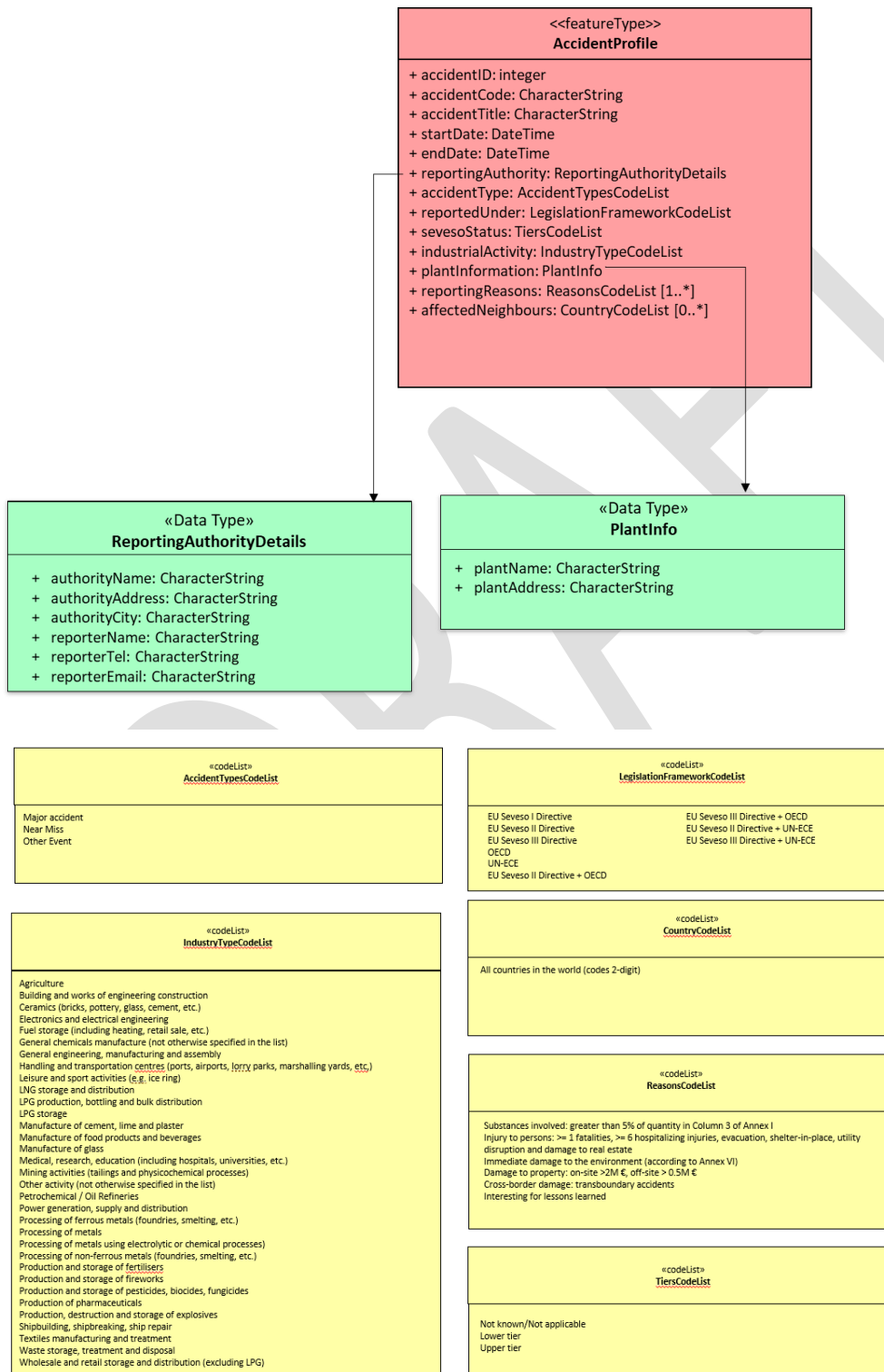**Figure 1 Overall (top) structure of eMARS**
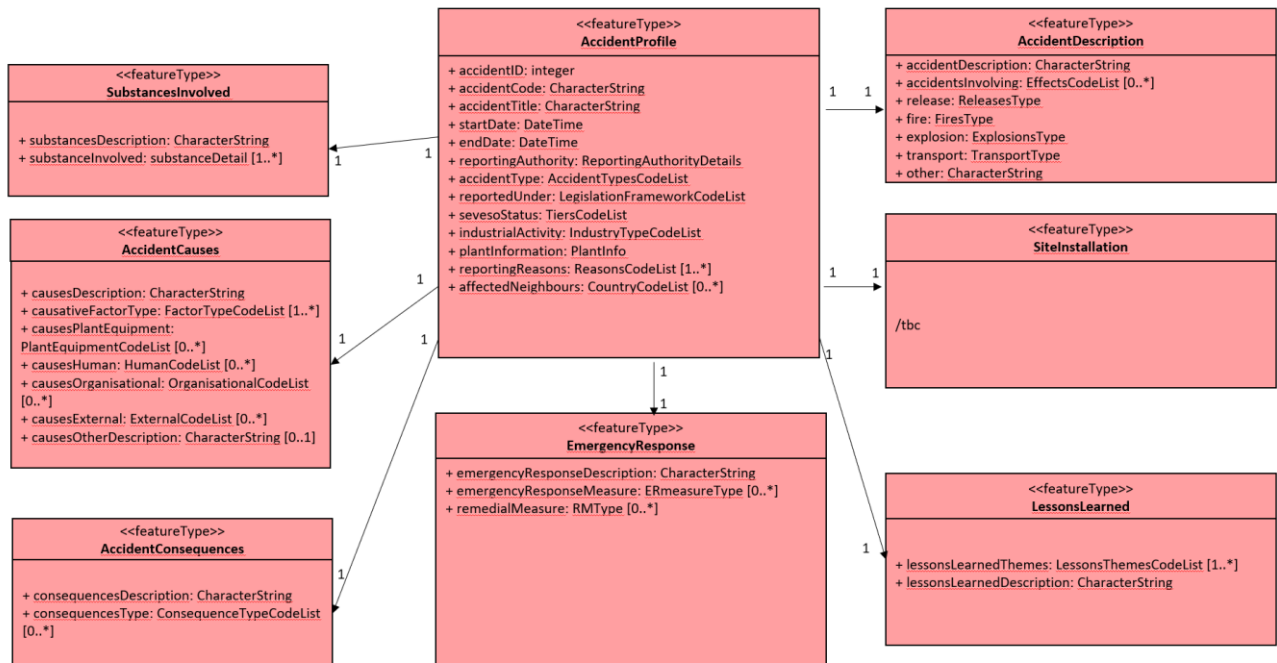
3.2 Accident profile

3.2.1 Key information

The *AccidentProfile* is the central feature type which provides the information on the place, date, time of the accident, the name and type of establishment, as well as information on reporting authority and reasons for reporting. This covers the elements in Part I of the Accident report as defined in Commission Decision 2009/10/EC. The visual representation of the structure is shown in Figure 2.

Figure 2 AccidentProfile feature type and associated data types and code lists

<<featureType>> **AccidentProfile**
+ accidentID: integer
+ accidentCode: CharacterString
+ accidentTitle: CharacterString
+ startDate: DateTime
+ endDate: DateTime
+ reportingAuthority: ReportingAuthorityDetails
+ accidentType: AccidentTypesCodeList
+ reportedUnder: LegislationFrameworkCodeList
+ sevesoStatus: TiersCodeList
+ industrialActivity: IndustryTypeCodeList
+ plantInformation: PlantInfo
+ reportingReasons: ReasonsCodeList [1..*]
+ affectedNeighbours: CountryCodeList [0..*]

«Data Type» **ReportingAuthorityDetails**
+ authorityName: CharacterString
+ authorityAddress: CharacterString
+ authorityCity: CharacterString
+ reporterName: CharacterString
+ reporterTel: CharacterString
+ reporterEmail: CharacterString

«Data Type» **PlantInfo**
+ plantName: CharacterString
+ plantAddress: CharacterString

«codeList» **AccidentTypesCodeList**
Major accident
Near Miss
Other Event

«codeList» **LegislationFrameworkCodeList**
EU Seveso I Directive   EU Seveso III Directive + OECD
EU Seveso II Directive   EU Seveso II Directive + UN-ECE
EU Seveso III Directive   EU Seveso III Directive + UN-ECE
OECD
UN-ECE
EU Seveso II Directive + OECD

«codeList» **IndustryTypeCodeList**
Agriculture
Building and works of engineering construction
Ceramics (bricks, pottery, glass, cement, etc.)
Electronics and electrical engineering
Fuel storage (including heating, retail sale, etc.)
General chemicals manufacture (not otherwise specified in the list)
General engineering, manufacturing and assembly
Handling and transportation centres (ports, airports, lorry parks, marshalling yards, etc.)
Leisure and sport activities (e.g. ice ring)
LNG storage and distribution
LPG production, bottling and bulk distribution
LPG storage
Manufacture of cement, lime and plaster
Manufacture of food products and beverages
Manufacture of glass
Medical, research, education (including hospitals, universities, etc.)
Mining activities (tailings and physicochemical processes)
Other activity (not otherwise specified in the list)
Petrochemical / Oil Refineries
Power generation, supply and distribution
Processing of ferrous metals (foundries, smelting, etc.)
Processing of metals
Processing of metals using electrolytic or chemical processes)
Processing of non-ferrous metals (foundries, smelting, etc.)
Production and storage of fertilisers
Production and storage of fireworks
Production and storage of pesticides, biocides, fungicides
Production of pharmaceuticals
Production, destruction and storage of explosives
Shipbuilding, shipbreaking, ship repair
Textiles manufacturing and treatment
Waste storage, treatment and disposal
Wholesale and retail storage and distribution (excluding LPG)

«codeList» **CountryCodeList**
All countries in the world (codes 2-digit)

«codeList» **ReasonsCodeList**
Substances involved: greater than 5% of quantity in Column 3 of Annex I
Injury to persons: >= 1 fatalities, >= 6 hospitalizing injuries, evacuation, shelter-in-place, utility disruption and damage to real estate
Immediate damage to the environment (according to Annex VI)
Damage to property: on-site >2M €, off-site > 0.5M €
Cross-border damage: transboundary accidents
Interesting for lessons learned

«codeList» **TiersCodeList**
Not known/Not applicable
Lower tier
Upper tier

The table below shows how each attribute maps to the CD.

Attribute	Item number in the Commission Decision (Part I)
accidentID	Metadata
accidentCode	Metadata
accidentTitle	1.2
startDate	1.1
endDate	1.1
reportingAuthority	1.3, 1.4
authorityName	1.3
authorityAddress	1.3
authorityCity	1.3
reporterName	1.4
reporterTel	1.4
reporterEmail	1.4
accidentType	1.5
reportedUnder	1.6
sevesoStatus	1.7
industrialActivity	1.8
plantInformation	1.9
plantName	1.9
plantAddress	1.9
reportingReasons	1.10
affectedNeighbours	1.11

Possible corresponding webform implementation (not including reporting authority and contact details):

3.2.1 Detailed description of elements

- **accidentID** and **accidentCode:** these attributes are created automatically and are used to identify the accidents. For existing accident data, the values will be inherited from the existing system. AccidentID is

the public accident identifier, while accidentCode is only visible to authorised users and contains country information. Only a single public accidentID will be created for new accidents.

- **accidentTitle:** this is a text string, which is used to explain what happened in a short sentence.

- **startDate** and **endDate:** attributes used to indicate the start and end of the accident.

- **reportingAuthority:** is an attribute that links to ReportingAuthorityDetails data type. This is not visible to the public. ReportingAuthorityDetails is a data type designed to collect name and address information of the reporting authority and the relevant contact point.

  This data type contains the following attributes:

  - ○ **authorityName:** A character string populated with name of the reporting authority.

  - ○ **authorityAddress:** A character string populated with street of the reporting authority.

  - ○ **authorityCity:** A character string populated with the name of the city where of the reporting authority.

  - ○ **reporterName:** A character string populated with name of the reporting contact point.

  - ○ **reporterTel:** A character string populated with the phone number of the reporting contact point.

  - ○ **reporterEmail:** A character string populated with the email address of the reporting contact point.

This set of attributes included in this draft data model to define Reporting Authority is based on the current data entry structure, since the existing data is available in this granularity and form. Country will be filled automatically. One field not included here is the fax number. While it is available as an optional field in the current data entry form, for new data reporting it is not expected to be useful.

- **accidentType:** This attribute is populated using a multiple selection field with a code list *AccidentTypesCodeList*. This is used to indicate the accident type reported (major accident, near miss or other).

- **reportedUnder:** This attribute is populated using a multiple selection field with a code list *LegislationFrameworkCodeList*. This is used to indicate the relevant legislation/agreement under which the accident is reported (relevant Seveso Directive version, or international).

- **sevesoStatus:** This attribute is populated using a multiple selection field with a code list *TiersCodeList*. This is used to indicate the relevant tier that the establishment where the accident occurred belongs to.

- **industrialActivity:** This attribute is populated using a multiple selection field with a code list *IndustryTypeCodeList*. This is used to indicate the industrial activity in the establishment.

- **plantInformation:** is linked to data type PlantInfo, which is a data type designed to collect name and address information of the plant where the event happened. This information is mandatory, but will not be made public, as it is marked as confidential in the Commission Decision (item 1.9).

  - ○ **plantName:** this attribute is a character string that contains the plant name where the event occurred.

  - ○ **plantAddress:** this attribute is a character string that contains the address of the establishment where the event occurred.

- **reportingReasons:** This attribute is populated using a multiple selection field with a code list *ReasonsCodeList*. This is used to indicate the reasons for reporting the accident, linked to the criteria list in Annex VI of the Seveso Directive.

- **affectedNeighbours**: This attribute is populated with values from the *CountryCodeList* code list which contains a list of all countries in the world.

3.3 Accident Description

The *AccidentDescription* feature type is used to cover the information required under section "1. Accident description" of the CD. This feature type is used to provide information about the events that took place during the accident and includes both descriptive fields and multiple selection variables.

3.3.1 Key information

Figure 3 AccidentDescription feature type and associated data types and code lists
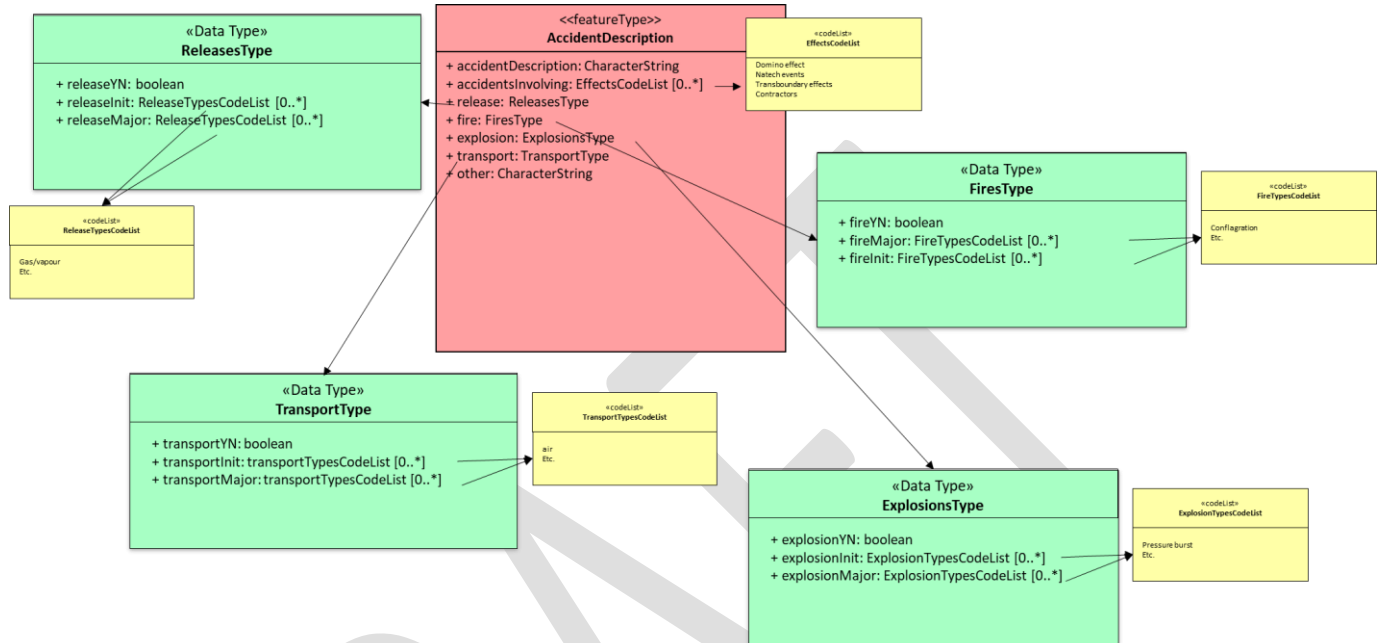
The table below shows how each attribute maps to the CD.

Attribute	Item number in the Commission Decision (Part II)
accidentDescription	1.1
accidentsInvolving	1.2
release	1.3, 1.3.1
releaseYN	1.3
releaseInit	1.3.1
releaseMajor	1.3.1
fire	1.4
fireYN	1.4
fireInit	1.4.1
fireMajor	1.4.1
explosion	1.5, 1.5.1
explosionYN	1.5
explosionInit	1.5.1
explosionMajor	1.5.1
transport	1.6, 1.6.1
transportYN	1.6
transportInit	1.6.1
transportMajor	1.6.1
other: CharacterString	1.7

Possible corresponding webform implementation (draft with example selections; when "yes" is selected, new drop-down boxes appear):

3.3.2 Detailed description of elements

The feature type contains two free text attributes to collect qualitative type of data. In addition, it contains an attribute to collect quantifiable information regarding the type of effects the accident involves. Finally, it has four attributes that are intended for collection of quantifiable information on the type of events that occurred during the accident.

- **accidentDescription**: This attribute is an open text field, used to provide a detailed description of the accident. This should include the timeline of events and involved parties.

- **accidentsInvolving**: This attribute is populated using a multiple selection field with a code list *EffectsCodeList*. This is used to indicate whether the accident involved any special circumstances (such as domino effects, Natech events, transboundary effects or contractors).

- **Release** is an attribute used to describe if the accident involved a release, if so, what type and in what situation (as an initiating event or a major occurrence). This attribute links to ReleasesType data type containing the following attributes:

  o **releaseYN**: is an attribute of Boolean type (or "yes", "no"). This is used to answer the question in the CD "did the accident involve a release?" This attribute is presently not explicit and mandatory, but to ensure the completeness of the dataset, this is proposed to be a mandatory attribute, i.e. either "yes" or "no" should be selected.

  o **releaseInit**: this attribute is used to indicate whether the initiating event of the accident timeline involved a release and what type of release occurred (i.e. an <u>initiating event</u>). It can take one or more values from the *ReleaseTypesCodeList.*

  o **releaseMajor**: this attribute is used to indicate what type of release occurred in the accident, as a <u>major occurrence</u>. It can take one or more values from the *ReleaseTypesCodeList.*

- **Fire** is an attribute used to describe if the accident involved a fire, if so, what type and in what situation (as an initiating event or a major occurrence). This attribute links to FiresType data type containing the following attributes:

  o **fireYN**: is an attribute of Boolean type (or "yes", "no"). This is used to answer the question in the CD "did the accident involve a fire?". This attribute is presently not explicit and mandatory, but to ensure the completeness of the dataset, this is proposed to be a mandatory attribute, i.e. either "yes" or "no" should be selected.

  o **fireInit**: this attribute is used to indicate whether the initiating event of the accident timeline involved a fire and what type of fire occurred (i.e. an initiating event). It can take one or more values from the *FireTypesCodeList.*

  o **fireMajor**: this attribute is used to indicate what type of fire occurred in the accident, as a major occurrence. It can take one or more values from the *FireTypesCodeList.*

- **Explosion** is an attribute used to describe if the accident involved a release, if so, what type and in what situation (as an initiating event or a major occurrence). This attribute links to ExplosionsType data type containing the following attributes:

  o **explosionYN**: is an attribute of Boolean type (or "yes", "no"). This is used to answer the question in the CD "did the accident involve an explosion?". This attribute is presently not explicit and mandatory, but to ensure the completeness of the dataset, this is proposed to be a mandatory attribute, i.e. either "yes" or "no" should be selected.

  o **explosionInit**: this attribute is used to indicate whether the initiating event of the accident timeline involved an explosion and what type of explosion occurred (i.e. an initiating event). It can take one or more values from the *ExplosionTypesCodeList.*

  o **explosionMajor**: this attribute is used to indicate what type of explosion occurred in the accident, as a major occurrence. It can take one or more values from the *ExplosionTypesCodeList.*

- **Transport** is an attribute used to describe if the accident involved a release, if so, what type and in what situation (as an initiating event or a major occurrence). This attribute links to TransportType data type containing the following attributes:

  o **transportYN**: is an attribute of Boolean type (or "yes", "no"). This is used to answer the question in the CD "did the accident involve transport?". This attribute is presently not explicit and mandatory, but to ensure the completeness of the dataset, this is proposed to be a mandatory attribute, i.e. either "yes" or "no" should be selected.

  o **transportInit**: this attribute is used to indicate whether the initiating event of the accident timeline involved transport and what type of transport was involved (i.e. an initiating event). It can take one or more values from the *TransportTypesCodeList.*

  o **transportMajor**: this attribute is used to indicate what type of transport was involved in the accident, as a major occurrence. It can take one or more values from the *TransportTypesCodeList.*

- **other: CharacterString**: This is an open text field, used to describe if the accident was initiated by or involved a major occurrence of another type of event not covered by the categories above.

3.4 Site and installation description

The *SiteInstallation* feature type is used to cover the information required under section "2. Site and installation description" of the CD Part II. This feature type is used to provide information about the area (operational phase, e.g. storage, process, transfer, transport) where the accident happened, and equipment involved. It includes both descriptive fields and multiple selection variables.

3.4.1 Key information

Figure 4 SiteInstallation feature type and associated data types and code lists
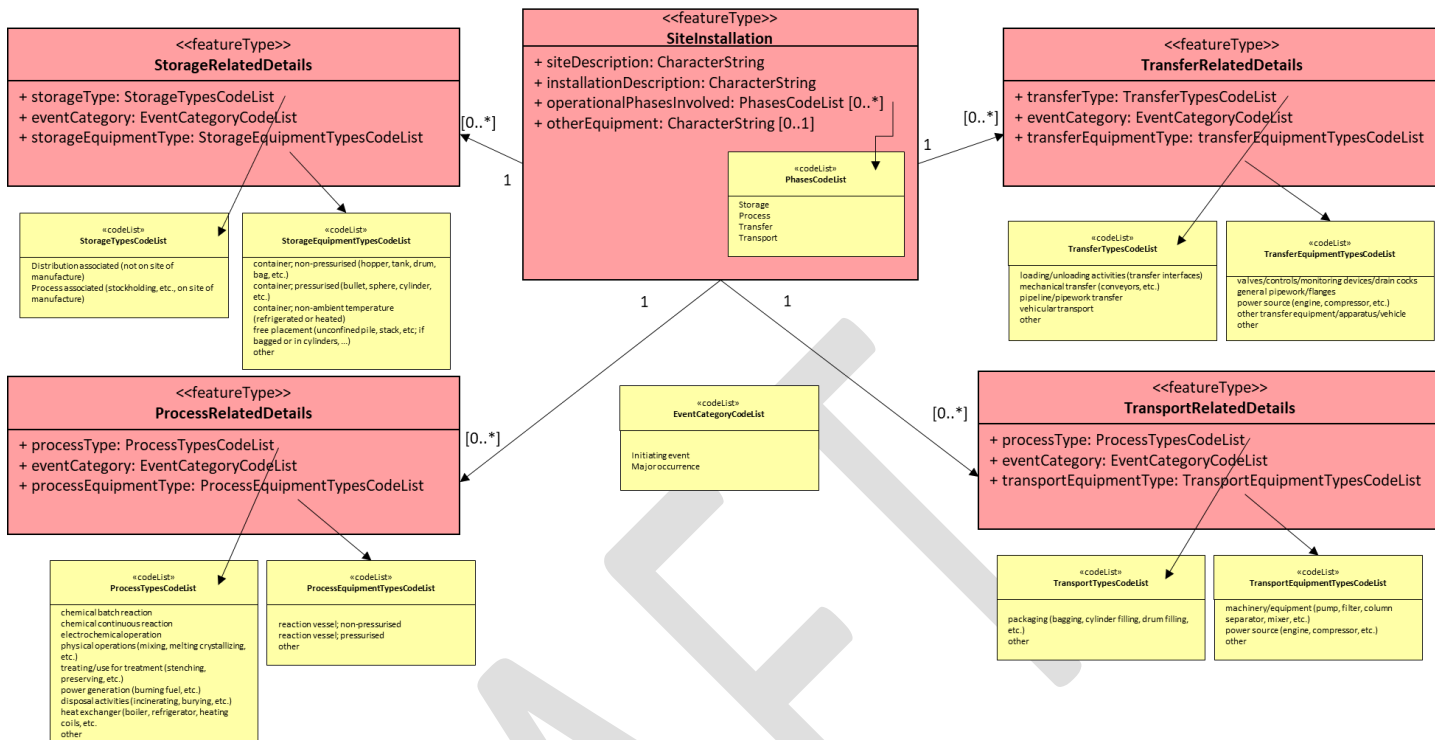
The table below shows how each attribute maps to the CD.

Attribute	Item number in the Commission Decision (Part II)
siteDescription	2.1
installationDescription	2.2
operationalPhasesInvolved	2.3, 2.4, 2.5, 2.6
storageType	2.3.1
eventCategory	2.3.1
storageEquipmentType	2.3.2
processType	2.4.1
eventCategory	2.4.1
processEquipmentType	2.4.2
transferType	2.5.1
eventCategory	2.5.1
transferEquipmentType	2.5.2
transportType	2.6.1
eventCategory	2.6.1
transportEquipmentType	2.6.2
otherEquipment	2.7

Possible corresponding webform implementation (draft with an example where a "storage" was involved, and the answer to "which of these areas were/was involved in the accident?" is "Storage". Subsequently a section on "storage details" appears, and multiple entries of those details are possible):

3.4.2   Detailed description of elements

The feature type *SiteInstallation* contains three free text attributes to collect qualitative data. In addition, it contains another attribute to collect information on the area or areas involved in the accident. Further, there are linked feature types for collecting information about details on areas and equipment involved.

- **siteDescription**: This is an open text field, used to provide a description of the site and industrial activities taking place.
- **instalationDescription**: This is an open text field, used to provide a description of the installation involved, and its components.
- **operationalPhasesInvolved**: This is an attribute used to select in which operational phases (storage, process, transfer, transport) of the installation there were equipment failures. Multiple options may be selected. The attribute takes values from *PhasesCodeList.*

- **otherEquipment**: This is an open text field, used to provide a description of the equipment involved, if it does not fall into one of the above areas.

For providing details on the areas involved in the accident, four separate feature types are used, each with three attributes.

StorageRelatedDetails – this feature type is used for providing details on equipment failures related with storage. More than one instance of this feature type can be reported, if there are multiple relevant events or types of equipment. The feature type has the following attributes:

- ○ **storageType**: This is an attribute used to select which type of storage was involved. It uses *StorageTypeCodeList*. This list consists of values listed in the CD item 2.3.1.

- o **eventCategory**: This is an attribute used to select if the failure occurred as an initiating event or major occurrence. It uses *EventCategoryCodeList*.
- o **storageEquipmentType**: This is an attribute used to select the specific storage related equipment that failed. It uses *StorageEquipmentTypesCodeList*. This list consists of values listed in the CD item 2.3.2.

ProcessRelatedDetails – this feature type is used for providing details on equipment failures related with process. More than one instance of this feature type can be reported, if there are multiple relevant events or types of equipment. The feature type has the following attributes:

- o **processType**: This is an attribute used to select which type of process was involved. It uses *ProcessTypeCodeList*. This list consists of values listed in the CD item 2.4.1.
- o **eventCategory**: This is an attribute used to select if the failure occurred as an initiating event or major occurrence. It uses *EventCategoryCodeList*.
- o **processEquipmentType**: This is an attribute used to select the specific process related equipment that failed. It uses *ProcessEquipmentTypesCodeList*. This list consists of values listed in the CD item 2.4.2.

TransferRelatedDetails – this feature type is used for providing details on equipment failures related with transfer. More than one instance of this feature type can be reported, if there are multiple relevant events or types of equipment. The feature type has the following attributes:

- o **transferType**: This is an attribute used to select which type of transfer was involved. It uses *TransferTypeCodeList*. This list consists of values listed in the CD item 2.5.1.
- o **eventCategory**: This is an attribute used to select if the failure occurred as an initiating event or major occurrence. It uses *EventCategoryCodeList*.
- o **transferEquipmentType**: This is an attribute used to select the specific transfer related equipment that failed. It uses *TransferEquipmentTypesCodeList*. This list consists of values listed in the CD item 2.5.2.

TransportRelatedDetails – this feature type is used for providing details on equipment failures related with transport. More than one instance of this feature type can be reported, if there are multiple relevant events or types of equipment. The feature type has the following attributes:

- o **transportType**: This is an attribute used to select which type of transport was involved. It uses *TransportTypeCodeList*. This list consists of values listed in the CD item 2.6.1.
- o **eventCategory**: This is an attribute used to select if the failure occurred as an initiating event or major occurrence. It uses *EventCategoryCodeList*.
- o **transportEquipmentType**: This is an attribute used to select the specific transport related equipment that failed. It uses *TransportEquipmentTypesCodeList*. This list consists of values listed in the CD item 2.6.2.

3.5 Substances involved

The *SubstancesInvolved* feature type is used to cover the information required under section "3. Substances involved" of the CD. This feature type is used to provide a description of substances involved in the accident, that are covered by Annex I of the Seveso Directive. The feature type includes both descriptive fields and multiple selection variables.

3.5.1   Key information

Figure 5 *SubstancesInvolved* feature type and associated data types and code lists
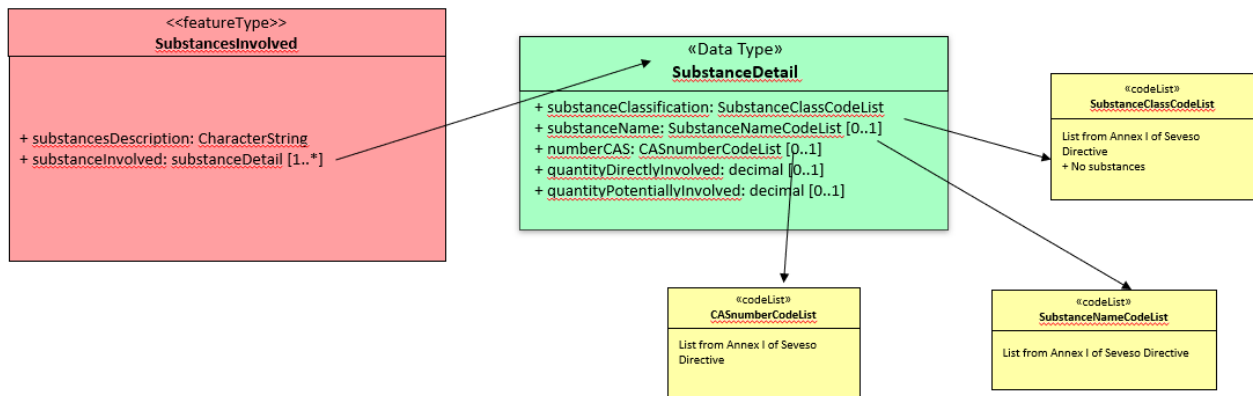
The table below shows how each attribute maps to the CD.

Attribute	Item number in the Commission Decision (Part II)
substancesDescription	3.1
substanceInvolved	3.2-3.5
substanceClassification	3.2
substanceName	/
numberCAS	3.3
quantityDirectlyInvolved	3.4
quantityPotentiallyInvolved	3.5

Possible corresponding webform implementation:

3.5.2 Detailed description of elements

The *SubstancesInvolved* feature type is linked to the AccidentProfile feature type. It contains two mandatory attributes:

- **substancesDescription:** This attribute is used to provide a free text description of the substances involved in the event.

- **substanceInvolved** is the attribute to describe the substances involved, using a set of structured checkboxes. It can take one or more values, corresponding to individual substances and their categories. The mandatory nature of this attribute is intended to ensure that the reporter indicates if no relevant

substances were involved. If there are multiple substances involved, the attribute can take more values. This attribute links to SubstanceDetails data type containing the following attributes:

- o **substanceClassification:** this attribute is used to select the classification of the substance involved. It takes values from *SubstanceClassCodeList.* If no relevant Seveso substances were involved, this can be indicated, and the rest of the form left blank.
- o **substanceName:** this attribute is used to report the name of the specific substance involved. It takes values from *SubstanceNameCodeList.*
- o **numberCAS:** this attribute is used to report the CAS number of the specific substance involved. It takes values from *CASnumberCodeList.*
- o **quantityDirectlyInvolved:** this attribute is used to report the quantity of the respective substance that was directly involved in the accident. This should be a numeric value and provided in tonnes.
- o **quantityPotentiallyInvolved:** this attribute is used to report the quantity of the respective substance that was potentially involved in the accident. This should be a numeric value and provided in tonnes.

3.5.3 Code lists

The *SubstanceClassCodeList:* This list is populated by values from Annex I of Seveso Directive.

The *SubstanceNameCodeList:* This list is populated by values from Annex I of Seveso Directive.

The *CASnumberCodeList*: This list is populated by values from Annex I of Seveso Directive.

In order to accommodate possible other substances, an additional field could be added to include "other" substances that are not from the above list (multiple substances).

3.6 Causes

The *Causes* feature type is used to cover the information required under section "4. Causes of the accident" of the CD. This feature type is used to provide information about the immediate and underlying causes of the accident. It includes both descriptive fields and multiple selection variables.

3.6.1 Key information

Figure 6 *Causes* feature type and associated data types and code lists
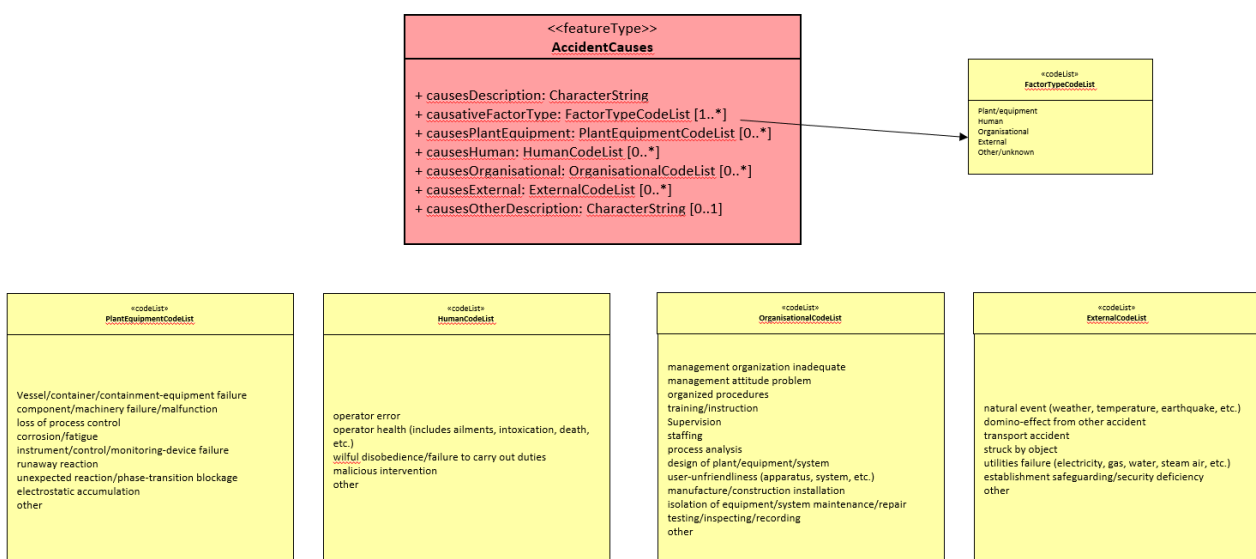
The table below shows how each attribute maps to the CD.

Attribute	Item number in the Commission Decision (Part II)
causesDescription	4.1
causativeFactorType	4.2, 4.3, 4.4, 4.5, 4.6
causesPlantEquipment	4.2.1
causesHuman	4.3.1
causesOrganisational	4.4.1
causesExternal	4.5.1
causesOtherDescription	4.6

Possible corresponding webform implementation (the selection in the "Causative factors" box is the condition for the other boxes to appear):

3.6.1 Detailed description of elements

causesDescription: this is a textual attribute used to describe the causes of the accident.

causativeFactorType: This is the element used to select which factor types played a role in causing the accident. This takes values from *FactorTypeCodeList*. The reporter can choose one or more factor types (Plant/equipment, human, organisational, external, other/unknown).

causesPlantEquipment: this attribute allows the reporter to specify which plant or equipment related factor was involved in the cause of the accident. It takes values from *PlantEquipmentCodeList* and more than one value can be selected.

causesHuman: this attribute allows the reporter to specify which human error related factor was involved in the cause of the accident. It takes values from *HumanCodeList* and more than one value can be selected.

causesOrganisational: this attribute allows the reporter to specify which organisational failure related factor was involved in the cause of the accident. It takes values from *OrganisationalCodeList* and more than one value can be selected.

causesExternal: this attribute allows the reporter to specify which external factor was involved in the cause of the accident. It takes values from *ExternalCodeList* and more than one value can be selected.

causesOtherDescription: if "other/unknown" is selected in **causativeFactorType** attribute, the reporter can elaborate the details in this field.

Note: The dropdowns for causative factors in the current system include "not known / not applicable" and "not identified" as the final options in addition to "other". These are not in the legislation. In the new system the drop-down can be trimmed and if "other" is ticked, the free text description would be compulsory.

3.7 Consequences

The information required under section "5. Consequences" of the CD is complex. In this data model it is described by several linked feature types. *AccidentConsequences* feature type is the central feature type, used to provide a description of the consequences of the accident, as well as a multiple selection variable to provide information on the type of consequences that the accident had. Each type of consequences is then covered by its own feature type. A distinction between on-site and off-site effects is required. The feature type includes descriptive fields, quantitative fields, and multiple selection variables.

3.7.1   Key information

Figure 7 *AccidentConsequences* feature type, linked feature types and associated code lists
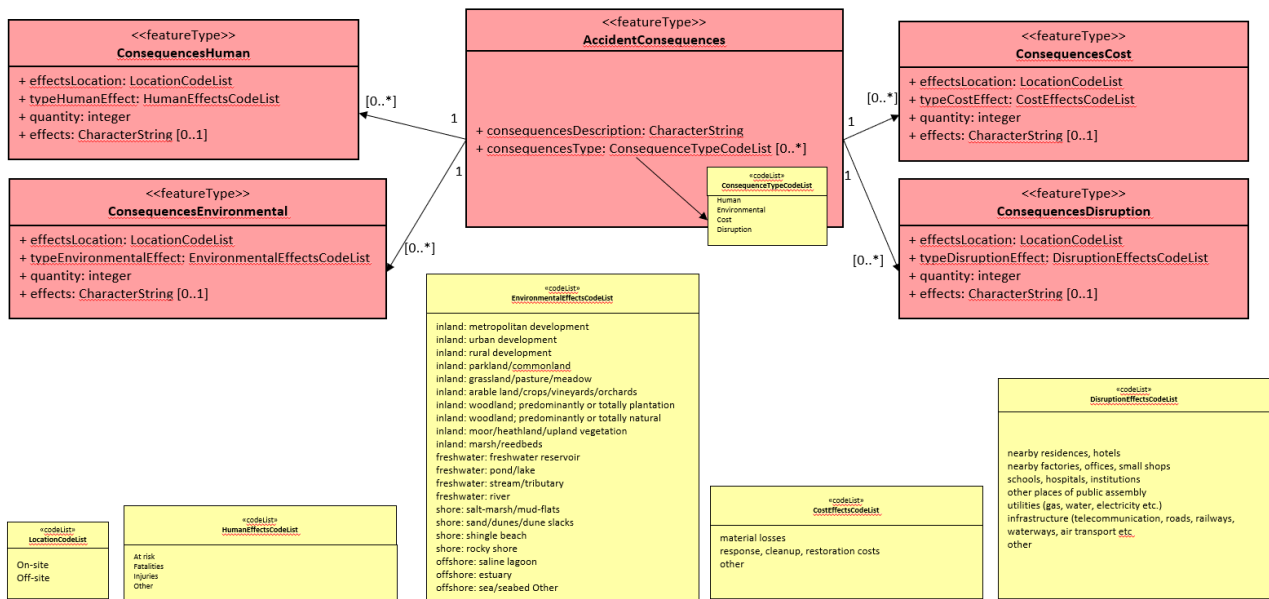
The table below shows how each attribute maps to the CD.

Attribute	Item number in the Commission Decision (Part II)
consequenceDescription	5.1
consequencesType	5.2, 5.3, 5.4, 5.5
humanEffectsLocation	5.2.1
typeHumanEffect	5.2.2
humanEffectsQuantity	5.2.3
humanEffectsDesc	5.2.3
envEffectsLocation	5.3.1
typeEnvironmentalEffect	5.3.2
envEffectsQuantity	5.3.3
envEffectsDesc	5.3.3
costEffectsLocation	5.4.1
typeCostEffect	5.4.2
costEffectsQuantity	5.4.3
costEffectsDesc	5.4.3
disruptionEffectsDesc	5.5.1
effectsLocation	5.5.2
typeDisruptionEffect	5.5.3
disruptionEffectsQuantity	5.5.3

Possible corresponding webform implementation (where "human" consequences are selected, the sub-form appears and multiple lines can be created to add multiple human harm consequences):

3.7.2   Detailed description of elements

The feature type *AccidentConsequences* contains one free text attribute to collect qualitative data. In addition, it contains another attribute to collect information on the type of consequences that the accident had. Further, there are feature types for collecting information about details on each type of consequences.

- **consequencesDescription**: This is an open text field, used to provide a description of the consequences of the accident.
- **consequencesType**: This is an attribute used to select what type of consequences the accident had (Human, Environmental, Cost, Disruption). Multiple options may be selected. The attribute takes values from *ConsequencesTypeCodeList.*

For providing details on each type of consequences, four separate feature types are used, each with four attributes.

ConsequencesHuman – this feature type is used for providing details on human consequences. More than one instance of this feature type can be reported, if there are more than one relevant consequence. The feature type has the following attributes:

- o **humanEffectsLocation**: This is an attribute used to select whether the consequences occurred on-site or off-site. It uses *LocationCodeList*.
- o **typeHumanEffect**: This is an attribute used to specify the types of human consequences. It uses *HumanEffectsCodeList*.
- o **humanEffectsQuantity**: This is an attribute used to specify how many people were affected by the type of human consequence given in attribute **typeHumanEffect**. As such, it is an integer value.
- o **humanEffectsDesc**: This is an attribute used to explain the reported effect, or provide further details, if necessary. It may also be left empty.

The first three attributes allow to provide information in a way which facilitates quantitative analysis, while the fourth attribute can be used to clarify or provide more detail.

Example: Two (2) workers injured while repairing a pipe.

HumanEffectsLocation: On-site
typeHumanEffect: Injuries
HumanEffectsQuantity: 2
HumanEffectsDesc: Two (2) workers were injured while repairing a pipe.

ConsequencesEnvironmental – this feature type is used for providing details on environmental consequences of the accident. More than one instance of this feature type can be reported, if there are more than one relevant consequence. The feature type has the following attributes:

- o **envEffectsLocation**: This is an attribute used to select whether the consequences occurred on-site or off-site. It uses *LocationCodeList*.
- o **typeEnvironmentalEffect**: This is an attribute used to specify the types of environmental consequences. It uses *EnvironmentalEffectsCodeList*.
- o **envEffectsQuantity**: This is an attribute used to specify the quantity for the type of environmental consequence given in attribute **typeEnvironmentalEffect**.
- o **envEffectsDesc**: This is an attribute used to explain the reported effect, or provide further details, if necessary. It may also be left empty.

ConsequencesCost – this feature type is used for providing details on economic/cost consequences of the accident. More than one instance of this feature type can be reported, if there are more than one relevant consequence. The feature type has the following attributes:

- o **costEffectsLocation**: This is an attribute used to select whether the consequences occurred on-site or off-site. It uses *LocationCodeList*.
- o **typeCostEffect**: This is an attribute used to specify the types of environmental consequences. It uses *CostEffectsCodeList*.
- o **costEffectsQuantity**: This is an attribute used to specify the monetary cost for the type of cost given in attribute **typeCostEffect**.
- o **costEffectsDesc**: This is an attribute used to explain the reported effect, or provide further details, if necessary. It may also be left empty.

ConsequencesDisruption – this feature type is used for providing details on disruption consequences of the accident. More than one instance of this feature type can be reported, if there are more than one relevant consequence. The feature type has the following attributes:

- o **effectsLocation**: This is an attribute used to select whether the consequences occurred on-site or off-site. It uses *LocationCodeList*. In practice, the disruption consequences are related to off-site effects.
- o **typeDisruptionEffect**: This is an attribute used to specify the facilities affected by the accident. It uses *DisruptionEffectsCodeList*.
- o **disruptionEffectsQuantity**: This is an attribute used to specify the facilities affected by the accident. It uses *DisruptionEffectsCodeList*.
- o **disruptionEffectsDesc**: This is an attribute used to explain the reported effect, or provide further details, if necessary. It may also be left empty.

3.8 Emergency response

The *EmergencyResponse* feature type is used to cover the information required under section "6. Emergency response" of the CD. This feature type is used to provide information about the emergency response following the accident. It includes both descriptive fields and complex attributes for indicating quantity of different response and remedial measure types.

3.8.1 Key information

Figure 8 EmergencyResponse feature type and associated data types and code lists
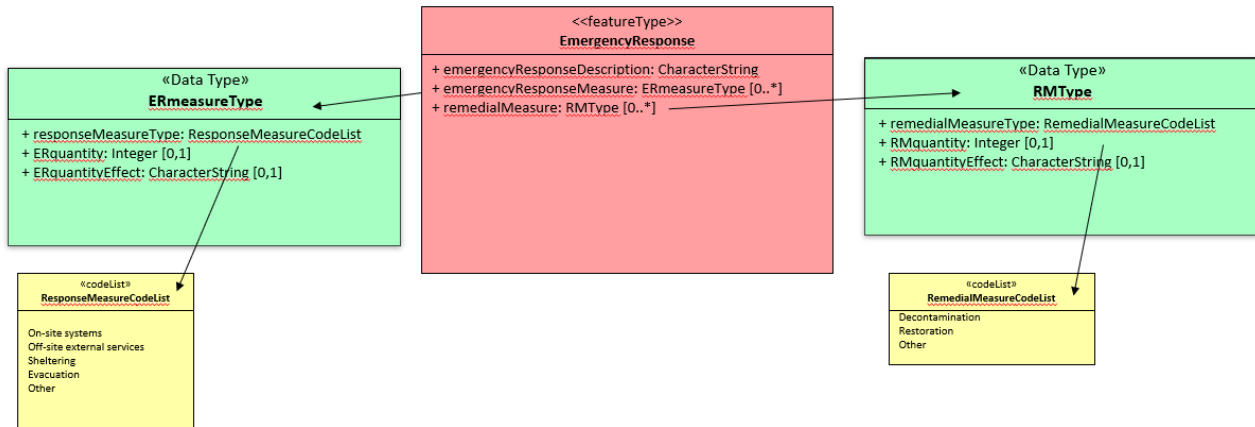
The table below shows how each attribute maps to the CD.

Attribute	Item number in the Commission Decision (Part II)
emergencyResponseDescription	6.1
emergencyResponseMeasure	6.2.1-6.2.2
responseMeasureType	6.2.1
ERquantity	6.2.2
ERquantityEffect	6.2.2
remedialMeasure	6.3.1-6.3.2
remedialMeasureType	6.3.1
RMquantity	6.3.2
RMquantityEffect	6.3.2

Possible corresponding webform implementation:

3.8.2   Detailed description of elements

The feature type *EmergencyResponse* contains one free text attribute to collect qualitative data. In addition, it contains two attributes to collect information on the type of emergency response measures employed as well as remedial measures taken following the accident.

- **emergencyResponseDescription**: This is an open text field, used to provide a description of the measures taken in response to the accident.
- **emergencyResponseMeasure**: This is an attribute used to describe the emergency response measures in a structured way, including the type of measures that were required, the quantity of people affected, and a description of the related effects. Several measures can be selected, with the corresponding quantities and effects. This attribute links to ERMeasureType data type containing the following attributes:
  - **responseMeasureType**: this attribute is used to select the type of response measure employed. It takes values from *ResponseMeasureCodeList.*
  - **ERquantity**: This is a quantitative field – proposed to be an integer. For each measure type selected in **responseMeasureType**, a corresponding quantity can be entered.
  - **ERquantityEffect**: This attribute is a text field, in which for each measure type selected in **responseMeasureType**, a corresponding effect can be described.
- **remedialMeasure**: This is an attribute used to describe the remedial measures in a structured way, including the type of remedial measures that were required, the quantity of people affected, and a description of the related effects for the selected remedial measure. This attribute links to RMType data type containing the following attributes:
  - **remedialMeasureType**: this attribute is used to select the type of response measure employed. It takes values from *RemedialMeasureCodeList.*
  - **RMquantity**: This is a quantitative field – proposed to be an integer. For each measure type selected in **remedialMeasureType**, a corresponding quantity can be entered.
  - **RMquantityEffect**: This attribute is a text field, in which for each measure type selected in **remedialMeasureType**, a corresponding effect can be described.

3.9 Lessons learned

The *LessonsLearned* feature type is used to cover the information required under section "7. Lessons learned" of the CD. This feature type is used to provide information about the lessons learned on the accident prevention or mitigation of consequences.

3.9.1   Key information

Figure 9 *LessonsLearned* feature type and associated code list
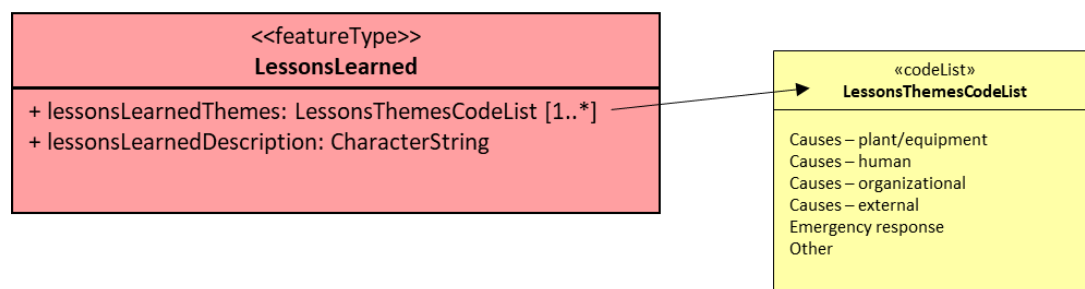
The table below shows how each attribute maps to the CD.

Attribute	Item number in the Commission Decision (Part II)
lessonsLearnedThemes	7.1
lessonsLearnedDescription	7.2

Possible corresponding webform implementation:

A description of any practical, organisational or other lessons learned on the prevention of accidents

Select the theme(s) of Lessons Learned *

Causes - External; Causes - Organisational; Emergency Response

Lessons Learned Description *

0

3.9.2 Detailed description of elements

- **lessonsLearnedThemes**: This is an attribute for providing information on the types of lessons learned that came from the analysis of the accident. One or more lessons learned themes can be selected. The attribute takes values from *LessonsThemesCodeList.*
- **lessonsLearnedDescription**: This is an attribute used to describe the lessons learned that relate to the prevention of accidents, mitigation of consequences, and the status of the implementation of possible changes.

3.10 Attachments and confidential section

The Commission Decision contains section 8 "Attachment section", to be used for attaching documents, such as reports, maps, etc. This section is for files that can be made public. Finally, there is also the final section "Confidential section". It can be used for adding confidential information as well as files that should not be made publicly available. These two sections of the CD are currently implemented with an attachments tab which contains two sections: a confidential and non-confidential. It also includes a description field for each attachment.

The Decision notes that for confidential elements, a justification should be provided. This is not included in the current structure.