

Final INSPIRE Data Specification on Mineral Resources

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OUTLINE OF THE PRESENTATION

- Background of development – Data Specification on Mineral Resources
- Use cases for Mineral Resources DS
- General Descriptions for Mineral resources
 - Pictorial view and key terms
- Data model for Mineral Resources
 - Core model
 - Extension model
- Code lists for MR data model



INSPIRE Infrastructure for Spatial Information in Europe



D2.8.III.21 Data Specification on Mineral Resources – Draft Guidelines



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Annex III.21 Mineral resources - Background

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Annex III.21 Mineral resources - Background

At the starting point - to specify the scope of MR for INSPIRE

- Reference material have been analysed, and particularly:
 - Two legal EU texts providing requirements for the data specification:
 - ✓ The raw materials initiative (RMI)
 - ✓ The management of waste from extractive industries (Directive 2006/21)
 - The standard data model EarthResourceML for Mineral resources – hosted by IUGS/CGI
 - The work currently done in European projects

Background material – www-addresses

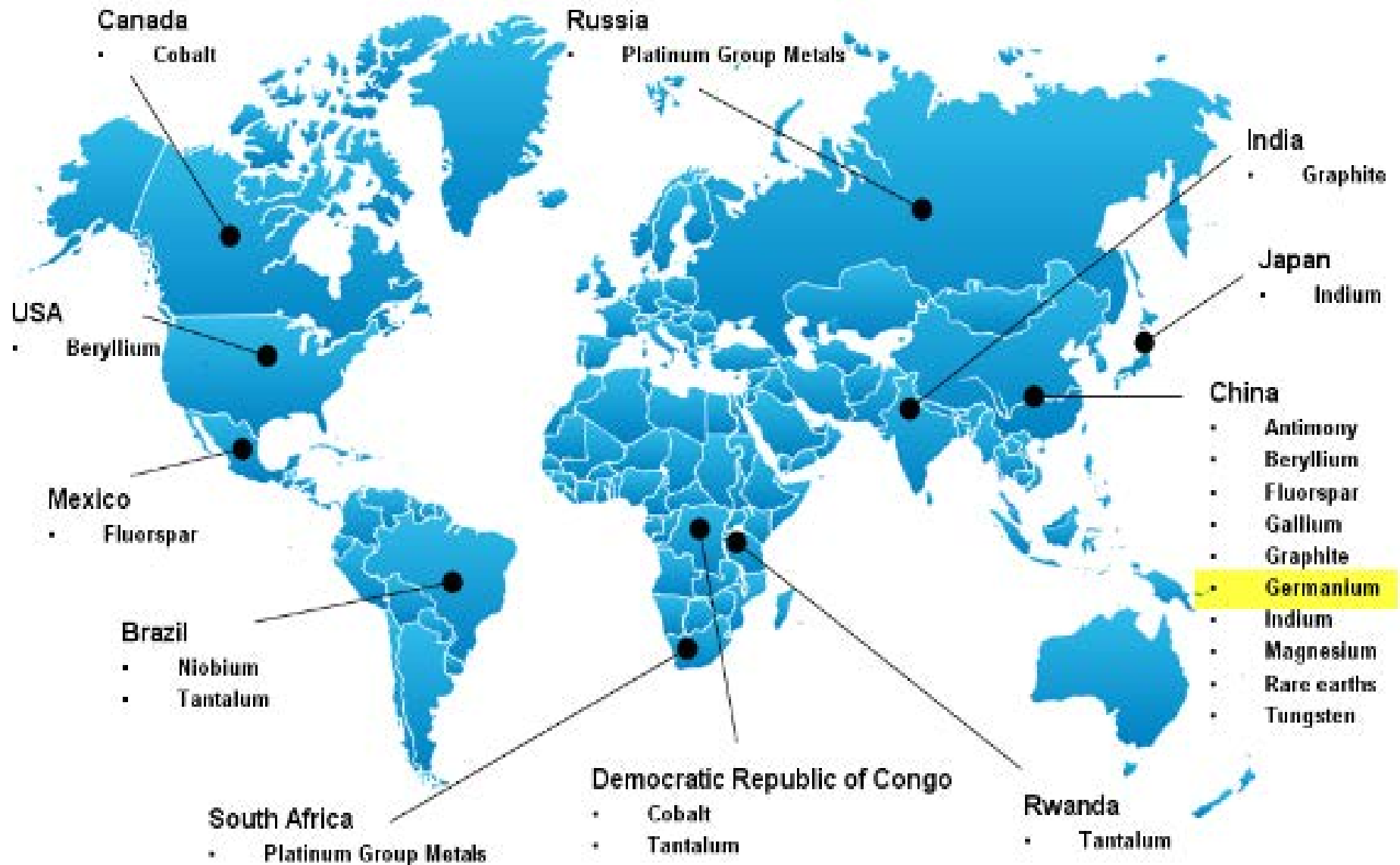
Legislation:

- Mining Waste Directive (MWD)
 - <http://ec.europa.eu/environment/waste/mining/index.htm>
- Raw materials initiative (RMI)
 - http://ec.europa.eu/enterprise/newsroom/cf/document.cfm?action=display&doc_id=894&userservice_id=1

Existing standards:

- EarthResourceML (IUGS/CGI) - <http://www.earthresourceml.org/>
- GeoScienceML (IUGS/CGI) - <http://www.geosciml.org/>
- Mineral: International Mineralogical Association (IMA)
 - <http://www.ima-mineralogy.org/IMAlistmin.html>

Production concentration of critical raw mineral materials



Definitions (INSPIRE 2012 Mineral Resources – Data Specification on Mineral Resources) – What are - metal ores, industrial minerals, **etc.**, - as pictorial view

8. Diavik Diamond Mine

The bunkers at Augusta are filled with mining waste



Metallic ores - Cu – open pit

Metallic ores - Au – open pit and underground mine

Industrial minerals – Talc - open pit

Industrial minerals – Marble – quarry

Industrial minerals – Gravel – pit

Industrial minerals – Aggregate

Gemstones – diamonds –open pit

Gemstones – ornamental stones

New mineral resources

Waste – anthropogenic deposits

INSPIRE 2012 Mineral Resources – Data Specification on Mineral Resources – What are - metal ores, industrial minerals, **etc., - new descriptions – DS document - some key words**

□ Mineral resource

- means a naturally occurring concentration/ accumulation of organic or inorganic material of intrinsic economic interest in or on the Earth's crust such as energy fuels, metal ores, industrial minerals and construction minerals,
- but excluding water,
- in such form and quality that there are reasonable prospects for eventual economic extraction

INSPIRE 2012 Mineral Resources – Data Specification on Mineral Resources – What are - metal ores, industrial minerals, **etc., - new descriptions – DS document - some key words**

□ EarthResource

□ The EarthResource class inherits the super class GeologicFeature from Geology. Geometry is provided by the occurrence association between GeologicFeature and MappedFeature shown in the Geology data specification. The kinds of observable or inferred phenomena required to classify economic and sub-economic earth resources.

□ MiningFeature

□ The abstract MiningFeature class represents a conceptual feature that exists coherently in the world. This corresponds with a Mine or a Mining Activity, locatable and identifiable features in time and/or space.

INSPIRE 2012 Mineral Resources – Data Specification on MR

- new descriptions – some key words

□ Mineral Occurrence

- could be a prospect, an occurrence, a mineral deposit, an ore deposit, etc.

□ Mine

- is an excavation for the extraction of mineral deposits. ‘True’ **mines** are underground workings and open-pit workings (also called open-sky mines) generally for the extraction of metallic commodities.
- feature also includes open workings generally for the extraction of industrial minerals, commonly referred to as **quarries**.

INSPIRE 2012 Mineral Resources – Data Specification on MR - **new descriptions – some key words**

Mining Activity

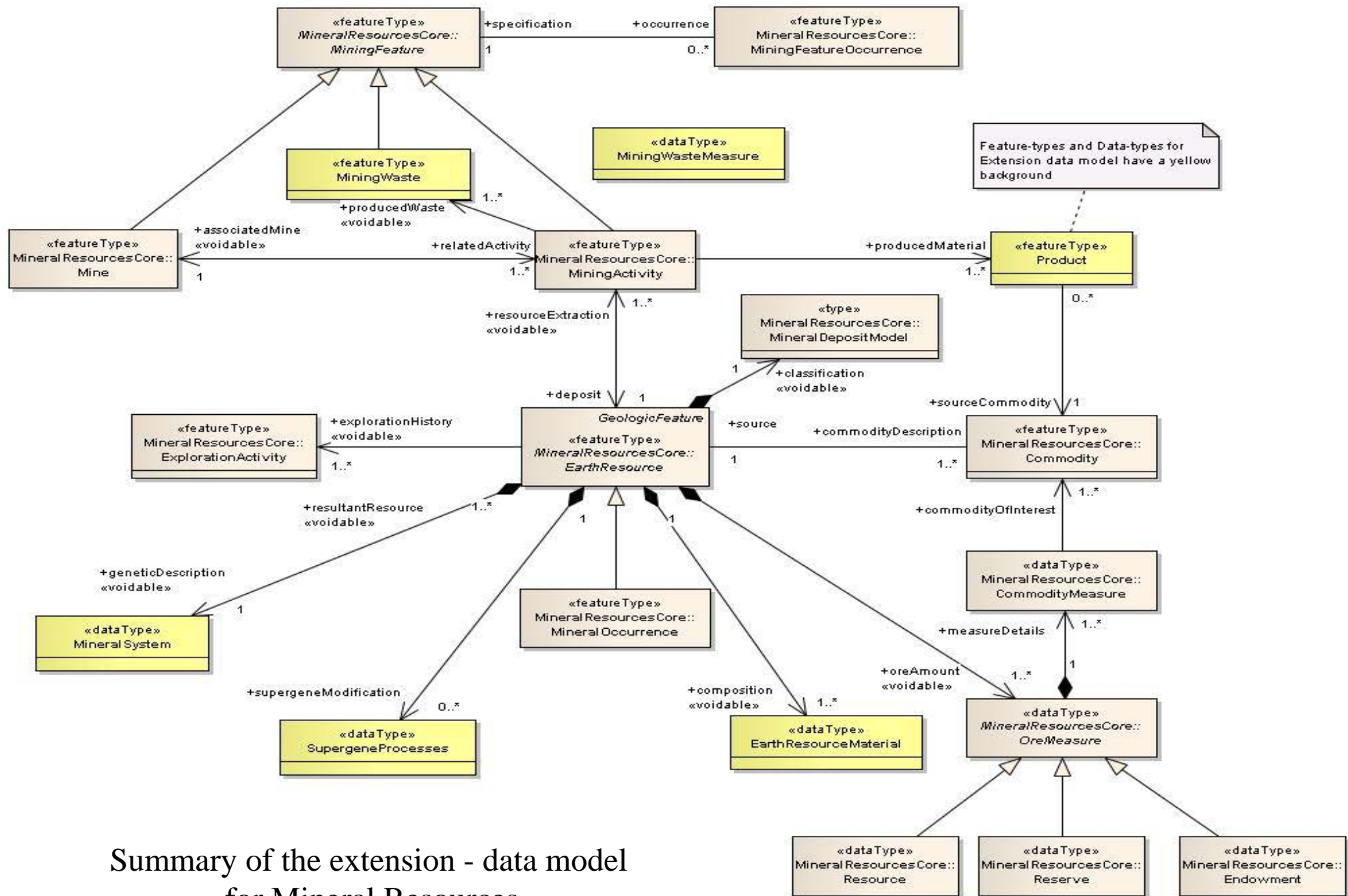
- related to a Mine, describes the process of extracting metallic or non-metallic mineral deposits from the Earth

Commodity

- describes the material of economic interest in the Earth Resource

Ore Measure

- an estimated or calculated amount of ore and grade that exist within an Earth Resource, in terms of its resource, reserve and endowment



Summary of the extension - data model for Mineral Resources

Mineral Resources (core model):

- **Earth Resource: natural material of potential economic value**
- **Mining Feature: working on the Earth R**

class MineralResourcesCore_EarthResource2

«type»
MineralDepositModel

+ mineralDepositGroup: MineralDepositGroupValue [1..*]

«voidable»

+ mineralDepositType: MineralDepositTypeValue [1..*]

class MineralResourcesCore_Mining

«featureType»
MiningActivity

+ activityDuration: TM_Period

+ activityType: MiningActivityTypeValue

+ processingType: ProcessingActivityTypeValue

«voidable»

+ oreProcessed: Quantity

class MineralResourcesCore_EarthResource1

«featureType»
ExplorationActivity

+ activityDuration: TM_Period

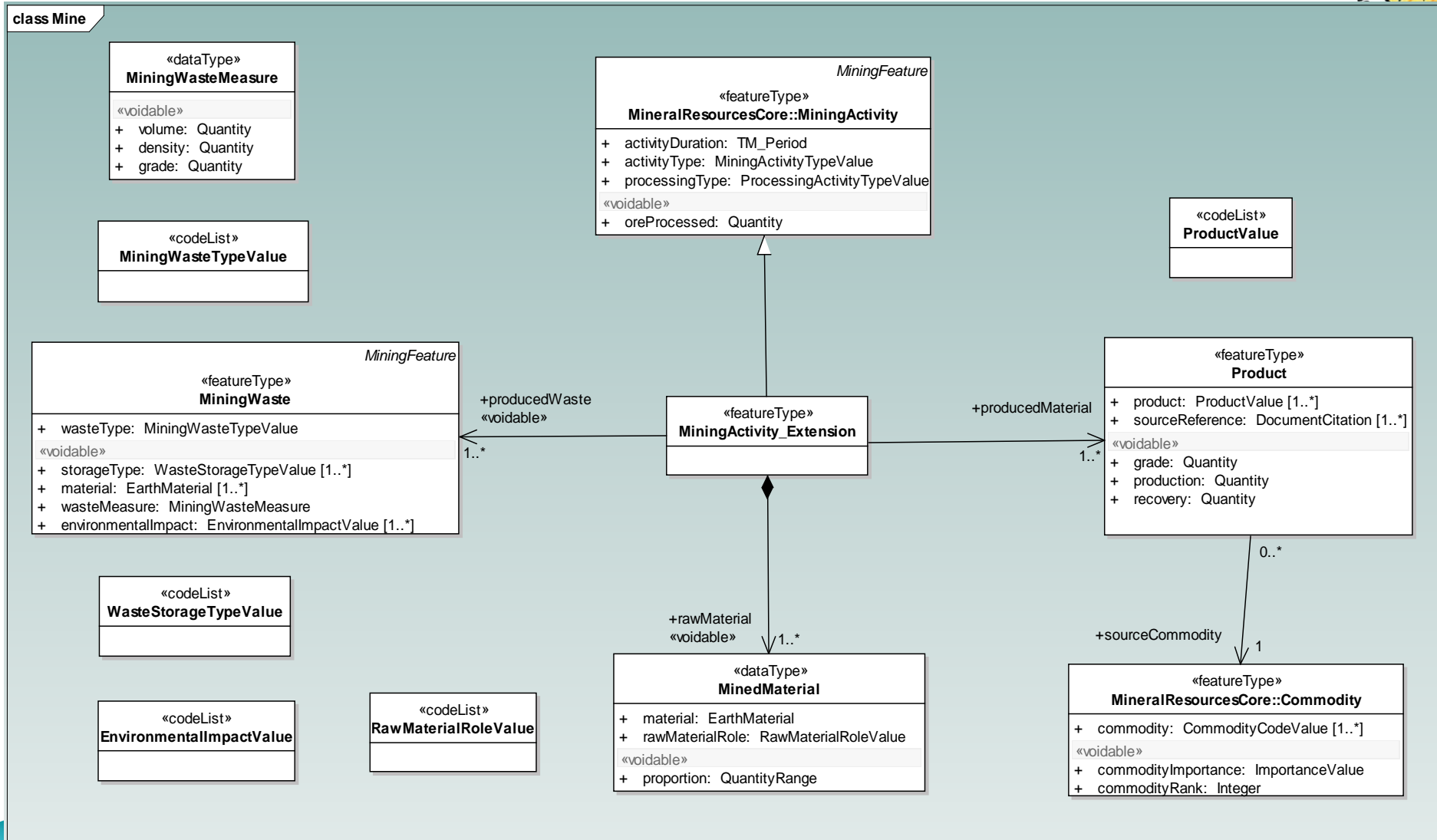
+ activityType: ExplorationActivityTypeValue

+ explorationResult: ExplorationResultValue [1..*]

Mining Feature:

- Mine
- Mining Activity

Annex III.21 Mineral resources – extension



Annex III.21 – Mineral Resources - codelists

A.1 Code lists for Mineral Resources - core

Code list	Name	Definition	Description	Structure	Identifier
ImportanceValue	Commodity importance term	Terms indicating the importance of the commodity to the earth resource.		flat	http://inspire.ec.europa.eu/codeList/ImportanceCode
CommodityCodeValue	Commodity term	The earth resource commodity.		flat	http://inspire.ec.europa.eu/codeList/CommodityCode
EarthResourceExpressionValue	Earth Resource Expression term	An indicator of whether an EarthResource has		flat	http://inspire.ec.europa.eu/codeList/EarthResourceExpressionCode

MineralDepositTypeValue	Mineral Deposit type	Style of mineral occurrence or deposit.		hierarchical	http://inspire.ec.europa.eu/codeList/MineralDepositTypeCode
MiningActivityTypeValue	Mining Activity Type	The type of mining activity.		flat	http://inspire.ec.europa.eu/codeList/MiningActivityTypeCode
ProcessingActivityTypeValue	Processing Activity type	The type of processing carried out during a mining activity.		hierarchical	http://inspire.ec.europa.eu/codeList/ProcessingActivityTypeCode
EndusePotentialValue	Enduse Potential type	The end-use potential of the mineral.		hierarchical	http://inspire.ec.europa.eu/codeList/EndusePotentialCode
				flat	http://inspire.ec.europa.eu/codeList/ReserveCategoryCode
				flat	http://inspire.ec.europa.eu/codeList/ResourceCategoryCode
				flat	http://inspire.ec.europa.eu/codeList/ClassificationMethodUsedCode

A.2 Code lists for Mineral Resources - extension

Code list name: *Classification Method Used Value*

	Value	Definition
EarthResourceFormValue	JORC code	The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the 'JORC Code' or 'the Code')
EarthResourceShapeValue	NI 43-101	National Instrument 43-101 (the "NI 43-101" or the "NI") is a mineral resource classification scheme used for the public disclosure of information relating to mineral properties in Canada. The NI is a strict guideline for how public companies can disclose scientific and technical information about mineral projects on bourses supervised by the Canadian Securities Administrators
ExplorationActivityTypeValue	CIM standards	The CIM Definition Standards on Mineral Resources and Reserves (CIM Definition Standards) establish definitions and guidelines for the reporting of exploration information, mineral resources and mineral reserves in Canada
ExplorationResultValue	SAMREC code	The South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves.
MineStatusValue	IMM Reporting Code	The Code for Reporting of Mineral Resources and Mineral Reserves (the 'Reporting Code' or 'the Code') sets out minimum standards, recommendations and guidelines for Public Reporting of Mineral Exploration Results, Mineral Resources and Mineral Reserves in the United Kingdom, Ireland and Europe.
MineralOccurrenceTypeValue	SME Guide	A guide for reporting exploration information, mineral resources, and mineral reserves - USA
MineralDepositGroupValue	IMMCh Code	Certification Code for Exploration Prospects, Mineral Resources & Ore Reserves. This Code is the result of a Collaboration Agreement between the Institution of Mining Engineers of Chile (IMMCh) and the Ministry of Mining.

ity	Formats	Subset
w.cgi-iugs.org/	SKOS	
w.cgi-iugs.org/	SKOS	
w.cgi-iugs.org/	SKOS	
w.cgi-iugs.org/	SKOS	
eionet.europa.eu/d	PDF	

Code list name: *Mineral Value*

The list of mineral should come from the Commission on New Minerals, Nomenclature and Classification (CNMNC) of the International Mineralogical Association (IMA)

The official IMA-CNMNC List of Mineral Names

See - <http://pubsites.uws.edu.au/ima-cnmnc/imalist.htm>

"Geology" & "Mineral Resources" TWG members





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By Boisvert, Eric - OGC Architecture gaps - Architecture working group GeoSciML meeting - Edinburgh 2011



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