

PRTR : Quarrying-Specific **Guidance Document**

Preamble

This specific guidance document for quarrying activities has been carried out in the context of the E-PRTR Regulation, which has created a European Pollutant Release and Transfer Register.

This guide has been developed by an ad hoc work group composed of representatives of the DGRNE, the ICEDD and the quarry sector.

Its purpose is to supplement the European Guidance Document by means of certain quarrying-specific guidelines and recommendations.

1. Introduction

Regulation (EC) 166/2006 of the European Parliament and the Council concerning the creation of a European Pollutant Release and Transfer Register, and amending Directives 91/689/EEC and 96/61/EC of the Council (Regulation E-PRTR), has been adopted in the context of the Aarhus Agreement, which acknowledges each person's right to a healthy environment. The Aarhus Agreement, in which Europe is a stakeholder, and therefore all Member States, was formulated under the aegis of the UN Economic Commission for Europe. The Aarhus Agreement makes access to information, public participation and access to justice in environmental matters the essential components of an effective legislation in this area.

By convention, the Regulation is known as "E-PRTR" while the register is called "PRTR".

The PRTR is a European Pollutant Release and Transfer Register. It will replace the EPER, which Directive 96/61/EC had required to be put in place. Similar on many points, the two registers are however differentiated on the number of pollutants and activities covered, greater under the PRTR. Thus, the latter requires in particular the notification of pollutant release into the ground, release from various sources and the transfer of waste from sites.

Such pollutant release and transfer is to be notified by installations which, on the one hand, exceed certain capacity or area thresholds and of which, on the other, the releases exceed the thresholds laid down in Annex II of the Regulation. The notification will be made to the competent Authority, which will pass the desired information on to the European Commission. The PRTR will take the form of an electronic database that will be accessible to the public. The data collection and processing principles have been left to the subsidiarity of the Member States and the competent Authorities.

As required by Article 14 of Regulation E-PRTR, a Guidance Document, intended to facilitate the implementation of the PRTR, has been developed. It provides companies with guidance, particularly in terms of:

- Notification procedures,
- Data to be notified,
- Quality assurance and evaluation,
- Data confidentiality,
- Release determination and analysis methods.

Relying on the aforesaid Guidance Document, this guide is intended to be specific to quarrying activities. It provides guidance as for the way in which quarrying concerns could report their releases to air, water and ground, and the off-site transfers of waste. These activities are for the first time, this year, subject to such reporting.

For quarrying activities, the Guidance Document provides an indicative and non-exhaustive list of pollutants that can be potentially emitted.

The quarrying sector is not concerned with ground pollutants since these only relate to waste disposal operations "land treatment" and "deep injection".

An indicative list of the pollutants covered by the E-PRTR is appended to this document, as are the threshold values beyond which the notification of pollutants is mandatory. In the Walloon Region, a pollutant has to be notified as soon as it reaches 50% of its assigned threshold value.

2. Purpose

In the PRTR context, one defines:

- An “installation” as a stationary technical unit where one or more activities listed in Annex I are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution;
- An “facility” as one or more installations on the same site that are operated by the same natural or legal person;
- A “site” as the geographical location of the facility;
- An “operator” as any natural or legal person who operates or controls the facility or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the facility has been delegated;

In the context of this guide, one needs also to understand by:

- A machine: any transport vehicle (for example: dumper) or handling vehicle (for example: fork lift truck), intended for use off the public highway or which has not yet received permission to be used mainly on the public highway, and which is equipped with an internal combustion engine;
- A source: a separately identifiable point or process in an installation from which pollutants are emitted.

The operator of the facility is responsible for the notification to the competent Authority.

Quarrying activities are covered by Regulation PRTR when the surface of the area of the site effectively under effective extractive operations exceeds 25 hectares.

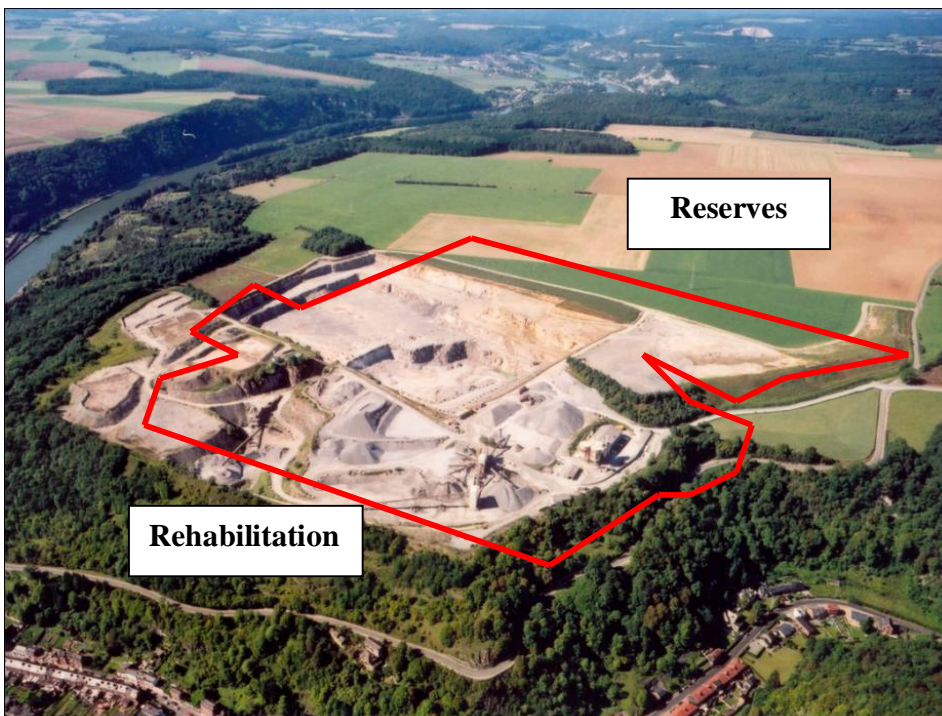
Annex II of the European Guidance Document specifies that “the surface of the area of the site effectively under effective extractive operations” means the area of the site reduced by the surface of the rehabilitated area and reduced by the area of future excavation.

Rehabilitation areas and areas of future excavation are therefore not concerned with the reporting.

Total surface of the area of the site (extraction area + reserves + rehabilitation area)

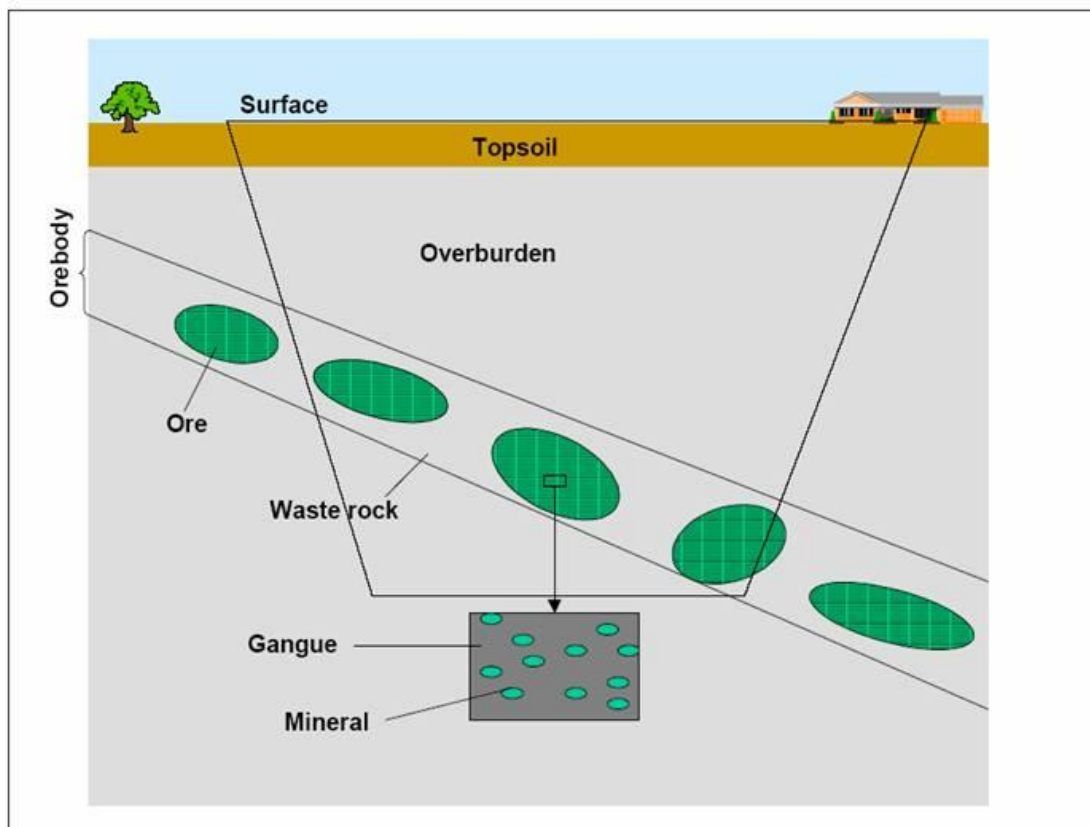


"Surface of the area of the site where extraction operations are carried out" (= area for the reporting)



In the Walloon Region, the sectoral conditions relating to quarries and their outbuildings define rehabilitation as “all of the acts and work during and after the end of the exploitation in order to carry out the cleanup imposed by the permit”. The rehabilitation area is the area of which the condition is in conformity with the rehabilitation plan, with the operator being responsible for that conformity. The final intended purpose of a quarry is defined by compliance with the procedures envisaged by the Walloon Regional Development, urbanistic ? Town Planning and Heritage Code.

The future excavation area corresponds to the authorised area from which the “callow” (i.e. the “Topsoil” and the “Overburden” in the graph below) has not yet been removed in order to uncover the exploitable rocks. The callow consists of the materials (rocks, schist, sand, and so on...) and the arable layer (i.e. the upper layer of the soil) displaced in order to reach the mineral or ore layer (also at the pre-production stage).



Source: Reference document on best available techniques for management of tailings and waste-rocks in mining activities – IPTS - July 2004

The reporting will have to take account of the facility’s evolution and of the successive rehabilitation phases that can occur during the exploitation.

Concerning the reporting of integrated sites (which can be of several kinds, for example: thermal and extraction activities, extraction of two different materials,...) i.e. sites where several Regulation PRTR Annex I activities are operated, one will proceed on a case-by-case basis, in agreement with the competent Authority, with a single or with separate reports.

3. Determination of Releases

The facilities' releases to air, water or ground can be determined by measurement, calculation or estimate. The Guidance Document defines these methods as follows:

- Measurement: Release data are based on measurements (“M”). Additional calculations are needed to convert the results of measurements into annual release data. For these calculations the results of flow determinations are needed. “M” should also be used when the annual releases are determined based on the results of short term and spot measurements. “M” is used when the releases of a facility are derived from direct monitoring results for specific processes at the facility, based on actual continuous or discontinuous measurements of pollutant concentrations for a given release route.

- Calculation: Release data are based on calculations (“C”). “C” is used when the releases are based on calculations using activity data (fuel used, production rate, etc.) and emission factors or mass balances. In some cases more complicated calculation methods can be applied, using variables like temperature, global radiance etc.

- Estimate: Release data are based on non-standardised estimations (“E”). “E” is used when the releases are determined by best assumptions or expert guesses that are not based on publicly available references or in case of absence of recognised emission estimation methodologies or good practice guidelines.

A release can be determined by several methods, but it is always the one with the highest amount of release that has to be notified.

If air quality measurements (excluding workstations) show that certain parameters are insignificant, i.e. not detected or not emitted, those parameters will not have to be reported if the competent Authority so agrees.

When possible and relevant, it is recommended that, on the first occasion, all of the parameters of the indicative list (see Appendix) are measured. Depending on the result of that exercise, the measurement frequency could be adapted. Without prejudice to the existing provisions in the environmental permits, for parameters with measurements of less than 50% of the laid down threshold, a control measurement can be made only every three years, if the competent Authority so agrees.

Without prejudice to the existing provisions in the environmental permits, for significant parameters, the frequency of measurement will be proposed by the operator for the competent Authority's approval.

Accidental emissions, which result from uncontrolled developments of the activity, also must, as far as possible, be notified and added to the deliberate emissions, resulting, for their part, from normal operating conditions.

3.1 Determination of Emissions into Air

Except for machines or for combustion installations, from the indicative list included in the guide document, only the PM10 are significant in the stone production process. This guide explains the calculation principle by use of emission factor.

Principle

$$\text{Emissions} = \text{AD} * \text{EF} * \text{AF}$$

With

- AD = Activity Data: expressed in the unit that is representative of the activity (mass, duration, volume,...)
- EF = Emission Factor: emission factor without abatement, by unit of activity. Measured or, failing this, standard.
- AF = Measured or standard Abatement Factor.

By each stage of the process, or by several cumulated stages, and according to the available data, a calculation is made on the basis of given abatement and emission factors and the activity data.

Description of the Process

For the report, each operator will have to formulate, for each stage of the process, a list of the various significant sources of emission and the relevant pollutants emitted by those sources. The entire process will have to be described (flow sheet). The choice of the sources will have to be clarified and the possible irrelevance of certain pollutants will have to be justified.

A quarrying installation is usually structured around operations of extraction, transformation and transportation of stone. They constitute the main sources of release.

An installation usually comprises:

- Extraction : drilling, demolition, loading and transporting of the raw materials
- Treatment of the stone: crushers, screening
- Storage and loading of the stone
- Possibly washing and/or drying of the products

3.1.1. "Measured" Emission factor

If an emission factor is deduced – derived? from the results given by the direct monitoring equipment installed in a facility, the notification will have to indicate that the emissions were determined on the basis of measurement.

For existing measurements, the competent Authority will have to agree to their representativeness and to the measurement methodology.

When a source encompasses several other sources (for example: the chimney of a warehouse grouping several sources together), the emission factor will be determined by a measurement at this one. It is this single emission factor that is used in the calculation of the releases.

3.1.2. Standard Emission factor

If a standard emission factor is used to determine an installation's releases, the notification will indicate that the emissions were determined on the basis of calculation, if the competent Authority so agrees.

Standard Emission factors for PM10 and machines

a. PM10

For the PM10, emission factors per extracted/treated ton are determined, for all stages of the process. The main reference on the subject is the AP42 of the US EPA (reference: AP 42, Fifth Edition, Volume I Chapter 11: Mineral Products Industry, Point 11.19.2 "Crushed Stone Processing and Pulverized Mineral Processing").

The emission factors are expressed in kg per ton. The third column contains emission factors for controlled sources, i.e. where watering measures have been put in place:

Source	Activity Variable Unit	Emission factor into free air (in kg per unit)	Emission factor with standard abatement (in kg per ton)
Drill	Ton	4×10^{-5a}	
Loader	Ton	8×10^{-6a}	
Dumper	Ton	0.0043 ^b	
Primary Crusher	Ton	0.0012 ^c	0.00027 ^a
Secondary/Tertiary Crushers	Ton	0.0012 ^c	0.00027 ^a
Fines - Grinder	Ton	0.0075 ^a	0.0006 ^a

^a AP 42, Fifth Edition, Volume I, Chapter 11: Mineral Products Industry, Point 11.19.2 "Crushed Stone Processing and Pulverized Mineral Processing").

^b National Pollutant Inventory – Environment Australia – "Emission Estimation Technique Manual for Mining and Processing of Non-Metallic Minerals – Version 2.0"

^c AP 42, Fifth Edition, Volume I Chapter 11: Mineral Products Industry, Point 11.19.2 « Crushed Stone Processing and Pulverized Mineral Processing » - For primary and secondary crushers, use of the tertiary crusher emission factor as higher limit.

Screening	Ton	0.0043 ^a	0.00037 ^a
Fines - Screening	Ton	0.036 ^a	0.0011 ^a
Conveyor transfer point	Ton	0,00055 ^a	2.3 x 10 ^{-5a}
Dryer	Ton	5,9 ^b	
Product Storage	Per Hectare per Dry Day	1,9 ^d	
Truck unloading	Ton	5 x 10 ^{-5a}	

Comment: Washing facilities are unlikely to emit PM10.

Fines are defined as being “the granular fraction passing through a screen of 0.063 mm” – Source: EN 13043 Standard – “Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas”

Abatement Factors:

The emission factors can also be reduced if the installation is equipped with an abatement system, such as:

- A baghouse: - 99%,
- A water spray: -85%
- A spray with micronisation or use of surface-active agents: -90%
- A confinement measure (for example: cladding, casing,...) -75% (source: NPI)
- Tracks watering: - 90 %

These abatements will have to be confirmed by feedback.

b. Machine-Related Emissions

In the absence of measurements on the machines in place or coming from the manufacturer, the emission factors below can be used:

kg/1000L fuel	CO	SO _x	NO _x	COV
Dumper	14.73	34.29	34.29	1.58

^d AP 42, Fourth Edition, Chapter 8, Point 8.19.1 “Sand and Gravel Processing”. For the estimate of the area, account is to be taken only of the area on the ground of the outside stocks. Account must also be taken of the days with no rain.

Other Machines				
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Source: National Pollutant Inventory – Environment Australia – “Emission Estimation Technique Manual For Mining And Processing Of Non-Metallic Minerals – Version 2.0” - Page 43 – Table 4

The Walloon Region’s Air Unit uses the following default factors:

kg/1000L fuel	CO	SOx	NOx	COV
Dumper	13.53	3.45	41.79	6.06
Other Machines				

Source: DGRNE – AIR Unit

These emission factors are expressed per litre of fuel consumed by the machines.

Engine Power (HP)	Year Model		Emission Standards (g/kWh)					
			HC	VHC	Nox	NMHC+Nox	CO	PM
50 à <75	1998-2003	Tier 1			5.14			
	2004-2007	Tier 2	0.29828	0.29798	3.87	4.17	2.75	0.22371
	2008-2012	Tier 3	0.14914	0.14899	2.46	2.6	2.75	
>75 à <100	1998-2003	Tier 1			5.14			
	2004-2007	Tier 2	0.29828	0.29798	3.87	4.17	2.75	0.22371
	2008-2011	Tier 3	0.14914	0.14899	2.46	2.6	2.75	
>100 à <175	1997 - 2002	Tier 1			5.14			
	2003 - 2006	Tier 2	0.29828	0.29798	3.35	3.65	2.75	0.164054
	2007 - 2011	Tier 3	0.14914	0.14899	2.08	2.23	2.75	
>175 à <300	1996 - 2002	Tier 1	0.7457	0.74495	5.14		6.33	0.29828
	2003 - 2005	Tier 2	0.29828	0.29798	3.35	3.65	1.93	0.111855
	2006 - 2010	Tier 3	0.14914	0.14899	2.08	2.23	1.93	
>300 à <600	1996 - 2000	Tier 1	0.7457	0.74495	5.14		6.33	0.29828
	2001 - 2005	Tier 2	0.22371	0.22348	3.35	3.57	1.93	0.111855
	2006 - 2010	Tier 3	0.14914	0.14899	2.08	2.23	1.93	
>600 à 750	1996 - 2001	Tier 1	0.7457	0.74495	5.14		6.33	0.29828
	2002 - 2005	Tier 2	0.22371	0.22348	3.35	3.57	1.93	0.111855
	2006 - 2010	Tier 3	0.14914	0.14899	2.08	2.23	1.93	
>750 excluding generators	2000 - 2005	Tier 1	0.7457	0.74495	5.14		6.33	0.29828
	2006 - 2010	Tier 2	0.22371	0.22348	3.35	3.57	1.93	0.111855
Generators >750 to 1200	2000 - 2005	Tier 1	0.7457	0.74495	5.14		6.33	0.29828
	2006 - 2010	Tier 2	0.22371	0.22348	3.35	3.57	1.93	0.111855
Generators >1200	2000 - 2005	Tier 1	0.7457	0.74495	5.14		6.33	0.29828
	2006 - 2010	Tier 2	0.22371	0.22348	3.35	3.57	1.93	0.111855

The above table (source: US EPA) provides an indicative order of magnitude of machine emissions according to their horsepower. The emission factors presented are given as an example. They are expressed in g/kWh.

For other combustion sources, reference is needed to the values indicated by the manufacturer or, failing this, measurement at the exhaust-pipe (or chimney) would need to be made.

3.2. Determination of Releases into Water

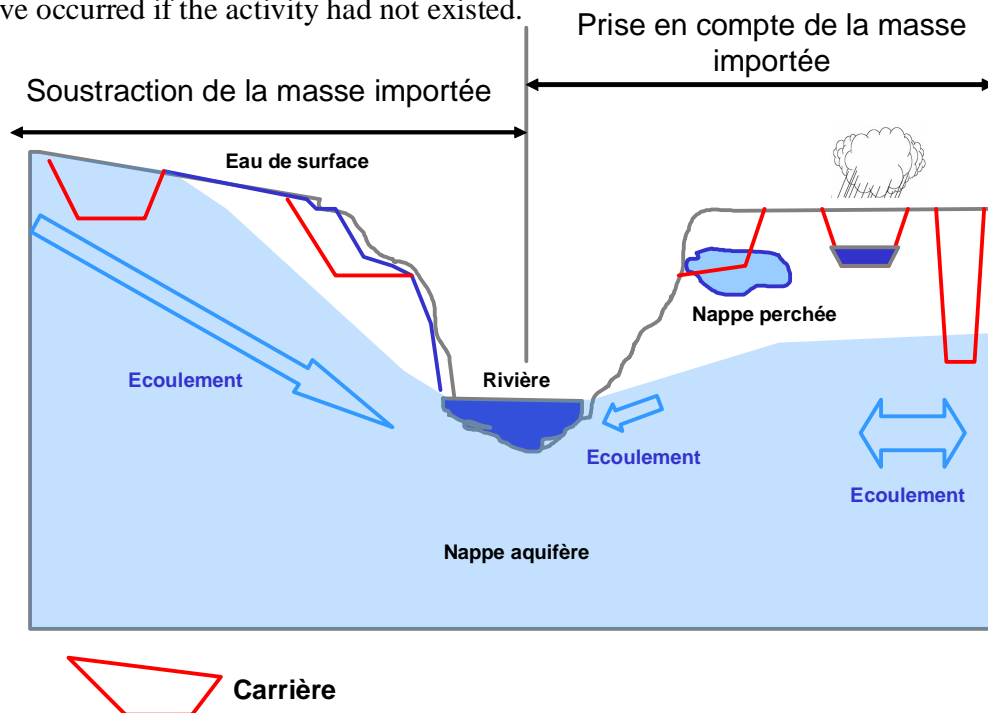
The Guidance Document recommends the following principles in the context of the determination of releases into water:

The **background load** of a certain pollutant in water may be taken into account. For example, if water is collected at the site of the facility from a neighbouring river, lake or sea for use as process or cooling water which is afterwards released from the site of the facility into the same river, lake or sea, the “release” caused by the background load of that pollutant can be subtracted from the total release of the facility. The measurements of pollutants in collected inlet water and in released outlet water must be carried out in a way that ensures that they are representative of the conditions occurring over the reporting period. If the additional load results from the use of extracted groundwater or drinking-water, it should not be subtracted since it increases the load of the pollutant in the river, lake or sea.

If concentrations in releases are **below determination (quantification) limits** this does not always permit the conclusion that threshold values are not exceeded. For example in large waste water or exhaust air volumes generated by facilities, the pollutants might be “diluted” below the determination limit, although the annual load threshold value is exceeded. Possible procedures to determine releases in such cases include measurement closer to the source (e.g. measurement in part streams before entering a central treatment plant) and/or estimation of releases e.g. on the basis of pollutant elimination rates in the central treatment plant.

General Principle

In order to determine an installation’s releases into water, a description of the quarry’s hydrogeologic scheme is required. Indeed, this enables an appraisal of the potential influence of the activity on the one hand on the released water load and, on the other, on the path followed by the water in the quarry. An analysis of this path enables the influence or not of the activity on the natural flow of water to be shown, i.e. the flow that would have occurred if the activity had not existed.



In this context, the various kinds of water to be found on the site need to be determined:

- It can be a question of meteoric water, originating from precipitations, which streams towards the bottom of the quarry,

or

- It can be a question of subterranean water originating from a water table.

Method For Sampling Industrial Water And Calculating Its Emissions

The following methodology is suggested:

a. Sampling from the hydrographic network

In the case of sampling water from the hydrographic network, with water released, after activity, into the same hydrographic network, the pollutant background load of the sampled water will be subtracted from the facility's total releases. If the released water's load is identical to the sampled water's load, no account will be taken of the background load in the total releases.

b. Sampling from a well

In the case of sampling water from a well (without contact with the hydrographic network), account will need to be taken of the sampled water's load in the facility's releases since this will increase the load of the hydrographic network where the water is released. The pollutant's background load is not subtracted from the facility's total releases.

c. Sampling at the bottom of the quarry

According to the general principle, one which existed in the water is or is not taken into account. In the absence of sampling, if the water sampled at the bottom of the quarry feeds the receiving catchment area in any event, no account will need to be taken in the total releases, after activity, of the sampled water's load. If the sampled water is not destined for the receiving catchment area because of an absence of pumping, the pollutant's background load is not subtracted from the facility's total releases.

3.3 Determination of Waste Transfers

By off-site transfer of waste from the site, one is referring to the removal, beyond an facility's limits, of waste intended for elimination or recovery.

Off-site transfers of dangerous waste must be notified when they exceed two tons per annum. Off-site transfers of non-dangerous waste must be notified when they exceed two thousand tons per annum.

The definition of "waste" is given by Article 1A of Directive 75/442/EEC on waste of 15 July 1975. Thus waste is described as being: "Waste shall mean any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard."

The operator will have to specify whether the waste is intended for recovery or for elimination.

3.4 Technical File

As of his or her first declaration, the operator will submit to the competent Authority a technical file containing:

- A description of the exploitation site and the areas effectively exploited,
- A description by flow-sheet of the installation and of the sources of releases into the air,
- The emission calculation parameters : Activity datas, emission factors and possible abatement factors,
- A hydrogeologic scheme with a description of the releases at the water entry/entries and exit(s),
- A plan for sampling the pollutants contained in the water and for measuring the annual flows,
- A list of the off-site transfers of waste from the site.

The Technical File is to be submitted to the competent Authority for approval.

Standard Report

APPENDIX: List of Pollutants Referred to by the PRTR

(Source: ANNEX II of Regulation (EC) Nr 166/2006 of the European Parliament and the Council of 18 January 2006 concerning the creation of a European Pollutant Release and Transfer Register, and amending Directives 91/689/EEC and 96/61/CE of the Council)

	Pollutants	Threshold Values
AIR		
	Methane (CH ₄)	100,000 kg p.a.
	Carbon monoxide (CO)	500,000 kg p.a.
	Carbon dioxide (CO ₂)	100 million kg p.a.
	Nitrogen oxide (NO _x /NO ₂)	100,000 kg p.a.
	Sulphur oxides (SO _x /SO ₂)	150,000 kg p.a.
	Arsenic and compounds (As)	20 kg p.a.
	Cadmium and compounds (Cd)	10 kg p.a.
	Chromium and compounds (Cr)	100 kg p.a.
	Copper and compounds (Cu)	100 kg p.a.
	Nickel and compounds (Ni)	50 kg p.a.
	Lead and compounds (Pb)	200 kg p.a.
	Zinc and compounds (Zn)	200 kg p.a.
	Chlorine and compounds (Cl)	10,000 kg p.a.
	PM10 Particles	50,000 kg p.a.
WATER		
	Nitrogen total	50,000 kg p.a.
	Phosphor total	5,000 kg p.a.
	Arsenic and compounds (As)	5 kg p.a.
	Cadmium and compounds (Cd)	5 kg p.a.
	Chromium and compounds (Cr)	50 kg p.a.
	Copper and compounds (Cu)	50 kg p.a.
	Nickel and compounds (Ni)	20 kg p.a.
	Lead and compounds (Pb)	20 kg p.a.
	Zinc and compounds (Zn)	100 kg p.a.
	Organic carbon total (as total C or DCO/3)	50,000 kg p.a.
	Chlorides (as total Cl)	2 million kg p.a.