

A General Assessment Methodology for substances and compounds for the implementation of emissions policy

Getting down to it

This brochure tells you what you need to know

"The GAM provides me and my business with an instrument for assessing whether it is actually sensible to use a particular substance in our production process. It can help to solve major problems. What's more, you can kill two birds with one stone: if it turns out that a substance has unacceptable toxicity, this provides an early signal. After all, a substance of this kind might have very undesirable effects in our own waste water treatment!"
Duward Sikkens (head of the Parengo Paper Mill laboratory in Renkum)

*"We think it's excellent that an absolutely clear method exists for being able to put the aquatic harmfulness of substances and mixtures of substances in order of priority. This is the basic principle behind improvement programmes based on ALARA and environmental performance.
The methodology is very nice to work with, and can be readily translated into a calculated programme. The whole industrial range of substances can in this way be mapped out in a very short time."*
Rente Wester (senior staff engineer, Fuji Photo Film, Tilburg)

Why the *General Assessment Methodology*?

You get to deal with the *General Assessment Methodology* (GAM) for substances and compounds:

As a business, if you discharge or wish to discharge wastewater into drains and surface water; and as a competent authority, licensor or enforcer for the implementation of emission policy (Pollution of Surface Waters Act or Environmental Management Act).

What is the GAM for? How does the methodology work? And what is expected of you?

Suppose that a chemical enterprise wants to introduce a new active ingredient. Potential customers will then of course want to know exactly why they should purchase that substance: what the substance does, what benefits it entails, how the substance behaves in the production process of potential customers, etc. In short: they first want to know all the ins and outs before deciding to 'risk' their own production process, their product and, partly as a result, their business (result) on this new substance. In other words: an enterprise introducing the new substance will first need to convince its potential customers. Which is understandable and logical.

Similar to this is the situation where an enterprise applies for a discharge licence from the government. The water quality manager, who is in fact the intended 'customer' for the polluted water, will first want to know whether his own primary production process (healthy, naturally thriving surface water) will not be jeopardised. Once again logical and understandable.

The existing situation

Concern about surface water quality has, based on such reasoning, led to rigorous regulations over the last few decades. Thus, an enterprise wishing to discharge waste water will first need a licence. Conditions are always attached to a discharge licence of this kind. However, things can and must improve. In the case of very many substances, simply nothing at all, or all too little, is known, for example, about their effects on the receiving surface water. Let alone the possible consequences of the discharge of such substances for users and consumers of that water, which may also be used at any given time - albeit following treatment - as a raw material for drinking water.

It is logical and understandable that licensors want to know whether, via a new waste water discharge, they might also 'bring in' toxic substances that may cause harmful effects in the longer term.

Unfortunately, discharge licence applicants are often themselves ignorant of such information. Their supplier might, for example, be an intermediary who himself has no (eco) toxicological knowledge or even have the data in-house. If the manufacturer is the supplier, the latter is often unwilling to provide the desired information, sometimes because he may not have the information but often because of competition considerations.

New practice

This situation must improve. As had thought water quality managers. And as had been thought by the business community. This is why they have sat down around the table. The purpose: to nevertheless find a way of unearthing the desired information without industrial secrets, or information which is sensitive from the competition point of view, ending up 'on the street'. This has been achieved. Extensive and careful consultation has resulted in a *General Assessment Methodology* (GAM) for substances and compounds. What does this GAM entail? To put it in a nutshell: a manufacturer or dealer answers a limited number of specific questions (see box) on the properties of the substance/compound that may affect the aquatic environment. The potential environmental hazard posed by it can in this way be assessed. The higher that potential environmental hazard, the greater the effort needed to prevent or reduce it. For the sake of clarity, the GAM classifies substances/compounds into just three categories.

"Desired decontamination effort"

A "desired decontamination effort" (A, B, or C) is linked to each GAM category:

A: The aim is to approximate a 'zero discharge' as closely as possible. To achieve this, industrial processes must be adapted (using the best available techniques) or other substances/compounds must be used.

B: The aim is to prevent discharge of the relevant substance/compound as far as possible through the use of the best practicable techniques. Process selection and internal operational management must also be optimally geared to this.

C: The discharge of relatively harmless substances (such as sulphate, carbonate and chloride) must also be prevented as far as possible. To what extent action must be taken for this purpose depends on the water quality objectives.

What specific measures now need to flesh-out the decontamination effort laid down?

During this 'translation stage', aspects other than the harmfulness of a substance/compound are also important.

Examples: costs of measures, the production process, available treatment techniques. And not forgetting the concentration of the substance/compound in the waste water. The starting point is thus a realistic, subtle approach in which not only environmental but also economic interests are taken into account.

What happens with the residual discharge?

Once the desired action has been taken, a *residual discharge* will nevertheless generally be involved. The question of whether this is acceptable is resolved via an *immission test*. In any event, conditions must be met in this context:

- Residual discharge must not contribute significantly to failure to achieve the water quality target for the *aquatic system* (water and soil) into which the discharge is taking place.
- Residual discharge must not lead to acute toxic effects on organisms living in the water or sediment *within the mixed zone*.

The CIW report entitled "Emission/immission - prioritisation of sources and the immission test" deals with this subject.

When is the GAM used?

It goes without saying that the GAM is used when an enterprise submits an application for a discharge licence pursuant to the Pollution of Surface Waters Act or the Environmental Management Act. But not only then! If other substances/compounds are produced/used later on, the enterprise must report to this to the competent authority and provide the desired information.

The GAM may also be a useful tool on any other occasion when the potential environmental hazards posed by substances/compounds are on the agenda. Thus, an enterprise could demonstrate via 'GAM data' that, through a particular choice of substances/compounds, it is implementing the agreed continuous reduction in environmental pollution.

Where does an enterprise get its GAM data from?

As previously mentioned, a customer will want to know from his supplier (manufacturer or dealer) the properties of the substance/compound that the supplier wants to sell to him. This no longer entails only those properties primarily connected with (the quality of) the in-house production process and the end product. Information on environmental aspects is also essential, since this is necessary to be able to secure the required environmental licences. The manufacturer and dealer are thus the appropriate parties from which to obtain the necessary information.

Particularly in the case of smaller enterprises/customers, trade associations may also play a role in securing information. They can provide a major service to affiliated enterprises by setting up a system with standard (environmental) information on raw materials and auxiliary substances used in their sector.

The big incentive for the manufacturer/dealer, and for the enterprise wishing to use a substance/compound, is that in the absence of 'GAM information' a substance/compound is automatically assigned to the 'most difficult category', to which the most extensive decontamination efforts are linked.

How can the accuracy of confirmed information be checked?

Users and the competent authority must be able to rely on the fact that the assessment is based on the proper information and that the assessment itself has been correctly performed. The customer/user supplying the information to the water quality manager is and remains responsible. The fact that the manufacturer of a substance/compound is responsible, and where appropriate liable, with respect to his customers does not alter this. In cases of doubt (but also at random), the competent authority must be able to check whether information supplied is correct and also whether the assessment takes place in the correct manner. The government must, on request, be granted access to inspect the product documentation, which also contains the data used to assess compounds.

Of course, the business community itself can also organise the check, for example via an independent body.

Benefits of the GAM

The great benefit of the GAM is that both enterprises and the competent authority (water quality managers) know what is expected of them. As a result, substances/compounds can be assessed in a uniform manner.

Of course, the GAM fits in with the Dutch environmental legislation (Pollution of Surface Waters Act, Environmental Management Act, Environmentally Hazardous Substances Act). However, the GAM also complies with the regulations of the European Union on the assessment of substances and compounds.

Consequently, enterprises do not in a number of cases have to commission extra toxicological research in order to be able to answer the GAM questions. The reason for this is that the required information is already available if the substances/compounds have previously been assessed pursuant to the Substances Directive (EU).

In other words: no conflict, no poor 'linkage' or extra costs.

On the other hand: clarity, a lack of ambiguity, and certainty.

Furthermore, the GAM is an aid, not a regulation. The GAM thus does not lay down whether or not a substance/compound may be used; the judgement on this is a question of administrative appraisal and choice.

If worst comes to worst, the competent authority can of course decide to prohibit the discharge of a particular substance/compound completely. However, this only occurs after all relevant aspects, both in terms of environmental hygiene and industrial matters, have been considered.

What is expected of manufacturers/dealers, users and the competent authority?

a) *Manufacturers/suppliers* must collate the information needed to assess substances and compounds. With the aid of the GAM, the designation of the aquatic harmfulness of a substance/compound can be determined. The customer/end user must be given at least a basic set of data (for example, by specifying the data on the Safety Data Sheet (MSDS) or another document).

b) *Users* must collate data for substances/compounds present at their enterprise and which may possibly end up in waste water (in any event, the designation of aquatic harmfulness and the decontamination effort). This procedure can be incorporated in the in-house environmental protection system.

This procedure fits in with the amended Implementation Decree on Pollution of National Waters, and with the ordinances of water quality managers obliging the applicant for a Pollution of Surface Waters Act licence to supply data on substances/compounds and on the consequences of discharges for surface water.

c) *The competent authority* must indicate in (preliminary) consultation with enterprises whether (and in what detail) they must supply data on substances/compounds in the licence application pursuant to the Pollution of Surface Waters Act. It must then also check the applications for the presence of information on the aquatic harmfulness of, and the decontamination effort relating to, substances and compounds. The absence of this may lead to an application not being processed.

Apart from that, the competent authority may also, for example with reference to checks, initiate consultation with an enterprise concerning substances and compounds that have been detected.

It is recommended that the competent authority encourage enterprises (in the preliminary consultation on licensing) to incorporate the GAM into their in-house environmental protection system.

With effect from 1-8-2002, the competent authority will assume during decision-making that the assessment of substances and compounds has been carried out in accordance with the GAM.

Introduction plan

The methodology and procedures of the GAM have been laid down in a report (see colophon). In view of the importance of the GAM, it has, however, been decided not to leave this to the publication of that report alone. Both for officials of the competent authority and for enterprises who get to deal with the GAM, a special introduction plan has been drawn up. In cases of competent authority, this is carried out by the Institute for Inland Water Management and Waste Water Treatment (RIZA).

Enterprises, subject to licensing, that are to discharge waste water, are informed by the competent authority. On the part of the business community, the trade associations concerned have declared themselves willing to lend strong support to the introduction of the GAM within their own circle.

What questions must suppliers/dealers answer?

A full data set for assessing substances and compounds covers answers to the questions below plus the result of the assessment.

Substances:

- Is the substance carcinogenic (R-45), so far as is known?
- Is the substance mutagenic (R-46), so far as is known?
- What is the acute toxicity to aquatic organisms (LC_{50}), preferably for four trophic levels, but in any event for crustaceans or fish.
- What is the biodegradability?
- What is the $\text{Log } P_{ow}$?
- What is the BCF? (optional)
- What is the solubility in water if acute toxicity to aquatic organisms cannot be determined?

Compounds:

In the case of compounds, the result of the GAM must in principle be given, together with the exact composition of the compound and the substance data per component.

If a manufacturer only wishes to provide a basic set of information, assessment of the substance or compound must in any event be carried out in accordance with the GAM.

Substances:

- The designation of aquatic harmfulness.
- The location at which the substance documentation is available for inspection by the competent authority/supervisory body.

In the case of only a basic set of information, the competent authority adopts a *worst-case* approach for the immission test. It is then assumed that the substance has an acute toxicity to aquatic organisms of < 1 mg/l and is also barely degradable. Should this lead to additional decontamination measures on the part of the user, the provision of more precise data on the properties of the substance may ensure that the immission test can be carried out more precisely.

Compounds:

- The results of the assessment of the compound in accordance with the GAM.
- The components with the designation of aquatic harmfulness: blacklisted substance, may cause hereditary damage and/or may cause cancer and the rough quantities of those components in the compound.
- The component(s) with decontamination effort A, and the rough quantities of this component in the compound.
- The location at which the product documentation is available for inspection by the competent authority/supervisory body.

The precise composition of the compound then only remains known to the manufacturer or supplier.

In the case of compounds, too, the competent authority then adopts the said *worst case* approach for the immission test.

Colophon

This brochure has been published by the CIW. It describes the main features of the General Assessment Methodology (GAM). With regard to the policy assumptions and set-up of the GAM, we would refer you to the report entitled "Assessment of substances and compounds for the implementation of emission policy on water; methodology and procedure" (May 2000). This report is available from CIW, Postbus 20906, 2500 EX Den Haag, the Netherlands.

Further information is available from the Steunpunt Emissies (Emissions Support Point) of RIZA (tel. +31 (0) 320-298428; e-mail: steunpunt@riza.rws.minvenw.nl). More information can also be found on the web sites of the CIW (www.waterland.net/CIW) and the Emissions Support Point (www.wateremissies.nl)

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