

## Environmental Impact Assessment and Evaluation of Environmental Risks

Dr. Adelbert Niemeyer

Gerling Consulting Group, Cologne

### Abstract

In former times the protection of our environment didn't play an important role due to the fact that emissions and effluents were not considered as serious impacts. However, opinions and scientific measurements meanwhile confirmed that the impacts are more serious than expected. Thus measures to protect our earth has to be taken into consideration. A part of these measures in the Environmental Impact Assessment (EIA).

One of the most important parts of the EIA is the collection of basic datas and the following evaluation. Experience out of the daily business of Gerling Consulting Group shows that the content of the EIA has to be revised and enlarged in certain fields.

The historical development demonstrated that in areas in which the population and the industrial activities reached high concentration there is a high necessity to develop strict environmental laws and regulations. Maximum values of the concentration of hazardous materials were fixed concerning the emission into and water. Companies not following these regulations were punished. The total amount of environmental offences increased rapidly during the last decade, at least in Germany.

During this development the public consciousness concerning environmental affairs increased as well in the industrialized countries. But it could clearly be seen that the development in the field of environmental protection went into the wrong direction. The technologies to protect the environment became more and more sophisticated and terms as: "state of the art" guided more and more to lower emissions, Filtertechnologies and wastewater treatment for example reached a high technical level-but all these sophisticated technologies has one and the same characteristic: they were end-of-the pipe solutions. A second effect was that this kind of environmental protection costs a lot of money. High investments are necessary to reduce the dust emission by another ppm!

Could this be the correct way?

In Germany the discussion started that the environmental laws reduce the attractivity to invest or to enlarge existing investments within the country. Other countries seem to be not so strict with controlling the environmental laws which means it's simply cheaper to produce in Portugal or Greece. Everybody however knows that this is not the correct way and does not solve the environmental problems.

Meanwhile the general picture changes a little bit and we think it changes into the correct direction. "End-of-the-

pipe” solutions are still necessary but this word received a real negative touch and nobody wants to be brought into connection with this word received a real negative touch and nobody wants to be brought into connection with this word especially in connection with environmental management and safety.

Modern actual environmental management starts in a different way. Thoughts about emissions start in the very beginning of the production, they start with the design of the product and modification of traditional modes of production. Basis of these ideas are detailed analyses of products and processes.

Due to the above mentioned facts that the public environmental consciousness changed dramatically a continuous environmental improvement of each single production plant has to be guaranteed. This question is already an important question of the EIA. But it was never really checked in a wholistic approach.

Environmental risks have to be taken into considerations during the execution of an EIA. This means that the environmental risks have to be reduced down to a capable risk-level. Environmental risks have to be considered within the phase of planning, during the operation of a plant and after shut down.

The experience shows that most of the environmental relevant accidents were and caused by human fault. Even in highly protected plants the human risk-factor can not be excluded during evaluation of the risk-potential.

Thus the approach of an EIA has to regard technical evaluations as well as organizational thoughts and the human factor.

An environmental risk is a threat to the environment. An analysis of the risk concerning the organizational and human aspect however never was properly executed during an EIA. A possible solution could be to use an instrument as the actual EMAS (Environmental Management System) of the EC for more accurate evaluation of the impact to the environment during an EIA.

Organizations or investors could demonstrate by an approved EMAS or even by showing their installment of EMAS that not only the technical level of the planned investment meets the requested standards but as well the actual or planned management is able to reduce the environmental impact down to a bearable level.

keywords : EIA, environmental risk, risk evaluation.

The goal of an EIA is generally spoken to increase the consideration of our environment during the process of permission of relevant projects. This means finally to protect our environment by prevention. The EIA thus is a part of the prevention.

Main parts of EIA are:

- ⇒ Finding out and description of possible impacts and
- ⇒ Evaluation of these impacts.

Finding out: Knowledge which “good” have to be protected

- evaluation of existing goods (life, human being, health, animals, plants, soil, water, air, landscape, cultural values)
- how to save these goods
- what possibilities are existing for possible compensation

Rules: EIA has to be executed

- ⇒ completely regarding all goods to be protected

⇒ wholistic: for example interaction between single goods have to be regarded as well

⇒ systematically: concerning methodes approable

⇒ early enough: to be regarded during the permission process

EIA: ecological self control of the project (manager, owner)

⇒ planning

Important points for my lecture are as a summary of the so far said:

- ① impact to our environment
- ② stage of planning a project
- ③ rules: completely
  - wholistic
  - systematically
  - early enough

This guided me to the idea of the lecture because I think that the environmental risks are to my feeling not directly misregarded but underrepresented during the EIA, however they are essential.

Learning from history is internationally regarded as gaining experience:

The Gerling Consulting Group is learning from environmental accidents and transferring this experience into protection measures.

The Gerling Consulting Group is one of Europe's leading consulting companies. We offer a comprehensive range of technical and management consultancy services in the fields of environmental protection, safety and risk management. We help to secure a company's success. And we help make economic action ecologically viable.

Our clients include international corporations as well as small and medium-size companies. We solve problems, taking into account the particularities of the industry involved. Our

know-how of European laws and regulations is at the disposal of our industrial clients. Our extensive experience with industrial risks and the knowledge we have of economic interrelations make us a competent consultant to ministries and administrative bodies.

The Gerling Consulting Group is an independent consultancy company within the Gerling Konzern. We have our own sophisticated laboratories and can draw on nearly a century of damage experience of the Gerling insurance companies, which are leading international insurers of industry and commerce. Furthermore, we are closely associated with the Gerling Academy, which studies the anthropogenic aspects of risks and safety, trying to optimize the interaction between human behaviour, organization and technology.

Consultancy services offered by the Gerling Consulting Group range from risk analysis to technical and organizational safety programmes to damage remediation. We cover the fields of environmental protection, worker and plant safety, materials technology and materials testing, fire and burglary protection, data processing safety, quality management, reliability of delivery services as are risk control strategies for multi-national corporations, quality assurance manuals as well as hazardous waste site remediation.

The Gerling Group is represented at four locations in Germany and has eleven branch offices in eight European countries with a total staff of nearly 200. We are also co-founders of the European Environmental Network (EEN) which has some 1,000 employees and sixty offices, making it one of the major consultancy groups in its field.

Our consultants and experts are highly qualified scientists, lawyers, engineers and business experts of long standing, who receive systematic, advanced training in our group. We typically carry out projects with interdisciplinary teams, specifically

put together for the particularities of the task concerned. An important principle of the Gerling Consulting Group is the close cooperation with the experts and managers of our clients. We employ our laboratories, our know-how and methodical knowledge for starting an ongoing process of optimization with our clients. We accompany projects all the way to complete realization.

Coming back to the environmental risk evaluation we have to find a generally accepted definition of the risk itself. This can be seen on the following foil.

#### Definition of Environmental Risk:

A Risk is a threat to objects, interests or persons by danger  
An environmental risk is a threat to the environment by actions or projects able to damage the environment

Which are the characteristics of environmental risks?

#### Environmental Risks:

- never can be excluded
- never can be brought to zero

have to be taken into consideration because of:

- protection against loss
- reduction of risks as far as possible

Where are the potential sources of environmental risks?

#### Potential Sources of Risks in a Company

- Location
- Plant Building/Construction; Plant Site
- Storage and Internal Transport of Dangerous Materials and Substances
- Waste Disposal (into ground, air, water)
- Transport of Dangerous Materials and Substances
- Organizational Structure, Personnel
- Risk- and Environmental-Consciousness
- Applicable Laws and Regulations

An insurance company dealing with industrial risks shortly published in a German newspaper:

#### Allianz published:

Production plants equipped by modern safety technology have the most damages if the safety management is missing

#### Allianz offers:

training for managers

Allianz's risk analysis: generalistic, intuitive, regarding soft facts

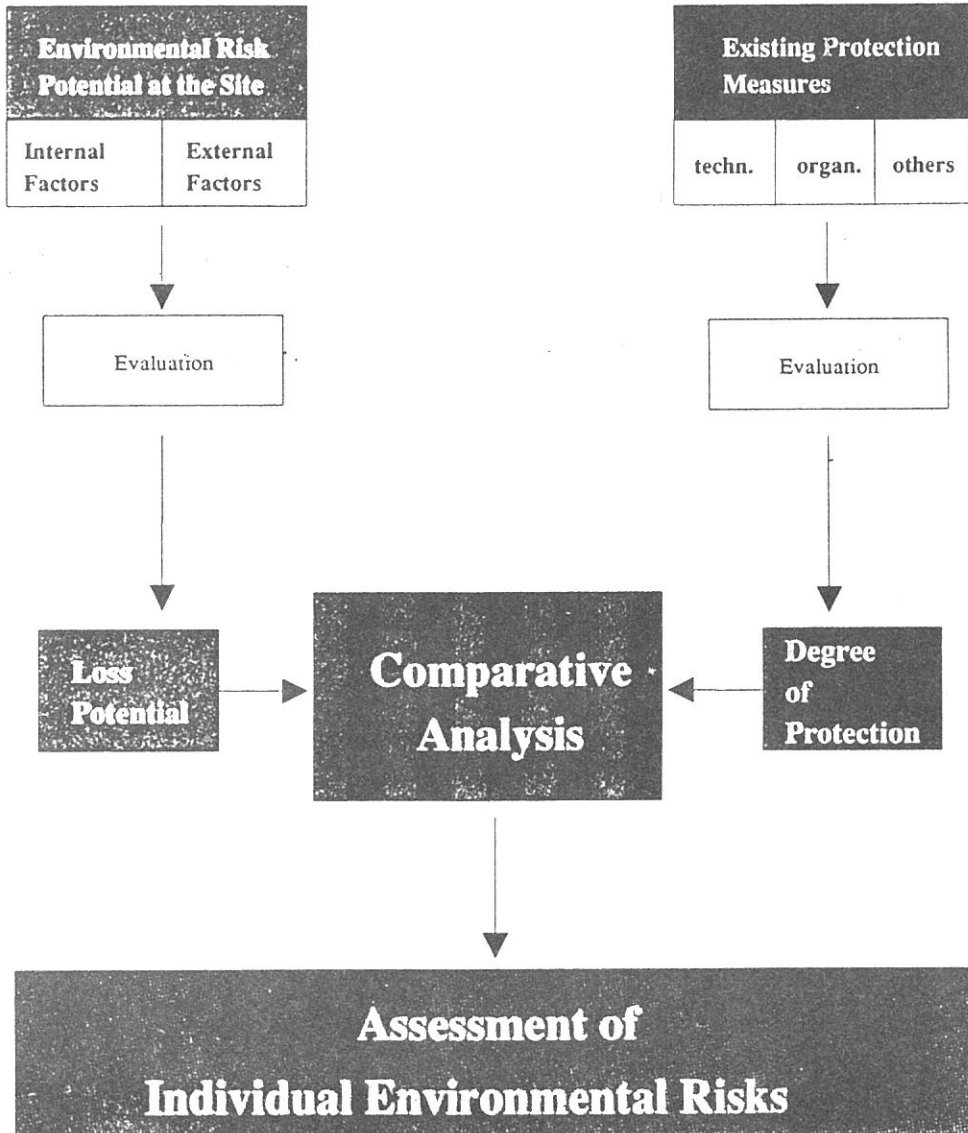
#### Soft facts:

- culture
- unprinted rules
- conflict relations

Decisions concerning possibilities of insurance are made only after a wholistic risk assessment

This again shows that the human factor is horribly important concerning environmental risk evaluation.

## Evaluation of Environmental Risks in a Company



As Prof. Chung mentioned we have to reduce down and keep low the impact severity and the impact frequency which means we have to reduce the environmental risks:

<p><b>Environmental Risk reduction</b></p> <p>has to be regarded in every stage of a project</p> <ul style="list-style-type: none"> <li>• during planning</li> <li>• during operation</li> <li>• after shut down</li> </ul>
<p>has to be regarded by a wholistic approach:</p> <ul style="list-style-type: none"> <li>• by a technical approach</li> <li>• by an organisational approach</li> <li>• by regarding the human factor</li> </ul>

This is transferable to any project which has to pass the EIA

- for example:
- oil refining plants
  - power plants
  - storage of unclear waste
  - steelmills
  - chemical plants
  - waste treatment

The human factor plays an important role.

Another important fact has to be regarded during evaluation of environmental risks, it is the human factor.

<p><b>History of and experience by environmental accidents:</b></p> <p>The majority of environmental accidents was caused by human factors</p>
--

During the last years the development in the industry showed clearly that there was a change:

<b>Change of aspects in environmental management</b>	
Yesterday:	Today:
Laws and regulations:	Advantages in competition
Damages	Liability
Fire prevention	Environmental protection
Production	Product, Lifecycle
<b>AVOIDING DAMAGES</b>	<b>SAFETY MANAGEMENT</b>

An excellent instrument to regard the correct way in finding and managing environmental risks is in ow thinking the

**ECO-Audit or EMAS**

The process of participation is explained on the following pages.

## EMAS in Four Steps

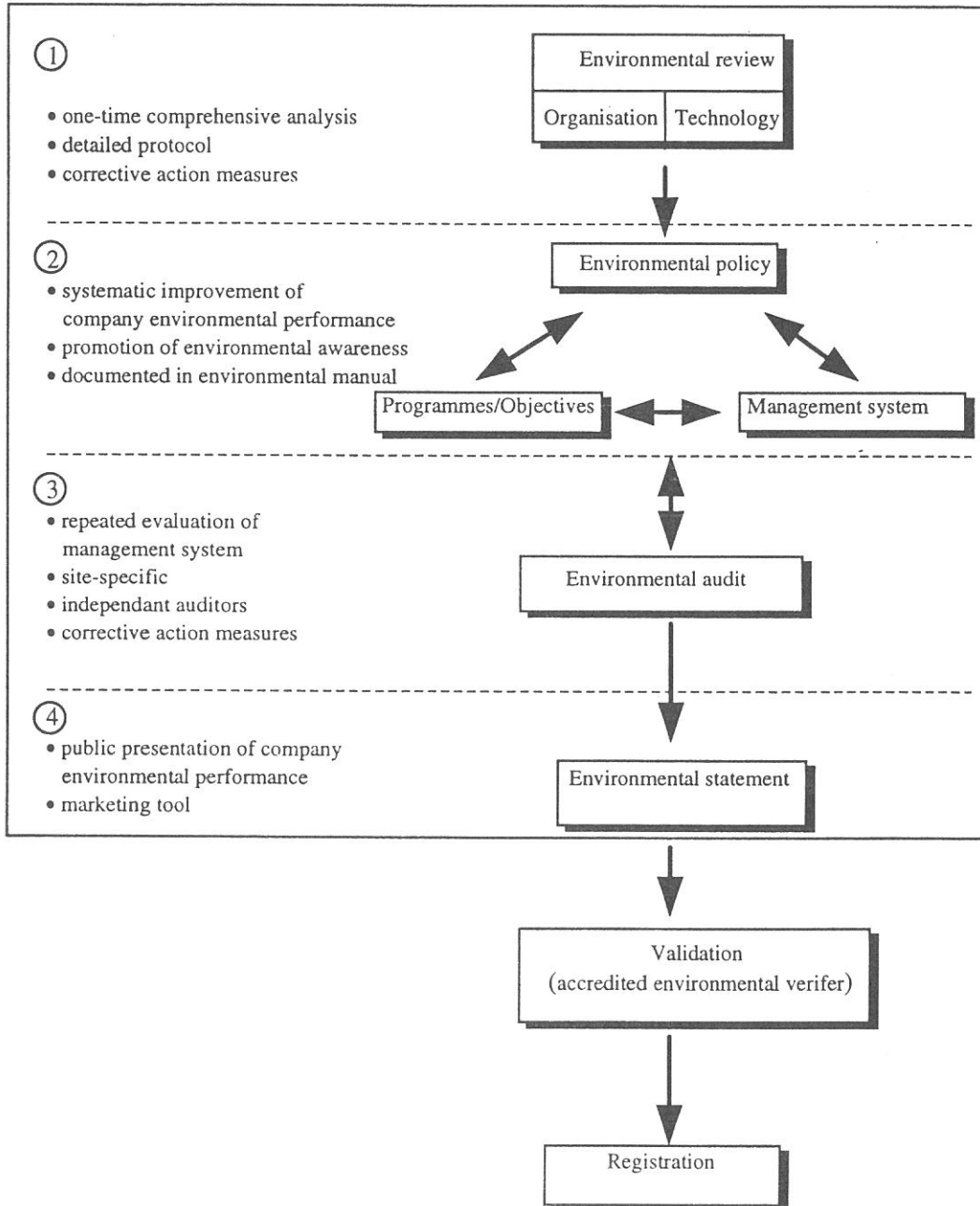
### Official participation in the EC EMA-Scheme

Four steps are necessary to obtain validation by an accredited environmental verifier. Upon completion, the company may register its site in the EMA-Scheme. In order to qualify for continuous participation, Steps 3 and 4 have to be repeated at regular intervals.

#### Step 1

An environmental review of the site has to be conducted in order to analyze the environmental situation and performance of your company. Content of this review are the environmental management system in place, soil, water, air, economy of resource use, environmentally-friendly products and produc-

## Four steps to Validation with the Gerling Consulting Group



tion processes, as well as training of your staff.

The result of the environmental review are reported in a detailed protocol. On the basis of the findings, action steps are recommended in order to eliminate the noted deficiencies.

#### Step 2

The company now has to introduce an environmental management system in accordance with the results of the environmental review (see Step 1). The environmental management system composes the setting of an environmental policy and the development and implementation of an environmental programme and objectives. The environmental management system may be systematically recorded in an environmental manual.

#### Step 3.

Installation of an environmental audit programme ensures

that the environmental management system is amended and updated on an ongoing basis. The environmental audit should be carried out by objective internal or external environmental auditors at least once every three years. For this purpose, a site-specific management audit questionnaire needs to be developed. The findings of the audit are reflected back on the environmental management system, which should then be amended accordingly.

#### Step 4.

An environmental statement for the public will be issued that describes the environmental effects of your company. This environmental statements is an instrument for demonstrating to the public that the company engages in proactive environmental management.