Final report

NATO-CCMS

Pilot Study on Environmental Management Systems in the Military Sector

March 2000

CONTENTS

Management Summary

The NATO-Committee on the Challenges of Modern Society started a Pilot Study on the possibility to implement environmental management systems in the military sector in 1996. A pilot-study group was formed that consisted of 29 countries. The pilot study group concluded her task in December 1999. In her annual meeting the final report of the pilot study group was approved by CCMS at her March 2000 meeting in Brussels.

The pilot study group had the following terms of reference:
1)   Exchange, review and evaluate experiences and expectationd among countries regarding Environmental Management Systems.
2)   Identify, compare and evaluate standards for Environmental Management Systems.
3)   Analyse the resource requirements and other implications of implementing Environmental Management Systems in the Military Sector.
4)   Formulating methodologies for application.
5)   Publish application guidelines, frameworks and/or models for implementing Environmental Management Systems in the militarys sector.

The pilot study group concluded that it is possible and even desirable to implement environmental management systems in military organisations. The pilot study group recommends to implement a standard for environmental management systems that is recognized all over the world. The only standard available that is recognized on both sides of the Atlantic is the ISO-14001 standard. The final product of the study is the first clear-cut and complete application guideline on implementing an environmental management system in the military sector.

Environmental management systems at the very least provide safeguards for top-management to ensure that environmental legislation is complied with. In addition, the ISO 14001 standard demands continual improvement of the environmental performance of the (military) organisation. This is unique to environmental management systems in general, but specific to the ISO 14001 standard. It ensures that the organisation is also in future capable of meeting the environmental challenges that lay ahead.

Implementing an environmental management system requires a clear policy from top management to do so.

Middle management has a difficult position. Shrinking budgets and expanding tasks are their main problem. Therefore the environmental management system should have a champion that coordinates the implementation of the system.

At work-floor level, environmental considerations should be incorporated into the normal tasks and routines by means of procedural instruments and checks. This will require a that all relevant procedures must be documented..

For each level, specific training is necessary to get the necessary know how when dealing with environmental issues.

The environmental impacts of the military sector will need to be looked at in a systematic way. A major undertaking indeed. This will generate information that forms the basis for

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environmental policies and ultimately, environmental protection measures.

A common misunderstandig is that the envrironmental measures (like installing filters in chimneys for example are part of the environmental management system. Taking (sometimes) expensive measures to protect the environment is not a part of the management system. So, environmental measures are not in this report. Taking the environmental measures will be a *consequence* of the implementation of environmental management systems. It should be remembered though, that these measures should have been necessary anyway. The environmental management system merely unveils its necessity earlier, so that decisions on taking action can be made by the military sector itself instead of yielding to external coersion at inappropriate moments. This is the main added value of environmental management systems.

The results of the environmental measures must be known to top management. This requires a planning and control-mechanism for environmental issues that works. That is the essence of every environmental management system. The ISO 14001 demands that the results will improve every year.

Foreword

In recent decades, governments, industries and citizens around the globe have become increasingly aware of environmental issues and the need to manage these issues in a more systematic way. From this, the concept of the environmental management system (EMS) took shape.

History of the EMS

In 1972, the report *Limits to Growth*, released by the Club of Rome, pointed out that the world's resources could not sustain the way of life of most of the developed world. In the decade that followed, environmental pressure groups and one-issue political parties succeeded in putting environmental issues on the political agendas of many governments and international governing bodies. Since then, policies for dealing with large-scale environmental problems have evolved through three phases.

In the first phase, it became clear that industry had to respond to society's environmental pressure. At first, industry's response was to consider only individual technical, end-of-pipe solutions, such as limiting pollution by putting filters on chimneys. Over the years, however, end-of-pipe solutions proved to be insufficient. They simply shifted the problem from one natural resource — soil, air or water — to another, without really solving it.

As governments around the globe reviewed the state of the environment in their own countries, they came up the same results: the environment is already polluted, with soil and water pollution in particular posing potentially large-scale clean-up problems. This prompted governments to enact legislation that led to the second phase in environmental policy — the clean-up of contaminated land and water. While clean-up is still a large component of management issues, it does not represent an integrated management approach.

These ad-hoc approaches had to be replaced by a more systematic procedure that covered the life span of operations, from cradle to grave.

The EMS is born

In the 1980s, both industry and government began taking a systematic approach to environmental problems — quality management systems. Industry analysis showed that environmental problems often resulted from non-technical causes and a lack of organisation and proper process, including unchecked human errors, poor communication and inadequate knowledge. As a result, governments and industry turned their focus to cradle-to-grave solutions, which take into account environmental issues throughout entire industrial processes. By adopting the principles of quality management, environmental thinking made the leap to a systemic approach.

The cornerstone of this approach is the EMS, which incorporates a plan, implement, check and review process. An EMS allows organisations to manage their activities to *prevent* pollution and *minimise* further impacts on the environment, without placing unnecessary operational or financial burdens on them.

This rationale holds true for government as well as industry. Generally, governments set their nation's environmental agenda by putting legislation into place. They should also set an example by introducing an EMS in all departments.

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Evolution of the EMS

In Western Europe, North America and, increasingly, the world, the approach to controlling or influencing impacts on the environment has changed dramatically. Initially, government efforts concentrated on the development of legislative and regulatory structures, together with enforcement through an environmental permit structure. Industry response was largely reactive. It invested in end-of-pipe technological solutions based on the need to comply with the ever-increasing regulations and the environmental conditions attached to operating permits.

In 1972, the World Commission on Environment and WCED was created, following the United Nations Conference on Human Environment. As an independent commission, the WCED took on the task of reassessing the environment in the context of development. In 1987, it published its report, *Our Common Future*, which promoted the term "sustainable development" and urged industry to develop effective environmental management systems. More than 50 world leaders recognised the importance of the report and called for a major conference for further discussion and decisions on actions. The UN then organised the UN Conference on Environment and Development (UNCED), also referred to as the Earth Summit, held in Rio de Janeiro in June 1992. The outcome was *Agenda 21*[1], a global consensus and political commitment at the highest level.

Other important events in the evolution of environmental management systems were the establishment of the World Business Council on Sustainable Development (WBCSD) and the 1991 launch of a Business Charter for Sustainable Development by the International Chamber of Commerce, which contained 16 principles of sound environmental management.

Development of EMS standards

As organisations developed and implemented an EMS, they sought out more clarity and details, particularly for standard methodologies. In March 1992, the British Standards Institute created BS 7750, a standard for environmental management that was soon followed by the Eco-Management and Audit Scheme (EMAS) in the European Union and the International Organisation for Standardisation (ISO). Adoption of the latter is considered to be essential if an EMS is to be applied so as to create a level playing field in international trade terms, as required by international trade agreements both within the European Union and worldwide. National standards were also produced in France, Ireland, Canada, Spain and South Africa.

British Standard 7750 (BS 7750)

The British Standard Institute, the first national standards body in the world, published a draft British Standard (BS 7750) on environmental management in March 1992, and a second edition in 1994. BS 7750 was a specification for an EMS rather than a guidance document. It provided details on how organisations could implement an EMS and ensure compliance with their chosen environmental policies and objectives. In the United Kingdom, ISO 14001 has since superseded the British Standard.

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[1]   In the UK, *Agenda 21* networks have been set up to engage the public.

Eco-Management and Auditing Scheme (EMAS)

In April 1995, the European Union published the Eco-Management and Auditing Scheme (EMAS). It is a voluntary scheme, operated/administered in each member state of the European Union. The EMAS requires participants (currently only companies performing industrial activities, except in the United Kingdom) to evaluate their environmental performance and commit themselves to continual improvement, and to make relevant performance information available to the public.

ISO 14001

Established in 1947, the International Organisation for Standardisation is a non-governmental organisation of about 100 national standards bodies. Since 1991, various working groups, followed by sub-committees of the official technical committee (TC207), have been developing standards for environmental aspects. A draft International Standard for Environmental Management Systems (ISO 14001) emerged in 1995 and was finalised in 1996.

EMS in the military and private sectors

(See Annex A of the Introduction for more information on the EMS in the military and public sectors.)

In 1996, KPMG's Canadian Environmental Risk Management Practice surveyed over 400 companies on EMS implementation. Of the 64% of companies that reported having an EMS, only 15% reported that their system conformed to all the EMS elements. This was an improvement over the 2.5% identified as having an

EMS in 1994. Nonetheless, the KPMG study did find that crisis management was still the most popular approach to addressing environmental issues. Since 1996, however, the number of companies that either have developed an EMS (ISO 14001 certified) or are conforming to an ISO-like EMS, has increased dramatically.

KPMG concluded that there are several reasons for implementing an EMS. An EMS:
- is a critical strategic business issue;
- is an enterprise-wide core process;
- affects every point in the chain of operation;
- affects business risk;
- affects customer and stakeholder satisfaction;
- affects product and process quality; and
- affects the bottom line.

The military sector's environmental impact often outweighs that of most other government departments. Given this, and the number of weapons, motor vehicles, aircraft and ships, as well as natural resources, under their stewardship, ministries of defence and armed forces, in particular, should have an EMS. An EMS is the best way to both protect the environment and maintain operational readiness.

Most countries have armed forces with roughly the same tasks and kinds of equipment, so the challenges surrounding environmental aspects are likely to be similar. It was, therefore, a logical step to initiate a pilot study under NATO's Committee on the Challenges of Modern Society (NATO/CCMS) to share experiences and knowledge in implementing an EMS — the *NATO-CCMS Pilot Study on Environmental Management Systems in the Military Sector*, initiated in 1996.

After examining the benefits of having an integrated approach, the

NATO/CCMS Pilot Study believed that *adopting an EMS makes sense*. The Pilot Study agreed to produce this guideline document to assist the military sector in planning and implementing an EMS. The Pilot Study views these guidelines as a natural supplement to the *Environmental Guidelines for the Military Sector*, a joint Sweden–U.S. project, as well as other NATO and CCMS products (see *Hint Box 1* in Chapter 1).

To that end, the *NATO-CCMS Pilot Study on Environmental Management Systems in the Military Sector* researched the three dominant international standards mentioned above:

- BS 7750
- ISO 14000
- EMAS

For comparative purposes, the Pilot Study Group also considered a fourth environmental management system, the CSA Z750, from Canada.

Bridging Document – ISO 14000 and EMAS.

The ISO 14000 is also recognized in Europe under EMAS. To bridge the gap between ISO and EMAS (EMAS goes a little bit further than ISO) a bridging document is available.

Conclusion

The Pilot Study Group concluded that the differences among these standards are minimal and that all four could be used by the armed forces without damaging their operational effectiveness. However, the group recommended the ISO 14000 series as standards and guidelines that could be used NATO-wide and by NATO Partnership for Peace (PfP) countries. It made this decision because ISO 14000:

- is the most recent standard;

- is the only standard that is recognised worldwide (including by the EU, within the framework of its EMAS);
- is easily added to the ISO 9000 quality management standard already used by NATO forces;
- has already been adopted by several NATO and PfP countries;
- is probably the most attainable standard (other standards demand a little more organisation and output); and
- is user-friendly, when used with the ISO-14004 guidance document.

It is appreciated, however, that some NATO countries may be obliged to follow the more stringent requirements for external reporting, as outlined in the EMAS.

Introduction

The Role of the Environment and Environmental Management Systems in Peacetime Defence Organisations

This guideline document is intended to help defence organisations implement an Environmental Management System (EMS). It describes the stages in developing and implementing an EMS, as presented in such standards as ISO 14001. It also illustrates each stage with military examples. It does not, however, simply reproduce the Standard or replace organisations featured in existing case studies with those of military themes. Instead, it takes a unique perspective: it illustrates methods of introducing environmental considerations into organisations that are not primarily concerned with environmental matters.

Before defence organisations begin developing an EMS, they must consider the roles of both defence and the environment, and how they interact. The relationship between defence and the environment will strongly influence the perspective that organisations take in developing an EMS, which in turn will affect the successful implementation of the EMS.

First, it must be remembered that the role of defence organisations is military defence. The primary consideration of defence ministries and military personnel is to maintain the capability to protect national and global security and alliance interests. Other considerations must assume a secondary role.

The role of the environment in defence is complex. Defence organisations are increasingly bound by national and international legislation and regulations to protect and conserve the natural resources of defence lands, and to act in an environmentally responsible manner.

Defence organisations should adopt a greener approach for other reasons as well. First, sustainable environmental management in training areas will ensure that the quality of land resources is maintained for realistic training in the future. Second, incorporating greener practices into military procedures and operations will enhance public relations and may have financial benefits such as reducing energy costs and clean-up, disposal or litigation costs.

Environmental management as a help, not a hindrance

While the incorporation of environmental management into defence activities has not been comprehensively addressed in literature, it is crucial that defence organisations address this issue before implementing an EMS. Organisations should investigate methods of integrating environmental thought into all levels of decision-making and during all operations. They should treat the environment as an integrated subset of defence, rather than as a separate issue.

Environmental management does not have to unduly restrict the military by making regulatory compliance an overriding burden. It is better viewed as an opportunity to save money, freeing it to be reallocated to operational activities.

In integrating environmental management thoroughly, defence organisations may have to overcome resistance or reluctance to change from within. Defence personnel might

regard the environment as a "limitation on the aim" or something for which a specialist organisation is responsible. However, environmental management should be depicted in terms of "support for the military member" and as an overall process and strategy rather than as a stand-alone item. In order to change the behaviour that led to many environmental problems, defence personnel must see the logic and the benefits of changing behaviour. Only then will good environmental practices become second nature.

The reaction and support of Senior Military and Civilian staff and other members of senior management will play a large role in whether or not an organisation successfully adopts and implements an EMS. The best way to achieve this support is to "sell" environmental management from a defence or financial standpoint rather than a purely environmental perspective. Defence managers are appointed to manage defence, and military personnel join the armed forces to fulfill defence duties, not to manage the environment.

Defence organisations must therefore introduce environmental management in such as way that it becomes integrated as an accepted, every-day activity that does not interfere or inconvenience personnel as they carry out their duties.

The following chapters outline how to establish an EMS. Chapter 1 gives an overview of how to implement an EMS in the military sector. Chapters 2, 3 and 4 describe the policy, planning and implementation stages respectively. Chapter 5 reviews monitoring, evaluating and reporting. Finally, Chapter 6 discusses registering an EMS.

These outlines are supplemented by hint boxes that provide practical advice on implementation. Annexes provide more detail on implementation, based on the experience of pilot study participants.

Annex A — EMS in the public and military sectors

The following examples show how a number of countries' public and military sectors have implemented environmental management systems.

Denmark

On 1 January 1993, the Danish Ministry of Defence (DMOD) established a commission for the protection of the environment and nature. Its task was to support the efforts for the protection of nature and environment within the area of responsibility of the DMOD, in cooperation with various defence and public authorities. Its members were selected from the Defence Command, the Home Guard Command, the Danish Defence Construction Service (DDCS), the Royal Danish Administration of Navigation and Hydrography, and the DMOD Hunting Officer. The DMOD provides both the chairperson and secretary of the commission.

The commission is also required to observe national and international efforts in the field of nature and environmental protection.

At the commission's first meeting, the DMOD introduced a draft for an environmental policy and strategy that specified four main fields for environmental efforts: legislation/policy; assessment of the environmental condition under the DMOD; education; and information.

The DDCS was allocated the task of developing and starting an EMS under the DMOD's domain. It based its EMS on the British Standard 7750 and, with a little assistance, the initial assessment was described. An airbase was chosen as a model site for an EMS pilot project.

An education system was designed and the first class with 86 participants was formed in 1993. At the start, the training was organised into three steps:
- A one-day course gave the establishment's chiefs an overview of the administrative and political aspects of an EMS and introduced environmental management to the whole class.
- An eight-day course that included practical training was given to the staff selected to be environmental managers. The course was designed to enable them to implement an EMS within their establishment.
- An additional eight-day course included more advanced material for instructors and coordinators.

The programme was developed and tested on a group in the autumn of 1993. On the basis of this experience, the DDCS developed a *Handbook for Preparatory Review*.

Later on (from 1994) the Defence Command, which is responsible for the education of environmental managers, changed the programme to a one-step course, eliminating the original first and third steps. Essentially, the course has been extended to five weeks, including one week of practice.

Other elements in support of the EMS included:

- guidelines for the Administration according to the *MOD Environmental Strategy* and the rules in *Handbook for Preparatory Review or Initial Review* (December 1993, Defence Command).

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- an environmental database. This requirement was recognised and the DDCS designed a database system (*Tilstandsvurderings* or Initial Review Database) (TIVU), the first version of which was available in early 1994.

The United Kingdom (UK)

Many of the United Kingdom's municipalities have adopted the Eco-Management and Audit Scheme (EMAS), which has given the country considerable experience in EMSs. The local government programme is called the Local Authority Eco-Management and Audit Scheme (LA-EMAS). Local governments see internal environmental management as a key issue because it enables them to influence their community by leading by example.

For many years, local authorities had been improving their environmental performance in a professional and progressive, though usually ad-hoc, manner. The LA-EMAS helps local governments manage their environmental responsibilities in a coordinated manner. It also enables them to share their best practices with other local authorities to improve overall performance and to leverage resources. In turn, this allows them to identify ways of saving money through good environmental practices.

In its first report on the 1990 White Paper, *This Common Inheritance*, Her Majesty's Government committed all departments to establish strategies for environmental good housekeeping by the end of 1992. In June 1997, the Prime Minister's address to the Special Session of the UN General Assembly on Sustainable Development stated that:

We must make the process of Government green. Environmental considerations must be integrated into all our decisions, regardless of the sector. They must be in at the start, not bolted on later.

In May 1997, the Department of the Environment (DoE) and the Department of Transport (DoT) merged to form the Department of Environment, Transport and the Regions (DETR). Both DoE and DoT actively developed and implemented initiatives to green operations, and shared advice and experience with other departments. Ministers responsible for green issues also reported and reviewed their progress at regular cross-government meetings. Both former departments published their commitment to environmental considerations in green-housekeeping policy statements. These statements reflected the then UK Government's White Paper, *This Common Inheritance*, the four programmes *Sustainable Development*, *Climate Change*, *Biodiversity* and *Sustainable Forestry*, and the European Union's *Fifth Environmental Action Program*. DETR recently issued a new framework for greening government operations which is now being taken up by all government departments. The framework is devised to help departments develop new aims, objectives and targets for improving their environmental performance, and includes a model policy statement and improvement programme.

In October 1996, DoE had become the first department to gain accreditation to BS 7750 and ISO 14001 for its Office Services Division's EMS. Extension of the EMS to DETR's Working Environment Division was formally accredited in March 1998.

The EMS is designed to identify, minimise and manage the significant environmental aspects of the divisions' operations; to secure continual improvement; and to provide a means

of demonstrating compliance with policy commitments and objectives. To help other departments consider introducing an EMS, DETR established and is chairing an interdepartmental group to develop and offer guidance. The document *Implementing Environmental Management Systems: Guidance for Government Departments* has become the backbone of these *Environmental Management System Guidelines for the Military Sector*.

Canada

In 1995, federal government departments and agencies were directed to develop and implement formal EMSs to minimise the negative effects on the environment caused by their activities. This requirement also applies to the Department of National Defence and the Canadian Forces (DND/CF). *Directions on Greening Government Operations* stated that: *A properly designed EMS will provide the framework for practices to help a department or agency manage its environmental agenda and document, evaluate, and communicate its environmental performance.*

In addition, amendments to the *Auditor General Act*, which came into effect in December 1995, require departments to prepare sustainable development strategies (SDS) and action plans, and to table them in Parliament at least every three years. The amendments also established the position of Commissioner of the Environment and Sustainable Development, which was filled in July 1996.
On behalf of the Auditor General, the Commissioner monitors departments' progress in meeting their sustainable development objectives and implementing their action plans. The Commissioner reports the results annually to Parliament.
DND/CF recognise that they have the potential to affect the Canadian environment and are responsible for helping to protect it. They have introduced many programmes to limit the impact of their activities and to contribute to the health and well-being of Canadians. These programmes range from placing oil-catching drip pans under parked vehicles, to providing emergency aid for flood victims. DND/CF's awareness of and contribution to environmental protection is amplified in their first SDS, Environmentally Sustainable Defence Activities. It incorporates existing initiatives where appropriate, and outlines new objectives to increase National Defence's contribution to sustainable development.

DND/CF recognise that sustainable development must be integrated into the business planning process. In the coming years, they hope to combine the SDS and the Business Plan into one document. (At present, they are complementary.)

The United States

In early 1996, the Office of the Secretary of Defence recognised the potential of environmental management systems such as ISO 14001 to improve the Department of Defence's mature environmental programme. After holding a symposium with industry and key Defence officials from the Military Departments, the Department of Defence agreed to implement ISO 14001 at approximately 15 installations to determine the benefits of adopting the principles of ISO 14001. The pilot phase began in 1997. After two years, the installations have found that implementation better integrates

environmental programmes and helps environmental managers more comprehensively identify the military's impact on the environment. The Department of Defence is now determining whether to encourage installations to adopt ISO 14001 as a good business practice.

The Czech Republic

Although the Czech Republic is not a member of the EU, it supports accession. As a result, in its policy document *State Environmental Policy* (1995), the government decided to implement the EU's EMAS to enhance the quality of the environment. Some of the country's more developed companies have achieved certification to EMAS and ISO 14001 standards. The Army of the Czech Republic has also implemented a unique EMS, using several proactive methods that will support conversion to a standard EMS. According to a decree issued by the Minister of Defence in 1997, the unique EMS will be replaced by ISO 14001. The Ministry is proceeding with an implementation outline, and it is expected that ISO 14001 will be fully introduced in the military sector by 2003. The Chief of Environmentalists recognises that any standardisation of the EMS in the framework of NATO countries would improve the integration of sustainable development into military activities.

Annex B — Goal of an environmental management programme

(See Chapter 3 — Planning for a further discussion of environmental management programmes.)

Environmental problems are often dealt with after the damage has been done by end-of-pipe solutions. If organisations introduce environmental considerations as part of their culture and overall management and process strategy, they may achieve regulatory compliance and financial savings without the sense that there has been an extra burden. General Staff and other members of senior management are often likely to dismiss environmental management as a drain on scarce resources. If it can be presented as an opportunity to save money, however, it is more likely to capture their attention.

For example, if organisations adopt a strategy to reduce overall process costs, some of the savings could come from reducing clean-up or waste disposal costs, or from using cheaper and possibly more environmentally responsible materials or processes. This has the dual advantage of reducing environmental impacts (keeping environmentalists happy) and saving money that can be re-invested in new equipment (keeping Senior Military and Civilian staff happy).

Role of Logistics and Infrastructure

Logistics is the branch of defence concerned with systems and processes, and includes acquisition, equipment maintenance, training, disposal, transport and supply. The Infrastructure is the branch responsible for the design, implementation and maintenance of buildings and all associated infrastructure including roads, sewer system. A large percentage of environmental impacts and clean-up costs could be avoided if environmental concerns were taken into account in the planning and design phases. If a problem is not corrected at the source or at the design phase, however, the resulting pollution usually winds up as an infrastructure clean-up problem.

The 80/20 rule (Pareto's Law) describes the principle of allocating 80% of resources to 20% of the problem. This principle could be applied to defence budgeting as a whole. In a number of cases, the logistics usually receives only a small fraction of defence budgeting compared with infrastructure (installations and equipment). If more money were invested to improve environmental performance during logistical processes, overall savings could be realised. Changing a parts-cleaning process, for example, could eliminate hazardous waste, which is a very expensive end-of-pipe solution. These savings could then be used to invest in infrastructure or military equipment. In other cases the infrastructure maintenance budget has been cut which can also lead to environmental costs.

Cost of doing business

Senior managers frequently see environmental activities as simply another cost of doing business. Environmentally driven baseline costs include disposal of hazardous materials and clean-up of contaminated sites or equipment. They also include the costs associated with environmental management plans (both money and person-hours), such

as implementation, administration, data collection and processing, and regulation activities to comply with environmental legislation.

Because the majority of these costs usually come from the annual budget of the Logistics branch, any cost reductions will save the branch money. Defence organisations should therefore have an environmental specialist operating as an integral member of the overall defence planning and budgeting system.

A comparison of the following approaches to environmental management illustrates the advantages of integrating environmental "top-down" thinking into senior levels of organisations over "bottom-up" approaches.

The first approach defines goals to monitor and improve specific environmental problems. (e.g., reducing gaseous emissions, such as methane). This is very much an end-of-pipe approach directed toward specific users or locations. This creates a myriad of small action plans, each requiring individual performance measures and monitoring programmes, and costing money for implementation, administration and data collection. In addition, senior managers are more likely to dismiss this type of *bottom-up* approach as part of the general environmental burden, because they do not wish to get bogged down in the intricacies of specific environmental issues.

The second approach defines broad environmental goals at the senior level, which are filtered down through the entire unit. A typical goal of this *top-down* approach may be to reduce energy costs per process throughout an entire branch, such as Logistics.

Cost reductions could include minimising environmental baseline costs such as clean-up and waste disposal, with a target of reducing paint/depaint costs by 5%. If organisations altered their practices to generate less hazardous waste, for example, or used alternative non-hazardous materials, the outcome would be favourable to both environmentalists and senior managers.

If this far-reaching strategy can help the Logistics branch cut environmental baseline costs, senior management is more likely to embrace environmental management. This subtle approach (with the added incentive of freeing up finances to re-invest in new equipment) may be more effective in gaining management support than a more blatant green approach involving separate plans to deal with individual environmental aspects.

Integrating the environment into defence

The environment cuts across all aspects of defence. All branches — preferably at a high level of defence planners — should therefore adopt broad strategies to accomplish environmental goals and cut costs. Managers with the foresight to incorporate environmental concerns in initial planning processes can realise considerable savings down the line.

The following examples show how environmental aims can be or have been incorporated into different defence sectors.

Logistics: An organisation's aim to reduce the cost of its paint/depaint processes by 5% could be incorporated into its overall strategy for reducing energy cost per process.

One method could be to reduce expenditures on hazardous waste disposal, therefore reducing hazardous waste production.

Infrastructure: The concept of sustainable buildings is growing at military installations. Organisations can sell the idea to senior management more effectively if they use a business case, identifying the financial incentive of environmental issues such as long-term energy savings, rather than pushing for an initial investment in green buildings, which may be viewed as little more than an environmental fad.

Acquisition: Acquisition is an important aspect of logistics and infrastructure. The following examples show how environmental concerns could be incorporated into the acquisition process.

Each of the U.S. Air Force's F-16 aircraft uses several million rivets that have to be greased before insertion. The grease comes in tubes and must be stored in refrigerators. By purchasing pre-greased rivets, the Air Force eliminated the environmental costs of disposing of empty tubes and the costs of cold storage, and saved an estimated $5 million and 24,000 person-hours per aircraft.

Summary

The military sector must use caution when adopting approaches for implementing an EMS.

There is a clear need to integrate environmental thought into all aspects of defence and at all levels. Organisations must look at the environment as a horizontal issue — a subset of all defence sectors.

Instead of concentrating on individual environmental aspects and reporting detailed sets of data trends for each impact measured, the environmental management programme must be relevant to the system as a whole. A top-down approach implementing broad strategies that reducing environmental impacts may be more cost effective and manageable than a bottom-up approach involving several small, specific environmental plans.

Defence organisations should integrate their EMSs as fully as possible into existing management systems, rather than deal with the environment as a separate issue. This will reduce the view of environmental management as a burden that must be accommodated at the expense of operational requirements. Organisations should also consult with process owners so that environmental issues can be incorporated early on, in such processes as logistics or acquisition, for example.

Chapter One — Overview of an EMS in the Military Sector

This chapter gives an overview of how military organisations can start implementing an environmental management system (EMS). It emphasises the importance of ensuring government and management commitment and following a standardised EMS structure.

Military organisations need EMSs because their activities have an impact on the environment. Some organisations may already have systems for dealing with environmental concerns, but these systems are probably not formalised to the degree that the ISO 14001 or EMAS standards require.
(See the Foreword for a brief discussion of the history of EMS standards.)

Getting started

Most military organisations have been aware of how their operations affect the environment for some time. In many instances, they have undertaken activities that benefit the environment, such as removing evidence of occupation from a bivouac area and refraining from discharging solid waste at sea during naval exercises.
Although military organisations follow these procedures for reasons of tactical concealment, they are nonetheless environmentally sound practices.
Beyond these operational activities, however, the public has insisted that in peacetime, military organisations minimise their impact on the environment and clean up pollution resulting from past defence activities. Environmental legislation and regulations that now apply equally to the military as well as to industry have had a direct impact on how the military interacts with the environment. The consequences of failing to adhere to regulations (e.g., fines, penalties or bad publicity) are driving military organisations to improve their environmental management. In many countries, the legislature and environmental ministries have pressured governmental organisations to implement EMSs. Whatever the situation is, if organisations have plans, procedures or activities that clean up past contamination or prevent pollution from current activities, they have the basis of an EMS.

Basic approach

Figure 1 shows the elements of an EMS.

Figure 1: Elements of an EMS (example of the British Standard BS 7750)
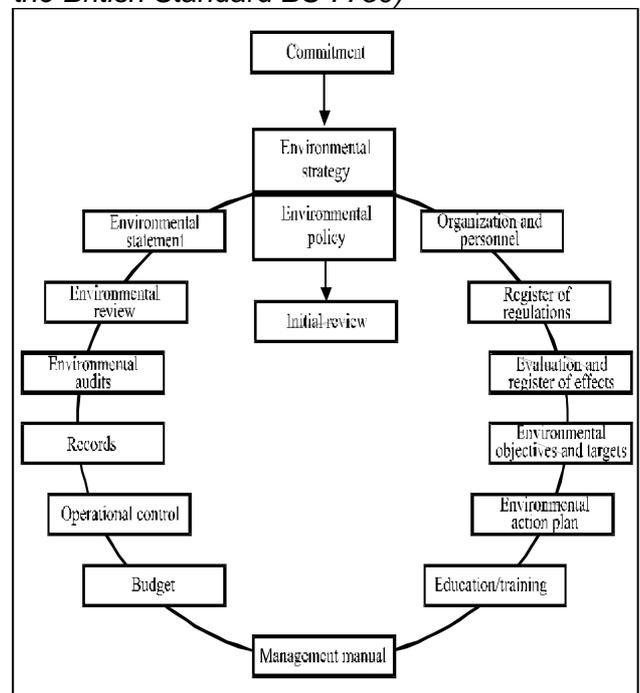
To develop and implement a formal EMS, organisations should follow a series of steps as proposed in the standards:

1. Obtain a copy of the *ISO 14000* series or *EMAS Standard* from your country's Standards Association.

2. Define the roles of senior and middle managers in developing and implementing the EMS. Appoint an "EMS Champion" who is a member of senior management. (Chapter 1)

3. Identify your organisation's activities that affect the environment either negatively or positively. Use an initial environmental review to do this. (Chapter 2)

4. Record and update legal and other *regulatory requirements* relevant to your activities. (Chapter 2)

5. Determine and prioritise the most *significant environmental impacts*. Determine the major ways in which your organisation affects the environment. (Chapter 3)

6. Draft an *environmental policy* from the environmental impacts identified and from relevant legislation, national environmental policies, etc. The policy must be approved by the commanders of each military service and by the relevant agencies at the Ministry of Defence level. Where applicable, the policy should also take into account the policies of the Ministry of the Environment, environmental non-government organisations (ENGOs), and attitudes of the general public. (Chapter 3)

7. Develop and set *objectives and targets* from the environmental policy, including *environmental performance measures*. (Chapter 4)

8. Develop an *environmental management programme* to achieve objectives and targets. (Chapter 4)

9. Define the staff *responsibilities and resources* required to drive the EMS forward. (Chapter 4)

10. Develop *awareness and training courses* to ensure that all relevant personnel: know the appropriate actions related to environmental concerns; are clear about their roles; and understand why the EMS is important. (Chapter 4)

11. Improve *communications*. (Chapter 4)

12. Develop an *environmental management manual* and related documents. (Chapter 4)

13. Establish *document control*. (Chapter 4)

14. Establish *operational control*. (Chapter 4)

15. Prepare for *emergencies and contingencies*. (Chapter 4)

16. *Monitor* the operation and effectiveness of the EMS. (Chapter 5)

17. Establish procedures for *correcting non-control and non-compliance* with policy and regulations/orders. (Chapter 5)

18. *Maintain records*. (Chapter 5)

19. Establish *environmental audit procedures* to identify strengths and weaknesses. (Chapter 5)

20. *Review* the EMS to determine its suitability, adequacy and

effectiveness, and ensure continuous improvement. (Chapter 5)

21. Produce an *environmental statement*. (Optional) (Chapter 5)

22. Obtain *registration*. (Optional) (Chapter 6)

(See also Annex 3E for an overview of the 19 steps used by the Danish Defence in its EMS.)

Although military organisations traditionally have not given the environment much attention, most military personnel will quickly become familiar with these steps. Military organisations approach most issues in a systematic fashion, so managing environmental aspects builds on skills and activities that the military prides itself on having. Developing an EMS is ultimately a practical problem, and following the steps in this manual should ensure that organisations control the impact of their activities on the environment.

Leadership roles for governments and military organisations

Without full support from the political level, the success of an EMS programme will suffer. The Minister of Defence must support the EMS. The NATO CCMS/Euro-Atlantic Partnership Council (EAPC) Model Work Programme states that Ministers of Defence should commit to:

- conducting environmental work within the military sector;
- elaborating a national environmental policy for the military sector;
- conducting the environmental work in a structured way, i.e., implement an EMS; and
- working closely with environmental and public health officials.

Adequate resources will be required to develop and implement an EMS. Military organisations may wish to provide funds as part of a "stand-alone" budget for the environmental programme, or it may be appropriate to allocate resources as an integral part of existing budgets.
The military will be seen to be committed to reducing environmental impacts, as is the case with civilian departments and the commercial/private sector. All share a common commitment to reducing environmental impacts.

Senior management's role

Senior management (senior military and civilian staff) set broad policies and fulfil an oversight role. They are responsible for making decisions that affect military operations as well as day-to-day tasks.
Therefore, senior management must play an active role in implementing and upholding an EMS. ***This is a key role, and it is imperative that their scrutiny continue***. To guarantee this, ISO14000 includes a management review and auditing scheme.

Senior management must:
- declare that having an operational EMS within a certain timeframe is an important goal for the organisation;
- stress that environmental issues must always be a factor in all planning and decision-making;
- ensure that middle management is aware of the EMS and incorporates the environment into decision-making;
- put time and interest into the management review process;
- underscore the need for environmental auditing;
- respond visibly to and take action on the outcomes of both the management review and the audit; and
- appoint an "EMS Champion" who is a member of senior management (possibly the individual to whom the Environmental Co-ordinator reports).

Senior management is also responsible for appointing the EMS Management Representative. The Management Representative should start by determining the scope of the EMS. Most organisations begin by trying out an EMS in a unit or building and then use that experience to extend it to other parts of the organisation. Eventually, the EMS will be extended to all parts of the organisation, becoming second nature to most personnel as they carry out their duties.

Middle management's role

Middle management support is crucial to successful implementation of the EMS. It is at this level that decisions most affecting the success of the EMS are made.

It is essential for middle managers to account for environmental issues when planning their own duties and those of their subordinates, and when reporting to senior management.

Experience shows, however, that while senior management is generally cooperative and willing to implement the EMS, the commitment of middle management is often more difficult to achieve. Middle managers are generally tightly budgeted and tightly staffed, and are under great pressure to ensure maximum military readiness with progressively less funding.

If senior managers order middle managers to implement an EMS, they should provide them with adequate support and motivation. They can do this by:

- demonstrating how implementing an EMS assists in conducting defence core business, and thus becomes part of their primary duties;
- ensuring that middle managers are made aware of the positive benefits of implementing an EMS; and
- making adoption of an EMS a target to achieve, and something on which middle managers will be assessed in performance reports.

Both senior and middle management are accountable for achieving environmental goals.

The role of civilian and military personnel

During daily operational tasks of military organisations, most of the environmental impacts arise from actions carried out by personnel under the direction of middle management. Middle managers can help these personnel implement an EMS by:

- ensuring that subordinate personnel understand the environmental effects of their daily actions through the appropriate training program (See Chapter 4); and
- recognising that good environmental performance of subordinate personnel is an opportunity to reward positive action, rather than disciplinary

measures for inadvertent negative action.

Summary

Military organisations, like most organisations, must reduce their environmental impact. Implementing an EMS is one of the best ways to achieve this. This chapter has given an overview of how to begin implementing an EMS.
It has also mentioned the key roles of management. It is clear that for an EMS to be effective, leadership commitment must be in place.
Countries that have already implemented an EMS have discovered that leadership commitment wields far more influence on the eventual outcome of the EMS than the discussion of costs and benefits.
The first step organisations must take toward an EMS is to develop a sound environmental policy, which is described in Chapter 2 — Policy.

Annex 1A — NATO Environmental Reports and Other Work

Conferences and seminars are an excellent way of bringing people together to communicate experiences and share developments in theory or technology. Also, presentations at professional and technical gatherings help to highlight the work done by the military and dispel any misconceptions of a "licence to pollute" on military sites. NATO and the Euro-Atlantic Partnership Council (EAPC) have been involved in this kind of activity for many years, as the following reports show.

NATO-CCMS "Blue Book" Series
The following publications are available from NATO-CCMS free of charge. Please provide the report number when contacting the NATO-CCMS office:
NATO-CCMS
Scientific Affairs Division
B-1110 Brussels
Belgium

NATO-CCMS Aircraft Noise in a Modern Society (NATO-CCMS Report No. 185, Nov 1989). This report addresses three aspects:
* source technology (to reduce noise at source, including airframes and engines)
* receiver technology (to reduce noise at the ground)
* operations and information
NATO-CCMS Pilot Study on Defence Environmental Expectations (NATO-CCMS Report No. 199, Sep 1992). This report lists the results from a questionnaire on environmental training and attitudes to military-related environmental matters in NATO countries.

NATO-CCMS Helicopter Noise Prediction Modelling (NATO-CCMS Report No. 202, Dec 1994). This report considers noise sources, measurement, sound propagation and noise exposure models.
NATO-CCMS Cross-Border Environmental Problems Emanating from Defence-Related Installations and Activities (NATO-CCMS Reports No. 204, 205, 206, April 1995).
* Volume 1: Radioactive contamination. Sources, levels, transfer processes, human impact, risk evaluation, handling (Barents Sea, Baltic, Black Sea).
* Volume 2: Chemical contamination. Dumped CW munitions, PCBs, heavy metals, chemical runoff, risk analysis, pollution disposal, evaluation and modelling.
* Volume 3: Summary Final Report

NATO-CCMS Use of Simulators as a Means of Reducing Environmental Impacts Caused by Military Activities (NATO-CCMS Report No. 210, Nov 1995). This report covers the environmental impact of military activities and use of simulators and simulations in military activities.
NATO-CCMS Protection of Civil Populations from Toxic Material Spills During Movements of Military Goods, 1992-97. Report in press (Oct 1999).

The following are not part of the NATO-CCMS Report series (stocks may be limited).
NATO-CCMS Environmental Guidelines for the Military Sector (A-96, June 1996)
NATO-CCMS Pilot Study on Environmental Aspects of Reusing Former Military Lands (1994-1998) (CCMS A-98, Dec 1996, 3 Volumes).

CCMS seminars, round tables and international conferences

NATO/CCMS has also conducted seminars, round tables and international conferences on defence environmental topics. Some have published reports, including:

- *Defence and the Environment: the Military Role in Environment Protection*, Dombas, Norway (1992)
- *Pollution Prevention and Defence Activities*, Brussels, Belgium (1993)
- *The Role of the Military in Protecting the Ozone Layer*, Brussels, Belgium (1994)
- *International Symposium on the Environment and Defence*, Swansea, Wales (1995)
- *Environmental Security*, Washington DC, USA (1995)
- *Simulation: A Challenge or a Benefit*? (Seminar based on the results of the Pilot Study on Use of Simulators 1997), Oberammergau, Germany (1997)

There are links to the CCMS Web site for references to conference proceedings.

http://www.vm.ee/nato/ccms/chs0.html

Annex 1B — Experience with the EMS in the Danish Defence, 1993 – 1999

It is the Danish experience that an EMS must be based on an existing standard. In Denmark, the Danish Ministry of Defence (DMOD) decided from the very beginning to base its EMS on the principles of British Standard 7750, to ensure that a simple, clear and effective system was established. When the standard changed from BS 7750 to ISO 14001 in 1997, a transformation of the system was necessary.

(See the Foreword for a brief discussion of EMS standards.)

Management Commitment

The DMOD, assisted by the Danish Defence Construction Service (DDCS), prepared a draft environmental policy and introduced it to the Commission for the Protection of Nature and Environment. The Defence Command followed up by making a regulation with guidelines within the military sector. Both regulations were in use for six years before it was deemed convenient to revise them.

It is the Danish experience that the involvement of the top leadership in the organisation is of the greatest importance for implementing the EMS. Especially in a command structure like defence, open commitment by the Minister and the chiefs of defence gives environmental managers a very strong starting position. On the other hand, it is important that the ordinary channels of command are always followed when superior authorities are involved.

It is also important to point out that the EMS is a *management* system built on the existing command structure. The EMS must set up a series of goals in the organisation, committing management to give these goals equal priority to economy, security, etc. This has not been fully accepted by all the chiefs of the establishments because some of them have not fully appreciated the significance of environmental management. This may be because the education and training programme for senior managers failed to convince them of the merits of ISO 14001.

The chiefs of the establishments might have had the idea that their environmental mangers' efforts were enough to satisfactorily implement the EMS. When the initial review was made, however, it was clear that the chiefs of the establishments had still not prepared an official environmental statement on the basis of an audit of the EMS.

The resource requirement for the first steps of implementing the EMS was calculated from experience with the pilot project. The time needed to carry out the initial review is estimated as about six hours per employee/military member. Some 10% of the total number of employees/military members are involved with the collection of data and similar activities at the start of the system.

As of October 1999, about 300 environmental managers had received training, but there is still a need for more. The environmental managers are recruited from very different ranks and backgrounds. Unfortunately, the military career system demands that some of them have to be transferred to other positions even though they are in the middle of an important step of the

implementation of the EMS at their establishment. The importance of keeping the environmental managers in position has not been fully addressed, perhaps because of a low priority of the environmental managers' role in the organisation.

The Initial Review / Environmental Assessment

The initial review is a very important step in the implementation of the EMS. The formulation of the basic element of objectives and targets, organisation of the data collection and evaluation of the effects are important tasks for environmental managers.

Registration of current laws and regulations in the field of environmental management was from the beginning seen as a "short list" because of expected problems with "a full list". Even maintaining a "short" list is a complicated and unfamiliar job for the environmental managers. The DDCS therefore offers the service of an updated list of environmental laws and regulations, which is distributed on the Internet

Chapter Two — Policy

The top management of defence organisations must develop clear and meaningful environmental policy goals to meet their operational needs. Environmental policy should establish an organisation's overall direction and principles for action related to the environment.

This chapter will help military organisations develop an environmental policy if they do not already have one, or help them modify an existing one to include a commitment to continual improvement. It will do this by:

- discussing the importance of reviewing existing environmental polices and practices;
- providing guidance on developing specific goals for defence-related environmental policy statements, referring to various national experiences; and
- stressing the importance of communicating policy to all interested parties.

Reviewing existing policies and practices

The first step organisations should take in developing an environmental policy is to review the existing environmental policies and current practices for dealing with potential incidents and non-compliance. They should develop policies and practices in accordance with the EMS Standard, as well as the guidelines outlined below. If organisations do not have a policy in place, they *must* conduct an initial environmental review.

Initial environmental review

Experience shows that organisations benefit from carrying out an initial environmental review as a pre-requisite to developing an environmental policy. This review will enable them to identify priority areas for action based on real knowledge of the existing situation. It will also help them allocate the appropriate resources at a later stage in the development of an EMS.
First, organisations must obtain an overview of regulatory requirements and the environmental impacts of their activities and services. By providing a snapshot of an organisation's environmental impacts, the review will enable it to establish a baseline from which to make improvements.

Method of review

In conducting an initial environmental review, organisations should take several approaches:

- gather data on the site's environmental effects;
- identify priorities using the following criteria: compliance with legislation, threats to health and safety, risks to the environment, financial consequences of non-compliance or incidents, remediation costs following failures, and damage to reputation;
- determine the basis for the site's environmental policy;
- identify any previous incidents of non-compliance or contamination;
- compare (benchmark) organisational performance with relevant internal criteria (defence directives) and external standards or codes of practice (e.g., NATO, environment ministries, industry, etc.);
- identify opportunities for cost savings;

- consider the views of personnel and other interested parties; and
- identify other organisational systems that can affect environmental performance.

To implement these approaches, organisations can use the following methods for both the initial review and the more in-depth development of environmental management programmes later.

- Review historical data (archived maps, interviews with long-time residents/neighbours).
- Use existing documentation to manage logistics functions.
- Document the use of hazardous materials on the site.
- Examine existing waste management documentation.
- Prepare a short questionnaire for personnel who operate key processes.
- Set up a dialogue with relevant environmental regulators.
- Set up a local public forum to discuss issues relating to the organisation's draft environmental statement.

Hint Box 3 — Encouraging participation in the environmental review
As the review is conducted, involve key managers and other personnel within the organisation. Let them know what the organisation is planning, and encourage them to think about how they can contribute. Promote awareness and participation through:
- articles in journals, base newsletters, Ministry of Defence circulars and Standing Orders
- briefings, workshops and seminars
- papers to management boards
- cross-functional teams that deal with the use of natural resources
- guidance for staff and suppliers
- posters and announcements on notice boards
- initiatives suggested by personnel, through such vehicles as E-mails, Intranets and the Internet.

Scope of review

An initial environmental review should cover such issues as:
- legal compliance
- emergency/contingency plans
- management structure
- activities of other organisational systems that could enhance or impede performance
- training and levels of awareness
- procurement, including existing relations with contractors
- opportunities for cost savings
- environmental aspects.

Environmental aspects

Section 4.3.1 of the Standard (ISO 14001) defines an environmental aspect as an element of an organisation's activities, products or services that can interact with the environment.

Organisations should identify their environmental aspects by using an initial environmental audit or a self-assessment. An audit or self-assessment is *not* the same as a review. *(See Annexes 3E, 5B and 5C and Chapter 5 for further discussions of environmental reviews, audits and evaluations.)*
Organisations must then determine which aspects are significant based on their importance and their influence. Finally, they must then prioritise them, determining which ones they want to control or reduce first, and which ones they can deal with later.
Organisations will use the results of the initial environmental review to

determine baselines, objectives and targets during the planning process (described in Chapter 3).

The following matrix shows examples of environmental aspects and impacts that could be included in an initial environmental review.

ASPECT	IMPACT
Emissions to air	Vehicle/aircraft noise or artillery firing Vehicle fumes or artillery firing Release of Chlorofluorocarbons (CFCs) Exhaust emissions
Discharge to water	Fuel spillages Sedimentation of rivers due to disturbance by vehicle training Sewage, drainage and effluent entering watercourses
Contamination and degradation of land	Compacted soil and removal of vegetation by tracked vehicles Leaked from waste stored in landfills Leakage from stores of waste Use of ammunition
Use of resources	Use of paper, energy and fuel Water consumption Land-management practices

(See annexes 2A, 2B and 2C for further details of environmental aspects.)

Developing an environmental policy statement

After reviewing existing policies and practices, the second step organisations should take is to actually develop an environmental policy statement.

The environmental policy statement is the cornerstone of an EMS. It provides a link between policy development, operational needs and the communication of policy to all interested parties. Section 4.2 of the Standard discusses the environmental policy statement.

Defence environmental policy statements should be prepared on two levels: a *top-level policy* applying to the whole organisation; and *a series of requirements* linked to internal organisational divisions that describe the direction and principles for action of the overarching policy. A top-level policy is likely to be from one to three pages in length and should meet the requirements of the EMS Standard. The following guidelines will help organisations prepare their environmental policy statement.

- Make the scope of the statement clear to the reader (e.g., include what parts of the organisation it covers). Ensure that it can be understood by both internal and external interested parties.
- State the overall aims and principles of action for addressing the significant impacts of the organisation's activities on the environment.
- Make it obvious that the organisation's intent is to comply with the letter and spirit of legislation and to prevent pollution. Organisations must comply with all laws (not just environmental), so they should come up with a more positive statement than mere compliance. Organisations could also make reference to multilateral agreements such as the Montreal Protocol.
- Make reference to objectives and use the policy statement as a framework for reviewing

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environmental objectives and targets. It may be possible to refer to objectives, even if they are not quantified. Also, refer to constraints when appropriate (e.g., *"when economically viable"*), but try to define this in advance as much as possible.

- Ensure relevance. A policy statement should be tailored to an organisation's activities. For example, "*consideration will be made of the impact of noise on local communities*".
- Include a commitment to continual improvement (an essential element of a policy statement). For example, *"The Defence Logistics Organisation is committed to minimising the impacts of its operations on the environment by means of a programme of continual improvement".*
- Ensure the policy statement is dated and signed by top management (e.g., the Minister of Defence and ⁄or the Chief of the Armed Forces). Communicate the policy statement to all military and civilian personnel, and make it available to the public.

The policy statement could also:
- contain material from third parties, such as Ministers of the Environment, suppliers and contractors;
- promote sustainability, by working with others to develop viable solutions to economic, social and environmental problems; and
- contain a commitment to train personnel and encourage improved environmental performance.

Organisations may wish to circulate a draft copy of their environmental policy statement to interested parties, as defined in the ISO Standard.

(See annexes 2C and 2D for the environmental policy statements of the Ministries of Defence from Denmark and the United Kingdom.)

Communicating the policy to all interested parties

Communication is important to the success of any organisation's environmental policy. ISO 14001 requires organisations to make their environmental policies available to the public, and also defines specific communication guidelines.
Any communications effort should address all interested parties. An open approach, using the latest communication techniques should help to build understanding and demonstrate leadership in policy making.
(See Annex 2F for a description of how Sweden communicates its policy to interested parties.)

Summary

This chapter has underlined how important it is for organisations to develop an environmental policy statement based on an initial environmental review. It also provided a guideline for best practices and examples of policy statements from different countries. The next step is to plan an effective EMS, which is described in Chapter 3 — Planning.

Annex 2A — Environmental Aspects

In using environmental aspects to develop environmental policy, organisations should follow three steps:
- Identify all activities that affect the environment;
- Determine which activities, or aspects, are significant; and
- Prioritise the aspects.

Identify all activities that affect the environment

The first step organisations must take is to identify the ways in which their activities affect the environment. Environmental aspects may be viewed in different ways. They may be negative (i.e., damaging the environment) or positive (i.e., benefiting the environment). Some are actual (i.e., they are already happening), while others are potential (i.e., they could occur if the organisation took, or failed to take, some action). Finally, environmental aspects may be either direct or indirect.

Direct environmental aspects in the military sector arise from military operations and from the logistics and infrastructure activities supporting them. For example, military operations may result in:
- noise from artillery firing and airfields
- soil degradation from running armoured vehicles on training areas
- solid waste to be disposed of in bivouac areas or at sea.

Logistics and infrastructure support may result in:
- emissions associated with industrial-type maintenance processes
- disposal of hazardous waste, such as solvents
- discharges of fuel during refuelling of military vehicles.

Indirect environmental aspects in the military sector arise from other activities that support operations, logistics and infrastructure. For example, the support organisations that develop the specifications for weapons platforms indirectly affect the environment through their choices. In this sense, procurement officers' indirect impacts on the environment are much greater than their direct impacts, such as recycling their office waste. Therefore, military organisations must assess the impact of their design and procurement decisions on the environment. Organisations can mitigate the indirect environmental aspects in different ways. Examples include:
- redesigning the maintenance process to specify a paint with fewer toxic chemicals;
- using life cycle assessment for all purchases so that the selection process takes into consideration the environmental impacts of the manufacturing process, maintenance activities and disposal procedures; and
- designing refuelling connections to minimise fuel spills during refuelling procedures.

In addition, *Environmental Guidelines forthe Military Sector*, the Sweden-U.S. publication referred to in Chapter 1, will assist organisations in identifying which military activities affect the environment, as will *Environmental Considerations in the Systems Acquisition Process*.
(See Table 1 in Annex 3F for several examples of military activities that have had an adverse effect on human health and the environment.)

Determine significant environmental aspects

After identifying all activities that affect the environment, military organisations must determine which ones are significant. In doing so, they should consider two main factors:

- **Importance** — the frequency with which the environment is affected by an activity, compared with the severity of its impact. The higher the frequency and severity, the higher the priority.
- **Influence** — the influence organisations could exert to control an impact compared with the degree to which they exert this influence. The more influence organisations have over a particular significant impact, the easier it is to reduce it.

Military organisations should also consider several other factors. These include potential regulatory exposure, difficulties in changing the impact, financial implications (costs and savings), concerns of interested parties, and the effect on the public image of the organisation from complaints and bad press.
In determining the significance of aspects, organisations should take into account the activities operating under routine conditions, non-routine conditions and emergencies.

Prioritise environmental impacts

Experience shows that the environmental policy will not be executed if organisations do not clearly prioritise environmental impacts. Prioritising environmental impacts means determining which ones organisations want to control or reduce first, and which ones they can deal with later. This should be done at each managerial level, taking into account priorities of levels higher up.
Therefore, top-level management must prioritise first, with input received from all management and operational levels, including data on feasibility and resources.
ISO 14000 states that prioritising should be done:

- in writing
- in a logical, defendable way
- at each managerial level
- taking into account priorities set at higher levels (including government policy and legislation)
- with the proper authorisation.

Organisations must decide how they will prioritise environmental impacts. They should take into account such considerations as financial risk, health and safety risk, legal risks, or the risk of a negative public image. They may choose from several methods of prioritising environmental impacts. In no particular order, these include the:

- environmental policy method (both international and national policies)
- environmental method
- financial method
- operational readiness method
- distance-to-target method
- multi-criteria assessment (also known as the weighted target method).

Annex 2B — Methods of Prioritising Environmental Aspects (text prepared by the Czech Republic)

If military organisations have a register of activities and their environmental aspects and impacts, they must prioritise them before including them in an effective EMS.

When assessing the significance of aspects and their priorities, military organisations should consider the following criteria:

- limits provided by standards and legislation
- aims of national or international environmental policy
- extent of the environmental burden
- financial aspects
- technological demands
- frequency of occurrence
- image of the organization
- social factors
- time of duration, etc.

It is recommended that the top management level set priorities first. From here, it is easier to set further priorities that relate to lower managerial levels. In practice, it is also possible to adopt a simple approach that considers only one or two of the criteria mentioned above. This way, you can set out priorities without outside assistance. However, the outcome can be partial and not fully in compliance with an optimum solution. The most common methods of this kind are:

- **Environmental policy method** — The organisations adopts priorities set by national or international policies.
- **Environmental method** — The organisation sets its priorities according to the extent of its impacts on the environment. It can then choose those that are technologically easy to implement, financially acceptable, and which promise the greatest potential of reducing impacts on the environment. Priorities can be set through brainstorming.
- **Financial method** — The organisation sets its priorities according to the lowest cost. This method is suitable for manufacturing organisations and well-defined environmental projects. To use this method, organisations must know the expenses related to addressing environment concerns, such as clean-up.
- **Operational readiness method** — The organisation sets its priorities according to those objectives that will be not only very easy to meet in terms of resources availability and demands on implementation, but that will also help preserve environment quality.
- **Distance-to-target method** — The organisation sets its priorities based on knowledge of the time framework and what reduction of a particular environmental aspect (e.g., pollutant) is required. These data are usually determined by the state policy requirements for military sector. In case where two pollutants have the same time framework for their reduction, the higher priority is given to the one for which a higher relative amount of reduction is required. If the time framework is different, a higher priority is assigned to the reduction of that pollutant to which the objective to be met has a greater benefit.
- **Multi-criteria assessment** — Organisations can get more exact results of prioritisation by some

form of multi-criterial assessment; that is, a complex assessment of the broadest spectrum of criteria (points a) to i) above). It is recommended that this be implemented by a working group of not more than 15 external and internal experts.

This method is based on the working group first setting a register of criteria and then assigning a vector of weight to each criterion according to its importance. The register of criteria and a vector assignment can then be implemented in an optimum way with the help of brainstorming or brainstorming-pool methods.

A decision-making matrix is then set up. Its lines consist of particular activities (aspects or impacts) and its columns consist of individual criteria. Every activity is quantified for each criterion either on the basis of estimate or calculation. Even in this phase it is possible to use brainstorming. All the criteria are converted to maximal ones and both ideal and basal variants are determined. The final step is to calculate standardised matrix of the elements that are then multiplied by the vector weight.

Priority is given to the activity (environmental aspect or impact) whose sum of values in the particular line of matrix is maximal (method of weighting sum).
Military organisations can use not only any of the methods mentioned above, but also other methods in the process of prioritisation. Whatever method used, it should meet the requirements of the chosen standard.

Annex 2C — The Environmental Policy Statement of the Danish Ministry of Defence

Policy

By means of positive co-operation with the authorities outside the armed forces, and in accordance with the purpose and intentions of environmental legislation, the authorities of the Ministry of Defence will actively work to preserve, protect and, if possible, restore the environment and nature.

The effort in the field of environmental and nature protection is carried out with due respect for the tasks that have been directed to the Ministry of Defence.

The authorities of the Ministry of Defence have, at all levels, established a standard environmental management system in order to record, minimise and control the impacts on the environment constantly. The system will be continuously developed and modified.

Goals

The authorities of the Ministry of Defence will:

- Improve environmental awareness and the attitude to environmental efforts and environmentally-conscious behaviour of all personnel, through information and education on the intentions of the Environmental Protection Act and about how pollution within different fields can be limited or completely avoided.
- Through active environmental management, aim at continual improvement in all fields of the environment.
- Prevent and fight pollution and also encourage the use of technical procedures that involve the least polluting technology, and change procedures and working methods to those that are less polluting.
- Carry out environmental clean-up, including, if necessary, nature restoration of areas subjected to former pollution, current pollution, and on closure of facilities.
- Limit the use of raw materials and resources as much as possible and encourage the sorting and recycling of solid and liquid waste.
- Limit the use of energy and promote the use of renewable energy sources.
- Strengthen nature protection through, for instance, the care of flora and fauna.
- Improve the opportunities for public access to military areas, with due consideration for the armed forces' needs for training, security issues and the protection of nature.
- Minimise the impact of noise and vibration on surrounding areas caused by training activities and exercises of the armed forces and the Home Guard in ranges and training areas, and the use of rifle ranges by the armed forces.

Annex 2D — The Environmental Policy Statement of the United Kingdom's Ministry of Defence (1996)

1. The Ministry of Defence is committed to the protection of the natural environment, by avoiding harm or nuisance, whilst maintaining our operational effectiveness. We conduct our activities in accordance with the Government's overall environmental policy set out in the 1990 White Paper "*This Common Inheritance*" and its associated reports. The department's Green Minister is responsible for developing environmental strategies appropriate to defence activities.

2. The environmental policy set out in this statement is to be observed throughout the Ministry of Defence and its Agencies and reflects our full support of the Government's overall environmental policy. The management of the environment is increasingly regulated and legislation imposes on us an overall duty of care that we need to fulfill.

3. The Department:
- ensures compliance with the letter and spirit of the Environmental Protection Act 1990 and with all other existing environmental legislation;
- invokes Crown or Defence exemptions from legislation only where essential to maintain operational effectiveness;
- complies with international conventions to which the UK is a signatory;
- respects host nation legislation;
- protects and enhances the natural environment in line with the Government's environmental strategy, and the principles of Stewardship and Sustainability, within overriding operational and financial constraints; and
- strives to be a good neighbour at home and abroad.

4. To meet the main policy objectives, the Department will:
- assess environmental costs and benefits to ensure these are considered in procurement and other decision-making processes;
- adopt suitable methodologies to establish the condition of defence assets as a basis for appropriate action planning;
- give appropriate funding priority to environmental issues, particularly those activities involving compliance with legislation;
- promote environmental awareness and performance through effective education and training;
- implement and operate appropriate management systems to ensure compliance with relevant legislation, and demonstrate (where practical) further improvement in environmental performances;
- maintain an environment manual (JSP 418) as the first point of reference: to ensure activities are conducted in compliance with the law and international conventions; and to provide a broad overview of the MOD's policies on environmental issues; and
- ensure unit, station and garrison commanders, navy personnel afloat and line managers are aware of their personal responsibilities and accountability.

Annex 2E — The Environmental Policy Statement of the Swedish Ministry of Defence

The comprehensive goal for the Armed Forces is to act as a deterrent against war, therefore avoiding the catastrophic devastation of the environment that war causes. In peacetime, the main task of the Armed Forces shall be carried out in accordance with environmental protection laws and with least possible impact to the environment, by:

- Considering the environment in all planning and activities
- Minimising the use of substances unfamiliar to nature
- Minimising the use of energy and finite resources
- Economising on raw materials and minimising waste
- Endeavouring to make continuous improvements within the environmental field
- Reducing spread of noise
- Promoting biodiversity
- Involving all personnel in environmental work
- Assisting civilian society in the event of environmental catastrophes

Communicating the environmental policy statement to interested parties

In Sweden, the Armed Forces distribute its environmental policy to all personnel to make certain that all staff have an opportunity to read it. This effort is supported by an education process to promote awareness and ensure each individual understands and follows the policy.

The Swedish Armed Forces has no formal legal obligation to communicate its environmental policy to civilians; however, it is an objective within Sweden's *Supreme Commander's Environmental Plan 97*.

To support this objective, the Armed Forces arrange conferences and takes part in different environmental exhibitions around the country each year. Prior to exhibitions, the Forces promote its environmental policy by placing advertisements in publications such as trade journals. It also puts up posters and distributes handouts at each exhibition.

The Swedish Armed Forces has found that participating in conferences and exhibits is a very effective method of communicating its environmental policy to the general public. There has been strong public interest in and positive feedback on the organisation's environmental work.

Chapter Three — Planning

This chapter outlines the four steps in planning an environmental management system. The planning process follows from the policy stages and uses the results of the initial environmental review *(see Chapter 2).* The four steps are:

- Determine baselines (expressed as performance measures)
- Develop objectives and targets to address goals
- Perform gap analysis
- Develop action plans

Figure 1 shows the order of key steps of the planning stage. *(See also Annex 3D)*

Figure 1: Hierarchy of approaches

Objectives

⇩

Targets

⇩

Projects

⇩

Action plan
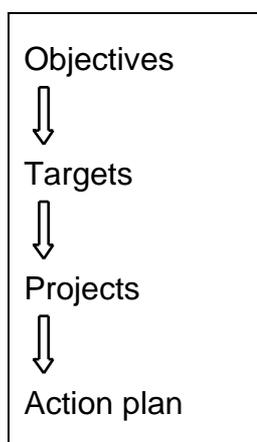
Baselines

To know where you are going, you must know where you are starting from. Organisations must establish baseline information for each significant environmental aspect in the order in which they have prioritised them.

Since organisations will be measuring future performance for each significant aspect, they should express initial data in terms of the measures they will be using to evaluate them. The measures must also be in line with the objectives and targets they develop.

For example, current performance regarding solid waste could be expressed in terms of volume, weight or the number of loads taken to the landfill, whether any reductions are expressed as a percentage or absolute measures. *(Note: Baseline information must be expressed as 100 per cent if percentage changes are to be shown.)* Organisations should select the terms of measurement most appropriate to their situation, and continue using those measures consistently.
(See annexes 3A, 3B and 3C for more details on performance measures in the military sector.)

Objectives and targets

Organisations must next develop objectives and targets to address their identified priorities**.**

Objectives are an interpretation of the broad goals outlined in the environmental policy statement, written so that they apply at the senior management level. An example of an objective would be "Greenhouse gas emissions are minimised".
Targets are specific commitments to achieve an objective. Several targets can contribute to a single objective. They should be as quantitative as possible, stating target dates, and expressed in terms of the performance measures. An example of a target would be "energy consumption in infrastructure is reduced by 15 per cent from 1989–90 levels by 2001". *(Note: In this example, it is imperative to know what the 1989–90 levels are. This underlines the importance of establishing baseline information.)*

Organisations should follow three criteria when developing objectives and targets:
- base them on the national goals;
- coordinate them with the goals of other sectors of society; and
- support national environmental goals.

They should ensure that the objectives and targets are "SMART":

Specific
Measurable
Agreed
Realistic
Timely
(See Annex 3D for more details on developing objectives and targets in the military sector.)

Gap analysis

After identifying targets, organisations should analyse the difference between their current status and their target. They can then use this gap as the basis for the developing action plans. A gap analysis may be performed using Risk Assessments or a Strengths/Weaknesses/ Opportunities/Threats (SWOT) analysis. Another kind of gap analysis is to identify aspects and impacts that have so far been neglected and not included in environmental protection and stewardship activities. Organisations can also use a gap analysis to identify areas of the actual EMS that have been overlooked in the planning phase.

Environmental Management Programme

Section 4.3.4 of the Standard requires that organisations establish and maintain environmental management programmes to achieve their objectives and targets, and to ensure a continual improvement of environmental matters. Organisations must also designate:

- responsibility for achieving objectives and targets at each relevant function and level of an organisation; and
- the means and time frame by which the objectives and targets are to be achieved.

The environmental management programme should include specifications for performance records for each aspect, indicating what they should contain, who is responsible for maintaining the records, how frequently they are to be updated, where results should be stored, and how progress will be measured. Senior managers are responsible for ensuring adequate financial, technical and human resources to achieve target commitments. If they fail to do so, they should be held accountable for the organisation's inability to meet its target commitments.

Action plans

The final step organisations must take in the planning stage is to develop environmental improvement action plans to support their programmes for achieving objectives and targets. Each action plan should clearly define responsibilities and authority for implementation, adequate financial and human resources, and deadlines. Action plans can vary from relatively straightforward information gathering, through major feasibility, research and design studies, to full-scale trials that potentially lead to changes in the way organisations conduct their activities. Organisations should incorporate into overall site plans any environmental project identified as having significant financial or human resource implications. In addition, they should include annual objectives and targets in their annual management plan, with

senior management reviewing progress at appropriate intervals.

Summary

This chapter has outlined the steps and parameters involved in the planning stages of an EMS: determining baselines; setting objectives and targets; performing gap analyses; and laying out management programmes and action plans. The next step is to put the planned framework into action, which is described in Chapter 4 — Implementation.

Annex 3A — Developing Performance Measures (Text prepared by the United States Department of Defense)

The process of developing performance measures is not easy. Before attempting to identify measures that you believe are important indicators of your organisation's environmental health, you must have identified your significant environmental aspects and set out your objectives. Performance measurements are critical if senior managers are to determine if the environmental policy's objectives and targets are being met. Maintaining an effective EMS requires that you focus on outcomes (performance measures) rather than processes.

Step 1 — Define performance framework

Why measure?

Managers should use measurement to determine the areas of the EMS that support successful environmental performance and those areas that are not meeting the objectives/targets. "You can't manage what you don't measure".

What to Measure?

1. Determine the relevant performance measures that will facilitate the behaviour desired in the day-to-day activity of your organisation (e.g., measures that are tied directly to your objectives/targets). Remember that more is not necessarily better and that more can be expensive, so keep the number of measures to a minimum.
2. Define what method might be used to measure performance.
3. Identify tools available to measure the behaviour/activity.
4. Identify management opportunities (e.g., cost avoidance) or challenges (e.g., organisational structure).
5. List necessary actions to be taken.

How to measure?

1. Select activities to be measured.
2. Select tool(s) to be used.
3. Develop a standard operating procedure (include a mechanism to report data).

Step 2 — Select appropriate measures

1. Prioritise objectives/targets, remembering that your performance measures must relate directly to the objectives/targets.
2. Pick measures that can be easily quantified and communicated, both up and down the chain of command. Remember that the measures can provide information about management or operations, or about the overall condition of the environment.
3. Identify the tool(s) that should be used to collect and communicate the selected performance measures.
4. Consider grouping the performance measures into a single Environmental Performance Indicator (provides a single snapshot of an installation, command, etc.).
5. Identify the standard(s) that you expect to be met.

Step 3 — Analyse results

1. Compare reported results with performance standards.
2. Identify when performance standards are not being met.
3. List suggested actions that should lead to conformance to the performance standard.

Principles

When following these steps to develop performance measures, there are important principles to keep in mind:

- Acceptance of the process by senior management is essential to the success of performance measures as a performance improvement tool. Like Strategic and Business Planning, the process by which you determine what and how to measure, and how to use the measures, is often more important than the actual product itself.
- The audience/user and purpose must be clearly defined. Who are the customers and end-users for the measurement system? What are their requirements? What do they feel they need from measurement to help them do a better job in managing, problem-solving and decision-making?
- The greater the participation in the measurement development process, the greater the resulting performance change, and the greater the ease of implementing future changes based upon performance measurement. This includes all levels of military and civilian personnel, from senior management to operational personnel.
- A complete and effective system of performance measurement will require years of consistent, incremental work to achieve. One reason performance measurement is difficult is that these measures have not been available historically; and the resulting uncertainty dampens enthusiasm substantially for some individuals and organisations. Further, performance measurement in the military sector is complicated by the fact that there is no generally accepted "bottom line" in government, there is no scientific or analytical measurement that indicates the relative benefit to society of, for example, more hospital beds, less toxic waste, less noise, more reforestation or better energy use.
- Measurement of any kind will affect the behaviour of individuals within the organisation. It has nearly universal capacity to focus attention. Management needs to recognise its obligation to monitor and direct the resulting changes in focus. Reporting performance measures will also affect the behaviour of Senior Officials, and military and civilian personnel.
- Performance measurement development is *not* an exercise in determining "the right measures". Instead, it is a process and culture for choosing, using and modifying measures to assist employees in focusing on continuous improvement over the long term.
- Aim to improve the things that will make a difference (those with large costs, large military value, substantial consequences, significant opportunities to save money, etc.).
- Measure what employees can translate into direct corrective action. Measuring global hunger is interesting and is of monumental

importance, but few can apply any direct correction.

Good metrics must be:
- **directional**, to confirm that you are on track to reach the goals;
- **quantitative**, to show what has been achieved and how much more is to be done; and
- **worthwhile**, adding value to the military mission without spending scarce funds needlessly.
- Measure what's important strategically (or what is of value to the military), not just what is easy to measure or already being measured.
- Measure intermediate-term outcomes as well as longer-term outcomes. Set dates for revising intermediate-term outcomes to reinforce the perception of their temporary status.
- Do not stop with measurement. Take time to analyse results of measurement, changes in behaviour, etc. Take time to communicate results, propose improvements, and persuade others of the value of the proposed improvements. Reward sound employee initiatives that are not adopted, as well as those that are. Remember, it is the processes, the culture and the structures for focusing attention on continuous improvement that contain the long-term, big payoffs (not just the immediate improved results for a specific case).
- Take time to analyse the real causes of the improvements, or the lack of progress. Adjust effectiveness measures accordingly.
- Balance the degree of management control over the processes being measured with the desirability of measuring outcomes (rather than outputs or inputs). Generally, the

measurement of items purely under management control (usually only inputs) or pure global outcomes (usually substantially beyond management control) are not nearly as useful as measures that strike a balance.
- Encourage comment/analysis in measurement reporting. Special circumstances must be visible along with measures of performance (especially where the measures anticipated only the routine case).
- Control-oriented measurement systems often hinder continuous improvement efforts.
- Measurement is often resisted due to perceptions (real or imagined) of negative consequences. Visibility of good performance leads to diminished resources. Visibility of bad performance leads, initially, to more resources, but eventually to punishment. Visibility of performance therefore may lead to crisis catering, more measurement, micro-management (and little lasting improvement).

In addition to the principles outlined above, it is important to understand the limits that performance measures have in affecting change in a large complex organisation such as the military.
- **Remember:** Measurement at its best only tells you something about the **history** of your performance.
- **Remember:** No matter how well an employee's work is planned, managed and measured, the outcome will depend **much more** on how passionate the employee is concerning the work.
- **Remember:** Problems related to an organisation's ability to perform its mission are more often related to poor management or command than to poor performance. An excellent commander's superior

interpersonal and leadership skills
have much greater potential to
foster continuous improvement than
does performance measurement.
- **Remember:** It is easy to measure
  the trivial; it is much more difficult to
  measure what is truly important,
  and in an objective way.

Related principles

- The goal is to design, develop and
  implement measurement systems
  that share information such that
  continuous performance
  improvement is supported.
- The measurement system must
  clearly fit the chain of command
  and be acknowledged as decision-
  making and problem-solving aimed
  at performance improvement
  support.

Annex 3B — Developing Performance Measures (text prepared by Sweden)

Work done by the Swedish government and military sector is useful for all NATO countries in developing performance measures to apply to environmental actions. The following experiences and reports are examples.

Performance measures

In its 1996 report *Environmental work within Governmental Authorities, guidance on integrating environmental aspects*, the Environmental Advisory Council discussed general (i.e., not military-specific) examples of possible performance measures (PMs). These included:

Travelling on duty

- amount of kms/yearly manpower, by air, road, boat and railway
- amount of kms by train/total kms travelled
- travelling costs/yearly manpower

Purchasing

- total purchasing/year
- percentage of purchasing in which environmental aspects have been regarded

Energy use and other consumption

- paper consumption in total/year
- paper consumption/yearly manpower
- (costs for) energy consumption/year
- percentage of renewable energy used

- energy consumption/m^2 working area
- energy consumption/yearly manpower

Waste

- waste in weight (kgs) or volume (m^3s)
- waste in weight or volume/yearly manpower

Personnel

- percentage of total number of employees being environmentally educated
- percentage of total number of employees being satisfied with the environmental work of the authority

Green performance measures

In its 1998 report *Green Performance Measures, indicators for an ecologically sustainable society*, the Environmental Advisory Council proposed green performance measures on:
- efficiency goals for sustainable development in Sweden (4 PMs)
- environmental goals for sustainable development (6 PMs)
- companies, authorities and others change to an ecological sustainable society (7 PMs)
- future green PMs (6 PMs).

As the PMs are very general and in no way specific to the military sector, examples are not included here.

Armed forces reports

For some years, the Armed Forces have submitted annual environmental reports to the supervising authority, the County Administration. Each artillery and shooting range and each air wing base must submit such reports. These

reports include information rather similar to performance measures. Artillery and shooting ranges have reported on:

- use and consumption of chemical substances and products: name of substance/product, substance containment, what to use for, possible releases, environmental information, quantity used;
- waste: type and origin, composition, quantity, treatment, company that will take care of disposal;
- hazardous waste: code, type of waste and origin, composition, quantity, transporter, company that will take care of disposal;
- shooting: type of ammunition, number of shooting days per weekdays and holidays, daytime and night-time, number of shoots per weekdays and holidays, daytime and night-time, total quantity of ammunition; and
- releases: substance, recipient (water, air and ground), quantity.

These reports will form the basis for further developing more specific performance measures. During 1998, performance measures were elaborated in:

- training and environmental education
- energy consumption
- use of fossil fuels
- use of energy for heating
- use of hazardous materials.

Follow-up measures — ISO 14031

The Defence Materiel Association (DMA) purchases all kinds of weapons and other materiel for the Armed Forces. It bases its performance measures on the ISO 14031 series, which provides suggestions for follow-up measures. In its first draft on performance measures (September 1998), the DMA noted that performance measures are very good tools for following up the environmental work and for providing a basis for reports. To some extent, performance measures can also be used for comparing with other organisations. The DMA also noted that performance measures should describe the extent of the environmental impact for important parameters and make it possible to determine if work is conducted properly or if additional measures are necessary.

The performance measures presented in the draft are so far only suggestions. They cover internal activities as well as direct and indirect impacts on the environment. The performance measures should be developed gradually by incorporating new experiences. It is often suitable to start with performance measures where it is easy to access data.

Energy
- energy consumption for the DMA in kWh (use of electricity, heating of offices, travelling, transports, fuel)
- purchased amount of fuel
- percentage of fuel that is "green" (according to Swedish standards)
- energy consumption for some key products purchased by DMA, such as PCs, vehicles, aircraft and ships

Water consumption
- amount of water used by/in DMA

Paper consumption
- paper consumption within DMA in kgs (in total and per employee)
- percentage "green" paper

Waste
- amount of waste generated by DMA
- amount of hazardous waste
- amount of paper for recycling
- percentage of recycled materiel in defence materiel disposal

Chemicals

- number of chemical products
- number of chemical products that should not be used (phased out) in society or whose use should be limited
- amount of batteries containing hazardous metals (cadmium, mercury, lead)
- number of "technical orders" to contractors being revised because they contain hazardous chemicals

Noise

- number of people disturbed by noise near DMA airfields
- number of complaints on DMA activities
- noise level for some key products purchased by DMA (PCs, aircraft, vehicles, ships)
- number of products where the noise level has been documented

Emissions

- amount of CO_2 releases
- Travels and transports
- travels on duty in kms/employee (train, automobile, airplane)
- transport of goods in tonnes or kms (train, truck, ship)

Compliance

- number of exemptions from the Law on Chemical Products
- number of installations licensed according to the Environmental Protection Law

Environmental work within DMA

- number of employees taking part in DMA environmental education
- number of DMA purchasers taking part in DMA environmental education
- percentage "tactical technical economical objectives" including environmental aspects

- percentage of purchasing made with adequate environmental demands
- percentage of larger companies/contractors with which DMA has discussed environmental issues

Contractors' environmental work

- percentage of contractors that have implemented an EMS

To conclude, it is important to develop performance measures. The Armed Forces is now developing them so that it can implement an EMS in the entire organisation by 2000. The Defence Materiel Administration has made a good start in this regard.

Annex 3C — Developing Performance Measures (text prepared by the Netherlands Ministry of Defence)

The following is the policy of the Netherlands' Ministry of Defence on environmental data and environmental performance indicators (first version).

Preface
The Netherlands' Ministry of Defence Environmental Policy Plan has 21 goals. These goals follow the Netherlands' national environmental policy and in most cases, state a percentage reduction of environmentally hazardous emissions or use of substances. There are also a few goals on soil clean-up and nature conservation. Most goals have a reference year.

It is evident that, in order to interpret the results achieved on environmental goals correctly, it is essential to measure and register them uniformly within the entire defence organisation. To achieve this, the environmental coordinator of the Ministry of Defence formed a working party named "Environmental Performance Indicators". The group strives to achieve:

> *"... a system of a limited number of environmentally related indicators, with which the goal-achievement of the Defence environmental policy will be monitored."*

Starting-points
The working party has used the following starting points:
- The environmental performance indicators should be based on the 21 goals of the Ministry of Defence's environmental policy.

- The environmental performance indicators should be absolute and relative indicators (e.g., environmental damage per person or per km).
- The level of detail of the raw data must be aimed at service-staff level. Aggregation to Ministerial level must be possible.

Phasing
Because of the need for a speedy start of acquiring and aggregation of environmental data, the 21 goals were cut in two . This was done on the basis of availability of raw data.

1. For the *first* , the raw data are for the most part already available (1998 will be the first year of reporting). On these data, reporting already takes place in the annual environmental report of the Armed Forces. The first version of the document covers a number of goals of the environmental policy plan of the Netherlands' Ministry of Defence, while others have been addressed in the second version.
2. The data for the *second version* are not yet (fully) available at all the services. The environmental performance indicators for this version are still under development. It should be possible to report on the second tranche for the first time in 1999 or 2000.

Structure
Raw data
The raw data are for the most part amounts of used products, goods or substances as well as data on the equipment and infrastructure for which these products, goods or substances are being used.

Calculation factors

The raw data must first be brought into comparable units so that they can be added. These calculation factors will be set by the Ministry of Defence for all the services, in consultation with the Netherlands' National Research Center for Public Health and Environment.

Subsequently, the outcome of the calculations will be added up in order to reach a total for the whole Ministry of Defence.

Indicators

The working party has strived to design only one indicator for each environmental goal. This indicator should give the absolute value of the environmental impact. In a number of cases, there are also more relative indicators, giving a "use per unit".

To measure or not to measure, that is the question !

Measurements playing field of Defence

In measuring the environmental impacts of Defence, it is very important to clearly define what impacts can and cannot be assigned to the Defence organisation.

For defining those "borders" of impact, the Netherlands' Ministry of Defence followed the National Environmental Policy Plan of the Ministry of the Environment, Housing and Spatial Planning. This Ministry divides up society into ten separate target-groups (e.g., industry, refineries, energy companies and waste-management companies). The environmental policy is then made in accordance with these target groups, which are made responsible for implementing the policies. Defence considers itself as a "virtual target-group". This implies that no double-

counting and no omissions of environmental impacts between target groups and Defence should occur. This further implies that the Ministry of Defence holds itself responsible for all environmental impacts caused by defence personnel (civilian and military). Environmental impacts caused by other target groups are not included in the environmental impacts of the Ministry of Defence.

In certain cases, the Ministry of Defence can — and will — demand environmental specifications for products being produced, maintained or treated as waste on its behalf.

Production phase

The mining, extraction and production of substances and goods for the armed forces (e.g., tank, shoe polish, fuels and drinking water) require raw materials, auxiliary materials and energy. In the process, emissions occur. The Armed Forces have only a very limited influence on the way in which mining, extraction and production is carried out. In purchasing contracts, the Ministry of Defence can demand environmental specifications on the company that is a counterpart. For example, the it can demand that the company be certified to ISO 14000. In other cases, selection can be based on the raw materials and the way in which goods are being produced.

For a number of products, the Ministry formulates all specifications itself. This is the case in infrastructure and naval ships. In those cases, environmentally friendly choices can be made in the designing stage.

Maintenance phase

Of all maintenance carried out by the Ministry of Defence itself, the environmental impacts will be measured and will be the responsibility of Defence. This is the case in

maintaining airplanes, naval ships, lorries, cars, tanks, etc.

Of all maintenance done outside the defence organisation, the environmental impact is not measured. The Ministry of Defence considers this to be the responsibility of other target groups in society. This is the case, for example, in external washing of the cars of our Military Police and the large maintenance projects on buildings and infrastructure by contractors.

More recently, the Netherlands' Ministry of the Environment has indicated that it will not accept that the Ministry of Defence is not responsible for large maintenance projects on Defence buildings and infrastructure by contractors. More negotiations are needed to avoid double counting between two target groups (i.e., Defence and building contractors).

The Ministry of Defence can — and will — in maintenance contracts demand specifications on the way in which the maintenance is carried out.

Waste phase

Also in this stage of the lifecycle of products, energy is being used to process the waste, and emissions occur. The Ministry of Defence holds itself responsible for minimising waste and for separating waste streams. It is also responsible to bring the different kinds of waste into the right channels for proper processing. As waste-processing companies form a separate target group, the Ministry does not consider energy use and emissions from defence-related waste its responsibility. Therefore, no defence measurements are foreseen on this subject.

Geographical limitation

The Ministry of Defence is active at military area's inside The Netherlands, in Germany and on the Dutch Antilles and Aruba. Frequently, operations also occur outside military training areas and outside these countries. In fact, peace keeping, aid relief and peace enforcing can occur anywhere in the world. To reach a logical limitation of the measurements playing field, the Ministry defined the scale in which the environmental impact occurs for each environmental goal.

When the environmental impact is local (waste, water use), only the environmental impact occurring at military area's are being measured. If the environmental impact is global (e.g., greenhouse gas emissions), then the impact will be measured all over the world.

For the goals dealt with in the first tranche, the following geographical limitations are set: *(see next page)*

Goal	Scale	Measurements also outside military area?
1. Water-use	local	no
6. Ozone depletion	global	yes
7. CO_2	global	yes
8. Other greenhouse gases	global	yes
9. Acidification	global	yes
11. Waste	local	no
12. Waste management	local	no
13. Energy use	global	yes
14. Energy efficiency	global	yes
15. Sustainable energy	global	yes
16. Noise	local	yes, insulation of houses outside bases (legal obligation)
17. Soil clean-up	local	no

Procedure for delivering environmental data
Delivering actors

The Central Environmental Coordinator delivers uniform calculation factors.

The services can use the protocols of the raw data to structure the delivery of raw data inside their own service. Central Environmental Coordinator
MPC 58B
P.O. Box 20701
2500 ES The Hague
The Netherlands

Deadline
Deadline for delivery of raw data on the preceding year is set at 1 May of each year.
Format
Raw data must be delivered in the format in the enclosure in Excel or spreadsheet. Also one hard copy on paper must be delivered. Preferably also a version on floppy disk.
The spreadsheet is available at the Central Environmental Coordinators office.

What to measure ?
See the policy.

Methods of measuring
For certain products that are used in a short lifecycle (e.g., fuel), measurements can be done by checking purchasing-documents or by reading measurements devices at the fuel station. When a method is chosen, The method should remain the same for the next few years. When changing the method double-counting or omissions can occur through stockpiling or stock depletion.

Validation of data
Literature: * Program for monitoring target groups; Ministry of the Environment, DGM d.d. 050495
* ISO-norm 3534
The raw data must be validated prior to the delivery to the Central Environmental Coordinator.
Validation is checking and judging the raw data on the quality demands by another person than the one who is collecting them. Validation is done when a consensus is reached on the raw data and on the way they were collected. This under the condition that a certain, known level of certainty and accuracy is reached.
Validation is a necessary step in the process of monitoring. Non validated data will never be accepted by the Central Environmental Coordinator.
Added to the raw data delivered to the Central Environmental Coordinator, a validation certificate must be included. It must state that validation was indeed carried out and that the validated data were proven valid.

What should be validated ?
Validation aims directly at the raw data and on the method of collecting the raw data. The data will be checked on the following aspects:

- amount of detail
- units
- up to date
- reliability (was the prescribed method of data collection followed properly?)
- accuracy (is the accuracy within the preset norms ?)
- correctness (what was collected and where?)

The <u>Method of collection</u> will be checked on the following aspects:
- completeness (is the preset level of completeness being met?)
- reproducibility (can the way in which information is produced be traced back?)

Who will validate ?
Validation of data must be carried out by someone who is independent from the data collector. At least the validation officer should be part from a part of the organisation other than the one who collects the data. The validating officer should have ample knowledge to carry out validation.

List of indicators Netherlands' Ministry of Defence

Goal	Indicator		Raw data	
1. Water	I.1	Use of water	R1	use of drinking water
			R2	use of groundwater
	I.2	Relative water use	R1	use of drinking water
			R3	# of employees
6. Ozone layer	I.3	Ozone layer depletion	R4	use of halon
			R5	use of CFCs
			R6	use of HCFCs
			R7	use of methyl chloroform
			R8	use of carbon tetrachloride
			R9	use of methyl chloride
			R10	use of methyl bromide
			R11	ODP of halon
			R12	ODP of CFCs
			R13	ODP of HCFCs
			R14	ODP of methyl chloroform
			R15	ODP of carbon tetrachloride
			R16	ODP of methyl chloride
			R17	ODP of methyl bromide

R11	ODP of halon	10,0 g CFC per g substance
R12	ODP of CFCs	1,0 g CFC per g substance
R13	ODP of HCFCs	0,1 g CFC per g substance
R14	ODP of methyl chloroform	0,1 g CFC per g substance
R15	ODP of carbon tetrachloride	0,1 g CFC per g substance
R16	ODP of methyl chloride	0,1 g CFC per g substance
R17	ODP of methyl bromide	0,0 g CFC per g substance

(Interpretation of EU regulation on ozone depleting substances)

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7. Greenhouse gas CO_2	I.4	CO_2-emission	R18	use of petrol
			R19	use of diesel
			R20	use of kerosene
			R21	use of bunker-oil (ships)
			R22	use of domestic fuel oil

```
                                        R23  use of natural gas
                                        R24  use of propane
                                        R25  conversion petrol-CO₂
                                        R26  conversion diesel-CO₂
                                        R27  conversion kero-CO₂
                                        R28  conversion bunker-oil-CO₂
                                        R29  conversion dom. fuel-oil-CO₂
                                        R30  conversion natural gas-CO₂
                                        R31  conversion propane-CO₂
```

R25	conversion petrol - CO_2	2.40 kg/l
R26	conversion diesel - CO_2	2.62 kg/l
R27	conversion kerosene - CO_2	2.50 kg/l
R28	conversion bunker-oil - CO_2	3.01 kg/l
R29	conversion dom. fuel oil - CO_2	2.62 kg/l
R30	conversion natural gas - CO_2	1.77 kg/m³
R31	conversion propane - CO_2	1.40 kg/l

(Netherlands' National Research Center for Public Health and Environment)

```
8. Other Greenhouse Gases   I.5   CO-emission   R18  use of petrol
                                                R19  use of diesel
                                                R20  use of kerosene
                                                R21  use of bunker-oil (ships)
                                                R22  use of domestic fuel oil
                                                R23  use of natural gas
                                                R24  use of propane
                                                R32  conversion petrol - CO
                                                R33  conversion diesel - CO
                                                R34  conversion kerosene - CO
                                                R35  conversion bunker-oil - CO
                                                R36  conversion dom. fuel - oil-CO
                                                R37  conversion natural gas - CO
                                                R38  conversion propane - CO
```

R32	conversion petrol - CO	0.10 kg/l
R33	conversion diesel - CO	0.01 kg/l
R34	conversion kerosene - CO	0.01 kg/l
R35	conversion bunker-oil – CO	0.01 kg/l
R36	conversion dom. fuel oil - CO	0.0004 kg/l
R37	conversion natural gas – CO	0.0005 kg/m^3
R38	conversion propane – CO	0.0002 kg/l

(Netherlands' National Research Center for Public Health and Environment)

I.6 N_2O-emission R18 use of petrol
R19 use of diesel
R20 use of kerosene
R21 use of bunker-oil (ships)
R22 use of domestic fuel oil
R23 use of natural gas
R24 use of propane
R39 conversion petrol - N_2O
R40 conversion diesel - N_2O
R41 conversion kerosene - N_2O
R42 conversion bunker-oil - N_2O
R43 conversion dom. fuel-oil-N_2O
R44 conversion natural gas - N_2O
R45 conversion propane - N_2O

R39	conversion petrol - N_2O	0.0007 kg/l
R40	conversion diesel - N_2O	0.0004 kg/l
R41	conversion kerosene - N_2O	0.0002 kg/l
R42	conversion bunker-oil - N_2O	0.0006 kg/l
R43	conversion dom. fuel oil - N_2O	0.000022 kg/l
R44	conversion natural gas - N_2O	0.000003 kg/m^3
R45	conversion propane - N_2O	0.000013 kg/l

(Netherlands' National Research Center for Public Health and Environment)

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9. Acidification   I.7 SO_2-emission R18 use of petrol
R19 use of diesel
R20 use of kerosene
R21 use of bunker-oil (ships)
R46 use of light dom. fuel oil
R47 use of medium dom. fuel oil
R23 use of natural gas
R24 use of propane
R48 conversion petrol - SO_2
R49 conversion diesel - SO_2
R50 conversion kerosene - SO_2
R51 conversion bunker-oil - SO_2
R52 conv. light dom. fuel oil-SO_2
R53 conv. med. dom. fuel oil-SO_2
R54 conversion natural gas - SO_2
R55 conversion propane - SO_2

R48	conversion petrol - SO_2	0.0003 kg/l
R49	conversion diesel - SO_2	0.0030 kg/l

R50	conversion kerosene - SO_2	0.0008 kg/l
R51	conversion bunker-oil - SO_2	0.0029 kg/l
R52	conv. light dom.fuel oil-SO_2	0.0064 kg/l
R53	conv. med. dom. fuel oil - SO_2	0.0227 kg/l
R54	conversion natural gas - SO_2	0.00001
R55	conversion propane - SO_2	============

(Netherlands' National Research Center for Public Health and Environment)
(B51: Netherlands' Center for Saving Energy and Clean Technologies)

I.8   Emission Nitrogen Oxide R18 use of petrol
                                R19 use of diesel
                                R20 use of kerosene
                                R21 use of bunker-oil (ships)
                                R22 use of domestic fuel oil
                                R23 use of natural gas
                                R24 use of propane
                                R56 conversion petrol - NO_x
                                R57 conversion diesel - NO_x
                                R58 conversion kerosene - NO_x
                                R59 conversion bunker-oil - NO_x
                                R60 conversion dom. fuel-oil - NO_x
                                R61 conversion natural gas - NO_x
                                R62 conversion propane - NO_x

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Conversion factor $NO_x = NO + NO_2$

R56	conversion petrol - NO_x	0.007 kg/l
R57	conversion diesel - NO_x	0.030 kg/l
R58	conversion kerosene - NO_x	0.01 kg/l
R59	conversion bunker-oil - NO_x	0.06 kg/l
R60	conversion dom. fuel oil - NO_x	0.0018 kg/l
R61	conversion natural gas-NO_x	0.0016 kg/m^3
R62	conversion propane - NO_x	0.0018 kg/l

(Netherlands' National Research Center for Public Health and Environment)

I.9   Emission of Volatile   R63 use of solvent
       Organic Compounds   R64 use of rustproof undercoat
                                R65 use of solvent containing paint
                                R66 use of other solvent cont. products
                                R67 amount of fuel intake at filling station
                                     without vapor-return-system
                                R68 % VOC in solvent
                                R69 % VOC in rustproof undercoat
                                R70 % VOC in solvent contain. paint
                                R71 % VOC in other solvent   containing
                                     products
                                R72 calculation factor VOC emission per fuel
                                     intake (petrol only)

R68 % VOC in solvent	100 %
R69 % VOC in rustproof undercoat	50 %
R70 % VOC in solvent containing paint	20 %
R71 % VOC in other solvent containing products	10 %
R72 calculation factor VOC-emission per liter fuel intake (petrol only)	7 grammes

(Former project office VOC; Ministry of Environment)

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-----------------------------------------------------------------------
11. Waste              I.10    Amount of waste      R73  Amount of industrial waste
                                                    R74  Amount of dangerous waste


12. Separation of waste  I.11   Waste collection R75  Collection structure y / n ?


13. Energy use         I.12    Total use energy (GJ)  I.13 + I.14
                               I.13    Use of energy   R18  use of petrol
                               movable property        R19  use of diesel
                                                       R20  use of kerosene
                                                       R21  use of bunker-oil (ships)
                                                       R76  calculation factor petrol - GJ
                                                       R77  calculation factor diesel - GJ
                                                       R78  calculation factor kerosene - GJ
                                                       B79  calculation factor bunker oil - GJ
-----------------------------------------------------------------------
```

R76	calculation factor petrol - GJ	0.0329 GJ/l
B77	calculation factor diesel - GJ	0.0359 GJ/l
B78	calculation factor kerosene - GJ	0.0343 GJ/l
B79	calculation factor bunker oil - GJ	0.0400 GJ/l

(Netherlands' National Research Center for Public Health and Environment)

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-----------------------------------------------------------------------
                      I.14    Energy use of  R22  use of domestic oil
                              non-movable    R23  use of natural gas
                              property in GJ R80  use of electricity
                                             R24  use of propane
                                             R81  use of urban heating
                                             R82  calculation factor dom fuel oil-GJ
                                             R83  calculation factor nat. gas - GJ
                                             R84  calculation factor electricity - GJ
                                             R85  calculation factor propane - GJ
-----------------------------------------------------------------------
```

R82	calculation factor domestic fuel oil-GJ	35.9 GJ/m^3
R83	calculation factor natural gas - GJ	0.0317 GJ/m^3
R84	calculation factor electricity - GJ	0.0036 GJ/kWh
R85	calculation factor propane - GJ	0.0214 GJ/kWh

(Netherlands' National Research Center for Public Health and Environment)

```
-----------------------------------------------------------------------
14. Energy-efficiency  I.15    Energy-efficiency     R86  fuel use gasoline (l/100km)
                               movable property      R87  fuel use diesel vehicles (l/100km) per type
                                                     R88  kerosene use by planes (l/flying hour) per type
                                                     R89  bunker oil use by ships (l/day at sea) per type
                                                     R90  number of vehicles using gasoline per type
                                                     R91  number of vehicles using diesel per type
                                                     R92  number of planes per type
                                                     R93  number of ships per type
```

(Note: It is impossible to measure improvements in economic driving styles.)

	I.16	Energy-efficiency non-movable property (heating)	R94 total net floor surface R95 climatic conv. factor R96 tot. energy use for heating in GJ excl. electricity

(R95 is supplied weekly by the Royal Netherlands' Meteorological Institute.)
(In R96, electricity is excluded because a major part of it is being used for other things than heating.)

	I.17	Installed veryefficient heating power of total installed room heating power	R97 installed very efficient room efficient room heating r R100 installed room heating power
	I.18	Installed efficient room heating power room heating power	R98 installed efficient room heating power R100 installed room heating power of total installed
	I.19	Installed non- efficient room heating power of total installed room heating power	R99 installed non-efficient room efficient room heating R100 installed room heating power
	I.20	Energy efficiency room heating installed	

{(I.17 * 85%) + (I.18 * 80%) + (I.19 * 70%)} : R100 * 100% = I.20

15. Sustainable Energy	I.21	% renewable energy of total use I.12 total energy use in GJ	R101 windpower in GJ R102 solar power in GJ R103 green power in GJ R104 other renewable sources

(Green power is ordinary non-sustainable electricity for a higher price than usual. The surplus money is invested by the electricity company in sustainable energy sources. Choosing for green electricity is voluntary.)

16. Noise	I.22	Number of people	R105 number of dwellings within 40 Ke contour by noise (not insulated) R106 number of noise-sensitive dwellings within 35Ke contour (not insulated) R107 number of dwellings within 55 dB(A) contour (not insulated) R108 average number of people per dwelling

(R108 is provided yearly by the Netherlands' Central Bureau of Statistics)

17. Soil-contamination	I.23	Sites	R109 number of sites under investigation R110 number of sites to be investigated R111 number of current soil clean-up projects (serious) R112 number of current soil clean-up projects (not serious) R113 number of sites already cleaned up (serious) R114 number of sites already cleaned up (not serious) R115 number of investigated sites with no follow-up needed R116 total number of sites

Annex 3D — Developing Objectives and Targets (Text provided by Sweden)

The following Swedish case study may provide guidance for military organisations when developing environmental objectives and targets. In 1995, a joint Armed Forces – DRE *Sector Report on the Military Defence and the Environment* described the environmental impacts of military activities in relation to national environmental goals and objectives. The was the first report of this kind. It is based on 13 environmental threats that the Swedish EPA identified out of the about 170 environmental objectives.

Based on the Swedish EPA's 170 national environmental goals and objectives and the 13 environmental threats, and on its own impacts on the environment, the Armed Forces elaborated a variety of objectives, goals and actions to reduce those impacts.

These objectives and actions formed the basis for the *Supreme Commander's Environmental Plan 97,* adopted by the Armed Forces in August 1996. Some goals have already been achieved, while others are more long-term.

Following are examples of objectives and actions for five areas of concern in this Environmental Plan.

Releases to ground, water and air

1.   Minimise the Armed Forces' releases of ozone-depleting substances by
*   carrying out CFC and halon phase-out plans.

2,   Reduce emissions of greenhouse gases compared with 1995 levels by

*   gradually changing to more environmentally friendly fuels; and
*   considering the environmental impact when purchasing new vehicles.

3.   Reduce the energy consumption of the Armed Forces related to 1995 figures by
*   mapping the consumption of oil, electricity, fuels and district heating at the local level.

Products and waste

1.   Minimise the use and dispersion of environmentally harmful materials and substances by
*   creating a register of environmentally harmful materials, etc.; and
*   developing procedures for handling and treating all environmentally hazardous waste generated by the Armed Forces.

2.   Apply the recycling and precautionary principles and best available techniques when purchasing materiel to minimise — as much as possible — the harmful impact to the environment by
*   directing environmental demands to the manufacturers when purchasing;
*   introducing lead-free small-calibre ammunition when training conscripts;
*   mapping the extent of ammunitions remainders/relics in ground and water at the Armed Forces training ranges;
*   elaborating methods for reducing potential damage caused by these ammunitions remainders/relics; and
*   cleaning up contaminated sites.

Use of ground and water

Promote biodiversity and genetic variation by
*   investigating ground wear according to Model Units and degree of mechanisation; and

- elaborating environmental plans for training and shooting ranges in consultation with the Fortifications Administration.

Noise

Work toward noise reduction by:
- reducing noise extension at rifle ranges, by building noise reducing shooting halls if needed;
- conducting experiments and evaluating handgun mufflers;
- investigating possibilities to reduce noise from weapons other than handguns; and
- measuring aircraft noise to verify theoretical calculations and mitigate problem areas; and
- developing an aggressive monitoring and personnel protection program

Environmental goals not focused on environmental threats

1.   Continue efforts to deepen environmental awareness in the Armed Forces by
- conducting training for all environmental professionals;
- ensuring that all staff undergo environmental training adapted to their needs;
- ensuring that students at officers colleges are trained according to established training plans; and
- attending environmental conferences biannually for environmental professionals, semi-professionals and heads of units. Can achieve this by allowing attendance at existing national/international conferences versus conducting the conference

2.   Implement an environmental management system in the Armed Forces by
- elaborating environmental plans for the Directorates at HQ;

- elaborating environmental plans at the local level;
- elaborating an environmental handbook; and
- elaborating a system for Environmental Audits.

3.   Continue marketing Armed Forces' environmental work in civilian society by
- conducting annual conferences with representatives from the EPA, Chemical Inspectorate, and all County Administrations; and
- participating in exhibitions and external environmental seminars in Sweden and abroad.

4.   Further development of international co-operation regarding defence-related environmental work by
- co-operating with the United States according to environmental agreements; and
- participating in CCMS pilot studies.

In 1998, the Government proposed reducing the national environmental objectives from 170 to only 15. (This proposal is pending.) The Government also decided that the Armed Forces (and 25 other authorities) should have a special responsibility for ecological sustainability. In this respect, the Armed Forces was commissioned to elaborate and propose to the Government new goals and objectives — and actions to achieve them — for the military sector ready for October 1999.

Annex 3E — Summary of *Environmental Management in the Danish Defence 1999 – procedures and guidance for use*

Implementation of the new guidance document

Environmental Management in the Danish Defence 1999 was published in autumn 1999 and was accompanied by seminars for environmental managers and chiefs of the establishments.

The main purpose of the new guidance document is to give a full overview of the uniform EMS in the Danish Defence. The manual gives options to modify environmental management to suit the establishments, which allows the system to have a local character. This has been achieved by putting the guidelines in the form of "how to write a procedure" instead of listing specific claims.

Personnel can use the guidelines daily as a reference book, as a guide in making procedures, and as a basis in the environmental inspections. The guidelines are also to be used in the education of new environmental managers.

## Structure of the guidance document

The guidance document has five chapters, laid out according to Figure 2:
1. Environmental policy
2. Planning
3. Implementation and operation
4. Checking and corrective action
5. Management review

For each section in these five chapters, the environmental manager has to write a procedure. The structure of the procedures is uniform and contains purpose, references and line of action. In the local system, these headings will be the same.

Figure 2: The EMS in the Danish Defence updated to meet ISO 14001
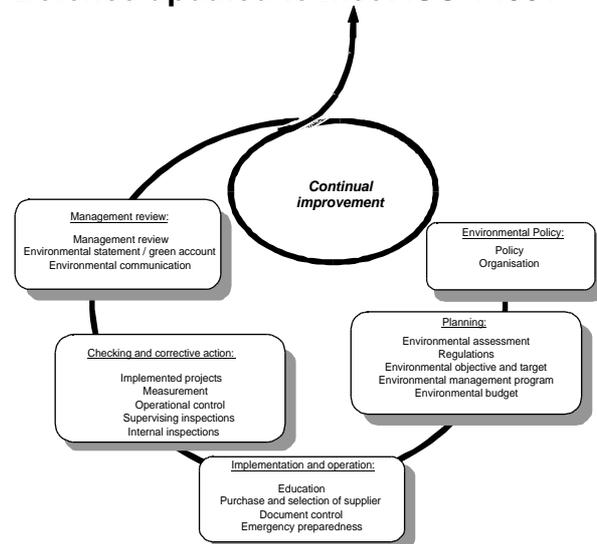
The following text briefly describes each step, with a focus on defining the words/notions used within the concept of EMS and outlining the purpose of this section.

1. Environmental policy

Definition: The establishment's statement of its intentions and principles concerning its environmental effort and results. It is the basis for preparing the environmental objective and targets.

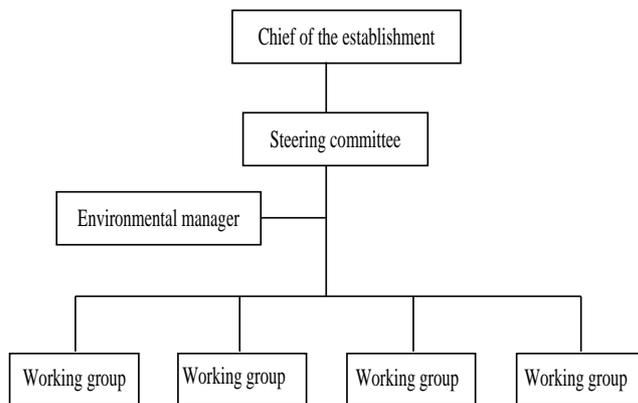*Purpose*: The establishment's environmental policy has to support the intentions in the environmental strategy of the Ministry of Defence. It is written∕endorsed by management, and can only be revised after the management review has taken place.

2. Organisation

Purpose: The procedure concerning organisation has to ensure that an environmental organisation is built and maintained at the establishment, and

that environmental managers and other people responsible for the EMS appear in the overall organisation. Figure 3 illustrates a typical environmental organisation.

Fig 3: Organisational diagram for EMS

3. Environmental assessment / initial review

Definition: Mapping the establishment's environmental aspects. This is done as an initial review, assessment and calculation of the environmental influence of the establishment. The initial review is revised each year.

Purpose: The establishment must build up significant knowledge about its environmental aspects before it can make improvements. An initial review is a very important step.

4. Regulations

Purpose: This procedure is meant to contain methods on how to register and comply with environmental laws and regulation. There has to be a list of every relevant environmental law.

5. Objectives and targets

Definition (objectives): On behalf of the environmental policy and the initial review, objectives that are relevant for the establishment are determined. For example: "reducing the amount of

polluting compounds in the waste water".

Definition (targets): The established and desired effort and results that rise from the objectives. For example: "reducing the amount of oil in the wastewater by 75% in the year 2001 compared with the amount in 1999".

Purpose: The procedure is intended to maintain the establishment's routines in pointing out the most important environmental issues at the establishment.

6. Action plan

Definition: All kinds of projects that could improve the establishment's environmental impacts. The action plan describes the resources that the establishment has to provide, and the projects that are to be carried out to achieve the objectives and targets.

Purpose: The procedure has to ensure that there is a continual improvement in environmental matters at the establishment. Only projects that are approved by management are entered in the action plan. The action plan also contains a time schedule and outline budget for the project.

Figure 4 shows the main steps of the planning stage of an EMS. *(See also Chapter 3)*

Figure 4: Hierarchy of approaches
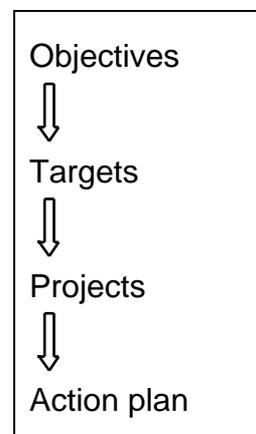
7.   Environmental budget

Purpose: The procedure must ensure that the financial effort concerning environmental matters is apparent to management. The budget contains a breakdown for the projects in the action plan. In addition, it can cover environmental taxes, such as for CO_2 and wastewater that have to be included in the environmental budget.

8.   Education

Purpose: The policy on education has to ensure that the need for training and education in environmental issues is established. Besides the policy, education must ensure that the sense of responsibility held by management and staff is increasing.

9.   Purchase and selection of supplier

Purpose: In Denmark, there is legislation to cover environmental and energy considerations when governmental institutions purchase products. The price is not the only factor. The establishment's purchase of products, vehicles, equipment, etc., must include an assessment of the products' environmental impact. This can be done by purchasing products that incorporate the appropriate Nordic or the European mark, or to buy products/services from a supplier who has implemented ISO 14001 or EMAS.

10.   Document control

Purpose: The procedure must ensure that updated versions of every procedure in the system are available, and that relevant employees⁄military members are told about changes in documents.

11.   Emergency preparedness

Definition: Emergency preparedness in this context refers to procedures to address accidents with environmental consequences, such as a spill of chemicals or leakage of toxic vapour.
Purpose: The procedure must ensure that methods to limit pollution in case of accidents are known by everyone.

12.   Implemented projects and non-conformance

Purpose: The procedure must ensure that results from implemented projects are assessed relating to the targets. Non-conformance from the system must be registered. The procedure is important when management reviews and evaluates the system.

13.   Measurement

Definition: Measurement of potentially polluting compounds is demanded by civil authorities, as covered by environmental permits. Danish legislation requires airbases and shooting ranges to have environmental permits.
Purpose: The procedure must ensure that registration and reporting of measurement is carried out. The DDCS negotiates with civil authorities and prepares a programme that describes how and when measurement is performed.

14.   Operational Control

Purpose: The procedure provides the framework for instructions that must be made to ensure that the continual monitoring of environmental issues is managed. Examples of operational control include control of oil separators, handling of waste and chemicals, and reporting of energy consumption. As help, the Tilstandvurderings (Initial Review) Database (TIVU) programme is used.

15.   Supervising inspections

Purpose: The procedure must ensure that approaches from civil authorities are handled. The DDCS carries out negotiations with the civil authorities in

cooperation with the environmental manager at the establishment. Official approaches and enquiries from civil authorities are referred to the Danish Defence Construction Service, and passed to the superior authority and the Defence Command.

16.   Internal inspections
Definition: There are three types of inspections:
- An internal inspection performed by the establishment's own environmental organisation.
- An inspection by the Defence Ministry, which is performed by the Defence Command and includes an assessment of the system, compared to the rules and regulations of the Defence Command.
- The DDCS does a third-party audit and focuses on the system compared with the international standard ISO 14001.

Purpose: The procedure describes internal inspections and is intended to test if the system works. The inspections will give the chief of the establishment the opportunity to evaluate the system, and make changes in cooperation with the environmental manager and the environmental organisation.

17.   Management review
Definition: Assessment of the system's appropriateness and effectiveness.
Purpose: The chief of the establishment must review the information generated in the system from inspections and the implemented projects and non-conformance. It is important to ensure that the system provides continual improvements, and that it is appropriate for the specific environmental matters which apply at the establishment. Comments from relevant authorities are also to be assessed in the management review.

18.   Environmental statement and green account
Definition (environmental statement): Results from the projects and data on consumption of energy, water and other resources is published in the environmental statement. The establishment can choose whether the statement is only published internally at the establishment, or if it should also be published externally. The database programme TIVU is a useful tool when making the statement.
Definition (green account): According to legislation, a number of Danish companies are obliged to perform a green account concerning the consumption of energy, water and other resources, including the production of waste. While the Danish Defence organisation is not covered by this legislation, it voluntarily produces a green account. The green account is compiled by the Defence Command using data collected in the TIVU programme.
Purpose: The procedure must ensure that material is made available concerning the environmental conditions at military establishments and that it can be published.

19.   Environmental communication
Definition: Approaches to or from interested parties concerning environmental matters.
Purpose: The procedure must ensure that environmental communication is taking place according to specific guidelines.

The guidance document and ISO 14001

The guidance document is constructed in accordance with the international standard ISO 14001. The structure of

the five chapters is identical to that of the Standard.

The procedures have minor differences compared with the standard. For example, "green accounts" is a Danish phenomenon and therefore not mentioned in ISO 14001. The environmental statement is mentioned in the Standard, but it is not a requirement that it be published. The guidance document contains all the aspects of environmental management mentioned in ISO 14001.

The guidance document has two enclosures, which elaborate in detail the procedures covering environmental assessment / initial review and environmental inspections.

Annex 3F — A Scoring System to Prioritise Significant Environmental Aspects (Text prepared by the Danish Ministry of Defence)

Environmental ranking

After determining their environmental aspects, organisations must rank them. A ranking implies that the environmental relations are arranged according to importance, and that the most important problems are to be solved first.

Ranking environmental aspects serves three purposes:

- It focuses management and personnel on a limited number of problems that should be addressed first.
- It gives interested parties outside the organisation brief information on the problems dealt with in the organisation.
- It helps organisations make the best use of limited time and financial resources.

This does not mean, however, that the other aspects can be ignored. After organisations significantly reduce the adverse impacts associated with their aspects which are ranked with the highest priority, they can focus on the remaining aspects.

Criteria

To be able to prioritise, organisations must determine which criteria of selection to use. Organisations should do this by estimating the consequences of the environmental impacts for health, safety and the environment, as well as possible conflicts with existing legislation and regulations.

Example of criteria include:

- impacts that have the most serious consequences for the environment, safety and/or health;
- impacts that involve large or small breaches of the law or that cause other problems regarding demands from the authorities;
- impacts that are in conflict with the external and internal environmental policies of the organisation; and
- impacts that can be solved easily.

Estimation of the consequences for environment, health and safety

Organisations' emissions and discharges into the air and the water from a site, as well as industrial wastes, can pose a risk of damaging the ambient environment or the health and safety of employees.

Examples of impacts on the ambient environment include:

- acidic precipitation
- greenhouse effect
- depletion of the ozone layer
- toxic effects on animals and human beings.

The risk of damage depends on two things: the hazard, or type, of the impact (i.e., type of substance, type of nuisance, type of working stress); and the exposure of the impact (i.e., how big the impact is).

$$Risk = Hazard \times Exposure$$

It is not really possible to determine the most hazardous risk objectively. Is an allergy "worse" than dead fish in the river, or is acidic precipitation more dangerous than heavy metals? Conditions that cause incurable (perhaps fatal) diseases are given higher priority more often than damages which can be remediated. Furthermore, global environmental

damages, such as the greenhouse effect and decomposition of the ozone layer, are more important than damages to regional and local environments.

Scoring systems for the ambient environment

Due to the difficulties in comparing various types of environmental impacts, it can be helpful to use the scoring systems for estimating the importance of environmental relations with industry, suppliers and the public. In a scoring system, the ranking is simplified by dividing hazards and exposure in coarse classes (high, medium, low) from criteria determined in advance. This means that an attitude to which effects are more serious than others is built into the scoring system.
When using a scoring system for estimating the seriousness of problems, it is important to consider the following items:
- what decisions are built into the scoring system;
- whether these decisions correspond to one's own understanding; and
- whether the results of the scoring system look reasonable from a subjective point of view.

Ranking procedure

The procedure consists of four steps:
1. The EMS champion or EMS team decides on the criteria to be used.
2. All impacts are ranked using the scoring system for the environment.
3. Information concerning other criteria is gathered (conflicts with the legislation, financial positions, easy solutions, etc.).
4. All information is presented in an easily accessible form.

The priority matrix is an example of how to compare "regular" information of each environmental relation for the use of a priority discussion. Furthermore, the priority matrix is an organisation's documentation of the priority towards other stakeholders. Table 1 gives an example of a priority matrix; Table 2 shows a sample priority matrix for the work environment.

Table 1: Example of priority matrix

Environmental aspect	Environmental score	Operating costs	External / working environment	Complaints from the neighbours	Conflict with legislation	Highly prioritised by the authorities	Easy to solve
Electricity consumption	18	180,000	No	No	No	No	Yes
Heat	12	70,000	Yes	No	No	No	No
Noise	12	0	Yes	Yes	No	Yes	No
Urea	12	0	Yes	No	Yes	Yes	No
Chemical waste	6	50,000	No	No	No	No	Yes

Table 2: Example of priority matrix for a work environment

Internal Environment	Operating costs	Occupational Safety and Health (OSH)-score	Conflict with legislation	Highly estimated by the authorities	Easy solution
Heavy burdens	0	18	Yes	Yes	No
Machine cover	0	9	Yes	Yes	No
Noise - dep. 1	0	18	Yes	Yes	No
Detergents	20,000	3	No	No	Yes
Organic solvents	50,000	18	Yes	Yes	No

An example scoring system

The Danish Defence uses a scoring system for the ambient environment. It is typically used on an organisation-wide level after the completion of the first audit visit. It includes all environmental aspects of an organisation. The environmental aspects are scored so that the environmental significance is highlighted. This is done by estimating each environmental relation in terms of:

• amount/size — A
• dispersion scale (global, regional, local) — D
• effect (reversible, irreversible) — E

Each of the three parameters is give a score of 1 to 3 depending on the size of the problems. Multiplying the score for "amount", "dispersion" and "effect" produces the total score, which represents the size of the problem. The higher score, the bigger the problems are. There are 10 possible levels: 1, 2, 3, 4, 6, 8, 9, 12, 18 and 27. It must be emphasised that the score does *not* indicate an objective value, let alone a scientific value. (Such a value cannot be given.) The score only indicates the size of the problem and how relevant it would be to do something about it.

Normally, scores with values of 1 to 2 do not warrant any action from an environmental consideration alone. From an environmental standpoint, scores of 3 to 8 typically require that action be taken. Scores 9 to 18 indicate that it is essential to take action. A score of 27 is alarming and requires that action be taken immediately.

Table 3 shows the scoring system.
Tables 4, 5 and 6 give examples of
how criteria may be structured. The
assignment of points must be
determined by the EMS Team.

Table 3: The scoring system from the Danish Defence

Score			Level of problem A x D x E	Class of problem	Need for effort
A	D	E			
3	3	3	27	IV	Alarming
3	3	2			
3	2	3	18		
2	3	3			
3	2	2			
2	3	2	12	III	Critical
2	2	3			
3	1	3			
3	3	1	9		
1	3	3			
2	2	2	8		
3	2	1			
3	1	2			
2	1	3			
2	3	1	6		
1	2	3			
1	3	2		II	Relevant
2	2	1			
2	1	2	4		
1	2	2			
3	1	1			
1	3	1	3		
1	1	3			
2	1	1			
1	2	1	2		
1	1	2		1	Little
1	1	1	1		

Table 4: Criteria for the "A" score (Amount/size)

(A)				
Environmental aspects	3 points	2 points	1 point	Remarks
Water consumption m^3/year	> 300,000	< 300,000 and > 60,000	< 60,000	
Energy consumption CO_2, SO_2 and NO_x tonnes/year	> 10	< 10 and > 1	< 1	The amount to be calculated after tables for each energy source
Waste tonnes/year	> 10	< 10 and > 1	< 1	Divided into landfill waste and hazardous waste
Components in wastewater tonnes/year	> 10	< 10 and > 1	< 1	Divided into individual components
Components in air emission tonnes/year	> 10	< 10 and > 1	< 1	Divided into individual components
Odour, noise, vibrations	Constant impact	Long periodic impact (more than 2 hours/day)	Short periodic impact	If any legal limit is exceeded 1 point will be added
Risk	> 50% of the amount, which is noticeable	< 50% and > 1% of the amount, which is noticeable	< 1% of the amount, which is noticeable	Noticeable in the sense of EU's "Seveso directive"

Table 5: Criteria for "D" score *(Dispersion scale (global, regional, local))*

(D)				
Environmental aspects	3 points	2 points	1 point	Remarks
Water consumption	Public water supply	Private water supply for more companies	Own boring for water	
Energy consumption CO_2, SO_2 and NO_x	Always 3 points			Due to global dispersion
Waste	Disposal not according to the legislation		Disposal according to the legislation	Divided into landfill waste and hazardous wastes. Can be different for the different types of waste
Wastewater pollutants	Discharge to stream, lake and sea	Percolation, spreading on ground	To treatment plant (with reasonable size and operation)	Can be different for different outlets from the company
Air emission	Always 3 points			Due to global dispersion
Odour, noise, vibrations	Noticeable more than 500 m from the company	Noticeable in more than 50 residential houses within a distance of 500 m from the company	Noticeable in less than 50 houses within a distance of 500 m from the company	
Risk	Always 3 points			Only to be used together with EU's "Seveso directive"

Table 6: Criteria for the "E" score (Effect (reversible, irreversible))

(E)				
Environmental aspects	3 points	2 points	1 point	Remarks
Water consumption	Regeneration takes more than 20 years	Regeneration takes from 5 to 20 years	Regeneration takes less than 5 years	
Energy consumption CO_2, SO_2 and NO_x		SO_2 and NO_x always 2 points	CO_2 always 1 point	Each type to be settled
Waste	Substances marked with N, T or T_x, Poisonous, carcinogenic, etc.	Materials which contain harmful substances (X_n). Fertilising substances (with N or P) or oxygen-consuming in the aquatic environment	All clean fractions of other materials: soil, concrete, sand, etc.	Determined for the different components in the waste
Wastewater, pollutants	Substances marked with N, T or T_x, poisonous, carcinogenic, persistent etc.	Harmful substances (X_n). Fertilising substances (with N or P) or oxygen-consuming in the aquatic environment	All other substances	Determined for the different components in the wastewater
Air emission	Substances marked with N, T or T_x, poisonous, carcinogenic, ozone depleting etc.	Inorganic dust, SO_2, NO_x, fume and gasses from harmful inorganic and organic substances	CO_2 and other substances	A guideline should be developed during audits
Odour, noise, vibrations		Always 2 points		
Risk	More than or equal to the amount which is noticeable	Less than the amount which is noticeable		Only to be used together with EU's "Seveso directive"

Chapter Four — Implementation

This chapter is designed to help organisations implement the action plans they developed during the planning phase. It is important to have a solid plan for implementing the EMS, for which there are some basic requirements.

- All levels of management, in particular the top level, must be committed to the EMS, and all players must have clearly defined roles and responsibilities.
- Training and awareness programmes must be developed and implemented to ensure that personnel at all levels have the competence and skills to meet the requirements of the ISO Standard.
- Finally, effective channels of communication must be established and a plan for documentation must be set down.

Roles, responsibilities and authorities
Section 4.4.1 of the Standard

Once top-level management has given commitment to the EMS process, it must define roles, responsibilities and authorities. In doing so, it should provide sufficient guidance in five areas:

- chains of command and reporting relationships, including those of lodger or tenant units;
- appropriate instructions for specific military activities that have significant environmental impact;
- personnel responsible for communicating on environmental issues, with special emphasis on those who communicate horizontally across branches and units;

- environmental protection procedures for day-to-day operations (detailed where needed); and
- environmental requirements of important suppliers (companies and contractors).

The ISO Standard also requires that organisations establish environmental emergency procedures. These procedures should describe how and with whom to communicate, and identify the respective roles of authorities.

Organisations may also choose to include other procedures, which are valuable but not obligatory, such as obtaining environmental permits from different authorities and producing an annual report on the environment (see Chapter 5).

Establishing environmental protection procedures for day-to-day operations is a challenging task. It involves taking a detailed look at all military sector activities from an environmental point of view, including the terms of reference for the officials responsible for the activities. If individuals and the way they perform their duties are scrutinised, resistance can be expected. However, a detailed examination is key to implementing the EMS, and it is important to get this step right.

Training and awareness

Once organisations have developed an EMS and determined roles and responsibilities, the next critical step is to ensure that the appropriate personnel are sufficiently trained to be able to implement the EMS.

There are two training and awareness elements related to the EMS: EMS Training and Competency Training.

EMS training and awareness

EMS Training ensures that both senior and middle management understand:
- their obligations with respect to the EMS;
- the requirement to commit to implementing the environmental policy statement;
- the requirement to put the EMS and the plans contained in the Environmental Management Programme into place; and
- the requirement to conduct a review to ensure that the EMS is operating as management expected it would.

Senior managers must be fully aware of the requirements and purpose of the EMS. Their initial training will be a natural consequence of their involvement in developing the organisation's environmental policy statement (Chapter 3). The best way to ensure senior managers are fully informed is through briefing modules and progress reviews that demonstrate how an EMS improves military operations.

Middle managers require more detailed practical training on how the EMS will improve the organisation's operations. Professional training personnel and environmental experts should provide this training in the form of a short seminar or similar method that allows for open exchange of information between the middle managers and the training team.

Junior managers should receive a combination of EMS training and Competency training. The EMS implementation plan should determine which junior managers need what training. Junior personnel should receive some EMS training as part of their job-specific Competency Training.

Environmental professionals are likely to be asked to take on most of the burden of ensuring that all the elements of the EMS are in place. They will therefore require specialised training on the EMS. In some cases, with the appropriate training, they may be certified as Lead Auditors, which qualifies them to audit the EMS, as defined by ISO and national accreditation bodies.

Competency Training

Competency Training ensures that both military and civilian personnel are trained and/or made aware of their environmental obligations as they carry out their day-to-day activities. These personnel must receive the appropriate training so that they can address the environmental issues of their respective military or civilian duties competently.

For example, when personnel are properly trained in pollution prevention, remediation costs are reduced, efficiency is improved, and adverse environmental impacts are avoided. Commanders can demonstrate their commitment to environmental regulators by ensuring that personnel are adequately trained to avoid causing environmental incidents, and to react quickly and effectively should those incidents occur.

Environmental training is required for:
- government/departmental policy
- legal compliance
- statutory requirements
- financial benefits
- environmental performance improvements.

(See Annexes 4A and 4B for specific guidelines on developing environmental Competency Training.)

Hint Box 4 — Raising awareness of the EMS

There are other methods of raising EMS awareness, including:
- vocational training
- continuous information updates on Intranet and Internet Web sites
- presentation of a policy statement, and environmental reports to each employee
- participation in environmental initiatives
- internal seminars, workshops, talks and lectures
- video presentations
- external seminars, workshops and conferences.

Who needs environmental training?

Both military and civilian personnel in modern military organisations require appropriate education and training to discharge their environment-related duties and obligations satisfactorily. These personnel include:
- senior military and civilian managers
- environmental specialists and policy staff
- staff assigned to specialist functions
- personnel with environmental responsibilities
- logistics and procurement personnel
- training personnel
- personnel who control facilities and resources
- incoming personnel and contractors
- personnel with financial responsibility.

Representatives from a number of military organisations agreed that — as a minimum — the following personnel categories require some form of environmental training:
- 65% of senior staff (primarily EMS Training)

- 55% of middle managers (both EMS and Competency Training)
- 55% of junior managers (primarily Competency Training, with some EMS Training)
- 30% of junior personnel (Competency Training).

Note that all staff should have some degree of environmental knowledge and understanding that they bring to, as second nature, their day-to-day activities.

Professional environmental training, like military training, must be appropriate to the recipient's level, grade or rank, as well as specific needs.
(See Annex 4B for more information on determining environmental training needs and on who should receive training.)

Communication

An EMS requires a communications strategy that targeted at all identified interested parties. This requirement is consistent with the transparent and accountable approach taking place in today's military sector. It also indicates a positive move away from the culture of secrecy associated with the military, contributing to a more positive image of the military. Individuals responsible for implementing the EMS in their executive areas will have been assigned at this stage, including the EMS champions.

The first step organisations must take is to identify all parties to which its EMS must be communicated. These parties include military and civilian personnel within the organisation and outside groups (environmental ministries, environmental non-government organisations). To do this, the EMS Champion should conduct a stakeholder analysis to identify people and organisations that have made their

interests known, either directly or indirectly.

The EMS Champion should then determine what communication tools are most effective for each group. A key to internal policy communication is documentation (see Section 5.6 of the Standard and below). Other useful tools include newsletters, house magazines and awareness road shows that bring the environmental message to individual sites and the public. Frequent meetings with outside organisations are the best way to communicate how a military organisation is implementing the EMS. Meetings with environmental ministry staff will help improve the program, limit criticism and lessen oversight. Meetings with ENGOs will engender trust and avoid adverse public reaction. The key to a successful communication strategy is having a mechanism to use information provided by others to improve the EMS.

In some cases, military organisations will be legally required to set up official consultation groups with particular bodies, particularly for subjects such as nature conservation on defence-owned land. Even when no legal requirement exists, this approach can be a very effective way of engaging policy makers from environmental organisations.
(See Annex 4C for examples of procedures on communication from the Danish Defence.)

Documentation

Once an organisation has developed its EMS, it must describe it, either electronically or on paper. ISO 14001 stipulates that EMS documentation may be integrated with other organisational documentation.

Although it does not have to be in the form of a single manual, this tends to be normal practice.

EMS manual

The EMS manual serves as a good overall description of the EMS and indicates where specific guidance can be found. It must document where the relevant elements can be found, demonstrate compliance with the EMS requirements, and show that objectives and targets are being met. It must also be readily identifiable and periodically reviewed and revised.
The manual should be the principal source of reference for the EMS, and a key document for third-party assessment. It should be relevant to the organisation's activities. It can cover an entire operation, a building, a base, a ship, a military unit, a division, directorate, or the entire military sector. As the ultimate goal of the EMS is to integrate the management of environmental aspects into the existing management system, however, the manual should not become a huge document, merely repeating what can be found elsewhere. Writing and updating the manual should not be a time-consuming burden.
Military organisations are well suited to fulfilling the documentation requirements efficiently. They are very good at providing consistent guidance and direction throughout, by way of existing systems of conveying direction, such as:
- standing and routine orders
- directives
- Standard Operating Procedures (SOPs)
- job descriptions
- terms of reference
- documented tasking.
These existing documents need to be modified in accordance with the

Environmental Management Programme step of the planning stage. Organisations should encourage the use of a common structure for the EMS manual, using a standardised framework or template, which each service or establishment can complete according to its environmental impacts. Each military service may choose to use a different style or method to communicate its requirements. It is important to remember that the main purpose of the manual is to convey information and direction to those who are expected to implement its contents. The documentation specialist must write it so that the reader or user can easily understand and act upon its direction.

Hint Box 5 — EMS Manual checklist

Ensure that the EMS Manual:
• is concise and well-structured (with subdivisions for key areas);
• contains a brief introduction to the organisation and its activities;
• outlines the organisation's environmental policies;
• summarises the organisation's significant environmental impacts, objectives and targets, and its management programme;
• defines key roles and responsibilities;
• identifies the role of the management representative;
• indicates how ISO 14001 requirements will be met;
• cross references procedures (e.g. work instructions and other relevant documentation);
• highlights any emergency plans (e.g. for spills); and
• has a standardised documentation format for reporting and evaluation.

Hint Box 6 — Items to be included in the EMS manual

The EMS manual should include the following items:
• Environmental Policy for the Ministry, the Armed Forces, or for the particular military service (whichever is applicable for this level of the EMS Manual);
• a list of significant environmental aspects;
• a register of significant environmental impacts;
• an environmental management (or improvement) programme and procedures (as per environmental aspect);
• local action plans containing objectives and targets, reflecting any agreements reached with local communities;
• work instructions for managing a particular activity or issue;
• site emergency plans;
• organisation charts; and
• health and safety instructions.
• In addition, the EMS manual should include a statement on how the following environmental requirements will be identified:
• compliance with legislation and regulations
• compliance with government policies
• compliance with Ministry of Defence and Armed Forces directives.

Document control
Section 4.4.5 of the Standard

Document control ensures that the right people have the right information at the right time in the right place. As noted above, military organisations already have effective systems of document control in place. Personnel documenting the EMS should take advantage of these systems rather than developing new ones. They should also avoid complex

document control systems by creating and maintaining only those documents that are necessary to implement the EMS and achieve improvements in environmental performance.

Using an electronic system, such as posting the manual on an Intranet site, or issuing the manual on CD-ROM, ensures that the direction is centrally updated at routine intervals. It also makes controlling paper-based copies unnecessary, since EMS documentation would be accessible to all. As each military establishment is encouraged to have its own EMS, it follows that each establishment would post EMS documentation on its own server / Web site, or issue their own CD-ROM.

Document control in a paper-based system works differently. In the interest of consistent direction and to ensure that all units are working from the most recent direction, most military organisations have a system of controlled amendments for certain designated key documents. Amendments are forwarded to identified document holders, with instructions to replace obsolete sections with newly issued direction.

Hint Box 7 — Maintaining EMS documents

Document control ensures that:
- documents are assigned to the appropriate unit or job title and can be easily found;
- documents are periodically reviewed, revised as necessary, and approved as adequate by authorised personnel;
- current versions are available at locations where operations essential to the effective functioning of the EMS are performed;

- obsolete documents are promptly removed from all points of use;
- any obsolete documents retained for legal or other purposes are suitably identified; and
- all pages are numbered, dated and fully referenced.

Operational control
Section 4.4.6 of the Standard

Operational control refers to actions that the EMS manager should undertake to ensure that everything is in good working order. It is the manager's responsibility to ensure:
- the EMS is effective in managing the organisation's environmental aspects;
- the appropriate resources are in place to implement the EMS;
- these resources are optimised (i.e. that the EMS is running efficiently);
- reasonable steps are taken to ensure the quality of the information on which decisions are based;
- the EMS implementation team knows about any mid-course adjustments and is able to follow them; and
- operations are performed accurately and completely.

Hint Box 8 — Operational control checklist

To ensure control of critical activities, the EMS manager should:
- check whether requirements are met and, where necessary, make any corrections;
- provide key people with work instructions that are identifiable, current and available on location;
- make contractors and suppliers aware of the organisation's EMS as it relates to them;
- provide contractors with details of relevant operational procedures and requirements;

- give details of verification methods employed in the manual and work instructions; and
- identify the person or persons responsible for ongoing supervision of the quality and accuracy of activities:
- overseeing or directly achieving the objectives and targets (e.g. the officers),
- undertaking spot checks,
- initiating investigations into cases of non-compliance, and
- taking necessary permanent corrective actions.

Emergencies and contingencies
Section 4.4.7 of the Standard

ISO 14001 requires organisations to maintain documented procedures to:
- incorporate existing emergency reporting requirements;
- identify potential accidents and emergencies that may arise from hazardous processes and the handling or disposal of dangerous materials;
- minimise any environmental, health and safety impacts resulting from these incidents; and
- periodically test such procedures, if practicable.

Once again, military organisations excel at this activity. Standard Operating Procedures are usually designed to include emergency procedures. Since military personnel must be prepared to respond to damage to the base in the event of hostilities, they have emergency plans on site that are regularly through Operations Evaluations or another testing activity.

Hint Box 9 — Emergencies and contingencies

Organisations must formally adopt and record emergency procedures in EMS documentation. They should also train employees in these procedures and provide additional training, as required, in the following areas:
- complicated monitoring, maintenance or inspection routines;
- the coordination of several operations; or mission and/or business continuity plans.

Summary

This chapter has dealt with aspects of the implementation process, including defining roles and responsibilities, training programmes for personnel, communication and documentation strategies, operational and document control, and strategies for emergencies and contingencies. Once management programmes are up and running, organisations must continually assess and evaluate the effectiveness of the EMS. The next step is to develop procedures for monitoring, evaluating and reporting, which is described in Chapter 5 — Monitoring, Evaluating and Reporting.

Annex 4A — Training in the Military Sector

Approach

In general, military organisations are effective at ensuring that personnel in military occupations and trades receive consistent training through a formal training programme. The key to conducting an effective environmental training programme is to integrate environmental subject material into existing courses.

Such integration need not entail an increase in training hours. As personnel are taught how to carry out their duties, they should be taught how those duties affect the environment and the proper procedures to ensure that minimal environmental damage is incurred. For example, as mechanics learn how to change the oil in vehicles, they should be taught how to dispose of used oil in an environmentally responsible manner.

Ideally, the environmental portions of military training should be transparent and seamless. Commanders should understand that the creation of an environmental module to address environmental training is not necessarily the most cost-effective approach to addressing the issue. In addition, military training should include:
• the importance of conforming with policy, procedures and the EMS;
• training those with roles and responsibilities needed to achieve conformance;
• the potential consequences of failing to follow operating procedures; and
• the merits of improving environmental performance.

Training options

Although environmental specialists are ideal for supplying subject matter expertise to training specialists, they are not experts in training. Training specialists are the ideal candidates for developing and delivering training in the military.
A training strategy should be established to:
• identify the complete range of training available;
• determine whether there is a gap in the existing training; and
• identify roles, responsibilities, priorities and a timeline to close gaps.

Organisations have a number of environmental training options. The first is a formal course, which should:
• develop environmental awareness amongst all personnel, since there is an environmental element in every military occupation, trade and task;
• help managers and key people understand the EMS and what the organisation is seeking to achieve and why;
• explain work instructions and develop technical skills for specialists, operators and those who are responsible for potential significant environmental impacts; and
• provide training on specific and unique environmental elements of individual jobs, tasks, secondary/tertiary duties and other assigned military duties (e.g. duty officer).

The second environmental training option is on-the-job training, which will increase individual compliance, knowledge and competence in environmental matters. And the third option is informal training, which

includes distance learning packages, news sheets, and in-house newsletters etc.

Common training elements

Certain elements should be common to all training to ensure that civilian and military personnel at all levels are aware of:
- the importance of conforming with the environmental policy and procedures and the requirements of the EMS;
- the significant environmental impacts of work activities and the benefits of improved performance; and
- the emergency preparedness and response programme, and the potential consequences of non-compliance.

Evaluation

The training development organisation should evaluate training regularly to assess its value to the environmental performance of the military organisation. In addition, the organisation should use compliance audits or audits of the EMS to identify deficiencies resulting from inadequate training or lack of training.

Annex 4B — Determining Training Needs

Organisations should determine the target audience and level of training required by asking such questions as:

- Do personnel fully understand the content and implications of the organisation's environmental policy?
- Do managers fully understand how the EMS provides control over the organisation's significant environmental impacts?
- Do operators understand the environmental impacts of their activities and have access to up-to-date information?
- As applicable, do commanding officers fully understand the potential risk they run of having their exercises stopped by the regulating authorities if they are found to be non-compliant with environmental laws and regulations?
- Is there a general awareness of the:
- the relationship between energy use and the environment?
- the need to minimise waste by maximising reduction, reuse and recycling?

Figure 1 shows how senior personnel tend to be more concerned with policy issues and how junior personnel are more concerned with implementation activities. Therefore, different ranks or levels need different tools to carry out their responsibilities.
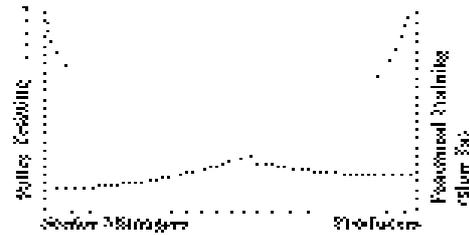
Figure 1: Policy, Implementation and Personnel

Figure 1

Senior personnel must be made aware of the context in which environmental concerns are addressed, or the "why" of an issue. Junior ranks and levels need training designed to fill the gap between their actual performance and the required level of performance, or the "how" of that issue. Middle managers (i.e. Major or equivalent) are in the best position to link the senior and junior levels. They need a blend of awareness exposure and process training to implement an EMS across their area of responsibility.

Personnel will need EMS training at key junctures, including upon the adoption of the EMS, recruitment, promotion or change of job, a change of process or equipment, and change of law or departmental policy, as well as following the investigation of an accident or breach of legislation. EMS training should cover the topics:

- EMS organisation, arrangements and procedures
- legal and departmental requirements
- environmental impact of military activity
- roles and responsibilities
- environmental and technical skills (e.g. pollution clean-up personnel)
- benefits and penalties
- remediation and mitigation
- specialist training to support EMS implementation.

Annex 4C — Procedures for Environmental Communication

(From Environmental Management Systems in the Danish Defence)

The procedure is divided into internal and external environmental communication, and has to ensure that environmental communication is taking place according to specific guidelines.

References

- ISO 14001 point 4.4.3.
- The general guidelines in the defence concerning communication with the press.

Internal communication
Guidance

There are already activities within the system that ensure upward communication in the organisation (initial review, objectives and targets, environmental statement, etc.). This procedure has the aim of ensuring that precise and relevant material about environmental issues is also being communicated down through the organisation in an effective manner. The most important information to be spread in the organisation is the environmental policy and information about environmental matters throughout the structure of the organisation.

Everyone at the establishment should know the:

- environmental policy
- level of environmental organisation
- environmental manager.

Table 1 summarises important information to be communicated internally.

Small groups

Some environmental issues are only relevant to small sections of the installation or personnel. Examples include:

1. **Initial review** — The environmental manager and the steering group are responsible for circulating information to the people and working groups that are involved in the initial review, and to the management. During the work with the initial review, the environmental manager co-operates closely with the working groups to help with any kinds of problems and to pass on positive feedback from one working group to another.
2. **Objectives and targets** — The participants in the working groups must have detailed information about the environmental issues that have top priority.
3. **Projects** — The person who proposes a project that could improve the establishment's environmental matters should be directly informed if the project is accepted or rejected.
4. **Regulations** — The environmental manager should inform the management and relevant units about new environmental legislation and regulations.
5. **Inspection** — Sections that are about to be inspected must be informed in advance. The audit of the system demands participation of key figures, who should also be informed.

Continual internal information and updates

In carrying out a plan for regularly transmitting internal information, the environmental manager must recognise:

- what kind of information is relevant

- how to get the information
- the target group
- what kind of medium is used
- timing of the information given.

Table 2 shows a sample internal information plan.

External communication Guidance

The environmental manager makes a list of external interested parties. For every party identified, the environmental manager should consider what kind of information the party can expect to receive, and what kind of information the establishment should send unrequested.

Applications from partners

The environmental manager should reply to applications from partners concerning environmental issues effectively and systematically. It is important to regulate the character and the amount of applications in the EMS. The environmental manager should
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register every application in a scheme. Table 3 shows a sample structure for a scheme.

Applications to partners

The establishment may occasionally spontaneously address interested parties. The Chief of the establishment and the environmental manager should make a list that considers:
- interested parties that the establishment has an obligation or a wish to inform about environmental issues;
- the kind of information these parties need;
- how often the information should be given; and
- the person responsible for delivering the information.

The procedure must be evaluated by the management review. The environmental manager should periodically check whether the register of interested parties is relevant.

Table 1: Information that everyone employed at the establishment should receive

Subject	Type of information
Environmental Policy	Everyone at the establishment must know the environmental policy.
Environmental organisation	Everyone at the establishment should know the environmental organisation.
Initial review	Everyone should be informed about the time schedule for carrying out the initial review.
Objectives and targets	Everyone should be informed about the environmental issues that have the first priority. This is done by informing about the objectives and targets.
Projects and action plan	Projects that are approved by the management are entered in the action plan. Everyone should be informed about these projects.
Implemented projects	Everyone should be informed about the implemented projects and the environmental results.

Table 2: Example of an internal information plan

Type of information	Target group	Information media	When
Date / time schedule for internal inspection	Sections that are involved	Notice boards in the sections	Two weeks before the inspection
A list of projects that is entered in the action plan	All employees	Notice boards	As soon as the projects are approved by the management
New legislation	Management	The environmental manager informs about the new legislation	As soon as the environmental manager knows the content

Table 3: Scheme for registering applications from interested parties

Interested party	Received by	Reason for application	Delivered material	Time schedule
Bo Jensen, Engineer from Viborg County	Environmental manager	Problems with the waste water plant	Report with measured compounds the 19.5.97	Wait for comments from B.J.
Gerda Toft, Engineer from Viborg County	Environmental manager	Investigation of soil and groundwater pollution	None	Contact the Danish Defence Construction Service
The farmer Tage Holm	Environmental manager	Complaining concerning noise from the shooting range	Copy of the environmental approval of the shooting range	None
Anne Bro, school teacher	Environmental manager	Asks for material for teaching in environmental issues	Environmental statement 1997	None

Table 4: Information to interested parties

Interested parties	Information type	Time schedule	Responsible person
Defence Command	Management review	January	Environmental manager
The public	Environmental statement	March	Chief of the establishment
The county	Measuring oil in waste water	1 March 1 September	Environmental manager
House owners	Plan for shooting exercises	14 days before the exercise starts	The responsible officer

Chapter Five — Monitoring, Evaluating and Reporting

This chapter deals with environmental monitoring, evaluating and reporting activities. Organisations must carry out monitoring to test whether it is achieving the objectives and targets of the EMS, and whether the procedures for operational control are effective. They must also evaluate their performance. That is, they must assess the performance of the EMS as a whole, through audits and/or management reviews. Finally, organisations must report on the performance of the EMS, which requires formal communication of the results of the EMS as it is implemented.

Monitoring

Organisations must monitor their current environmental performance against their stated objectives and targets. This is critical if they are to take appropriate corrective action, where needed, to ensure continual improvements in the EMS and in overall environmental performance. Organisations should monitor their performance by using the performance measures they established during the planning stage of the EMS *(Chapter 3).*

Corrective and preventative action

No system is perfect, and as an EMS is established and implemented, managers will most likely identify areas for improvement. Measurement and evaluation procedures will help identify areas of non-conformance with the standard and other problems so that corrective action can be taken. If

evaluation indicates that problems are recurring, it might mean that elements of the EMS should be redesigned.

Hint Box 10 — Problems
The following problems demonstrate EMS non-conformance with the Standard:[2]
• activities or operations that violate environmental policies;
• environmental programme management plans with insufficient details;
• roles, responsibilities, and authorities that are not clearly defined;
• training plans, monitoring schedules, or procedures that are not followed;
• inadequately documented management reviews;
• audits that are not scheduled or defined;
• emergency plans that are not tested or followed; and
• incorrect or obsolete documents.

Evaluating

An EMS can be evaluated in a number of ways, including through environmental audits, EMS audits and management reviews. Clear distinctions exist between audits and management reviews. While both approaches evaluate how an organisation manages its environmental performance, they differ in focus, scope and who conducts them.

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[2] Woodside, Gayle, Patrick Aurrichio and Jeanne Yturri. *ISO 14001 Implementation Manual*, p.136.

Environmental audits

Environmental audits, sometimes referred to as environmental compliance audits, assess an organisation's performance regarding its significant environmental aspects. They evaluate whether an organisation is in compliance with legislation and regulations, and whether it is achieving its environmental goals, objectives and targets. Environmental audits are performed by an audit team. The team consists of a lead auditor and one or more auditors (the exact size depends on the scope of the audit). Auditors should hold qualifications similar to those described in ISO 14012.

EMS audits

EMS audits evaluate an EMS for the effectiveness of its elements and whether it conforms to the EMS audit criteria set by the organisation (see below). EMS audits are performed by an auditor appointed by senior management. Auditors must be independent from the organisation being audited, although they need not be from outside the organisation. If they are part of the defence organisation, to ensure objectivity, they should be from an organisation not directly related to the management of the EMS they are auditing.

Audit focus and structure

Audit area — The audit area gives the broad perspective of what an audit is going to examine. Together with the criteria, the area defines the audit scope.
Audit criteria — Before conducting *any* audits, organisations must decide what criteria will be used to determine whether their EMS, or their performance concerning particular

environmental aspects, is satisfactory. Audit criteria may include, for example: compliance with legislation and regulation;
• compliance with the Environmental Policy Statement;
• adherence to all the elements and procedures of the Environmental Management Programme; and
• inclusion of environmental considerations in contracts.

Audit phases — As defined under ISO 14011[3], the phases of an audit include:
• initiation and audit preparation
• audit investigation
• report preparation
• recommendations and follow-up.

Audit procedures — Organisations should follow the ISO 14011 model, which gives more detailed procedures for conducting audits.

The EMS audit should be clearly distinguished from the management review. The EMS audit determines if the EMS still functions properly, and should be undertaken by a third party, preferably but not necessarily, from someone outside the military sector. The outcome of the EMS audits can be part of the management review.
(See Annex 5B for more information on audit procedures and types.)

Management reviews

The third type of evaluation is the management review. Management reviews determine how the EMS is operating. They examine programmes and look at organisational policies, objectives and goals to determine how an organisation's EMS is accomplishing its stated policies. Management reviews are performed by

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[3] ISO 14011. *Guidelines for Environmental Auditing: Auditing of Environmental Management Systems.*

senior management, ideally the individuals who signed the Environmental Policy Statement. Management reviews also provide a forum for senior managers to review goals and objectives, examine data and targets, and set the direction for system improvement. Due to changing circumstances and an uncertain future, the management review should be key part of a military organisation's plan to proactively address environmental issues.
(See Annex 5C for issues that should be addressed during management reviews.)

Records

Successful evaluations depend on a well-structured environmental plan, including a monitoring and record-keeping system. With an effective plan, the data needed to chart and report progress will be readily available.

EMS records are kept to demonstrate compliance with the requirements of an EMS and legislation. Records provide evidence of the ongoing operation of the system and can help determine the extent to which targets and objectives have been met in relation to an organisation's overall environmental policy.

Reporting

Effective environmental reporting can help establish and promote public awareness. Military organisations should keep interested parties and the general public informed about their EMS by producing a report on current activities, past achievements, areas of non-conformance and corrective action, and future plans.

Functions of environmental reporting

Environmental reporting helps the public see that the military is managing environmental issues responsibly. The environmental report should provide clear, coherent and comprehensive information on the organisation's environmental activities.

Target audiences

Organisations should identify their target audiences before writing the report. In the field of environmental issues, there are two main audiences: the public; and varying levels of government (e.g. Ministries of the Environment) and other environmental interest groups.

Public Audiences

In their public audience, military organisations should include local residents, environmental organisations and other interested parties, including personnel and unions representing employees.

The report to the public should include enough information and detail to give a good understanding of the organisation's environmental impact. It should also cover what environmental protection measures the organisation is applying. In some cases, it may be advisable to have the report validated by an independent party. As the military is usually funded by public money, the public has the right to know if the military is acting in an environmentally responsible manner.

Government and other environmental interest groups

Government and other environmental interest groups (including licensing and

enforcement organisations) monitor the military's compliance with environmental legislation, regulations and permits, and assess its performance.

Some government licensing and enforcement organisations are willing to allow the military to use alternative methods of adhering to regulations. If military organisations take a proactive approach in environmental affairs, such as setting up an EMS and delivering environmental reports, government regulating bodies may not insist on strict compliance with regulations. (Also, an organisation with a strong environmental programme may be less likely to be inspected.) In this case, the licensing organisation may issue a framework licence, which allows for internal self-regulation.
(See Annex 5D for suggestions on the contents of the report.)

Report formats

While the report is a good way to convey the required information, these two audiences — public and government/ENGO — are quite different and will need the information at varying levels of detail and complexity. As a result, organisations may decide to prepare two reports, one for public consumption and one for government. The government report is more likely to contain complex technical details, while the public report will provide a more general interpretation. In many countries, access-to-information legislation means that members of the public can also access the government report. Some environmental reports may not be available for public consumption, however, because government security policy may classify the information as confidential. This is similar to industry

wishing to maintain confidentiality on intellectual property and patented processes.

It is important to bear in mind that the more restrictions applied on access to information, the greater the possibility for public mistrust of the military sector's commitment to environmental protection.

Summary

This chapter has discussed the importance of monitoring, evaluating and reporting, and has outlined procedures for these steps. The final step military organisations should take regarding an EMS is to register it for compliance with a chosen standard, which is described in Chapter 6 — Registration.

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Annex 5B — Types of Audits

Internal audit, first party

Performing internal audits is good management practice. An *independent* and objective person from within the organisation should conduct the audit. Senior management should use the audit as a follow-up to management reviews.

External audit, second party

These audits usually evaluate a supplier or sub-contractor for compliance. Performed by both parties on an agreed upon (but usually contract-stipulated) basis, second-party audits differ from first-party audits in that the client states the scope and the criteria to be applied.

External audit, third party

A third-party auditor is defined as an accredited, independent audit agency. Third-party audits are the most rigorous in scope and usually take the longest to complete.

Compliance audits

Compliance audits compare an organisation's environmental performance with the activities prescribed in permits, regulations, laws, internal standards and other requirements.[4] The compliance audit usually asks these questions:
- Which environmental performance areas are monitored?
- Which environmental performance indicators are established?
- Do the performance indicators relate to the organisation's objectives and targets?
- Are the performance indicators routinely measured?
- What quality control measures are used for calibration and sampling systems?
- Are monitoring results distributed to management in a timely manner?
- How is compliance evaluated against legal and other relevant standards?

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[4] Tom Tibor and Ira Feldman, *Implementing ISO 14000,* p. 175.

Annex 5C — Management Reviews

A management review determines if and how well the EMS is operating. It checks the current status of the EMS, what has been accomplished since the last review, and what improvements are needed. Because it looks at the big picture, the management review is critical to ensuring that environmental policy is still relevant and effective.

Purpose

The management review:
- ensures the continuing suitability, adequacy and effectiveness of the EMS;
- addresses possible changes to policy targets;
- involves key leaders in the EMS; and
- documents deficiencies, non-compliance and weaknesses in the EMS.

Structure

The members of the management review team should include the key personnel of the EMS section under review. For example, the management review team for an EMS installation should include the installation commander, environmental coordinator, unit commanders, and the department heads in charge of the installation.

Focus

The benefit of the EMS management review is that it focuses on how the EMS is improving the organisation's efficiency. Focusing on the adequacy, relevancy and effectiveness of the EMS is critical to developing a robust, efficient and economical system.

Frequency

The management review should be conducted according to the needs of the organisation. Experience shows that while semi-annual or annual reviews are sufficient for mature, developed programmes, quarterly reviews are necessary for a new EMS programme. Holding quarterly reviews allows senior leaders, who are aware of the professional, legal and financial aspects of the organisation's environmental compliance, to participate regularly and guide the development of a comprehensive EMS.

Agenda

The management review should include the following activities in its agenda:
- identify key leaders involved in the review;
- review past (if any) recommendations;
- review current environmental policy, objectives and goals;
- determine if the objectives and goals are being met;
- check quantitative data (metrics used in evaluating goals);
- review new legislation, regulations and reforms;
- audit results and recommendations; and
- make and examine recommendations;

Records

The management review should include good record keeping, essential for documenting progress. Records allow management to learn from past performance and to set policy for new objectives. Management review records should include:

- accomplished objectives and targets;
- improvements made and how suitable the system is;
- concerns of interested agencies and other officials; and
- management's observations and recommendations.

Conducting the review

When conducting the review, include the following questions under key categories.

Identifying key leaders involved in the review
- Are the key leaders of the organisation present?
- Is there anyone else who could contribute to improving the EMS?

Reviewing past (if any) EMS management review recommendations
- What did the last review recommend?
- Were these recommendations implemented?
- Has EMS management changed since the last review?

Reviewing environmental policy, objectives and goals
- Is the current policy valid and relevant to the organisation?
- Are the objectives practical and the goals achievable?

Evaluating if the goals and objectives are being met
- Did the organisation meet the goals set?
- What criteria did the organisation use to evaluate goal achievement?
- Are other performance indicators available to evaluate goal achievement?

Checking quantitative data (metrics) needed to evaluate goals

- How, when and where was the data obtained?
- Is the data relevant to the goal?
- What other metrics would be useful in evaluating the EMS?

Review new legislation, regulations and reforms
- What new rules are coming that will affect the EMS?
- What rules can we implement to make the EMS better?

Audit results and recommendations
- When was the last EMS audit?
- What were the results?
- What recommendations did the audit make?
- Were they implemented?

Examine recommendations
- Does the organisation need to adjust its goals?
- Does the organisation need new objectives to achieve its goals?

Bottom Line: Is the EMS Effective?

Evaluating the review

The management review should be evaluated. Several criteria can be used to judge the review's effectiveness, the most critical being whether the review improved the EMS. The review should result in continuous improvement through updating objectives and refocusing goals. If no actions were taken and no recommendations made, the review probably failed to improve the EMS. To facilitate open communication with the public and other stakeholders, the review team should consider having an external, independent body evaluate the review.

Reports

The review team should issue a report and deliver it to upper management. The report should include:
- the agenda
- the personnel involved
- discussion topics (not included in the agenda)
- recommendations.

Follow-up

The final step of the management review is to implement the recommendations. This may require updating objectives, adjusting or changing goals, or finding new ways to evaluate the EMS. The management review team should be prepared to hold additional meetings.

Annex 5D — Reporting

Contents of the public report
The public report should give an overview of the military organisation's environmental impact during the reporting year, as well as what environmental protection measures were taken and what facilities were installed.

Environmental impact

The report should describe if the organisation's activities had any environmental impact. The regulations set down in environmental legislation can guide the report's scope. In addition, the report could include other environment-related requirements, such as the clean-up of contaminated land.

Environmental protection

The report should describe the organisation's environmental protection activities, including any measures, activities and efforts that raise awareness and provide information about how the organisation is monitoring, reducing and preventing adverse environmental effects.

Format

The report must be concise and easily understandable to the general public. Tables, graphs or diagrams with clear explanations increase clarity. The report must contain quantitative data on the organisation's environmental effects, as a minimum in summary form.

Forecast for the future

The report should give a forecast of the future, describing expectations for environmental impacts and plans for future environmental management efforts. The public needs to know whether the environmental impact will increase or decrease.

Contents of the government report

In many cases, the military is subjected to mandatory reporting, based on laws and regulations, licence requirements and covenants. Usually, this results in many separate reports to the appropriate government authority. These can be merged into a single comprehensive report that includes data that responds to enforcement of environmental regulations. The data should be collected and presented in a way that helps government authorities determine compliance and non-compliance. The enforcement data can be sent in monthly or quarterly reports. At the end of the year, the data can be compiled into the yearly report.

Possible themes

As mentioned, the final contents of the government report should be determined in close consultation with local levels of government. The government report includes the year just past as well as forecasting the future and setting expectations for the following year.
Organisations can use these themes as a basis for the contents of the report:
- climate change
- acidification
- emissions to the atmosphere
- emissions to the surface waters
- radioactive emissions
- eutrophication
- waste disposal
- soil protection and clean-up
- disturbance: noise
- disturbance: odour
- disturbance: major hazard

- Environmental Management System
- specific environmental research
- internal inspections and auditing
- complaint management
- incident management
- policy plans.

Chapter Six — Registration

ISO 14001 allows organisations to make a self-declaration of compliance to the requirements of the Standard. This is the recommended practice in the military sector. The registration process takes this self-declaration a stage further and provides a mechanism through which the organisations can formally demonstrate their commitment to environmental protection. The need to demonstrate this commitment will depend upon the requirements of interested parties, such as Management Boards, Environmental Non-Governmental Organisations (ENGOs), Ministers, or Parliament. Registration for compliance with the Standard in member nations is carried out by external registrars who are formally accredited under schemes run by the governing standards body of each country. Before organisations can register their EMS, they must, of course, have it in place, and they must have completed a whole implementation cycle.

Self-declaration and registration to ISO 14001 is a two-stage process involving:
1. an initial assessment, and
2. the main assessment.

Initial assessment

An organisation should conduct an initial assessment to gain an understanding of:
- its EMS in the context of relevant environmental impacts and regulations; and
- whether it are fully prepared for the main assessment.

The certification body will:

- Check that an organisation's EMS
- has the commitment of senior management,
- meets legislative and regulatory requirements,
- is intended to control and improve the organisation's environmental performance,
- is based on a proper evaluation of the organisation's environmental aspects and impacts, and
- is auditable.
- assess the reliability of the organisation's internal audit;
- plan and allocate resources for further document review (where required for the main assessment); and
- provide a document explaining what further action the organisation must take.

Main assessment

The main assessment, involving a visit from the auditor, is the final stage in the certification process. To determine whether the organisation is ready for the main assessment, the registrar will review a copy of its environmental manual and procedures.

The primary purpose of the main assessment is to:
- confirm that what is written actually represents what is occurring;
- confirm that the EMS complies with all elements of ISO 14001;
- determine whether the EMS should achieve and, if so, is achieving improvements in environmental performance and regulatory compliance; and
- confirm that an organisation is complying with its own policies and procedures.

This means the registrar must focus on an organisation's:

- identification and evaluation of its environmental impacts;
- consequent objectives and targets;
- performance monitoring, reporting and review against your objectives and targets; and
- auditing to ensure that the EMS is effective.

Generally, organisations will only fail the registration process at this stage if the corrective actions demanded by the registrar were not completed during the permitted period. Organisations seldom pass the first time, but often go through the registration process two or three times at least.

The award of an ISO 14001 registration does not complete the process, however. The registrar will maintain a cycle of continuing assessments to ensure that the EMS complies with the Standard and that the organisation demonstrates continual improvement in its environmental performance.

The registration process should not impose excessive documentation requirements on an organisation. The system is supposed to help the organisation, not to make the role of the registrar easier.

Registration is not sufficient to demonstrate performance improvements, because of differing performance objectives. An organisation's environmental report should be the medium through which details of environmental performance are published.

Hint Box 11 — Advantages and disadvantages of registration

There are a number of advantages and disadvantages to registration. Advantages include:

- It is a formal demonstration by an external verifier that the EMS conforms to the relevant standard.
- Some suppliers or customers require registration to a standard, and an organisation's environmental risk/liability insurance carrier may also suggest it.
- Registration can improve relations between a defence organisation and its regulators.
- Registration may be an incentive for continued commitment, and a goal or incentive for staff at all levels to support the EMS.

Disadvantages include:
- Feeling a "need" to register too soon can lead to rushed implementation of a plan, which can be draining on time and resources and may not be comprehensive enough to meet the requirements of the Standard.
- Registration can lead to more intensive scrutiny of an organisation's system and activities by external bodies and the public, which may be uncomfortable for an organisation not used to such an open philosophy.

The Environmental Statement

The environmental statement is another optional component of ISO 14001, and may follow from the compulsory environmental reporting dealt with in Chapter 5.

The publication of an environmental statement provides public evidence that an organisation is committed to continual improvement in its environmental performance. The content of the report is left to the discretion of an organisation, but should:

- be simple, consistent, relevant and balanced, with extra detail included in annexes;
- briefly describe the organisation's activities;
- contain reliable and accurate information;
- summarise objectives, targets, impacts and other relevant issues;
- highlight the progress being made;
- cover both good and bad news in a positive manner; and
- give the name of the accredited registrar.

GLOSSARY

Note: Words marked by an asterisk* have been defined using ISO 14000. Other definitions were developed by consensus of the pilot study group.

Auditor — *A person who undertakes audits or reviews of the performance of an organisation or the efficiency of its EMS.*
Usually a member of the organisation being audited although will be independent of the area being audited (as for an environmental audit and EMS audit). However, an external auditor is required for more advanced processes such as Registration, and he/she must be qualified and accredited by the governing standards body of that country.

Certification (or Registration) — *The acknowledgement by an ISO accreditation agency that the organisation conforms to ISO 14001.*
The process of certification is carried out by external registrars who are accredited under a scheme run by national accreditation agencies. Registration can only take place once an EMS is operational and has completed the entire EMS implementation cycle including a *management review).*

Continual improvement* — *The process of enhancing the EMS to achieve improvements in an organisation's overall environmental performance in line with its environmental policy statement and improvement program.*
The process need not take place in all areas of activity simultaneously. For example it may only be possible to invest to achieve improvements in activities on a priority basis over a period of time.

EAPC — *Euro-Atlantic Partnership Council*

EMAS — *Eco-Management and Audit Scheme*

EMS — see *"Environmental Management System"*

EMS "Champion" — *A member of staff responsible for facilitating the implementation of the EMS and for reporting progress to top management.*
In larger businesses this will be a dedicated post. Other people, with various other jobs, will develop and oversee different elements of the system and report and document their activities to the coordinator. The EMS Champion will be the point of contact for the team leader of the *EMS audit* and *management review.*

Environment* — *The surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.*
Surroundings in this context extend from within an organisation to the global system. If something could be impacted by your organisation it is considered part of the environment for EMS purposes.

Environmental aspect* — *Element of an organisation's activities, products or services that can interact with the environment.*
The organisation is therefore in a position to exert an influence to reduce their environmental impacts. ISO 14001 defines a significant environmental aspect as that which "has or can have a significant environmental impact". The preliminary review will identify the environmental aspects and their source and they are likely to include: emissions to air, discharges to water, solid and other wastes, use of energy, water, wood and other natural resources.

Environmental Assessment (or Environmental Impact Assessment (EIA)) — *A review of the potential impact of a new development,*

particularly for a new building or road, on e.g. wildlife, people and the landscape.

Environmental coordinator —

Environmental impact* — *Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.*

Products which directly or indirectly have an adverse or beneficial impact on the environment include: carbon dioxide and hydrofluorocarbons which contribute to global warming, CFCs and HCFCs which deplete the ozone layer, consumption of water which can deplete water tables and result in streams drying up.

Environmental impacts evaluation — *A documented evaluation of the environmental significance of the environmental impacts of an organisation's activities, products and services (both existing and planned).*

Environmental management — *The management functions (including planning) that develop, implement and maintain an organisation's environmental policies.*

Environmental management programme — *A strategic course of action to enable an organisation to achieve set objectives and targets.*

It would usually consist of a number of programmes that together ensure the organisations impacts are addressed. Each programme will deal with particular impacts, e.g. processes, projects, services, sites etc. A structured approach will take account of short and long-term impacts and the contribution to continual improvement. The various departments in the organisation will have at least one programme to achieve.

Environmental Management System (EMS)* — *The part of the organisation's overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy and enables an organisation to continuously improve its environmental performance.*

Environmental Management System audit — *A systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organisation's environmental management system conforms to the audit criteria set by the organisation, and for communication of the results of this process to management.*

The organisation should monitor its own activities against its own criteria, including policies, procedures and ISO 14001. The audit determines if the criteria are appropriate and adequate and whether an organisation's EMS is satisfactory and if the resources needed for its operation are sufficient. The audit team has an obligation to cite any practices that violate environmental laws or government regulations as non-conformances.

Environmental Management System manual — *The description of the environmental management system.*

This is optional under ISO 14001, however a manual is most useful because it provides for a single document to describe the structure of the EMS, explain the goals, demonstrate continual improvement and will serve as a reference document for audit purposes. It should not be large (less than 25 pages) or unduly technical in content.

Environmental objective* — *An overall environmental goal, arising from the environmental policy and evaluation of environmental impacts, that an organisation sets itself to achieve and which is quantified where practicable.*

The objectives are usually translated into *environmental targets* that are measurable through *environmental performance indicators*.

Environmental performance — *Results of an organisation's achievements in protecting the environment by reducing the environmental impacts of its activities in accordance with its environmental policy, objectives and targets.*

For example, reducing vehicle emissions by using more efficient vehicles and cleaner fuels. When environmental performance fails to meet specified requirements, the occurrences that caused this are referred to as non-compliance.

Environmental performance indicators (EPIs) — see "*Performance indicators*". *They are used to evaluate environmental performance.*

Environmental policy* — *A publicly available statement by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.*

The document commits the organisation to an understanding of its environmental impacts and achieving continual improvement. It should be clear and concise.

Environmental statement — *A written statement of an organisation's clear intention to achieve continuous improvement in environmental performance.*

When verified by an accredited third party, this acts as a main criterion of the EMAS regulation.

Environmental target* — *A detailed performance requirement, quantified where practicable, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.*

The target statement should explain in detail what objective is being met, how the organisation intends to meet it, and quantifies the target in terms of amount, the measurement units used and the baseline for measurement.

For example: "to conserve energy by reducing, between Jan 1, 2000 and Dec 31, 2002 the amount of electricity used by 25%, as measured in terms of kilowatt hours consumed, compared with 1999 levels".

Gap analysis (or baseline audit) — *A procedure by which an organisation that wishes to establish a formal EMS identifies additional or new requirements over and above their existing environmental management practices.*

A structured approach is necessary and it may be advisable to use the services of a consultant who is fully conversant with the EMS standard at this stage.

Goals, objectives and targets — *Goals establish an overall sense of direction and set the parameters for action for the department. Objectives are the overall aims arising under each sustainable development goal. Targets are the detailed performance requirements that the department sets out to achieve. It is through the definition of targets that departments will clearly indicate their priorities on individual issues. Fulfilment of these targets will provide the focal point for departmental efforts towards sustainable development.*

Interested party* **(**also called **stakeholders)** — *an individual or group concerned with or affected by the environmental performance of the organisation.*

For Government departments this includes employees, regulators, the public, environmental NGOs, Ministers, the EU and the OECD.

ISO — International Standards Organisation

Lifecycle assessment — *The consideration of the environmental impacts of every stage of a product's life and in all stages of the organisation's activities.*
This involves product production and disposal including recovery and recycling, and pollution prevention and resource requirements during product use.

Lodger units — **see** *"Tenant units"*

Management Representative — *The employee nominated by management to initiate, monitor, control and take responsibility for the initiatives necessary to improve an organisation's environmental performance.*
The person appointed needs some knowledge of environmental issues to be able to perform his or her duties effectively. See also *"environmental coordinator"*.

Management program — *A description of the means and time scales for achieving environmental objectives and targets.*

Management review — *The formal evaluation by management of the status and adequacy of the organisation's environmental policy, system s and procedures for implementing its environmental policies, complying with regulations and adapting to changing circumstances.*
The management review covers the responsibilities of top management to ensure that the EMS remains in conformance with ISO 14001 by reviewing audit results, monitoring objectives and targets, considering the adequacy of the EMS at that point and addressing the legitimate concerns of *interested parties*.

Middle management — *Military personnel at the level of Commanding Officer of a unit, Staff Officer, or*

civilians of an equivalent level of authority.

Military Sector — *Includes the armed forces and the defence administration responsible for supporting military activities.*

NATO — *North Atlantic Treaty Organisation*

Non-compliance — *Situations that are not in accordance with the law or regulations.*

Non-conformance — *Refers to deficiencies in the EMS, which may vary in severity depending on their nature. As the system fails, non-conforming performance issues may also be evident. Examples may include system compliance deficiencies, objectives and targets missed, incidents and accidents, ineffective procedures, and other elements of the EMS not performing to specification.*
ISO 14001 requires organisations to give responsible parties authority to investigate non-conformances and to take action to mitigate any impacts caused. Further action must include measures to avoid repetition of the non-conformance.

Objectives — see "*Goals, objectives and targets*"

Organisation* — *A company, corporation, firm, enterprise, authority or institution, in part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration.*
For organisations with more than one operating unit, a single operating unit may be defined as an organisation. For an entity to be an organisation under ISO 14001, there must be a responsible party who has authority to approve, disapprove or mandate change within the management system.

Performance indicators — see "*Environmental Performance Indicators*". *These demonstrate the*

scale of an organisation's environmental impacts and, if viewed over time, its progress in reducing them.

Examples include the amount of raw materials used, or the output of pollutants or effluent into a watercourse.

Performance measures — *These are more specific than performance indicators and relate to the exact measurements to be taken to assess performance, for each impact.*

Examples include the mass in kilograms of raw materials used per year, and the Biochemical Oxygen Demand (BOD) or parts per million of pollutant in river water.

Pre-registration audit — *An environmental audit or assessment carried out by an EMS registrar as part of the certification process.*

It reveals the organisation's state of readiness for the actual registration audit.

Prevention of pollution* — *Use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution.*

The potential benefits of prevention of pollution include the reduction of adverse environmental impacts, improved efficiency and reduced costs. For example, most organisations will develop targets to conserve energy and water, promote recycling and waste minimisation.

Procedures — *A procedure describes how an activity (or set of actions) is performed within a department as part of the organisation and who has direct responsibility for the activity.*

Procedures can be formal and informal, written and unwritten (i.e. an accepted working practice) and should be integrated into existing systems whenever possible. They should be understandable, actionable, auditable and mandatory and describe:
responsibility — who will take action;
action — what action will be taken;
recording — how and where the action will be recorded.

Register of environmental impacts — *A list of significant impacts, related to the activities, products and services of an organisation.*

Registration audit — *The investigation process through which accredited registrars establish that an organisation is certified as ISO 14001 compliant.*

A team of auditors assesses how the EMS has been integrated throughout each area that could have significant environmental impact.

Resources — *The allocation of resources needs to be considered during many stages of an EMS process. Resources include time, money, personnel and equipment.*

Responsible individual — *Individuals identified by the Management Representative as having responsibility for a particular environmental impact, objective, target, program, procedure or work instruction.*

Risk assessment — *Many pollution incidents and disasters could have been foreseen or prevented by assessing risk in advance. Questions to be asked when assessing the likelihood of an environmental impact of an activity or new development include, "What are the worst things that might happen?" and "How do we prevent them from happening".*

Senior Advocate (Champion) — *A General Officer or a Senior Manager at the most senior level of the organisation, who's role is to ensure that environmental objectives and targets for the military sector are developed, resourced and promulgated in all management plans and reviewed annually.*

Senior Management — *Military personnel at the level of General, Senior Commander, and civilians of an equivalent level of authority.*

Stakeholders — see "*Interested Parties*".

STANAG — *Standardisation Agreement*

Sustainable development — *Growth that can meet the needs of the present without preventing future generations from meeting theirs.*

Today's activities should not harm the future. Examples of acting sustainably include avoiding the use of scarce or non-renewable raw materials, preventing pollution and maintaining biodiversity.

Tenant units — *An organisation that is physically located in an entity (e.g., a base), but which reports through a different chain-of-command.*

Targets — see "*Goals, objectives and targets*"

TIVU — *A Danish database which organises data collected during the Initial Review Phase – Tilstandsvurderings Database*

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World Wide Web Sites

www.eea.dk/   European Environment Agency: Reports, articles, brochures and papers, news, stories and latest additions of environmental events calendar for the whole year

www.iso14000.net   Global Environmental Technology Center: ISO 14000 training ISO 14000 implementation, general ISO news and tools to implement ISO 14000

www.doe.ca/envhome.html   Environment Canada's "The Green Lane": Environmental priorities, environmental assessment guidelines, eco-communities, and news releases

www.deb.uminho.pt/fontes/enviroinfo/   Environmental Information Sources: Sustainable development (virtual library), US Dept of Energy Pollution Prevention Clearinghouse, Global Environmental Management Initiative, Centre for Alternative Technology, and Centre for Sustainable Development

www.ifi.co.uk/main.htm   Environmental Business: News, management, compliance guidance, and UK's leading environmental publishing house

cbae.nmsu.edu/~smills/Claymor/e.htm   Environmental Measures: What are environmental measures and who uses them, how companies measure environmental performance and how do companies track environmental measures

www.ofee.gov/   Office of the Federal Environmental Executive: Mission, Environmental Executive Orders, breaking news from White House, best practices, and important meetings

www.quality.co.uk   Environmental Management Systems: Background and history on the development of ISO 14000, benefits of EMSs, ingredients of a EMS and sustainable development

www.csubak.edu/iems   Institute of Environmental Management Systems: Virtual enviro-library, international meetings on the

internet, and environmental internet degree programs

www.cgli.org/environmental.html Council of Great Lakes Industries: Focuses on industrial use of Environmental Management Systems from TQEM to ISO 14000

www.rec.org Regional Environmental Center: Looks at EMS strategies for businesses in Central and Eastern Europe

www.nato.int/ccms Environmental Management Systems in the Military Sector: Describes the pilot study, identifies briefings and reports and Calendar of events

www.wicklow.ie/avoca/ems Environmental Management Systems: What is an EMS? EMS Standards, aspects of an EMS, and implementation

euler.ntu.ac.uk EMS – Nottingham Trent University: Description of need and each aspect of an EMS

www.usserve.us.kpmg.com KPMG: Strategic EMS and how it should be developed

www.nec.co.jp/english/profile NEC Eco Action Plan: NEC (Japan) describes their environmental management activities, focusing on performance measures

www.eutech.co.uk Safety Health & Environment(SHE): Describes a SHE Management System and their implementation

home.mira.net/~mpitcher/ems.html Describes systems standards, general requirements of an EMS and provides an excellent on-line EMS implementation manual.

virtualoffice.ic.ge.ca Canadian Business Environmental Performance Office: Provides an overview of EMSs and provides additional links

www.greenware.ca Greenware Environmental Systems Inc: Provides an overview of ISO 14000, importance of an EMS and describes software that could be used to facilitate implementation

www.iso14000.com This site contains books, journals, newletters, professional articles and links to other sites. A must look!!!!!

www.iso14000online.com.br	Contains news, professional articles and web-based courses pertaining to ISO 14000
www.trst.com	Transformation Strategies: Articles, bookstore, case studies, concepts, gap analysis methods, and an outstanding list of links to other sites. Also, an excellent web questionaire for assessing how well prepared you are for implementing an EMS
www.cutter.com	Cutter Information Corp: Resources for Environment & Business Professionals and they publish ISO 14000 Update each month
www.exit109.com	Frequently asked quesitons about ISO 14000 and links to sites which can provide additional information on EMSs
www.web.net/ecoeco/14000.htm	Ecological Economics: Articles on EMSs and links to other ISO 14000 information
www.scc.ca	Standards Council of Canada: ISO 14000; Can one size fit all? Pressure to develop sector-specific EMS standards
www.gza.net/iso14000	GZA GeoEnvironmental Inc: Strategic environmental management, information management and technology and ISO 14000
www2.getf.org/saic	What is ISO 14000? Discussion on EMSs and path to implementation
web.ansi.org/public/iso14000	ANSI: Press releases pertaining to ISO 14000 and articles related to ISO14000
www.epa.gov	US Environmental Protection Agency: Contains over 400 documents related to EMSs. Also, an excellent source for environmental information from the U.S.
www.region.peel.on.ca	corporate performance measurement
www.ctdol.state.ct.us	overview of performance measurement
nnh.com/ev	performance measurement data analysis
www.nasbo.org/process/peform	performance measurement resource
www.tnworld.com	test & measurement world

www.mcb.co.uk/services/articles performance measurement & organizational design

www.npr.gov/library/papers/benchmrk national performance review

www.tbs-sct.gc.ca   performance measurement by line managers

www.indcom.gov.au   performance measures for councils

www.itpolicy.gsa.gov/mkm/pathways links to measurement websites

www.bja.evaluationwebsite.org performance measurement (justice, but references!)

www.caction.org/glossary   performance measurement glossary

brint.com/wwwboard/messages performance measures