SWEDISH ARMED FORCES

Environmental Guidebook for Military Operations

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Foreword

This guidebook was developed by a multinational working group consisting of representatives from the defense organizations of Finland, Sweden, and the United States. It reflects a shared commitment to proactively reduce the environmental impacts of military operations, and to protect the health and safety of deployed forces.

Any successful military operation begins with sound planning. This guidebook gives operational planners the necessary tools to incorporate environmental considerations throughout the life cycle of the operation. Failure to integrate environmental considerations into operational- and tactical-level planning increases the risk to the health and safety of military personnel and civilian non-combatants. Inadvertent damage to the natural environment or to significant cultural or historic resources also complicates the attainment of the desired strategic end state through the loss of political capital, negative public image, and increased overall cost.

This document does not necessarily reflect the official policies or doctrine of any nation, but represents the combined knowledge and ideas of contributors with significant experience in this area. This document is intended to serve as an environmental guidebook to help troop contributing nations with environmental management responsibilities identify relevant environmental requirements, practices, standards, and preventive measures, with a goal of integrating them into the planning and execution of military operations in a way that enhances the readiness of the force and accomplishment of the overall mission. It provides overarching principles, guidelines, templates, and examples which may be used by operational planners and deployed forces to achieve the overall environmental goals and objectives associated with a military operation. Within the text, links are provided to directly access additional reference material and applicable templates.

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1 Overview

Military operations present unique challenges that are not typically associated with peacetime domestic routines or training activities. Although operational requirements are paramount, the integration of environmental considerations into all aspects of operational planning, training, and execution is essential for maintaining the health and well-being of the deployed troops and the local population. In addition, early environmental planning and continuous risk management is critical for preventing irreparable damage to sites with natural, cultural, and historic significance which degrade or complicate the overall achievement of mission objectives.

Most military operations are characterized by generally recognized phases of varying duration, depending on their nature, intensity, and complexity. In broad terms these phases may be defined as **planning, pre-deployment, deployment (execution and force rotation), redeployment**, and **post-deployment**.

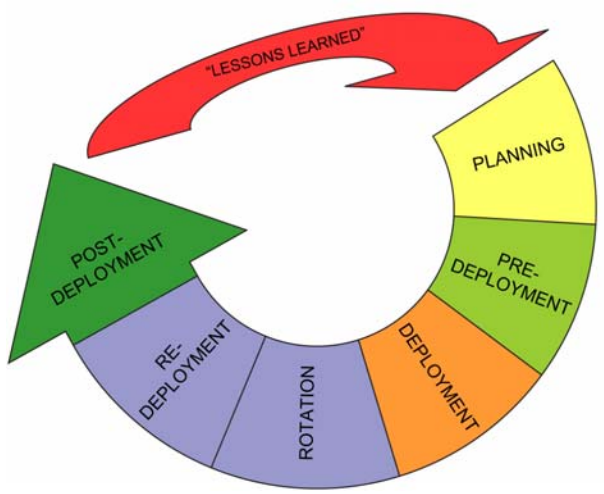


Figure 1:1 Life Cycle of Military Operations

As illustrated in *Figure 1:1*, a truly accurate model for the life cycle of operations also includes the documentation of lessons learned and their integration into the decision making and planning processes for future operations. Thus, operations are not merely the accomplishment of tasks on a linear timeline, but are truly cyclical in nature.

1.1 Commander's Responsibilities

Force commanders are ultimately responsible for the integration of environmental considerations during the training[1] and planning for a military mission, and during the conduct of operations within his/her area of responsibility (AOR). They must demonstrate leadership and promote environmental awareness throughout their chain of command, and ensure that environmental experts within the military staff are involved in every aspect of the operational planning and pre-deployment reconnaissance as well as the mission execution.

Commanders must also ensure that the forces under their command receive the appropriate levels of environmental awareness and technical training. This involves the identification and assignment of clear responsibilities and resources to provide effective and proactive environmental management. An officer with sufficient knowledge and experience in environmental protection should be designated by the commander as the primary point of contact for environmental issues. (*Appendix 1* provides a listing of minimum competency requirements for the Environmental Officer.) This individual's focus should ultimately be the development and implementation of an Environmental Management Plan, with the overall purpose of institutionalizing policy, standards, and procedures throughout the deployed force.

It is particularly important to conduct a training needs analysis during the pre-deployment planning timeframe so that pre-deployment training may be modified or adjusted to address any identified shortfalls or deficiencies[2].

1. Training requirements are discussed in greater detail in *Chapter 3* and *Chapter 4*.
2. This is discussed in greater detail in *Annex C to NATO STANAG 7141 EP (edition 4), Joint NATO Doctrine for Environmental Protection during NATO Led Military Activities*

Environmental Officers need to:

- Know and understand the mission objectives
- Work effectively within the established chain-of-command
- Understand all applicable legal and policy requirements
- Be familiar with general and specific environmental and health protection standards
- Study prior lessons learned
- Lead the environmental planning for mission sustainability
- Ensure initial, current, and final site conditions are accurately and correctly assessed and documented
- Establish and implement an Environmental Management Plan
- Collaborate with other staff, support agencies, stakeholders, and experts
- Maintain and archive pertinent documents and records
- Plan for mission completion and base camp closure
- Know where to get help.

1.2 Environmental Policy

Environmental policy for military operations (by a troop contributing nation, UN, NATO, or other) is typically characterized by a code of environmental stewardship or principles for environmental protection which often includes the following elements:

- The tenet that environmental protection is every individual's responsibility
- Compliance with applicable legal requirements, including international agreements
- Recognition of the importance of environmental planning
- The goal of minimizing environmental damage
- A respect for local environmental standards
- The minimization of waste streams by wisely using raw materials, hazardous substances, energy, water, etc.
- Effective handling and storage of hazardous substances
- Timely response to environmental incidents to mitigate impacts
- Minimizing noise and other safety hazards.

Force Commanders and unit leaders should therefore be aware of all applicable policy, and should define the policy requirements through a

memorandum of intent, published Standard Operating Procedures (SOPs), or other similar directive. Consideration should be given to troop contributing nation (TCN) requirements, multilateral or coalition policy, or force-specific directives. References to all relevant policy should be included in the Operations Plan (OPLAN).

To more fully understand environmental policy statements, refer to the example developed by *EUFOR for HQEUFOR/NHQS*, a peace support operation.

NATO Definition of Environmental Protection (EP):

- Measures and controls to prevent damage and degradation of the environment, including the sustainability of its living resources.

Source: STANAG 2545, 2nd Study Draft, EP Glossary

1.3 Legal Considerations

Compliance with applicable environmental laws and regulations is a necessary cost of doing business, even during military operations. Often national environmental regulations do not specifically apply to forces engaged in military operations in another country. This is not always the case, however, and the extent to which domestic laws and regulations apply extraterritorially will vary from nation to nation. Force Commanders and their designated environmental officers and specialists therefore must make every effort to understand their legal requirements, and examine the applicability of their national law, international law and conventions, and the regulations of multinational or supranational bodies such as the European Union or the United Nations.

2 Operational Planning

Once the political and military decision has been made to participate in a military operation, environmental considerations should be incorporated into each phase of the planning process. The requirement for good, reliable information early in the planning process *(Figure 2:1)* reinforces the value of feedback on environmental issues from previous operations in the form of lessons identified or lessons learned. In addition, information may be gathered from a variety of other sources, including:

- Geographic information systems (GIS) data
- Legal documents (for applicable international agreements, troop contributing nation laws, host nation laws, etc.)
- Interactions with NGOs, host nation authorities or subject matter experts, civil-military cooperation (CIMIC) groups, etc.
- Open source data available on the internet, newspapers, etc.
- Intelligence assets.

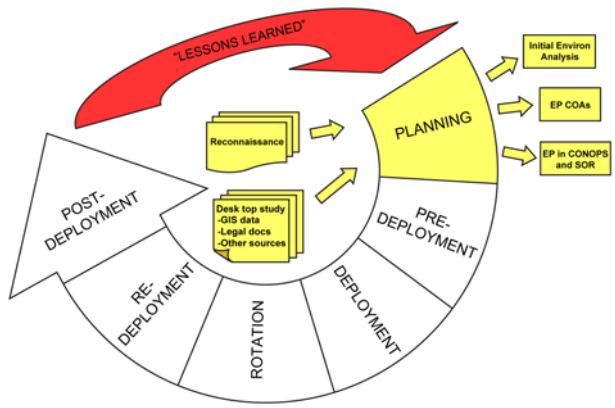


Figure 2:1 Life Cycle of Military Operations for Planning

Incidents during recent operations have reinforced the importance of integrating environmental considerations as early as possible in the operational planning process.

Example 1:

During the initial planning for a recent military mission, intelligence revealed that the scarcity of water was one of the factors that had contributed to the conflict. In response, an initial environmental analysis was performed by the Commander's environmental advisor which not only validated significant concerns regarding the local impacts of increased water consumption, but also highlighted the fragility of the local soil and the likelihood of significant soil damage within the area of operations.

Reconnaissance teams were tasked to follow up on the issue, and as a result a detailed baseline survey of the initial site conditions was carried out with the active participation of the local community. The baseline survey not only documented the existing site conditions, but also pointed out the recent rapid development in the local area and the impending need for viable land for community expansion. As a result, the operational planners could make informed decisions about unique issues and risks that had the potential to complicate the accomplishment of the mission.

Example 2:

While building a defensive soil berm as part of base camp construction, military troops and hired local nationals began to complain of headaches, nausea, and stomach cramps. The symptoms were later found to be caused by contaminated soil from an existing broken underground fuel line which could have been identified had a conventional preliminary site analysis been conducted.

The discovery of contamination after-the-fact meant that the base camp had to be relocated while assessments were performed to determine the extent of the contamination and the increased risk to the troops and the local community from the digging operations. As a result of the incident, troops and local nationals were inadvertently exposed to a health hazard and the mission was negatively impacted by delays, increased cost, and a reduction in troop morale.

2.1 Environmental Analysis for OPLAN Development

Initial environmental analyses are instrumental in facilitating early, informed decision making so that the Operations Plan (OPLAN) and other deliberate planning documents account for known environmental risks and other relevant concerns, such as the protection of significant cultural and historic sites. The initial environmental analysis for the OPLAN typically consists of four key tasks.

Information obtained through desktop study and verified through reconnaissance(recce) may be combined with any environmental and/or health hazard assessments and risk assessments that might have already been done. This becomes the starting 6point for developing environmental considerations in the operational planning process. With this information, the EP officer's first key task is to coordinate with the relevant planning groups and identify and establish the EP **requirements** (e.g., binding international agreements, national or host nation laws, policies) and **limitations** (e.g., logistics, existing infrastructure, geography, and operations tempo) that can affect mission execution.

Tasks for Environmental Inputs into the OPALAN:

- Identify EP requirements and limitations
- Identify who, what, why, and when of EP considerations
- Develop and prioritize EP COAs for the CONOPS and SOR
- Identify EP resources needed.

The second key task is to identify **what** the EP considerations are, **why** they are issues of concern, **who** should be involved in EP actions, and **when** EP actions are likely to occur during the operation.

The third key task is to develop the **"how"** – i.e., develop and prioritize courses of action (COAs), based on what was identified during the second task. The outputs from this task are the environmental inputs to the Concept of Operations (CONOPS) and Statement of Requirements (SOR), which will then be approved by higher authority. In developing COAs, the following factors should be considered:

- Specific characteristics of the deployment area
  - "bare base camp" vs. existing facilities
  - condition of existing supporting infrastructure (e.g., waste water)
- Available resources (manpower, funding, equipment and supplies)
- After-action-reports and lessons learned
- Environmental awareness and technical training required (depending upon the nature, location, and scope of the operation)
- Availability and applicability of contracts
- Local expertise, including labour.

The duration of the operation also has a significant impact on environmentalconsiderations and resources required for environmental sustainability, although it is important to note that **requirements may be event-driven rather than time-driven**.

Duration of the Operation:

- Short-Term. Typically characterized by austere facilities requiring minimal engineer effort, intended for immediate operational use by units. Facilities may require replacement by more substantial or durable facilities during the course of the operation. The medium-term (temporary) standard may be used initially, if so directed by the force commander, to increase efficiency, safety, durability, morale, and health standards.
- Medium-Term. Typically uses temporary facilities, which require a higher level of engineer effort than that required for initial short-term facilities. Medium-term (temporary) facilities generally support more sustained operations, and are intended for replacing short-term facilities in cases where mission requirements dictate. This option should only be considered, however, for special situations since planning and constructing a camp for the long-term situation is probably more beneficial and economical.
- Long-Term. Facilities are designed and constructed with finished materials, and systems are selected with due consideration for (at least) moderate energy efficiency, maintenance requirements, and life-cycle costs.

Even under the most austere conditions, there are minimum environmental standards for the protection of human health and the environment. As the operation stabilizes and resources become more available, the ability to comply with more protective standards will increase in steps, resulting in an overall increase in environmental stewardship, as depicted in *Figure 2:2*. This scalable approach to environmental considerations is critical in the development of flexible courses of action for environmental sustainability, while maintaining minimum environmental standards for the protection of human health and the environment.

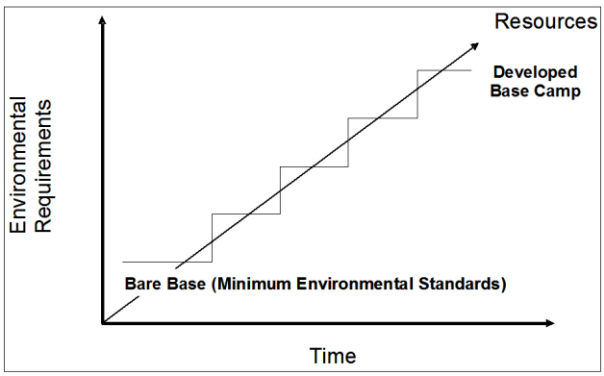


Figure 2:2 Variables Affecting Environmental Considerations

The fourth key task is to use the EP COAs in the CONOPS and SOR to determine the EP resources required for the OPLAN. This includes a recommended "troop to task" list, identifying individuals with first line (primary) responsibility for environmental management during the operation, and the chain of command for environmental issues. Periodic reviews of the OPLAN will ensure that the plan remains valid and will identify changes requiring new guidance, such as SOPs.

3 Pre-Deployment

3.1 Develop the OPLAN Environmental Annex

The Annexes connected with the OPLAN are more detailed planning documents for selected functional areas, and a typical OPLAN includes an annex for environmental considerations. The Environmental Annex should detail the roles and responsibilities for environmental management throughout the operational chain-of-command. In addition to the Environmental Annex, there may be other annexes of interest (e.g., Engineering, Medical, Logistics). An example of an Environmental Annex is provided in *Appendix 2*.

3.2 Pre-Deployment Environmental Surveys

In the pre-deployment phase *(Figure 3:1)*, preliminary surveys should be undertaken prior to troop mobilization and deployment to validate COAs and the OPLAN Environmental Annex and to further document and assess the initial site conditions with respect to health and environmental considerations. Site surveys should, to the extent practicable, be scientifically valid and defensible.

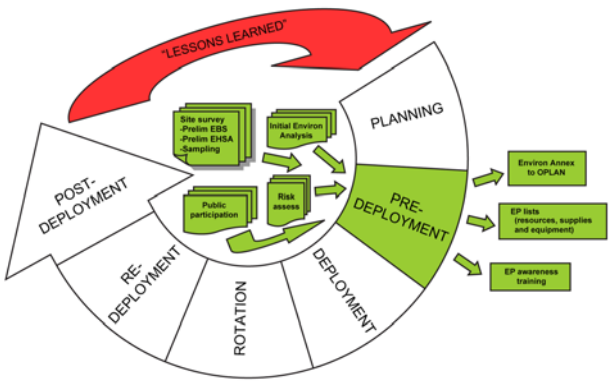


Figure 3:1 Life Cycle of Military Operations for Pre-Deployment

3.2.1 Environmental Risk Management Assessments

Risk management assessments[3] are conducted to identify and quantify the risks to military personnel arising from conditions within the proposed area of operations. They also may determine the extent to which operations may significantly and permanently affect the environment or well-being of the local community. In conducting a risk management assessment, the hazard probability (likelihood of encountering a hazard) and hazard severity (a measure of the impact or consequences of a hazard on the health of individuals or on the mission itself) are displayed in matrix format to determine the hazard risk level, as depicted in *Figure 3:2*.

3. See, for example Headquarters US Department of the Army "Field Manual No.5-19 (100-14) Composite Risk Management" (Washington, DC, 21 August 2006) or US Army Center for Health Promotion and Preventive Medicine (USACHPPM), Technical Guide 248: Guide to Deployed Preventive Medicine Personnel on Health Risk Management.

Operational Risk Management (ORM) Process

1 Identify all actual or potential conditions that can cause injury, illness, or death to personnel; damage to or loss of equipment or property; or mission degradation.
2 Assess the hazards. What is the probability of each hazard? What is the severity? Complete a risk matrix like the one depicted in *Figure 3:2* to determine the level of risk for each hazard identified.
3 Develop controls and make a decision concerning the risks you identified. Controls could be administrative ones, physical controls, or part of risk avoidance.
4 Implement controls. Inform personnel of the risk control measures and how each will be implemented.
5 Leaders and staffs supervise and evaluate the effectiveness of the controls established.

Criteria for determining hazard probability and severity levels should be consistently defined and applied in light of operational contributing factors such as the operations tempo, level of local support, potential for spills and releases, availability of trained environmental personnel, and natural and cultural sensitivities. The analysis may be conducted for a number of actual or potential conditions that could impact the ability to carry out the mission, and is useful in selecting sites for base camps. In the same way, operational activities can be evaluated to determine the potential for causing severe environmental damage. If the risk management assessment indicates areas that could negatively impact the health of the force or local non-combatants, or that may cause environmental damage, recommendations for additional sampling may be included in the report.

HAZARD SEVERITY	HAZARD PROBABILITY				
	Frequent (A)	*Likely (B)*	*Occasional (C)*	*Seldom (D)*	*Unlikely (E)*
Catastrophic (I)	Extremely high	Extremely high	High	High	Moderate
Critical (II)	Extremely high	High	High	Moderate	Low
Marginal (III)	High	Moderate	Moderate	Low	Low
Negligible (IV)	Moderate	Low	Low	Low	Low
	RISK ESTIMATE				

Figure 3:2 Risk Assessment Matrix

3.2.2 Environmental Baseline Surveys (EBS)

A site-specific Environmental Baseline Survey (EBS) should be conducted to document initial environmental conditions. The EBS identifies existing environmental hazards and sensitivities (to determine, for in-

stance, the most suitable locations for base camps), serves as the baseline to examine potential environmental changes resulting from the operation, and may be used to address unfounded claims for pre-existing environ-mental damage. It also provides a tool for assessing the overall sustainability of the site. The **EBS Checklist** provides the main elements of an EBS.

Optimally, the EBS will be conducted during the pre-deployment site recon-naissance, but in any case it should be conducted no later than 30 days after the initial deployment. The EBS should be documented in a written report, maintained throughout the course of the operation, and archived for future reference. A template for the EBS report is contained in *Appendix 3*.

EBS Checklist

General Elements

- Facility description and general Condition
- Adjacent land use, including potential for physical encroachment
- Proposed mission/functions
- Topographic, hydrologic, and geologic features
- Climate and seasonal considerations
- Soil type and land cover
- Climate and seasonal considerations
- Prior uses of the site and adjacent lands (environmental intelligence)
- Sources and condition of water supply
- Electricity
- Sanitary waste treatment and disposal options
- Waste disposal (historic and available options)
- Existing underground and aboveground storage tanks
- Visible signs of potential environmental contamination
- Air quality
- Natural resources
- Historic and cultural resources
- Known disease threats and vectors
- Existence of unexploded ordnance (UXO)
- Legal concerns, including regulatory encroachment
- Overall general assessment of sustainability.

Record of Sampling and Analysis

- Sampling plan, including locations and depths
- Analysis of samples
- Conclusions/recommendations.

Site-Specific Instructions

3.2.3 Environmental Health Site Assessments (EHSA)

Geographical Information Systems

- Where feasible, geo-coding of all information (i.e. providing the information with a geographic location) is essential to be able to use GIS as an analytical tool later on.

The purpose of an environmental health site assessment (EHSA) is to identify environmental, health, and safety conditions that may pose health risks to deployed personnel[4]. Potential exposure pathways through air, groundwater, surface water, soil, sediments, and biota (including vectors) are identified and analyzed. In most cases, the EHSA will involve some degree of sampling and analysis to characterize potential exposure pathways. Sampling and analysis data may be used to conduct environmental health risk assessments as a part of operational risk management. The EHSA is a written report, maintained throughout the course of the operation, and archived for future reference.

In light of the interrelationship between elements of the EBS and EHSA, combining site reconnaissance for the two reports is advisable, and their execution should be closely coordinated. *Figure 3:3* highlights the common features of the EBS and EHSA.

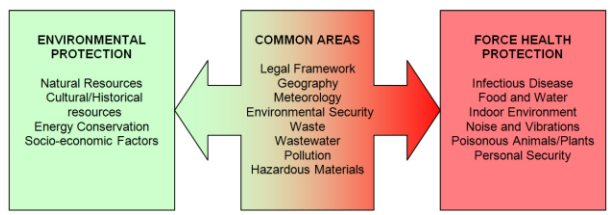


Figure 3:3 The Interrelationship Between Environmental and Health Considerations in Operational Planning

4. Because the focus of this guidebook is on environmental aspects, an *EHSA template* is provided as a hyperlink, but is not discussed in detail in the text.

3.2.4 Site Sampling

Ideally, environmental sampling should be performed during the pre-deployment surveys to acquire quantitative data to be used in risk assessments. A detailed site-specific sampling and analysis plan should try to maximize the collection of useful data in light of available (constrained) resources. Any adjustments or limitations in executing the sampling and analysis plan should be noted. A sampling plan must answer the following questions:

- What is the purpose of the sampling?
- What substances are we looking for, and why?
- How will the data be used?
- What are the sampling and testing protocols?
- What quality assurance and quality control measurements (QA/QC) are sufficient and appropriate?

General sampling guidance provided in the *US Army Engineer School guide to environmental baseline surveys* and the *US Army Center for Health Promotion and Preventive Medicine (USACHPPM)'s Technical Guide 251* might be useful when developing a sampling and analysis plan.

The large number of samples typically required for statistically valid[5] results may not, however, be achievable within a military area of operations. It is therefore essential to ensure that all sampling is conducted by sufficiently trained and experienced professionals to minimize uncertainties in the results due to operational circumstances. (See *Appendix 1* for general minimum competency requirements.) Several nations have chosen to develop and train special units (i.e. environmental monitoring teams), deployed specifically to perform environmental sampling.

3.2.5 Outreach

When operations are conducted under permissive entry conditions, it is often beneficial to invite the host nation, including regional and local community leadership and experts, to participate in base camp planning, environmental surveys, and any subsequent follow-on assessments.

Consideration might also be given to the possibility of environmentally-related CIMIC work, such as the transfer of environmental infrastruc-

5. See for instance: Kieth L. H., "Environmental Sampling- A summary" Environ. Sci. Technol., Vol.24, No.5, pp 610 – 617, 1990

ture and equipment to the host nation. It is, however, critical that any project – whether it is a longer-term commitment or a Quick Impact Project (QIP) – is carefully planned, coordinated, evaluated, and conducted on the basis of "do no harm" and "build back better."

Selected Potential Environmental Impacts of Military Operations (Positive and/or Negative).

- Use of wastewater from base camps for human, livestock or commercial use in arid areas
- Secondary market for solid waste
- Improved infrastructure
- Road construction leading to modified drainages and flooding
- Increased security around a base camp leading to greater natural resource use by displaced populations
- Over extraction of groundwater for base needs, leading to water shortages for neighbouring residents
- Placement of a camp on productive lands, forcing local populations to use land more liable to erosion and degradation.

Clearly military operations face a number of challenges to incorporating community involvement, including force protection concerns, an inability to locate appropriate local experts, cultural differences, and language barriers. The World Bank Participation Sourcebook describes numerous helpful tools to encourage and facilitate community involvement; a range of participatory tools are documented in Appendix I of the Sourcebook[6]

3.3 Environmental Considerations in Base Camp Planning

Base camp planning is influenced by a variety of factors, such as the type of operation, duration of deployment, size of troop contingent, geography (i.e. part of the world), other nations' involvement in the deployment, and contributions from other organizations and contractors. As the preliminary planning work on the base camp layout progresses, it

6. The World Bank (1996) The World Bank Participation Sourcebook. (http://www.worldbank.org/wbi/sourcebook/sbhome.htm)

is important for the Environmental Officer to be involved in this work. S/he will help articulate and integrate concerns involving force health protection, local health protection, and environmental sustainability considerations in the camp planning, within the confines of available resources and the nature of the military operation. In the site selection and layout of a camp, consideration needs to be given to future liability assigned as a result of agreements on the use of that land.

Examples of such considerations include:

- Safety and security
- Location of "clean" versus "dirty" areas (e.g., hazardous materials storage areas, fuel farms, generators, waste management facilities, wash racks), and placing dirty areas away from living and working areas
- Protection of potable water sources and facilities (which should be located within the camp)
- Drainage and erosion control
- Location of toilets and ablution facilities close, but not too close, to living and dining facilities
- Ability to protect natural and cultural resources, including ecologically sensitive flora and fauna, and archaeological sites
- Location of noise-generating activities away from living areas
- Existence and proximity of external environmental influences (e.g. industrial areas close to or downwind of the deployment site)
- Sustainability (room for expansion of the camp or functions within the camp, potential encroachment impacts)
- Resource conservation and adaptability to the local environment
- Procurement.

Establishing a base camp can be viewed as an incremental process, as illustrated in *Figure 3:4*.

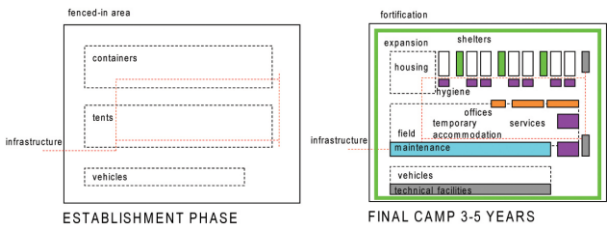


Figure 3:4 Sample Base Camp Layout: Initial and Final Phases

Each of these planning elements should be revisited during troop mobilization as plans begin to be translated into action. As time and resources allow, additional consideration can be given to the aim of a "zero footprint camp"[7], in the interests of enhanced safety and security as well as environmental protection.

3.4 Environmental Planning for Mobilization

As the force prepares to mobilize, environmental officers and planners should identify environmentally related supplies and equipment required to support the mission in light of the OPLAN's Environmental Annex, reports from site reconnaissance or pre-deployment site surveys, intelligence assessments, and known facts about existing conditions in the deployment area. Guidance on supplies and equipment is often provided in military field and technical manuals, technical papers, after action reports, and reports of lessons learned. Equipment lists should be cross-checked against what is scheduled for shipment. (Examples of supply and equipment lists are contained in *Appendix 4*.)

Environmental planners should also work closely with engineers and logisticians to determine the extent to which resources (manpower, funding, equipment and supplies) are available for environmental protection, and identify the limitations and constraints of those resources. These include both unit-owned resources and those that could be obtained through local purchase.

It is also important to determine the environmental awareness and technical training required to support the operation prior to mobilization. This will likely be dependent upon the nature, location, and scope of the operation. Units may require technical training in areas such as proper spill prevention, waste disposal, pesticide usage, and hazardous materials management in order to maintain good environmental stewardship.

Environmental planning for force mobilization should also include the identification of relevant contracts, contracting officers, and contract managers. Planners should assess the availability and applicability of contracts and the specific capabilities of the contractors. They should also work closely with contracting officers and contract managers to ensure that environmental considerations are included in all relevant service and support contracts, and that provisions are made for monitoring contractor compliance.

7. The Zero Footprint Camp (ZFC) is a concept developed in the United States to improve overall force readiness by reducing the logistics footprint, improving force protection, and minimizing environmental impacts from base camp development.

3.5 Environmental Awareness Training and Education

Environmental awareness training should be pragmatically incorporated into existing national military personnel training programs through individual, collective and continuing education. NATO provides a concise summary of considerations for routine environmental training and education in STANAG 7141 EP (Edition 4), *Joint NATO Doctrine for Environmental Protection during NATO Led Military Activities*, *Annex C: Environmental Training and Education*.

Time should be allocated during pre-deployment for training on environment and health to ensure an understanding and commitment to act in an environmentally responsible way. The approach taken to environmental education will either guarantee its acceptance or ensure its failure. A mixture of approaches employing the concepts of individual responsibility, good military practice, and global responsibility will most probably be required. It is particularly important to conduct a training needs analysis during the pre-deployment planning timeframe so that pre-deployment training may be modified or adjusted to address any identified shortfalls or deficiencies.

Individualized training should be varied in length and degree of specificity, depending on the rank and responsibilities of the personnel. At the command level, awareness training should focus on how the environment can impact mission execution. Elements of this can include:

- Critical environmental and health considerations
- Mission-oriented legal requirements and responsibilities
- Environmental budget, mandate, resources
- The importance of environmental leadership at the command level
- Familiarization with the OPLAN Environmental Annex.

In addition to the information provided to the command level, the Environmental Officer's training should focus on:

- Environmental Protection and resource conservation
- Mission-specific requirements, tools, and resources
- How to create an Environmental Management Plan
- Network of available resources, including contractors
- EP link to other sectors of the deployed force
- Responsibilities for environmental training of other deployed personnel.

This information can be provided in the form of briefings, as well as on CD-ROM, complete with references.

Environmental awareness training given to all personnel should emphasize:

- EP as a personal/professional responsibility
- Job-specific EP SOPs and Best Management Practices (BMPs)
- Location-specific training (e.g., about environmentally sensitive sites, cultural and historic sites, natural resources).

Hand-outs summarizing this information (such as laminated cards and posters) can be provided, ideally in each deploying nation's language (when part of a multinational operation).

4 Deployment

For the purposes of this guidebook, the term “deployment” entails all activities during the physical execution of the mission in the area of operations. This chapter provides guidance for effective environmental management throughout the deployment, through the development and implementation of an Environmental Management Plan.

4.1 Development of an Environmental Management Plan (EMP)

Once troops are deployed, it is important to establish and continuously communicate the roles, responsibilities, and standards for effective environmental management, and to maintain records of site assessments, decisions made in the field, environmental incidents, and specific actions taken. The creation and periodic updating of such a deliberate, written EMP is essential. This plan is, in fact, a consolidation of multiple programs, procedures, and plans that are integrated both horizontally and vertically within the overall mission execution. The EMP must be approved by the force commander.

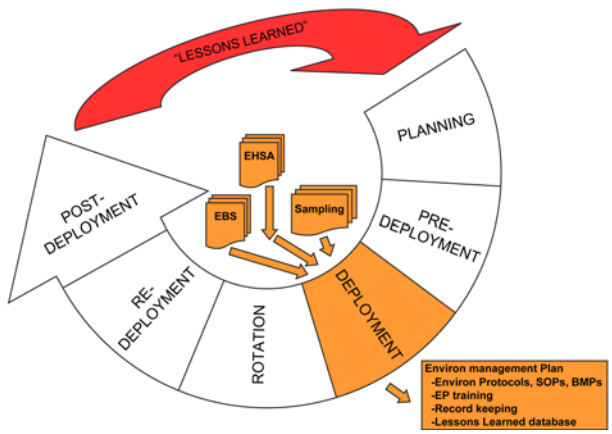


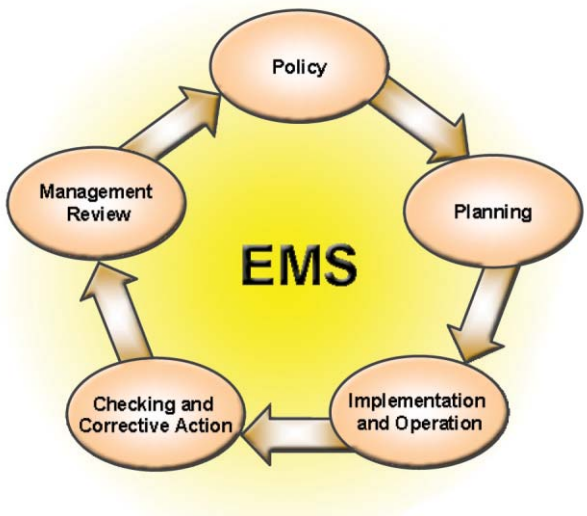
Figure 4:1 Life Cycle of Military Operations for Deployment

There are numerous reasons for establishing and maintaining a written EMP throughout the course of a deployment:

- **Facilitates participation and support from higher level leadership.** A written, comprehensive plan that cites specific legal, regula-

tory, and OPLAN requirements, and documents the responsibility of the force commander for environmental leadership, stewardship, and awareness will encourage support and participation at the highest possible level.

- **Incorporates the general principles of an Environmental Management System (EMS), an internationally recognized model.** While the purpose and nature of most military deployments are not conducive to operating within the construct of a formal EMS, the writing and implementation of an EMP serves to promote EMS-like objectives, and therefore adds environmental "credibility" to the mission.



- **Defines, standardizes, promulgates, and communicates environmental standards, BMPs, and SOPs.** During a military mission, operational and tactical objectives often outweigh environmental considerations, and full observation of/compliance with procedures for environmental protection may not be feasible. It is therefore important that environmentally sound and achievable standards are considered, defined, adopted, and communicated with all members of the deployed force during the various phases of the operation. As the nature and intensity of the mission evolve, the EMP will help the force commanders, engineers, medical personnel, etc. in making informed decisions toward the adoption of increasingly protective standards, procedures, and equipment.
- **Serves as a guidebook for inexperienced personnel.** It is not uncommon for military personnel to be assigned duties for which they have no formal training or experience. The EMP will help inexper-

ienced action officers to better understand the tasks associated with their assigned duties and the rationale behind the tasks.

- **Provides a venue for the transfer of records and documents during rotations of forces.** For further discussion, see *Chapter 5*.
- **Helps resolve or prevent future legal actions.** The documentation of initial site conditions, environmental incidents, and mitigating actions taken is often instrumental in the prevention or resolution of disputes or claims associated with the operation.
- **Provides historic documentation for use during compound closure and turn-over.** For further discussion, see *Chapter 5*.

4.2 Elements of an Environmental Management Plan

An effective EMP must be "signed" (approved) by the Commander and should include, at a minimum, the recommended elements, as described below.

4.2.1 Environmental Roles and Responsibilities

The EMP must emphasize that the Commander of assigned forces – whether as Commander of an allied mission, a multinational operation, a national military, or a subordinate command – is ultimately responsible for the integration of environmental considerations into the planning and overall execution of the mission. In addition, other specific roles and responsibilities for environmental management should be assigned and institutionalized in the EMP.

Suggested Elements of an Effective Environmental Management Plan:

- Environmental Roles and Responsibilities
- Environmental Management Board
- Applicable Environmental Protocols, SOPs and BMPs
- Training Requirements and Training Deficiencies
- Reporting, Recordkeeping & Archiving
- EMP Evaluation and Updating Process.

An Environmental Officer should:

- Serve as the primary point of contact for environmental matters
- Manage the development, evaluation (audits) and oversight of the EMP
- Staff environmental planning, decisions and actions through other key command and staff members, as well as other troop contributing nations, and coordinate monitoring, evaluation, assessment, and review
- Provide feedback and recommendations to the Environmental Management Board (see next section).

In addition, the EMP should consider, if applicable, the roles and responsibilities of the Force/Unit Commander, Staff Engineers, Staff Judges Advocate, Staff Medical Officer, Logistics Directors, Safety Officers, Contracting Officers, etc. It should specifically address the parties responsible for the incorporation of environmental considerations into all support contracts (consistent with all applicable standards, regulations, and the EMP itself), and for monitoring, evaluating, and enforcing contractor compliance[8].

4.2.2 Environmental Management Board

This section of the EMP designates the chairman, members and functions of the EMB[9]. The EMB should be established as early as possible in the deployment process in order to integrate all environmental actions under a single authority (the Force Commander), assist in the mission analysis process, and ensure a unity of effort for environmental protection activities. The EMB, which could logically be chaired by the Force Engineer (or equal), advises the Force Commander in establishing policies, procedures, practices, priorities and overall direction for environmental management requirements. Some of the functions of the EMB include:

- Determination of applicable standards
- Identification of resources
- Oversight of environmental actions

8. Documents that spell out specific environmental responsibilities for different personnel include: Annex B to NATO STANAG 7141 (ed 4) Joint NATO Doctrine for Environmental Protection During NATO Led Military Activities; SOP HQ ISAF III, chapter 10, section 520 (SOP DI 10520 v0.1), paragraph 7.e.; and the US Air Force Handbook 10-222, Vol. 4, Environmental Guidelines for Contingency Operations Overseas (1 March 2007), Section 1.5
9. ISAF SOP DI 10520-B vol. 1 contains a sample structure for an EMB as well as examples of environmental SOPs and BMPs.

- Evaluation of environmental programs
- Review of internal and external audits
- Oversight and review of environmental contracts.

The frequency with which the EMB should meet is at the discretion of the Force Commander and the EMB members. However, it is recommended that during the early stages of the operation, meetings occur fairly frequently (perhaps every other week); as systems and processes become institutionalized, the frequency of its meetings will likely diminish.

Suggested EMB Membership:

- Environmental Officer
- Force/Unit Commander
- Legal
- Medical
- Engineering
- Logistics (water, fuel, waste management)
- Real Estate
- Contracting Officer
- Public Affairs
- Financial
- Key equipment & plant operators (as necessary)
- Civil-military (if necessary)
- Troop Contributing Nation(s) (if multi-national force).

4.2.3 Applicable Protocols, Standard Operating Procedures (SOPs) and Best Management Practices (BMPs)

The EMP should contain the environmental protocols and a complete listing of applicable environmental SOPs and BMPs. Applicable environmental protocols should be determined by balancing environmental requirements, the duration of the deployment, and resources available. In addition to the requirements of existing international agreements, minimum environmental standards for the protection of human health and the environment must be enforced.

In order to determine applicable standards[10], the following should be considered for each environmental protocol:

- International agreements
- Solid Waste
- Hazardous Waste
- Medical Waste
- Hazardous Materials/POL
- Air Pollution
- Potable/Non-Potable Water
- Noise
- Natural Resources
- Cultural Resources
- Pesticide Management
- Spill Response.

Conservation opportunities to reduce the overall environmental impact of base operations should also be considered. In order to demonstrate environmental stewardship, deployed forces must plan for energy conservation to minimize the impact or resource drain on the surrounding community. The EMB should consider an energy conservation policy with achievable goals to save energy and manage waste generation through: reduction (minimization), reuse, and recycling. The goals of a conservation program in the EMP may include:

- Eliminating energy waste in existing facilities
- Increasing energy efficiency in renovations and new construction
- Reducing dependence on fossil fuels through the use of wind and/or solar power
- Conserving water resources.

10. See, for example, NATO STANAG 2982, Essential Field Sanitary Requirements; NATO STANAG 7102, Environmental Protection Requirements for Petroleum Facilities and Equipment; NATO STANAG 7141, Joint NATO Doctrine for Environmental Protection During NATO Led Military Activities; NATO STANAG 2510, Joint NATO Waste Management Requirements during NATO-led Military Activities, NATO AMedP-3, Chemical Methods of Insect and Rodent Control; US Air Force Handbook, 10-222, Vol. 4 (1 March 2007), Environmental Guidelines for Contingency Operations Overseas; US-Republic of South Africa Environmental Security Working Group Project, Guidebook on Environmental Considerations during Military Operations (Publication ESWG/006, June 2006); United Nations Department of Peacekeeping Operations, Environmental Policy for UN Field Missions and Environmental Guidelines for UN Field Missions (draft version, March 2007)

It is important to be cognizant of the impact the force will have on the availability of resources to the local population that is being supported. In developing countries and countries that have experienced significant turmoil (natural or man-made), how the deployed force conserves or wastes energy can impact the local population's perception of that force and can affect overall mission success.

Figure 4:2 illustrates the generic process for establishing, executing and reviewing appropriate actions for any type of environmental consideration (protocol). Thus, for each protocol (e.g., wastewater, air pollution), the first step is to identify its characteristics (the type and how much will be generated/consumed/required), the types of supplies and equipment that will be needed, options available for treatment and disposal, and potential sources/suppliers. All of these help determine the source characterization. In certain circumstances, environmental testing may be required to properly characterize a specific environmental consideration (protocol). The EMB then determines the applicable standards and identifies what resources are available, resulting in a recommended course of action.

As the action is executed, it is vital that good documentation be maintained and reviewed in order to help update the EMP. Compliance is monitored through the use of checklists, audits, and sampling. Through routine compliance monitoring, it is possible to identify whether the course of action fulfils all requirements or whether adjustments need to be made. Such feedback goes to the EMB, which can then recommend any necessary changes to the process. These changes may take on many forms, such as modifying the applicable standards, changing the recommended environmental actions to a higher environmental standard or BMP, or minimizing the waste stream or consumption requirements. This simple process follows the general requirements for an Environmental Management System and is designed for continual improvement in environmental considerations and stewardship.

Table 4:1 may be useful as a guideline in selecting the most appropriate approaches for the protection of the environment and human health, and in identifying minimum essential equipment and training.

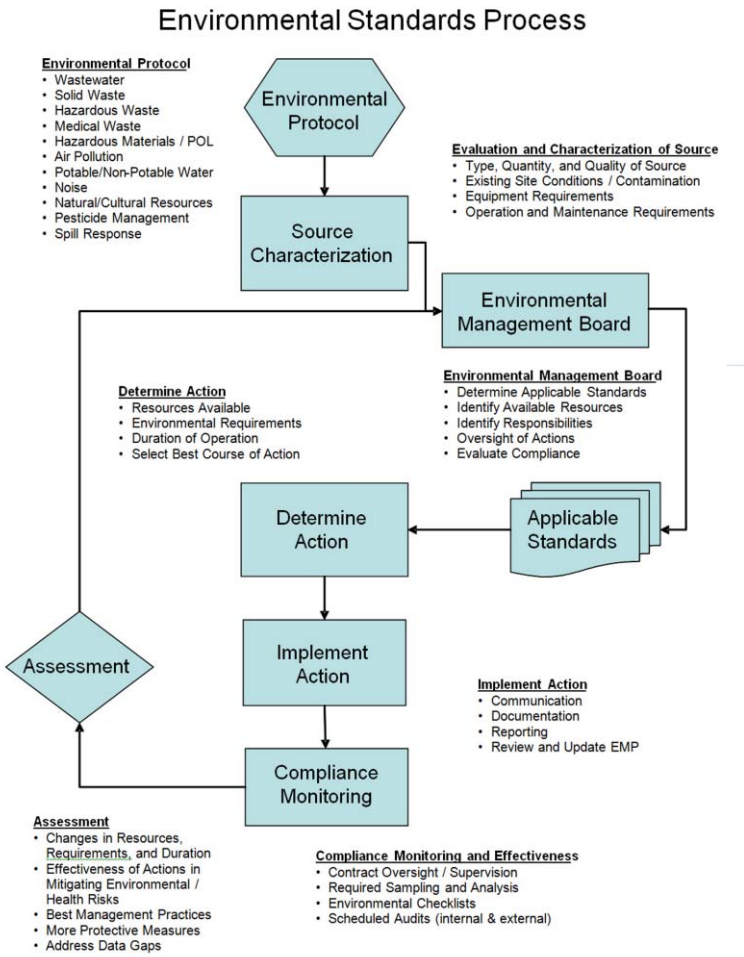


Figure 4:2 Environmental Standards Process

Table 4:1 Considerations for Environmental Protection

Environmental Protocol	Duration of Operation		
	Short-Term	**Medium-Term**	**Long-Term**
Wastewater – Black (human waste)	Field expedient methods: burn barrels, slit trench, pit latrines, and chemical toilets (contracted disposal).	Field expedient methods, chemical toilets (contracted disposal), semi-permanent latrines, facultative ponds/lagoons, municipal or camp WWTP (primary & secondary treatment). Sewage Sludge: Contract off-site disposal, land apply, or compost.	Chemical toilets (contracted disposal), semi-permanent latrines, facultative ponds/lagoons, municipal or camp WWTP (primary & secondary treatment with disinfection). Sewage Sludge: Contract off-site disposal, land apply, or compost.
Wastewater – Gray	Field expedient methods: evaporation beds, soakage pits, and French drains.	Field expedient methods: evaporation beds, soakage pits, and French drains. Facultative lagoons, municipal or camp WWTP (primary & secondary treatment).	Facultative lagoons, municipal or camp WWTP (primary & secondary treatment with disinfection).
Solid Waste	Field expedient methods: burn pits, bury-in-place, back-haul/retrograde.	Engineered landfill, incineration, recycling, composting.	Field expedient methods: burn pits, bury-in-place, back-haul/retrograde. Engineered landfill, incineration.
Hazardous Waste	Field collection, consolidation, storage, segregation, secondary containment, labelling. Retrograde.	Centralized collection, consolidation, storage, segregation, secondary containment, labelling. Retrograde or disposal in compliant HW facility.	Centralized collection, consolidation, storage, segregation, secondary containment, labelling. Retrograde or disposal in compliant HW facility-
Medical Waste	Field collection, consolidation/storage, segregation, labeling, and retrograde, autoclave.	Contract off-site disposal, retrograde, two-stage incinerator.	Contract off-site disposal, retrograde, two-stage incinerator.
Hazardous Materials / POL	MSDS, segregation, safety, secondary containment, HAZCOM/HAZMAT training, HAZMIN.	MSDS, segregation, safety, secondary containment, HAZCOM/HAZMAT training, HAZMIN.	MSDS, segregation, safety, secondary containment, HAZCOM/HAZMAT training, HAZMIN.
Air Pollution	Minimize open fires/burning, dust suppression.	Control open fires/burning, dust control and suppression.	Compliant generators, aqueous solvents, proper vehicle maintenance. Minimize emissions and traffic.

Environmental Protocol	Duration of Operation		
	Short-Term	Medium-Term	Long-Term
Potable/ Non-Potable Water	Bottled water, wells, field expedient methods, water treatment system, and municipal water systems.	Bottled water, wells, field treatment methods, water treatment system, and municipal water systems.	Bottled water, wells, water treatment system, and municipal water systems.
Noise	Field expedient methods: sand bags, earthen berms, vehicles, or other physical barriers.	Field expedient methods: sand bags, earthen berms. Construction of physical barriers, distance/relocation.	Engineered sound proofing/physical barriers, centralized generator farms, low-noise generators.
Natural/ Cultural Resources	Obtain lists, survey base camps, limit impacts, avoid/ minimize damage due to mission requirements.	Obtain lists, survey base camps, limit impacts, avoid/ minimize damage due to mission requirements. Consider a natural and cultural resources management plan.	Obtain lists, survey base camps, limit impacts, avoid/ minimize damage due to mission requirements. Consider a natural and cultural resources management plan.
Pest Management	Use approved pesticides, record pesticide use, follow HAZMAT guidelines.	Use approved pesticides, record pesticide use, follow HAZMAT guidelines.	Integrated pest management plan using approved pesticides. Record pesticide use, follow HAZMAT guidelines.
Spill Response	Unit SOP, spill response plan, equipment and reporting. Field expedient secondary containment	Unit SOP, spill response plan, equipment and reporting. Interim spill prevention and control containment structures .	Semi-permanent spill containment structures. HAZMIN. Regular inspections. Spill prevention control and countermeasures pla.n

4.2.4 Training Requirements and Training Deficiencies

The EMP specifies the types of environmental training (general education, technical, awareness, etc.), stipulates who is to be trained, and documents deficiencies that have been identified. In addition to normal pre-deployment environmental awareness and technical training (outlined in *Chapter 3*), additional training needs to be accomplished after deployment as new equipment, processes and situations dictate. It is also important to assess any training deficiencies and new requirements in order to prepare rotational forces for their deployment. Training for rotational forces should focus on the unique environmental challenges associated with the deployment. Environmental lessons learned may

identify training deficiencies and dictate additional training requirements.

Examples of Types of Documents to be Archived

- EBS/EHSA
- Incident reports
- Monitoring logs/reports (checklists)
- Sampling and analysis data
- Compliance assessments
- Hazardous materials inventories
- Pesticide usage records
- Waste management records (hazardous, medical manifests)
- Lessons learned
- Environmental contracts
- Natural and cultural resources management plan
- Environmental log.

4.2.5 Reporting, Recordkeeping and Archiving

The EMP stipulates the type of records to be kept, by whom, and where. Accurate documentation of existing conditions, incidents, and actions taken is essential for the well-being of the deployed troops, continuity during rotation of forces, addressing claims, and facilitating final base camp closure. These records should be maintained, updated, and archived in an accessible and logical format.

The central repository for recordkeeping and the duration of record retention will vary depending on the type of document, as determined by the EMB. For example, a daily log of activities may be kept at the unit level, but for reporting up the chain of command and for purposes of the effective rotation of forces, these daily logs could be summarized in quarterly reports, which would then be retained for a period of time as determined by the EMB. The central repository for recordkeeping should also include a lessons learned database. Important lessons learned categories are listed and an example of a structure for a lessons learned database is presented in *Chapter 6*.

The EMP should:

- Address how units are to report incidents up the chain of command. Unit SOPs, field guidance, and the OPLAN Environmental Annex may be used to determine reporting thresholds.
- Address how the EMB reviews and evaluates incident reports. A template for an incident report is provided in *Appendix 5*, while *Appendix 6* offers a template for an environmental condition report (ECR).
- Include guidance for maintaining environmental logs (an example is contained in *Appendix 7*). An environmental log can be a good management tool for a unit to determine and assess its environmental program.
- Provide guidance for documenting lessons learned. Incident reports, daily logs, and quarterly reports can be excellent sources for the identification of lessons learned.

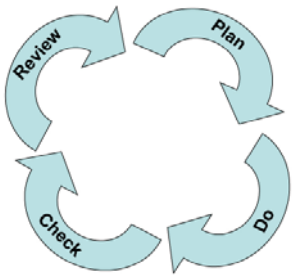
4.2.6 EMP Evaluation and Updating Process

This section should describe the frequency and re-approval process for the EMP. The evaluation process of the EMP is critical to ensure the plan is kept current and responsive to changing environmental requirements, as well as reflect current policies, goals and conditions. This dynamic equilibrium is maintained through continuously evaluating standards and procedures in light of changes in available resources, mission requirements, and mission duration. The review of results will identify the effectiveness of actions in mitigating environmental/health risks. Data gaps and deficiencies in environmental protection measures, as well as new requirements, should be identified in order to adjust or update environmental policies and procedures. Scheduled audits (internal and external) will facilitate the implementation of more effective SOPs, BMPs, and administrative controls.

The evaluation process may include:

- Environmental Management Structure
  - Contract Oversight/Supervision Procedures
  - Education and Training
  - Environmental Awareness
- Sampling and Analysis Requirements and Frequencies
  - Potable/Drinking Water
  - Wastewater Discharge
  - Hazardous Waste Characterization
  - Ambient Air Sampling
  - Noise Monitoring
  - Groundwater and/or Surface Water Runoff Monitoring.
- Environmental Checklists[11]
  - Hazmat Management and Storage
  - Accumulation Point
  - Water/Wastewater Management
  - Pesticide Management
  - Motor Pool/Vehicle Maintenance Areas
  - Fuel Storage Area
  - Environmental Supplies and Equipment (e.g., Spill Response, Field Analysis Material, Reference Books).
- Plans and Exercises
  - Spill Response
  - Emergency Notification.

11. See, for example, within the US Air Force Handbook 10-222, Vol. 4, (1 March 2007), attachment 4 (accumulation point checklist) as well as references throughout this handbook to checklists that can be used depending on the phase of the operation. In addition, there are checklists hyperlinked to this guidebook for: field environmental science officer (USACPHHM Technical Guide 202); field sanitation team; preventive medicine measures for company-size units; pollution prevention; environmental compliance; bulk fuel facilities; bulk and retail petroleum handling; motor pool; pesticide storage; noise survey; water point inspection; water container inspection; and shower-decontamination point inspection.



The updating process is not stagnant; it is on-going, relying on constant monitoring, evaluation and feedback to the EMB. Based upon the feedback, the EMB updates the EMP. In preparation for the rotation of forces, the out-going and in-coming environmental officers should jointly review and update the EMP. Further guidance, including a checklist for actions in preparation for the rotation of forces, is provided in *Chapter 5* of this guidebook.

5 Rotation of Forces, Redeployment, Site Transfer, and Site Closure

For the purposes of this guidebook, "rotation of forces" means the relief in place / transfer of authority (RIP/TOA) of forces by the same troop contributing nation. "Redeployment" means the termination of a nation's mission or the RIP/TOA from one troop contributing nation to another troop contributing nation. "Site closure" is defined as the transfer of property from the troop contributing nation back to the host nation. "Site transfer" (in *Figure 5:2*) refers to the hand-over of property from one troop contributing nation to another.

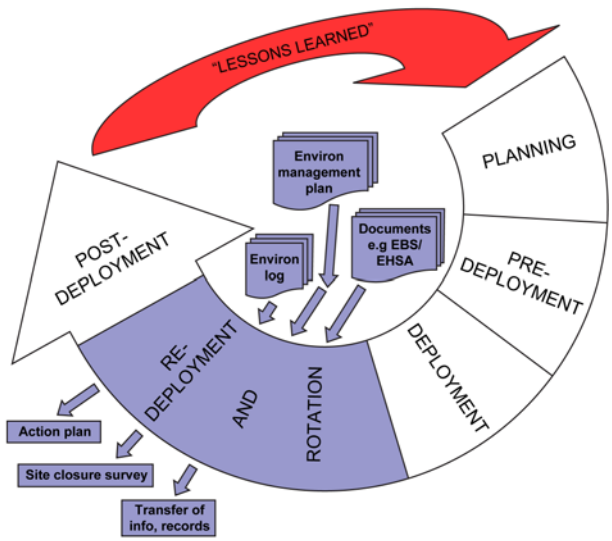


Figure 5:1 Life Cycle of Military Operations for Redeployment, Rotation, and Site Closure

In preparation for the aforementioned actions, the Environmental Officer or designated Unit Environmental Point of Contact should prepare to transfer key information and responsibilities to his/her replacement or host nation. Incoming and out-going Environmental Officer deployments should overlap for a sufficient amount of time, if possible, in order to transfer important files, documents, agreements, logs, OPORD Annexes, SOPs, Commander's Guidance, contracts, etc., and to discuss any current and past significant environmental issues. *Table 5:1* is provided to assist in completing the basic tasks.

Table 5:1 Checklist for Information Transfer by Environmental Officers during RIP/TOA

Tasks	Rotation of Forces	RIP/TOA & Site Transfer	TOA & Site Closure
Review & Validate Roles & Responsibilities	X		
Update & Confirm Members of Environmental Management Board	X		
Review Applicable Environmental Standards and OPORD Environmental Annex	X	X	
Review & Update Standard Operating Procedures	X	X	
Review & Update Environmental Management Plan / Best Management Practices	X	X	
Review Requirements for & Identify Deficiencies in Environmental Awareness Education & Training	X		
Review EBS/EHSA	X		
Review Reporting, Recordkeeping, and Archiving	X	X	
Review Lessons Learned	X	X	
Review Contracts	X		
Update EBS	TBD	X	
Disposition of Hazardous Materials/Waste[1]		X	X
Disposition of Solid Waste[2]		X	X
Disposition of Reusable Materials[3]		X	X
Terminate Contracted Services[4]		X	X
Close Waste Disposal Sites[5]		TBD	X

Tasks	Rotation of Forces	RIP/TOA & Site Transfer	TOA & Site Closure
Close POL Areas[6]		TBD	X
Conduct Environmental Site Closure Process (Assessment & Action Plan)[7, 8]			X

a) All hazardous material should be packaged according to international standards and laws in approved containers and properly disposed of or transferred (hazardous waste, excess hazardous material, medical waste/supplies, pesticides, etc.).
b) All solid waste should be collected and properly disposed of.
c) All reusable materials (metals and scrap metal items, wood, cardboard, glass, plastic bottles, etc.) should be collected and turned in through supply channels for reissue or recycling where feasible.
d) Contracts for services related to environmental management (waste management, water treatment, wastewater collection and treatment, etc.) should be terminated and all equipment provided by contractors removed from the site and the area cleaned of any trash and hazardous materials.
e) Disposal sites such as soakage pits, open latrines, solid waste pits and burn pits should be shut down, cleaned out when possible, or covered and marked.
f) Fuel bladders, blivets, secondary containment liners and associated fuel distribution equipment should be removed and any known contamination cleaned up per applicable national or coalition standards.
g) The environmental conditions at the base camp area should be assessed and the requirements (Action Plan) and/or extent of remediation actions (Environmental site closure process) should be identified.
h) If not previously decided, consideration should be given to the possibility of environmentally-related CIMIC work, such as the transfer of environmental infrastructure and equipment to the host nation.

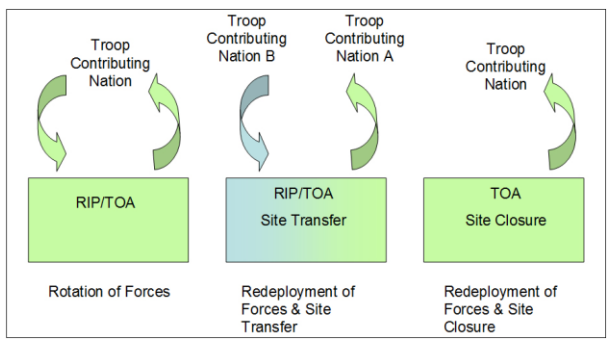


Figure 5:2 Information Flow during RIP/TOA

5.1 Environmental Site Closure Process (Assessment & Action Plan)

Once the decision has been made to redeploy forces and close or transfer a site, the planning for the site closure should begin. The process for assessing the final environmental condition of a site is inherent to the process for the transfer and closure of a camp, and will therefore be discussed under the umbrella of "environmental site closure." A site closure plan is developed to meet the established redeployment date. The environmental closure planning can be aided by the example checklist provided in *Appendix 8*.

It is important to remember that site closure and transfer to the original owner or to another nation as part of the force redeployment affects both parties. Unnoticed or undocumented contamination could influence future land use and lead to unforeseen liability issues. It is therefore essential to properly assess and document the final condition of the site as part of the redeployment and camp closure process to determine the extent to which the site was damaged by the force and if there are legal or health and safety concerns and obligations.

If an initial EBS was not performed, complications are likely to arise regarding pre-existing contamination at the site. In this situation, the owner or receiving nation may seek compensation or corrective action for environmental damage such as contamination. As such, the thorough and accurate assessment and documentation of the initial site conditions in an EBS or similar document is essential for addressing environmental claims.

The first phase of the environmental closure process should include a desk study with an associated site visit in order to identify possible environmental risks. If risks are evident, the study would be followed by a second phase consisting of a site survey and possibly a third phase describing necessary actions. The process of the environmental site closure is summarized in *chapter 5:2*; it is similar to the process currently used in EUFOR operations (*EUFOR SOP J4 6292*).

5.2 Phases of the Environmental Site Closure Process

Phase I

Task: To determine the environmental areas of concern and the need for further actions.

Desk Study: Collection and review of a wide range of background information, including local environmental standards.

Site Visit: A detailed site visit involving taking of pictures for documentary evidence and drafting of detailed descriptions. The focus lies on describing and documenting processes that could cause environmental damage.

Preliminary Report: Reporting all information collected during the Desk Study and Site Visit including details of previous site investigations, photos, videos and eventually addressing and highlighting the necessity of a Phase II site investigation.

Phase II

Task: To investigate the existence and degree of contamination on site and determine necessary actions.

Site Survey: Based on the findings of Phase I, a site survey plan is made. The aim of the survey is to establish possible environmental damage (contamination) caused by the occupation and activities related to it, on soil and/or water on and off the occupied site.

Environmental Assessment: Analysis of the results of the site survey to determine the presence and magnitude of contamination and any possible adverse health or environmental effects the contamination may cause.

Final Report: The report will contain a detailed description of the survey and all information gained by it, including measurement and analysis results, maps and photos. The results of the survey will be compared to the agreed standard values for each type of contamination and the conclusions will be presented in the form of remediation needs and follow-up or monitoring recommendations.

Phase III

Task: To plan and carry out necessary actions to assure the site is environmentally safe and fulfils the agreed requirements for closure/transfer.

Action: Based on the findings of the site survey, an Action Plan is made and the actions are carried out in accordance with the troop contributing nation legal requirements and/or applicable international standards and agreements. All actions are properly documented and reported.

The environmental site closure process should be led by the Environmental Management Board, which may require assistance from outside environmental professionals. This process should commence immediately following the decision to close the site. It is essential for desk studies and site visits to be conducted while the camp is still functioning normally, before any dismantling of facilities and infrastructure. The timing of site surveys should take into account the benefit of accomplishing any closure actions while supporting infrastructure and facilities as well as deployed forces are still in place.

5.2.1 Phase I

Desk study

The desk study consists of the collection and review of a wide range of background information in order to provide a picture of environmental sensitivities at the site and the potential for historical contamination (along with the likely type of contamination). If a proper EBS has been carried out prior to the occupation of the site, the EBS report will contain most of the necessary background information, and minimize the work required at this stage.

In general, information to be collected includes:

- Geological, topographical, hydrological, hydro-geological and meteorological data about the area
- Natural resources, flora and fauna
- Historical information about the site: previous use and functions
- Known previous contamination
- Local legislation and standards, applicable international agreements and/or troop contributing nation legislation (in the absence of local standards).

In addition to the EBS, the desk study can be aided by the use of a sequential checklist, an example of which is provided in *Appendix 9*.

Site Visit

Once the desk study is completed, a site visit should be performed to determine the current environmental condition, as compared to the initial documented condition. The site investigation should assess the potential or likelihood for undocumented contamination based on the activities conducted at the site, known facilities or materiel with the potential to cause damage to the environment, documented incidents of significance, visible evidence of contamination or pollution, and the degree of attention paid to environmental proteRelevant orders and guidelines (OPORDER Annex L, SOPs, etc.)ction by the deployed force. Consideration should also be given to training areas or other potentially contaminated sites outside the camp. Information should be collected using direct observation; geo-coded if possible, reviews of documentation, and personal interviews.

Useful Sources for Site-Specific Information

- Environmental surveys and reports (EBS, ECR, environmental audit reports, geological and hydro geological surveys, etc.)
- Accident and clean-up reports
- Waste, wastewater and hazardous waste management contracts
- Relevant orders and guidelines (OPORDER Annex L, SOPs, etc.)
- Other possible descriptions for waste, wastewater and hazardous materials handling processes on site
- Maps: site maps, function locations, sewage, drainage and storm water channeling maps
- Photografs
- Interviews.

Generally, the following factors inside and outside the camp area should be reviewed in order to obtain a complete picture of the situation:

Table 5:2 Environmental Issues to be Addressed during Phase I Site Visit[12]

Environmental Issues	Examples
Ground conditions (including hard-stand areas)	Staining or coloration of ground, odours or smells
Surface water appearance and odour (standing puddles, streams or ditches, ponds or lakes, any water discharge points from the site)	Vegetation (type of vegetation, appearance, coverage, whether indicative of wet or dry ground)
Air quality (odours, dust, etc.)	Noise
Infrastructure appearance, especially presence of staining– pipe work, oil separators, roadways, drainage ditches, etc.	Tanks and other containment structures – appearance, integrity, staining of the containers and of the underlying area
Waste disposal area – building materials, general wastes, waste drums, etc.	Buildings – presence of asbestos, painted woodwork
Electrical units and transformers	Heating units and boilers, especially associated tanks and lagging
Neighbouring Activities - especially industry or farmland where contaminants might arise	Sensitive neighbouring receptors - e.g. housing, schools, hospitals, nature reserves, or agricultural land where impacts of TCN activities may be felt.

The picture of possible environmental Areas of Concern (AOCs) should then be completed by reviewing all activities that might have a potential environmental impact. These activities should be listed and all procedures and documentation associated with them should be checked to determine possible risks. Possible re-locations of these activities during the operation should also be checked.

12. EUFOR SOP J4 6292, Environmental Status Assessment Guidelines, Annex C.

At a minimum, the following activities should be included:

- Handling and storage of petrol and other oil products:
  - uses and types of products
  - storage tanks (size, location, condition)
  - secondary containment structures
  - pipelines and transfer systems
  - protection measures and procedures
  - oil/water separators
  - energy production and heating/cooling systems.
- Handling and storage of hazardous materials:
  - uses and types of products
  - storage areas
  - protection measures and procedures.
- Generation and management of wastes:
  - types and amounts of waste generated
  - management and disposal methods and procedures, to include possible landfills and burn pits.
- Generation of hazardous and medical waste:
  - types and quantities generated
  - storage areas
  - disposal methods used (contractors used)
  - disposal locations.
- Generation and management of wastewater:
  - types and amounts of wastewater (grey and black) generated
  - collection and treatment methods
  - discharge areas
  - quality of discharged water
  - water from possible fire-fighting area.
- Pest and vegetation control:
  - types of pesticides and herbicides used
  - storage areas.
- Overland flow and storm water management:
  - drainage areas
  - location of retention ponds (if any).

- Activities related to vehicles:
  - maintenance
  - washing
  - parking.
- Ammunition and explosive storage:
  - types and quantities stored
  - location
  - documentation of incidents.
- Shooting (firing) ranges:
  - location
  - types of ammunition used.
- Known historical contamination:
  - pre-existing contamination
  - location, type, quantity of known spills.
- Water supply:
  - description of water source (surface or groundwater)
  - amount of water used per day
  - describe water supply system, treatment and use.
- Natural resources:
  - location and description
  - documentation of preservation actions
  - documentation of adverse actions.
- Cultural resources:
  - location and description
  - documentation of protective actions
  - documentation of damage.

The site visit can be aided by the use of a checklist, an example of which is provided in *Appendix 10*.

Preliminary Report

A report on the Phase I findings should be produced, to include all the information reviewed and details of the site visit, including photographic evidence. This report should be signed by the host nation/receiving nation to indicate their acknowledgement of the existing environmental situation at the site at that point.

The Importance of Documentation

- Proper documentation of the Environmental Site Closure Process is essential to avoid future liability issues and possible health and environmental risks.
- The documents produced in the process result in an environmental overview of the mission and its effects on the base camp area and surroundings.
- The documents should be coordinated with appropriate legal advisors and be connected to the MOU between the deploying and relieving/receiving party, and archived at mission leadership and national level for the handling of possible claims.

The Phase I report is a document which "proves" the on-site environmental situation upon land occupation. Additionally, the Phase I Report provides subsequent occupiers with information regarding site conditions prior to their occupation of the site. All the documentation used in the process should be listed in the report.

The results of the desk study and site visit should be analyzed with regard to the presence and magnitude of environmental risk factors. If environmental areas of concern are identified, a Phase II site survey should be conducted. The Phase I report should include recommendations for planning the site survey.

If the timeframe is tight and a Phase II site survey will be conducted, the Phase I findings can be reported together with the site survey findings in one official report. In this case, the Phase I findings and the site survey recommendations will only be reported for internal use or considered a preliminary report.

5.2.2 Phase II

Site Survey

It is important that the site survey is planned in a manner that will both provide accurate information and withstand legal scrutiny. The scope of the investigation will depend upon the findings from Phase I as well as the standards and requirements for the site closure/transfer.

Before the actual survey, a Site Survey Plan should be developed by an environmental professional. The planning can be aided by the use of the flowchart provided in *Appendix 11*; a checklist of factors to consider is provided in *Appendix 12*. In most cases, only part of the issues mentioned will need to be considered.

The survey should be conducted according to the Site Survey Plan and all the information should be geo-coded to the greatest extent possible. Sampling, field testing and packaging of samples for transport should be done by, or at least closely supervised by, an environmental professional. An accredited laboratory should be used for laboratory analyses.

Environmental Assessment

The findings of the site survey should be compared to the agreed standards for site closure/transfer to determine the presence and magnitude of contamination in order to avoid future liabilities.

An environmental assessment should be carried out by a trained environmental professional to determine the possible adverse health and environmental effects associated with the type of contamination and the environmental conditions on site. The site survey results should provide a clear picture of what actions are necessary. The site survey results should also indicate whether long term environmental monitoring should be considered to provide information about contaminant migration on and off site.

Final Report

The Phase II final report includes a detailed description of the survey methodology and results, and analysis of the results of the survey by means of an environmental assessment. If contamination exceeding the agreed closure/transfer requirements is found, the report should also include recommendations for actions or other measures. The report should be illustrated with maps and photographs and the original laboratory analysis reports should be included. All measurable data should be geo-coded. Any documentation used in Phase II, in addition to what

has already been reported from Phase I, should be listed. A model for a combined Phase I and Phase II site closure report is given in *Appendix 13*.

This report should be signed by the host nation/receiving nation to indicate their acknowledgement of the existing environmental situation at the site at that point. The report should be attached to and archived with the MOU or other transfer documents with adequate legal status between the host nation and deploying force or between the in-processing and out-processing force. The report should also be archived at the national level for the handling of possible claims.

5.2.3 Phase III – Action

An Action Plan should be developed before any actions are carried out.

If the plan includes soil remediation, the plan should include descriptions of the chosen remediation method, an estimation of the amounts of soil or other materials to be remediated, agreed target values, supervising and sampling during the work and disposal/treatment of contaminated soil or other materials. In addition, the plan should contain instructions for work safety, including safe handling of contaminated material and safe digging in the area.

All actions should be documented and reported, either in a separate report, or, in case of only minor actions, in the Phase II Report. The report includes a detailed description of the actions and the results, including any unexpected findings. In the case of soil remediation, the volume and quality of remediated soil should be stated, as well as the disposal/treatment method. The report should be illustrated with maps and photographs and the original laboratory analysis reports should be included. All measurable data should be geo-coded. If remediation target values are not reached, a risk assessment for the final condition of the site and possible restrictions for land use must be included.

6 Post-Deployment

"Post-deployment" refers to all actions to be taken after forces withdraw completely from the area of operations. The vital functions of this phase are typically executed outside the Area of Operation, in the Headquarters of the organization (e.g., EU, UN, NATO) or of the troop contributing nation. Post-deployment functions include archiving important documents, reviewing operational environmental management, collecting lessons learned and monitoring the environmental status in the AOR if necessary, as described in the checklist below.

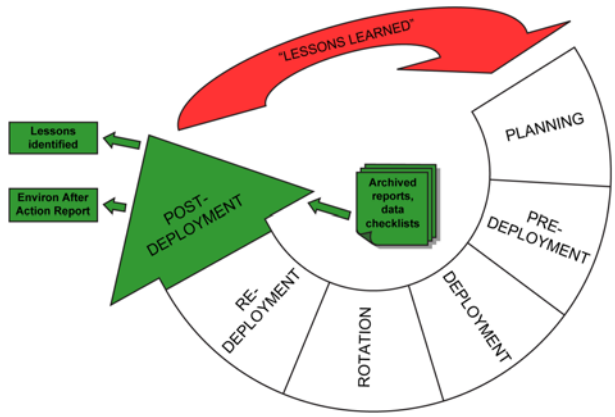


Figure 6:1 Life Cycle of Military Operations for Post-Deployment

6.1 Post-Deployment Checklist

- Archive agreements and contracts, transfer documents, EMS documents and environmental status reports
- Archive survey and monitoring data
- Archive quarterly reports
- Lessons identified and lessons learned information concerning environmental and health issues to channel information into future operation planning (see *Appendix 14* for a sample checklist)
- Post-deployment action requirements (monitoring, on-going remediation, follow-up checks, etc.)
- Environmental After Action Report (see *Appendix 15* for an example).

At this stage of the operation's life cycle process, the importance of documentation and identification of lessons from the operations are paramount. Furthermore, if not already in place, a system for transferring the lessons identified/learned between rotations, as well as from the operation (field) to the troop contributing nations' joint forces command needs to be established at this point.

A Lessons Learned database and collection system should have been established already during the pre-deployment or deployment phase. The structure could, for example, adopt the following principles:

- A designated lessons learned (LL) officer or other person responsible for the LL system is appointed and the task is rotated on a normal basis.
- The LL system is an electronic file in the operation archive.
- The data categories coincide with the organization, e.g. J1, J2, J3.
- Each LL issue consists of a data-sheet, which is filled out by the LL officer, a sector contact person or the person who comes up with the idea, depending on how user rights are distributed in the organization.
- The data sheet includes certain obligatory fields with pull-down menus for keywords, that help save the issues in the correct data category, and can later be used for searching and sorting.
- The designated LL officer or equivalent will actively follow and edit the contents of the LL archive.
- After each operation, or on a regular basis during a longer operation, the contents of the LL archive will be transferred to a national/organizational database that is used in planning future operations.

6.2 Suggested Lessons Learned Categories/Keywords (Environmental Issues)

- Personnel resources
- Material resources
- Statements, orders and other documents
- Sampling and results
- Contracts
- Contacts
- Water and waste water
- Waste disposal
- Hazmat
- Fine training area
- Workshop
- Vehicle parking areas
- POL station and vehicle washing area
- Generators and energy
- Ammunition and explosives
- Contaminated soil handling
- Natural resources protection
- Cultural and historic resources preservation
- Education and training material
- Environmental damage.

A sample checklist (memory aid) for identifying best practices and Lessons Learned concerning environmental and health issues, to be used during re-deployment/post-deployment is provided in *Appendix 14*. The sample checklist is partly filled out with examples of issues to deal with and examples of suggested best practices, but it should be adapted and reformulated to each specific mission. The problems and practices identified with the help of the list can then be transferred into lessons learned and channelled into future operational planning.

7 Conclusions

This guidebook is meant to assist the international military community in identifying the process and tools to be used in incorporating environmental considerations throughout the life cycle of an operation.

Although operational requirements are paramount, the integration of environmental considerations into all aspects of operational planning, training, and execution is essential for maintaining the health and well-being of the deployed troops and the local population.

The nature, intensity, and complexity of the specific operation will clearly impact the extent to which environmental factors are addressed. It is hoped that the descriptions of what should be taken into account environmentally, as well as the templates for various forms that should be maintained during the operation (which are contained in this guidebook), will provide a useful framework for the environmental aspects of any national or multinational military operation.

8 Acronyms

AOC	Area of Concern
AOR	Area of Responsibility
BMP	Best Management Practice
CIMIC	Civil-Military
COA	Course of Action
CONOPS	Concept of Operations
EBS	Environmental Baseline Survey
EHSA	Environmental Health Site Assessment
EMB	Environmental Management Board
EMP	Environmental Management Plan
EMS	Environmental Management System
EP	Environmental Protection
EU	European Union
LL	Lessons Learned
NATO	North Atlantic Treaty Organization
MOU	Memorandum of Understanding
OPLAN	Operations Plan
OPORD	Operations Order
POL	Petroleum, Oils and Lubricants
QA/QC	Quality Assurance/Quality Control
QIP	Quick Impact Project
Recce	Reconnaissance
RIP/TOA	Relief in Place/Transfer of Authority
SOP	Standard Operating Procedure
SOR	Statement of Requirements
STANAG	Standardization Agreement
TCN	Troop Contributing Nation
UN	United Nations
ZFC	Zero Footprint Camp

9 Acknowledgements and Authors

This guidebook was developed by a multinational working group consisting of representatives from the defence organizations of Finland, Sweden, and the United States. The individuals listed below provided significant contributions to the development and completion of this guidebook. In addition, these contributors would like to express their appreciation to Ms. Mari Kulmala and Mr. Ingemar Ebbhagen for their role in facilitating the group's successful meetings in Levi, Finland and Umea, Sweden, respectively.

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Appendix 1 Minimum competency requirements

Source: Annex B to EUFOR V.b. SOP J4 6292.

HQ Environmental Manager/Engineer/Officer

B1. Advanced University Degree or PhD in Civil and Environmental Engineering or equivalent.

B2. At least ten years postgraduate combined experience in the environmental and civilengineering fields, including project development and writing project submissions.

B3. Previous experience in environmental and infrastructure liabilities managementincluding environmental claims mitigation and Real Estate management. Minimumof two years experience working in an international organization. Experience indeveloping and undertaking training programs.

B4. Previous experience in developing policy and operating procedures relating to bothprevention and disposal of environmental waste, contamination and environmentalliabilities management.

B5. Professionally qualified and/or member of relevant professional civil and/orenvironmental institution in accordance with National regulations.

Multinational Task Forces' (MNTFs) Environmental Person

B6. Former assignment as environmental officer and / or special environmental training.

B7. Technical experience in at least one of the following areas:

6.1 Waste management

6.1 Contaminated land investigation and remediation

6.1 Auditing

6.1 Emission monitoring

6.1 Environmental standards

6.1 Storage and handling of materials

6.1 Environmental issues in project design

6.1 Emergency response planning and implementation

Troop Contributing Nations' (TCNs) Environmental Person

B8. Special environmental training

B9. Technical experience / special training in at least one of the following areas

- 6.1 Waste management
- 6.1 Contaminated land investigation and remediation
- 6.1 Auditing
- 6.1 Emission monitoring
- 6.1 Environmental standards
- 6.1 Storage and handling of materials
- 6.1 Environmental issues in project design
- 6.1 Emergency response planning and implementation

Appendix 2 Sample environmental annex to the oplan

Source: NATO, Appendix 3 to Annex EE to OPLAN XXX.

APPENDIX 3 TO

ANNEX EE TO

OPLAN 12345 OP XXXXX

DATED ____

References:
A. MC 469 - NATO Military Principles And Policies For Environmental Protection (EP)
B. STANAG 7141 - Joint NATO Doctrine For EnvironmentalProtection During NATO Led Operations And Exercises
C. STANAG 2510 (Study Draft 4 15 Aug 2005) Joint NATO Waste Management Requirements During NATO Led Military Activities

2.1 Situation

a. General. During expeditionary operations, in addition to its forces, NATO brings international values, which it seeks to impart on all communities. One of these values is respect for the environment and for the people who live in it. Environmental considerations are the spectrum of environmental media, resources, or programs that may impact on, or are affected by, the planning and executing of military operations. Planning factors include: environmental compliance; pollution prevention; waste management; conservation; heritage protection (natural and man-made); and protection of flora and fauna. Environmental Protection (EP) is the application and integration of all aspects of environmental considerations as they apply to the conduct of military operations. Environmental damage may be an inevitable consequence of operations; however, environmental planning should minimise these effects without compromising either operational or training requirements. With an understanding of applicable environmental legislation and regulations, commanders will be able to plan efficiently and act accordingly. By taking proper steps to assess, plan, train and execute the deployment and execution of the mission, the commander will: protect human health and essential environmental resources; reduce the occurrence of environmental accidents; mitigate any damage that may be caused to the environment; and limit NATO's potential long-term liability.

b. Scope. This Appendix covers protection of the environment during NATO-led operations and exercises. The environment is defined as the surroundings in which NATO operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation. By early consideration of the potential environmental impacts, commanders will become aware of the environmental effects of mission accomplishment while alternatives may still exist. Impact is defined as any change to the environment, whether adverse or beneficial, wholly or partially resulting from NATO's activities. Nuclear, Biological and Chemical (NBC) wastes and related issues are not addressed by this appendix; nor are force protection, targeting, or preventive medicine issues addressed, but EP advise will be required during the planning cycle of these activities.

c. Assumptions.

(1) Host Nation Support. Due to the political situation and probable lack of government stability, there will probably be little likelihood of significant Host Nation (HN) support initially; thus, government environmental protection agencies will not be able to provide much assistance or advice and NATO Forces will be required to be self-sufficient. This

may require a harmonization of the Sending Nations (SNs) environmental principles and policies.

(2) Environmental Situation. The environmental situation will probably be poor due to the near breakdown in government and possible ongoing terrorist activities. Industrial and municipal facilities will probably be poorly maintained and administered and there could be force protection incidents of Toxic Industrial Hazards (TIH) requiring support from NBC and medical experts. The hydrogeological conditions may make protection of fresh water sources a particularly important task. Conversely, the Area of Operations (AOO) may be environmentally pristine, but the infrastructure may be underdeveloped and Host Nation environmental legislation may not exist. This situation will necessitate first-principles planning, specifically with respect to waste management.

d. Limiting Factors.

(1) Existing security conditions, preparation time (e.g., for transit and other agreements supporting environmental contracts), and availability of environmental personnel, especially during the initial phase of deployment may be limiting factors.

(2) Operational imperatives will have priority over EP principles and policies. Factors such as mission success, force protection requirements, security considerations, and the non-availability of required logistic support may limit the ability of deployed forces to comply with the directed environmental protection requirements, especially during the employment phase.

(3) Fiscal restraints to expend funds under contingency operation conditions may be a limiting factor.

(4) Delays in implementing international agreements and contracting actions could result in additional requirements for waste storage facilities at the point of generation.(5) Environmental actions or projects (e.g., on-site treatment of soil contaminated with petroleum, oil, or lubricants) that are required after redeployment of units and transfer of facilities (sites and base camps) may become limiting factors.

(5) Environmental actions or projects (e.g., on-site treatment of soil contaminated with petroleum, oil, or lubricants) that are required after redeployment of units and transfer of facilities (sites and base camps) may become limiting factors.

2.2 Aim

The aim is minimise environmental impacts without compromising NATO's operational requirements.

2.3 Execution

a. Commanders EP Intent. A sound environmental policy is a key aspect of Information Operations, and a requirement for NATO to retain its international reputation. Deployed NATO forces must follow NATO's EP Policy as outlined in Reference A which define the responsibilities of NATO Commanders and Commanders of units from SNs, and the expected responsibilities of cooperating HNs for EP during the preparation for and execution of military activities. Although operational imperatives will have priority, NATO-led forces must strive to respect the environment. EP principles and policies will have to be balanced against the risk to forces and mission accomplishment. The HN's environmental laws will be respected unless specific exceptions have been agreed to. International environmental legislation, rules and regulations and conventions will also be applied. National standards may be used if they are more stringent than the HN's standards. NATO and the SNs have a collective responsibility for the protection of the environment; however, each nation bears ultimate responsibility for the actions of its forces. NATO will take a proactive EP approach and any significant adverse environmental impacts or threats must be immediately reported to appropriate NATO and national authorities.

b. Concept of Operations. Operations will be planned and conducted with appropriate consideration of their effect on the environment as detailed in Reference B. The effect of operations, both on the environment and from the environment, must be weighed against the military requirements of the mission. While the NATO mission will take precedence, the potential dangers and high media profile of environmental issues requires thorough consideration and awareness of the potential environmental impacts of NATO operations. An environmental incident at the tactical level may have the potential to have a strategic effect. This translates into specific duties and responsibilities during all phases of an operation.

(1) Warning and Preparation Phases. During these phases, a country study is completed and a strategic reconnaissance is done. Existing site conditions and the impact on operations will have to be determined. (See Tab A for Guidelines For Environmental Assessment for NATO-Led Military Activities and Tab A1 for Theatre Level Checklist).

(2) Deployment Phase. During this phase, any problematic areas must be investigated. An environmental detailed reconnaissance may be initiated based on identified concerns.

(3) Employment Phase. It is critical to ensure that environmental conditions are properly quantified / qualified at the outset for health and legal purposes, as well as to ensure that the proper level of continuous monitoring is performed to ensure protection of the environment and human health. The two major activities in this phase of the operation are the detailed environmental baseline study of the selected location(s) (Tab B Environmental Baseline Study and Tab B1 – Environmental Baseline Study_Elaboration) and the set-up of an Environmental Management System (EMS) and subordinate Environmental Management Plans (EMPs) for the duration of the occupation. Changes in the environmental situation are to be continuously monitored (See Tab B2 – Environmental Conditions Report).

(4) Redeployment Phase. Upon completion of a mission or the operation, the SNs will return all sites to their original state, aside from any damage that may have been caused by natural disasters or outside influences (Tab B & B3). The SN may also have the option to handover the site to another organisation. The SN will then have the responsibility to conduct remedial actions prior to handover or as negotiated.

c. Responsibilities.

(1) Sending Nations

(a) SNs should provide appropriate EP education and training to their forces (Joint Functional Area Training Requirements – Environmental Protection refers).

(b) SNs may advise and assist with the conduct of pre- and post occupation surveys, environmental documentation, and site clean up.

(c) SNs should provide appropriate environmental expertise in their contingents. Deploying forces should appoint an officer or senior NCO to co-ordinate and control unit level environmental procedures (See Tab D for Performance Requirements). A summary list of these appointments shall be provided to the Combined Joint Task Force (CJTF) Environmental Protection Officer before deployment.

(d) SNs should ensure that their contingents comply with the CJTF directive for EP, specifically due to liability implications.

(2) HN Responsibilities. The HN should co-operate with the designated NATO Commander in order to permit the conduct of military activities with due regard for EP. This will include:

(a) the provision of available and appropriate environmental expertise, information and resources.

(b) advice to the designated NATO CJTF Commander and SNs on the HN EP standards.

(3) CJTF Environmental Management Board (EMB). An EMB will be established at the CJTF HQ under the J4 to integrate the environmental protection efforts of all participating components under a single authority, ensuring unity of effort for environmental protection activities. The EMB should include representatives from each service component and joint force staff representative, as necessary (legal, occupational health, preventive medicine, safety, comptroller, planning, operations, and logistics). The EMB assists the JFC in establishing the joint force environmental policies, practices, procedures, and priorities and in providing oversight of environmental protection standards and compliance. Establishing a dedicated and appropriately staffed environmental engineering staff, supported by experts from other joint force staff members (legal and medical), may obviate the need for a EMB in smaller operations (See Tab C1 – Environmental Management Board).

d. Tasks.

(1) CJTF Chief Joint Engineer (CJENG) (See Tab C for elaboration).

(a) Provide advice to the Commander CJTF on environmental issues.

(b) The CJTF CJENG is responsible for the development and coordination ofenvironmental policy within the AOO.

(c) Develop reporting procedures with the Forces and National SupportElements (NSEs).

(d) Coordinate environmental remediation measures for CJTF HQ and relatedNATO-facilities with Component Command (CC) HQs.

(e) Establish and maintain AOO-wide archive on all environmental incidentsduring the operation coordinated with environmental CCs HQ databases.

(2) Component Commands Chief Engineer.

(a) Provide environmental support to NATO Operations within means and capabilities.

(b) Identify contractors for hazardous waste and/or contaminated soil disposal within the AOR.

(c) Establish and maintain AOR-wide archive on all environmental incidents during the operation.

e. Coordinating Instructions.

(1) Risk Assessment. CJTF units and detachments should undertake risk assessment (Ref B) to determine the level of risk to the environment when planning military actions. The complexity of these risk assessments will vary with the size of the operation/activity and the personnel, equipment and materials involved.

(2) Base Camps and Detachment Facilities. CJTF units will occupy sites with a view to returning and/or vacating property at least in the same physical/environmental condition as when first occupied. The environmental baseline studies or pre- occupation surveys (See Tab B & B-1) will provide the basis of a CJTF environmental protection database established at the HQ CCs Chief Engineer and coordinated with HQ CJTF CJENG. The database will be updated with any environmental incident caused by CJTF forces inside the AOR (See Tab B2). As a minimum, site photos/video will be taken before any NATOled forces move into a site. Units may be supported by the HQ EP Officer, J4 Real Estate and Advisory Team (REAT), Legal, Medical and other specialists as required. As SNs depart, the condition of occupied real estate may become a financial issue for the SN, as well as a public relations issue for CJTF/ NATO.

(3) Damage Remediation Actions. SNs are responsible to clean up any damage their troops cause. NSEs should plan ahead and take the right precautions prior to, and during, their occupation of a site and prior to their eventual redeployment from that site. HQ CCs ENG represents the first level for further action of remediation.

(4) Site remediation which is suspended due to military operations, redeployment or force protection shall be documented. This documentation shall include, but not be limited to, an interim report with narrative, sampling analysis, and photographic documentation. Site remediation shall address the following areas:

(a) Fuel and lubricant storage and dispensing.

(b) Ammunition and explosive storage.

(c) Vehicle parking and maintenance areas.

(d) Waste (includes also medical waste) storage or disposal (clean up).

(e) Hazardous material storage.

(f) Medical waste storage or disposal.

(g) Human waste problem areas, i.e., visible sewage, smell of sewage, latrines.

(h) Closure of grease or soakage pits (latrine or dining facility).

(i) Stagnant or standing water removal complete with photographic documentation.

2.4 Service support

a. Identify those environmental planning factors which, although not mandated as law or regulation, will support successful execution of the plan in all phases and protect the health and NATO Force and noncombatants. As a minimum, address certification of local water sources by medical field units, solid and liquid waste management, hazardous material (HM) and hazardous waste (HW) management, flora and fauna protection, archaeological and historical preservation, and spill response. Disposal of solid and liquid waste will depend upon the location and surrounding environment of the disposal area. The intent is to minimize the environmental impact and to limit potential contamination to the holding site. NATO Forces will, at a minimum, comply with the following mitigation measures.

(1) Potable Water. CJTF preventive medicine personnel will accomplish approval of potable water sources, including bottled water. CJTF CJENG will ensure that water sources are free from contamination by suitable placement and construction of wells and surface treatment systems. Consideration should be given to the siting and maintenance of septic systems, on-site treatment units, hazardous material and hazardous waste accumulation points, solid waste disposal sites, and other activities that may threaten the integrity of the potable water supply. The CJTF will provide bottled drinking water until such time as approved potable water sources are located.

(2) Grey Water. Mess, bath, and laundry operations will use existing sewage lines where available or constructed soakage pits and ponds. Location of soakage pits will be co-ordinated with preventive medicine personnel. They will be constructed to prevent pooling and the creation of new insect breeding areas. Where practical grey water and black water waste treatment systems will be combined.

(3) Wastewater/Human Waste (Sanitary Sewage – Black Water). Sanitary sewage will be disposed by using the method that maximises protection of human health and the environment under existing operational conditions. The following disposal alternatives are presented in general order of preference; however, sitespecific considerations and operational duration and intensity may take precedence:

(a) Existing systems (e.g., latrines, sanitary sewers, and treatment facilities).

(b) Constructed or packaged wastewater treatment units or contracted services.

(c) Field expedient procedures (e.g., cat-holes or straddle trench latrines).

(4) Solid Waste. Solid waste will be managed by using the method that maximises the protection of human health and the environment under existing operational conditions. Management of solid waste will be IAW applicable procedures determined by the HQ CJTF J 4, in consultation with preventive medicine personnel. The following disposal alternatives are presented in general order of preference; however, site-specific considerations and operational duration and intensity may take precedence:

(a) Existing solid waste disposal systems.

(b) Construction of solid waste disposal facilities or contracted services.

(c) Field expedient procedures (e.g., garbage pit).

(5) Infectious Waste (Medical Waste Management). Infectious waste will be segregated at the point of origin. Mixtures of solid waste and infectious waste will be minimised and will be handled as infectious waste.

(a) Definition. Infectious waste: Waste produced by medical and dental treatment activities, with the potential for causing disease, and may pose a risk to both individual or community health if not managed properly (e.g., pathological waste such as; human tissues and body parts, human blood and blood products, sharps-hypodermic needles and syringes).

(b) Management. Infectious waste will be segregated, transported and stored IAW preventive medicine procedures approved through medical channels and the HQ CJTF Medical Advisor.

(c) Treatment and Disposal. In-country contract disposal will be used where feasible. Methods of disposal (typically high temperature incineration) shall be approved through medical channels and the HQ CJTF Medical Advisor. If contract disposal is not feasible, approved field expedient procedures will be used.

(6) Hazardous Materials. Minimise use of hazardous materials whenever possible to minimise the production of hazardous waste. All excess hazardous material should be reissued by the supply support activity in theatre, if possible. Excess hazardous material not reissued shall in general be returned to home station as hazardous material. Hazardous material that cannot be returned to home station shall be disposed of as hazardous waste. The owner of the hazardous material shall be responsible for co-ordinating the disposition of the hazardous material with the HQ CJTF J4, in accordance with guidance provided by the HQ CJTF Environmental Officer.

(a) Definition. A hazardous material is every material that, based on either chemical or physical characteristics, is capable of posing a risk to health, safety, or the environment if improperly handled, stored, issued, transported, labelled, or disposed. Examples include: carcinogens, corrosive materials, irritants, toxic materials, combustible liquids, compressed gases, explosives, flammable materials, oxidisers, unstable (reactive) materials, pesticides, water-reactive materials, batteries.

(b) Shipment. Shipments of hazardous material will be accompanied throughout by shipping documents that clearly describe the quantity and identity of the material and will include Material Safety Data Sheets (MSDS). HQ CJTF J4 or contracted vehicle operators will be providedinformation on the hazardous material contained in the shipment including health risks of exposure, the physical hazards of the material, and the potential for fire, explosion, and reactivity. HQ CJTF J4 or contracted vehicles transporting hazardous materials will be appropriately marked, subject to security and operational considerations, and their contents appropriately labelled. International air shipments will follow appropriateinstructions.

(c) Storage. Hazardous material will be segregated from non-hazardous materials and separated from incompatible hazardous material. Hazardous material storage sites and containers will be checked on a regular basis to assure they are secure. Hazardous material storage containers will be locked unless being filled or emptied.

(d) Pesticide Usage. A certified pesticide applicator must apply all pesticides, herbicides and fungicides, excluding arthropod skin and clothing repellents, and record these applications.

(7) Hazardous Waste. Minimise use of hazardous material whenever possible to minimise the production of hazardous waste. The generator of the hazardous waste shall be responsible for co-ordinating the disposition of the waste with the HQ CJTF J4, in accordance with guidance provided by the HQ CJTF Environmental Officer.

(a) Definition. Waste which contains dangerous substances and which due to its nature, composition or quantity presents particular risks to human health or the environment. This particular waste category may explode, burn or may contain or release germs, which transmit diseases (this does not include radioactive waste).

(b) Collection Points. Each base and unit shall establish individual or shared hazardous waste collection points. Waste shall be properly segregated and labelled (e.g., waste oil, contaminated fuel, solvents, and chemical compounds) to ensure proper packaging for handling and final disposal.

(c) Transportation/Shipment. Service components are responsible forarranging the transportation of hazardous waste from collection points tocentralised hazardous waste collection areas in accordance withprocedures established by the HQ CJTF J4.

(d) Final Disposal. Hazardous waste will be disposed by using a method that maximises the protection of human health and the environment with consideration of existing operational conditions. The following disposal alternatives are presented in general order of preference:

i Contractor-Managed Disposal. Local contracting for disposal isallowed if done in a manner that is as protective of human health and safety and the environment as practicable under existing operational conditions. Following turn-in, contractor shall be responsible for ensuring proper disposal of hazardous waste.

ii Return to the Unit's Home Station. International agreements (e.g., Status of Forces Agreements, transit and disposal agreements) and laws of involved nations (countries of origin, transit, and destination) must be considered before this alternative is used. This alternative requires the prior approval of HQ CJTF Legal Advisor and approval of the HQ CJTF J4 Environmental Officer.

iii Local Recycling. Local recycling of select hazardous waste as a fuel (e.g., recovered POL) is an alternative disposal option if consistent with local practices and if the appropriate medical officer determine that no significant risk to human health and safety is associated with burning the particular waste as a fuel. Prior approval of the HQ CJTF J4 Environmental Officer is required.

iv Abandonment. Hazardous waste may be abandoned only if it is determined by the Commander CJTF to be necessary under combat or other hostile conditions. Quantity, type, and location of waste abandoned must be reported to the HQ CJTF J4 Environmental Officer, as soon as practicable upon cessation of combat or hostile conditions. Abandonment does not necessarily imply dumping; it could consist of securing the waste for subsequent disposal as conditions allow.

(8) Air Quality. Equipment and facilities will be operated such that adverse health and environmental impacts are minimised. The quality of ambient air will be considered in siting activities of NATO Forces. Problems arising from air quality will be referred to the CJTF Medical Advisor and the Environmental Officer.

(9) Air and noise emissions. Give special consideration to preventing air and noise emissions—normally confined to theater rear areas or to security, support, or humanitarian missions. (e.g. there may be a restriction on generator use to state that they will be operated only in the reduced sound signature mode during a certain time period; or there may be a restriction on movement of tracked vehicles outside of designated assembly areas).

(10) Petroleum, Oil, and Lubricants (POL). POL facilities must be designed and installed with attention to leak detection and spill containment requirements as threat conditions allow. Efforts should be made to ensure good housekeeping, adequate equipment maintenance, and adherence to proper procedures to avoid or minimise operational spills of POL. Spill response and cleanup is a unit responsibility. Waste POL shall be disposed of IAW alternatives identified above for hazardous waste. Selection of POL bulk storage system shall consider sitespecific conditions and operational duration, i.e. at what point will the force change from fuel bladders to hardened storage tanks in order to prevent spillage.

(11) Spill Prevention and Control. Main base and satellite camps will develop a spill prevention/control plan. Special care will be taken to protect surface water and groundwater from contamination. Trained spill response teams will be identified to respond to spills. Spills will be cleaned up as soon as possible. Low cost equipment (e.g., drip pans) will

be used to catch leaking POL and hazardous material. Units are to ensure that adequate types and quantities of containment and cleanup equipment (e.g., dry sweep and over packs) are available at hazardous material storage locations, designated overnight resting areas, and on all appropriate transports (e.g., fuel transports and hazardous material transports). The CJTF Environmental Officer will co-ordinate spill response plans with civilian fire departments and other host nation authorities, where practicable.

(12) Natural Resources (Ecosystem Protection). The CJTF Environmental Officer will pursue available documentation and intelligence assets to identify environmentally sensitive areas. To the extent practicable and consistent with operational conditions, Unit Commanders should avoid or minimise adverse impacts to natural resources including all plants and animals and, in particular, any endangered or threatened species. Liaison with Host Nation environmental authorities and local experts should occur during the strategic recce or EBS, and planning for the construction and/or leasing of major base camps or sites to be occupied by NATO Forces. The Commander will ensure appropriate guidance and practices are established to minimise unnecessary clearing, soil erosion, degradation of air and water quality, and habitat destruction to protect identified environmentally sensitive areas. Significant clearing in excess of 100 acres, soil erosion fissures greater than 30 cm in depth, and suspect drinking water quality will be reported promptly up the chain of command.

(13) Historic and Cultural Resources. The CJTF Environmental Officer will pursue available documentation and intelligence assets to identify historic and cultural areas during the conduct of the EBS. To the extent practicable and consistent with operational conditions, Unit Commanders will avoid or minimise adverse impacts on historic and cultural resources. Liaison with host nation environmental authorities and local experts should occur during the planning for the construction and/or leasing of major base camps or sites to be occupied by NATO Forces. The Commander will ensure appropriate guidance and practices are established to minimise unnecessary disturbance to historically and culturally significant areas.

b. Logistics. Address any necessary guidance for administering the environmental effort. Provide guidance for logistic support to environmental support and compliance.

(1) Hazardous Material, Hazardous Waste and Waste Management. Specify unique control measures used in supply, storage, transportation and retrograde to reduce and regulate.

(2) Environmental considerations and service locations. Provide, when appropriate the locations of landfills, incinerators, HW collection facilities, water and wastewater treatment facilities, watershed protection areas, ecologically sensitive areas, contaminated areas, potentially dangerous industrial facilities, and other points of environmental sensitivity or interest to the force.

2.5 Command and signal

a. Environmental Technical Network. The designated unit or detachment environmental protection officer may be provided information, advice and assistance direct from the EP specialist at the next higher HQ. There may also be national EP technical assistance available. Direction and orders from a superior formation will follow the normal chain of command.

b. EP Points of Contact

(1) CJTF EP Officer.

(2) JF EP Officer.

(3) SHAPE EP Officer LTC Stephen Kelly (CA A) contact at(32) 44 4550 or IVSN 254-4550, FAX 254-3049 orInternet Email: Stephen.Kelly@nato.shape.int

c. Incident Reporting. Environmental incident/ accident or hazardous material or POL spill will be reported to the HQ CJTF CJENG. Initial reports shall be made not later than 2 (two) hours after their occurrence.

d. Format of Reports. Initial environmental incident reports will be made using the standard INCSPOTREP as detailed in AP 80-3 Vol III and be followed up in the ENGSITREP. Formats for detailed reporting of environmental incidents may be promulgated at a later date (See Tab B2 – Environmental Conditions Report).

e. Archiving. A copy of all environment related reports must be submitted to the CJTF EP Officer.

f. Lessons Learned. Lessons Learned will be forwarded as detailed in Annex LL.

Signature (An appendix can be signed by the commander or the primary staff officer)

TAB A – Guidelines for Environmental Assessment for NATO-Led Military Activities

Tab A1 – Strategic Level Theatre Environmental Checklist

Tab B – Environmental Baseline Study

Tab B1 – Environmental Baseline Study Elaboration

Tab B2 – Environmental Conditions Report

Tab B3 – Environmental Out-Processing Checklist

Tab C – CJTF CJENG Environmental Responsibilities

Tab C1 – Environmental Management Board

Tab C2 – Environmental Policy Statement

Tab D – Performance Requirements of SN Unit Env Officer

Appendix 3 EBS report format and checklist template

Source: US Air Force Handbook 10-222, Vol 4, Environmental Guide for Contingency Operations, 1 March 2007, Attachment 2.

1. Purpose of EBS. State reason(s) for the EBS, the site/location where the survey was/is being conducted, and include the date(s) of the survey.

1.1 The primary reasons are to identify environmental, health, and safety conditions that pose a potential health threat to deployed personnel and to alert personnel to existing contamination at a site prior to a deployment.

1.2 The EBS is also used to document environmental conditions during initial occupancy to protect the U.S. from unfounded claims of environmental damage. The EBS captures predeployment environmental damages and serves as a basis for comparing postdeployment environmental conditions to determine the extent, if any, of damage caused by U.S. personnel.

2. Survey Methodology. State the methods, procedures, and techniques used to gather and analyze the information.

2.1 Methods, procedures, and techniques usually involve searching for and analyzing existing surveys, inspection reports, hazardous waste management plans, spill plans, utility drawings, previous EBS, etc. Other sources include maps, titles, and deeds that can be used to determine locations of tanks/equipment.

2.2 Sample collections can be taken to determine water quality, quality of surface and ground water supply, radon levels, presence of PCBs or lead paint, and sources of contamination.

2.3 Interviews with personnel familiar with the site/location or persons who live nearby are useful in gathering information to complete the EBS.

3. Findings. Describe the history, current use and condition.

3.1 History.

3.1.1. Contact the AOR Environmental POC to obtain relative data, review chain of title records if available and accessible, and analyze any reports that can be obtained locally. In addition, conduct interviews with persons in the area who are familiar with the site/location.

3.1.2. Attempt to identify specific chemicals and/or materials associated with the site, and determine whether any spills or cleanup actions took place.

3.1.3. Evaluate aerial images to help determine past uses or to provide indications of previous beddowns, hazardous material usage and storage, hazardous waste storage and/or disposal, storage tanks, landfill areas, etc.

3.2. Current Use. Identify current use of the property and each facility therein.

3.2.1. Describe the land area, all structures, roads, and utilities.

3.2.2. If there are training areas, describe how they are used.

3.2.3. Interview individuals on the site/location and those nearby.

3.2.4. Describe areas adjacent to the site/location; include past use of the property and determine for what purpose the adjacent property is currently being used.

3.2.5. Describe the proposed site usage including the expected duration of an operation, activities to take place and equipment to be used. Determine the possible effect the operation or activities might have on the health and safety of deployed personnel and the host nation.

3.3. Environmental Condition.

3.3.1. Check for problems with air quality in all facilities on the site.

3.3.2. Identify water source(s), capacities, and the condition of water supply lines (check for corrosion, leaks, lead pipes, etc.). Determine if water samples were taken and whether medical personnel conducted an inspection of water sources. Check supply lines; assess vulnerability of water source to tampering or contamination by outside sources.

3.3.3. Identify sources of wastewater and describe the capacity and condition of existing wastewater systems (pits, catch basins, dry wells, lagoons, etc.). Describe how wastewater is collected, treated, discharged or reused, and how it will be done under the proposed usage.

3.3.4. Determine if hazardous waste was stored at the location. Check for hazardous substances and petroleum products. Check aboveground and underground storage tanks, wells, and drums for hazardous materials or wastes. Look for vent pipes, fill pipes, or other indicators of underground storage tanks. Look for signs of spills, leakage or contamination (stained soil, distressed vegetation, dead/diseased wildlife). Determine the affect on the proposed usage.

3.3.5. Identify solid waste disposal areas. Check for signs of dumping. Try to determine what materials were dumped. Look for areas where solid waste may have been burned or buried. Determine if disposal contracts or other agreements exist and describe how deployed forces will handle solid waste, including proposed layout of storage areas in relation to beddown areas.

3.3.6. Identify sources of medical/biohazard wastes, accumulation and disposal areas. Check for signs of dumping. Look for areas where medical waste may have been buried. Describe how deployed forces might handle medical waste, including proposed collection and disposal areas and their relation to bed down areas, food service areas, and water sources.

3.3.7. Determine if any fixed petroleum distribution points exist and look for ground contamination around these areas. If areas previously used as field distribution points are discovered, check for ground contamination. Look for signs of aboveground or underground storage tanks and check these areas for leaks, spills, and/or contamination. Determine if the tanks are still in use; if they are not, attempt to determine when they were taken out of service. Look for petroleum storage throughout the site, including all training areas, if applicable.

3.3.8. Determine if any areas at the location or areas adjacent to the site might present a noise hazard. Also, based on proposed activities at the site, determine if any areas might pose restrictions on deployed forces based on the noise produced by the proposed activities.

3.3.9. Describe pesticide and herbicide storage and use. Try to determine to what extent chemicals were used, where and how often. Attempt to identify precisely what was used and exactly where chemicals may have been stored. Look for indications that pesticides or herbicides may have been dumped or buried. Try to apply these same criteria to adjacent areas to determine what impact these activities might have on deployed forces, water sources, bed down areas and food service areas/operations.

3.3.10. Determine if there are any cultural or historical areas or facilities and what restrictions might be placed on deployed forces or activities as a result.

3.3.11. Look for species of threatened or endangered plants or animals, and determine if any areas are wetlands or wildlife habitats. Describe these animals, plants, and habitats in detail, and determine what restrictions might be placed on deployed forces or activities as a result.

3.3.12. Identify electrical sources. Inspect transformers, substations, power lines, hydraulic systems, voltage regulators, circuit breakers, etc. Characterize the equipment's condition and age, and determine if any of the equipment contains polychlorinated biphenyls.

3.3.13. Check all areas for asbestos and lead paint. Note the exact location of suspected asbestos or lead paint. Comment on the condition of asbestos (i.e., friable or non-friable), take photos, and coordinate with BEE for sampling.

3.3.14. Check facilities with basements for airflow. Make sure basements are aired out prior to use to prevent radon exposure.

4. Soil Type and Land Cover. Provide a description of the soil type, condition, and land cover. Describe how well the soil drains. Attach a map of the area and take photos if possible.

5. Topographic, Hydrologic, and Geologic Features. Describe the topography, state whether there are rivers and streams in the area, and determine if the area might be prone to flooding (look for indications of past flooding). State if there is geologic activity that could affect operations.

6. Unexploded Ordnance (UXO). Provide type(s) and grid coordinates of any UXO in the area.

7. Sanitary Waste Disposal. State whether these facilities are available; provide locations.

8. Radiological Hazards. Identify any sources of radiation that could be harmful. Provide a listing to BEE.

9. Heating and Ventilation Systems. Provide the type, location(s), source of power, type of fuel (if applicable), and storage tank(s) locations for existing heating and ventilation systems.

10. Electrical Hazards. Provide the size and location of high-power lines and transformers.

11. Fire Protection Systems. Identify type, location, and condition of fire protection systems.

12. Site Survey Maps. Include maps, sketches, and proposed site layout plan, if applicable.

13. Photographs. Cross-reference photos of land areas, facilities, and equipment to maps.

14. Samples. If samples were taken, include the results and state whether further sampling is required. Provide photos where samples were taken, and where additional sampling needs to be done. Cross-reference the photos with maps, plans, or sketches.

15. Related Documents. List all other documentation used to conduct the survey.

16. Outside Agency Assisting on Documentation. List point of contact information for other agencies that provided information used to produce the EBS report.

17. Environmental Requirements. List U.S., host nation, and local laws, regulations, guidance, and standards deployed forces must adhere to

during the course of operations; i.e., Overseas Environmental Baseline Guidance Document, Final Governing Standards, etc.

18. References Used. List references used to conduct the survey and produce the EBS report.

19. Images. This section can be used to catalog photographs and provide date/time photographs were taken, angle or location of photographer, etc.

EBS – EXAMPLE CHECKLIST

1. Document Title: Environmental Baseline Survey of _____		
2. Survey Administrative Data		
a. Date of survey:	b. Assessment performed by:	
Name/Grade	Duty Position	Contact Information
3. Document Date:		
4. Site Survey Data:		
a. Description of the site:		
Installation(s)		
(1) Installation Name:		
(2) Installation Number:		
(3) Facility Identification:		
(4) Street Address:		
(5) City/Town:		
(6) State/Province:		
(7) Zip Code:		
(8) Command Jurisdiction:		
Facility Type		
(9) Description and Condition of Property:		
(10) Description of Training Areas:		
(11) Description of Adjacent Land Usage:		
b. Description of Proposed Site Usage:		
c. Current Environmental Conditions:		
Survey of Site Conditions		
Air Quality:	Drinking Water:	Waste Water:
Hazardous Materials:	Hazardous Waste:	Solid Waste:
Medical Waste:	Petroleum:	Noise:
Pesticides:	Historic and Cultural Resources:	Natural Resources/Endangered Species:
Polychlorinated Biphenyls (PCBs)	Asbestos:	Radon:
5. Soil Type and Land Cover:		
6. Topographic, Hydrologic, and Geologic Features:		
7. Unexploded Ordnance:		
8. Sanitary Waste Disposal:		
9. Heating and Ventilation Systems:		
10. Electrical Associated Hazards:		
11. Fire Protection Services:		
12. Radiological Hazards:		
13. Site Survey Maps:		
14. Photographic:		
15. Samples:		
16. Related Documents:		
17. Outside Agency Assisting on Documentation:		
18. References Used:		
a.	b.	c.
d.	e.	f.
19. Satellite Imagery and Aerial Photographs:		

Appendix 4 Example of supply and equipment checklists

Sources: The examples provided here are drawn from two US sources: The US Air Force Handbook 10-222,Environmental Guide for Contingency Operations, 1 March 2007, pp. 91-94 (attachment 5) and USArmy Center for Health Promotion and Preventive Medicine, Hazardous Material/Hazardous Waste-Management Guidance for Maneuver Units During Field and Deployment Operations, Technical Guide217, October 2000, pp. A-1 – A4 (appendix A).

The following are examples of the types of supplies and equipment deploying forces should consider for protecting themselves and the environment. These lists are simply suggestive; each nation's deploying forces will have their own specific lists of supplies and equipment from which to draw.

Equipment for Environmental Site Survey

- GPS
- Camera
- Maps
- Tape measure or electronic distance measuring device
- Fieldbook
- This Guidebook

Environmental Sampling Kits for water/soil Ambient Air Monitoring Equipment Equipment for the Construction of:

- field latrines
- personal hygiene stands
- field waste disposal pits/lagoons
- secondary containment
- potable water distribution and storage systems
- drainage and retention basins

Spill Prevention Equipment Spill Response Equipment, such as

- Sweeping compound (sawdust, sand)
- Oil sorbant
- Shovels
- Spill kits
- Pads

Hazardous Material Storage, such as

- Drums
- Pallets

Hazardous and Medical Waste StoragePersonal Protective Equipment, such as

- safety goggles
- gloves
- aprons

Appendix 5 Template for an environmental incident report

Source: US-Republic of South Africa Environmental Security Working Group Project, Guidebook onEnvironmental Considerations during Military Operations (Publication ESWG/006, June 2006).

REPORT NUMBER: _____

GENERAL INSTRUCTIONS: Used to send periodic information (interim snapshots) of the environmental status of specific sites (assembly areas, base camps, logistical support areas, and medical facilities) where hazards are likely to occur and can result in significant, immediate and/or long-term effects on the natural environment and/or health of friendly forces and noncombatants. Sent in accordance with unit SOP and commander's direction.

LINE 1— DATE AND TIME_____	(Date-time Group [DTG])
LINE 2— UNIT_____	(Unit making report)
LINE 3— LOCATION_____	(Universal traverse mercator [UTM] or six-digit grid coordinate with MGRS grid zone designator of site/incident)
LINE 4— DESCRIPTION_____	(Description of site/incident)
LINE 5— CHANGES_____	(Changes from last ECR or EBS)
LINE 6— HAZARDS_____	(Hazards to natural environment, friendly forces, and/or civilian personnel)
LINE 7— ACTIONS_____	(Summary of actions to minimize hazards/remedial effects)
LINE 8— UNIT POC_____	(Reporting unit Contact Person details)
LINE 9— ASSISTANCE_____	(Assistance required/requested)
LINE 10— REFERENCE_____	(Site specific EBS, if required)
LINE 11— NARRATIVE_____	(Free text for additional information required for clarification of report)
LINE 12— AUTHENTICATION_____	(Report authentication)

Appendix 6 Template for an environmental condition report

Source: US-Republic of South Africa Environmental Security Working Group Project, Guidebook onEnvironmental Considerations during Military Operations (Publication ESWG/006, June 2006).

References:

a. Applicable environmental laws and regulations, Operations Order and unit SOP.

b. Site specific EBS (if applicable).

c. Environmental Incident Report Format in Appendix 5.

1. Site/Incident Location. List the legal address and 6-figure grid reference or latitude and longitude of the incident location or reference the applicable EBS to link the ECR to a given site. Refer to the environmental incident report format at Appendix 5. (The ECR can function as a situation report (SITREP), or interim report, for a given site. The frequency of ECR reports is a higher headquarters' decision but supports the need to document the condition of a given site over time [interim snapshots], as well as helping to ensure that an appropriate environmental focus is being maintained at a given site. The basic format of the ECR may also be used when reporting an incident, such as a POL spill, not related to a given EBS or site location.)

2. Site/Incident Description and Background. Give a brief description of the site (installation), including its related EBS/historical use(s) or the circumstances surrounding the incident. For an incident at a location not covered by an EBS, it is critical to provide the same sort of information contained in a standard accident report.

3. Map/Description of the Incident Location. If the ECR is related to a site covered by an EBS, this entry is able to relate to the information already provided in the EBS (a baseline document). If the ECR defines a location where an incident has occurred that is not covered by an EBS, the description needs to be adequate to direct a follow-on element to the site. In this respect, it is similar to the graves-registration report if the incident occurs during a tactical operation where time precludes remaining at the site.

4. Summary of Environmental Conditions. List the environmental event(s) at the site/location. All spills should be inventoried. If the ECR is a periodic report for a given site, significant events, such as major spills, should have been reported using the basic ECR format. In this case, simply reference any significant incident report ECRs that may have occurred at the given site over the time frame that the periodic ECR covers. Also provide a "snapshot" report of the types of Hazardous Waste/HAZMAT that are stored at the site. Describe minor spills and other events that have occurred over the time frame in question in basic terms, including quantities and the method(s) used.

Example: Twenty liter of waste oil spilled at the Hazardous Waste accumulation site (Hazardous Waste) located northwest of the maintenance building (shown on map) at 1600 hours on 16 December 2004. The Fire and Rescue Service contained the spill with assistance by 24 Hour Spill Response, by 1725 hours. About 3 cubic meters of contaminated soil was taken to the 24 Hour Spill Response Hazardous Waste disposal area at Vissershok Landfill site.

Example: Raw sewage ran from a pump house behind the main warehouse (shown on map) for an estimated 3 days during the initial stages of occupying the base in early June 2004. The problem was identified on 13 Jun 04 and corrected when the pump was repaired on 14 Jun 04.

Example: A fuel tanker overturned at the road intersection R46 – N1 vicinity Touws River (see map) at 2000 on 09 November 2004 during the road movement to Cape Town. Immediate mitigation included spill containment by the employment of all available spill kits with the unit. Higher HQ was immediately notified. An estimated 10 000 liters of diesel spilled at that site. The vehicle has been righted, and excavation of the site will begin at first light, 10 November 2004.

5. Interior and Exterior Observations. These entries should be viewed as an abbreviated version of the information that would be found in an EBS. Items should only be addressed if they differ from the last ECR or vary from the initial EBS.

6. Findings and Determinations with Qualification Statement. A statement similar to the following should appear in this paragraph of the ECR: According to national legislation and DOD policy I have considered whether or not significant environmental impacts will occur as a result of turnover/return of this site (base camp, logistics area) and have determined that (include one of the following statements):

a. Turnover of this base camp area will not result in environmental impacts significant enough to warrant additional environmental analysis.

OR

b. Turnover of this base camp area will result in environmental impacts significant enough to warrant additional environmental analysis. Environmental actions or projects must continue after transfer of the base camp area because of substantial (imminent) threat to human health or safety. The impacts of concern are (list impacts): (If the report is due to an incident not connected to a specific site/installation, this paragraph is an assessment by the commander/individual on the scene.)

(J. DEERE)

ENVIRONMENTAL MANAGER: LT COL

Appendix 7 Sample environmental log

Source: US Form DA1594

DAILY STAFF JOURNAL OR DUTY OFFICER'S LOG For use of this form, see AR 220-15: the proponent agency is Office of The Deputy Chief of Staff for Operations & Plans				PAGE NO.	NO. OF PAGES
ORGANIZATION OR INSTALLATION	LOCATION	PERIOD COVERED			
		FROM		TO	
		HOUR	DATE	HOUR	DATE

ITEM NO.	TIME		INCIDENTS, MESSAGES, ORDERS, ETC.	ACTION TAKEN	INL
	IN	OUT			

TYPED NAME AND GRADE OF OFFICER OR OFFICIAL ON DUTY	SIGNATURE

DA FORM 1594, NOV 62 PREVIOUS EDITION OF THIS FORM IS OBSOLETE. USAPPC
V3.00

Appendix 8 Checklist for environmental closure planning

Source: Appendix 5 to US Environmental Annex (Annex L) to an OPLAN (generic template).

HEADQUARTERS

UNIT #

ADDRESS

1. (U) Purpose. Provides a checklist for the final Environmental Closure Report for base camps.
2. (U) Responsibilities
   a. (U) Unit Commanders:
      (1) (U) Identify all hazardous materials (HAZMAT) andhazardous waste (HW) at least 60 days prior to scheduled re-deployment.
      (2) (U) Insure accountability and movement of all HW to the camp accumulation point and all HAZMAT to appropriate storage areas. This must occur before significant redeployment of soldiers to insure availability of manpower.
      (3) (U) Identify and mark (flag) areas of hazardous contamination and spills.
      (4) (U) Prepare a list of all spills and corrective actions taken, including camp site map identifying spill areas.
      (5) (U) Prepare a list of hazardous substance storage areas, motor pools, engine repair and battery shops, fuel storage, wash racks, and all areas where environmentally sensitive operations took place.
      (6) (U) Clean small contamination sites by excavating contaminated soil and turning in to HW accumulation points.
      (7) (U) Prepare a record of all clean-up efforts.
      (8) (U) Using proper procedures, clean empty POL tanks and fuel blivets at fuel points and maintenance areas.
      (9) (U) Pump out POL from sumps and POL separators into appropriate containers and move it to the camp HW accumulation point.
      (10) (U) Turn in all used oil to accumulation points.
      (11) (U) Empty fuel from heaters (as preparation for shipment) into special containers. Take this fuel to fuel storage areas or to HW accumulation points, as appropriate.
   b. (U) Unit Commanders:
      (1) (U) Prepare Environmental Final Conditions Report in coordination with the Joint Force Engineer and staff Surgeon no later than 30 days before closure.
      (2) (U) Direct units to assist with environmental closure tasks, as required.

(3) (U) Provide environmental specialist to the base camp closure assessment team.

(4) (U) Conduct a joint assessment with the Joint Force Surgeon to determine imminent health threats as part of the base camp closure assessment team.

(5) (U) Examine critical camp areas for possible contamination. This includes spill sites, hazardous substance accumulation points, motor pools, engine repair and battery shops, fuel storage, wash racks, and all areas where environmentally sensitive operations took place. Recommend remedial action, if required.

(6) (U) Identify any site conditions or existing legal or real estate agreements that define environmental actions or projects that must continue after transfer of the site. Coordinate with contracting officer to execute these actions.

(7) (U) Maintain all environmental documents and provide them for periodic archiving.

c. (U) DRMS [For non-US: organization responsible for HW management]:

(1) (U) Accept, account for, and store HW from the contractor.

(2) (U) Arrange for final disposal of all HW.

d. (U) Contractor:

(1) (U) Accept HW at established base camp accumulation points and HW storage areas.

(2) (U) Maintain HW accumulation points at base camps and a HW storage site to ensure timely removal from the camps.

(3) (U) Coordinate with base camp commanders to insure timely turn-in of HW.

(4) (U) Notify the Unit Commander of any site with known HW contamination. Test, collect, and transport to temporary storage, as directed (see DRMS responsibilities for disposal).

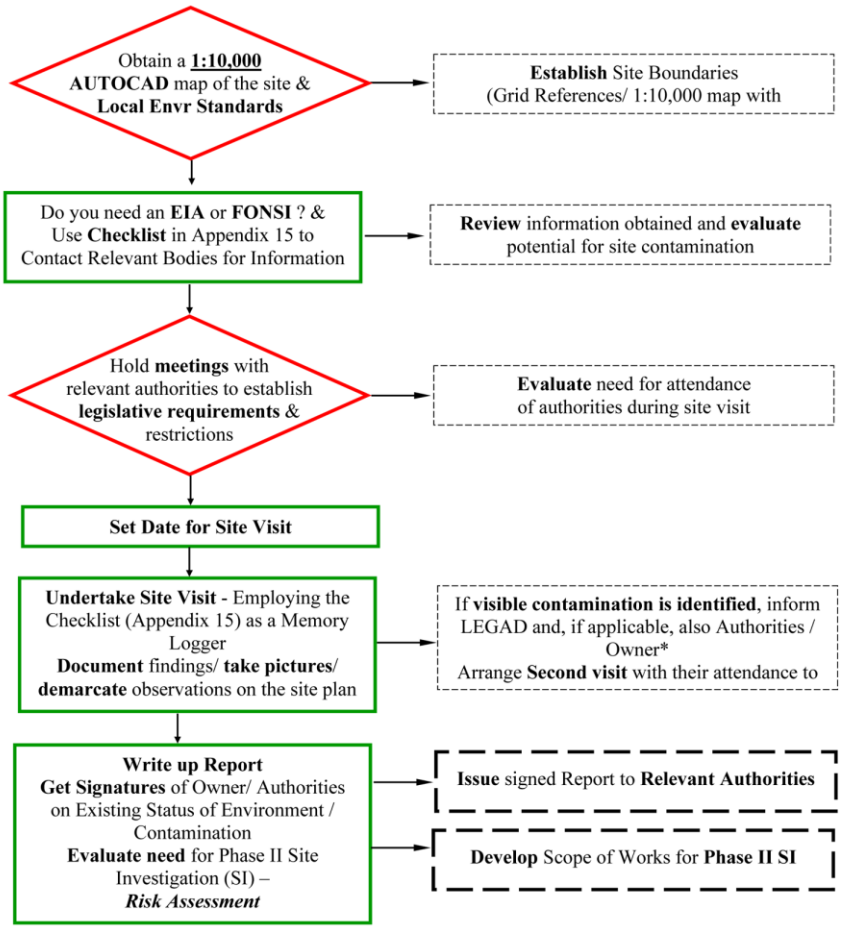
(5) (U) Prepare and execute closure plans for services that impact on the environment (e.g. wash racks, gray water drainage, black water drainage, incinerators). Decommission services as directed.

(6) (U) Prepare a list of all spills and corrective actions taken, including a camp site map identifying spill areas.

(7) (U) Prepare a list of all environmentally sensitive operations (motor pools, wash racks, etc.).

Appendix 9 Sequence of events for a phase I desk study

Source: EUFOR SOP J4 6292, Appendix 1 to Annex C.



- In case of 'opening a new site' it is the *property owner*. In case of 'closure' it is the *lead nation*

Appendix 10 Background issues to be adressed during a phase I - desk study

Source: EUFOR SOP J4 6292, Appendix 2 to Annex C.

STEP 1. **FIRST SCREENING:** Determine if a planned project (e.g. site occupation) has a level of impact on the environment requiring the preparation of an **Environmental Impact Assessment (EIA)** or if a **Finding of NO Significant Impact (FONSI)** is the appropriate conclusion. Sources for information for each environmental issue/receptor are indicated in STEP 2.

Finding of NO Significant Impact (FONSI)

Summary of consideration on significance impact of new activity/project		
Envr Issue Receptor	Significant? ✓ or N/A	Reasons the action **IS** or **IS NOT** significant
Topography landscape and visual		
Geology and soils		
Land use		
Wetland		
Contaminated land		
Public land, Scenic & Recreational areas		
Archaeology & Historic buildings		
Air quality and climatic factors		
Noise and vibrations		
Water (surface and ground)		
Forest resources		
Fauna & Flora		
Ecology		
Amenity & socio-economic		
Waste (any kind)		
Cumulative impact		
	TOTAL	If **ALL** receptors are **NOT SIGNIFICANT** (N/A) then it is a **FONSI**

Significance testing

The standard, widely agreed practice for decision making with respect to significance is the sensitivity/magnitude matrix:

		MAGNITUDE OF IMPACT		
		High	Medium	Low
SENSITIVITY OF RECEPTORS	High	**Severe**	**Severe/Moderate**	**Moderate**
	Medium	**Severe/moderate**	**Moderate**	**Moderate/Low**
	Low	**Moderate/Low**	**Low**	**Low**

Determining Magnitude

- What is the **frequency and duration?**
- What is the **proximity** to the sensitive receptors?
- Is the timing likely to be sensitive to a particular receptor?
- Is there a high level of **risk** associated with the impact, such as exposure of humans to contaminants or pollution, or high risk of accident?
- Is the effect likely to be **irreversible?**
- Is the effect likely to combine with other effects in the area/region in a way that could combine with other impacts in a **cumulative** way to threaten a receptor?

STEP 2. SECOND SCREENING: If FONSI is NOT the appropriate conclusion, then more detailed information should addressed. Examples of questions to be asked, but not limited to, are:

Checklist of background issues to be adressed - Phase I

Envr Issue	Example Questions	Information Types	Information Sources
Air Quality	• Is it good / bad / medium? • Does it get worse at some times during the year?	• Air Quality Monitoring Data • General Public complaints	• Local Authority – municipalities • Local population survey
	• Does it affect human health?	• Health problems	• Health Authority • Hospital statistics • Local population survey
Meteorology	• Which direction does the wind typically blow and frequency (spread of dust / pollution)?	• Predominant wind direction / wind rose	• Airport • Local met stations • Local institute of meteorology
	• Is it a wet region? High snowfall? Flooding?	• Precipitation – rain / snow	• Airport • Local met stations • Local institute of meteorology
	• What temperature ranges are there?	• Annual Temperature ranges	• Airport • Local met stations • Local institute of meteorology
	• Is there inversion activity in the area?	• Inversion – atmospheric pressures	• Airport • Local met stations • Local institute of meteorology
Radioactive Waste	• Are there nuclear waste disposal sites in the area? • Origin? (Industry, medical, nuclear power plants, fuel cycle, decommissioning)	• Maps • Industry Registers • Physical properties: state (liquid, solid, aeriform), compactability, volatility, solubility, etc.Maps	• Local Authority – municipalities • Ministry of Defence Airport • Hospitals • Industry

Envr Issue	Example Questions	Information Types	Information Sources
Surface Water	• What rivers, lakes, streams, ditches are in the area? Are any close to the site/ on site and where do they discharge?	• Maps	• Local municipality • Water authority • Public Utilities (sewerage systems)
	• What is the quality of the water?	• Monitoring data • River Classification	• Local municipality • Water authority
	• Is it used for anything – drinking water? Agricultural water? Fish farming? Is it treated or used directly by small populations?	• Water abstraction licenses • Local wells / pumps	• Local municipality • Water authority • Local Population
	• What discharges to the relevant water courses – untreated sewage? Industrial discharges?	• Industry • Sewage / Waste Water Treatment Plants	• Local municipality • Water authority • Industry authority • Local Population • Public Utilities (sewerage systems)
	• Is water used for amenity purposes – bathing / swimming / fishing?	• Recreational areas	• Local municipality • Water authority • Local Population
Groundwater	• What depth is the groundwater? What aquifers exist?	• Hydro geological maps • Geological maps	• Geological / hydro geological institutes • Local water company • Local municipality
	• What is the quality of the water?	• Monitoring data • Groundwater protection / classification zones	• Geological / hydro geological institutes • Universities • Local water company • Local municipality
	• Is it used for anything – drinking water? Agriculture? Industry? Is the water treated or used directly by small populations?	• Maps • Abstraction licenses	• Geological / hydro geological institutes • Local water company • Local municipality • Local population • Industry
	• What industries / activities exist on groundwater zone?	• Maps • Mineral Abstraction Licenses • Waste Disposal licenses • Industry operating Licenses	• Mineral Authority • Industry • Local Municipality • Waste Companies

Envr Issue	Example Questions	Information Types	Information Sources
Natural Resources	• Are there protected areas / areas of scientific, national or local interest?	• Maps • Protected Area Lists • Guidebooks • Local nature books	• Environment Authority • University natural history / Biology / Botany departments • Local municipality
	• Are there woodlands present? Are they used for recreational or economic purposes?	• Maps • Industry Licenses • Guide books	• Environment Authority • University natural history departments • Local municipality
	• Are rare species known to be present in the area?	• Maps • Guidebooks • Protected area lists • Local nature books	• Environment Authority • University natural history / Biology/ Botany departments • Local municipality
	• Are there areas of historical / archaeological interest present?	• Maps • Guide books • Archaeological Maps / lists • Geological Maps / lists	• Environment Authority • University natural history / history / archaeology / geology departments • Local municipality
Waste Management	• What activities occur – industrial / agricultural / waste disposal / water treatment, etc.	• Maps • Land Registers • Industry Registers / Licenses	• Land registry • Local municipality • Industry Authority • Health Authority • Agriculture Authority • Water Authority • Waste Authority
	• Are dump sites / landfill sites / waste treatment activities situated near to the site?	• Maps • Industry Registers	• Land registry • Local municipality • Industry Authority • Health Authority • Agriculture Authority • Water Authority • Waste Authority
	• Are the sites well managed or poorly managed? How were they designed	• Waste licenses • Original designs	• Local municipality • Industry Authority • Waste Authority • Waste Management Company

Envr Issue	Example Questions	Information Types	Information Sources
Historical land use	• Industrial use of the site including waste dumps	• Historical / Archive maps • Land Registers • Guidebooks • History books	• Local municipality • Land registry • Libraries • University Archaeology / history departments • Industry Authority
	• Agricultural use of the site	• Historical / Archive maps • Land Registers • Guidebooks • History books	• Local municipality • Land registry • Libraries • University Archaeology / history departments • Agricultural Authority
	• Housing / retail use of the site	• Historical / Archive maps • Land Registers • Guidebooks • History books	• Local municipality • Land registry • Libraries • University Archaeology / history
	• Medical usage of the site	• Historical / Archive maps • Land Registers • Guidebooks • History books	• Local municipality • Land registry • Libraries • University Archaeology / history departments • Health authority
Neighbours	• Who occupies land close to the site	• Maps • Land Registers	• Land registry • Local municipality

STEP 3. ASSESMENT QUESTIONNAIRE DURING A PHASE I DESK STUDY

ASSESSMENT DATA

Date:	Assessor:
Site name:	Grid:
Ownership	
Purpose:	

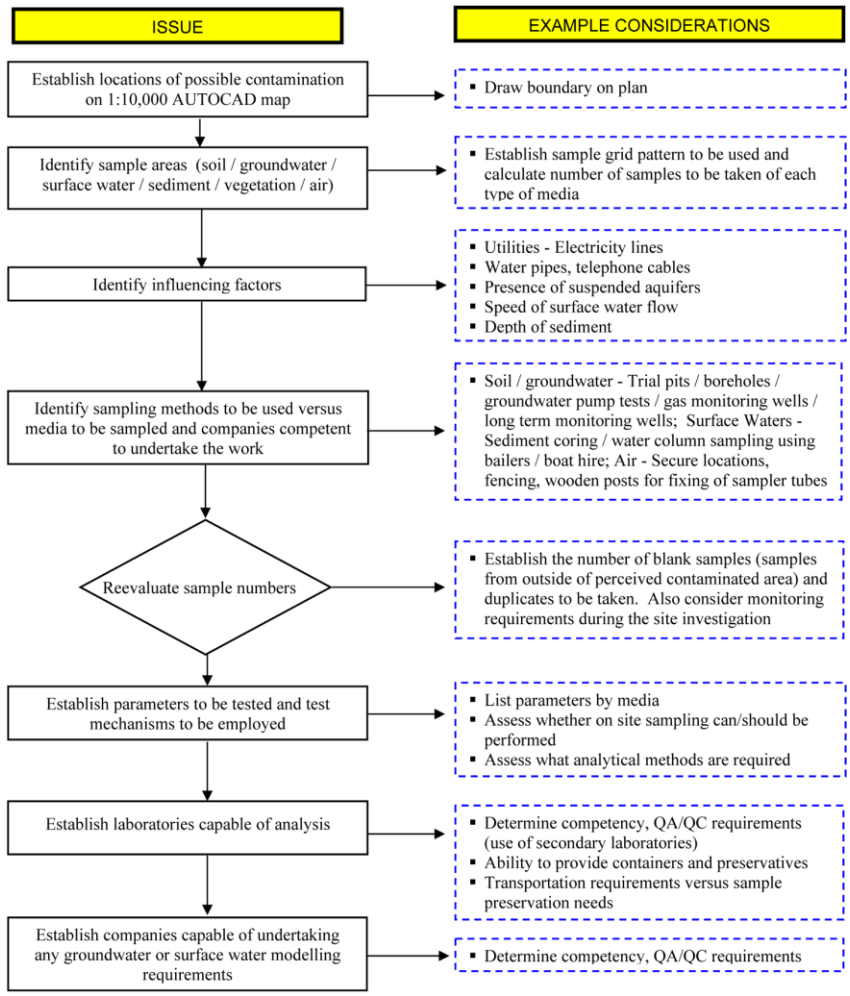
Envr Issue	Questions	COMMENTS
Air Quality	• Is it good / bad / medium?	•
	• Does it get worse at some times during the year?	•
	• Does it affect human health?	•
Meteorology	• Which direction does the wind typically blow and frequency (spread of dust / pollution)?	•
	• Is it a wet region? High snowfall? Flooding?	•
	• What temperature ranges are there?	•
	• Is there inversion activity in the area?	•
Radioactive Waste	• Are there nuclear waste disposal sites in the area? • Origin? (Industry, medical, nuclear power plants, fuel cycle, decommissioning)	•
Surface Water	• What rivers, lakes, streams, ditches are in the area? Are any close to the site/ on site and where do they discharge?	•
	• What is the quality of the water?	•
	• Is it used for anything – drinking water? Agricultural water? Fish farming? Is it treated or used directly by small populations?	•

Envr Issue	Questions	COMMENTS
	• What discharges to the relevant water courses – untreated sewage? Industrial discharges?	•
	• Is water used for amenity purposes – bathing / swimming / fishing?	•
Groundwater	• What depth is the groundwater? What aquifers exist?	•
	• What is the quality of the water?	•
	• Is it used for anything – drinking water? Agriculture? Industry? Is the water treated or used directly by small populations?	•
	• What industries / activities exist on groundwater zone?	•
Natural Resources	• Are there protected areas / areas of scientific, national or local interest?	•
	• Are there woodlands present? Are they used for recreational or economic purposes?	•
	• Are rare species known to be present in the area?	•
	• Are there areas of historical / archaeological interest present?	•
Waste Management	• What activities occur – industrial / agricultural / waste disposal / water treatment, etc.	•
	• Are dump sites / landfill sites / waste treatment activities situated near to the site?	•
	• Are the sites well managed or poorly managed? How were they designed	•

Envr Issue	Questions	COMMENTS
Historical land use	• Industrial use of the site including waste dumps	•
	• Agricultural use of the site	•
	• Housing / retail use of the site	•
	• Medical usage of the site	•
Neighbours	• Who occupies land close to the site	•

Appendix 11 Aide memoir for site investigation planning

Source: EUFOR SOP J4 6292, Appendix 1 to Annex D.



Appendix 12 Checklist of factors to consider when planning a phase II site investigation

Source: EUFOR SOP J4 6292, Appendix 2 to Annex D.

1. The information presented is simply an Aide Memoir to help in the planning process. Not all of the issues presented here will be applicable to every Phase II investigation.

Issues		Factors to Consider	Sampling Locations/ Considerations
Sample locations	• Where to sample	▪ Obvious or what appears to be obvious points of contamination / presence of materials such as asbestos or transformer oil ▪ Possible points of contamination (areas around / from historical use) ▪ Down slope of contamination point ▪ Water discharge points	▪ Visibly contaminated areas ▪ Areas where historical activities could have affected contamination ▪ Based on geology follow the slope of the ground/ soil profile ▪ Where discharge from contaminated areas are to drains or discharge from the site into a water body occurs
	Sample point numbers	▪ At every point of obvious contamination ▪ Where contamination is suspected	▪ The number of sample points required is dependent on the size of the site and whether hot spots of contamination are expected or whether the contamination is believed to be more widespread. Sources of information on sample point identification are presented in ANNEX A TO HQ EUFOR/NHQ Sa COMMON SOP J4 6292
	Number of samples	▪ One per not at sampling grid ▪ At every change of strata ▪ Whenever water is detected ▪ Water - At strata change ▪ Water - At different depths and positions within a watercourse ▪ Sediment – at different depths at different points in the water course.	▪ Duplicate samples for each sample taken. ▪ Blank samples for each location – to determine background quality in a known or believed to be uncontaminated area as some areas are naturally high in metals for example

Issues		Factors to Consider	Sampling Locations/ Considerations
	Factors to be taken into consideration when choosing sample points	▪ Utilities – electricity / drainage runs / water pipes / sewage pipes / phone lines ▪ Suspended aquifers separated from major sensitive or protected aquifers by a shallow layer of impermeable strata. ▪ Speed of water flow – dilution of contaminants / concentration of contaminants	▪ Hitting such utilities is costly, dangerous for the excavator / driller and can lead to pollution ▪ If the perched aquifer is contaminated, any breach of the separation layer can result in the underlying aquifer being contaminated. ▪ Puncturing of the protective layer can lead to a crossing point for overlying contamination (present or future) to the groundwater aquifer
Sample Types (collection for on site analysis)	Sample containers	▪ Contaminants can react with the sample container giving false readings on analysis.	▪ Use of colorimetric testing equipment on site requires the use of disposable reaction vessels to prevent cross- contamination. ▪ Dilution of samples may be required prior to analysis. This will involve the use of distilled water and accurate measuring equipment including pipettes and calibrated beakers.
Sample Types (collection for laboratory analysis)	Sample containers, preservatives and storage times	▪ Contaminants can react with the sample container giving false readings on analysis. ▪ Some contaminants need preservatives to prevent their decay. ▪ Storage times are limited by the degradation rate of the contaminant.	▪ Sample containers with preservatives included can be obtained from the analytical laboratory to be used. ▪ Storage prior to transporting to the laboratory typically involves the use of cooling systems (cool boxes or refrigerators)

Issues		Factors to Consider	Sampling Locations/ Considerations
Sampling methods - Excavation	Sample Pits (Trial Pits)	▪ The use of sample pits will allow samples to be obtained up to a depth of 3 m below ground level. Where groundwater samples are required, where bedrock is close to the surface and precludes the use of an excavator for sampling or where open pits may pose a danger boreholes should be used.	▪ Sample pits can be excavated using a simple back-hoe excavator ▪ Where obvious contamination is present, the excavator bucket should be washed down with a high pressure spray at every change in strata or when new contamination is observed. ▪ The excavator should be hosed down every evening after completion of the days drilling, especially if it is to leave the site to prevent off site transportation of contaminants.
	Boreholes	▪ For the obtaining of soil samples from greater than 3 m or for the sampling of groundwater and assessment of directional flow, it is necessary to use boreholes	▪ Boreholes can be drilled using either percussion methods (shell and auger) for permeable strata or rotary/ percussion drilling for bedrock / solid strata. ▪ The use of water or drilling fluids as part of the drilling process should be avoided at all costs to prevent the introduction of contaminants to the borehole and thus a false positive result on contamination. Air flushing should be used wherever possible.

STEP 4. CONSIDERATIONS REGARDING CHOICE OF LABORATORY FOR SAMPLE ANALYSIS

2. Samples collected during the sampling regime should be stored in a manner to prevent degradation / loss of contaminants before reaching the laboratory. The choice of laboratories is important from several reasons:

STEP 5. There is a need to ensure that analysis performed gives accurate results by accredited methods and to accredited standards.

STEP 6. Local governments / population may be apprehensive of results obtained from military laboratories or non-local laboratories

STEP 7. Local laboratories may not be able to perform the entire sample analysis required or may not be accredited to a level which gives “international” confidence in the results.

STEP 8. Transportation time may affect the quality of some samples (e.g. micro-biological samples or for Biological Oxygen Demand).

STEP 9. CONSIDERATIONS IN RESPECT OF MONITORING REQUIREMENTS

3. On occasion, short or long term monitoring may be required as part of the Phase II Site Investigation to establish contaminant migration or to detect "pulses" of contaminant migration. The type of monitoring regime to be employed needs to be taken into account when planning a site investigation. Typical monitoring requirements are:

a. Groundwater monitoring – flow

- Direction of flow
- Recharge of the aquifer
- Contaminant presence
- Contaminant plume migration

b. Explosive Gas in Ground

- Monitoring of gas migration routes
- Monitoring of gas presence under different barometric pressures

c. Air Quality

- Monitoring of air quality arising from point source emissions
- Monitoring of ambient air quality

4. For sources of information on best practice methods refer to ANNEX A TO HQ EUFOR/NHQ Sa COMMON SOP J4 6292

STEP 10. CONSIDERATIONS REGARDING MODELLING USED TO ESTABLISH PATTERNS OF MIGRATION AND DEGRADATION

5. Occasionally, modelling may be required for the assessment of groundwater flow or plume migration or for the dispersion of air emissions from a point source (e.g. generator or incinerator). For sources of information on best practice models and software to employ refer to ANNEX A TO HQ EUFOR/NHQ Sa COMMON SOP J4 6292

Appendix 13 Template for environmental site closure survey report

1 EXECUTIVE SUMMARY

2 INTRODUCTION

3 PURPOSE AND SCOPE OF THE STUDY

4 REFERENCES

Applicable environmental laws and regulations.

Command guidance references.

Initial EBS (and any applicable update), Environmental Condition Reports, Environmental Logs and other documentation

PHASE I

5 SITE LOCATION

Location and site survey boundaries

6 GENERAL SITE SETTING

6.1 Current use of the property

6.2 Past uses of the property

6.3 Current and past uses of surrounding areas

6.4 Terrain, topography and geology

6.5 Climate

6.6 Groundwater conditions

6.7 Surface water conditions

6.8 Structures and infrastructure

6.9 Cultural resources

6.10 Natural resources

7 ENVIRONMENTAL MANAGEMENT DURING THE OPERATION

Organization and responsibilities, description of the EMS

8 SITE VISIT

8.1 General

Time, personnel and their qualifications

8.2 Methodology

Document reviewed

Site inspections

Personal Interviews

9 ENVIROMENTAL AREAS OF CONCERN

9.1 Handling and storage of petrol and other oil products

Uses and types of products, storage tanks (size, location, condition), pipelines and transfer systems, protection measures, procedures, oil/ water separators. Include energy production and heating/cooling.

9.2 Handling and storage of hazardous materials

Uses and types of products, storage areas, protection measures, procedures

9.3 Generation and management of wastes

Types and amounts of waste generated, management and disposal methods, procedures, possible landfills and burn pits. Include hazardous and medical waste.

9.4 Generation and management of waste water

Types and amounts of waste water (grey and black) generated, collection and treatment methods, discharge areas and quality of discharged water. Include water from possible fire-fighting area.

9.5 Pest and vegetation control

9.6 Overland flow and storm water management

9.7 Vehicle maintenance

9.8 Vehicle washing

9.9 Vehicle parking

9.10 Ammunition and explosive storage

9.11 Shooting ranges

9.12 Known historical contamination

9.13 Water supply

Describe water supply, treatment and use, for assessment of possible impacts on groundwater conditions.

9.14 Natural resources

9.15 Cultural resources

10 REPORTED INCIDENTS

11 CONCLUSIONS OF PHASE I

A summary of Phase I findings and an assessment of the necessity of a Phase II site survey.

PHASE II

12 SITE SURVEY

12.1 Site Survey Plan

12.1.1 Sampling locations

12.1.2 Sample types

12.1.3 Sampling requirements

12.1.4 Analysis requirements

12.2 Site Survey Results

12.2.1 Description of sampling

Including methodology, field logs, pictures and maps

12.2.2 Results

13 ENVIRONMENTAL ASSESSMENT

13.1 Agreed assessment criteria for site closure

13.2 Assessment of environmental impacts

13.2.1 Soil and groundwater contamination

13.2.2 Surface water contamination

13.2.3 Impacts on natural resources

13.2.4 Impacts on cultural resources

13.2.5 Other impacts

14 CONCLUSIONS OF ENVIRONMENTAL SITE CLOSURE SURVEY

A summary of the key environmental impacts, considerations and risks for the purpose of recommending courses of action.

15 RECOMMENDED ACTIONS

ANNEXES

ANNEX A - PHOTOGRAPHS

ANNEX B - RECORDS OF INTERVIEW

ANNEX C – COPIES OF IMPORTANTS DOCUMENTS

ANNEX D – SITE SURVEY FIELD LOGS

ANNEX E - SUMMARY OF ANALYTICAL RESULTS

ANNEX F – ORIGINAL LABORATORY ANALYSIS RESULT DOCUMENTS

FIGURES

FIGURE 1 - LOCATION MAP

FIGURE 2 - SITE LAYOUT MAP, AOC'S

FIGURE 3 – SAMPLING LOCATIONS

Appendix 14 Practices and lessons learned checklist for an environmental officer

Purpose:

Date: xx.yy.200x

Nro	*Subject*	*Yes*		*No*	*If YES, explain the best practise* *If NO, explain the situation and how to overcome the problem*	*Other remarks*
1.	**ENVIRONMENTAL PERSONNEL RESOURCES**					
1.1.	Field Sanitation Team (FST) personnel appointed with accurate subject matter education and expertise					
1.2.	HazMat responsible person appointed					
1.3.	Other environmental personnel appointed					
1.4.	Environmental Management Board (EMB) appointed and working effectively					
1.5.	Environmental personnel's education & briefings conducted in mission oriented matter					
1.6.						
2.	**STATEMENTS, ORDERS AND OTHER DOCUMENTS**					
2.1.	CO's Environmental Protection Statement OPORDER annex L …					
2.2.	SOPs					
2.2.	Environmental Damage Reporting order					
2.3.	Environmental Damage Reporting form					
2.4.	Waste sorting order					
2.5.	HazMat handling and sorting order					
2.6.	Environmental Status Report documents					
2.7.	All other relevant document (OPORDER, TAs etc)					
2.8.	Etc…					

3.	**ENVIRONMENTAL MATERIAL RESOURCES / FIELD HYGIENE LAB**					
3.1.	Field laboratory was easy to put up					
3.2.	Field hygiene and environmental material available and appropriate techniques used					
3.3.	All manuals, orders and instructions available					
3.4.	Etc…					
	Suggest Best Practise equipment and procedures				*Proper listing should be done while packing the containers in SN (easy to unpack)* *Field lab should be taken into account in camp lay-out planning*	
4.	**ENVIRONMENTAL SAMPLING AND RESULTS**					
4.1.	Soil samples					
4.2.	Water samples					
4.3.	Waste water samples					
4.4.	Other environmental samples					
4.5.	Etc…					
	Suggest Best Practise equipment and procedures					
5.	**CONTRACTS**					
5.1.	Mobile toilets daily cleaning service					
5.2.	Water Treatment Plant service					
5.3.	Sewage Treatment Containers service					
5.4.	Mixed Waste daily service					
5.5.	HazMat Collection service					
5.6.	Environmental Lab in SN					
	Describe typical contract management and audit procedures					
	Describe mission specific problems associated with contract management				*Language and cultural difficulties when writing contracts*	
6.	**CONTACTS**					
6.1.	Environmental Lab in HN					
6.2.	Environmental Lab in SN					*XX, e-mail:*
6.3.	Environmental Authorities in HN					
6.4.	Environmental personnel in Mission HQ					*YY*
6.5.	Environmental personnel in other Units					*ZZ, VV, WW*
	List any other necessary contact useful in the mission					

7.	**WATER AND WASTE WATER**					
7.1.						
7.2.						
7.3.						
7.4.						
	Suggest Best Practise equipment and procedures					
8.	**WASTE DISPOSAL**					
8.1.	Daily service inside the Camp(s)					
8.2.	Waste collection from the Camp(s)					
8.3.	Burning of wastes					
8.4.	Burying of wastes					
8.5.	Composting of bio wastes					
8.6.						
	Suggest Best Practise equipment and procedures					
9.	**HAZMAT**					
9.1.	Adequate HazMat containers controlled, locked and in use					
9.2.	Incinerator available					
9.3.	Proper documentation (dates, amounts, sorts)					
9.4.						
	Suggest Best Practise equipment and procedures					
10.	**FIRE TRAINING AREA**					
10.1.						
10.2.						
	Suggest Best Practise equipment and procedures					
11.	**WORKSHOP**					
11.1.	Area is fully covered					
11.2.	Area has hard surface					
11.3.	Workshop is drained					
11.4.	Oil/water separator in use					
	Suggest Best Practise equipment and procedures					
12.	**VEHICLE PARKING AREAS**					
12.1.	Areas have hard surfaces (concrete, asphalt)					
12.2.	Areas have oil/water separator					
12.3.						
	Suggest Best Practise equipment and procedures					
13.	**POL STATION AND VEHICLE WASHING AREAS**					
13.1.	Areas have hard surfaces (concrete, asphalt)					
13.2.	Areas have oil/water separator					
13.3.	Absorbent mats/granules available					

13.4.	Detergent used in washing areas					
13.5.						
	Suggest Best Practise equipment and procedures					
14.	**GENERATORS**					
14.1.						
14.1.						
	Suggest Best Practise equipment and procedures					
15.	**AMMUNITIONS AND EXPLOSIVES**					
15.1.						
15.2.						
	Suggest Best Practise equipment and procedures					
16.	**CONTAMINATED SOIL HANDLING AND STORING PLACE**					
16.1.	Proper place available					
16.2.						
16.3.						
	Suggest Best Practise equipment and procedures				*Reserve an area for contaminated soil handling*	
17.	**NATURAL RESOURCES PROTECTION**					
17.1.	Water					
17.2.	Vegetation					
17.3.	Wildlife					
17.4.	Air					
17.5.	Marine					
	Suggest Best Practise equipment and procedures					
18.	**CULTURAL AND HISTORICAL PRESERVATION**					
18.1.	Cultural and historical targets reconnoitred and listed in AOO					
18.2.	Management Plan done and approved by CO					
	Suggest Best Practise equipment and procedures					
19.	**ENVIRONMENTAL PROTECTION TRAINING, EDUCATION AND EDUCATION MATERIAL**					
19.1.	Common training and education material available					
19.2.	Common EP lectures given to the troops in the theatre					
19.3.	Specific EP lectures given to the EMB					
19.4.	Specific EP lectures given to POL handling personnel					
19.5.	Specific EP lectures given to the					

	local cleaning workers					
	Suggest Best Practise equipment and procedures				*EP education should be given already in rotation phase in SN*	
20.	**ENVIRONMENTAL DAMAGES**					
20.1.	Petroleum spill					17.1.2007
20.2.	Olive tree damages					3.12.2006
20.3.	Sewage Ditch running from the XX Camp					Oct 2006 – Mar2007
	Suggest Best Practise equipment and procedures					

Appendix 15 Template for an environmental after action report

Memorandum for the Record

Subject: Environmental Protection After Action Report

1. General Information.
   a. Operation/Deployment Name:
   b. Date/Time:
   c. Location/Country of Deployment:
2. Environmental Issue #1.
   a. Issue: (short one-line description of environmental protection issue)
   b. Discussion: (tied to task and standard if possible)
   c. Recommendation: (indicate how the unit could have executed the task(s) better or describe training that will be needed to improve future performances)
3. Environmental Issue #2.
   a. Issue:
   b. Discussion:
   c. Recommendation:
4. Environmental Issue #3.
   a. Issue:
   b. Discussion:
   c. Recommendation:
5. Lessons Identified/Learned.
6. Point of contact.

<Signature>

Your Name

Title

Unit

Projektledare	Hans-Björn Fischhaber, HKV Prod Miljö
Redaktör	Roger Tiensuu, Citec Information AB