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Guide on Inspection of Industrial Facilities

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Explanatory Note by the Secretariat

1. Several articles to the Protocols under the Barcelona convention refer to the obligations to ensure implementation and law enforcement. In particular the Land based Sources and Activities Protocol as amended in 1996, under its Article 6 on authorization or regulation system provides for:

> *"Point source discharges into the Protocol Area, and releases into water or air that reach and may affect the Mediterranean Area, as defined in article 3(a), (c) and (d) of this Protocol, shall be strictly subject to authorization or regulation by the competent authorities of the Parties, taking due account of the provisions of this Protocol and annex II thereto, as well as the relevant decisions or recommendations of the meetings of the Contracting Parties.*
>
> *To this end, the Parties shall provide for systems of inspection by their competent authorities to assess compliance with authorizations and regulations.*
>
> *The Parties may be assisted by the Organization, upon request, in establishing new, or strengthening existing, competent structures for inspection of compliance with authorizations and regulations. Such assistance shall include special training of personnel.*
>
> *The Parties establish appropriate sanctions in case of non-compliance with the authorizations and regulations and ensure their application."*

2. In the framework of MED POL Programme of UNEP/MAP, an informal network on enforcement and compliance had been established which meets on regular basis and aims at sharing relevant best practices with the view to support the Contracting Parties to comply with the obligations under Article 6 above.

3. One of the activities approved under the MAP PoW 2016-2017, COP 19, Athens, Greece, 2016, is related to the preparation of guide documents to facilitate both the identification or selection of BAT during the authorization (permit) process as well as and the environmental inspections of facilities in view of BAT implementation.

4. The present document represent a practical and simple guidance tool to support the relevant national authorities in promoting BAT application in the inspection process.

5. The document is composed of two main parts, a general one addressing overall processes related to inspection such as planning, effectiveness, follow up, indicators, etc., and a second one addressing check lists required to facilitate the inspection process with the view to be used as guidance for the conduction of inspections in selected industrial sectors.

6. The version of the Guide presented in the document has fully reflected the changes made by the Meeting of the Mediterranean Informal Network on Compliance and Enforcement, held in Loutraki, Greece, on 6-7 April 2017. The present version also includes in square brackets and highlighted a change proposed by Italy after the Meeting, together with an explanatory footnote, in order to be reviewed by the MED POL Focal Points Meeting (Rome, Italy, 29-31 May 2017).

Guide on Inspection of Industrial Facilities

Table of contents

Tables

Figures

Annnexes

Abbreviations/Acronyms

AEL	Associated Emmission Limit
AOD	Argon Oxygen Decarburization
BAT	Best Available Technique
BREF	Reference Documents
EAF	Electric Arc Furnace
ELV	Emission Limit Value
EMAS	Environmental Management and Audit System
EMS	Environmental Management System
EQS	Environmental Quality Standards
EU	European Union
IMPEL	European Union Network for the Implementation and Enforcement of Environmental Law
ISO	International Standards Organization
PCB	Polychlorinated Biphenyls
PCDD/F	Polychlorinated Dibenzodioxins / Furans
PRTR	Pollution Release and Transfer Register
UO	Unit Operation
VOD	Vacuum Oxygen Decarburization
WWTP	Wastewater Treatment Plant

Introduction

1. The Guide on inspection of industrial facilities is aiming at the acquaintance of the national inspecting authorities with the general framework for conducting of inspections which includes issues such as planning, preparation and execution of an inspection focusing on practical issues such as the relevant checklists to be used during a site visit. Therefore the Guide will contain a general part which is essential to understand the steps to be taken for a successful conduction of an inspection; on the other hand the practical checklists will give an insight into the technologies (introduced in a facility, either as production units or as pollution abatement measures) as well as on the main pollutants to be checked for some industrial sectors (as examples). As a matter of fact the Guide will be mainly tailored to assess the BAT performance of an industrial installation in order to find out whether the relevant BAT described in the permit are put in place and perform according to the permit’s conditions (ELV).

2. In doing so, the inspector has to be provided with a set of information which will help him to assess whether the installed BAT are fulfilling the scope of their introduction in the industrial process i.e. meeting the ELV as well as reducing the consumption of resources.

3. The target groups for the use of the Guide are mainly the national inspectors who are generally familiar with the conduction of inspections but they need well documented tools to facilitate their work i.e. the relevant checklists. Additionally the permit writers will also benefit because they will understand the practical context where the on-site inspections are conducted so that they will be able to modify the relevant permits according to inspections’ findings.

4. The purpose of routine/non-routine inspections is to check compliance of the inspected installations with legal requirements and permit conditions. In case of non-compliance the competent authority will require the operator to take measures necessary to ensure that compliance is restored.

5. Following each site visit, the competent authority prepares a report describing the relevant findings regarding compliance of the installation with the permit conditions and conclusions on whether any further action is necessary.

6. The purpose of this document is to provide the necessary background information for inspectors on how they have to inspect various industrial operations in order to better conduct their in-plant inspections.

7. The Guide is structured in 2 parts: part 1 (general) gives background information on the elements to be considered when inspections are planned i.e. planning/execution of an environmental inspection, reporting after the on-site visit and performance monitoring (i.e. evaluation of inspections, follow-up actions taken for enforcement, inspection performance indicators) whereas part 2 is devoted to the presentation of some checklists which will be used as guidance for the conduction of inspections in selected industrial sectors.

1. General part

1.1. Planning of an environmental inspection
1.1.1. Types of inspection

8. Before embarking to conduct an inspection it must be clear for the inspectors the framework/context which defines its purpose and scope in order to avoid scattered and bad organized site visits which inevitably will cause wasting of resources (e.g. manpower/equipment) and, on the other hand, eventual complaints of plant owners and of the public. Therefore an inspection program has to be designed which will follow concrete purposes, priorities and targets. In table 1 the types of inspections are shown.

Table 1: Inspection types

Inspection type	Objectives
Program	
Geographic	• Checking of pollution sources to specific receiving media • Checking of pollution sources from facilities in a specific area
Sector specific	Checking of aspects relevant to specific sector
Site inspection	
Comprehensive	Evaluation of compliance of all facilities of one/more sectors in a geographic area
Specific	Investigation of compliance status of one or more facilities on the basis of complaints
Follow-up	Evaluation of implementation of compliance procedures (from previous inspections)

9. Therefore the inspections' coordinator has to define in advance (i.e. before starting the inspections) whether the inspections should be devoted to a geographic area e.g. a river basin or a coast line where many installations are located or to a specific sector (e.g. iron/steel production) which contains several installations which are located in one or more geographical areas. In doing so, a good input for deciding about the inspection program is the historical findings from previous inspections i.e. inspection results from the past, monitoring results i.e. self-monitoring reports (prepared by the operators of the installation), any past/current complaints from the public etc.; the permit conditions i.e. critical pollutants and the associated emission limit values (ELV), environmental quality standards (EQS) of the ambient environment in the area concerned form the framework for setting the inspection priorities for those installations which potentially endanger the quality of the related recipients (water bodies, soil, air).

1.1.2. Minimum inspection criteria

10. All inspection activities should be planned in advance, by having inspection plans that cover the entire territory of the country and those sectors/installations which can cause a potential harm to the environment.

11. The plans should be based on:

(i) The legal requirements to be complied with
(ii) A register of controlled installations (structured according to their size and environmental "importance"
(iii) A general assessment of major environmental issues in the area

(iv) A general appraisal of the state of compliance of the controlled installations so far: number/size of installations which showed deviations from set standards in the past and of those ones which generally comply with the set legal requirements.

12. Each inspection plan should as a minimum:

- Define the geographical area which it covers, which may be for all or part of the territory of a country
- Cover a defined time period (e.g. one year)
- Include specific provisions for its revision
- Identify the specific sites or types of controlled installations covered
- Prescribe the programmes for routine inspections, taking into account environmental risks; these programmes should include, where appropriate, the frequency of site visits for different types of specified controlled installations
- Devote additional time for random inspections which can occur in case of unforeseen circumstances (e.g. sudden release of pollutants, public complaints)
- Provide for coordination between the different inspecting authorities, where relevant.

1.1.3. The inspection cycle

13. A schematic picture of the whole inspection cycle is given in figure 1. This is an interactive process; that means that the reporting findings can lead to a review/modification of the inspection plan.

This cycle can be further described (figure 2):

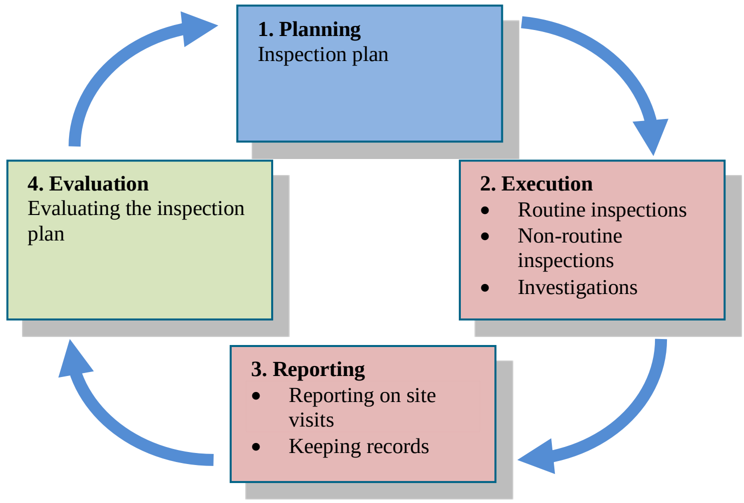

Figure 1: The inspection cycle

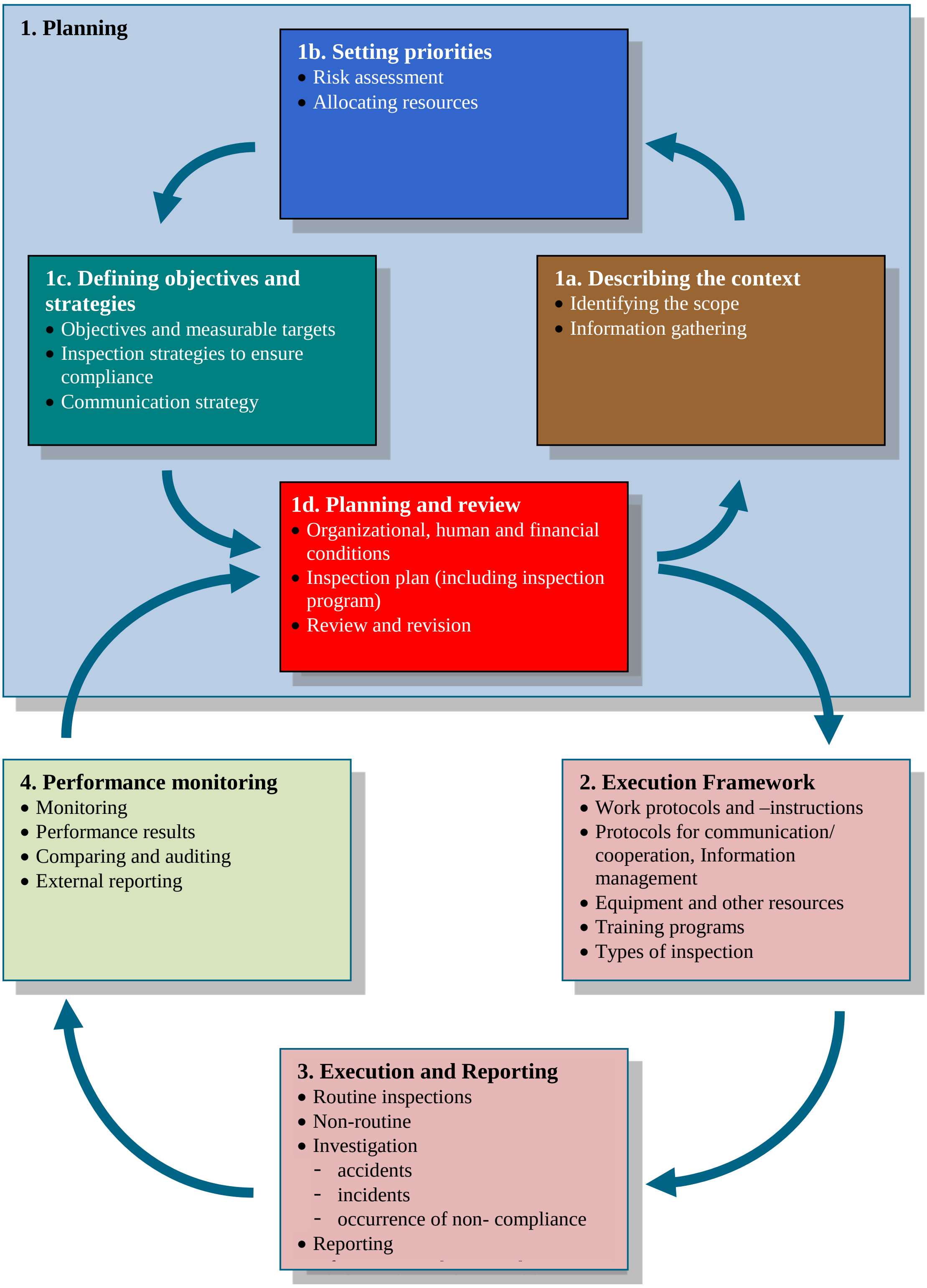

Figure 2: Inspection cycle – details

1.1.3.1. Context

14. Describing the context is a first step of the systematic approach for planning of inspections and a necessary input for identifying and analyzing the risks; it defines the scope and objectives of the inspection plan taking into consideration the country's environmental policies (as a whole or in a specific geographic area), the existing situation in the environmental recipients (water, air, soil), the available resources (i.e. financial means, manpower, equipment) so that a comprehensive, practical and targeted plan can be designed.

1.1.3.2. Setting priorities

15. Setting priorities starts with a risk assessment. The main goal of a risk assessment is to prioritize the workload of the inspectorate. The result of an assessment will result in an inspection frequency of site visits of inspection objects. The reason for prioritizing the workload is that inspecting authorities have limited resources (inspectors and finance), which should be distributed among the inspection objects in an accountable way. In a risk-based approach, most inspection effort should be expended on the objects with the highest risks (highest risk first).

16. Elements to be taken into consideration for the risk definition can be:

- Quantity/quality of air pollution
- Quantity/quality of water pollution
- Potential pollution of soil and ground water
- Waste production or waste management
- Amount of dangerous substances released
- Local nuisance (noise, odor)
- Local environmental conditions

1.1.3.3. Objectives/strategies

17. Based upon the priorities, the inspectorate should set targets and objectives. In order to establish whether these objectives and targets can be met, the outputs of the inspections must be monitored. This is generally done by using performance indicators. Examples of performance indicators that may be useful are:

- The amount of incidents or complaints occurring
- The level of compliance
- The actual achievement of reduction targets for certain pollutants
- Improvement of air, land and water quality through the actions of the inspectorate to improve compliance.

18. These indicators will be derived by analyzing historic monitoring/inspection data so that the strategy to be developed will not be too ambitious or too difficult to be implemented.

19. To determine the best inspection strategy it can be useful to assess the following 2 elements:
<u>Element 1</u>

20. Clearly define the target group (i.e. the installations) and the rules they have to comply with.

<u>Element 2</u>

21. How often and why the target group does not meet the standards set by the relevant permitting authorities.

22. The aim is to get an insight into the target group compliance behaviour and the motives for that behavior: in many cases the operators do not comply with the requirements due to:

- Increased costs
- Lack of qualified personnel for emissions monitoring
- Confidence that the inspections will rarely occur
- Bribing of inspectors

23. On the basis of these elements the inspection strategy will define the pathways to be followed in order to define the installations to be inspected according to the expected emitted pollution load, the installations' past behavior and the quality of the inspecting personnel.

1.1.3.4. Planning/review

24. Based upon the previous steps, the inspecting authority should then develop its inspection program and plan. The inspection program can be seen as a strategic reference document which will act as guidance throughout the whole inspection cycle.

25. The program will describe:

- The objectives that the Inspecting authority, given its mission and tasks, wants to achieve
- The policy, environmental, legal, organizational, financial and other relevant conditions under which the inspecting authority has to perform its inspection activities
- The strategies which the inspecting authority has adopted for performing its inspection activities
- How priorities with regard to inspection activities are set, taking into account these objectives, conditions and strategies
- The priorities themselves.

26. When developing the inspection program and inspection plan it is necessary to consider the organizational, human and financial circumstances. Most importantly the inspection program and the inspection plan should be in balance with the available resources and budgets and should be in line with the organizational structure.

27. When the program and the plan for the forthcoming inspections are set it will define and prioritize:

- ➢ The regions and environmental recipients which potentially are in danger from pollution caused by certain installations
- ➢ The industrial sectors which show a greater potential to harm the environmental quality of these recipients
- ➢ The relevant installations which have to be inspected in a defined time interval.

28. It must be noted that, obviously, the larger installations of a specific sector (e.g. food processing industry) have to be tackled first; however and due to the fact that many smaller industrial units can cause a cumulative pollution load (in some cases comparable to a single large one), the plan should envisage the inspection of some of these installations as well. The available resources (manpower, equipment) should be distributed accordingly. As a rule of thumb:

- ✓ All large installations discharging in a single recipient (e.g. a coast line, a river) have to be inspected
- ✓ Approx. 30 – 40 % of the medium/small installations have at least to be investigated.

29. The review and revision of the inspection plan is also part of this step of the environmental inspection cycle: it is possible that, after execution of the initial plan, some findings can show that, due

to improved performance of the inspectors or compliance with the permit standards of high risk installations, the plan's objectives and/or content have to be revised.

30. The inspection program should be multi-annual and reviewed/modified annually. Its intermediate and final performance has to be communicated to other relevant authorities as well as to the public: this communication can provide information on the numbers and types of regular inspection supervision (which can be approx. 60% of the total number of inspections), extraordinary inspection supervision (which can be approx. 40% of the total number of inspections) to be carried out, including the frequency of site visits for different types of specified installations to be controlled and of course some crucial inspection results on the basis of required confidentiality (e.g. how many installations have met/not met the standards, which environmental recipients are in danger etc.).

1.2. Execution of an environmental inspection

1.2.1. Execution framework

31. As framework is meant the preparation of the necessary "infrastructure" for the implementation of the inspection program/plan: the absence of it will lead to badly prepared on-site inspections.

32. Within this step, training, protocols and working instructions are developed and conditions for realization of inspections are established. This step is necessary to make sure that inspection activities can be executed effectively, efficiently, professionally and consistently.

33. The execution framework should at least cover:

- Training program(s) for the inspectors (staff) based on a training needs assessment
- Protocols and working instructions for routine inspections
- Protocols and working instructions for non-routine inspections (how to react to incidents and accidents).
- Procedures/guides for imposing sanctions
- Development of inspection and enforcement handbooks
- Protocols for communication with the public (access to information) and with industry
- Information management (e.g. information systems) and information exchange (within the organization and with partner organizations)
- Provisions and memoranda of understanding for cooperation with relevant partners (other inspecting authorities).

34. For the realization of the inspection framework some crucial conditions have to be fulfilled namely:

- ➢ Clear authorizations and competencies (e.g. legal right of access to site and information)
- ➢ All necessary assistance from the operators to carry out any site visits, to take samples and to gather information necessary for the performance of their duties (described in the inspection legislation)
- ➢ System for planning, programming and monitoring
- ➢ Facilities and materials needed (e.g. computers, transport, and means of communication).
- ➢ Maintenance and calibration of equipment.

1.2.1.1. Training

35. Inspectors in principle should be well trained persons on a continuous basis. This is a precaution as BAT are evolving and so does the law (e.g. issuing of permits, new inspection authorities etc.). The trainings should be twofold:

- Focused on administrative issues and legal aspects of inspections
- Focused on technical aspects of inspections.
- Focussed on information/communications issues.

The first type of training must include the following aspects:
- Administrative preparation of inspections, including planning issues
- Legal acts on inspections
- Interpretation of legal acts.

36. Training does not have to mean a group of inspectors gathered together in one room with a lecturer. It might be realized on an individual basis, even weekly e.g. professional duties can include the reading of a case-law of a court or the examination of a received complaint from an installation’s neighborhood.

37. The second type of training should be focused on technical aspects that an inspector may encounter on site. This should be co-ordinated with the way inspectors are assigned to installations/sectors of industry.

38. Two solutions for this “technical” training are possible:

1. The inspectors focus on one aspect of the environment e.g. some inspectors concentrate themselves on wastewater issues, other on waste issues, etc. This enables achievement of a high level of competences in particular fields, however an integrated approach to installations might be lost.
2. The inspectors focus on particular branches of industry, where there are a lot of cross-media aspects in terms of environment e.g. one inspector might be well-trained in food industry, another one in metal processing industry.

39. The training can be conducted by experienced inspectors or by specialized external experts.

<u>Issues that can be addressed in a training program:</u>

40. Before developing a training programme for an inspector or a group of inspectors a training needs assessment must be performed. This assessment will show the gap(s) between the required and existing skills and qualifications for job. Based on this assessment a training programme may include the following issues:
Knowledge of:
- work and procedures in governmental organizations
- procedures, methods and systems in the field of environmental inspections
- respective industrial sectors
- the applicable legislation
- the procedures in court
- environmental management systems (i.e. ISO 14000, EMAS).

Specific skills required by an inspector:
- Basic inspection skills
- Sampling of emissions, soil and waste

- Assessment of administration and data management (e.g. maintenance, monitoring)
- Basic information technology
- Social skills, especially for dealing with difficult facilities' operators
- Communication skills to communicate with industry and the public
- Provision of administrative and/or criminal evidence.

1.2.1.2. Equipment

41. Equipment that an inspector should have during on-site inspections is:

- A camera (it should take pictures of a minimum quality)
- Clothes resistant to atmospheric conditions and difficult circumstances (e.g. water proof boots) as well as safety equipment
- Some basic measuring equipment such as pH-meter, conductivity meter, etc. that should be taken if needed
- Any equipment needed for taking complex samples if necessary.

1.2.1.3. Working documents

42. For the best possible implementation of the on-site visits some protocols (checklists) have to be prepared before the visits in order to achieve a targeted and well-focused visit. These checklists can be:

- ➢ General – horizontal i.e. dealing with issues such as the environmental management procedures, monitoring/reporting systems, end-of-pipe facilities (i.e. wastewater treatment plants, air pollution abatement devices), waste handling/storage management, noise/odor etc.
- ➢ Specific for the industrial sector concerned aiming at the assessment of the level of BAT installment and operation.

43. Types of these checklists will be listed (as examples) in the 2nd part of this Guide.

1.2.1.4. Authorization and competences

44. Each inspector should be formally authorized by the inspectorate to carry out environmental inspection. He/she should have an identification card while conducting inspections. At the beginning of inspection, the inspector should identify him/herself with his/her identity card to the subject of supervision or to the responsible or other authorized persons of the installation.

45. Obligations and authorizations of inspectors should be described in detail in the relevant law on inspections and in other legislative acts such as the framework law on environment and corresponding sectoral legislation (e.g. law on nature protection, law on waste etc.).

1.2.1.5. Cooperation with other institutions

46. The inspector has the right to request information from a state administration body or legal entity, as well as assistance from a state administration body for the purpose of completing the inspection supervision. The same applies to cooperation with other institutions: the inspector may, within the boundaries of the inspection procedure, request an opinion and cooperation from expert institutions, should that be necessary to properly assess the actual situation.

47. It is possible that a joint inspection is necessary e.g. when indications show that a freshwater reservoir is in danger and the expertise of the specialized drinking water authority is needed to assess the potential damage from a polluting activity. In terms of administering such cases, the corresponding inspectorates are obliged to:

- ✓ Consolidate the work plans and programs of both (or more) inspectorates and plan the joint inspections
- ✓ Exchange experiences and consolidate opinions on the means and methods of work and other issues;
- ✓ Hold joint meetings, consultations, councils and other forms of joint cooperation
- ✓ Inform other state bodies competent in the enforcement of the corresponding regulations, when the inspection services make some finding relevant to those regulations during the supervision.
- ✓ Inspectors should be aware of the existing protocols to implement such joint inspections and modify them if necessary.

1.2.1.6. Programs for routine/non-routine inspections

48. The regular (routine) inspection supervision is an announced supervision that is performed on the basis of the working program of the inspectorate and covers the inspection of the enforcement of the laws.

49. The routine/planned inspection is performed after the expiry of the term determined in the inspection report adopted by the inspector in the last prior inspection. During this inspection the inspector will verify the facts and the actual situation and will conclude whether the operator (in relation to the previous inspection findings):

- Took all the actions required
- Partially took the actions required
- Did not take any action.

50. In terms of routine inspections, there are two basic types:
- <u>On-site inspection</u> (as mentioned above)
- <u>Desktop inspection</u> which is a "paper" inspection based on the reports submitted by operators - focused mostly on checking whether monitoring and reporting obligations are fulfilled plus obtaining the knowledge on the fact whether emission limit values stated in environmental permits are not breached.

51. The extraordinary (non-routine) inspection is an unannounced inspection and is performed upon initiative submitted from state authorities and physical or legal persons.

1.2.2. Execution and reporting

52. In this step the inspections are actually carried out: the various inspection activities (aiming at compliance) are prepared and executed. Traditional inspection activities are the (physical) routine (site) inspections, non-routine (site) inspections and investigations of incidents. Many of these activities can and should be executed according to standard protocols and working instructions (see 1.2.1.3.).

1.2.2.1. What should be inspected?

53. Each inspection should at least cover:

A) Routine site visits:
   - o Examining the environmental impact
   - o Evaluating permits and authorizations
   - o Monitoring of emissions
   - o Checks of internal reports
   - o Verification of self-monitoring devices

- Checking of the BAT used
- Adequacy of the environmental management of the installation
- Additional inspection (follow-up/control inspection) in case an important non-compliance has been identified (within 6 months after the initial inspection).

B) Non-routine site visits:
- Complaints received
- Accidents and incidents occurred
- Occurrences of non-compliance (e.g. sudden discharge of pollution load into a river)
- The need for revising an existing permit or issuing a new permit.

54. In case of accidents/incidents:
- To clarify the cause and its impact
- Responsibilities, liabilities and consequences of the operator
- Follow up that has to be taken:
  - Actions to mitigate / remedy the impact
  - Actions for prevention of such cases in the future
  - Actions of the operator.
  - Enforcement actions.

55. Needless to say that non-compliances identified during inspections need to be followed up. In the specific case of a serious non-compliance an additional inspection has to be executed within 6 months at the latest (to examine whether the remedial actions have been implemented).

1.2.2.2. What should be reported?

56. Reporting/data gathering after a site visit should at least cover:
- Processed inspection data
- Recommendations for further actions
- Recorded reports (kept in an accessible database)
- Notification to the operator
- Publicly available information.

57. The audience of the inspection reports can be broad. Besides the inspectorate and the operator, also other competent authorities, ministries, public and the European Commission (for EU member states) could be interested in the results of the inspection. An inspection report should therefore be written in plain language and not too technical. Commercial confidentiality and national security are also issues to take into account before publishing the report. Because of this, it may be considered appropriate to make specific reports (i.e. a summary) excluding these issues to be accessible by the public.

58. In chapter 1.3.4., the rules/tips for the preparation of an inspection report are presented (EU practice).

1.2.3. Preparation of an inspection

1.2.3.1. Type of inspection, staff, equipment

59. This is an obligation of the head of the inspectors unit to decide on type of inspection and how many resources (including human resources and equipment) should be used for it. Some considerations that should be taken into account:
- Complexity of an installation - the more complex it is the more inspectors that may be directed to it;
- Time of inspection - for safety reasons it is recommended that at night two inspectors should conduct inspection;

- For non-routine inspection, especially conducted upon a complaint and problematic situation, it is advisable to direct two inspectors to it;
- Weather condition as well as the time of a year - some additional equipment might be needed (e.g. torches, protective clothes, etc.).

60. Having in mind that one of the inspection goals is to detect whether BAT have been introduced in an installation an integrated inspection has to be preferred. This type of inspection requires a well-qualified personnel and asks for a very good preparation before the inspection. A summary of the features of this inspection is summarized in table 2.

Table 2: Integrated inspection

Integrated inspection (process and prevention inspection)			
Objectives	Advantages	Disadvantages	Target facilities
• Improves overall efficiency and environmental performance • Promotes broader goals (e.g. pollution prevention, compliance assistance)	• Considers all relevant factors • Capable of improving overall process • Capable of promoting broader goals (e.g. pollution prevention, compliance assistance) • Appropriate for industry sector	• Requires development of in depth understanding of facility and processes • Training essential for the inspectors • Close cooperation with the operator is needed (not always feasible)	• Appropriate for any size company where the goal is to identify and address process-related causes of non-compliance

1.2.3.2. Desktop study/collection of information

61. The more an inspector is prepared for an inspection, the better. Therefore he/she should gather all the relevant information and data that can be found in the following documents:

- Reports of previous inspections
- Maps
- Checklists (see examples in part 2 of this Guide)
- Environmental Impact Assessment studies
- Application for the permit
- The permit
- Environmental reports submitted by the operators
- Complaints received
- BAT documents (e.g. BREF)
- PRTR and other register
- Information on the installation received from other competent authorities.

62. If the inspection should focus not only on the general performance of the installation but also to which extent BAT are operational, some more detailed information has to be gathered such as:

1. Permit(s) or other types of authorisation of the installation and details of the application process including site reports, self-monitoring programme, EMAS, and mass balance information
2. The permit application submitted by the operator to the permitting authorities where the features of each BAT are described in details

3. Reports already submitted from the operator to the authorities on regular basis (e.g. self-monitoring report)
4. Technical literature: existing process techniques, industry best practice, related BREF, equipment used in the treatment process, equipment for pollution control and monitoring, analytical methods for pollutants identification
5. New or changed regulations of relevance to the installation
6. Technical drawings of the installation
7. Description of changes in the process or installation modification that are proposed or have been implemented
8. Process flow diagram for the installation. The site management may be asked to provide a process flow diagram showing the main process unit operations, inputs and outputs
9. Letters, reports, correspondence from previous inspections, including non-compliance and follow-up actions taken
10. Seasonal or other circumstantial differences that are of importance for the outcome of the visit
11. Inputs/outputs of unit operations (UO):

- ➢ <u>Which inputs should be assessed?</u>
  - Raw materials (ton/day)
  - Chemicals/other additives (kg/ton of raw material)
  - Water consumption (m^3/day)
  - Energy usage (kWh/day)
- ➢ <u>Which outputs should be assessed?</u>
  - Air emissions (mg/Nm^3)
  - Wastewater (effluents) discharges (kg/ton of raw material or mg/l)
  - Waste (kg/ton)
  - Products (ton/day)
  - By-products (ton/day)

63. The balance of inputs/outputs should be also assessed

64. All the gathered information will lead to specific questions which have to be formulated in an extensive questionnaire which will act as guide for the site visit.

1.2.3.3. Before embarking for the site visit

- ✓ Map the spots to be checked in the installation: emission points, fugitive emission sources, energy production facilities, storage sites, raw material handling systems (loading/unloading devices, feeding systems, chemicals handling), waste collection and disposal points
- ✓ Select the team for the site visit and assign roles
- ✓ Discuss and prepare the site visit programme with the team
- ✓ Inform the operator about the visit, ask for the availability of the necessary documents
- ✓ Get all documentation (checklists, tables, questionnaires) and any sampling and other (e.g. safety) equipment ready.

1.2.4. Execution of an inspection

1.2.4.1. What to check?

65. The questionnaire and the checklists will guide the inspector throughout his/her inspection. In general the inspector has to check:

- ➢ The administrative part (names of responsible persons, structure of the environmental management unit, procedures applied for monitoring the environmental performance of the installation etc.)
- ➢ The vicinity of an installation (this may be done even before entering the area of the installation) to see if there are some traces of a possible impact of the installation (e.g.

leftovers of waste, dust from air emissions, appearance of a river that is a recipient of discharges from the installation)
- Production lines to assess whether the installation is actually working during the visit and to what extent
- Emission points to air/water to check whether their number and positions are in line with the permit
- All the required equipment used to protect the environment (e.g. air filters, the installation's wastewater treatment plant, barriers built to prevent leakages from storage tanks etc.).
- Areas and buildings used for waste storage: in the case of hazardous waste all the safety measures protecting against leakages (if the barrels are closed, the waste is packed in a proper way) and uncontrolled disposal to the environment should be checked.
- Self-monitoring devices.

1.2.4.2. Sampling/laboratory analysis

66. The inspector has to take any samples he/she thinks necessary for counter-check of the self-monitoring results (taken by the operator). In doing so, the inspector has:

1) In the same conditions and at the same time to obtain 2 samples in the amount necessary for examination (the second sample at the request of the operator
2) To draft a report on the collection of the sample
3) To draft a chain of custody

4) To seal the samples and mark them properly
5) To submit without delay the sample for the first analysis to the appropriate expertise institution (prescribed by law).

67. To anticipate eventual discrepancy between the laboratory results derived from the two samples, a third one has to be taken in parallel (if possible) and be regarded as the "final/concluding" sample.

1.2.4.3. Additional documentation

68. Everything that can be found during inspections may be worth being collected and treated as evidence and must be attached to the report:

- Photographs
- Oral and written statements of the operator and the employees
- Reports from previous laboratory analysis results
- Notes/reports of visual inspection
- Documents such as environmental reports, registries, results of self-monitoring. In case of infringements it is worth making copies and attach them to the inspection report, as they will serve as a proof in case of later proceedings.

1.2.5. Closure of the inspection

69. Minutes of the inspection are crucial in terms of later actions that need to be followed. They have to be prepared by the inspector, signed by him/her and counter-signed by the operator.

70. The minutes have to be written in a "neutral" way; that means that personal opinions of the inspector and/or the operator should be avoided.

71. An outline of inspection minutes can look as follows:

- ✓ Each activity performed by the inspector should be mentioned. This includes taking samples and measurements as well as formal order to the operator to take the corresponding measures and activities in a certain period of time given by the inspector
- ✓ Findings from pictures, maps which show non-conformity
- ✓ Description of previous sampling results
- ✓ Short report of the sampling procedures (e.g. which samples/from where)
- ✓ Findings about BAT application (e.g. in which UO BAT have been operational, BAT performance, needed improvements etc.)
- ✓ Review of operator’s statements
- ✓ Final conclusions.

1.3. Follow-up

1.3.1. Review of the inspection’s findings

72. The inspector has to inform the head of the inspectorate and his/her colleagues about the overall execution of the inspection and the relevant findings namely:

- ➢ How the inspection has been performed: cooperation with the operator, accessibility of the installation’s facilities, difficulties encountered (e.g. for taking samples, transport to the installation) etc.
- ➢ Overall appearance of the installation e.g. desolate machinery/equipment, modern facilities, level of BAT operation, existing end-of-pipe techniques etc.
- ➢ Findings → minutes
- ➢ Proposals for follow-up actions.

73. On the basis of this briefing the head of the inspectorate will propose the next steps to be undertaken e.g. fines/sanctions to be imposed.

1.3.2. Informing other competent authorities

74. In case that other institutions are also responsible for this installation (e.g. forestry department, water authorities) a short report has to be drafted and submitted to them in order to enable them to take the necessary follow-up steps. The permitting department has also to be informed, especially about the conformity of the findings with the permit conditions.

1.3.3. Fines/sanctions

75. In case of non-conformity the respective fines have to be discussed and agreed upon by the inspectorate. The following issues should be considered:

1. Level of environmental harm: this can be derived from the laboratory results and the endeavoured deviations from the prescribed permit conditions. In this context the consultation with those authorities which have defined the respective Environmental Quality Standards (EQS) is necessary
2. Frequency of deviations i.e. how often they happened (according to previous inspections’ findings)
3. The size of the installation which inevitably can cause the emission/discharge of higher pollution loads
4. The legal framework defining the sanctions context.

76. In any case any level of flexibility (without breaking the law) for imposing the fines has to be explored in order to secure that the fines will lead to the installation’s improvement of its

environmental performance and that any lengthy legal procedures can be avoided: in case of very severe financial fines it is possible that the operator will consult lawyers and appeal the relevant decision.

1.3.4. Publication of the inspection report

77. The inspection report can be reported and published on the inspectorate's website according to various needs (authorities/public). The report's elements/content are described in chapter 1.2.2.2. In general the conclusions derived from the inspection should form the main part of this report. It is possible that a consolidated report can be prepared i.e. containing findings from several inspections in one or more installations.

78. It must be noted that the report is part of the information provided to other authorities and to the public and justifies the inspectorate's activities and actions. Some tips about the structure and content of this report according to EU practice are presented in table 3.

Table 3: Inspection report - EU practice

EU practice When discussing reports that should be publicly available according to IED, the Directive states that the report should include the relevant findings regarding compliance of the installation with the permit conditions and conclusions on whether any further action is necessary. There are some tips on reports in the IMPEL Reference Book on Environmental Inspection: - General rules: (i) The purpose of the inspection report is to present a factual record of an inspection, from the time when the need for the inspection is perceived through the analysis of samples and other data collected during the inspection. (ii) The objective of an inspection report is to organize and co-ordinate all evidence gathered in an inspection in a comprehensive, useable manner. To meet this objective, information in an inspection report must be: − Accurate. All information must be factual and based on sound inspection practices. Enforcement personnel must be able to depend on the accuracy of all information. − Relevant. Information in an inspection report should be pertinent to the subject of the report. − Comprehensive. The subject of the report should be substantiated by as much factual, relevant information as is feasible. − Co-ordinated. All information pertinent to the subject should be organized into a complete package. Documentary support (photographs, statements, sample documentation, etc.) accompanying the report should be clearly referenced so that anyone reading the report will get a complete, clear overview of the subject. − Objective. Information should be objective and factual; the report should not draw conclusions. − Clear. The information in the report should be presented in a clear, well organized manner. − Neat and Legible. Adequate time should be taken to allow the preparation of a neat, legible report. Conclusions regarding compliance: Inspection reports should contain only the facts about the inspection. The report to the inspection management should be objective and complete. Clearly, the inspector’s conclusions about the compliance of the facility are the critical factors to decide if a violation did or did not exist. When the inspection report is sent to the company, the personal opinion of the inspector must be omitted. Although the inspector may communicate to the company his view on certain matters, facts and figures should never be mixed with personal opinions. If the inspector has concluded that there has been non-compliance, this information should be mentioned in the report sent to the company. All inspection reports should preferably be read and discussed by more experienced inspector. Note that the above mentioned principles are also applicable to the minutes of the inspection. The report is more comprehensive as it also includes non-compliance issues. In most EU Member States, there are no minutes of inspection but reports only. Usually, the leader of the inspection team is responsible for the drafting of the final inspection report; it also includes suggestions to the operator for the improvement of the environmental performance of the plant and proposal of amendments to the permit to the Competent Authority.

1.4. Performance monitoring

79. Good performance monitoring is essential for the inspecting authority. It helps to show to the public, the policy makers and the operators the results of the efforts of the inspecting authority in a defined period. The inspecting authority should act on the basis of systematic monitoring of the inspection and enforcement process and its result and effects.

This monitoring can take place on different levels: not only the results of the performance of the inspecting authority as a whole but also the performance of the individual inspectors has to be measured.

1.4.1. Reports

80. The performance of the inspectorate can be published on regular intervals, usually annually or biannually.

81. A typical report outline can contain the following sections:

1. General part
    - Regulatory inspection framework i.e. the legislative acts governing the inspectorate's functioning/operation – mission of the inspectorate
    - International standards fulfilled/cooperating organizations (e.g. IMPEL for EU countries)
    - Organizational structure, manpower/equipment used
    - Profile of inspectors
    - Budget/financial resources

2. Inspections
    - Types of inspections
    - Subjects of inspections i.e. industrial installations, environmental facilities (e.g. landfills, wastewater treatment plants)
    - Number of inspections performed in the given time period (1/2 years)
    - Results achieved on the basis of indicators of performance of the inspectorate (see 1.4.2.)

1.4.2. Performance indicators

82. Regular checking of the inspectorate's performance is crucial to justify its mission and function. The best way for this checking is the close monitoring of some indicators which have to be comprehensive (well defined), simple and understandable.

83. Types of performance indicators can be:

- ✓ Total number of inspections performed/year
- ✓ Number of inspections allocated/inspector unit/individual inspector
  [Number of installations allocated/inspector unit/individual inspector][1]
- ✓ Number of complaints received/year
- ✓ Number of non-compliant facilities/year
- ✓ Number of samples taken/facility
- ✓ Number of administrative decisions issued/year
- ✓ Number of appearances in courts
- ✓ Number of fines/year

[1] Additional performance indicator proposed by Italy, in order to take into account that the compliance monitoring of an installation could in some cases also be performed without carrying out inspection activities on that installation (each year), and therefore, the indicator "Number of inspections allocated/inspector unit/individual inspector" might not complete the assessment of the working load/performance of an inspector unit or an individual inspector.

- ✓ Amount of collected fines (i.e. $/€/year).
- ✓ I_2 = Number of environmental inspectors
  Number of facilities
  I_5 = Number of inspected facilities
- ✓ Number of facilities
- ✓ I_6 = Number of non compliances
- ✓ Number of facilities
- ✓ I_7 = Number of judicial actions
  Number of non compliances
- ✓ **Optional indicators**
- ✓ I_9 = Number of inspectors with an operational plan
- ✓ Number of environmental inspectors
- ✓ I_{10} = Number of facilities with self monitoring or environmental management system
- ✓ Number of facilities
- ✓ I_{11} = Number of administrative sanctions
  Number of inspected facilities

2. Checklists

2.1. What is a checklist?

84. A good preparation of a site visit requires that the inspector knows in advance what/where to inspect. Therefore he/she needs a "pathway" which will guide him/her throughout the visit. The checklist is exactly this "pathway": it contains a sequence of issues to be addressed which will allow the inspector to assess the environmental performance of the installation.

85. Advantages of using checklists are:

- To ensure that all necessary aspects will be inspected
- A better organisation of the interview and site visit
- Time/resources rationalisation
- Fast assessment of the non-compliance situations.

86. The checklist consists of 2 parts: the first one contains some "horizontal" issues i.e. general information about the facility (names, location etc.), environmental management systems (EMS) applied, energy efficiency, storage/handling of raw materials/waste, end-of-pipe installations (wastewater, air emissions), monitoring devices, communication duties (i.e. self-monitoring and reporting), general resource management (i.e. water use, raw materials, chemicals), BAT application. The 2nd part refers to each specific sector (i.e. industry, landfills, wastewater treatment plant) and contains targeted questions on BAT application.

87. It must be kept in mind that checklists are an important tool but cannot replace the critical mind of an experienced inspector; that means that the checklists should not restrict the inspector from changing direction based on unexpected observations during the site visit. Additionally the checklists can be modified according to particular national/local situation, experiences gained from previous inspections and the inspector's personal judgement.

88. Before developing the checklists the inspector has also to prepare a **factsheet** for each sector he/she intends to inspect; the factsheet should contain in a "condensed" way the main permit's prescriptions (i.e. which BAT have to be implemented) and some basic findings about the production processes applicable in the sector: it is practically a summary about the sector and the available BAT.

89. Two examples of factsheets (iron/steel production, meat processing/slaughterhouses) are presented in annex 1.

2.2. "Horizontal" checklist

90. An example of a "horizontal" checklist is presented in annex 2.

2.3. Sectoral checklists

91. Two sectoral checklists (iron/steel production, meat processing/slaughterhouses) are presented in annex 3.

Annex I
Factsheets

1. Iron/steel production: Electric arc furnace (EAF)

1.1. Production process

1. The direct smelting of materials which contain iron, such as scrap is usually performed in electric arc furnaces (EAF): steel is produced by melting the steel scrap with the help of graphite electrodes. After refining process, liquid steel transferred from the ladle to the continuous casting machine is solidified and finally shaped as the desired size of semi-finished products.

2. The major feedstock for the EAF is ferrous scrap, which may be comprised of scrap from inside the steelworks, cut-offs from steel product manufacturers (e.g. vehicle builders) and capital or post-consumer scrap (e.g. end-of-life products). Direct reduced iron (DRI) is also increasingly being used as a feedstock due to its low gangue content, variable scrap prices and lower content of undesirable metals (e.g. Cu). Ferroalloys may be used as additional feedstock in greater or lesser quantities to adjust the desired concentrations of non-ferrous metals in the finished steel.

3. For the production of carbon steel and low alloyed steels (the common case in most EAF processes), the following main operations are performed:

- raw materials handling, pretreatment (if any) and storage
- furnace charging
- EAF scrap melting
- steel and slag tapping
- ladle furnace treatment for quality adjustment (secondary metallurgy)
- slag handling
- casting.

1.1.1. Raw materials handling

4. Scrap metal is stored normally outside on large, uncovered and often unpaved ground. The ferrous scrap metal is loaded into baskets by magnets or grabs. In house generated scrap can be cut into manageable sizes using oxygen lancing. The scrap may be loaded into charging baskets in the scrapyard or may be transferred to temporary scrap bays inside the melting shop. Other raw materials including fluxes in lump and powder, powdered lime and carbon, alloying additions, deoxidants and refractories are normally stored under cover. Powdered materials can be stored in sealed silos (lime should be kept dry) and conveyed pneumatically or kept and handled in sealed bags.

1.1.2. Scrap preheating

5. Over the past several years more and more new and existing EAFs have been equipped with a system for preheating the scrap by the off-gas in order to recover energy. Such preheating is performed either in the scrap charging baskets or in a charging shaft (shaft furnace) added to the EAF or in a specially designed scrap conveying system allowing continuous charging during the melting process.

1.1.3. Furnace charging

6. The scrap is usually loaded into baskets together with lime or dolomitic lime which is used as a flux for the slag formation. Carbon-bearing materials are also charged for the needs of the metallurgical work to be performed in the furnace. At some plants, lump coal is also charged in order to adjust the carbon content. A commercially available system is known as the shaft furnace which allows part of the scrap to be charged into a vertical shaft integrated into the furnace roof and thus prevents the opening of the furnace roof halfway through the melting process. The scrap present in the shaft is preheated by the hot gases coming from the furnace.

1.1.4. Electric arc furnace melting and refining

7. During the initial period of melting, the applied power is kept low to prevent damage from radiation to the furnace walls and the roof whilst allowing the electrodes to bore into the scrap. Once the arcs have become shielded by the surrounding scrap, the power can be increased to complete the melting. Fuels include natural gas and oil.
Oxygen in electric furnace steelmaking has become increasingly considered over the last 30 years not only for metallurgical reasons but also for increasing productivity requirements.

1.1.5. Steel and slag tapping

8. The furnace is tilted backwards towards the slagging door and the slag runs off or is raked into a pot or on the ground below the furnace resulting in dust and fume generation. For special steels, mainly alloyed steel, for metallurgic reason, the slag is tapped with the liquid steel into the ladle. Most of the slag is separated from the steel at a deslagging station into a slag pot. The fumes generated there should be captured by an exhaust system.

1.1.6. Ladle furnace treatment for quality adjustment (secondary metallurgy)

Carbon steel

9. Secondary metallurgy is carried out on the molten steel after the tapping of the primary steelmaking furnace up to the point of casting. It is typically carried out at ladle treatment stations while the molten steel stays in the ladle. These treatment stations are generally comprised of an arc-heating unit (a ladle furnace) which allows an adjustment of the final temperature of the liquid steel for the casting operation. The treatment includes the addition of deoxidizing agents and alloying elements in order to adjust the chemical composition of the finished steel. In some cases, vacuum treatment units are used for achieving special requirements regarding the concentration of elements such as hydrogen, nitrogen and oxygen of finished steel. In order to achieve a good homogenization, inert gases (Ar or N2) are injected into the ladle for stirring purpose. Some minor ladle treatment stations are based on inert gas or powder injection equipment.

Stainless steel

10. The secondary metallurgy of stainless steel may be performed either under vacuum in the ladle (VOD process – vacuum oxygen decarburization) or in a separate metallurgical vessel called an AOD (argon oxygen decarburization) converter and a subsequent ladle treatment. Depending on the s

11. teel grades to be produced, some operators apply a combination of both AOD and VOD.

Alloys steel

12. The secondary metallurgy of alloy steels which contain (besides carbon) substantial quantities of alloying elements but do not rank in the stainless steel category consist generally of a ladle furnace and, if required, a vacuum treatment, depending on the steel grades produced. During most of the processes of secondary metallurgy, slags are used to capture the non-metallic compounds generated during the treatment.

1.1.7. Slag handling and processing

13. If slag is collected in a slag pot at the EAF (or at secondary metallurgic plants like AOD or VOD) it needs to be poured into outside slag basins for solidification. The cooling of the slag may be enhanced by water sprays. Some sites operate a slag treatment during the liquid phase to improve the slag final quality and its dimensional stability, by adding silica, alumina, boron (colemanite or sodium borate) and checking the cooling duration. In some plants the slags from the different processes are mixed in the liquid phase to make them more suitable for further processing.
If the slag is poured on the floor, it is pre-crushed after solidification using excavators or shovel loaders and brought to an outside storage area. After a certain period of time, the slag is processed in crushing and screening devices in order to give it the desired consistency for its further use in construction. During this operation, any metallic particles contained in the slag are separated magnetically, manually or using digging, crushing and sieving in order to be recycled into the steelmaking process.

1.1.8. Casting

14. Once the final steel quality has been achieved, the steel is conveyed in a casting ladle to the casting machines. Some years ago, the standard method was to pour the molten steel into permanent moulds (permanent mould or ingot casting) by a discontinuous process. In ingot casting, the liquid steel is cast into casting moulds. Depending on the desired surface quality, degassing agents can be added during casting in the ingot mould. After cooling, the ingots are taken out of the casting mould and transported to the rolling mills. Subsequently, after preheating, the ingots are rolled into slabs, blooms or billets.

15. Today, the method of choice is continuous casting, whereby the steel is cast in a continuous strand (i.e. slabs of different sizes, thin strip): it is a process which enables the casting of one or a sequence of ladles of liquid steel into a continuous strand of billet, bloom, slab, beam blank or strip. The liquid steel is poured from the converter into a ladle which transports the steel after secondary metallurgy to the ‘tundish’ of the continuous casting machine. This is an intermediate ladle with a controllable outlet. The ladles are preheated prior to accepting a liquid steel charge in order to avoid temperature stratification in the tundish.

16. When the liquid steel has reached the desired temperature, it is poured into the tundish. From here, it passes to a short water-cooled copper mould where no air is present and which performs oscillating up and down movements to prevent the steel from sticking. The mould gives the metal the desired shape.

1.2. Key environmental issues/BAT

1.2.1. Air

1.2.1.1. Dust

17. BAT for dust abatement in electric arc furnishes are the following ones:

18. BAT for the electric arc furnace (EAF) primary and secondary dedusting (including scrap preheating, charging, melting, tapping, ladle furnace and secondary metallurgy) is to achieve an efficient extraction of all emission sources by using one of the techniques listed below and to use subsequent dedusting by means of a bag filter.

I. A combination of direct off-gas extraction (4th and 2nd hole) and hood systems

II. Direct gas extraction and doghouse systems.

III. Direct gas extraction and total building evacuation (low-capacity EAFs may not rquire direct gas extraction to achieve the same extraction efficiency).

The overall average collection efficiency associated with BAT is> 98 %.

The BAT associated emission level for dust is < 5 mg/Nm3 , determined as a daily mean value.

19. BAT for on site slag processing is to reduce dust emissions by using one or a combination of the following techniques :

I. Efficient extraction of the slag crusher and screening devices with subsequent off gas cleaning, if relevant

II. Transport of untreated slag by shovel loaders

III. Extraction or wetting of conveyer transfer points for broken material

IV. Wetting of slag storage heaps

V. Use of water fogs when broken slag is loaded.

20. In the case of using BAT I the BAT associated emission level for dust is < 10-20 mg/Nm3, determined as the average over the sampling period (discontinuous measurement, spot samples for at least half an hour).

1.2.1.2. Pollutant substances

21. BAT for the electric arc furnace process is to prevent mercury emissions by avoiding, as much as possible, raw materials and auxiliaries which contain mercury.
BAT for the electric arc furnace (EAF) primary and secondary dedusting (including scrap preheating, charging, melting, tapping, ladle furnace and secondary metallurgy) is to prevent and reduce polychlorinated dibenzodioxins/furans (PCDD/F) and polychlorinated biphenyls (PCB) emissions by avoiding, as much as possible, raw materials that contain PCDD/F and PCB or their precursors and using one or a combination of the following techniques, in conjuction with an appropriate dust removal system:

I. Appropriate post-combustion

II. Appropriate rapid quenching

III. Injection of adequate absorption agents into the duct before dedusting.

1.2.2. Wastewater

22. BAT is to minimize the water consumption from the electric arc furnace (EAF) process by the use of closed loop water cooling systems for the cooling of furnace devices as much as possible unless once-through cooling systems are used.
BAT is to minimize the wastewater discharge from continuous casting by using the following techniques in combination:

I. The removal of solids by flocculation, sedimentation and/or filtration

II. The removal of oil in skimming tanks or in any other effective device

III. The recirculation of cooling water and water from vacuum generation as much as possible

23. The BAT associated emission levels for waste water from continuous casting machines, based on a qualified random sample or a 24-hour composite sample, are

- Suspended solids < 20 mg/l
- Iron < 5 mg/l
- Zinc < 2 mg/l
- Nickel < 0,5 mg/l
- Total chromium < 0,5 mg/l
- Total hydrocarbons <5 mg/l

1.2.3. Soil and groundwater

24. BAT is the appropriate storage and handling of input materials and production residues which can help to minimize the airborne dust emissions from stockyards and conveyer belts including transfer points and to avoid soil, groundwater and runoff water pollution.

1.2.4. Waste

25. BAT for solid residues is to use integrated techniques and operational techniques for waste minimization by internal use or by application of specialised recycling processes (internally or externally).

26. BAT is to maximise external use or recycling for solid residues which cannot be used or recycled according to previous BAT, wherever this is possible.

27. BAT is to use the best operational and maintenance practices for the collection, handling, storage and transport of all solid residues and for the hooding of transfer points to avoid emissions to air and water.

28. BAT is to prevent waste generation by using one or a combination of the following techniques:

I. Appropriate collection and storage to facilitate a specific treatment

II. Recovery and on-site recycling of refractory materials from the different processes and use internally, i.e. for the substitution of dolomite, magnesite and lime.

III. Use of filter dusts for the external recovery of non-ferrous metals such as zinc in the non – ferrous metals industry, if necessary, after the enrichment of filter dusts by recirculation to the electric arc furnace.

IV. Separation of scale from continuous casting in the water treatment process and recovery with subsequent recycling e.g. in the sinter/blast furnace or the cement industry.

V. External use of refractory materials and slag from the electric arc furnace process as a secondary raw material where market conditions allow for it.

2. Meat processing (Slaughterhouses)

2.1. Production process

2.1.1. Slaughtering of large animals

29. In slaughterhouses of cattle and sheep the hide is removed. Pig skins are usually retained, although the bristles are removed and the surface of the skin is singed. The basic processes are briefly described below.

2.1.1.1. Animal reception and lairage

30. The animals are unloaded via ramps and the lorries are cleaned. Most slaughterhouses have a dedicated vehicle wash area for this purpose. In some cases bedding, such as straw or sawdust, is used. The animals are often held in the lairage to allow them to recover from the stress of the journey.

2.1.1.2. Slaughtering/bleeding

31. Animals are taken from the lairage along a fenced or walled passageway constructed to allow them to walk in single file, or in small groups to where they are stunned and slaughtered. Carcasses are bled over a trough or tank to collect the blood. The blood trough is normally fitted with a double drain, one opening for the blood to be pumped to a tanker for disposal and the other for wash-water.

32. During bleeding blood coagulates on the base/walls of the trough. This is either hosed down or washed directly to the WWTP or in some slaughterhouses it is collected by shovels, squeegees or by vacuum suction and as much as possible is pumped to a blood tanker. Some slaughterhouses have traditionally allowed all or a significant proportion of the blood they collect to run to their WWTP. This has always been considered to be bad practice, due to the high COD and BOD and because it also removes the possibility of other routes for the use and/or disposal of blood being followed.

2.1.1.3. Hide and skin removal

33. Machines to remove hide and skin typically pull the hide/skin from the carcass. Two chains are hooked to the hide/skin and are then wound onto a drum to pull the hide/skin. Some sheepskins are removed manually, but automated removal is also common. The hides and skins are supplied to

tanneries for the production of leather goods. In some slaughterhouses, the hides and skins are salted to improve preservation. Pigs are washed before the skin is removed using a hide-puller.

2.1.1.4. Head and hoof removal for cattle and sheep

34. After the bleeding of cattle and sheep, the animals' forelegs, tail and udder/testicles are manually removed using knives. The tongue and cheeks may also be removed for human consumption. Cattle and sheep heads are washed, inspected and disposed of. Hooves are traditionally supplied for use in the manufacture of glue but may also be ground for use in pet food. They may also be used to produce horn meal fertilizer.

2.1.1.5. Pig scalding

35. Traditionally the pig carcase is passed through a static or rotary scalding tank filled with water between 58 ºC and 65 ºC for 3 – 6 minutes to loosen the bristles and toenails. Steam heating is normally used to maintain the temperature in the scalding tank and continuous make-up water is required to balance drag-out, which drips onto the floor and into the de-hairing machine. The scalding process produces some steam and odor.

2.1.1.6. Pig hair and toenail removal

36. An automatic de-hairing machine is used to remove bristles and toenails from pig carcases. In some de-hairing machines, the carcases are tumbled two at a time horizontally between two sets of rubber flails, with a water spray from above to wash the hair out of the bottom of the machine. The water spray is used to flume hair and toenails to a primary screen. In some slaughterhouses, toenails are collected dry and sent for rendering.

2.1.1.7. Pig singeing

37. Pig carcases are singed to remove residual hair which has not been removed by the de-hairer, to provide a firmer skin texture and to eliminate micro-organisms. The singeing unit commonly uses propane gas burners firing intermittently or alternatively oil burners, although this is becoming less common.

2.1.1.8. Evisceration

38. Evisceration involves manual removal of the respiratory, pulmonary and digestive organs. This is done by pulling out the bladder and the uterus, if it is present; the intestines and mesenteries; the rumen and other parts of the stomach; the liver and then, after cutting through the diaphragm, the plucks, i.e. the heart, lungs and trachea. The resulting offal is loaded into pans for inspection and transportation to the offal processing area. The heart, liver, kidneys and non– ruminant intestine may be sold for human consumption.

39. Offal, including the lungs and trachea for all animals and the first stomach for cattle and sheep, can be used in the production of pet food. For cattle and sheep, the first stomach is cut open on a table and the contents are removed using either a wet or dry process. In the wet process, it is cut open in a water flow to produce a slurry which is discharged over a screen and then pumped to a holding area.

40. In some slaughterhouses macerator equipment is used to chop, wash and spin-dry the remaining offal prior to supply to the rendering company. This can reduce the offal volume by over 50 %.It is not necessary to wash the carcases in the evisceration area, although it is sometimes undertaken if there is contamination present from damaged viscera.

2.1.1.9. Splitting

41. After evisceration, the cattle, mature sheep (not lamb, because it is not necessary to remove the spinal cord as a TSE precaution) and pig carcases are split along the spine using a saw. Water is sprayed onto the blade to remove any bone dust which is generated. The spinal cords of the cattle and mature sheep are then removed from the carcase and disposed of. Some slaughterhouses use a vacuum system which sucks the spinal cord material to the SRM waste skip. In other slaughterhouses, the spinal cord is removed manually and the cavity is cleaned using a steam spray/suction device.

2.1.1.10. Chilling

42. The carcases are chilled to reduce microbiological growth. To reduce the internal temperature to less than 7 ºC, they are chilled in batch chillers with air temperatures between 0 ºC and 4 ºC. The carcases may then be held in a chilled meat store to further condition the meat prior to dispatch to cutting plants, wholesalers, or on to further processing.

2.1.1.11. Associated downstream activities – viscera and hide/skin treatment

Viscera treatment

43. If the intestines are destined for food use, after veterinary approval, the pancreas gland is cut off the intestine set. The intestine set is then conveyed to the casing cleaning area. It is then separated into the following parts: stomach, fat end (rectum), small intestine (duodenum, jejunum), large intestine (colon) and "blind" intestine (caecum). These are then cleaned and may be salted at the slaughterhouse or off-site. If the intestines are to be rendered, the contents may be removed first by, e.g., cutting followed by centrifugation.

Hide and skin treatment

44. Whether hides/skins are salted or not may depend on customer requirements. If hides/skins can be delivered to a tannery and processed within 8 – 12 hours after slaughter they generally don't require any treatment at the slaughterhouse. They need to be chilled if they are to be processed within 5 – 8 days. For longer storage times, e.g. if they have to be transported overseas, then salting is reported to be the preferred option, due to the weight of ice and the energy consumption required for ice production and for refrigeration. If sheep/lamb skins and cattle hides are to be salted, they may be cooled first with cold water or chilled prior to being stacked flat and then salted, using sodium chloride, or alternatively they may be salted directly. After approximately 6 days they are packed with additional salt and stored or transported to tanneries for leather production.

2.1.2. Slaughtering of poultry

2.1.2.1. Reception of birds

45. It is essential that crates, modules and vehicles used to transport birds are thoroughly cleaned between collections, to reduce the spread of any infection which may be present. The poultry processor generally provides separate facilities for cleaning and disinfecting the crates, modules and vehicles. In general, crate cleaning is a three-stage process, which offers considerable opportunities for re-using and recycling water. Many of the larger poultry processors have installed automated crate washing equipment to permit a thorough cleaning immediately following delivery of the birds.

2.1.2.2. Stunning and sleeping

46. After the birds have had time to settle they are removed from their crates/modules and put onto the killing line. They are required to be stunned, before being killed. A commonly used stunning

system uses a water-bath, which constitutes one electrode and a bar which comes into contact with the shackles and forms the other electrode.
After stunning, the bird is bled for up to two minutes before being dressed.

2.1.2.3. Scalding

2.1.2.4. After stunning and bleeding, the birds are immersed in a scalding tank to loosen the feathers to facilitate de-feathering.

2.1.2.5. De-feathering

47. Feathers are removed mechanically, immediately after scalding, by a series of on-line plucking machines. The machines comprise banks of counter-rotating stainless steel domes or discs, with rubber fingers mounted on them. Rubber flails mounted on inclined shafts are sometimes used for finishing. Any feathers remaining on the bird after mechanical plucking, including pin feathers, are removed by hand.

48. Continuous water sprays are usually incorporated within the machines for flushing out feathers.

49. Feathers are commonly taken to a centralized collection point via a fast-flowing water channel located below the machine.

2.1.2.6. Evisceration

50. After de-feathering and head and feet removal the birds are eviscerated, i.e. the internal organs are removed. In the majority of production sites, evisceration is carried out mechanically, but manual evisceration is still practiced in some of the smaller companies.

2.1.2.7. Chilling

51. After evisceration and inspection, fresh poultry meat must be cleaned immediately and chilled in accordance with hygiene requirements to a temperature not exceeding 4 ºC. There are several designs of chilling equipment used; the most popular are immersion chillers, spray chillers and air-chillers.

2.1.2.8. Maturation

52. Where carcases require maturation after chilling, further conditioning using a refrigeration medium (air, ice, water or other food-safe process) can be used which may continue the cooling process of the carcases or parts of carcases.

2.1.2.9. By-products recovery from slaughtering

Storage

53. Arrangements for the storage of animal by-products vary between premises. To some extent they depend on the nature and characteristics of the by-product and its intended use or disposal route. Generally, the storage of materials can be undertaken within an enclosed area, operated under negative pressure, provided with extractive ventilation connected to a suitable odor abatement plant. Some slaughterhouses store animal by-products in open containers in the open air and rely on frequent removal from the site, e.g. once or twice a day, to prevent odour problems from putrescible materials.

Fat melting

54. The product of fat melting is generally for food use, so feedstocks are required to be fresh and consequently cause less odor problems during storage and processing.
Three methods of fat melting have been reported: batch wet fat melting, batch dry fat melting and continuous wet fat melting.

Rendering

55. The rendering process uses animal by-products from meat production. These originate from e.g. slaughterhouses, meat processing plants, butcher's shops, supermarkets and livestock rearing facilities. The by-products include carcases, parts of carcases, heads, feet, offal, excess fat, excess meat, hides, skins, feathers and bones.

56. The rendering process comprises a number of processing stages, as follows, although the order may vary between installations. The raw material is received at the installation and stored. Preparing the raw material for rendering generally involves size reduction. The material is then heated under pressure to kill micro-organisms and to remove moisture. The liquefied fat and the solid protein are separated by centrifugation and/or pressing. The solid product may then be ground into a powder to make animal protein meal. The final products are transferred to storage and dispatch. The waste solids, liquids and gases are then treated and disposed of, possibly with some intermediate storage.

Blood processing

57. Blood processing uses blood from animals which have been passed as fit for human consumption by an official veterinarian, after a post mortem inspection. The sequence of processes is as follows:
Blood collection (in the slaughterhouse), filtering and centrifugation (in the slaughterhouse) and plasma/red cell production.

Gelatine manufacture

58. Gelatine is natural, soluble protein, gelling or non-gelling, obtained by the partial hydrolysis of collagen produced from bones, hides and skins, tendons and sinews of animals. The raw materials used comprise bones, fresh or frozen hides and pig skins.

59. There are various unit operations for gelatine manufacture e.g. degreasing, demineralization, liming, neutralization, extraction, filtration, ion exchange, concentration, sterilization, drying, acid treatment.

2.2. Key environmental issues/BAT

2.2.1. Air

2.2.1.1. Dust

60. Dust emission arising during the unloading of poultry and the hanging of live birds on the slaughter-line is a key environmental issue at poultry slaughterhouses (during the unloading and hanging of birds up to and during slaughter and bleeding). The dust levels can be abated by the use of exhaust ventilation. The dust can be collected in a fabric filter or a wet scrubber or metal mesh.

2.2.1.2. Pollutant substances

61. Most emissions to air from slaughterhouses are water vapour from the boilers used to raise hot water and steam. There is also a potential for the release of refrigerant gases from chilling and freezing plants and CO2 from stunning equipment.
The replacement of the use of fuel oil with natural gas, where a natural gas supply is available is appropriate BAT to reduce the emission of sulphur compounds into the atmosphere.

2.2.2. Wastewater

62. “Process-integrated” BAT which minimise both the consumption and the contamination of water should be applied. The selection of wastewater treatment techniques can then be made, based on the capacity required to treat the waste water produced after BAT minimizing its quantity and load have been applied.

63. Wastewater treatment, an “end-of-pipe” technology, is always required because waste water is produced from various sources. These include water from vehicle, equipment and installation cleaning and from the washing of carcases and animal by-products.

A. There are several options considered as BAT – good housekeeping measures which, if applied, can substantially reduce water consumption and consequently wastewater generation. Some of them are listed below:

1. Apply dedicated metering of water consumption
2. Separate process and non-process waste water
3. Remove all running water hoses and repair dripping taps and toilets
4. Fit and use drains with screens and/or traps to prevent solid material from entering the waste water
5. Dry clean installations and transport by-products dry, followed by pressure cleaning using hoses fitted with hand-operated triggers and where necessary hot water supplied from thermostatically controlled steam and water valves
6. Fit and use floor drains with screens and/or traps to prevent solid material from entering the waste water
7. Dry clean installations and transport by-products dry.

B. For the treatment of wastewater from slaughterhouses and animal by-products installations, BAT is to do the following:

1. Prevent wastewater stagnation
2. Apply an initial screening of solids using sieves at the slaughterhouse or animal by-products installation
3. Remove fat from wastewater, using a fat trap
4. Use a flotation plant, possibly combined with the use of flocculants, to remove additional solids
5. Use a wastewater equalization tank

6. Provide a wastewater holding capacity in excess of routine requirements

7. Prevent liquid seepage and odor emissions from waste water treatment tanks, by sealing their sides and bases and either covering them or aerating them

8. Subject the effluent to a biological treatment process.

9. Remove the sludge produced and subject them to further animal by-product uses.

10. Subject the resulting effluent to tertiary treatment (in own or municipal wastewater treatment plant).

2.2.3. Waste

64. Any possibility to separate solid waste quantities generated from all production processes and to avoid any mixing with the various water/wastewater flows should be explored. This will lead to a smaller wastewater pollution load and on the other side it will avoid unnecessary solid waste treatment (e.g. drying). Available BAT to achieve this goal are the following:

1. Continuously collect by-products dry and segregated from each other, along the length of the slaughter-line

2. Collect floor waste dry, with e.g. shovels, avoiding usage of water

3. Dry clean the lairage floor and periodically clean it with water

4. Operate continuous, dry and segregated collection of animal by-products throughout animal by-products treatment

5. Dry clean installations and transport by-products dry

Annex II
“Horizontal” Checklist

GENERAL DATA	
Date of Inspection	
Type of Inspection	☐ Routine ☐ Non Routine ☐ Follow up
Field of inspection	☐ Integrated ☐ Sectorial - ☐ Water ☐ Air ☐ Soil ☐ Noise ☐ Waste ☐ Odor
Name of Company	
Location of the plant	
Address	
Industrial activity	
Permit (number, date and title)	
Permit holder	
Telephone	
E-mail	
Contact person for integrated permit-related issues	
Representative competent authority	

ENVIRONMENTAL MANAGEMENT SYSTEM					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	EMS	Commitment of senior management	Official company documents on the EMS		
	EMS	Establishment of environmental policy including continuous improvement of installations by management	Company documents on the EMS and most recent reporting on results		
	EMS	Planning, establishing and implementation of necessary procedures, objectives and targets	Company documents and reports on the EMS about targets and necessary investments		
	EMS	Implementation of structure, responsibility, training, communication and documentation	Reports on results of EMS implementation in the company		
	EMS	Performance and corrective action, monitoring and measurement and preventive action	How does the system work, how is the monitoring and measurement organized		
	EMS	Maintenance of records Independent internal and external auditing	The presence of auditing reports		
	EMS	Review EMS by senior management on adequacy and effectiveness	Is a regularly review organized?		
	EMS	Following development of cleaner technologies	Presence of knowledge about new developments in the industrial sector		
	EMS	Application of sectoral benchmarking on a regular basis	Is the operator aware of the environmental performance of other companies in the sector? What is the knowledge about international norms and standards		

ENVIRONMENTAL MANAGEMENT SYSTEM					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	EMS	Independent audits	Is the EMS and audit procedure examined and validated by an accredited certification body or an external EMS verifier?		
	EMS	EMAS and EN-ISO 14001:1996	Is there an implementation and adherence to an internationally accepted voluntary system such as EMAS and ISO 14001?		

COMMUNICATION					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	Self-monitoring report	Preparation of self-monitoring reports	Check the correct delivery to the competent authority of the self-monitoring report. Check results of the monitoring.		
	Incidents/Emission Limit Values (ELVs)		Check if the operator communicates incidents and exceedances of ELVs to the competent authority		
	Installation changes		Check that the operator asked for authorization for making changes to the installation, as specified in legislation.		

ENERGY EFFICIENCY					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**

ENVIRONMENTAL MANAGEMENT SYSTEM					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	Energy efficiency	Carrying out an audit	Check if the operator ever performed an audit. Check the content of the audit: - energy-using equipment, and the type and quantity of energy used in the installation; - detected possibilities to minimize energy use; - possibilities to use alternative sources or use of energy that is more efficient.		
	Energy efficiency	Establish energy efficiency indicators	Check if the operator identified suitable energy efficiency indicators for the installation, and measure their change over time or after the implementation of energy efficiency measures		
		Carry out maintenance at installations to optimize energy efficiency	Check if the operator applies the followings: - establishing a structured program for maintenance - supporting the maintenance program by appropriate record keeping systems and diagnostic testing		

STORAGE/HANDLING					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	Storage and handling	Ensuring that the storage area drainage infrastructure can contain all possible contaminated run-off and that drainage from incompatible wastes cannot come into contact with each other	Check the separation among wastes with different properties; check if rainwater can produce a leakage of the waste; check the drainage infrastructure. Check whether any hazardous wastes are		

STORAGE/HANDLING					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
			stored properly (safety regulations)		
	Storage and handling	Collect the rainwater in a special basin for checking, treatment if contaminated and further use.	Check the separation among wastes with different properties; check if rainwater can produce a leakage of the waste.		
	Storage and handling	Handling odorous materials in fully enclosed or suitably abated vessels and storing them in enclosed buildings connected to abatement.	Check from the yearly report the presence of odorous wastes; check how they are stored.		
	Storage and handling	Equipping tanks and vessels with suitable abatement systems when volatile emissions may be generated, together with level meters and alarms.	Check from the yearly report the presence of waste that can produce volatile emissions; check how they are stored and the presence of abatement systems.		
	Storage and handling	Have a waste management plan	Check if they have procedures to manage existing waste streams; check if they maximize the re-use of generated waste (i.e. separation of waste streams, transport to waste recycling centers).		
	Liquid storage: soil protection around tanks	Provide secondary containment to aboveground and underground tanks containing flammable liquids or liquids that pose a risk for significant soil pollution or a significant pollution of adjacent watercourses. Install a liquid-tight reservoir that can contain all or a part of the dangerous liquids stored.	Check which secondary containment measures has been applied by operator (double wall tanks, monitored bottom discharge etc.).		
	Storage of packaged dangerous substances	Apply a storage building and/or an outdoor storage area covered with a roof.	Check where dangerous substances are stored.		

STORAGE/HANDLING					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	Transfer and handling of liquids and liquefied gases	For large storage facilities, according to the properties of the products stored, BAT is to apply a leak detection and repair program.	Check if the operator as a leak detection and repair program.		
	Storage of solids	BAT is to apply enclosed storage by using, for example, silos, bunkers, hoppers and containers, to eliminate the influence of wind and to prevent the formation of dust by wind.	Check the storage areas of materials likely producing dust.		
	Open storage of solids	BAT for open storage are: - moistening the surface - covering the surface - solidification of the surface - grassing-over of the surface	Check the measures undertaken by the operator.		
COMMON WASTEWATER AND WASTE GAS TREATMENT					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	Wastewater assessment	Checking and identifying relevant water-consuming processes and listing them according to their water usage. The resultant ranking is the basis for improvement of water consumption	Check whether any wastewater/ cooling water recirculation systems are applicable.		
	Wastewater and waste gas treatments	Treat contaminated waste water/waste gas streams at source in preference to dispersion and subsequent central treatment.	Check if the operator treats or pre-treats the effluents (water, gas) at source (not using a centralized treatment plant).		
	Wastewater	Using process water in a recycle mode whenever feasible for economic and quality reasons.	Check if the process foresees recycling measures of the process water.		

STORAGE/HANDLING					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	Wastewater	Segregate process water from uncontaminated rainwater and other uncontaminated water releases.	Check if the operator takes adequate measures to avoid rainwater to mix with process water.		
	Rainwater	Duct uncontaminated rainwater directly to a receiving water, by-passing the waste water sewerage system. Treat rainwater from contaminated areas.	Check the discharging of rainwater and the possibility to be contaminated. Check whether any possibilities for on-site treatment and reuse of rainwater from contaminated areas can be applied.		
	Wastewater discharge	BAT-associated emission levels for final waste water discharge into surface water	Compare the emission values of waste water discharge into surface water with BAT-associated emission levels		

	BAT PROCESS MANAGEMENT			
Ref. to the permit (page)	**Topic**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	Process design	Is the configuration of the process’ modules arranged according to the manufacturer’s instructions?		
		Have any design’s modifications occurred? If YES, for which reasons?		
		Do any improvements result from these modifications?		
		Are there any corrective measures planned to overcome any malfunctions of the process? If YES, specify the achieved improvement of the process features (in environmental terms e.g. less use of water/ energy)		

STORAGE/HANDLING					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
	Equipment	Has the equipment been installed/ operated according to its technical specifications?			
		Any changes/ modifications occurred? If YES, specify the achieved improvements			
		Is the equipment regularly checked for defects, leakages?			
		Is maintenance performed regularly according to the equipment's specifications?			
	Use of resources	Are the quantities of raw materials, water, chemicals, energy introduced in the production process **(inputs)** according to the technical prescriptions? If NO, specify the reasons and the achieved improvements in the production process			
		Are measured/ weighted quantities of raw materials, chemicals, water registered? If NO, specify why			
		Is the least polluting energy source used for the production e.g. natural gas? If NO, specify why			
		Is the energy input measured? If NO, specify why			
		Which process **outputs** (products, by-products, air emissions, effluents, waste) are measured? If NO, specify why			
		How is the heating/cooling system operated?			
		Are there any special precautions to avoid losses/leakages from the feeding devices of inputs (raw materials, chemicals)?			

STORAGE/HANDLING					
Ref. to the permit (page)	**Topic**	**BAT**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
		If NO, specify why			
		Are there any special precautions to avoid losses/leakages from the storage devices for raw materials/chemicals needed? If NO, specify why			
		Are there any special precautions to avoid losses/leakages from the water feeding system? If NO, specify why			

Annex III
Sectoral Checklists

1. Iron/steel production: Electric arc furnace (EAF)

AIR EMISSIONS					
Topic	**What does the permit say**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Pollution abatement systems EAF steelmaking and casting		To prevent mercury emissions by avoiding, as much as possible, raw materials and auxiliaries which contain mercury	Check use of material with low or no mercury content		
Pollution abatement systems EAF steelmaking and casting		To achieve an efficient extraction of all emission sources by using one of the techniques listed below and to use subsequent dedusting by means of a bag filter A combination of direct off-gas extraction (4th and 2nd hole) and hood systems Direct gas extraction and doghouse systems. Direct gas extraction and total building evacuation (low-capacity EAFs may not require direct gas extraction to achieve the same extraction efficiency). The overall average collection efficiency associated with BAT is> 98 %.	Check if primary and secondary de dusting (incl. scrap preheating, charging, melting, tapping, ladle furnace and secondary metallurgy) is implemented by one of the techniques described in BAT and is followed by de dusting by means of a bag filter. Check the measurement reports of the BAT–AELs for dust and mercury The BAT-AEL for dust is < 5 mg/Nm^{3}as a daily mean average The BAT-AEL for mercury is < 0,05 mg/Nm^3 determined as the average of the sampling period (discontinuous measurement, spot samples for at least four hours.		

AIR EMISSIONS					
Topic	**What does the permit say**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
		The BAT associated emission level for dust is < 5 mg/Nm3, determined as a daily mean value.			
Pollution abatement system EAF steelmaking and casting		To prevent and reduce polychlorinated dibenzodioxins/furans (PCDD/F) and polychlorinated biphenyls (PCB) emissions by avoiding, as much as possible, raw materials which contain PCDD/F and PCB and using one or a combination of the following techniques, in conjunction with an appropriate dust removal system: I. appropriate post-combustion II. appropriate rapid quenching III. injection of adequate adsorption agents into the duct before dedusting. The BAT-AEL for PCDD/F is < 0,1 ng I-TEQ/Nm^3 based on 6-8 hour random sample during steady-state conditions	Check the use of one (or a combination of) the 3 described techniques in the BAT to reduce the formation of PCDD/Fs and PCBs Check the measurement reports of the BAT-AEL for PCDD/Fs.		

AIR EMISSIONS					
Topic	**What does the permit say**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Pollution abatement systems EAF steelmaking and casting		To reduce dust emissions by using one or a combination of the following techniques: I. efficient extraction of the slag crusher and screening devices with subsequent off gas cleaning, if relevant II transport of untreated slag by shovel loaders III. extraction or wetting of conveyor transfer points for broken material IV. wetting of slag storage heaps V. use of water fogs when broken slag is loaded. The BAT-AEL for dust is < 10-20mg/Nm^3 when the extraction technique (I) with slag-crusher is used.	Check the use of one (or a combination of) the 5 emission reducing techniques for the reduction of dust emissions and check emission levels		

WASTEWATER					
Topic	**What does the permit /National law says**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Water and wastewater management		To prevent, collect and separate waste water types, maximising internal recycling and using an adequate treatment for each final flow. This includes techniques utilising, e.g. oil interceptors, filtration or sedimentation. In this context, the following techniques can be used where the prerequisites mentioned are present: • avoiding the use of potable water for production lines • increasing the number and/or capacity of water circulating systems when building new plants or modernising/revamping existing plants • centralising the distribution of incoming fresh water • using the water in cascades until single parameters reach their legal or technical limits • using the water in other plants if only single parameters of the water are affected and further usage is possible • keeping treated and untreated waste water separated; by this measure it is possible to dispose of waste water in different ways at a reasonable cost • using rainwater whenever possible.	Check if the use of potable water is avoided, if contaminated water streams are segregated, internal water recycling is maximized and if non-contaminated water streams are segregated/reused and if other measures stated in BAT are used		
Water and waste		To minimize the water consumption from the electric arc furnace (EAF) process by the use of	Check if water consumption of the EAF installation is minimized by the use of		

WASTEWATER					
Topic	**What does the permit /National law says**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
water management		closed loop water cooling systems for the cooling of furnace devices as much as possible unless once-through cooling systems are used.	closed loop water cooling systems for the cooling of furnace devices.		
Pollution abatement systems for water emissions from EAF steelmaking		To minimise the wastewater discharge from continuous casting by using the following techniques in combination: The removal of solids by flocculation, sedimentation and/or filtration The removal of oil in skimming tanks or in any other effective device The recirculation of cooling water and water from vacuum generation as much as possible. The BAT-AEL for waste water from continuous casting machines based on a qualified random sample or a 24-hour composite sample are: Suspended solids < 20 mg/l Iron < 5 mg/l Zinc < 2 mg/l Nickel < 0,5 mg/l Total chromium < 0,5 mg/l Total hydrocarbons < 5 mg/l	Check if water discharge from continuous casting is minimized by the use of flocculation, sedimentation and/or filtration, oil removing by e.g. skimming and recirculation of cooling water and water from vacuum generation. Check the reporting on BAT-AELs and monitoring frequency.		

SOIL AND GROUNDWATER					
Topic	**What does the permit /National law says**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Rainwater		Process water should be segregated from rainwater and other water effluent, to allow reuse or recycling, as well as to minimize the amount of waste water which requires treatment, the installation of a roof over certain process areas, loading and unloading bays, etc. Prevention of uncontrolled effluents from the site, such as contaminated rainwater. Rainwater from production areas is collected either in sumps on the spot or in other central facilities (e.g. emergency storage tanks or lagoons) to allow inspection and then a decision is to be made on whether to discharge it directly to the receiving water or to a waste water treatment facility.	Existence of systems to separate and treat first flush rainwater from later rainfall.		
Tank bunds		Design a tank farm bund (or dike) to contain large spills, such as that caused by a shell rupture or a large overfill. The bund consists of a wall around the outside of the tank (or tanks) to contain any product in the unlikely event of a spill personnel both on and off-site. The volume is normally sized to accommodate the contents of the largest tank within the bund.	Presence of tank bunds to contain spills from storage tanks and drums of waste, to prevent soil contamination in case of leakage.		

WASTE					
Topic	**What does the permit /National law says**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Waste generation		To prevent waste generation by using one or a combination of the following techniques: I. appropriate collection and storage to facilitate a specific treatment II. recovery and on-site recycling of refractory materials from the different processes and use internally, i.e. for the substitution of dolomite, magnesite and lime III. use of filter dusts for the external recovery of non-ferrous metals such as zinc in the non-ferrous metals industry, if necessary, after the enrichment of filter dusts by recirculation to the electric arc furnace (EAF) IV. separation of scale from continuous casting in the water treatment process and recovery with subsequent recycling, e.g. in the sinter/blast furnace or cement industry V. external use of refractory materials and slag from the electric arc furnace (EAF) process	Check if waste generation is prevented according to one or a combination of the techniques that are described in BAT. Check if EAF residues that cαn not be voided or recycled are managed in a controlled manner.		

WASTE					
Topic	**What does the permit /National law says**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
		as a secondary raw material where market conditions allow for it.			
Waste minimization by internal use or by application of specialized recycling processes		To use integrated techniques and operational techniques for waste minimization by internal use or by application of specialized recycling processes (internally or externally).	Check if integrated techniques for the recycling of iron-rich residues are used.		
Waste reuse		To maximize external use or recycling for solid residues which cannot be used or recycled wherever this is possible.	Check if there is maximum reuse or recycling for solid residues that cannot be recycled according to previous BAT; check if there is control and management for residues that cannot be avoided or recycled.		
Waste treatment		To use the best operational and maintenance practices for the collection, handling, storage and transport of all solid residues and for the hooding of transfer points to avoid emissions to air and water.	Check operational and maintenance practices for collection, handling, storage and transport of solid residues and the hooding of transfer points to avoid emissions to air and water.		

2. Meat processing (Slaughterhouses)

AIR EMISSIONS					
Topic	**What does the permit /National law say**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Pollution abatement systems			Air emissions collection Air emissions treatment		
Pollution abatement systems			Concentration and quantity of contaminants before and after the treatment. Duration of operation daily/annually.		
Air emission continuous monitoring			Check the program of maintenance and calibration of the air emission measurements equipment.		
Dust		Dust collection at poultry reception – fabric filter - wet scrubber - metal mesh.	Check which type (fabric filter, wet scrubber, metal mesh) is installed and operated. Check what is happening with the collected dust (e.g. transport to landfill?).		
WASTE WATER					
Topic	**What does the permit /National law say**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Pollution abatement systems		Apply an initial screening of solids using at the slaughterhouse or animal by-products facilities installation sieves Use a wastewater equalization tank Remove fat from waste water, using a fat trap	Check whether the relevant treatment facilities are in place: • Sieves • Equalization tank • Emergency lagoon • Fat trap • Flotation plant • Own biological WWTP		

AIR EMISSIONS					
Topic	**What does the permit /National law say**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
		Use a flotation plant, possibly combined with the use of flocculants, to remove additional solids Subject the effluent to a biological treatment process Subject the resulting effluent to tertiary treatment (in own or municipal wastewater treatment plant)	Check the records (kept by operator) concerning the total waste water quantity (m^3/day) and the concentration of contaminants after final treatment (exit of own WWTP – entrance to municipal WWTP) Check the level of treatment applied in the municipal WWTP (tertiary treatment?)		
Water use conservation measures		Apply dedicated metering of water consumption Separate process and non-process waste water Dry clean installations and transport by-products dry followed by pressure cleaning using hoses fitted with hand-operated triggers and where necessary hot water supplied from thermostatically controlled steam and water valves.	Check whether metering devices are installed at the major water supply devices: cleaning of floors/ equipment, hot water supply Inspect whether the cooling water (closed loop system) is separated from the process water and whether it is eventually sometimes discharged into the WWTP (for dilution purposes) Inspect how the by-products are collected/ transported (dry collection/ transport?) and how frequent floors/devices are cleaned with water.		

SOIL AND GROUNDWATER					
Topic	**What does the permit /National law say**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Disposal of carcasses, sludge, by-products			Inspect the places where any solid residues are dumped/ disposed of: Are these areas covered? Any underground sealing in place?		
WASTE					
Topic	**What does the permit /National law say**	**Which BAT are applicable**	**What to check**	**What has been observed**	**Compliance (YES/NO)**
Collection/ Storage		Segregation of collected by-products	Check where offal, feathers and any other non-usable by-products are separately collected and stored Check how manure from lairage is collected (dry collection?)		
Waste generated			Waste classification (according to national list of waste) Check the records (kept by the operator) concerning the quantity of each waste/by-product (kg/day)		
Disposal/ Recycling			Check the disposal/recycling route: Disposal (where are they disposed – municipal landfill?) Recycling (according to applicable national waste legislation) Are they recycled within the facility? Are they transported to other facilities for re-use/ recycling?		