European Union Network for the Implementation and Enforcement of Environmental Law

Reinforcement program on inspection skills according to the landfill directive in IMPEL member countries

Draft- Report

V5-2February 2014

Landfill in Poznan Suchy Las

Introduction to IMPEL

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association of the environmental authorities of the EU Member States, acceding and candidate countries of the European Union and EEA countries. The association is registered in Belgium and its legal seat is in Bruxelles, Belgium.

IMPEL was set up in 1992 as an informal Network of European regulators and authorities concerned with the implementation and enforcement of environmental law. The Network's objective is to create the necessary impetus in the European Community to make progress on ensuring a more effective application of environmental legislation. The core of the IMPEL activities concerns awareness raising, capacity building and exchange of information and experiences on implementation, enforcement and international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation.

During the previous years IMPEL has developed into a considerable, widely known organisation, being mentioned in a number of EU legislative and policy documents, e.g. the 6th Environment Action Programme and the Recommendation on Minimum Criteria for Environmental Inspections.

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on both technical and regulatory aspects of EU environmental legislation.

Information on the IMPEL Network is also available through its website at:
www.impel.eu

Title report: Reinforcement program on inspection skills according to the landfill directive in IMPEL member countries	**Number report:**
Project manager: John Visbeen, Netherlands Romano Ruggeri, Italy	**Report adopted:**
Authors: John Visbeen, Netherlands	**Number of pages:** [58] Report: [42] Annexes: [1]
Project team John Visbeen, Netherlands; Romano Ruggeri, Italy; Jana Miklavcik, Slovenia; Bianca Schijven, Stuart Gunput, Ronald Smallenburg Netherlands; Vojtech Hamernik, Czech Republic; Ewa Chruscinska, Poland; Sanja Radovicz, Croatia.	

Executive summary:

During 2011, 2012 and 2013 we have been working on the project:*Reinforcement program on inspections skills according to the landfill directive*.

The Council Directive 1999/31/EC on the landfill of waste and the Council Decision of May 2002 establishing criteria and procedures for the acceptance of waste at landfills (2003/33/EC) set standards for the authorisation, design, operation, closure and aftercare of landfills.

Improving implementation of EU law is a high priority objective of both the European Commission and IMPEL. Recent reports on implementation of EU waste legislation have shown that "*implementation and enforcement of EU waste law remain poor particularly regarding the waste framework directive, the landfill directive and the waste shipment regulation*".
The project Landfill inspection started in 2011. The objectives of the project:

- identification of good inspection practices, developing guidance;
- improve cooperation between IMPEL member countries to work towards a consistent regulatory and enforcement regime;
- to give feedback to policy makers on (effectiveness) of the various approaches and practices in the field of permitting and inspection of landfill sites in the IMPEL member countries.

In 2011 an information exchange forum was organised in base camp and a workshop was organised in Sardinia (Italy). The aim of the project in 2012 and 2013 has been to improve inspections skills for landfills by:

- Joint inspections in Sardinia (2011), Slovenia and Romania (2012), Czech Republic, Croatia and Poland (2013). Guidance and inspection tools that are available from the different EU member states have been used and checklists to be used during the inspections were developed. During a workshop in October 2012 the joint inspections were evaluated and the practicability of guidance's and tools used was discussed. Results of the joint inspections in 2013 will be added to the guidance.
- In 2013 also an inspector from the water board participated the joint inspections in Czech Republic and Croatia.

As an inspection at a landfill has to cover different subjects, the inspection team decided to choose certain subjects to focus on during the joint inspections. The results of the 2011 workshop, of the executed joint inspections and the information exchange forum showed that the activities, on which the project will focus, to begin with, are:

(1) Criteria and procedures for the acceptance of waste.
(2) Gas control.
(3) Protection of soil and water (underground water).
(4) Water control and leach ate management.

This report contains, the reports of the joint inspections 2013. The guidance document is a separate document.

Contents

1 Scope

1.1 Project Background

Improving implementation of EU law is a high priority objective of both the European Commission and IMPEL. Recent reports on implementation of EU waste legislation have shown that “implementation and enforcement of EU waste law remain poor particularly regarding the Waste Framework Directive, the Landfill Directive and the Waste Shipment Regulation” (See Commission note for IMPEL Board/Clusters on EU Waste Legislation: consolidated summary of main implementation gaps, August 2010).

A questionnaire that was sent out in December 2010 to national IMPEL coordinators showed that there are countries (50%) who have a lack of knowledge to fulfil inspection requirements, especially with regard to new-to-build landfill sites, (but also new build on existing locations). There are also several countries who can offer the required technical knowledge. It was also shown that there was significant support for the exchange of knowledge and experiences because the inspection of landfill sites are complex and challenging. (see annex one for results of questionnaire)

Some countries, (for instance Romania), say that the best moment for support for inspection landfill sites they need is now, because these sites are being built at this moment,

On European projects of landfill construction (based on European funding) it is obligatory to have special technical assistance (TA) by an independent consultant. However often public administration lacks the required expertise. As a result the European Commission has organised significant assistance in recent years. Nevertheless there is still need for training measures to reach a certain minimum level of expertise in order to guarantee a good standard and quality of inspections (and also to verify or check the work of the independent consultants). IMPEL is in a position to organise knowledge exchange platforms, training measures and inspection tools for inspectors (and also permitters).

1.2 Objectives

The main objectives of the current project are:

- Identification of good inspection practices
- Cooperation (and helping each other) between IMPEL member countries to work towards a consistent regulatory and enforcement regime
- Feedback to policy makers on the (effectiveness of) the various approaches and practices in the field of permitting and inspection of landfill sites in IMPEL Member countries,

A coreteam to achieve these main project objectives worked together during 2011, 2012 and 2013. We managed to organise the joint inspections in Czech Republic, Croatia and Poland by using basecamp. The guidance document and developed preparation documents were used by the captain and experts of the inspection teams.

1.3 Activities 2013

The objectives will be achieved by:

- Extending the use of Basecamp under the IMPEL website for experts in all IMPEL member countries as an exchange platform for information and specific questions, discussions etc.
- Carrying out three joint inspections to exchange experiences and knowledge

- Drafting of project report containing findings, conclusions and recommendations of the three joint inspections and proposal for TOR 2014.

1.4 Organisation of the project

We choose to use the basecamp for the preparations of the joint inspection. Travels and accommodation were arranged by project leader. Project leader also pointed out team captain for each joint inspection. Together with hosting country he/she was responsible for the preparation of the joint inspection. The inspection team together was responsible for drafting the report of the inspection.

1.5 Inspection teams

Inspection team Czech Republic

- Inspector Italy: Romano Ruggeri (teamcaptain)
- Inspector Poland: Ewa Chruscinska
- Inspector Netherlands: Stuart Gunput
- Inspector Netherlands: Ronald Smallenburg (Waterboard)

Inspectors Czech Republic: Lenka Němcová, Vojtěch Hamernik, Martin Zemek, František Kraus (Water Protection Department)

Inspection team Croatia:

- Inspector Netherlands: Stuart Gunput (team captain)
- Inspector Slovenia: Jana Miklavcic
- Inspector Czech Republic: Vojtěch Hamernik
- Inspector Sweden: Nina Hansson

Inspectors Croatia: Sanja Radović, Mirela Košutić, Sandra Pezelj Meštrić, inspector Water Protection Department

Inspection team Poland:

- Inspector Slovenia: Jana Miclavcic (team captain)
- Inspector Croatia: SanjaRadovic
- Inspector Sweden: Nina Hansson
- Inspector Netherlands (water board): Ronald Smallenburg
- Advisor Netherlands: Bianca Schijven
- Inspectors Poland:EwaChruscinska, Michal Ratajczak

1.5 Conclusions and recommendations

The following conclusions and recommendations have been shared during the joint inspections:

- Lack of information in sampling plan and hazardous properties assessment. Training is needed to inspectors concerning protocols of sampling and hazardous properties assessment in order to check procedures and results.
- Find out good example of sampling plan
- Find out good example of hazardous properties analytical assessment (lab bulletin) in case of mirror code wastes
- Different implementation of EU Directive concerning waste basic characterization and compliance testing
- Different interpretation of EU Directive concerning the meaning of trigger levels for groundwater protection
- Different approach concerning pre-treatment of waste before landfilling
- Good examples of pre-treatment of waste has been observed in Celio
- Feedback for permit improvement: mandatory communication to inspection authority of the monitoring data report
- The use and promotion of checklist among inspection teams has been recommended, as well as the use of basecamp.

- Separate waste collection is no pre-treatment. This aspect needs more attention.
- No pre-treatment of waste has been observed on the selected landfill in Croatia.
- Feedback for permit improvement: mandatory communication to inspection authority of the monitoring data report
- The use and promotion of checklist among inspection teams has been recommended, as well as the use of basecamp.

- There is a lack of information on the way waste and water has to be sampled to guaranty that the samples are representative for the composition of the waste or water. Training is needed for inspectors concerning protocols of sampling and hazardous properties assessment in order to be able to supervise both the classification of waste as well as the acceptance procedures and monitoring results of landfills.
- The interpretation of the monitoring results from landfills (groundwater, leach ate, surface water, landfill gas) requires specific knowledge. When a landfill is only inspected once a year it is very difficult to gain this special knowledge. More information is needed on how the different member states evaluate the results of monitoring by the landfill operator.
- Inspectors need more knowledge on the pre-treatment of mixed municipal waste and how to check if the mixed municipal waste that is land filled does not contain biodegradable waste in a higher concentrations than allowed according to the legislations of a member state (implementation Landfill directive).
- The requirements on the conditions of top layers of landfills seems to be very different between member states. Is there need for a minimum criteria ?
- The inspectors of Poland were informed by the visiting inspectors about the Information exchange in base camp and the Guidance of the project. Understanding the information coming from the

IMPEL project is difficult for the majority of the inspectors in Poland this is because most of the information is in English.

- To optimise the information exchange during the joint inspections having a translator present during the inspection is very useful.

2 Reports form the joint inspections 2013

2.1 Czech Republic 09-10 September 2013

2.1.1 Preparation of the inspection

- Definition of the main goals of the inspection going through the conclusions/recommendations indicated in the Inspection guidance book for Landfill inspection and come out from the Utrecht meeting.
- Draw up of the agenda of the meeting and update of the checklist.
- Translation of the permit of the landfill.
- Preparation of the starting presentation (PPT) containing presentation of IMPEL network, and of the previous steps of the project.
- Stimulating the discussion and preparation of the group on Basecamp.

2.1.2 Definition of the topics of the inspection

At chapter 7 “Conclusions/ Recommendations” of the Inspection guidance book for Landfill inspection,it is indicated that future joint inspections should focus on the following activities:

- The pre-treatment of waste before land filling.
- How and when to inspect the top and bottom layer of landfills.
- The sampling of waste (and classification).
- Ground water monitoring.

Therefore, the topics focused in the inspection in Prague have been:

- Pre-treatment of waste before landfilling
- Sampling and classification of waste
- Groundwater monitoring

The checklist has consequently been adjusted (Boxes 1 and 3 of the checklist)

2.1.3 Agenda of the joint inspection

Time	Activity	Location	Apparatus	Who
Sunday 08/09/2013 arrival of : (staying in HotelClarion, Prague) - Inspector: Italy: Romano Ruggeri (teamcaptain) - Inspector: Poland: Ewa Chruscinska - Inspector: Netherlands: Stuart Gunput - Inspector Netherlands: Ronald Smallenburg (Water board) **Inspection team Czech Republic** - Lenka Němcová - Vojtěch Hamernik - Martin Zemek - František Kraus (Water Protection Department)				
Time	**Activity**	**Location**	**Apparatus**	**Who**
Monday 9 September 2013				
8.00 8.20	Breakfast	HotelClarion		
8.20 10.00	Appointment at 8.20 at the lobby of Hotel Clarion.	HotelClarion	Transport to Landfill by cars of regional inspection organisation. Landfill CELIO a.s. near Litvínov city (North Bohemia)	Inspection team
10.00 10.10	Welcome	Landfill conference room		LenkaNemcova
10.10 10.30	IMPEL project in 2012: Guideline and checklist. Organization of the inspection	Landfill conference room	Laptop and beamer (ppt)	Romano Ruggeri
10.30 11.00	Presentation of landfill	Landfill conference room	Laptop and beamer	Landfill operator
11.00 11.30	Permit conditions of Landfill and history of compliance of landfill	Landfill conference room	Laptop and beamer	Vojtech Hamernik
11.30 13.00	Joint inspection on landfill Main focus on following items: - pre-treatment of waste before land filling; - sampling and classification of waste; - ground water monitoring Use of checklist	Conference room and landfill	Checklist	Inspection team (personal safety equipment)
13.00 14.30	Lunch			
14.30 16.30	Joint inspection on landfill	Landfill	Checklist	Inspection team (personal safety equipment)
16.30 18.00	Discussion (checklist)	Landfill conference room	Checklist	Inspectors and landfill operator
18.00 19.30	Transport back to hotel		Transport to Landfill by cars of regional inspection organisation	
20.30	Dinner			
Tuesday 10 September 2013				
8.00 9.00	Breakfast	HotelClarion		
9.30 10.00	Presentation of Czech Inspectorate. Inspection organisation in Czech Republic and legislation basis	Inspectorate meeting room	Laptop and beamer	Lenka Nemcova
10.00 11.30	Inspection evaluation - What has been observed; - Experience with	Inspectorate meeting room	Checklist and notes	Inspection team

	checklist - Experience of inspectors Input for report			
11.30 11.45	Coffee break	Inspectorate meeting room		
11.45 13.00	Inspection evaluation - What has been observed; - Experience with checklist - Experience of inspectors Input for report	Inspectorate meeting room	Checklist and notes	Inspection team
13.00 14.00	Lunch			
14.00 15.30	Discussion, conclusions and further steps. Input for final report	Inspectorate meeting room	Laptop and beamer (ppt)	Inspection team

2.1.4 Inspection team

The inspection group has been composed by:

- Inspector Italy: Romano Ruggeri (team captain)
- Inspector Poland: Ewa Chruscinska
- Inspector Netherlands: Stuart Gunput
- Inspector Netherlands: Ronald Smallenburg (Water board)
- Inspectors Czech Republic: LenkaNěmcová, Vojtěch Hamernik, Martin Zemek, František Kraus (Water Protection Department)

2.1.5 Inspected landfill

CELIO: localization: Ústecký Region, town: Litvínov, cadastral area: Růžodol

Operating unit I:

- Other waste and municipal waste landfill (1.640.000 m3)
- Hazardous waste landfill (540.000 m3)
- Inert waste landfill (370.000 m3)

- Biodegradation area (12.600 m2)
- Waste treatment for energy utilization (organic sludge, wood pieces) – 15t/h

- Waste stabilization and neutralization – 15t/h
- Construction waste recycling
- Industry composting plant (3.800 t/Y)
- Mobile shredder – wood waste and whole scale municipal waste – 17t/h
- Geobal 4 storage before its energy utilization (110.000 t)

Operating unit II:

- Centre for separating and mechanical adjustment of whole scale municipal waste and industry waste (10t/h)
- Line for tire crushing for energy or other material utilization (7 t/h)
- Electro waste processing
- Transport and mechanical works.

2.1.6 Introduction to the inspection

Before starting with the inspection, three power point presentations in the Landfill conference room have been performed, by the operator (description of the plant), Romano (objectives of IMPEL and of the project) and Vojtech (permit of the landfill).

2.1.7 Conduction of the inspection

To easily and efficiently conduct the inspection, a waste stream has been selected.
The selected one has been:

Cod. 170504: soil and stones other than those mentioned in 17 05 03
It's a mirror code waste. It comes to the plant as a hazardous waste in the biodegradation plant, then it is treated ant after treatment the result is a non-hazardous waste. The operator send to the Competent Authority a report on evaluation of treatment – declassification of the waste. In case the treatment is not efficient it could be dumped in the HW sector.

Once the waste stream has been selected, the inspection group has checked all steps indicated in the checklist, asking for evidence of documents to the landfill owner.

2.1.8 Open questions

The inspection group has been addressed to the following open questions, considered as main problems to be solved:

1. Who and how perform sampling of waste before landfilling? Sampling plan.
2. Sampling criteria (how and when) of not regularly produced wastes?
3. How to assess hazardous properties in case of mirror code waste? Lab bulletin?
4. Which pre-treatment are necessary before landfilling the waste?
5. When may the waste be considered as stable and non-reactive?
6. How to define trigger levels for groundwater?

2.1.9 Main results of the discussion

1. *Who and how perform sampling of waste before landfilling? Sampling plan.*

Different approach in Member States have been identified. In NL and Italy we have 3 steps of checking: producer (basic characterization), operator (compliance testing), inspection authority (samples). In CZ no compliance testing is performed by the operator.

Sampling plan: protocols of sampling are mentioned in the basic characterization, but the sampling plan is not presented and inspection authorities do not perform inspections on sampling. In NL sampling plan is sent to inspection authority.

2. *Sampling criteria (how and when) of not regularly produced wastes?*

It can be checked from the diary if the waste comes from different sites (that means that is not regularly produced). It is up to the producer to declare if technology has changed and a new basic characterization is required.

As far as sampling is concerning, no particular criteria are set, a part of those included in the sampling protocols.

3. *How to assess hazardous properties in case of mirror code waste? Lab bulletin?*

In MS usually we do not have analytical evidence of the hazardous properties calculation. The choice between HW or NHW code is often not more than a declaration of the producer or of the external lab. The indication of H code is a declaration of the producer as well, depending on the kind of pollutant of the area. The considered waste 170503 comes to the plant as hazardous waste; hazardous codes are H5 and H15; they are indicated in the basic characterization and are defined not on the basis of analytical detection but on the knowledge of the producer about the kind of contamination of the site.The bulletin attached to the basic characterization includes just the analysis of leachate.

4. *Which pre-treatment are necessary before landfilling the waste?*

As far as Municipal Solid Waste, different approach can be observed: NL uses to burn the residual part of the waste selection stream. Italy, Poland and CZ consider treated a residual waste coming from a well performed separate collection (infringement of the EU Directive up to the Commission).

As far as Bulky Municipal Waste are concerned, a good example has been appreciated in CELIO plant: waste are pre-treated (shredder, multi-sieverecc). Resulting of pre-treatment are different fractions like iron, RDF ecc used in cement factory and recovered.The residual part that cannot be recovered is sent to landfill.

It must be observed that in CZ a defined amount of waste can be used as technological material (walls, covering ecc). If the waste is used as technical material the producer has not to pay a fee. The properties of the waste allowed as technical material are defined in the permit. Usually it cannot be stored for a long period.

Used tyres are physically treated (crumbled) and sent to the cement factory.

5. When may the waste can be considered as stable and non-reactive

Different approaches in MS are observed: in CZ the waste must be stabilized, even if declassification is a preferred solution. In Italy (in some regions) leachate test is considered to be enough and no chemical-physical treatment is mandatory.

No criteria are set to define the kind of treatment and what has to be checked by the competent authority and the producer.

In Celio landfill, when a HW comes to the plant it is usually required that it should be declassified. Leachate test is not enough for declassification, as also hazardous properties are checked. HW can be disposed after declassification. Disposal fee are different for HW and NHW. The report of the company concerning declassification results includes evidence of the absence of hazardous properties.

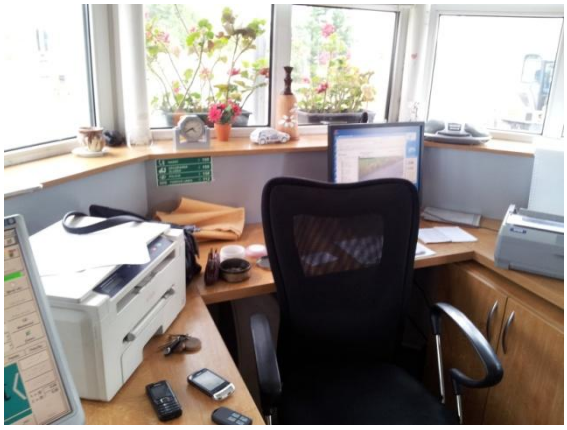
In Celio there is a bio treatment of HW, performed by an external company, which aim is the declassification to NHW, by means of bacteria (biological) treatment removing hazardous pollutants.

6. *How to define trigger levels for groundwater?*

In MS there is a misunderstanding and different interpretations of trigger levels, as indicated in the Council Directive. No examples are available of application of the directive assumption. Trigger levels are not usually determined.

7. *Acceptance of waste in the landfill*

In Celiotwo steps of control are foreseen: camera on the top at the entrance of the landfill and operator visual control during the disposing of the waste in the body of the landfill. Another check is performed by means of statutory declaration. An operation diary is filled out with the information of the waste coming in. The operator do not take samples from each load.



8. *Protection of soil and groundwater*

In Celio, water coming from the washing wheels area goes to the water treatment plant. The driver can decide if the washing is necessary or not; it's not mandatory in the permit.

The treatment consists of 2 basins. The wastewater coming from the landfill (except for the part where hazardous waste is landfilled) is collected in one of the basins. This is the settling basin; the second basin is filled with activated carbon. Here further treatment takes place.After purification, the purified water is discharged into nearby surface water.There is no good assurance for the saturation of the technical treatment facility (activated carbon). Sampling is performed as signaling.

Four times per year, the treated water, discharged into surface water, is checked on the parameters specified in the permit.Sampling is performed by or on behalf of the operator. Competent authority does not takes samples (except when there is reason to do so).

The reports are checked during an inspection. Reports are not sent to the competent authority. The method of sampling is not clear; it could not be determined whether the sampling is performed in a representative way.

It was not possible to check the location where the groundwater samples are taken The location was not accessible, because the grass was too high. It is not clear whether the sampling is done in a proper representative manner.

Severalmonitoring wells are installedbothin and outside the landfill. The level of groundwater is checked (21 piezometers) to prevent the contact with the waste. There is noonline monitoringof groundwater. A maximum height is prescribed, and in case it is exceeded operator has to pump the water to the treatment plant; throughan existing pipeline the excess of groundwater can bedischarged intoa purification tank.When the pump which pumps off the excess groundwater fails, there are 3 equal pump at the landfill site with different tasks which are interchangeable.The operatoris responsible forsamplingand monitoringofthewells.

Monitoring of groundwater is performed 4 times/year (same in Poland), by means of 5 piezometer for water quality; parameters are defined in the permit.

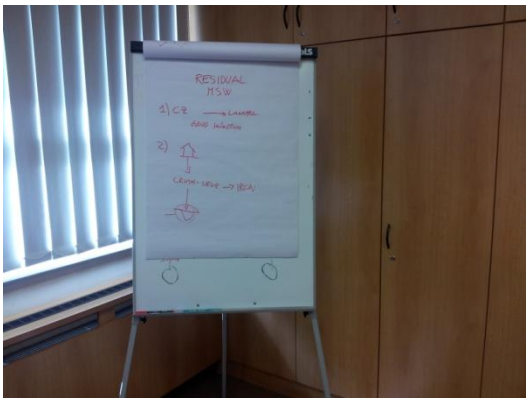
In case of contaminant values exceeding the limit, operator has to inform competent authority and take some decision depending on the risk.

The zero state oftheground water quality is unknown.In somecontrols there isacontamination ofgroundwater with Ammonium has been detected detected upstream the landfill.

Monitoring report is sent once per year to the permitting authority; inspectorate do not receive annual report, but monitoring data are available at the plant.Every 3 months the external lab produces a report for the operator.

2.1.10 Conclusions and recommendation

The second day has been dedicated to comments and discussion concerning the visit to the landfill and the remaining open questions.



The following conclusions and recommendations have been shared:

- Lack of information in sampling plan and hazardous properties assessment. Training is needed to inspectorsconcerning protocols of sampling and hazardous properties assessment in order to check procedures and results.
  - Find out good example of sampling plan
  - Find out good example of hazardous properties analytical assessment (lab bulletin) in case of mirror code wastes
- Different implementation of EU Directive concerning waste basic characterization and compliance testing
- Different interpretation of EU Directive concerning the meaning of trigger levels for groundwater protection
- Different approach concerning pre-treatment of waste before landfilling
- Good examples of pre-treatment of waste has been observed in Celio
- Feedback for permit improvement: mandatory communication to inspection authority of the monitoring data report

The use and promotion of checklist among inspection teams has been recommended, as well as the use of basecamp.

2.2. Croatia 23 and 24 September 2013

2.2.1 Preparation of the inspection

- Definition of the main goals of the inspection going through the conclusions/recommendations indicated in the Inspection guidance book for Landfill inspection and come out from the Utrecht meeting.
- Draw up of the agenda of the meeting and update of the checklist.
- Translation of the permit of the landfill and waste regulations.
- Inspection checklist of the landfill inspection 2013 by the inspectorate
- Preparation of the starting presentation (PPT) containing presentation of IMPEL network, and of the previous steps of the project.
- Giving access to basecamp of inspectors and stimulating the discussion and preparation of the group on Basecamp.

2.2.2 Definition of the topics of the inspection

At chapter 7 “Conclusions/ Recommendations” of the Inspection guidance book for Landfill inspection,it is indicated that future joint inspections should focus on the following activities:

- The pre-treatment of waste before land filling.
- How and when to inspect the top and bottom layer of landfills.
- The sampling of waste (and classification).
- Ground water monitoring.

Therefore, the topics focused in the inspection in Prague have been:

- Pre-treatment of waste before landfilling
- Sampling and classification of waste
- Groundwater monitoring
- Surface water control and leachate management

The checklist has consequently been adjusted (Boxes 1,3 and 4 of the checklist)

2.2.3 Agenda of the joint inspection

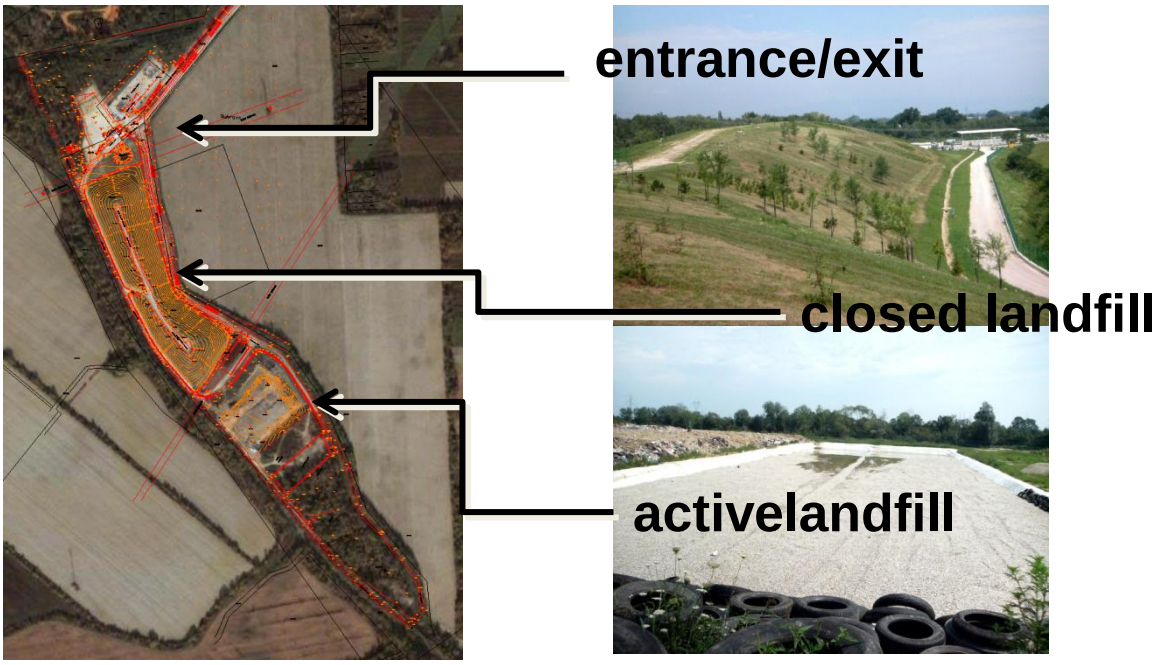
Time	Activity	Location	Apparatus	Who
Monday 23 September 2013				
8.00 8.30	Breakfast	Hotel		Ms. Sandra PezeljMeštrić will pick us up at the hotel "Croatia" at 8.30 pm.
8.30 9.30	Transport	Ministry of Environment and Nature Protection	Transport to Landfill by cars of regional inspection organisation. Landfill 30 km from Zagreb	Inspection team
9.30 9.40	Welcome	Landfill conference room		SanjaRadović
9.40 10.00	IMPEL project in 2012: Guideline and checklist. Organization of the inspection	Landfill conference room	Laptop and beamer (ppt)	Stuart Gunput
10.00 10.30	Presentation of landfill	Landfill conference room	Laptop and beamer	Landfill operator
10.30 11.00	Permit conditions of Landfill and history of compliance of landfill	Landfill conference room	Laptop and beamer	Sandra PezeljMeštrić / IvanPušić
11.00 12.30	Joint inspection on landfill Main focus on following items: - pre-treatment of waste before land filling; - sampling and classification of waste; - ground water monitoring Use of checklist	Conference room and landfill	Checklist	Inspection team (personal safety equipment)
12.30 13.00	Snack	Official premises in the landfill		
13.00 14.30	Joint inspection on landfill	Landfill	Checklist	Inspection team (personal safety equipment)
14.30 16.00	Discussion (checklist)	Landfill conference room	Checklist	Inspectors and landfill operator
16.00 17.30	Lunch			
17.30 18.30	Transport back to hotel		Transport to Landfill by cars of regional inspection organisation	
Tuesday 24 September 2013				
8.00 8.30	Breakfast	Hotel		
9.00 9.30	Presentation of Croatia Inspectorate. Inspection organisation in Croatia and legislation basis	Inspectorate meeting room Str. Republic of Austria 14, room 32	Laptop and beamer	Sanja Radović
9.30 13.00	Inspection evaluation - What has been observed; - Experience with checklist - Experience of inspectors	Inspectorate meeting room	Checklist and notes	Inspection team
13.00 14.00	Lunch	restaurant of the Ministry		
14.00	Discussion, conclusions and	Inspectorate	Laptop and beamer (ppt)	Inspection team

Time	Activity	Location	Apparatus	Who
15.30	further steps	meeting room		

2.2.4 Inspection team

The inspection group has been composed by:

- Inspector Netherlands: Stuart Gunput (team captain)
- Inspector: Slovenia: Jana Miklavcic
- Inspector Sweden: Nina Hensson
- Inspector Czech Republic: Vojtěch Hamernik
- Inspectors Croatia: Sanja Radović, Sandra Pezelj Meštrić, Ivan Pušić and Branko Gracin (Water Protection Department)



2.2.5 Inspected landfill

Mraclinska Dubrava: localization: Zagreb County, 7,5 km south from Velika Gorice

Characteristics of Landfill for municipal waste

Total area 12,6 ha

- Infrastructure 3,6 ha
- Old part of landfill 4,0 ha
- New part of landfill 5,0 ha
- landfill for municipal waste is used by 70,000 residents of city Velika Gorica

-Total capacity is about 900.000 m3 (enough space till 2020.)

- Until 2003. (start ofremediation) delayedabout 244.000 m^3 waste
- Every dayabout 20-40 communalvehicles pass throughvillage Mraclin (aproximately 18 – 20.000 t per year)

History

- Established in 1976. for the need of former communities VelikaGorica, Orle, Kravarsko and Pokupsko
- Location is properly chosen based on experience of data that it is clayey area and it is difficult to access ground water– near this landfill there is still today clay pit brickfactoryMraclin
- In the area of the landfill there is a 5 m layer of

clay approximately 1 m under the top soil.

2.2.6 Introduction to the inspection

Before starting with the inspection, three power point presentations in the Landfill conference room have been performed, by the operator (description of the plant), Stuart (objectives of IMPEL and of the project) and Sandra (permit of the landfill).

2.2.7 Conduction of the inspection

To easily and efficiently conduct the inspection, a waste stream has been selected.
The selected one has been:

Cod. 101008: Waste sand from casting non Ferro metals 10.10.08
This is a mirror code waste. This waste is not normally accepted at the landfill for non-hazardous waste. Waste is accepted due to characteristics (lab analysis) and is recognized as non-hazardous. No pre-treatment of waste is necessary.

Once the waste stream has been selected, the inspection group has checked all steps indicated in the checklist, asking for evidence of documents from the landfill owner.

2.2.8 Open questions

The inspection group has been addressed to the following open questions, considered as main problems to be solved:

1. Who and how perform sampling of waste before landfilling? Sampling plan.
2. Sampling criteria (how and when) of not regularly produced wastes?
3. How to assess hazardous properties in case of mirror code waste? Lab bulletin?
4. Which pre-treatment are necessary before landfilling the waste?
5. When may the waste be considered as stable and non-reactive?
6. How to define trigger levels for groundwater?
7. Acceptance of waste in the landfill.
8. Protection of soil and groundwater.

2.2.9 Main results of the discussion

1. *Who and how perform sampling of waste before landfilling? Sampling plan.*

Different approach in Member States (MS) have been identified. In NL and Italy we have 3 steps of checking: producer (basic characterization), operator (compliance testing), inspection authority (samples). In CZ no compliance testing is performed by the operator.

In Croatia the waste producer is obligated toprepare basic characterization of the waste intended for landfill through an accredited laboratory. The basic waste characterization shall be developed on the basis of sampling and results of waste testing respectively integral part of the basic characterizationis the waste sampling and analysis of eluates.

In the event that the basic waste characterisation shows that the waste may be accepted in a certain type of landfill, the waste must be submitted to compliance testing. The landfill operator must take care that the compliance testing is carried out according to the scope and procedure set out in the basic waste characterization.

For analysis of waste properties standard procedures and methods shall be used in conformity with the standards in effect in the Republic of Croatia. The used ISO norm is mentioned in report. Authorised laboratory takes sample and analyze the waste.

Sweden Waste producer has the obligation to analyse the waste.

Slovenia, operator has to control at random. Authorised laboratory takes sample.

Waste characterisation form from member states to be put on basecamp as an example!

Sampling plan: protocols of sampling are mentioned in the basic characterization, but the sampling plan is not presented and inspection authorities do not perform inspections on used sampling plan. In Croatia accredited laboratoriesmust adhere tothe prescribedsampling plan in the Ordinance. In NL sampling plan is sent to inspection authority.

2. *Sampling criteria (how and when) of not regularly produced wastes?*

The diary mentions the location from which the waste collected. The waste accepted on the landfill is normally household waste from different sites of the collecting region. It is up to the producer to declare if technology has changed and a new basic characterization is required. The producer of waste has to update the information yearly.

Transport forms mention data with transport. Location of waste production is mentioned in the form. Transport inspections are not performed. In case of suspicion it is possible to perform transport inspections.

In NL transport inspections are performed regularly.In CZ transport inspections are focused mostly on international shipment.

3. *How to assess hazardous properties in case of mirror code waste? Lab bulletin?*

In MS usually we do not have analytical evidence of the hazardous properties calculation. The choice between HW or NHW code is often not more than a declaration of the producer or of the external lab. The indication of H code is a declaration of the producer as well, depending on the kind of pollutant of the area. The considered waste 101008 comes to the plant as non-hazardous waste; There are no hazardous codes that indicated the basic characterization. The waste is defined on the basis of analytical detection of eluate and the knowledge of the producer.The requested bulletin which indicate or refers to the basic characterization including the analysis of leachate is available and has been send by the inspectorate after the inspection.

All parameters are checked. Conclusion is most important.

In member countries inspectors depend on laboratory results. Each category is checked separately. In Sweden the properties are summated (summation rule). H14 is not recognised in NL.

In 2015 CLP will come into act.

4. *Which pre-treatment are necessary before landfilling the waste?*

As far as Municipal Solid Waste, different approach can be observed: NL uses to burn the residual part of the waste selection stream. Italy, Poland and CZ consider treated a residual waste coming from a well performed separate collection (infringement of the EU Directive up to the Commission).

Separate collection is no pre-treatment. According to new act. Bio degradable waste should be collected separately. Some landfills perform separate waste collection.

From 2002 it is forbidden to landfill organic matter. From 2005 it is forbidden to landfill biodegradable waste. Sorting at the source is performed at recycling centres. Asbestos in some landfill. SLOV one for MBO lower than 220 kg. some transitional period, no infrastructure.

5. *When may the waste can be considered as stable and non-reactive*

Different approaches in MS are observed: in CZ the waste must be stabilized, even if declassification is a preferred solution. In Italy (in some regions) leachate test is considered to be enough and no chemical-physical treatment is mandatory.

Not applicable for the Mraclinska Dubrava landfill in Croatia. E.g. infectious material is first disinfected, pre-treated with high temperature and pressure by authorized persons and afterwards landfilled. The TOC level is too high in some cases. Authorised body pre-treat hospital waste in SLOV. In NL it is incinerated. Czech Republic In CZ it is mostly incinerated, but pre-treatment and dispose in landfill is also possible. In SW also the same for Hazardous waste and non-hazardous waste.

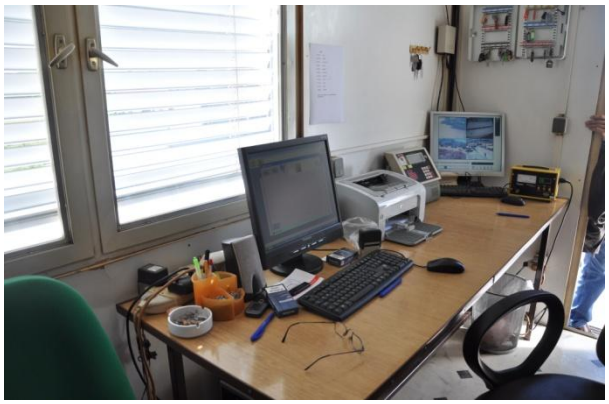
6. *How to define trigger levels for groundwater?*

Comparison is made. Level is manually measured. Water protected areas are spread over the country. The connection of the water protected area is checked in the neighbourhood. Not in the landfill act but mentioned in the waste act. Influence of landfill on groundwater is checked. When transition time is over the water inspection is important. Groundwater composition is important for monitoring. Water permit for Landfill and implementation pact. Level and composition are measured according to water act. 1st year once a month measurement, every 3 months (in case there are no significant changes). After closure of the landfill every six months. Minimum is 3 piso-meters. Checked by Water inspector.

In Croatia in general 3 measure points: Minimum 1 upstream and 2 downstream in Sweden. CR IPPC permit (specialist water inspector, corporate like a team.) SLOV in case of changing in groundwater, the operator is responsible. Quantity depends on underground composition, geological formation. New parts and old parts of landfill are close by. Old parts do not have bottom layer. Application of the permit is important. Rainwater and surface water are collected separately. Covering is important. There is an agreement between water inspection and environmental department.

7. *Acceptance of waste in the landfill*

In MraclinskaDubrava two steps of control are foreseen: camera on the top at the entrance of the landfill and operator visual control during the disposing of the waste in the body of the landfill. Another check is performed by means of statutory declaration. An operation diary is filled out with the information of the waste coming in. The operator does not take samples from each load.Trucks which collect household waste have, like any other vehicle on the road, have their own unique registration number. It is possible that other producers of the same waste bring their load to the landfill. In that case the check is done by comparing the registration (quantity and characteristics).



8. Protection of soil and groundwater

In Mraclinska Dubrava, water coming from the washing wheels area goes to a separator which separate water from oil. The separator is emptied regularly and the water which overflow the separator is discharged directly in open water. All truck which transport municipal waste are washed on the landfill wheel washer.

Leachate and surface water runoff from the new landfill body is collected in a colleting basin, the settling basin. From here the water is pumped to the water treatment facility.

Here further treatment takes place and the waste water is aerated and passes a filter membrane. After purification, the purified water is discharged into nearby surface water. The whole process is monitored automatically and when something does not work properly the water treatment officer gets a warning message on her mobile phone.

The volume of the waste water basin is monitored every day. The composition of the discharged water is checked four times per year on the parameters specified in the water permit. Sampling is performed

by or on behalf of the operator. A total of 35 parameters are analysed. Competent authority does not takes samples (except when there is reason to do so). The treated water is not discharged into surface water but recycled on the location.

The reports are checked during an inspection of the Water board inspector. Reports are not yet sent to the competent authority. The method of sampling is not clear. It could not be determined whether the sampling is performed in a representative way. A procedure (for example ISO) is not known. The procedure used is not mentioned in the report.

Truck washing water is discharged after sedimentation and separation in open channel. Surface water is prevented from entering into the landfilled waste by concrete channels.

Surface water is monitored once a year at three points. 1 upstream and 2 downstream. The two points down steam are determined due to the fact that on the location there is an old and a new landfill body. The landfill body is placed on a natural layer of clay of approximately 5 meter. The groundwater level is beneath this clay layer.

Monitoring of groundwater is performed yearly, by means of 3 piezometer for water quality. Parameters are defined in the permit. Groundwater pollution parameters must be measured at one measuring point in the groundwater inflow region and at least two measuring points in the outflow region. Later delivered Analytical report of surface water and leachate from landfill “Mraclinska Dubrava” (13 Oct. 2013).

In case of contaminant values exceeding the limit, operator has to inform competent authority and take steps (depending on the risk).

The zero state of the ground water quality is known. These figures are compared with the results of the analysis. The operator is responsible. The laboratory performs the sampling and analyses. The operator checks the results of the report and send the report to the competent authority.

2.2.10 Conclusions and recommendation

The second day has been dedicated to comments and discussion concerning the visit to the landfill and the remaining open questions.

As we miss some information in the checklist, we have agreed that the open items will be filled in by the Inspectorate. In case of national law, the act will be mentioned with the article number.

The open questions were send to the inspectorate and the answers are mentioned in this final report.

Evaluation Joint inspection landfill Croatia

4 good points. Visiting inspectors and Croatian inspectors

- Water inspector in inspection team.
- Well organized plant in good condition (3 stages of landfilling).
- Checklist of latest inspection and other documents translated in English.
- Inspectorates recognition of the problem of the inspection of landfills and the need of further development of waste management.
- Good experience to work together with other inspectors from other countries.
- Best practice from other countries.
- Experiences sharing good and bad ones.
- Basis for future corporation.

4 points of improvement Visiting inspectors and Croatian inspectors

- More responsible persons from operators should attend the inspection (with the right knowledge)
- Absence of the competent inspector for this plant and more inspectors from the inspectorate (discussion). Information from the project in front should be more clear. Basic characterization should be explained as an important part of the checklist.
- Change agenda so the legislation is presented in the first day.
- Presentation of the plant should also focus on compliance with the permit
- Information about project should be more clear.
- Change the agenda according to presentation first day and examples.
- Basic characterisation waste producer and compliance testing competent authority, example empty form would be useful.

Future development areas Visiting inspectors and Croatian inspectors

- Need of evaluation how the directive is implemented in different member countries and could be accessed by the member countries.
- Use basecamp as a share point for documents and forms.
- Case studies on basecamp

Conclusions and recommendations shared with the Czech inspection team:

- Lack of information in sampling plan and hazardous properties assessment. Training is needed to inspectors concerning protocols of sampling and hazardous properties assessment in order to check procedures and results.
  - Find out good example of sampling plan
  - Find out good example of hazardous properties analytical assessment (lab bulletin) in case of mirror code wastes
- Different implementation of EU Directive concerning waste basic characterization and compliance testing
- Different interpretation of EU Directive concerning the meaning of trigger levels for groundwater protection
- Different approach concerning pre-treatment of waste before landfilling.
- Separate waste collection is no pre-treatment. This aspect needs more attention.
- No pre-treatment of waste has been observed on the selected landfill in Croatia.
- Feedback for permit improvement: mandatory communication to inspection authority of the monitoring data report

- The use and promotion of checklist among inspection teams has been recommended, as well as the use of basecamp.

2.3 Poland 7-8 October 2013

2.3.1 Preparation of the inspection

Draw up an agenda for the joint inspection together with inspection team. Adapting checklist to main topics to focus on during inspection in Poland. Receiving part of permits (in Polish) and results of sampling and analysing results of third quarter of 2013 of groundwater samples, surface water, leach ate (untreated), leach ate(cleaned) and landfill gas.

2.3.2 Definition of the topics of the inspection

The conclusions of the joint inspections in 2012 were that for future joint inspections focus should be on the following activities:

- The pre-treatment of waste before land filling.
- How and when to inspect the top and bottom layer of landfills.
- The sampling of waste (and classification).
- Ground water monitoring.

Before the joint inspections the polish inspection team (from the Voivodship Inspectorates for Environmental protection Wielkopdskie Poznan) was asked on which subject they would like to focus on during the inspection. The answer was:

- The procedure for the acceptance of waste;
- Monitoring of landfill in operation phase and phase after operation;
- Odours occurring in landfills;
- Landfill gas development building installation.

Based on this information the checklist was adapted to the wishes of the inspection team. The following subjects were part of the checklist:

- Waste acceptance criteria for landfills
- Gas control
- Surface water control and leach ate management
- Protection of soil and groundwater.

2.3.3 Agenda of the joint inspection

Monday 7 October 2013

09.45	Arrival at Landfill in Suchy Las
09.45- 10.15	Presentation of IMPEL project (Bianca Schijven Netherlands)
10.15- 11.15	Presentation of landfill by management of landfill
11.15- 11.45	Presentation of Polish legislation on landfill by Michal Ratajczak
11.45- 13.30	Inspection on landfill (during which samples were taken of leach ate before and after treatment in leach ate treatment plant)
13.30-15.00	lunch
15.00-18.00	Checklists by interviewing operator landfill and other members of management team and checking information in available documents.

Tuesday 8 October 2013

09.00	Arriving at Polish inspectorate in Poznan
09.30-10.00	Presentation of organisation of Polish inspectorate by Michal Ratajczak
10.00- 13.00	Evaluation of joint inspection/ information exchange
13.00-14.00	Lunch
14.00	Leaving of inspection team members of other member states

2.3.4 Inspection team

Inspection team Poland

- Inspector Ewa Chruscinska, Inspector Michal Ratajczak (and one other Polish inspector)

Inspection team members other member states

- Inspector Slovenia: Jana Miclavcic
- Inspector Croatia: Sanja Radovic
- Inspector Sweden: Nina Hansson
- Inspector Netherlands (water board): Ronald Smallenburg
- advisor Netherlands: Bianca Schijven

2.3.5 Inspected landfill

Landfill in Suchy Las. See short description of landfill on website of landfill: http://www.odpady.poznan.pl/index_en.php

This is a landfill for non-hazardous waste and inert waste. The landfill has been in operation since 1984. The storage area of the landfill is 61,49 hectares of which operated cell is 3.06 ha, reclaimed and closed cell 24.0 ha, lodging-designed cell 6.8 ha, surface facilities associated with the technical, administrative, social infrastructure and green area 14,4 ha. The provision of land for facilities related to waste management is 13,2 ha. The target capacity of the landfill waste is 5,9 million m^3. Deposited is 4,75 million m^3 of waste. The expected life time of the landfill is until 2028. The landfill was granted an integrated permit in 2007. The surrounding areas are the Moraska Meteorite Nature Reserve at a distance of 1000 m and the landfill also borders on the Biedrusko Special Area of Conservation, which is a Natura 200 area.

2.3.6 Introduction to inspection

During the inspection a translator (hired by landfill operator)was present. This was very helpful and made understanding each other much easier. Before starting with the inspection presentations were given by Bianca Schijven (*IMPEL and method of inspection*), Manager Landfill (*Presentation of Landfill*) and Michal Ratajczak.

2.3.7 Conduction of inspection

After the presentations samples were taken of leach ate before and after treatment in the leach ate treatment plant. The Polish inspectorate has her own sampling equipment and laboratory (see further information under sampling of leach ate). Then we had a visual inspection on the other parts of the landfill. After this the inspection was performed in the office at the landfill.

Acceptance of waste

For answering the questions in the checklist three waste codes were selected. These were:

- 17.09.04:mixed construction and demolition waste other than those mentioned in 17.09.01, 17.09.02 and 17.09.03. (*this is a mirror code waste 17.09.03* other construction and demolition wastes (including mixed wastes) containing dangerous substances*)

1. 19.12.12: other wastes (including mixture of materials) from mechanical treatment of wastes other than those mentioned in 19.12.11.*(this is mirror code of 19.12.11* other wastes (including mixture of materials) from mechanical treatment of waste containing dangerous substances).*
2. 17.03.80: this a Polish waste code for tar paper from roof non hazardous (*in European waste list code 17.03.02 bituminous mixtures other than those mentioned in 17.03.01 also mirror waste code*)

We asked the management of the landfill how the waste is tested before accepting it on the landfill (pre-acceptance procedure). The answered that the following tests are performed with waste that needs to be tested.

3. Composition.
4. L/S testing.

In Poland the producer of waste has the obligation to deliver the results of the testing of the waste to the operator of the landfill. The method of sampling of the waste are not tested by the operator of the

landfill (also not the inspectorate that supervise the landfill). Therefore they can't asses if the sampling is representative for the waste. The operator of the landfill evaluates on basis of the analyse results if the waste may be accepted on the landfill.

Weighing bridge

Inspection of waste when delivered on the landfill is by camera's (weighing bridge) and visual at the moment of unloading. At delivery of the waste at the landfill, one sample is taken of each transportation of waste. These samples are stored during one year. If during a delivery at the landfill by visual inspection it is concluded that the waste is not in agreement with the description given in the pre-acceptance phase, the taken samples are analysed (only for waste where testing is required). There is no special location on the landfill where the waste can be visual checked and sampled before the final decision of acceptance. When after unloading of the waste the operator of the landfill has to decide that the waste can't be accepted the waste has to be reloaded in the truck.

Classification of waste in the different categories is a subject which can lead to different interpretations in different countries. All three waste codes which we selected were categorized by the landfill operator as regularly generated. For waste from construction and demolition and wastes from mechanical treatment of wastes (both mirror codes) there was a discussion if this can be the right category for this kind of waste. In the information of the basic characteristics the producers of the waste writes that there is no change in composition of the waste. Although the waste is produced as a result of demolition and mechanical treatment of a large dimension of waste (from different projects and locations). The decision if waste is hazardous or not (especially important for mirror code waste) is decided on the parameters which are in the composition of the waste (the total content of pollutants in the waste) . The concentration levels for the different parameters in the waste and if on basis of these parameters the waste has to be classified as hazardous or not are is decided by checking the legislation on hazardous waste of Poland. Two of the selected wastes that are part of a mirror code (17.09.04 and 19.12.12) had not been classified by the waste producer due to total composition, before performing the basic characterisation. The waste producer had performed sampling and testing of the waste and only compared it with the leaching limit values for non-hazardous landfill. Therefore the decision if the waste is hazardous or non-hazardous has not been performed in agreement with Polish legislation.

It is important that waste is first classified as hazardous or non-hazardous waste, to determine what types of pollutants they may contain and in if the levels are so high that the waste can be considered to have properties that it means that the waste becomes hazardous. This is especially important since there are not leach ate limit values for all types of pollutants, and wastes with high content of

pollutants should also be treated before the waste can be considered to go to a landfill. It is the waste producers responsibility to perform sampling and analyses to determine the correct waste code.

When the waste is classified and considered suitable for land filling, it can then be tested according to the legislation for acceptance of waste at landfills. Testing (legislation only demands testing as L/S 10) then determine the level of leach ate (when and how fast the pollutants is leaching from the waste) and if the waste can be accepted at the selected landfill class.

All three selected wastes has been sampled and tested according to the legislation for acceptance of waste at landfills. But there are some lack of information both in the basic characterisation and in the analyses. Most deficiencies concern: the classification of waste, testing of compliance, lack of selected parameters when testing of compliance, changes in properties of the waste and finally evidence that recovery or recycling of the waste is not possible.

Pre-treatment of municipal waste
In Poznan municipal waste is collected by three different companies. (Inhabitant used to pay directly to these companies). The mixed municipal waste which is collected by these companies is pre-treated in the installation of these companies and then transported to the landfill. In 2010 Poland had to reach the first reduction target, a maximum of 75% biodegradable waste in mixed municipal waste. There is no sampling by the landfill operator on the composition of mixed municipal waste. Since 1 July 2013 due to the introduction of a new municipal waste management system, companies will be chosen via public procurement by each municipality. The fee will be paid by the inhabitant to the municipality.

At the moment of the inspection is was to the visiting inspectors not clear how the Polish inspectorate checks what the maximum percentage of biodegradable is in the mixed municipal waste that is being land filled.

Gas control
On the landfill is a landfill gas extraction system which is used for electric power generation. In the beginning, degasification was carried out only in the reclaimed disposal cell with an area of 11 ha. At present 23 ha of an area used for waste treatment is reclaimed and degassed. Landfill gas from drilled wells equipped with perforated pipes is delivered to container type collector stations with collector sewers and control and measurement stations. The gas from the collector stations is transported to the container-type suction/blower station. By producing negative pressure the gas suction nozzle sucks the gas out from the gas wells and then compresses it to approximately 100 mbar supplying power-generating units or the flare. When methane is lower than 30% and oxygen higher than 3% the landfill gas is flared. At this moment the landfill is independent from the operation of external power and heat. Before the inspection we received the results of the composition of the landfill gas during three months in 2013 (on discharge on collector collective gas on entrance power station):

Parameter	**Date of sample 10/7/2013**	**Date of sample 28/08/2013**	**Date of sample 27/09/2013**
% CH_4	46,7	43,4	43,8
% CO_2	40,2	39,7	40,2
% O_2	0,9	2,0	0,9

During the inspection we had an discussion about odour. At this moment there is no legislation for odour caused by landfills in Poland. Other member states explained something about their legislation and permit rules. Some examples will be uploaded on base camp.

Surface water control and leach ate management
On the landfill is a leach ate treatment plant. Rainwater which is infiltrated in the landfill is collected in the retention reservoir. Rain water from the part of the landfill that is closed and contains a upper layer is (run off water) is run off to surface water.

The leach ate treatment plant operates on the basis of reverse osmosis i.e. cross-filtration.

Leach ate treatment plant

After the treatment a cleaned water and a condensed water is produced. The condensed water is returned to the retention reservoir and re-circulated to the reclaimed cells in order to intensify the process of anaerobic digestion and generation of biogas. The clean treated water goes into a stabilisation pond. The water from this stabilisation pond is used for technological processes on the landfill such as in the greenery and washing of the internal roads on the landfill.

Observation of sampling of leachate

During the inspection samples of the leach ate before and after treatment were taken. The method of sampling was by taking one sample with a measuring cup on a stick. This was done in the retention reservoir (leach ate before treatment) and stabilisation pond (cleaned leach ate water).

Sampling of leach ate by specialist on sampling of Polish inspectorate

Recommendation for sampling
The sampling method that was observed during the inspection may not give a representative sample for analysing the composition of the leach ate. Taking a volume proportional sample would give a better representative sample. Another method can be taking samples of the leach ate going to the leach ate treatment and the cleaned leach ate after the treatment plant during two hours by taking a sample every 10 of 15 minutes. From these samples one mixed samplecan be produced. With these sampling methods the efficiency of the treatment plant can be measured more accurate. The frequency for sending results of monitoring to the authorities is once a year. It would be better to receive the results more often.

Results of sample taken during inspection on 7 October 2013:

	Before treatment (retention reservoir)	After treatment (stabilisation pond)
pH	8,2	7,2
Conductivity (us/cm)	21.500	260
O_2 (mg/l)	3,9	9,3

Results of analyses laboratory Polish inspectorate

	Before treatment (retention reservoir)	After treatment (stabilisation pond)
pH	8,4	7,6
Conductivity (us/cm)	20100	256
Organic Total C (mg/l)	879	7,25
Cu(mg/l)	0,0127	0,00535
Cd (mg/l)	< 0,005	< 0,005
Hg (mg/l)	<0,0005	<0,0005
Zn (mg/l)	0,183	0,023
Pb (mg/l)	<0,02	<0,02
Cr (mg/l)	0,195	<0,005
BTEX	0,049	0,036

The results of the analyses of the samples which were taken during the joint inspection show that the installation is achieving the necessary reduction (especially shown by parameters organic total C and conductivity). The content of nitrogen in the leachate before and after treatment was not analysed. This would also be a good parameter to analyse especially with regard to the impact in the stabilisation pond.

Protection of soil and groundwater

Groundwater
Before the inspection we received the results of the composition of nine groundwater samples taking on different locations. The quality of the groundwater is measured every three months. Samples are taken by a certified company. The results of the measuring of the groundwater quality are reported to the authority once a year.

In the permit are no concentrations for the trigger level for the groundwater. During the inspection the operator of the landfill showed the inspectors the map with the location of the monitoring wells of the groundwater. There are no monitoring wells in the inflow region of the landfill. According to the operator of the landfill this is because of the site-specific hydro geological formation in the inflow region of the landfill. The level of the groundwater is so low that they were not able to drill a monitoring well were groundwater samples can be taken. During this inspection we had no time available to asses this information. A recommendation for the Polish inspectors is to check with the permit writer or a specialist on groundwater if indeed it is not possible to take samples of the groundwater in the inflow region of the landfill location.

Soil protection
The new cells are constructed with seal of the bottom. The insulating top layer of the landfill (top) is 20 cm. (sand, soil above the waste). This seems to be very thin. The inspectors had a discussion that in each member states the requirements for the top layers of landfills seems to be very different. Is there

2.3.9 Main results and recommendations
On 8 October we had an evaluation of the joint inspection. The inspectors from Poland and the inspectors from the other member states was asked to give their opinion on:

- good points of the joint inspection;
- points of improvement for joint inspection;
- future development areas for joint inspection.
-

Positive results

Polish inspectors	*Visiting inspectors*
- Learned more about the legislation on waste in other member states - Learned more about the way inspections on landfill are being performed in other member states - Learned more about acceptance of waste and the meaning of the different steps in this process - The structure of the inspection for the different topics was well organised. This made the discussion on different topics more efficient - Having a translator during the inspection was very helpful	- The leach ate treatment plant can be seen as a best practice - The operator of the landfill was very open and helpful during the inspection - Having your own laboratory and sampling equipment and sample takers is very useful for an inspection organisation - Legislation in Poland on keeping records of landfill during 15 after closure would also be very useful for other member states - The system of the operator for time monitoring when the producer of the waste has to deliver new analyses of the waste (once a year) that he is bringing to the landfill can be seen as a best practice

Points for improvement

Polish inspectors	*Visiting inspectors*
- Receiving final program for inspection earlier - The Polish inspectorate would like to have more information and photo's of landfill and inspections in other member states (none of the inspectors uses base camp)	- The inspectors would like to have more information about the methods of sampling of waste and water in Poland. - At this moment the recovery rate of the landfill gas seems not to be optimal. The subject was not inspected in detail because of the limited time. This can be a subject to focus on in following inspections by the Polish inspectors.

Future development areas results

Polish inspectors	Visiting inspectors
- The inspectors would like to have more examples and solutions for specific problems they are facing in Poland. The Guidance is not know in this organisation. Most inspectors can't read English. - The classification of waste (especially hazardous and non hazardous) - Examples of the way member states acted with landfills which do not comply with the Landfill directive - Examples of monitoring of closed landfills - Exchange information with inspection organisations in other member states who also have their own laboratory	- To the visiting inspectors it was not clear how the Polish inspectorate makes sure that mixed municipal waste it pre-treated in a way that the percentage of biodegradable is lower than 25% - The classification of waste (especially hazardous and non hazardous)

2.3.10 Conclusions and recommendation

- There is a lack of information on the way waste and water has to be sampled to guaranty that the samples are representative for the composition of the waste or water. Training is needed for inspectors concerning protocols of sampling and hazardous properties assessment in order to be able to supervise both the classification of waste as well as the acceptance procedures and monitoring results of landfills.
- The interpretation of the monitoring results from landfills (groundwater, leach ate, surface water, landfill gas) requires specific knowledge. When a landfill is only inspected once a year it is very difficult to gain this special knowledge. More information is needed on how the different member states evaluate the results of monitoring by the landfill operator.
- Inspectors need more knowledge on the pre-treatment of mixed municipal waste and how to check if the mixed municipal waste that is land filled does not contain biodegradable waste in a higher concentrations than allowed according to the legislations of a member state (implementation Landfill directive).
- The requirements on the conditions of top layers of landfills seems to be very different between member states. Is there need for a minimum criteria ?
- The inspectors of Poland were informed by the visiting inspectors about the Information exchange in base camp and the Guidance of the project. Understanding the information coming from the IMPEL project is difficult for the majority of the inspectors in Poland this is because most of the information is in English.
- To optimise the information exchange during the joint inspections having a translator present during the inspection is very useful.

Annex 1: Landfill Environmental Inspection; checklist

European Union Network for the Implementation and Enforcement of Environmental Law

Landfill inspection

Reinforcement program on inspection skills according to landfill directive

LANDFILL ENVIRONMENTAL INSPECTIONS: FINAL CHECKLISTS

October 2013 Poland

This checklist was used during the joint inspection in Poland.

INDEX Checklist

1. WASTE ACCEPTANCE CRITERIA FOR LANDFILLS		
	Yes	**No**
Is this a landfill that may accept hazardous waste ?		
If hazardous waste may be accepted. What kind of hazardous waste (name and waste codes):		
Is this a landfill that may accept non-hazardous waste ? *(these landfills may be used for (i) municipal waste (ii) non-hazardous waste iii) stable, non-reactive hazardous waste (e.g. solidified, vitrified) with leaching behaviour equivalent to those of the non-hazardous waste referred to in point (ii) which fulfil the relevant acceptance criteria set out in accordance with Annex II (and Council decision 2002/33/EC).*		
Is this a landfill that may accept inert waste ?		
Select a waste streams from a specific producer and answer the questions below for this waste stream: (This can be repeated for different waste streams. Try to select different kind of wastes and also a waste that can be hazardous (mirror code waste))		
Waste code (according to European list of waste more information on : http://ec.europa.eu/environment/waste/framework/list.htm)		
Name of waste :		
Description:		

Ask the landfill operator the file of acceptance of the waste stream which you have selected.		
Period for which records with required information are kept The operator shall keep records of information required for a period to be defined by the Member State. In your member state this ..(TO BE DEFINED)..... (Regulation in which this is required is ....)		
	Yes	**No**
Are the basic characterisation documents kept according to the period determined in your national legislation ?		
Registration of data fundamental requirements for <u>basic characterisation</u> of the waste in records (information from producer of the waste)		
Do the records contain the following information ?	**Yes**	**No**
The source and origin of the waste		
Information on the process producing the waste (description and characteristics of raw/input materials and products)		
Description of the waste treatment applied in compliance with article 6a of the Landfill directive (*means psychical, thermal, chemical or biological including sorting with the purpose to change the characteristics of the waste in order to reduce the volume or hazardous nature, facilitate its handling or enhance recovery*) or a statement of reason why such treatment is not considered necessary ?		
Data on the composition of the waste and the leaching behaviour, where relevant (*depends on how the waste has to be tested see next page*)		

Appearance of the waste (odour, colour, physical form)		
For hazardous waste in case of mirror entries: the relevant hazard properties according to Annex III of the Waste frame directive		
May the waste be accepted at a landfill ? *(following type of waste may not be accepted: liquid waste, flammable waste, explosive or oxidising waste, hospital and other clinical waste which is infectious, used tyres) (your national legislation may have more waste types that may not be accepted at a landfill)*		

How has the waste to be tested

Waste may have to be tested to obtain the necessary information for basic characterisation on the composition of the waste and the leaching behaviour.
What is required depends on the type of waste. A difference is made between:

- Waste where testing is not required
- Waste regularly generated in the same process
- Wastes that are not regularly generated

:

<u>Waste where testing is not required</u>

For the following waste according to the landfill directive testing is not required (*also check your national legislation, some of the waste codes below may not be land filled in some member states because they can be recycled*)

Your national legislation may contain additional conditions on when testing is not required.

10.11.03(waste glass-based fibrous material), 15.01.07 (glass packaging), 17.01.01 (concrete), 17.01.02 (bricks), 17.01.03 (tiles and ceramics), 17.01.07 (mixture of concrete, bricks, tiles and ceramics), 17.02.02 (glass), 17.05.04 (soil and stones), 19.12.05 (glass), 20.02.02(glass), 20.02.02 (soil and stones)

<u>Waste regularly generated in the same process</u>

Individual and consistent wastes regularly generated in the same process.
Where: the installation and the process generating the waste are well known and the input materials to the process and the process itself are well defined.
The operator of the installation provides all necessary information and informs the operator of the landfill of changes to the process (especially changes to the input material). The process will often be from a single installation but the waste can also be from different

installations, if it can be identified as a single stream with common characteristics within known limits/facilities (e.g. bottom ash from the incineration of municipal waste)

Waste that are not regularly generated

These wastes are not regularly generated in the same process in the same installation and are not part of a well-characterised waste stream. Each batch produced of such waste will need to be characterised. The basic characterisation shall include the fundamental requirements for basic characterisation. As each batch produced has to be characterised, no compliance testing is needed

Depending on the waste code that you have selected for the inspection answer the following questions

Describe for the waste stream (codes) which you have selected for the inspection how they have been categorised (the file should contain information on this aspect)

Waste code (1)

……
……
……
……

Waste code (2)

……
……
……
……

Waste code (3)

……
……
……
……

For the selected waste stream : do you agree with the way the waste stream has been categorised (*in (a) regularly generated (b) not regularly generated (c) or cases where testing is not required by the installation owner)*	**Yes**	**No**
Waste code (1) When the answer is no give a motivation : ……		
Waste code (2) When the answer is no give a motivation: ……		
Waste code (3) When the answer is no give a motivation: ……		

Compliance testing (this is performed by the operator of the landfill)

When a specific waste is qualified for a certain landfill class on the basis of basic characterisation it shall subsequently be subject to compliance testing to determine if its complies with the results of the basic characterisation and the relevant acceptance criteria. The directive makes a difference in:

- criteria for landfills for inert waste
- criteria for landfills for non-hazardous waste
- criteria for hazardous waste acceptable at landfills for non-hazardous waste pursuant article 6(c)iii
- criteria for waste acceptable at landfills for hazardous waste
- criteria for underground storage

The limit values for leaching an organic content have been implemented in your national legislation. In the Polish legislation this is the following legislation:.....
.....
.....

.....

	YES	**NO**
For the selected waste streams has compliance testing been performed?		

selected waste stream : (1)..... (2)..... (3).....		
Are all the tests of the compliance testing in agreement with the ones used in the basic characterisation procedure? (1)..... (2)..... (3).....		
Is the frequency of compliance testing in agreement with the frequency of the basic characterisation?		
If not how often is the compliance test performed?		
Records (data) of the analytical results shall be kept for a period that will be determined by the Member States legislation; are the records kept for the time required according to your legislation?		

On-site verification Each load (batch) of waste delivered to a landfill shall be visually inspected before and after unloading. The documentation required shall be checked. During the visual inspection on the landfill focus on the way the waste is visually checked and who is responsible for this.		
	Yes	**No**
Is there physical space to perform an inspection of a waste delivery?		
The waste may be accepted at the landfill, if it has the same composition as is the waste that has been subjected to the basic characterisation procedure and the compliance testing and the descriptions in the accompanying documents. If this is not the case, the waste may not be accepted.		
	Yes	**No**
Are records (data) kept of waste that has not been accepted at the landfill ?		
Member States shall determine the testing requirements for on-site verification, including where rapid test methods where appropriate		
What kind of legislation do you have on this subject in your member state ? Polish legislation :.....		
	Yes	**No**
Is the acceptance procedures of this landfill on the subject of testing in compliance with your national legislation ?		
Upon delivery, samples shall be taken periodically. The samples taken shall be kept after acceptance of the waste for a period that will be determined by the Member State (see Article 11(b) of the Landfill Directive not less than		

one month)

Period that sample shall be kept according to your legislation is :

.....
.....
.....
.....
.....

Sampling and test methods

Sampling and testing for basic characterisation and compliance testing shall be carried out by independent and qualified persons and institutions. Laboratories shall have proven experience in waste testing and analysis and have an efficient quality assurance system.

Member States may decide that:

- the sampling maybe carried out by producers of waste or landfill operators under the condition that sufficient supervision of independent and qualified persons or institutions ensures that the objectives as set out in this Decision are achieved;
- the testing of the waste maybe carried out by producers of waste or operators if they have set up an appropriate quality assurance system including periodic independent checking.

In your member state what is the regulation in regard to this subject ?:

For sampling

.....
.....
.....
.....
..

.....

For analyses

.....
.....
.....

....		
	YES	**NO**
For selected waste streams has on site verification been performed ? (1)..... (2)..... (3).....		

2.GAS CONTROL			
Topic	**What has been observed during the inspection?**	**What information needs to be checked in the administration of the installation owner**	**In compliance?**
Gas extraction system (conditions in permit and description in permit application are important to check **before** the inspection)			
Gas flaring torch (conditions in permit and description in permit application are important to check **before** the inspection)			
Gas trigger level (conditions in permit and description in permit application are important to check before the inspection)			
Gas samples How often are samples taken? Is this in agreement with the permit conditions? Which parameters are measured? Is this in agreement with the permit conditions?			

2.GAS CONTROL			
Topic	**What has been observed during the inspection?**	**What information needs to be checked in the administration of the installation owner**	**In compliance?**
Observation during inspections Did you observe indications of gas leaking (for example cracks in slopes on the landfill), odour or vegetation damage?			

3. SURFACE WATER CONTROL AND LEACHATE MANAGEMENT			
Topic	**What has been observed during the inspection?**	**What information needs to be checked in the administration of the installation owner**	**In compliance ?**
Leach ate collection and monitoring			
Check the locations where leach ate is discharged from the landfill site.			
Is the volume and composition of the leach ate measured at these points ?			
What is the frequency of monitoring volume and composition ?			
Which parameters are analysed?			
What is the average composition of the leach ate and is this is agreement with the permit conditions?			
Are the drainage and pumping system for the leach ate regularly maintained ?			

4. PROTECTION OF SOIL AND GROUNDWATER			
Topic	**What has been observed during the inspection?**	**What information needs to be checked in the administration of the installation owner**	**In compliance ?**
Groundwater **Trigger levels** Trigger level (*threshold below which remedial action must be taken to restore the previous situation*) should be laid down in the permit. (*whenever possible*) Does the permit of this landfill contain a trigger level? Check the operational actions to be implemented in case of exceeding of trigger levels.			
Monitoring of groundwater			
How is the groundwater level measured?			
Who is responsible for the measurement of the groundwater level?			
What is the frequency in which the level of the groundwater is measured ?			

4. PROTECTION OF SOIL AND GROUNDWATER			
Topic	**What has been observed during the inspection?**	**What information needs to be checked in the administration of the installation owner**	**In compliance ?**
Which parameters are analysed in the groundwater ?			
What is the frequency of measuring these parameters in the groundwater?			
What is the frequency of submitting monitoring reports to authority?			