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## Safety requirements to prevent major accidents in Polish sea harbors

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### As of 31 December 2008 in Poland there were

- 161 upper-tier establishments (UTES) at high risk of a major accident
  - 195 lower-tier establishments (LTEs) at enhanced risk of a major accident
- of which 11 UTES and 9 LTEs were situated in seaports. Now, there are 7 (5) UTES and 6 (3) LTEs.

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### LTEs in Zachodniopomorskie Province

1. PKN Orlen SA Fuel Terminal in Szczecin (former fuel storage BM 91)
2. PKN Orlen SA Fuel Terminal in Świnoujście (former fuel storage BM 94)
3. J&S ENERGI SA of Warsaw – fuel base in Stobno
4. Messer Polska Spółka z o. o. – Police branch
5. Intergas LTD. Spółka z o. o. in Szczecin
6. Bioetanol Spółka z o. o. in Iłńsk
7. SSR GRYFIA SA
8. PGNiG KRNiG Zielin at Troszyn

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### PKN Orlen SA Szczecin Fuel Terminal (former fuel storage BM 91)

- Until 2009 operating as No. 91 Liquid Fuel Storage Facility in Szczecin, the Fuel Terminal is situated in the Port of Szczecin on the River Parnica. Built in the 1950s, the facility was comprehensively refurbished in 2004-2006. It was granted an operation licence in April 2006. Main hazards: fire and potential pollution of surface waters, soil and groundwater with oil derivatives, as well as atmospheric emission of hydrocarbons.
- The following substances are stored in the Terminal:
  - Heavy/diesel oil
  - Light heating oil
  - Petrol

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### PKN Orlen SA Szczecin Fuel Terminal (former fuel storage BM 91)

Slajd 6

### PKN Orlen SA Szczecin Fuel Terminal (former fuel storage BM 91)

- In the 1990s pollution with oil derivative substances was revealed at the railway siding
- Currently, reclamation procedures on the affected soil and groundwater are carried out according to the decision of the Mayor of Szczecin issued on 16 December 2005 on the basis of the Environmental Protection Law.
- The reclamation involves in-situ and ex-situ soil remediation, and also selective recovery of free product, supported by dewatering.
- The reclamation procedures are carried out by an external contractor and a reclamation report is issued after each year of work.
- The procedures are expected to be completed in the last quarter of 2012.

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### PKN Orlen SA Szczecin Fuel Terminal (former fuel storage BM 91)

Inspection by PIEP in 2007

- Findings:
  - no valid approval regarding waste management,
  - incorrect marking of tanks and hazardous substance storage areas

Environmental Site Assessment in 2007

- concerned the construction of a fuel component unit

Inspection by PIEP in 2009

- Findings:
  - correction of the previously found irregularities,
  - change of the name of establishment that was not notified to the City HQ of the State Fire Service or PIEP in Szczecin,
  - change of the terminal manager.

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**PKN Orlen SA Szczecin Fuel Terminal (former fuel storage BM 91)**

Petrol vapour reclamation plant

Slajd 9

**PKN Orlen SA Świnoujście Fuel Terminal (former fuel storage BM 94)**

- Until 2009 operating as No. 94 Liquid Fuel Storage Facility in Świnoujście, the Fuel Terminal of PKN Orlen SA is situated in the Port of Świnoujście overlooking Świna Strait. It is a part of the legacy of Soviet Army troops that were stationed in the area. Refurbished in the years of 2005-2008, the establishment was granted an operation licence in 2008. Main hazards: fire and potential pollution of surface waters, soil and groundwater with oil derivatives, as well as atmospheric emission of hydrocarbons.
- The following substances are stored in the Terminal:
  - Heavy oil – diesel and heating oil
  - Petrol
  - The facility can also be used to store and handle toluene (however it is not used for this purpose yet)

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**PKN Orlen SA Świnoujście Fuel Terminal (former fuel storage BM 94)**

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**PKN Orlen SA Świnoujście Fuel Terminal (former fuel storage BM 94)**

- Pollution with oil derivative substances has been identified in a few places on the premises.
- Currently, reclamation is carried out in the polluted areas. Every quarter the water is analysed using data from piezometers located in the terminal. The results revealed that the oil derivatives migrated to an area where limit values were not exceeded before. This may be attributed to the construction of a masonry envelope around Tank No. 1, which increased the load.
- Considering the above, a new reclamation project will be prepared along with an application for a new approval.

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**PKN Orlen SA Świnoujście Fuel Terminal (former fuel storage BM 94)**

Inspections by PIEP in 2008:

- Environmental Site Assessment of the railway siding (a decision was issued to suspend its commissioning)
- Environmental Site Assessment of the land area of the terminal (a procedure to suspend its commissioning was initiated)
- Environmental Site Assessment of the whole terminal was performed upon notification of PIEP on the correction of irregularities (the a.m. suspension procedure was cancelled)

An inspection carried out in 2009 revealed no irregularities.

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**PKN Orlen SA Świnoujście Fuel Terminal (former fuel storage BM 94)**

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**SSR GRYFIA SA**

- The repair shipyard is situated on Gryfia Island on the River Odra (Oder), within the so-called territorial sea. The shipyard repairs and constructs marine vessels, using technical gases (acetylene and oxygen), paints, solvents (petrol, xylene) and varnishes.
- Moreover, hazardous processes include bleeding fuel from ships and refuelling, and oil separation carried out on HYDRUS barge (waste recovery plant). The shipyard also operates its own chemical treatment plant for oily sewage. In the sewage treatment process sulphuric acid and hydrochloric acid solution are used.
- Due to a high risk of fire the shipyard keeps its own fire response team.

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**SSR GRYFIA SA**

- The highest fire and explosion risks are related to the storage and use of extremely flammable, explosive and oxidizing substances. Paints, varnishes and solvents are stored in areas equipped

with natural and mechanical ventilation, smoke detection systems and heat detectors, as well as non-sparking floor coating. All electrical systems are explosion proof.

- There is also a risk of leakage of oil derivatives into the surface waters of the River Odra (Oder) during the removal of fuels and oils from repaired vessels.

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#### **SSR GRYFIA SA**

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#### **SSR GRYFIA SA**

- The shipyard presented a lower-tier establishment notification in June 2007.
- On 30.07.2007 it presented its MAPP. In the course of an inspection carried out by the State Fire Service, Szczecin City HQ, it was concluded that the MAPP was not consistent with the factual circumstances and did not guarantee safety. The establishment was committed to review its MAPP with due consideration of the findings.
- A reviewed MAPP was submitted on 30.01.2009.

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#### **SSR GRYFIA SA**

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#### **UTES in Zachodniopomorskie Province**

1. Baltchem SA Chemical Works in Szczecin Fuel and Methanol Terminal in Szczecin
2. Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)
3. Krono - Chem Spółka z o. o. in Szczecinek Methanol Storage and Handling Terminal in Szczecin
4. Kronospan Chemicals Spółka z o. o. in Szczecinek – Chemical plant in Szczecinek
5. Zakłady Chemiczne POLICE SA
6. GASPOL SA - Barlinek Area LPG Filling Plant
7. NAFTOBAZY Spółka z o. o. in Warsaw – Fuel Storage No. 7 at Trzebież
8. PGNiG SA - Zielona Góra Branch
9. PGNiG SA – DEBNO Natural Oil and Gas Mine at Barnówek
10. PROGAS EUROGAZ – Liquefied Gas Distribution Centre in Koszalin
11. Orlen Gaz Spółka z o. o. – LPG Marine Terminal in the Port of Szczecin

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#### **Baltchem SA Chemical Works in Szczecin Fuel, Methanol and Ethanol Terminal in Szczecin**

- The terminal is situated in central Szczecin, on the Wrocławski Canal in the River Parnica, the area that had been formerly occupied by POLIFARB, a paint manufacturer.
- The products stored and handled in the terminal are substances in fire hazard class I, II and III, and unclassified products:
  - heavy/diesel oil
  - heating oil
  - methanol
  - Ethanol/petrol
  - vegetable oil

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#### **Baltchem SA Chemical Works in Szczecin Fuel, Methanol and Ethanol Terminal in Szczecin**

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#### **Baltchem SA Chemical Works in Szczecin Fuel, Methanol and Ethanol Terminal in Szczecin**

An inspection carried out by PIEP in 2007 revealed that, due to successive changes in investment plans, affecting the scope of activities and increasing the storage capacity of the terminal, neither the MAPP nor the Safety Report had been updated. It indicated inefficient risk management or a total lack thereof. The inspectors found that the safety management system had not been correctly implemented. The MAPP was submitted with the initial LTE notification and then again with the UTE notification. The underlying problem is the establishment management's lack of understanding of the principles of a risk management policy. After the inspection a new MAPP was designed and submitted in April 2007.

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**Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)**

- The former Maritime Fuel Storage Facility of Porta Petrol SA in Świnoujście was converted from a Soviet Army Forces base and commissioned early in 2001. It is a storage and handling terminal for which a hazard analysis was performed already during the design and project development processes. The facility was equipped with necessary safety systems and technical measures to prevent, eliminate and mitigate effects of major industrial accidents. The facility is situated in the east of the Isle of Uznam (Usedom) in the southern part of Świnoujście, in the south basin of Świna Strait.
- Due to a close proximity of a sewage treatment plant (a biogas tank) and forest areas (with the predominance of a coniferous forest) there is a possibility of amplification of consequences if a major accident occurs (the domino effect).
- After the bankruptcy declared in 2004 the facility handled only limited quantities of fuel.
- Since 1 June 2006 the terminal has been run by „Baltchem” SA.

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**Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)**

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**Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)**

Terminal facilities:

- underground cylindrical-shaped storage tanks made of reinforced concrete with a laminated steel jacket;
- above-ground transport pipelines;
- the terminal has been fitted with a vapour recovery system;
- all tanks are fitted with automatic overflow protection devices, vents with flame baffles preventing the gas zone from the propagation of fire, and liquid level sensors;
- the system is monitored and visualised in the central control room;
- there are eight fuel loading units and barge and ship unloading stations on the berth;
- the base of the berth is impenetrable and equipped with a disposal and treatment system for oil derivative waste.

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**Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)**

- The Accident Prevention Programme was updated and adjusted to the new organisational structure of the establishment in 2007,
- The Safety Report was updated and adjusted to the new organisational structure in 2007.
- A new Internal Emergency Plan was presented in 2007.
- The information required for the development of an external emergency plan was submitted to the State Fire Service city headquarters in Szczecin in 2007.
- The SFS MHQ in Szczecin developed the External Emergency Plan.
- PIEP has been notified of the quantities of hazardous substances kept at the establishment as of 31 December each year (since a follow-up order was issued by PIEP in 2007).

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**Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)**

- In the 1980s soil and groundwater pollution caused by SAF was observed.
- Long-term reclamation consisted in recovering free product from the surface of the groundwater table. A system of drain wells was built to that end. The pumps are activated from the control room when the set thickness of the oil layer stratum is exceeded.
- The recovery process is still underway, however the occurrence has substantially decreased.

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**Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)**

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**Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)**

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**Baltchem SA Chemical Works in Szczecin Liquid Fuel Handling Terminal in Świnoujście (former Porta Petrol SA)**

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**Krono - Chem Spółka z o. o. in Szczecinek Methanol Storage and Handling Terminal in Szczecin**

The establishment was built in the years of 2005 - 2006.

- PIEP participated in two final inspections. A total of four interim inspections were carried out on different stages and scopes of works.

The terminal is equipped with the following:

- methanol storage tanks
- product pumping plant
- firewater pumping station
- distribution and handling installations for vessels and rail/road tankers, including a vapour recovery system
- railway siding
- loading/unloading system for vessels, rail and road tankers)
- stormwater drainage with oil sediment separators

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**Krono - Chem Spółka z o. o. in Szczecinek Methanol Storage and Handling Terminal in Szczecin**

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**Krono - Chem Spółka z o. o. in Szczecinek Methanol Storage and Handling Terminal in Szczecin**

- An UTE notification, APP and Safety Report presented in April 2006.
- In the course of a PIEP inspection in 2007 it was found that the APP and the Safety Report were not consistent with the actual situation, particularly as regards risk management.
- In December 2007 the above-mentioned, updated documents were submitted to PIEP, however they were still found noncompliant. The Provincial Headquarters of SFS issued a decision refusing approval of the Report.
- In November 2008 a revised APP was submitted, followed by a new Safety Report in December 2008.
- The revised documents were approved by PHQ SFS in Szczecin, once PIEP reviewed them.
- Information concerning the quantities of hazardous substances as of the last day of the year was submitted annually.

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**Krono - Chem Spółka z o. o. in Szczecinek Methanol Storage and Handling Terminal in Szczecin**

Hazards:

- Methanol
- Water-soluble substance, regardless of the concentration
- There are no emission standards for methanol
- Diluted methanol makes a good medium (source of carbon) for microorganisms.
- The influence on aquatic organisms is not so harmful as on people.

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**Krono - Chem Spółka z o. o. in Szczecinek Methanol Storage and Handling Terminal in Szczecin**

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**Example (case study)**

Szczecin, February 2008,

- An attempted theft of methanol resulted in a leakage from a rail tanker (approx. 60 Mg) on the railway track and ground at the Polish State Railways (PKP) station.

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**Threats**

- Explosion hazard,
- Contamination hazard – bird habitats on the isle of Dębina, the River Odra, close to a Natura 2000 site,
- Proximity of a surface intake for process water used by Huta Szczecin (ironworks),
- A distant potable water intake in Skolwin district (3.5 km away) in the direction of the river flow,
- Soil contamination hazard (industrial area),
- Other industrial establishments in the area.

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**Foto – Szczecin 09.01.2009**

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**Actions**

Provincial Inspectorate of Environmental Protection (PIEP):

- Field visit to the place of incident,
- Notification of hazards to the water users,
- Inspections at the following establishments:
  - KRONOSPAN Spółka z o. o.,
  - KRONO-CHEM Spółka z o. o.,
  - CTL Spółka z o. o.,
  - PKP PLK Rail Track Manufacturer in Szczecin.

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**Actions**

PIEP (continued):

- The Railway Transport Inspection was notified of the irregularities and a request was made to take authorised measures.
- Two decisions were issued (for CTL and PKP) committing the parties to determine the reasons of negligence that led to the accident and to find the responsible persons who allowed the negligence, as well as to initiate a disciplinary procedure against the persons, to determine the environmental consequences of the accident and to confirm when the decision has been complied with.

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**Zakłady Chemiczne POLICE SA**

**POLICE Chemical Works were built in the 1970s, when no special requirements to prevent major accidents were in use.**

Facilities and installations at ZCH POLICE:

1. Heat and Power Plant (I and II)
2. Sulphuric Acid Plant
3. Titanium Dioxide Plant with an iron sulphate disposal (II)
4. Ammonia Plant (Seveso II)
5. Urea Plant
6. Phosphoric Acid and Sodium Fluorosilicate Plant with a phosphogypsum disposal
7. Fertilizers Plant, using phosphorus, nitrogen and potassium
8. Wastewater Treatment Plant
9. Auxiliary installations

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**Zakłady Chemiczne POLICE SA**

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**Zakłady Chemiczne POLICE SA**

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**Zakłady Chemiczne POLICE SA**

- An UTE notification was presented in March 2002 and updated in December 2008.
- An accident prevention programme was presented in September 2002 with the first revision in November that year and the second one in February this year.
- A safety report was presented in January 2009 and updated in April 2008. PIEP reviewed it and issued a negative opinion due to the absence of some obligatory information in the report, most importantly regarding the places of storage and the quantity of hazardous substances, as well as the risk management responsibility assigned on each level of the organisation. SFS PHQ in Szczecin did not approve the report, either. A reviewed update was submitted this February and was approved by PIEP and SFS in Szczecin.
- It should be noted that both PIEP and PHQ SFS were involved in the report development process and systematically provided their comments, which considerably facilitated the subsequent assessment of the final report.

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**Zakłady Chemiczne POLICE SA**

Beside ammonia, there are also other dangerous substances stored in large quantities on the premises of POLICE Chemical Works, including:

- Chlorine
- Hydrofluoric acid
- Methane
- Sodium fluorosilicate
- Heavy / diesel oils
- Heating oils
- Hydrogen
- Petrol

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**Zakłady Chemiczne POLICE SA**

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**Orlen Gaz Spółka z o. o. LPG Marine Terminal in the Port of Szczecin**

A new establishment, built in 2008-2009 and equipped with:

- underground LPG storage tanks
- product pumping plant
- railway siding with unloading and loading equipment
- berth with handling arms
- loading/unloading system for road tankers
- internal basin
- process pipelines
- firewater pumping station
- fire monitors

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**Orlen Gaz Spółka z o. o. LPG Marine Terminal in the Port of Szczecin**

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**Orlen Gaz Spółka z o. o. LPG Marine Terminal in the Port of Szczecin**

The Terminal was reported for final acceptance in January 2009.

In the course of an inspection performed by PIEP a number of irregularities were observed, such as:

- lack of protective devices,
- lack of an LTE notification, MAPP or safety report,
- lack of arrangements regarding the use of environment
- inconsistencies with the decision specifying environmental conditions of the operation licence issued.

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**Orlen Gaz Spółka z o. o. LPG Marine Terminal in the Port of Szczecin**

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**Document**

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**PEIP inspections**

Inspections performed by PEIP in Szczecin covered:

- Completeness and compliance of the information/documents required under the Environmental Protection Law with the factual circumstances;
- Identification of environmental hazards, including reclamation activities;
- Extent of implementation of the safety system in the establishment;
- Technical condition of process installations and environment protection equipment;
- Results of exercises and analyses of emergency plans;
- Required environmental permits and the manner in which they are used and respected;
- Project acceptances.

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**PEIP inspections**

- The documents required under the Environmental Protection Law were accepted by the Provincial Headquarters of the State Fire Service upon correction of all inaccuracies and provision of complete documents.
- The irregularities found in the course of inspections concerned the following:
  - lack of understanding of the concept of accident prevention,
  - non-implementation of a safety system (the assumptions of the APP and safety reports were not put in effect, the documents were not analysed or updated and no conclusions were drawn from carried out exercises),
  - absence of environmental permits (e.g. as far as waste management or reclamation procedures are concerned),
  - non-implementation of permits

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**Environmental assessment**

- The aquatic and soil environment, oversaturated with oil derivative substances, are the most at risk. Reclamation procedures are still underway.
- **Monitoring of transitional and coastal waters – the current status (2007 – 2009)**

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**Implementation of the Water Framework Directive – to achieve a good ecological status of the waters by 2015**

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**Thank you for your attention**