**Elements of an IPPC inspection at a crude oil refinery**

General Issues to be checked during an IPPC inspection:

|  |  |  |
| --- | --- | --- |
| ***General aspects*** | ***Yes/No*** | ***Observations*** |
| Is an IED license in place? |  |  |
| Previous imposed measures during inspection, were they fulfilled? |  |  |
| Clear Monitoring requirements inside the license? |  |  |
| Monitoring is performed as required? (sampling procedures, schedule, reporting) |  |  |
| EPRTR submitted to authority? |  |  |
| Environmental annual report performed? Comparison with previous report (e.g. Production, emissions, energy consumption/unit of production etc. |  |  |
| Changes in capacity, technology etc.; did the company ask and receive authorities approval? |  |  |
| Other requirements of the license/IED directive/national legislation |  |  |
| Complaints between two inspections? What are consisting of? How were solved? |  |  |

**Crude Oil Refineries**

Refining of crude oil results in emissions to air and water, as well as generation of

various solid and liquid waste streams.

**Emissions to air**

Common monitored parameters in flue gas emissions to air from a crude oil refinery

include:

Carbon dioxide (CO2)

Carbon monoxide (CO)

Oxides of Sulphur (SOx)

Oxides of nitrogen (NOx)

Particulates (PM)

Volatile Organic Compounds (VOCs)

Ammonia (NH3).

Main sources of Emissions/pollutant to Air from a Crude Oil Refinery



**Wastewater**

In accordance with the E-PRTR Regulation, water pollutants are:

Total nitrogen, Total phosphorus, Arsenic and compounds (as As), Cadmium and

compounds (as Cd), Chromium and compounds (as Cr), Copper and compounds (as Cu),

Mercury and compounds (as Hg), Nickel and compounds (as Ni), Lead and compounds

(as Pb), Zinc and compounds (as Zn), Dichloromethane (DCM), Halogenated organic

compounds (as AOX), PCDD + PCDF (dioxins + furans) (as Teq), Pentachlorobenzene,

Benzene, Ethyl benzene, Phenols (as total C), Polycyclic aromatic hydrocarbons (PAHs),

Toluene, Total organic carbon (TOC) (as total C or COD), Xylenes, Chlorides (as total Cl),

Cyanides (as total CN), Fluorides (as total F), Fluoranthene, Benzo (g, h, i) perylene.

Common monitored parameters in wastewaters include:

* pH
* Flow
* Biochemical Oxygen Demand (BOD)
* Chemical Oxygen Demand (COD)
* Suspended Solids
* Oil
* Hydrocarbons
* Ammonia
* Phenols
* Heavy Metals





**SOx**

The main sources of SO2 are combustion processes, the SRU (Sulphur Recovery Unit) and flaring. A technique similar to that used to establish BAT for NOx emissions can also be used for

SO2 emissions, that is to look at BAT for the processes emitting SO2.

BAT is to apply a staged SRU including tail gas treatment with a recovery efficiency of 99.5% to 99.9%. In addition, the operator should carry out a mass balance of sulphur within a

refinery. BAT is to have an SRU configuration with sufficient capacity for the H2S feed to

the unit.

BAT for Reduction sulphur dioxide emissions by:

* quantifying the sulphur emissions from various refinery sources to identify the main sources in each specific case;
* using BAT applicable to SO2 emission reduction in the energy system, catcrackers and cokers;
* efficient operation of the sulphur recovery unit;
* reducing emissions from typically small contributors when they become a significant part of the total emission and if cost-effective (e.g. flaring, gases from vacuum ejector gas burnt in furnaces).

**VOC**

Volatile Organic Compounds (VOCs) are emitted as fugitive emissions from storage

tanks, pipes, flanges, valves and other fittings, as well as from oil/water separation

systems and flares.

BAT to reduce VOC emissions will depend on BAT for storage and handling

processes.

The REF BREF specifies a VRU recovery rate between 95% and 99%.

**Waste**

Types of solid waste generated in a refinery include:

* Oily sludge from tank bottoms and desalters. Any waste oils generated are recovered and recycled on site
* Spent catalysts
* “Sulphur cake” from the SRU. Recovered sulphur may be sold as a byproduct, if a demand exists.
* Waste from auxiliary operations similar to municipal waste, such as packaging, domestic waste and food waste may also be generated.

BAT for solid waste management is to:

* + Implement a solid waste management system
  + Minimize oil spills and exclude oil spills that contaminate the soil
  + Apply techniques to reduce the solid waste generated by each unit operation.

**Noise and vibration**

The use of heavy, rotating machinery such as pumps, compressors and turbines

may give rise to noise and vibration. Other sources of noise include Pressure Relief

Valves, air-fin coolers, furnaces and truck movements within the site.

**Odour**

Emissions of VOCs and sulphur compounds may cause odour problems.

The majority of complaints coming from nearby population are referring to odour and respiratory problems.

**Resources consumption**

Crude oil refineries consume

· large amounts energy (thermal and electrical). Some refineries have

installed Combined Heat and Power (CHP) plants for the purposes of

generating steam and electricity.

· large quantities of water (in desalting, steam generation and cooling). The

amount of water used will depend on the type of refinery and the cooling

system in place. For Romanian refineries, it is very variable and depends on

water management scheme.

In the end, the scope of IPPC inspection is to assess how close is the installation functioning to BAT requirements and to impose appropriate measure- if necessary.

Reference:

„ *National Technical Guidelines on Best Available Techniques for Oil and Gas Refineries” Country: Romania*

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