Technical Bulletin

Temporary storage of wastewater in an effluent pit

Vecom offers the option to temporarily store wastewater on site with a very large storage capacity

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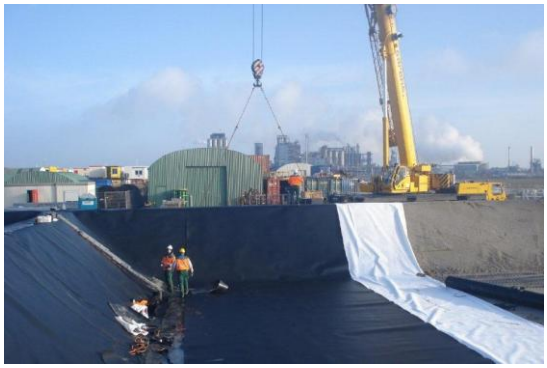
Introduction

Vecom has been carrying out boiler cleanings successfully for many years. Boiler cleaning is extensively described in previous Technical Bulletins (see, for example, Technical Bulletins 2010/04 and 2010/06). When chemically cleaning, often large quantities of wastewater are released that usually need to be stored quickly so that the following phase of the cleaning can start.

Wastewater originating from chemical cleanings can be temporarily stored in different ways. Often IBC containers (1 m^3 per item) are used for small cleaning projects and tank vehicles (approx. 25 m^3) or temporary storage tanks (approx. 70 m^3) are used with larger cleaning projects. The disadvantage of these storage methods is the limited capacity when very large volumes are released during boiler cleaning. Quantities of more than 1000 m^3 are common with regard to boiler cleaning. Sometimes this wastewater is temporarily stored in, for example, four temporary storage tanks (with a total of 280 m^3). They must, therefore, be emptied quickly using tank vehicles during cleaning before the following waste stream is released by the cleaning. This mainly has logistics disadvantages.

Effluent pit

Another solution is an effluent pit. An effluent pit is constructed by creating a large pit with sand. Next, the inside and the sides are covered with foil. The foil can be rolled out manually or by using a crane (depending on the size of the pit and the available manpower). The foil is welded with a hot, round electrode and is, in a way, molten together. Since the welding seam is hollow inside, it is relatively easy to determine whether the welding seam leaks. To determine this, a thin needle is used to exert pressure on the welding seam. Next, a pressure gauge is used to determin whether the pressure remains constant for a specific period of time. When the pressure decreases, the welding seam leaks and it will be rejected. When welding an effluent pit, all welds are inspected and a record of this is also maintained. When the effluent pit is delivered, these certificates are also supplied.



Depositing foils using a crane: first the white protective foil, next, the black EPDM foil

An effluent pit after the earthworks (top) and the final result (bottom)

Foil

The foil that will be used will depend on different factors such as, for example, resistance to chemicals, mechanical strength, flexibility, etc. EPDM is often used for the storage of chemical waste. The specific advantages of EPDM are:

- EPDM has a high elasticity (up to 400%) over a large temperature range (-40 °C to 120 °C);
- EPDM has a good chemical, thermal and UV resistance;
- EPDM has a long service life (> 20 years; this will, of course, depend on the conditions and application).

This makes EPDM extremely suitable as storage resource for chemical solutions when there are high temperatures temporarily.

Often a soft protective blanket is placed under the foil. This protects the EPDM foil against any stones or other sharp objects that may be present.

Advantages of an effluent pit:
- Very high storage capacity;
- Economically more favourable in many cases with a longer working life;
- An effluent pit is also extremely suitable to treat wastewater on site as the only storage method that offers this option;
- It is installed in accordance with the Kiwa guidelines with a certificate.

Siemens – Enecogen Project

Siemens Energy has built a STEG (SToom - En Gas-; steam and gas) power plant in the Europort industrial and port area of Rotterdam. The customer is Enecogen, a joint venture of the Dutch energy company Eneco and the Danish energy company DONG Energy. This gas-fired plant is the cleanest in Europe and has a power output of approx. 870 megawatts (MW). The plant will become operational at the end of 2011.

The STEG plant has been chemically cleaned by Siemens itself by applying its patented high temperature EDTA (ethylenediamine-tetraacetic acid) cleaning method. Siemens decided to treat the wastewater on site. Fir this, a large storage capacity for a longer period of time was required. Siemens, therefore, decided to store the waste in the aforementioned effluent pit. Vecom constructed an effluent pit for this project with an intermediate dike so that two different streams could be stored without the streams mixing.

The effluent pit was constructed in approximately 1 to 2 weeks. Next, the heat recovery steam generator (HRSG) was cleaned by applying the EDTA method. The wastewater that was released during this treatment has been stored in the effluent pit. Next, the wastewater was treated on site after which the residue was taken to a recognised wastewater treatment facility using tank vehicles. The effluent pit was dismantled after seven months. The foil was cut loose and removed using a crane and manually. To conclude, the foil was taken to a recognised waste treatment facility.

Source:
http://www.siemens.com/press/pool/de/pressemitteilungen/2009/fossil_power_generation/EFP200905056e.pdf

TB 2010/04 : Pre-commissioning cleaning of 4 Heat Recovery Steam Generators (HRSGs) in Egypt and
TB 2010/06 : Reducing time and costs cleaning Heat Recovery Steam Generators

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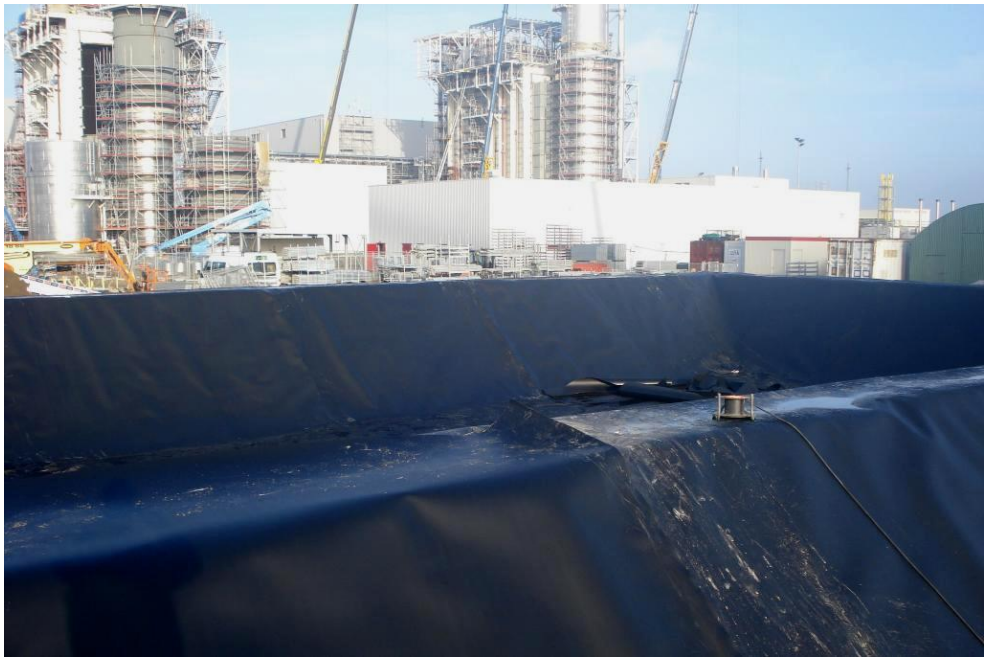

Foil with in the background the HRSGs that have now been cleaned that are still partly being built