

REPORT ON THE ACTIVITIES DEVELOPED DURING A TRAINING PERIOD WITHIN THE RICCOBONI S.P.A. (PARMA) THROUGH THE PRESENTATION OF THE STUDY CASE OF A FORMER QUARRY SITE IN THE VARESE PROVINCE (ITALY), USED FOR MANY YEARS AS AN ABUSIVE LANDFILL.

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ABSTRACT

Contaminated sites are the legacy of a long period of industrialization that have involved careless production and usage of hazardous substances and inadequate management of wastes. The industrial expansion and the increased amount of industrial wastes have led to considerable environmental problems in all the industrialized countries.

The problem of the management of contaminated site has been raised fairly recently and also the relative legislation is quite recent. To better understand the dimension of the problem only in Italy, according to the provided regional plans, in the year 2000 some 8873 sites were identified as potentially contaminated and 1251 as actually contaminated.

According with the current legislation the remediation of a contaminated site follows some steps:

1) Characterization plan → 2) Preliminary project → 3) Definitive project → 4) Tender → 5) Execution of the works → 6) Post execution monitoring.

The first three steps aim to report on the site main features and on which solutions could be adopted in order to get the remediation, following the principle that they have to be the best available techniques with affordable costs.

Once the techniques are chosen a tender is made and some companies working in the field of the reclamations executions field participate to the tender, presenting an executive project in which, beside to a summary of the most important aspects underlined in the above mentioned three steps, explain thoroughly how the work will be done. Hence every tenderer will get a score based not only on the economical request but also on the presented technical documentations. The tender's winner will be the company that gets the best score and it will have to carry out the remediation according with the executive project it have presented.

The main activity developed in this internship (or *stage*) has been on the preparation of the technical documentation a company have to present to the customer, on the tender, hence within the 4th step above stated and in order to better explain the working context, a case of remediation designing and executions has been reported.

The presented case was a former quarry site, the Fagnano Olona ex-quarry Pigni's brothers in which sand and gravel have been extracted for many decades until the 1960. The site that an abusive landfill, from the 1960 to the 1980, in which a chemical factory collected toxic – noxious waste, special waste and municipal urban wastes.

In the project about the site reclamation, after a brief explanation about the site and the kind of pollution, has been described the actions the company have proposed to do in order to get the remediation.

According to the project the following actions have been defined as the most important:

- 1. wastes and leachate characterization of the former abusive landfill;*
- 2. realisation of an hydraulic barrier to assure the aquifer protection against the pollution's leaching from the waste to the groundwater;*
- 3. preparation of the area in terms of roads conditions and yard's safety;*
- 4. progressive excavation of wastes;*
- 5. progressive landfill build-up;*
- 6. shaping the newly constructed landfill, looking for the best results in term of respect of the landscape hence final restoration of the site;*
- 7. revegetation of the site;*
- 8. post execution monitoring on the site.*

This internship has been a great opportunity to work not only in the field of the remediation of contaminated site but also in the field of the waste management because of the strong link between the two working areas.

The work has been on the preparation of the tender's technical documentation (mainly the "executive project") after have studied the provided environmental characterization and the preliminary/definitive projects.

Nevertheless, there has been also the possibility to visit some contaminated sites, first of all the Fagnano Olona's site which has been visited several times during the 5 months of internship either for having a view of what was happening during the remediation execution, working directly into the yard helping the others workers in some operations (like the liners layering) and also to learn about the conditioning plant present on the site to make inert some wastes needing to be stabilized.

Moreover as first visit to contaminated sites before the tenders, there has been the chance of having an overview on some other real contaminated situations. For instance it has been visited a metallurgical wastes contaminated site, a chromium contaminated site and also a case of a petroleum hydrocarbon contaminated site remediation.

Yet because of the topographical surveys importance into the identification of the waste piles levels in height (in order to check their volumetric evolutions), during the internship also some topographical surveys on contaminated sites have been done.

This internship within the Riccoboni's corporation has been really positive, interesting and also motivating, having covered a broad range of subjects included in the fields remediation of contaminated site and waste management and a remarkable trait has been the possibility to view also directly on the field some real situations, getting experience about some contaminated sites and some technologies used to remediate them.