

**CASE STUDY** : Soil remediation programme (The Finnish Petroleum Industry's Programme SOILI to remediate oil polluted decommissioned service station sites)

**SECTOR:** Waste  
**COUNTRY:** Finland

**BACKGROUND**

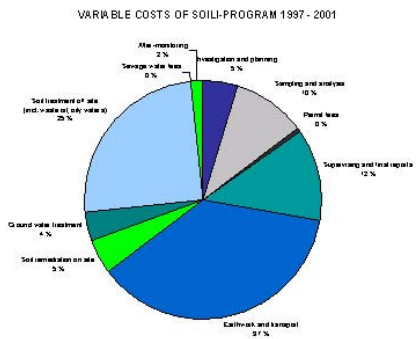
The Soili-programme is a programme for the remediation of sites which have been used for the retail sale of petroleum products. The programme will remediate soil that was polluted by oil from the service station or other commercial outlet activities that took place on these sites. The programme is based on an agreement between the Finnish Oil and Gas Federation (FOGF), the Ministry of the Environment, the Association of Finnish Local Authorities and the oil companies. The agreement was made from oil industry's initiative in 1996 and the programme was started up in 1997. The practical implementation of the programme is the responsibility of the Oil Industry Service Centre Ltd, a company owned by the FOGF. The programme is carried out in co-operation with the authorities.

The nation-wide programme offers holders of former service station sites an opportunity to solve an otherwise difficult environmental problem. The remediated sites can be taken in other use after the remediation, for example for residential use. The target is to remediate several hundred former service station sites and remove the possible risk to the environment and health. The programme is a first voluntary industry sector wide programme of this nature in Finland.

**FINANCING**

The project is funded mainly by oil companies or retail chains having activities in Finland as well as the Oil Pollution Compensation Fund (OPCF), operating in connection with the Ministry of the Environment. OPCF is a national

government fund to which oil companies pay a fee levied according to their oil imports to Finland. The main aim of the fund is to act as an administrative secondary compensation fund in oil pollution damage as well as to sustain adequate oil pollution combating equipment and preparedness in Finland.



**DESCRIPTION**

*REMEDIATION PROJECT*

When handling the single remediation project the programme uses from beginning to end a general project managing methodology to investigate and remediate the possibly contaminated site. The methodology comprises all phases from a historical investigation and a schedule for ground survey through soil remediation works to the final report and approval by the regional environment authorities.

*APPLICATION*

- The applicant will fill in the application form to the programme.

*APPROVAL*

- The board of the programme and the OPCF will approve the application to the programme.

*SITE INVESTIGATION*

- The programme will do a site investigation to clear up the

contamination and need for the remediation.

#### **PERMIT**

- The programme takes care of the permit procedure in the regional environment center.
- The authority will approve the remediation plan.

#### **REMEDIATION WORK**

- The remediation work is done in the programme's supervision.
- The duration of the work can vary from couple of weeks to several months depending on the chosen remediation method.
- There is a variation of remediation methods in use but mainly the oil contaminated soil is excavated and replaced with clean soil. The contaminated soil is transported for treatment to various authorised treatment facilities maintained at private or municipal waste treatment plants. The most common way is to treat the mildly contaminated soil biologically in open compost stacks. Also closed and aerated composting or certain composting devices are in use especially when cleaning the heavily contaminated soil. In these cases also the thermal treatment and the washing of the excavated mass (incineration in a stationary or mobile plant) has been used.
- The in-situ technology is mainly used when the soil is heavily contaminated with lighter petroleum fractions as gasoline. Then the usual method is the soil vapour extraction containing the treatment of the light hydrocarbons for example with activated carbon filter or catalytic burner. Also a microbiological in-situ treatment can be used. For on-site and off-site treatments the mobile treatment devices, both biological and physical, have been developed and commercialised during the duration of the programme.

#### **APPROVAL OF THE WORK**

- The board of the programme and the regional environment center will approve the remediation work.

#### **DELIVERY**

- After the remediation project the remediated site will be delivered back to the applicant.

#### **EVALUATION**



The programme will give property owners the opportunity to have their property remediated to its unpolluted condition, enabling it to be considered for other uses. The programme has so far progressed according to plans. The number of applications was c. 300 towards the end of the year 2001 and the application period will continue up to the end of the year 2005.



Basic investigations including risk assessment have been made on about 200 sites and more than 140 sites have already progressed into remediation phase, of which 113 projects were already completed before the end of the year 2001.

By a framework agreement between the oil industry and the public sector the administration has also committed itself to contribute to the programme by improving its own working methods, i.e. improving permit procedures, and by having an effect on the regional studies

of possibly contaminated old service station sites.

The quality standard of the programme is high. The programme is also partly public by its nature and managed in close co-operation with the authorities. The media follows also closely the work and success of the programme. The participating companies can benefit the high quality standard usually without the fear of need to go back to the site after the process has been finalised in the programme.



### **BENCHMARK DATA**

The remediation targets set by the permitting authorities (regional environment centers) based on a Ministry of the Environment Guideline proposal have been reached in most completed projects. When the strict targets have not been fully met the programme has presented a risk assessment on the possible effects of the residual contamination. Benchmarking to other countries is difficult because corresponding programmes are not general elsewhere but in the Nordic countries. Also the Nordic soil remediation programmes differ from each other. The legislation

and local circumstances are also different in each country what influences the remediation costs.

### **DRIVERS**

The 'Soili' programme can be regarded as an oil industry's response to requirements of safeguarding the valuable ground water resources. The programme provides also means to prevent the creation of judicial problems in advance because of lacking legislation concerning so called old soil contamination. The prevailing legislation cannot be applied to those parties who once owned a site and operated there in due form in the circumstances as they then were but have been off already for years.

### **LESSONS LEARNT**

The programme will go on still years. Although the programme was first established a cost-effective project management programme with no R & D duties but utilise commercialised soil treatment services, the programme has had influence also in R & D activities. It has also changed its stand in this respect and gives its support to undertakings developing new technology whenever possible, however, without bearing the development risk.

### **APPLICATION**

Most of the experience can probably be utilised in other countries. The oil industry and especially the service station concept is so homogeneous that the application would be easier within the oil sector than other industrial sectors.

### **TRANSFERABILITY**

The Soili-programme is unique - the programme in this form can work only in Finland. The idea and the concept is however transferable. The original concept is adapted from Denmark to Finland and it has been made suitable for the Finnish circumstances and society. One year later the Swedish oil sector started its own programme.

**IMPACT ON SUSTAINABILITY AREAS**

Environmental - High

Social - Medium

Economical - Medium

Institutional - High

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**REFERENCES**

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