

Pollution Prevention: Major Pipelines

These guidelines have been drawn up to identify the pollution risks in pipeline construction and operation and to assist those involved in minimising the risks by promoting appropriate prevention and mitigation measures. For the construction phase, it is recommended that these guidelines be read with the Agency's general guidance for working at construction and demolition sites (PPG6 – Reference 1)

1. GENERAL

The Agency is responsible for both the protection of “controlled waters” from pollution and for the prevention of pollution of the environment, harm to human health and detriment to local amenity by waste management activities under the Environmental Protection Act 1990.

“Controlled waters” include all watercourses, lakes, lochs, coastal waters and water contained in underground strata (or “groundwater”) and it is an offence to pollute such waters, either deliberately or accidentally. In addition, the formal consent of the Agency is required for many discharges to controlled waters, including both direct discharges and discharges to soakaways. Such consents are granted subject to conditions and are not issued automatically.

Any other waste produced during construction or operation will be subject to the Duty of Care (Reference 2) under the Environmental Protection Act 1990 and may also be subject to control under the Waste Management Licensing Regulations 1994. In addition, certain hazardous wastes are subject to the Special Waste Regulations 1996. Advice is available from the Agency.

The most frequent pollution problems involving pipelines occur during the construction and initial commissioning. Leaks and pipeline failures are rare. However, if they do occur their impact could be large.

2. PLANNING AND PIPELINE DESIGN

- a. The choice of route of the pipeline can have a significant impact on the risk of pollution occurring during construction and subsequent operation. Discussions should be held with the Agency at the earliest possible stage and sensitive watercourses, vulnerable groundwaters, contaminated land and old landfill sites identified before the final route is chosen. These sites should either be avoided or appropriate measures agreed to prevent water pollution. In some circumstances the Agency may oppose the route of a pipeline due to the risk of groundwater pollution (see Reference 3). At some river crossings in-river work may not be permitted and an alternative route or crossing technique will be necessary.
- b. The design of the pipeline should take into consideration:
 - i. The thickness of the pipe wall, which may have to be increased in sensitive areas to minimise the risk of product loss due to damage or corrosion.
 - ii. The depth of the pipe, which should take into account sensitivity, land use and the potential for damage due to excavation, construction or agricultural activities.
 - iii. The provision of stop valves at river crossings, monitoring equipment to identify leaks and facilities to stop leaks.
 - iv. Maintenance and inspection programmes for the operational pipeline may need to be more exhaustive in sensitive areas and there will be a continuing need to monitor development along the route.
 - v. Emergency procedures for dealing with leaks or damage to the pipeline will need to take into account the time taken to reach a the site and effect a repair.
- c. In most cases some on-site treatment of silty water will be required during construction and commissioning and this may necessitate acquisition of additional land for settlement lagoons or grass plots. It is essential that provision is made for this at the planning stage.
- d. In some cases the pipeline may cross or pass under vital flood defences. Such work will require close liaison with the Agency in order that these are not compromised.

3. CONSTRUCTION

The construction phase provides the greatest potential for pollution to occur. De-watering, silt laden run-off from bare soil and stockpiles, and spilled oil are the main problems (Reference 4). A common cause of pollution from construction sites is vandalism and theft. Equipment and storage facilities should be adequately protected by secure fences and locked access where possible. An additional factor in pipeline construction is the risk that pollution could travel a considerable distance along the trench before detection, particularly where imported granular bedding is used.

a. RUN-OFF FROM SOIL STOCKPILES AND EXCAVATIONS

Following the fencing of the route, the first phase of pipeline construction usually involves the removal of top soil from the line of the pipe to a linear stockpile on one side. Soil stockpiles and the exposed excavation area have a large potential for the generation of silt laden run-off. Such a discharge can have a severe impact on the flora and fauna of local watercourses. Silt can coat plants, fish eggs and the stream bed resulting in reduced productivity, suffocation and death to the bottom dwelling creatures (benthic invertebrates) upon which fish feed. Silt is also directly harmful to fish due to gill damage and, indirectly, by coating the stream bed which destroys egg laying sites.

Discharge points should be identified before work starts and the appropriate consents obtained from the Agency. This may take up to four months, so early application is essential. Measures to reduce the mobilisation of silt, such as covering stockpiles, should be considered. Treatment of the run-off will almost certainly be required using settlement facilities and possibly coagulants.

b. WHEEL WASH FACILITIES

Wheel washes to prevent silt and mud deposition on roads at crossings may also be required. These should be securely constructed, using a recirculatory system with no overflow, and the effluent should be contained for proper treatment and disposal.

c. DE-WATERING

De-watering of the trench, valve pits and of excavations for thrust blocks and anchor points is usually required. Such discharges should not be made without the prior agreement of the Agency and some form of treatment such as a settlement lagoon or a grass plot to remove silt may be necessary. If work is carried out in contaminated land, trench liquors will require comprehensive chemical analysis and possibly more specialised treatment or even disposal off site by specialist contractor. In all such cases dewatering operations should be agreed with the Agency at the earliest opportunity.

d. CONCRETE AND CEMENT

Water contaminated with cement is highly alkaline and can cause severe pollution. The placing of concrete in, or close to, any watercourse must be controlled to minimise the risk of such water discharging to the watercourse. Effluent produced from the washing out of any concrete mixing plant or cleaning of ready mix concrete lorries must not be allowed to flow into any drain or watercourse.

e. OIL STORAGE

i. Above Ground Tanks

Detailed guidelines for above ground oil storage tanks are available from the Agency (PPG2 – Reference 5). In general any oil storage tank or oil stored in drums should be sited on an impervious base within an oil tight bund. No damp course should be provided in the bund wall structure and there should be no drainage outlet. The bunded area should be capable of containing at least 110% of the tank or largest drum and any fill or draw pipes and sight gauges should be enclosed within its curtilage. Any tank vent pipes should be directed downwards into the bund.

ii. Mobile Bowsers

Care must be taken in siting mobile bowsers to avoid the risk of spillages entering a watercourse or groundwater. Vandalism and theft are frequently a problem, so bowsers should be secured to prevent unauthorised access and stored within a security compound when not in use.

A supply of suitable absorbent materials should be available at refuelling points for use in dealing with minor spillages.

f. SITE SEWAGE DISPOSAL

Adequate provisions for the collection, treatment and disposal of sewage from site offices and accommodation should be provided. For more details see PPG4 – Reference 6.

If a discharge is to be made consent will be required and should be applied for at least 4 months in advance.

4. RIVER CROSSINGS

River crossings pose a high risk of pollution occurring, and techniques which avoid in-river work such as thrust bores and directional drilling should be adopted where possible.

The use of machinery in the river can cause silt and oil pollution and will damage the river bed and banks. The use of concrete and cement may also cause difficulties due to their highly alkaline nature and problems can arise with “release” oils used on shuttering.

If in-river work is unavoidable, some measures may be required to mitigate the effect. These could include the deployment of oil booms and straw bales downstream or temporary overpumping or diversion of flow.

5. COMMISSIONING

Problems have occurred during the testing and commissioning of pipelines due to unsatisfactory procedures. The initial testing of liquid carrying pipelines should be undertaken using water or gas and not with product. If water for testing is to be taken from surface or ground water an abstraction licence may be required from the Agency. If more than 20m³/d are required the licence should be applied for at least six months in advance.

Water pipelines need to be sterilised before being brought into service. The biocide will need to be neutralised before any discharge can be made to a watercourse. In some cases, the test water may have a low level of dissolved oxygen or may contain solids or oil and will require appropriate treatment prior to discharge. In all cases the agreement of the Agency should be sought well in advance and at least 24 hours notice should be given before any discharge is made.

6. OPERATION

a. FAILURES AND LEAKAGE

Depending on the product carried a leak or failure could result in significant water pollution occurring. It is essential that the design and operation of the pipeline minimises the risk of failure. Automatic shutdown and isolation facilities should be installed and all systems monitored and properly maintained and tested. Emergency plans should be prepared in consultation with the Agency and where appropriate joint emergency exercises should be held at regular intervals.

b. USE OF HERBICIDES

Where fire precautions and maintenance require control of weeds, only non-persistent herbicides should be used. An Agency consent is required for such use in or near watercourses.

7. CONTACTING THE ENVIRONMENT AGENCY

Early consultation can result in considerable savings in both time and resources. Where a consent, licence or other approval is required from the Agency, it should be obtained well in advance to avoid delay. Initial contact should be made with the Region in which the majority of the work is to be carried out or where the project

management office is based. See below for details. If a potentially polluting discharge should occur, the material should be contained if possible and the Agency notified immediately on the emergency Freephone number listed below.

8. REFERENCES

1. PPG6: Working at construction and demolition sites
2. Waste management – The Duty of care – A code of practice:
ISBN 0-11-753210-X: The Stationery Office Tel 0171 873 9090
3. Policy and Practice for the Protection of Groundwater; ISBN 0-11-310145-7:
The Stationery Office Tel 0171 873 9090
4. Environmental Handbook for civil engineering projects – Construction Phase CIRIA special publication 98.
ISBN 0 86017 378X. Tel: 0171 222 8891
5. PPG2: Above ground oil storage tanks
6. PPG4: Sewage disposal at sites where no foul sewer is available

References 1,5 and 6 are available free from the Agency

For any further information, please contact your Agency Regional Office

...or at all times in an emergency on Freefone 0800 80 70 60