Technical Guidance Note
IPPC H 8

Integrated Pollution Prevention and Control (IPPC)

Guidance on the Protection of Land Under the PPC Regime: Surrender Site Report

(Consultation Draft Version 1.0)

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Note:

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1.0 Introduction

1.1 Background to the guidance

The Pollution Prevention and Control (PPC) Regulations 2000 (Reference 1) are intended to ensure that operators adopt an integrated approach to controlling pollution from certain industrial and other activities. To achieve high level of protection of the environment overall, the PPC regime uses a system of Permits that address, amongst other things, the measures to be taken to protect the site[1] of the installation.

Operators of Part A installations and mobile plant are required to produce reports on the condition of the site at two key stages:

Stage 1. **At the time an application is made to the Environment Agency (the Agency) for a Permit to operate an installation or mobile plant.** The report submitted at this stage - the **Application Site Report (ASR) –** focuses on the condition of the site before permitted activities begin. Normally, the ASR will be based on (but is not restricted to) a desk-based review of documentary information. It must address the environmental setting and pollution history of the installation, the substances that may be present in, on or under the site as a result of current (or likely future) operations and the preventative measures to be used to protect the site.

On the basis of the ASR, the Agency may impose a Permit condition which requires the operator to design and submit a Site Protection and Monitoring Programme (SPMP). This may require the collection of Reference Data on the substances handled (or likely to be handled) during permitted activities that have the potential to pollute land and/or groundwater

Stage 2. **At the time of definitive cessation of active operations and following decommissioning of the installation when the operator makes an application to the Agency for surrender of the PPC Permit.** The report submitted at this stage – the **Surrender Site Report (SSR)** – is intended to demonstrate that the land at a site is in a 'satisfactory state' and that pollution risks have been removed.

This guidance is concerned with the preparation of the SSR and relates only to the protection of land.

1.2 What is a Surrender Site Report?

The SSR must describe the condition of the site occupied by a permitted installation (or part of it)[2] at the time that all permitted activities have ceased and decommissioning works are complete[3]. The report is required to demonstrate to the satisfaction of the Agency that the site has not deteriorated as a result of permitted activities or, if pollution has occurred, that it has been returned to a satisfactory state and pollution risks have been removed. Satisfactory state is not defined in the PPC Regulations but Defra's Practical Guide to the PPC regime (Reference 2) indicates that 'satisfactory state' is the condition of the site before the installation was granted a Permit. The SSR is expected to draw heavily on information and reports produced at the time of Permit issue and throughout the operational life of the installation, in particular through the requirements of the SPMP.

The Surrender Site Report is intended to:

a) describe the condition of the site once permitted operations have ceased;

[1] The site of the installation includes all of the land on which any of the activities of the installation may take place including any land integral to the satisfactory operation of the installation.

[2] The intention may be to apply for surrender of the Permit relating to only a part of an installation. In this case, a SSR should still be prepared for that part of the site relevant to the particular part of the installation.

[3] It is an indicative BAT requirement under the PPC regime for operators to maintain a site closure plan to demonstrate that the installation can be decommissioned to avoid any pollution risk and to enable it to be returned to a satisfactory state.

b) demonstrate that there has been no deterioration in the site condition since the Permit was issued, for example by showing that:
   - pollution prevention and containment measures have performed as required and no pollution has been caused, and/or;
   - any pollutants that have resulted from permitted activities have been removed, treated or immobilised or their effects remedied or mitigated;

c) show that pollution risks have been removed;

d) allow the Agency to determine whether to accept the application to surrender the Permit or require further information or remediation.

In preparing the SSR, operators should seek to:

- provide sufficient, relevant, reliable and unambiguous information to demonstrate that the site has not deteriorated as a result of permitted activities;

- if pollution has occurred, demonstrate that any additional pollutants have been dealt with in accordance with PPC requirements.

To assist operators in providing an appropriate type and amount of information, the Agency has prepared a reporting template for submission of the SSR (Reference 3).

1.3 Which installations does the guidance apply to?

1.3.1 Part A Installations and Mobile Plant

The guidance applies to all Part A installations and Part A mobile plant (but excluding Specified Waste Management Activities), regulated by the Agency under the PPC regime.

1.3.2 Specified Waste Management Activities (SWMAs)

The guidance is not intended to cover parts of installations where there has been permitted direct landfilling of waste materials. Separate guidance on the surrender of PPC permitted landfills has been produced by the Agency (Reference 4).

For Specified Waste Management Activities (SWMAs) in PPC, the Regulations require that the reference date for determining satisfactory state may be different from other PPC activities. The Agency is currently seeking to clarify the exact regulatory position for these activities, and this guidance should not be applied to permit surrender at such installations.

1.3.3 Installations issued with Permits under previous Agency policy

With the exception of the installations described in 1.3.2 above, the guidance applies to all Part A installations and mobile plant whether the Permit was issued before or after the Agency introduced the new policy on the implementation of SPMPs in August 2003.

For installations issued with Permits prior to August 2003, it is intended that any requirement to implement a SPMP will be based on a review of Permit conditions normally within 4 to 6 years of Permit issue.

For the purposes of this guidance, the main practical effect of the policy change relates to the form and content of the information submitted by operators as part of their application for a PPC Permit, the requirement for a SPMP and the timing of intrusive investigations where required.

Clearly information submitted for installations issued with Permits before August 2003, or where applications were in the process of determination, will not have been collected in accordance with a SPMP.

In the absence of a SPMP, operators intending to make an application to surrender a PPC Permit will need to ensure that the information available to them is sufficient to describe the reference condition of the site and to demonstrate satisfactory state and the removal of pollution risks. This is most likely to be the case where the information is based on intrusive site investigation data.

1.3.4 Non-operation of a permitted Installation

There may be circumstances in which a PPC Permit has been issued but the installation has not been operated for some reason, and the operator wishes to surrender the Permit. In these circumstances, operators should make an application to surrender the Permit in the normal way. Provided the applicant can satisfy the Agency with a statement in the surrender application that the permitted installation has not been in operation (and therefore the condition of the site has not changed from that described in the ASR) the Agency could accept the surrender application.

1.4 Purpose and scope of the guidance

This guidance has been produced to advise operators on the preparation of the SSR. It considers the ways in which information about the condition of the site occupied by an installation may have arisen and how such data should be collated, critically reviewed and incorporated into a report that meets the surrender site report requirements of the PPC regime. It covers:

- the process of preparing the SSR;
- the different types of information that may be available for use in the SSR and the circumstances in which such information may have been produced;
- how information on the condition of the site should be evaluated and used to prepare the SSR;
- how to approach the preparation of the SSR including use of the reporting template.

This guidance does not cover the decommissioning of the installation i.e. dismantling, demolition of plant, machinery and buildings. It focuses solely on the protection and restoration of land. It therefore complements and will form an integral part of the installation decommission plan.

1.5 How to use the guidance

Following this introductory section:

Section 2	Sets out the process of preparing the SSR
Section 3	Contains a brief overview of the framework for the protection of the site under the PPC regime
Section 4	Reviews the circumstances leading to the production of particular types of information on the condition of the site that may be used in the SSR
Section 5	Covers the critical evaluation of information for inclusion in the SSR
Section 6	Sets out a step-by-step approach for preparation of the SSR cross referenced to the relevant sections of the reporting template

It has been assumed that operators using this guidance are preparing the SSR at the point of definitive cessation of permitted activities, including decommissioning of the site to remove pollution risks, and before submitting an application to the Agency for the surrender of the PPC permit.

2.0 Process of Preparing the SSR

Once a decision has been made to cease operations at an installation, the operator will need to actively consider how to go about making an application for surrender of the PPC Permit and preparing the SSR. The aims are to ensure that robust information is available about the condition of the site and such information is capable of demonstrating that the site is in a satisfactory state and that pollution risks have been removed.

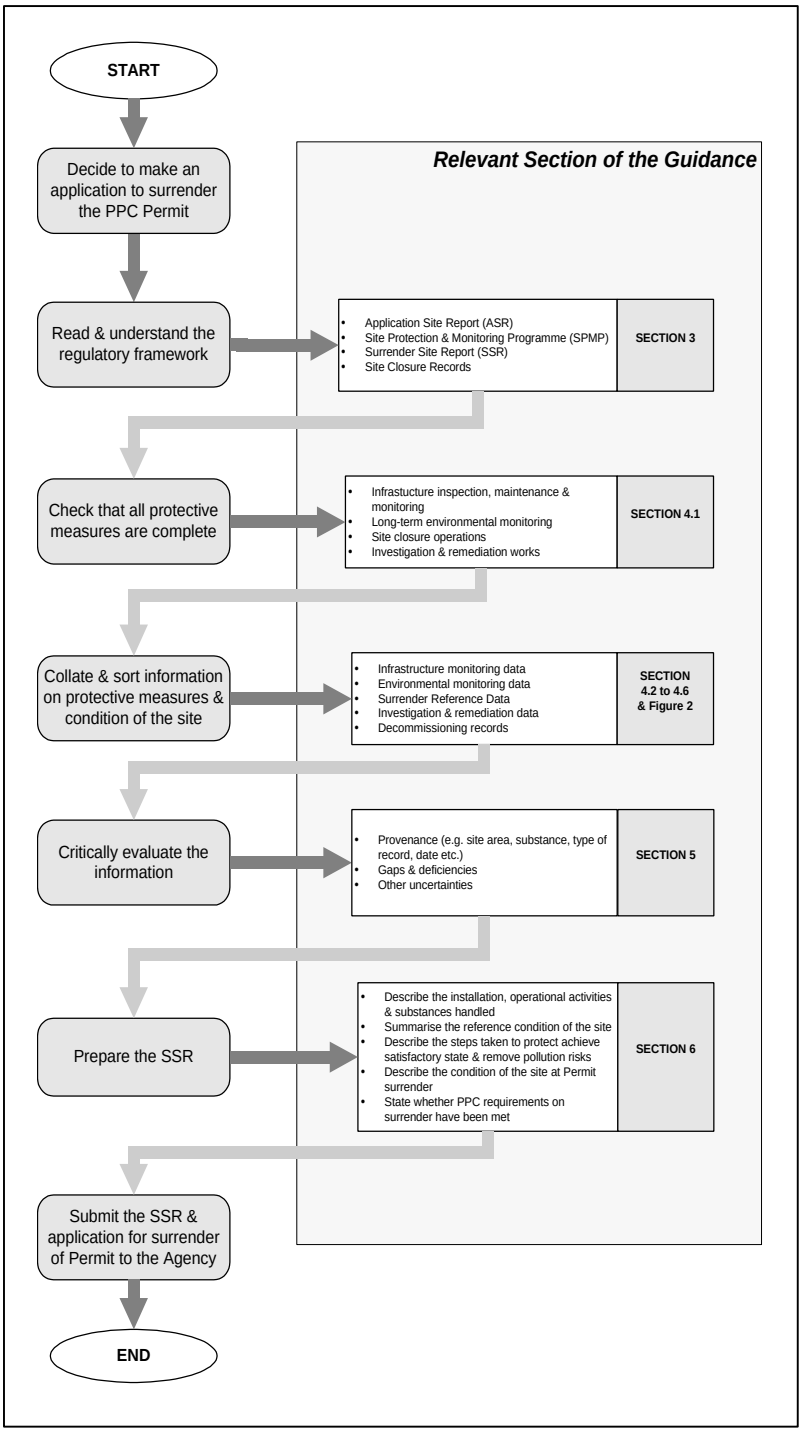
Over the life of the installation, operators will have in place measures to protect the site and will have collected information about its condition. This information is expected to include the types described in more detail in Section 4 of this guidance, all of which are relevant to the preparation of the SSR. In addition, the operator will have implemented a site closure plan and therefore will have decommissioning records that are also relevant to the SSR.

Preparing the SSR is a systematic process of:

- checking that all measures designed to protect the site are complete and fully reported;
- evaluating such reports and ensuring that they are capable of supporting operator statements about the condition of the site, and;
- presenting the information in a succinct and meaningful way, including appropriate references to all necessary supporting documentation.

Steps in the process, showing links to the various relevant sections of this guidance, are shown in Figure 1.

Figure 1: Process of Preparing an SSR



3.0 Framework for the Protection of Land under PPC

3.1 Introduction

Production of the SSR marks the final formal reporting stage in the broad framework of provisions for protecting the site that is built into the PPC regime. Some provisions reflect high level requirements on the use of appropriate pollution prevention and containment systems; others are highly specific to protection of the site itself. Of those provisions specific to the site, most are triggered at the Permit application stage (through the ASR) and some apply throughout the operational life of the installation (through SPMP implementation and reporting requirements) and site closure.

The purpose of the SSR is to provide confirmation that the quality of the site has not deteriorated as a result of permitted activities such that the Agency can accept an application for surrender of the PPC Permit with confidence. A key aim for operators therefore is to ensure that the SSR contains a robust account of the condition of the site and how it has been protected, monitored, investigated, remediated and decommissioned to achieve satisfactory state and remove pollution risks.

The following sections give a broad overview of the key elements of the PPC framework for protection of land.

3.2 Pollution prevention and containment measures

3.2.1 Application Site Report (ASR)

The PPC Regulations require the submission of a report which describes the condition of the site of the installation at the time an application is made for a PPC Permit.

The ASR is required to:

- define the environmental setting and pollution history of the installation;
- identify the substances in, on or under the site that are currently used or produced, or are likely to be used or produced in the future, by the activities covered by the Permit;
- identify the preventative measures to be used to protect the site;
- assess the effectiveness of those measures thereby providing a basis for deciding whether a SPMP should be required, and if so, what its scope should be.

Guidance to operators on the preparation of the ASR is given in Technical Guidance Note IPPC H7 (Reference 5).

3.2.2 Site Protection and Monitoring Programme (SPMP)

Purpose of the SPMP

Many operators will be required to prepare a SPMP as a condition of the PPC Permit. The SPMP will be the primary vehicle for preventing site pollution over the operating life of the installation. The SPMP should also help in identifying if and when a pollution incident does occur, and ensure that steps are taken to return the site to a satisfactory state.

The SPMP may include a requirement for sampling and monitoring of soil and groundwater conditions, but as a minimum will require records on the inspection and maintenance of plant and equipment to be held and reviewed in accordance with the PPC Permit.

The SPMP is intended:

- to ensure (as far as practicable) that pollution prevention measures are sufficient to prevent the emission of pollutants to the site;

- to maintain the effectiveness of pollution prevention measures throughout the life of the installation through adequate maintenance, inspection and testing;
- where necessary to require the collection of Reference Data for substances in use at the installation for which there is a reasonable possibility of such pollution occurring;
- where necessary, to monitor soil and/or groundwater to ensure pollution prevention measures are effective and to provide warning of the failure of such measures;
- to record the results of the above to demonstrate the site is in a satisfactory state for the purposes of surrendering a Permit.

Scope of the SPMP

The detail and scope of the SPMP will have been based on the assessment of pollution prevention measures as detailed in the ASR and will be proportionate to the risks posed by the installation. As part of the SPMP, an operator may have been required to collect Reference Data that describe the condition of the site with respect to the substances (currently or in the future) used, produced, stored or transported under a PPC Permit. In conjunction with long-term environmental monitoring data (e.g. for groundwater quality), Reference Data will be used to set the reference condition of the installation against which restoration requirements will be determined at Permit surrender stage. If pollutants attributable to permitted activities are added to the site, the aim should be to return the site back to its reference condition. Note that where Reference Data does not exist, the requirement will be to return the site to background conditions – effectively to concentrations of substances in soil and groundwater at the limit of analytical detection.

If, during the life of the installation, there is a requirement to carry out remediation following a pollution incident then the results of intrusive investigations, assessment of pollution and remediation activities should be reported through the SPMP reporting provisions but the Reference Data must not be amended.

The questions of whether the Agency will require a SPMP, and what its scope will be, depends on which of the following circumstances will apply at any individual installation:

Minimal pollution potential

In exceptional circumstances, there may be installations where the possibility of pollution is so small, even if controls fail, that protection of the site will be achieved through other conditions of the Permit, e.g. Environmental Management System (EMS) operating procedures and inspection requirements. In these circumstances, there may have been no requirement to produce an SPMP.

Little likelihood of pollution or leaks to site during the life of the installation

In this case, the SPMP may have required only an inspection, maintenance and monitoring programme to ensure that pollution prevention measures are maintained and continue to be effective. The SPMP may have complemented EMS protocols and procedures but is likely to have included specific requirements for maintaining records, verifying inspections and reporting compliance to the Agency.

Reasonable possibility of current or future pollution of the site from the installation

In these cases, the SPMP will have included a requirement to establish Reference Data for those parts of the site where there is a reasonable possibility of current or future pollution. Long term environmental monitoring (for example for groundwater quality or in relation to ground gases) may have been required where there was also a potential for on-going pollution.

Note that whilst environmental monitoring data may have been obtained during the operational life of the installation in accordance with the SPMP, it is predominantly against the Reference Data that the installation will be judged at the time of surrender to determine satisfactory state.

Pollution has occurred during the operational life of the installation

The PPC Regulations require operators to supply the Agency regularly with monitoring data and to inform the Agency, without delay, of any incident or accident that is causing or may cause significant pollution.

In the event of a pollution incident, a course of action to remediate the site to a satisfactory state will have been agreed with the Agency. If there was little potential for harm, it may have been agreed that the pollution could be left in situ to be addressed once permitted activities ceased (deferred remediation action). In any event, the SPMP will be updated to address the pollution incident; but not the ASR or the Reference Data which, once set, must not be altered over the operating life of the installation.

Further guidance on the preparation of the SPMP can be found in Technical Guidance Note, IPPC H7 (Reference 5).

3.3 Surrender Site Report

The basic aim of the SSR is to demonstrate at the time an application is made for the surrender of a PPC permit that the site (or part of the site) is in a satisfactory state and that pollution risks have been removed. That is, no pollution attributable to permitted activities has occurred or, if pollution has occurred, that the site has been remediated to bring it back into a satisfactory state. The SSR is expected to draw heavily on the Reference Data and various inspection, monitoring, site investigation, remediation and decommissioning records prepared by the operator.

At Permit surrender, the task for the operator is to critically review, collate and present this information in a form that supports robust statements about the condition of the site.

It is likely that if an appropriate SPMP has been agreed with the Agency at the time the Permit was issued, and the programme has been complied with, at the Permit surrender stage there will have been no deterioration in the condition of the site attributable to permitted activities. Satisfactory state will have been achieved and pollution risks removed, and Permit surrender should be straightforward.

Typically, operators will rely on the following types of documentation to prepare the SSR:

a) The ASR for the installation.
b) Records and reports produced through the SPMP, that is:
   - all relevant infrastructure inspection, maintenance and monitoring records;
   - long-term environmental monitoring data;
   - Reference Data (established at the time of issue of the PPC Permit and upon cessation of permitted activities);
   - information on pollution incidents (e.g. site investigation and remediation reports for incidents dealt with at the time and on a deferred basis).
c) Site closure plan and associated records for the installation.
d) Information (including site investigation and remediation reports where appropriate) for the site where decommissioning operations have been carried out.
e) Other information that the operator wishes to supply to the Agency, provided it is relevant to demonstrating satisfactory state and the removal of pollution risks. Such data might include the output of a defensive monitoring programme or work carried out to support a liability assessment.

4.0 Data collection and Collating Records

4.1 Checking protective measures are complete

Before beginning the process of preparing the SSR, operators will need to check that:

- All relevant infrastructure inspection, maintenance and monitoring records are complete.
- Any pollution that has arisen due to gaps in the inspection, maintenance and monitoring record (e.g. where a containment failure has been overlooked and pollution has occurred) has been investigated, assessed and remediated where appropriate.
- Any other evidence (for example from long term environmental monitoring) of a failure in pollution prevention measures has been further investigated, assessed and remediated where necessary.
- Any pollution that has occurred as a result of permitted activities (as evidenced for example by a comparison between Reference Data collected at the time of Permit issue, and data subsequently collected on cessation of activities) has been remedied.
- The investigation and remediation of pollution incidents (i.e. those dealt with at the time and deferred incidents) are complete.
- All relevant site closure/decommissioning activities to remove pollution risks (e.g. emptying/cleaning of process plant, tanks, sumps etc.) are complete.
- Areas of site that may have been adversely affected by decommissioning operations or were previously inaccessible and may have been polluted through permitted activities, have been investigated and remediated where necessary.

Assuming these activities are complete, and depending on the scope of the SPMP, the operator should have a range of data on the condition of the site occupied by the installation as shown in Figure 2. Note that for some installations, only one type of data may be available; for example, an installation may have relied entirely on infrastructure monitoring records. For others, data of all types may be available for different parts or zones of the site (see Box 1).

Box 1: Example of different data sets for a single installation

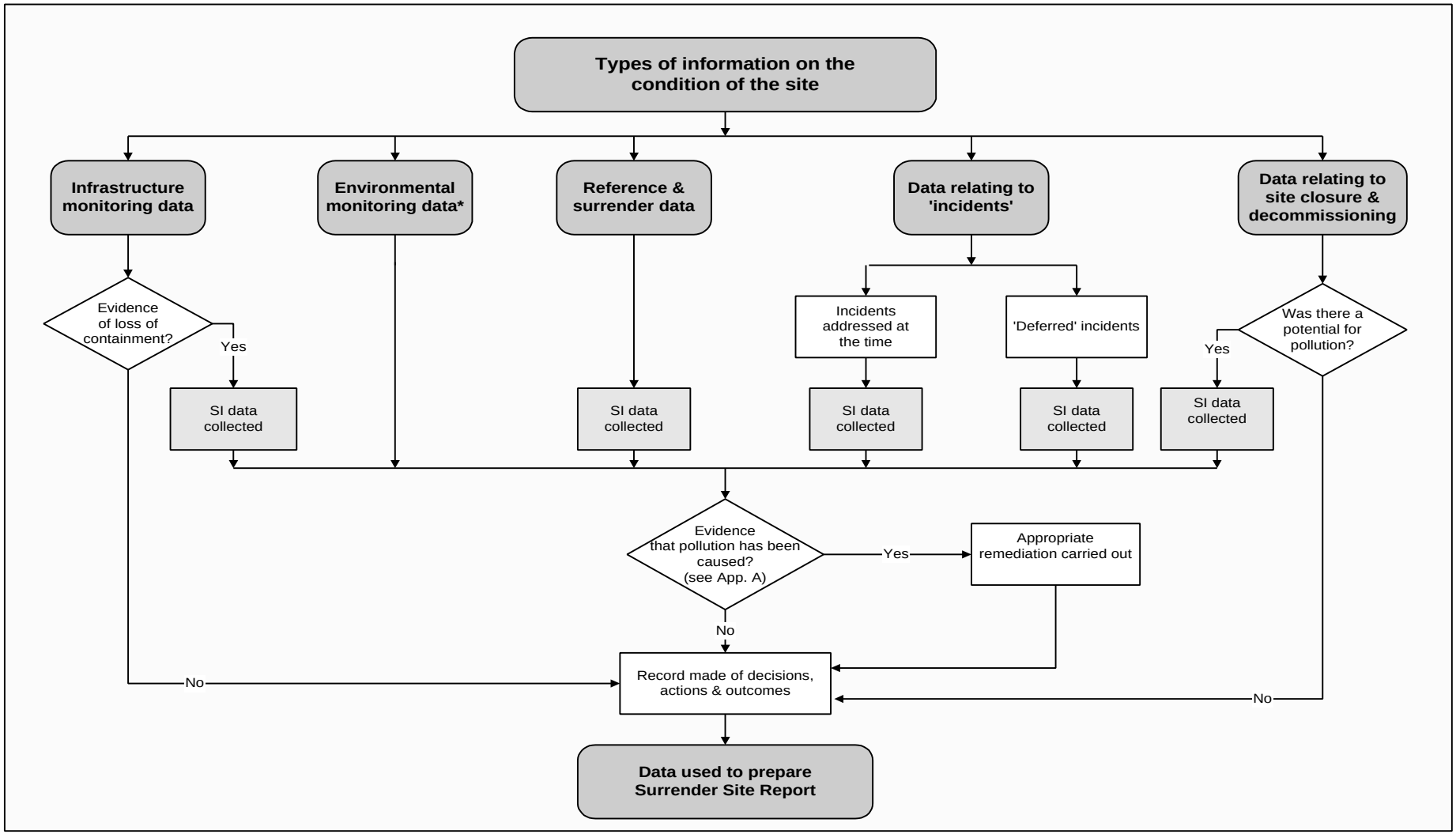
The operator has various types of information on the condition of site in each of the following zones:

Production Zone (all above ground tanks, vessels and pipework):
- infrastructure monitoring records for operational period
- upstream and downstream groundwater quality monitoring data in accordance with the SPMP
- Reference Data (in ASR and following decommissioning of the plant)

Product Storage Zone
- Reference Data (in ASR and on cessation of permitted operations)

Fuel Storage Zone
- Site investigation and remediation (including verification) records for a fuel spill dealt with at the time it was identified

Figure 2: Information on the condition of the site used to prepare the Surrender Site Report



*** Including any other data voluntarily collected by the operator that are relevant to the preparation of the SSR**

The following sections of the guidance discuss in more detail the circumstances that will have given rise to different data sets, all of which have a role to play in the preparation of the SSR. In considering the different types, it is worth highlighting two key issues that operators should have been bearing in mind when collecting information about the condition of the site and deciding what, if any, further action should be taken in response to that information.

1. When carrying out *any* site investigation, sampling and analysis to obtain factual information on the condition of the site, operators will have aimed to ensure the data were technically robust and reliable in line with the quality assurance/quality control (QA/QC) requirements set out in the H7 documentation. The H7 guidance covers Reference Data and long-term environmental monitoring data, as well as information generated in relation to pollution incidents and remediation. Important issues for consideration under QA/QC plans are:

    - the rationale for the investigation and any constraints that may apply to its design or execution;
    - the density/frequency of sampling locations and depths;
    - the timing (including duration) of sampling and on-site testing;
    - the methods used to carry out on-site testing and monitoring;
    - the techniques used to collect, preserve, handle, store, ship (where laboratory analysis carried out off-site) and prepare samples for laboratory analysis;
    - the methods used to carry out laboratory analysis (noting that from September 2004, soil analysis data that do not conform to the Agency's Monitoring Certification Scheme (MCERTS) will not be acceptable for regulatory purposes);
    - the processing (e.g. statistical analysis) of data for interpretation and reporting purposes;
    - the technical competence of individuals/companies involved in sampling, testing, analysis, data interpretation and reporting activities.

2. In some cases, operators will have had to respond to particular site investigation findings especially where they have shown pollution has been caused. Common questions that operators will have regularly faced therefore are *'what constitutes pollution?'* and *'when can remediation be enforced via the PPC regime?'* These questions are considered in more detail in Appendix A of this guidance.

4.2 Infrastructure monitoring data

When preparing the SPMP, the operator will have prepared a written scheme describing how techniques relied on for the protection of the site are to be inspected, maintained and monitored. A methodology for preparing this written scheme is given in Technical Guidance Note IPPC H7. During the operating life of the installation it is likely that the scheme will be maintained, reviewed and updated in accordance with EMS or other procedures. For those companies that have a certified EMS (e.g. to the ISO 14001 standard on environmental management) the SPMP is likely to be subject to third party review (i.e. by the certification body) giving additional assurance to the Agency on the robustness of the data collection processes.

IPPC H7 guidance provides the methodology for the preparation of the SPMP. The operator is systematically led through the process of considering the potential for pollution and assessing the adequacy of containment measures. During operation of the installation, it is to be expected that the tables will be up-dated with the outcome of inspection, maintenance and monitoring and that action will have to be taken in response to any evidence of a containment failure.

On site closure, the operator must review the SPMP data on infrastructure monitoring to ensure it is capable of demonstrating that the integrity of containment systems has been maintained over the life of the installation.

If adequate records are not available, and there is reasonable doubt about the integrity of containment measures, then the operator should have collected intrusive site investigation data and carried out remediation (to achieve satisfactory state) where necessary (see Box 2).

In preparation for the SSR therefore, the operator will have:

1. Confirmed that inspection/ maintenance records are available to verify that the infrastructure monitoring programme was maintained in accordance with the SPMP, and/or;

2. Carried out intrusive investigation and remediation, where necessary, if adequate inspection records were not available.

Box 2: Example of infrastructure monitoring

A sub-surface drain carries a hazardous wastewater from the production plant to an adjacent effluent treatment plant. The SPMP has identified that there is a "reasonable possibility of pollution" if the drain is damaged or fails due to age or lack of maintenance and it has therefore been agreed with the Agency that drain integrity will be monitored by annual CCTV inspections.

Upon cessation of permitted activities, the SPMP is reviewed and as CCTV inspection reports for the drain are available then the PPC permit conditions have been complied with and no further action is required. Had CCTV reports not been available (even though the inspection had taken place) then the operator would need to consider how the integrity of the drain can be verified.

If it can be demonstrated from planned preventative maintenance records that the drain has not, over its life, needed to be repaired, then a final CCTV inspection may be adequate to demonstrate the integrity of the drain. However, if records indicate that the drain was at some point repaired it can be anticipated that prior to repair there was leakage of effluent to site and an intrusive investigation would be required to establish whether or not pollution had occurred.

Once the operator has assembled an adequate basis for demonstrating that the site is in a satisfactory state using infrastructure monitoring data (supported where necessary by intrusive site investigation and remediation works and records), this element of the information base for the SSR can be considered complete.

4.3 Long term environmental monitoring data

Where there was a potential for on-going pollution, the SPMP will have required the operator to collect long term environmental monitoring data to establish trends in the quality of the land. Operators may have also carried out environmental monitoring on a voluntary basis; for example to comply with corporate environmental policies or for defensive reasons. A typical application is the use of permanent groundwater quality monitoring wells to determine the concentration of dissolved substances in groundwater beneath the installation over time. Such monitoring networks perform a number of key functions, particularly where direct access to the site beneath an installation is not possible because of the presence of operational plant and equipment. For example, they can help to:

- determine the reference condition of the site (for example with regard to water quality) particularly where pollutants are present that pre-date the issue of the PPC Permit;

- identify failures in pollution prevention and containment measures - for example losses from small fractures or holes in sub-surface pipework that are difficult to pinpoint using visual or other means (e.g. CCTV); or losses from the bases of underground tanks that cannot be directly observed or tested; quantify seasonal variations in groundwater quality due to factors other than permitted activities;

- quantify the contribution to pollutants in the site from external sources, such as neighbouring industrial processes (see Box 3).

If used as intended, environmental monitoring data may have triggered further site investigation and assessment of pollution sources, for example in relation to:

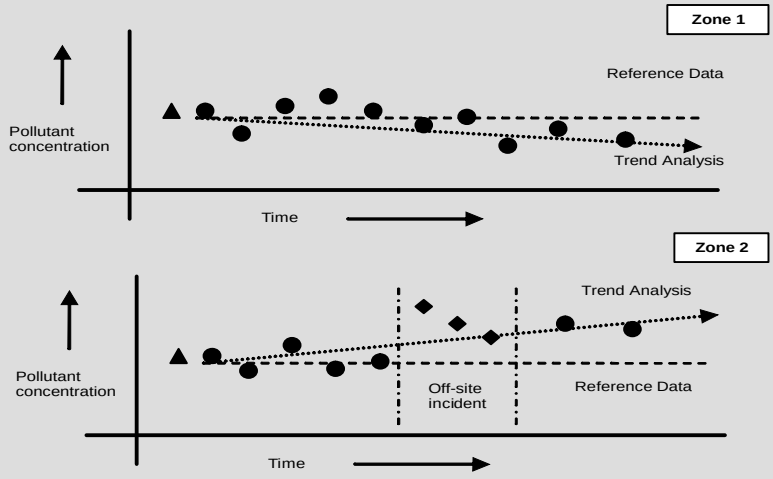
- failing components in a containment system on the site;
- increased levels over time or against reference levels;
- the migration of pollutants onto the site from external sources;
- unexplained historical sources of pollution that were not known about at the time the ASR was prepared.

In some cases, monitoring data may have lead to remediation and verification reports because it can be shown that pollution was attributable to permitted operations. All of this information is important in the preparation of the SSR and needs to be taken into account.

Box 3: Example of use of long-term groundwater quality monitoring data

For the purposes of the SPMP, Reference Data were collected from two zones on the installation where pollution risk was considered high due to the nature of the production activities. In addition, a programme of quarterly monitoring of groundwater quality was established for both zones.

The operator reviewed the analytical data and plotted the groundwater quality data for both zones to permit comparison with Reference Data.



During the course of monitoring in Zone 2, a sudden increase in pollutant concentrations was noted. Investigation established that the source was an incident on a neighbouring site and that the pollution had migrated in groundwater from the source to beneath the site of the installation. When preparing the SSR, the operator will use the monitoring data collected for Zone 2, as well as all available records of the pollution incident and any associated remediation, to demonstrate that the permitted installation has not contributed pollution of the site.

4.4 Reference and Surrender Data

Reference Data for the site of the installation should have been submitted to the Agency within a specified period of issue of the PPC Permit. The data may have been based on actual measurement of the substances in soils and groundwater or by reference to literature sources on background concentrations of substances (see Technical Guidance Note IPPC H7). These data set the reference condition of the site against which restoration requirements to achieve satisfactory state will have been decided.

To judge whether the site is in a satisfactory state, a second set of reference data, Surrender Data, will have been collected for the relevant parts of the site occupied by the installation. Depending on when and where Surrender Data were collected, they may serve the added purpose of showing that the site closure/decommissioning operations carried out in accordance with the site closure plan have not adversely affected the condition of the site. Note that the site investigation and analysis activities used to collect Surrender Data should have been subject to the same (or better) QA/QC standards than applied to the collection of other types of information about the condition of the site (see Section 4.1).

Operators will have compared the Surrender Data with the Reference Data established as part of the SPMP and come to decision about whether or not pollution has occurred (see Appendix A).

If there is evidence that pollution attributable to permitted activities has occurred, the operator will have carried out remediation to achieve satisfactory state. Therefore, the full set of information for this part of the site will include:

- Reference Data collected as part of the SPMP (data based on SI or literature sources)
- Surrender Data based on intrusive site investigation collected on cessation of permitted activities, including decommissioning where relevant
- Any additional site investigation reports to support remediation design (for example to fully delineate affected areas or support remediation design)
- Remediation reports
- Verification records to demonstrate that remediation objectives have been achieved.

Box 4: Example of information collected in relation to a deferred pollution incident

A sub-surface pipe carries heavy fuel oil from bulk storage to a combustion plant. The pipe had been laid in a concrete inspection channel but routine pipeline maintenance discovered that an oil leak had seeped through an expansion joint in the concrete causing pollution of the underlying land. Subsequent investigation established that the oil had spread under the production building but was contained by the clay strata underlying the site. In discussion with the Environment Agency it was agreed that the oil was not presenting a risk to human health or the environment. Also, as removing the oil would be impracticable without severe disruption to production, it was agreed to decommission the oil line and to defer remediation until site closure. To ensure appropriate records of the incident were maintained, the 'site closure plan' was updated with the agreed actions and proposed remediation strategy.

4.5 Information on pollution incidents

Despite the controls exercised by the operator, incidents that cause pollution of the site may have occurred during the operation of the installation. Ideally, the operator will have dealt with the incident at the time it occurred. In other cases, although pollutants may have been added to the site, the operator may have obtained the agreement of the Agency to defer remediation works until permitted activities have ceased (see Box 4).

In each case, however, the operator will have gone through the same process of:

- identifying and characterising the incident;
- assessing the effect of the incident on the condition of the site;
- deciding (in consultation with the Agency) whether pollution has occurred and, if so, the nature and timing of remediation;
- undertaking remediation works and demonstrating that they have achieved remediation objectives and hence been effective in achieving satisfactory state.

As before, this process will have generated site investigation, remediation and verification information about the condition of the site all of which must be taken into account when preparing the SSR.

4.6 Information on decommissioned areas

Operators will have set out the details of any decommissioning operations carried out in connection with the installation in their site closure plans. Decommissioning (see Box 5) is important for the SSR because it:

- plays a major role in the removal of pollution risks as required by the PPC regime;
- represents an important potential source of soil and groundwater pollution if not properly planned and managed, particularly if pre-demolition checks are not made.

Box 5: What is meant by "decommissioning"?

Decommissioning may take many forms, but is primarily concerned with taking a production plant (or part of a plant) out of active service. As a minimum, all process chemicals or other hazardous materials must be safely removed and appropriately disposed of. This will include raw materials in drum, bulk storage and process vessels. It may also include the cleaning of pits, sumps, bunds and drains and the removal of any hazardous substances used in the engineering of the installation e.g. asbestos.

It is possible that a Permit is surrendered following a change of use of the installation. For example, if an installation is permitted under Section 4.2, Part A(1)d to use lead compounds and at some point the process is improved and lead compounds are no longer used, then the PPC Permit can be surrendered. However, the plant must be decommissioned with respect to the removal and safe disposal of all lead compounds, and the SSR report submitted to the Agency must demonstrate that pollution did not occur while lead was used in the process.

At cessation of permitted activities, a wide range of potential pollution sources may be present at the installation in the form of reagents, intermediates, products and wastes contained in tanks, pipework, vessels, pits, sumps, drums, IBCs, flues and other exhaust and ventilation systems. Hazardous materials that form an integral part of the installation itself may also be present. Examples include asbestos lagging associated with boilers, and dielectric fluids (such as polychlorinated biphenyls) in electrical equipment, such as capacitors and transformers. All of these potential sources may need to be removed using appropriate methods (Reference 6) before the operator can demonstrate that pollution risks have been removed as required under PPC.

Some decommissioning operations may pose relatively little risk to the land, e.g. overpackaging drums in a dedicated and sealed enclosure; some may pose greater risks, such as emptying sub-surface tanks and pipelines. Decommissioning may lead to accidental emissions to land and it may have other implications. For example, removing process plant and equipment may mean there is greater access to parts of the site that may have been polluted as a result of permitted activities but could not be characterised previously because of the presence of operational plant.

When carrying out decommissioning works, therefore, it is expected that operators will have taken into account both the direct impacts on site as well as the opportunities that decommissioning creates to better characterise previously inaccessible land (see Box 6).

Operators may have established Reference Data using intrusive site investigation and analysis of samples of soil and groundwater. As a result of access difficulties, they may have relied on literature

Box 6: Example of information collected in decommissioned areas

A large reactor forming part of the installation is located on a concrete pad. It is likely that substances used in the installation are present beneath the pad as a result of operations that preceded the issue of the PPC Permit. The land beneath the pad was not accessible for the collection of intrusive site investigation data as part of the SPMP, and the operator defined the reference condition of this part of the site on the basis of data obtained for other parts of the installation where the same substances had been used. (1)

The engineering standard used in the construction of the pad was fairly dated and the operator relied on periodic visual inspection to monitor its condition.

Groundwater monitoring wells are located in the vicinity of the vessel but these are unlikely to detect any evidence of losses as the concrete pad will have itself inhibited leaching of any substances that may have been emitted. However, the material may pose a pollution threat when the slab is removed in the future because rainwater infiltration will occur.

Once the process plant was decommissioned, the operator collected samples of soil and groundwater from beneath the pad to compare with Reference Data and to judge whether the site had deteriorated as a result of permitted activities.

Note (1) *Operators need to be aware that once Reference Data have been set they cannot subsequently be amended on the grounds, for example, that 'more' of the substance found to be present in the ground at Permit surrender stage was derived from historical sources than was assumed to be the case when Reference Data were established*

sources or data on the condition of soil and groundwater collected in other representative parts of the site, to define the reference condition of the site in inaccessible locations. In each case, however, operators should compare the Reference Data obtained with Surrender Data obtained from intrusive site investigation and analysis once decommissioning operations are complete, to judge whether pollution has occurred and remediation is required.

As before, the reports and records arising out of decommissioning operations, including any associated site investigation, assessment and remediation records for these areas, should be taken into account in the preparation of the SSR.

5.0 Evaluating Data for Inclusion in the SSR

Depending on the nature and operational history of an installation, information of the type described in Section 4 of this guidance may be available for periods perhaps spanning many decades. It is to be expected that information will be scrutinised both by operators and the Agency as it becomes available: for example, as the ASR and Reference Data are produced, as reporting proceeds under the SPMP, and in relation to pollution incidents.

Inevitably, however, changes will occur in the way in which information is collected, presented and stored, and responsibilities for protecting land quality and enforcing PPC requirements will pass to different people within the operator's organisation and the Agency respectively. This means that it is essential that operators maintain a systematic and secure system for managing information on site conditions that allows easy retrieval and review of individual records.

A key requirement of the SPMP is the design of an Information and Data Management and Reporting Programme that will ensure information on the condition of the site:

- is easy to understand and has a clear provenance (e.g. there should be no ambiguity about what part of the site is the subject of a record or report, or about how the information was collected and used);
- can be easily interrogated (for example to retrieve a particular report or record, or information relating to a particular time period);
- is easy to maintain and update;
- is amenable to data quality checks (e.g. to check completeness or consistency of record keeping).

One of the advantages of establishing such a programme, and assuming it includes a means of identifying individual records and summary information, is that it should allow operators to identify and scrutinise key extracts from particular records or reports for use in the SSR.

Thus the intention is not that the SSR should include all the technical underpinning information that is relevant to the condition of the site – it should contain only that which is needed to produce a defensible account of the steps taken to achieve satisfactory state and removal of pollution risks, and the condition of the site at permit surrender. All such summary information should be cross-referenced as required to supporting information.

To ensure that the account produced in the SSR is defensible, operators will need to check the quality, consistency and completeness of their information sources. Table 1 contains a checklist of items that may assist this process; Table 2 gives examples of the type of record that may be available and how individual items should cross refer to specific locations on the installation, and to timing and methods of data collection and other associated records.

Table 1: Checklist of items for evaluation of information on site condition

1. Do individual records have an ID that allows them to be cross referenced to (see examples in Table 2):	• Individual parts of the site/installation & site plan? • Substances in a particular location? • a data collection date? • a type of record? • a measurement or testing protocol? • an outcome? • an associated record or report?
2. Are there gaps or deficiencies in the information?	• In the duration or frequency of testing/measurement • number or type of sample collected • type or amount of material treated or removed during remediation • in the testing, measurement or remediation methods used • in terms of actions taken in response to findings
3. Are there any other uncertainties?	• In relation to integrity or quality of data • in terms of competence of measurement or reporting or other factors

Table 2: Examples of the type of record that may be available in any particular case

	Type of Record		
	Infrastructure Monitoring Data	**Site Investigation Data[1]**	**Remediation Data**
1. Do individual records have ID information that cross-references them to:			
a) Individual parts of the installation or site and an accurate site plan?	• Tank or vessel in Zone A • Pipework in Zone B • Bund in Zone B	• Soil (0-3m below ground level) & groundwater in Zone C • Fill/natural ground (0-0.5m below ground level) & groundwater in Zone D • Soil Vapours (within 1m of surface) in Zone D	• Fill/natural ground (0-1m below ground level) in Zone C • Groundwater in Zone D
b) A substance/ substances in a specified location	• Lead compounds x, y, z in superficial soils (0-0.5m) associated with Tank P2	• Benzene in groundwater in Zones A & B • C_{10} – C_{16} aliphatic hydrocarbons in soil (0-3m below ground level) in Zone D	• Naphthalene & zinc in fill/natural ground (0-0.5m below ground level) in Zone A • Trichloroethylene in groundwater in Zone A, B and C
c) A data collection date	• Annually 2000 – 2010	• Nov – Dec 2002	• April 2003
d) A type of record	• Visual inspection • Pressure test • CCTV survey	• Results of long term environmental monitoring of groundwater quality • Investigations to obtain reference data • Data relating to decommissioning	• Remediation of pollution incident • Remediation related to decommissioned area
e) A measurement or testing protocol or method of working	• British Standard • Documented in-house • Manufacturer's recommendation	• British Standard • Other published method • Documented in-house	• Documented specification • Documented method statement
f) An outcome	• Test passed, failed, repeated • Repair or replacement of equipment • Further action to investigate site in the vicinity	• Evidence of pollution of x, y, z substances from permitted activities • No change in condition • Pollution due to 'other factors'	• Further remediation • Further monitoring of effectiveness of remediation • Confirmation of satisfactory state
g) Associated records or reports	• A related test report • A repair log • Site investigation report	• Further investigation reports • Remediation reports	• Additional remediation reports • On-going monitoring reports • Remediation verification report

[1] Including environmental monitoring data, Reference & Surrender Data, data on pollution incidents & data relating to decommissioned areas

A key aim when evaluating the data is to show that the data sets relating to particular parts of the installation are complete. For example, the operator may need to locate a number of records to show how land in a particular part of an installation has been protected to justify a claim of satisfactory state (see Box 7).

Records and reports should be internally consistent. For example, it might be expected that downstream groundwater monitoring wells in one zone should reflect upstream conditions in a neighbouring zone, and that operators will check that concentration data for substances in the two zones confirm the anticipated relationship.

Operators may wish to consider other factors, but the information provided in the SSR must be sufficiently robust to demonstrate to the satisfaction of the Agency that permitted activities have not given rise to pollution and that pollution risks have been removed. Clearly operators can best assist the process of Permit surrender by providing as complete a picture as possible of the condition of the site so reducing the need for submission of further more, detailed information and clarification at the request of the Agency

Box 7: Example of how related records may be needed to prepare the SSR

A site has a PPC Permit under Section 4.3, Part A(1) of the regulations for the surface treatment of metals. The installation comprises various acid pickling and chemical treatment baths for preparing the surface of metal components for painting.

The treatment tanks are mounted above a spill containment sump, which is of concrete construction and lined with an acid/chemical resistant plastic. The sump is readily accessible for inspection, which is undertaken as part of the planned preventative maintenance (PPM) programme. Raw materials and wastes are stored within a concrete bunded area, which is also regularly inspected under the PPM programme. However, a sub-surface drain carries a hazardous wastewater from the production plant to an adjacent effluent treatment plant. The SPMP has identified that there is a "reasonable possibility of pollution" if the drain is damaged and it has therefore been agreed with the Agency that drain integrity will be monitored by annual CCTV inspections. All inspections of the installation and any maintenance undertaken are recorded with details regularly submitted to the Agency as specified in the SPMP.

Prior to site closure and preparation of the SSR, the operator reviews the SPMP along with the inspection and maintenance records for the installation. The operator locates:

- the infrastructure monitoring reports which indicate that there has been no damage to the treatment tank sump or its lining over the life of the installation, and:
- an additional record on reassurance testing in this area which shows that the plastic lining was removed and the concrete sump inspected for acid/chemical attack.

As the sump was found to be secure, the operator adds a comment to the SSR stating that there was no loss of containment and therefore that the risk of pollution was minimal.

6.0 Preparing the SSR and Using the Template

6.1 Method of approach

The SSR is required to:

- provide an account of the steps taken to ensure that the site of an installation is in a satisfactory state and pollution risks have been removed, and;
- describe the condition of the site of the installation at the time of Permit surrender.

A methodology for preparing the SSR is set out below.

Step 1. Describe the installation by reference to an appropriate plan(s) that clearly shows all relevant features and zones

1.1 Prepare a plan of the installation (preferably 1:1250) that shows the relevant features and confirm its boundary with reference to the Application Site Report. Ensure boundary details are clearly marked and that the plan shows the locations of key features of the installation.

1.2 Identify on the plan, or cross-referenced subordinate plans, the location and extent of any zones established to define particular sub-areas of the installation, and associated land, with reference to the Application Site Report. Clearly mark any changes or variations to zoning arrangements that have occurred over the lifetime of the Permit.

1.3 Identify on the plan any operational changes that have occurred over the lifetime of the Permit (e.g. changes to raw material and waste storage areas, production plant, alterations to site drainage system etc.). List the changes first by zone and then by chronology.

Step 2. Describe the operational activities undertaken at the Installation

2.1 Describe the operational activities undertaken at the site, particularly those that may have posed risks to the site of the installation because of the nature of the activities carried out and the substances handled. Separate this description into zones where necessary.

Step 3. Describe the substances handled at the installation

3.1 List the potentially polluting substances handled on the site, including approximate volumes and environmental properties. Identify any changes to the types of substance handled over the lifetime of the Permit. Cross-reference the locations of substances used with the relevant plans and zones.

Step 4. Describe the Reference Condition

4.1. Provide a summary of the condition of the land at the Permit application stage. This may summarise the Application Site Report, or the first phase Site Protection and Monitoring Programme, but it must be sufficient to properly describe the reference condition of the land before the Permit was issued. Cross-reference information presented in plans, and describe zone by zone.

Step 5. Describe the steps taken to ensure satisfactory state and removal of pollution risks

5.1 **Schedule of steps** - for the site as a whole, and by reference to specific zones where appropriate, itemise the steps taken to ensure that the site is in a satisfactory state and that pollution risks have been removed. For each step, indicate the date during which the activity was carried out. The information may be taken from a review of the Site Protection and Monitoring Programme, if one is available. For ease of reference, tabulate the steps making reference to such measures as site investigation, sampling, remediation, infrastructure monitoring, environmental monitoring etc.

Under each of the following headings, provide further detail on each of the activities carried out on the site or within individual zones.

5.2 **Infrastructure monitoring records** - summarise infrastructure monitoring records taken from the Planned Preventative Maintenance (PPM) or Site Protection and Monitoring Programme. Comment on the outcome of such monitoring and whether there are any gaps in the records. Provide details of where the records are kept. Describe any implications arising from the findings of infrastructure monitoring for the collection of Surrender Data (see 5.7).

5.3 **Environmental monitoring data** - present a summary of any environmental monitoring data carried out. Long-term data are best presented graphically. Describe any implications arising from long-term monitoring data for the collection of Surrender Data (see 5.7).

5.4 **Pollution incidents** - list, in date order, pollution incidents that had an impact on the condition of the site and were notified to the Agency. Describe the outcome of any investigation and remediation activities and include details of the rationale for carrying out (or not carrying out) remediation in each case. Describe any data associated with remediation works that were collected in the form of Surrender Data (see 5.7).

5.5 **Site closure operations -** describe the steps taken to remove pollution risks during site closure. Refer to the Site Closure Plan. Describe any implications of site closure operations on the collection of Surrender Data (see 5.7).

5.6 **Decommissioned areas -** where areas of the site have been decommissioned, particularly where they have hitherto been inaccessible for inspection or sampling, describe what steps have been taken to determine the quality of the site, for example in process areas formerly under hard-standing or under bunds and around underground storage tanks etc. Describe the implications of decommissioning operations on the collection of Surrender Data (see 5.7).

5.7 **Surrender Data** – Describe the intrusive investigation, testing and sampling carried out to obtain Surrender Data for the site or individual zones together with the outcome of such investigation, testing and sampling.

5.8 **Schedule of reports** - provide a schedule of the reports referred to in the steps above. Include title, author, date, reference and location.

Step 6. Describe the condition of the site at Permit surrender

6.1 For the site as a whole, and by reference to specific zones where appropriate, describe the condition of the site at Permit surrender by summarising the information contained in reports and records prepared under the SPMP and in relation to other site protection activities. Highlight any areas where the condition of the land has been achieved through remediation activities. Highlight any areas where elevated levels of pollutants have been detected but no remediation under PPC has been carried out and the reasons why. Ascribe a level of confidence to the information sources used to

describe site condition. Cross-reference the descriptions provided to the relevant supporting documents.

6.2 Justify the description of the condition of the site given in Section 6.1 by describing the process by which data relevant to the condition of the site have been collated, reviewed and summarised. Highlight any gaps, discontinuities or uncertainties in the documentary record and explain how they have been allowed for in the description of the condition of the site.

Step 7. Statement of satisfactory state

7.1 On the basis of the information provided, provide a statement (by zone where appropriate) on whether the condition of the site meets the PPC requirements of 'satisfactory state' and 'removal of pollution risks'.

6.2 Using the Template

The Agency has developed a reporting template to facilitate the completion of the SSR (Reference 3). For ease of reference this uses a numbering system that is consistent with that used for the methodology set out in Section 6.1 above.

Operators should answer the initial screening questions to facilitate rapid determination of the surrender application.

References

1. *Pollution Prevention and Control (England and Wales) Regulations*, 2000, SI 2000 No. 1973

2. Defra, *Integrated Pollution Prevention and Control: A Practical Guide,* Edition 3, April 2004

3. Environment Agency IPPC H8 Surrender Site Report Template

4. Environment Agency PPC landfill surrender policy under development

5. Environment Agency, *Integrated Pollution Prevention and Control (IPPC), Guidance on the Protection of Land under the PPC Regime: Application Site Report and Site Protection and Monitoring Programme*, Technical Guidance Note IPPC H7, August 2003

6. CIRIA, *Decommissioning, decontamination and demolition*, Volume II in: Remedial Treatment for Contaminated Land, SP102, 1995

Glossary

Application Site Report (ASR)	A report on the condition of land at the time an application is made for permission to operate an installation or mobile plant.
Containment	In the context of pollution prevention, a physical structure (e.g. vessel or bund) or barrier (e.g. a concrete hardstanding) used to contain substances used in the installation and to prevent their uncontrolled emission into the environment.
Decommissioning	The process of taking a production plant (or part of a plant) out of active service. It may include the removal and appropriate disposal of process chemicals and other hazardous materials and cleaning of plant such as tanks, pits, sumps and drains.
Emergency Monitoring Plan	A formally agreed, quality assured and quality controlled plan for environmental monitoring at an installation following a release of polluting substances to land, or the identification of pollution during the routine environmental monitoring programme. The aim of the plan is to identify the source of the pollution, characterise the extent of the pollution and to collect data to facilitate any necessary remediation to return the site to a satisfactory state.
Emission	In relation to Part A installations, the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in an installation into the air, water or land. In relation to Part A mobile plant, the direct or indirect release of substances, vibrations, heat or noise from the mobile plant into the air, water or land.
Environmental Management System (EMS)	A documented structure that allows for the monitoring and assessment of environmental impact with the objective of continuously improving environmental performance.
Environmental Monitoring Programme	A formally agreed, quality assured and quality controlled programme of monitoring of land and / or groundwater during the operation of a PPC Permit.
MCERTS	Environment Agency's Monitoring Certification Scheme
Infrastructure Monitoring Programme	A formally agreed, quality assured and quality controlled programme of testing, inspection and maintenance of plant and pollution prevention infrastructure to demonstrate continued integrity and performance to design criteria.
Monitoring Programme	A formally agreed, quality assured and quality controlled programme combining Environmental and Infrastructure Monitoring Programmes.
Operation	The combination of a substance (and its properties), the containment measures used to hold it and related operations (e.g. filling of a storage tank from a road tanker).
Operational Group	A group of related operations involving the handling of a substance that collectively comprise a complete stage in a production process or service activity.

Pollutant	Any substance, vibration, heat or noise released as a result of such an emission (see Emission) which may have such an effect (see Pollution).
Pollution	Emissions as a result of human activity which may be harmful to human health or the quality of the environment, cause offence to any human senses, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment. (Regulation 2(1) of the PPC Regulations).
Practicability	In the context of a remediation method, the extent to which it is possible to successfully implement the method given site, regulatory, timescale, commercial availability, health and safety and environmental protection constraints.
Protective measures	In the context of the protection of land, activities such as site investigation, monitoring, remediation and decommissioning, which are designed to characterise the condition of the site and ensure satisfactory state is achieved and pollution risks are removed.
Quality Assurance	Documented procedures of quality controlled methods.
Quality Control	Actions, methods or techniques employed to ensure a quality product. In relation to monitoring or analysis this is to ensure accuracy and reproducibility of results.
Reference Data	The condition of the land, with respect to potentially polluting substances, which is set within the SPMP consisting of quantified data (See Appendix A for further explanation).
Remediation	In the context of PPC, action taken to return land to a 'satisfactory state'.
Risk assessment	The process of assessing the hazards and risks associated with a particular site or group of sites.
Satisfactory state	The condition of the land occupied by an installation or mobile plant when the Permit was issued.
Surrender Site Report	A report on the condition of land at the time an application is made for surrender of a PPC Permit.
SPMP	Site Protection and Monitoring Programme.
Substance	Includes any chemical element and its compounds and any biological entity or micro-organism, with the exception of radioactive substances within the meaning of Council Directive 80/836/Euratom, genetically modified micro-organisms within the meaning of Council Directive 90/219/EEC and genetically modified organisms within the meaning of Council Directive 90/220/EEC.
Surrender Data	Data (based on intrusive investigation and analysis) describing the condition of the site once permitted activities have ceased and pollution risks have been removed.
Zoning	The process of delineating one or more parts of a site that justify different or specific approaches to sampling on the basis of existing or future conditions.

APPENDIX A: Assessing Changes in the Condition of the Site

Comparing data sets on the condition of the site

There are 5 main circumstances in which an operator will collect intrusive site investigation information on the condition of the site of a PPC permitted installation following issue of the PPC Permit:

1. When there has been a failure in pollution prevention or containment systems that may have led to pollution of the land.

2. To satisfy a requirement for long term environmental monitoring as specified in the SPMP.

3. To demonstrate satisfactory state and the removal of pollution risks prior to submitting an application to surrender the Permit.

4. To determine the impact on the site of a pollution incident.

5. To determine the impact of decommissioning operations or examine and characterise those parts of a site that were not accessible prior to decommissioning because of the presence of operational buildings, plant and equipment.

In each case, the operator will compare the results of such intrusive investigation with Reference Data established as part of the SPMP. Reference Data may have been defined either through direct measurement (i.e. intrusive site investigation, sampling and analysis) or by reference to literature sources on typical background concentrations of substances in soil and groundwater.

The key questions that arise are whether there is a difference between the two data sets, and if so, whether the difference is due to permitted activities. At this point, operators may find it helpful to consider the following possible outcomes:

a) There are large and obvious differences in the condition of the site that are clearly attributable to permitted activities (for example as a result of a loss of containment). In this case, the operator will carry out remediation to return the site to the reference condition.

b) There are differences in the condition of the site which suggest that permitted activities *may* have added pollutants to soil and/or groundwater. The operator may take the view that it is not practicable nor cost-effective to carry out further assessment work to demonstrate to the satisfaction of the Agency that permitted activities were *not* the cause of the presence of the substances. In this case, the operator will again carry out remediation to return the site to the reference condition.

c) There are differences in the condition of the site that may be attributable to permitted activities but differences are marginal and factors other than permitted activities may be the cause of the presence of the substances. Even if more detailed assessment work is required, operators may consider it both practicable and cost-effective to undertake such work in order to demonstrate to the satisfaction of the Agency that permitted activities were *not* the cause of the presence of the substances, and remediation under PPC provisions should not be enforced.

In the last case, it is for operators to produce sufficient scientifically robust evidence to support their position. Such evidence might include for example:

- Analysis of the datasets to show that there is no statistically significant difference in the concentration or amount of the substance(s) present.

- Data showing that observed concentrations of polluting substances are the result of factors other than permitted activities. Such factors could include, for example, above or below ground migration of the substances from a neighbouring property, atmospheric deposition from diffuse

sources, or other mechanisms unrelated to permitted activities such as the physical movement of soils during construction or landscaping activities, or as a result of flooding or a leaking water pipe. The relevant data could take the form of, for example:

- long-term groundwater quality monitoring records including measurement of the direction and rate of groundwater flow;
- chemical fingerprinting showing that the observed pollution could not have originated from a permitted activity;
- ambient air quality measurements perhaps supported by atmospheric dispersion modelling (see Box A1);
- photographic evidence of construction works, floods and similar events;
- field evidence (e.g. visual appearance, odours, and texture of strata and field samples) that suggest particular substances at particular locations and concentrations or amounts cannot be attributed to permitted activities.

Box A1: Example of how air-modelling data can be used to support monitoring programmes

A foundry is located on an industrial estate in close proximity to a number of other, similar, permitted installations. As the site has large areas of open land, the operator was concerned about the deposition of potentially polluting particulate emissions from vent stacks on his own and neighbouring sites.

During the preparation of the SPMP, the operator obtained data from the Environment Agency on potential emissions from each of the installations and commissioned an atmospheric dispersion modelling study to assess the relative contribution each source was likely to make to long-term land pollution on his site.

On the basis of the modelling study a monitoring programme was established in which soil samples were collected and analysed over the life of the installation.

Upon site closure the modelling and monitoring data were used to demonstrate that whilst pollutant concentrations had increased compared to 'Reference Data' the principal reason for this was particulate deposition from off-site sources.

Determining whether pollution has been caused

The strict interpretation of an outcome of a comparison between two datsets which shows that substances in soil and groundwater have been added to by permitted activities is that pollution has been caused and remediation is required. Therefore the presumption is that operators will carry out work that aims to return the site to a satisfactory state i.e. to the condition the site was in before the Permit was issued.

However, the Agency is required to consider whether in any particular case the steps taken by an operator to return the site to a satisfactory state are appropriate. The Agency is also required to exercise all its powers and duties in a reasonable, proportionate and fair manner.

In any individual case, an operator may take the view that the particular circumstances do not justify remedial work and that it would not be reasonable, proportionate or fair for the Agency to require such work to be carried out. In such cases, it is for the operator to prepare and submit a robust scientific case and cost benefit analysis to justify such a position.

Box A2 summarises the approach the Agency will take on the issue of deterioration in the condition of the site and the need for remediation.

Factors that will influence decisions on the extent of the required remediation

A number of factors are likely to influence decisions on the scope and extent of what remediation is actually required in cases where evidence of pollution attributable to permitted activities can be demonstrated.

For example:

- the identity and nature/degree of hazard associated with the substance – for example how toxic, bio-accumulative or persistent it is, and what other hazardous properties (such as fire, explosion, corrosion) it exhibits;
- the amount of the substance involved (e.g. a small or large amount relative to what may already be present);
- where the substance is located (e.g. in a readily accessible place within the boundary of the site; at depth in complex strata; in a location outside the boundary of the property under the control of the operator);
- the sensitivity of the site setting and nature and magnitude of harmful effects associated with the presence of the substance;
- whether it is feasible to undertake remediation (e.g. in terms of commercially available techniques, scale of operation, timescale, likely impacts during and after remediation and site constraints such as available workspace and access);
- the costs and benefits (in terms of environmental improvement) associated with remediation.

Box A2: Agency approach to changes in condition and the need for remediation

Circumstance	Agency Approach
A new pollutant is identified that was not identified at the time the Permit was issued	The operator will be deemed to have caused the pollutant to be present assuming the substance could have originated from the permitted activities. The assessment of whether pollution has been caused and whether remediation is required will be made on the basis of the nature & total amount of the pollutant present.
A substance was identified at the time the Permit was issued but it has been added to as a result of permitted activities	The assessment of whether pollution has been caused will be made on the total amount of the substance present. The decision of whether any remediation is required will be based on the nature & amount of pollutant that has been added by the operation of the installation.

Notes:

1. *Both the PPC Regulations and the Practical Guide to IPPC link the steps to be taken to return the site to a satisfactory state to emissions which have occurred during the existence of the Permit i.e. emissions in addition to the reference condition established when the Permit was issued. In making a decision whether to accept a surrender application, the Agency is required to consider whether "such steps (if any) as are appropriate...to return the site to a satisfactory state have been taken by the operator" (Regulation 19(4)). As in the exercise of all its powers and duties, in determining what steps are appropriate in the circumstances of each case the Agency is required to act in a way which is reasonable, proportionate and fair. The Agency is also required to take into account the likely costs and benefits when considering what steps are appropriate (Environment Act1995 section 39).*

2. *The starting point in any consideration of what steps are appropriate to return a site to a satisfactory state will be that polluting substances added during the existence of the permit should be treated, removed, immobilised etc. However, the steps that the Agency actually requires may in certain circumstances be tempered by the factors referred to above, in particular the assessment of costs and benefits. For example, if the amount of a polluting substance added during the existence of the Permit is so small in relation to the total amount present that the cost of remediation work in relation to the added amount far exceeds the environmental benefit likely to be achieved, the Agency may not require any steps to remediate the land. Determinations as to what steps are appropriate to return a site to a satisfactory state will depend upon the facts of each case, but are likely to be complex and finely balanced in many cases. Any decisions taken on this basis will not influence future decisions in relation to Part IIA of the EPA 1990 or assessment of the site as being 'suitable for use' in the context of the site use planning regime.*

Remediation requirements under PPC

Remediation requirements under the PPC regime are determined by three key factors (see Figure A1):

1. **The source of the pollution:** remediation under PPC provisions is not required to deal with amounts of substances used in the installation that were already present in, on or under the site at the time the PPC permit was issued or that are present as a result of factors other than permitted activities (e.g. neighbouring operations
2. **The nature of the pollution:** remediation under PPC provisions is not required to deal with pollution that is present due to substances that are not, nor have been, used at the installation.

3. **The concentration of the substances:** remediation under PPC provisions is only required to deal with substances that have been added to the site as a result of permitted activities. In this case, remediation is required to bring the amount or concentration of the substances back to the level they were at the time the Permit was issued. Permitted activities include not only the listed activities in Schedule 1 of the PPC Regulations but also any associated activities within the installation.

Note There is an exception to the points 1 & 3 above in relation to Specified Waste Management Activities (SWMA's) in PPC that previously had a WML. The regulations require that the point of the reference condition of the site that will be used to determine satisfactory state is when the WML was issued and not the point the PPC was issued other than landfill sites covered by the PPC regime

It is important for operators to be aware of the implications of relying on literature sources to define reference conditions rather than by measurement using site investigation, sampling and analysis. For example:

- Reference Data defines 'satisfactory state' - in effect, the standard of remediation that must be achieved in the event that pollution attributable to permitted activities occurs. Even for greenfield sites, it cannot be assumed that typical background conditions automatically equate to reference concentrations. Substances may be present at concentrations higher than 'typical' background concentrations due to the deposition of contaminants from diffuse sources (such as vehicle emissions), agricultural activities (e.g. spreading of sewage sludge on land) or 'natural' highly mineralised strata. Therefore, particular care will be needed to define 'typical' background concentrations.

- Operators need to be aware of the condition of the site on which they carry out their activities because they may have liabilities for remediation of the site under the provisions of Part IIA of the Environmental Protection Act 1990. In addition, the site condition may be due to external factors, such as neighbouring activities. Therefore operators will need to be able to distinguish between:

  - substances that are attributable to permitted activities (restoration to reference condition may be enforced under PPC provisions)
  - substances that may have already been present at the time permitted activities commenced (remediation may be enforced under Part IIA)
  - substances whose presence are the result of other factors for which operators can demonstrate they have no responsibility.

  In practice, such distinctions may be difficult to make unless factual data are available on the actual condition of the site which are based on intrusive site investigation, sampling and analysis.

Figure A1: Remediation Requirements under PPC