Ministry of Defence

Defence Infrastructure Organisation

Professional Inspection of Fuel Infrastructure and Flammable Dangerous Goods Stores

Technical Standard – Petroleum - 03

ESTATE MANAGEMENT

Estate Management

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22/02/2020	1.0	Matthew Spare	9 Site Briefing requirements added
22/02/2020	1.0	Matthew Spare	10 Reporting requirements updated
22/02/2020	1.0	Matthew Spare	Annex A References updated
22/02/2020	1.0	Matthew Spare	Annex B risk assessment requirements updated
22/02/2020	1.0	Matthew Spare	Annex C NDT requirements updated
22/02/2020	1.0	Matthew Spare	Annex E NDT of steel pipelines added
22/02/2020	1.0	Matthew Spare	Annex F Guidance on grading and reporting of common defects added
22/02/2020	1.0	Matthew Spare	Annex G Standard Report updated

FOREWORD

This Technical Standard here after known as the TS is published by Defence Infrastructure Organisation (DIO) for application across all areas of the MOD and replaces Practitioner Guide 06/12. The TS is mandated for all contracts let after publication of this document. For existing contracts, no work involving expenditure on any MOD account is to be entered into without prior authority from the appropriate MOD officer for that location or facility.

DOCUMENT AIM

This Technical Standard sets the Ministry of Defence (MOD) Standard for the professional inspection of fuel infrastructure and flammable dangerous goods stores.

DOCUMENT SYNOPSIS

This document provides procedural guidance on the inspection of fixed mechanical and electrical equipment installed at fuel infrastructure and flammable dangerous goods stores on the MOD estate. It is not a technical guide on the practical aspects of maintenance, inspection and testing of such installations, which is left to the professional skills and judgement of Competent Person(s) undertaking the work.

CONTENTS

1 INTRODUCTION

1.1 The MOD operates a range of fuel infrastructure which is maintained by Maintenance Management Organisations (MMO) under contract. An annual professional inspection of fuel facilities is mandatory within these contracts in order to comply with the requirements of JSP 317 – Joint Service Safety Regulations for the Storage and Handling of Fuels and Lubricants as the professional inspection is an integral element of the Licensing and Fuel and Gas Safety Assurance Assessment (FGSAA) regime.

1.2 This professional inspection shall be annual and its purpose is to:

a. Confirm that all currently applicable legislation and legal requirements are adhered to.

b. Confirm that there is a maintenance management system in place (with details) and that the fuel infrastructure is being maintained to the appropriate standard.

c. Provide a report based on a thorough visual inspection of the fuel infrastructure.

d. Review non-destructive examination data to ensure appropriate future actions are programmed as part of the asset management strategy.

e. Confirm that the fuel infrastructure can continue to be used until the next annual professional inspection or to precisely define the actions required in order for the installations to continue to be used.

1.3 It should be noted that this annual professional inspection does not include the evaluation of operating procedures or fuel quality checks, and therefore in no way provides assurance that these practices are being suitably carried out.

1.4 The Fuel and Gas Safety Regulator (FGSR) (which is a specialist group located in the Defence Safety Authority (DSA)) is responsible within the MOD for awarding permission to operate fuel installations and may issue a Certificate of Continued Operation contingent on the status of the installations defined by this annual professional inspection.

1.5 A list of relevant documents which apply to this professional inspection can be found at Annex A. Note that this list is not exhaustive.

2 TYPES OF FUEL INFRASTRUCTURE TO BE INSPECTED

2.1 A professional inspection is required for the following:

a. Storage for flammable liquids including slops and buffer tanks

b. Fuel transfer installations (e.g. cross-base pipelines and naval fuel jetties) including pigging facilities where appropriate

c. Aviation and marine fuel hydrant systems

d. Mechanical transport fuelling installations

e. Flammable dangerous goods stores

f. Specialist installations for example; semi-permanent installations, jerry can filling plants

g. Bulk storage installations for plant diesel and fuel oil

h. Ancillary installations; including small plant diesel, fuel oil and waste oil installations

2.2 Above ground ancillary installations shall be examined annually. The MMO must appoint a competent person to undertake the ancillary tank inspections. The competent person must be suitably qualified and experienced to undertake the task and shall have an understanding of the current regulations, British/European Standards and industry standards to enable judgement to be made for the installation's compliance with legislation and fitness for continued operational use.

The MMO is to provide a declaration to the inspector confirming that these installations either:

a. comply with current legislation, which will include:
England - The Control of Pollution (oil storage) (England) Regulations 2001, enforced by Environment Agency
Scotland - The Water Environment (Miscellaneous) (Scotland) Regulations 2017, enforced by Scottish Environmental Protection Agency
Wales - The Control of Pollution (oil storage) (Wales) Regulations 2016, enforced by Natural Resources Wales
Northern Ireland - The Control of Pollution (oil storage) (Northern Ireland) Regulations 2010, enforced by Northern Ireland Environment Agency

or

b. do not comply with current legislation but that an action plan is in place with appropriate timescales

2.3 A template for the declaration can be found in Appendix A.

2.4 The declaration from the MMO must also confirm that there is an appropriate and implemented planned maintenance regime.

2.5 The declaration from the MMO is to be included within the professional inspection report.

2.6 Those undertaking the professional inspection shall examine a minimum of 10% of the ancillary installations in order to confirm the MMO declaration and include them as part of the professional inspection report. This 10% should be recorded and a mechanism put in place to ensure that 100% of ancillary installations are inspected over a 10 year period. This must specifically highlight where the MMO is not completing their responsibilities satisfactorily.

2.7 For the purpose of this professional inspection, sites that have only ancillary installations must be grouped with the nearest inspected site for that contract or other area to ensure oversight by the inspector of any declaration by the MMO.

2.8 All underground ancillary storage shall be examined annually by the professional inspector completing this report. Each examination shall consider the requirement for appropriate non-destructive testing of the storage tank and any associated underground pipelines.

2.9 Service Family Accommodation and Misappropriated Service Family Accommodation with domestic size oil fuel storage are exempt from inspection under this publication (but not exempt from an appropriate maintenance regime).

3 APPLICATION OF THE TECHNICAL STANDARD ELSEWHERE

3.1 This Technical Standard applies to all Defence Infrastructure Organisation (DIO) managed overseas estate fuel installations which are subject to an FGSR license or FGSAA regime.

3.2 The estates occupied by BF(G) apply their own local (German) regulations and where acceptable to the FGSR, the TUV inspection reports can be utilised as an equal and equivalent to the Professional Inspection.

3.3 The guidance given in this TS is applicable to fuel installations on MOD establishments occupied by the United States Visiting Forces (USVF).

3.4 Where acceptable to the FGSR, USVF professional inspection reports can be utilised as an equal and equivalent to the Professional Inspection.

3.5 For Deployed Operating Bases where operational conditions permit the application of peacetime regulations and contractors are engaged on works services under CONDO[1] the guidance given in this TS should be followed for permanent/semi-permanent deployed operating bases where practicable. The TS is not applicable for installations designed, executed and maintained by the Royal Engineers in an operational theatre designated as a Military Works Area[2].

4 PREPARATION FOR THE PROFESSIONAL INSPECTION

4.1 **DIO Site Estate Facilities Manager (SEFM) / Head of Establishment (HoE) / MMO**. In order to initiate the Professional Inspection, the DIO SEFM / HoE / MMO will advise the professional inspector of the due date, the list of assets to be inspected, inform all stakeholders, make access arrangements and offer any assistance required by the inspector.

The Site shall arrange meetings between the inspector and all relevant stakeholders to ensure the main findings of the inspection are identified and to ensure the DIO SEFM / HoE and MMO have a clear understanding and agreement of the actions required.

4.2 **Professional Inspector**. Prior to the site visit, the professional inspector is to provide notification to the DIO SEFM / HoE / MMO to inform them of the programme, information and access required to conduct the inspection.

5 STRUCTURE OF THE PROFESSIONAL INSPECTION

5.1 A list of fuel installations and flammable dangerous goods stores for the location to be inspected is to be provided to the inspector by the DIO SEFM / HoE / MMO.

5.2 The professional inspection will comprise:

a. A visual examination of the installations (paragraphs 24-26)

b. An inspection of the maintenance records and supporting information (paragraphs 27-31)

c. An assessment of the historical data from non-destructive examinations (paragraphs 32-36)

6 VISUAL INSPECTION OF FUEL INFRASTRUCTURE

[1] Contractors on Deployed Operations.

[2] Infrastructure Management on Joint Operations: Joint Warfare Publication 4-05.

6.1 The basic elements of the visual inspection for each of the applicable fuel installations, described in Item 6 above, are contained in the standard report format, which can be found in Annex D

6.2 The inspector should also ensure that the design and location of installations is in accordance with applicable standards (see References contained within Annex A). Unsafe design features or unsafe conditions are to be reported with suggested actions (see also paragraph 38).

6.3 Where the inspector identifies installations and/or equipment that is determined as requiring inspection but are not identified on the list of fuel installations, the DIO SEFM / HoE is to be informed immediately to enable their asset register to be updated and any funds to be secured for subsequent inspection. The inspector is to identify any such installation in the final report.

7 INSPECTION OF MAINTENANCE RECORDS & SUPPORTING INFORMATION

7.1 A sample check of the maintenance procedures and records is required to:

a. Confirm that an appropriate system of planned maintenance is in place in accordance with the MMOs agreed specification and scope of work

b. Confirm that the system of maintenance is implemented and that tasks are completed with appropriate records

c. Confirm that modifications and other works are designed and implemented to conform to current legislation and appropriate standards

7.2 The views of the body responsible for operating the installation (referred to hereafter as the Operating Authority) on the condition and maintenance of the installations should be taken into account in the preparation of the inspection report.

7.3 The inspector should confirm the availability of the risk assessment documentation and hazardous area classification plans for the site as required by the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR). Where within the expertise of the Inspector, any observations based on the DSEAR records and the hazardous area classification of installations should be reported with suggested actions. The inspector should establish whether the following documentation is available:

a. MOD Form 5014 – DSEAR Risk Assessment Stage 1
b. MOD Form 5014 – DSEAR Risk Assessment Stage 2
c. Flammable Materials List & Characteristics
d. ATEX Equipment Register
e. Hazardous Area Classification Drawings of each asset or installation shown in plan view and in section or elevation as appropriate. The plan view shall show the classified hazardous areas in context to the site features within 2 metres of the hazardous zone. This should include buildings, culverts or other man-made structures and clearly indicate the required temperature class and gas group for any equipment to be used in that area. Further information on these requirements can be found in JSP 375 Vol 1 Chapter 9 Annex B.

7.4 The inspector should confirm the availability of a Unit Spillage Response Plan (USRP) and note the date that it was last amended and issued. The USRP should be drafted in compliance to JSP 317 Pt 2 Vol 4 Chapter 5 Spillage Response Plan.

7.5 The inspector should comment on the installation records, noting in particular whether there is original design data, design drawings, piping and instrumentation diagrams (P&IDs), verification dossier for the electrical installation in accordance with the requirements of BS EN 60079-14 and information on repairs, modifications and other changes. (Note: data for assets maintained under Project Aquatrine is the responsibility of the Aquatrine Service Providers. In exceptional circumstances, where access to this data is required in order to provide the necessary assurance, contact can be made with the Aquatrine Service Providers through the Aquatrine Local Representative).

8 ASSESSMENT OF HISTORICAL DATA FROM NON DESTRUCTIVE EXAMINATIONS

8.1 The frequency of internal inspections for storage tanks, which include thickness measurements of both bottom and shell, will vary dependant on a number of factors, including product stored, lining and environment. Guidance on typical frequencies for these inspections is contained in References at Annex A and further guidance can be obtained from Defence Infrastructure Organisation (DIO) Technical Authority if required.

8.2 The inspector should review historical data collected from previous non destructive examinations for the installations to help determine annual corrosion rates, future testing requirements and any other appropriate actions.

8.3 There are a number of underground tanks on the MOD estate. A process for the assessment of the condition of such tanks can be found in Annex B.

8.4 There are a number of underground pipelines on the MOD estate. A process for the assessment of the condition of such pipelines can be found in Annex C.

8.5 The MMO should provide any completed assessments for the inspector to evaluate. The inspector should make observations relating to the need for any further testing.

9 BRIEFING THE SITE TEAM ON COMPLETION OF THE INSPECTION

9.1 On completion of the inspection and before departing site, an out-brief is to be conducted with all relevant stakeholders including Head of Establishment staff, DIO and the MMO.

9.2 The out-brief should inform all attendees of significant deficiencies, their effect on the Certificate for Continued Use and the actions to be taken.

9.3 A paragraph must be included under the General heading in the Summary and Recommendations section of the inspection report stating that an out-brief has taken place with the names and roles of attendees recorded.

9.4 Where a sufficient out-brief could not be provided, the reasons should be clearly stated.

9.5 Responsibilities for the out-brief are as follows:

a) MMO – Inform relevant interested parties of the requirement for an out-brief and agree the timing and location.
b) Head of Establishment staff, DIO and MMO – Ensure that the relevant interested parties are available to attend the out-brief at the agreed time and location.
c) Inspecting Engineer – Provide an out-brief to all relevant interested parties at the agreed time and location before leaving site.

In exceptional circumstances, it may be acceptable to arrange for the out-brief to be conducted via video conference call. This must be agreed with key personnel on site and undertaken within 2 working days of the inspection and prior to the issue of the report. Grade D defects requiring immediate action shall be communicated to the relevant personnel immediately regardless of the arrangements for the out-brief.

10 REPORTING

10.1 The inspector is required to complete and submit a report, the format of which can be found in Annex D. Key elements of the report will include:

a. A summary and recommendations, including:

- a determination regarding future testing requirements and associated actions
- a statement regarding the inspection out-brief, which must include the names and roles of attendees

b. A list of categorised defects and recommendations identified by the visual inspection

c. A statement of professional judgement on the condition of the fuel installations and flammable dangerous goods stores confirming that they are either:

- Fit for continued use until the next inspection or for a period of twelve months, whichever is sooner

or

- Fit for continued use for a specified period or under other restrictions to allow defined actions to be implemented

or

- Not fit for continued use

10.2 Any installation where the remedial action associated with an identified defect is required to meet statutory or mandatory obligations (Grade D) will be declared either:

- Not fit for continued use

or

- Fit for continued use for a restricted period to allow defined actions to be implemented

Note: The Electrical Installation Condition Report (EICR) will be reviewed and the asset categorised accordingly depending on the status and criticality of any outstanding defects.

10.3 When an inspection has declared an installation Not Fit For Continued Use pending corrective action, (or Fit For Continued Use for a specified time period pending corrective action), the installation shall only be considered Fit for Continued Use, following a written declaration by those completing the corrective actions, that they have been completed to the required standard. This declaration is to be kept with the Inspection Report and the MMO is then to inform FGSR by email using DSA-DLSR-FGSRInspGroup@mod.gov.uk

10.4 Those actions associated with the declaration will be confirmed as adequate by the inspector during the next inspection.

10.5 During an inspection if there are serious conditions identified regarding an installation for which the Inspector determines is unsafe for continued use, the information should be immediately communicated to the Operating Authority and MMO. The Operating Authority is then to inform FGSR by email using DSA-DLSR-FGSRInspGroup@mod.gov.uk

10.6 The report is to be submitted electronically direct to the MMO and copied to the DIO SEFM, the Operating Authority, Fuel & Gas Safety Regulator, DIO Technical Authority, Authorised Person Petroleum and Authorising Engineer Petroleum within four weeks of inspection completion (a detailed distribution is included within Annex D). The DIO SEFM is responsible for further distribution of the professional report and must consider stakeholders within their management chain who will require sight of the report; this may include the Head of Establishment, CESOs and other TLB staff.

10.7 MMOs that work to different prioritising criteria than those contained in the standard report format in Annex D, are to include a comparator either in their covering letter or as an additional column in the Table of Defects and Rated Seriousness.

11 QUALIFICATIONS OF THE INSPECTOR

11.1 The inspector should provide the level of skill and experience based on professional practice to identify safety and maintenance problems, over a wide range of installations. It is therefore the responsibility of the MMO to ensure that the inspector is competent and as a minimum is a Chartered

Mechanical Engineer with demonstrable experience in petroleum installations. Full membership of an appropriate institute recognised by the Engineering Council is required.

11.2 The inspector may be an employee of the MMO.The inspector should be independent from site maintenance delivery team in order to provide the necessary impartiality.

11.3 In exceptional circumstances and with agreement from DIO Technical Authority, Engineers with appropriate qualifications and significant relevant experience, but who are not Chartered Mechanical Engineers, may be engaged to carry out the inspection. In such cases all inspection reports will be countersigned and approved by a Chartered Mechanical Engineer experienced in petroleum installations who will take professional responsibility for the content of the report.

11.4 MMOs carrying out these professional inspections shall submit the names and qualifications of their prospective inspectors, plus any countersigning Chartered Mechanical Engineers taking professional responsibility, for inclusion on a register that will be maintained by DIO Technical Authority. CVs of prospective candidates should be provided to DIO Technical Authority in sufficient time in order that an assessment can be made and the individual included in the register prior to the inspection being carried out.

11.5 Individuals will be notified in writing whether they have been included on this register and, if successful; their names will be available to the Fuel & Gas Safety Regulator.

11.6 DIO Technical Authority (Fuel) for the purposes of this publication can be contacted at:

Head Mechanical and Fuels Infrastructure
Engineering and Construction
Technical Services
Defence Infrastructure Organisation
Kingston Road
Sutton Coldfield
B75 7RL
Tel: 01638 54 5835
E-mail: mark.spooner583@mod.gov.uk

ANNEX A REFERENCES

1. APEA/EI Design, construction, modification, maintenance and decommissioning of filling stations
2. API RP 575 Guidelines and Methods for Inspection of Existing Atmospheric and Low-pressure Storage Tanks
3. API Standard 2000 - Venting atmospheric and low pressure storage tanks- Remote Overseas Sites
4. API Standard 610 - Centrifugal Pumps for Petroleum and Natural Gas Industries- Remote Overseas Sites
5. API Standard 620 Design and construction of large welded low pressure storage tanks- Remote Overseas Sites
6. API Standard 653 Tank Inspection, Repair, Alteration and Reconstruction
7. API Standard 653 Welded Storage Tanks for Oil Storage - Remote Overseas Sites
8. API/EI 1550 **–** Handbook on Equipment used for the Maintenance and Delivery of Clean Aviation Fuel
9. Associated Octel Company (now Innospec). Leaded Gasoline Tank Cleaning and Disposal of Sludge.
10. BS EN 13160 1 to 7 Leak detection standards
11. BS EN 13463 Non-electrical equipment for use in potentially explosive atmospheres
12. BS EN 13636 Cathodic protection of buried metallic tanks and related piping
13. BS EN 14015. Vertical, cylindrical, flat bottomed, above ground and welded steel tanks
14. BS EN 14161 Petroleum and Natural Gas Industries – Pipeline transportation systems
15. BS EN 60079 10 Classification of hazardous areas
16. BS EN 60079 14 Selection, Installation and Maintenance of Electrical Apparatus for Use in Potentially Explosive Areas
17. BS EN 60079 17 Electrical apparatus for explosive gas atmospheres – Part 17: Inspection and maintenance of electrical installations in hazardous areas (other than mines)
18. BS EN 61508 Functional safety of electrical/electronic/programmable electronic safety- related systems (SIL assessment)
19. BS EN 61511 Functional safety. Safety instrumented systems for the process industry sector
20. BS EN 799-5:2010 Carbon Steel Oil Storage Tanks
21. BS EN 858-1 Separators systems for light liquids. Note section 6.6 states the requirements for labelling
22. BS EN 858-2 Separators systems for light liquids. Note section 6 covers he maintenance requirements
23. Dangerous Substances and Explosive Atmosphere Regulations (DSEAR) 2002 (as amended)
    a. ACOP L133 Unloading petrol from road tankers
    b. ACOP L138 DSEAR approved code of practice and guidance.
24. Defence Instruction Notice 2007DIN04-123 (Replaces 2006DIN04-105) Aviation fuel quality. Removal of absorbent type elements from Aviation Fuel Filter Monitors
25. Defence Standard 01-5 Fuels, Lubricants and Associated Products
26. Defence Standard 05-52, parts 1 & 2, Markings for the identification of fuels, lubricants and associated products
27. Defence Standard 91 Series fuels and lubricants
28. Defence Standard 91-87 is for F34 – (Avtur FSII – Kerosene + FSII)
29. DEFRA – Groundwater Protection Code
30. DEFRA – Guidance note for the Control of Pollution (Oil storage) (England) Regulations
31. Design and Maintenance Guide 03 Storage of Dangerous Substances
32. DSA 02 FGSR Fuel and gas safety and environmental regulations
33. DSA 03 DLSR-FGSR Fuel and gas safety and environmental regulations - code of practice
34. EEMUA Publication 159 – User's Guide to the Inspection, Maintenance and Repair of Aboveground Vertical Cylindrical Steel Storage Tanks
35. EEMUA Publication 183 Guide for the prevention of bottom leakage from vertical, cylindrical, steel storage tanks
36. EEMUA Publication 186 A Practitioner's Handbook – Electrical Installation, Inspection and Maintenance in Potentially Explosive Atmospheres
37. EI 1529 Aviation fuelling hose and hose assemblies
38. EI 1540 Design, Construction, Commissioning and Maintenance of Aviation Fuelling Facilities
39. EI Guidelines on environmental management at filling stations
40. EL/TSA Guidance on risk assessment and conceptual design of tertiary containment systems for bulk storage of petroleum, petroleum products and other fuels

41. Energy Institute / Joint Inspection Group 1530 Quality assurance requirements for the manufacture, storage and distribution of aviation fuel to airports (A4)
42. Energy Institute Model Code of Safe Practice Part 15 Area classification code for installations handling flammable liquids
43. Health and Safety (Safety Signs and Signals) Regulations
44. Health and Safety at Work etc. Act 1974 (as amended)
45. Health and Safety Executive Safety and environmental standards for fuel storage sites
46. HQ Air Command A4 Fuels Notification 06/17 Filter Water Separator (FWS) - Coalescer Element Changes
47. HS (G) 71 Chemical Warehousing
48. HS G) 140 The safe use and handling of flammable liquids
49. HS(G) 176 The storage of flammable liquids in tanks
50. HS(G) 51 The storage of flammable liquids in containers
51. HSE RR509 management of equipment containing hazardous fluids or pressure
52. ISGOTT – International Safety Guide for Oil Tankers and Terminals
53. item 28, GPP 2 is only applicable to Wales, Scotland & Northern Ireland. Also need to reference GPP 1
54. JSP 317 Joint service safety regulations for the handling of fuels and lubricants
55. JSP 319 Joint service safety regulations for the storage and handling gases
56. JSP 375 Vol 1 Chapter 9 (V1.3 Oct 2020)
57. JSP 375 Volume 3, Chapter 5 – Petroleum
58. Management of Health and Safety at Work Regulations 1999 (as amended)
59. OCIMF - Single point mooring maintenance and operation guide (SMOG). Note covers the requirements for the testing and inspection of floating /sub-sea hoses.
60. Policy Instruction PI 65/2004 Aviation Fuel Quality. Separator element fitted to filter water separators
61. Process Safety Leadership Group (PSLG). Safety and environmental standards for fuel storage sites
62. Technical Standard Petroleum 01 - The Inspection, Maintenance and Testing of Equipment at Petroleum Installations – Mechanical and Electrical
63. Technical Standard Petroleum 02 - Specification for Specialist Works on Petroleum Installations
64. Technical Standard Petroleum 04 - Mechanical Transport Fuelling Installations
65. The Control of Pollution (Oil Storage) (England) Regulations 2001
66. The Control of Pollution (oil storage) (Northern Ireland) Regulations 2010
67. The Control of Pollution (oil storage) (Wales) Regulations 2016
68. The Environment Agency and The Scottish Environment Protection Agency Pollution Prevention Guidelines
    a. Above Ground Oil Storage Tanks: GPP2
69. The Groundwater Regulations 1998 (as amended)
70. The Petroleum Consolidation Act 1928 (as amended)
71. The Petroleum Consolidation Act has been replaced by SI 2014-1637 The Petroleum (Consolidated) Regulation 2014
72. The Water Environment (Oil Storage) (Scotland) Regulations 2006
73. The Water Resource Act 1991
74. UKLPG Code of practice 7 - storage of full & empty LPG cylinders and cartridges

ANNEX B – BASIC (LEVEL 1) RISK ASSESSMENT OF UNDERGROUND SINGLE SKINNED STEEL TANKS

INTRODUCTION

1. There are large numbers of underground single skinned steel tanks on the MOD estate. In order to ensure these tanks do not create explosion risks or pollution through loss of integrity, they require an appropriate inspection regime informing a pro-active schedule of maintenance and infrastructure replacement.

2. An important component of inspection and maintenance for underground single skinned steel tanks is a process that allows for data collection and analysis of the data in order to determine the appropriate non-destructive testing.

3. This document describes a Level 1 risk assessment, which comprises data collection and analysis in order to determine whether there is an increased risk of loss of integrity

4. The process described in this document is relevant for bulk fuel, slops or liquid chemical storage and motor transport fuelling installations. Vertical, splinter protected NATO type installations are excluded from the Level 1 risk assessment. Aviation fuel tanks are subject to internal inspection as defined by Section 2.2 of the extant version of the Technical Standard for 'The Inspection, Maintenance and Testing of Equipment Installed at Petroleum Installations – Mechanical and Electrical'.

5. All underground single skinned steel tanks used for the storage of fuel, slops or liquid chemicals shall be subjected to an initial Level 1 risk assessment using this guidance. These initial assessments only need to be updated if conditions assessed within the report are subject to change.

6. The results of the Level 1 risk assessments will determine, in part, the requirement for non-destructive testing and should be used by MMOs to inform prioritised and pro-active infrastructure lifecycle replacement. All high risk tanks (score >6) will require a follow up non-destructive testing to be undertaken.

7. All work is to be undertaken in accordance with JSP 375 Volume 3 Chapter 5 Petroleum and the Authorised Person (Petroleum) should be consulted prior to any non-destructive testing.

LEVEL 1 RISK ASSESSMENT

8. Data collection and analysis is non-invasive and therefore does not require any operational constraints to be imposed.

9. The MMO should make available either of the following:

a. Previously completed Level 1 risk assessments

b. Construction, ground conditions and Source Protection Zone data to permit the completion of Level 1 risk assessments

10. Construction or ground condition data may not be available but the assessment can still be completed. However, the result may be a higher risk score with follow up actions.

11. The Level 1 risk assessment should be undertaken using the standard forms provided in this guide.

12. Table 1 indicates the extent of information required to be collated. To aid completion the following paragraphs provide additional guidance.

a. Tank Description
License/FSAA issued and expiry date is available from the current Certificate of Continued Operation issued by the Fuel and Gas Safety Regulator

b. Tank Construction
External Coating – If this information is not available, then the top of the tank should be inspected at the manhole access. A bitumen enamel coating will be 2 – 4 mm thick, bitumen paint and coal tar epoxy will be less than 500 micron thick. Bitumen enamel and bitumen paint are degraded by fuels, consequently

if a spillage has occurred in the manhole then the coating may have been removed. If this is the case then write “bare” in the “other” category

Internal Lining – This information will be available only from construction, inspection or repair records

Surround – This information will be available only from construction or repair records

Proximity of Earth Rods – This can be confirmed on site by visual examination

Depth – Measure the diameter of the tank using the gauge stick and the distance from ground level to the top of the tank in the manhole. Measurements are to be recorded to the nearest 0.1m

c. Inspection and Repair
This section can be completed only by reference to the inspection records

d. Current Status
This section must be completed for all tanks. If data is not readily available, a request should be made to the Operating Authority

e. Ground Conditions
The information may be available from an existing Land Quality Assessment, Land Condition File or soil surveys carried out for works projects

f. Additional Information
Provide further information if considered relevant

13. Table 2 indicates rankings that can be assigned from the information obtained from Table 1. The cumulative score will provide an indication of the likely risk of loss of integrity presented by the tank. The higher the score the higher the probability of the tank constituting a safety and/or environmental hazard.

14. After the initial preparation of a Level 1 risk assessment, the Inspector will review the results annually, where there has been a change that may potentially raise the overall score the Level 1 risk assessment is to be revised. Where the score is >6 then appropriate actions as detailed in paragraph 6 should be taken.

TABLE 1 – COLLATION OF INFORMATION

SITE:

Tank Identifier				
Tank Description				
In service/not in service				
Fuel stored				
Capacity (litres)				
Date installed (or estimated)				
Date last licensed				
Date next licence due				
NATO/national facility				
Buried/semi-buried				
Hardened/soft				
Frequency of fuel delivery				
Tank Construction				
External coating **-bitumen enamel** **-coal tar epoxy** **-bitumen paint** **-other** **-not known**				
Internal lining **-epoxy** **-other** **-not known**				
Surround **-concrete** **-clay** **-not known**				
Proximity of earthing rods **-< 5m** **-5 - 10m** **-10 - 20m** **->20m** **-not known**				
Piping materials **-steel** **-galvanised steel** **-externally coated** **-not known**				
Depth **-ground level to top of tank (m)** **-top of tank to base of tank (m)**				
Inspection and Repair				
Inspection type and date **-internal visual** **-internal NDT** **-external visual**				
Level gauge calibration method and date				
Previous leaks identified and dates				
Previous leaks attributed to **-internal corrosion** **-external corrosion**				
Current Status				
Daily dips within prescribed limits*				
Dip readings erratic*				
Ground Conditions				
Soil ph				

Soil profile **-topsoil** **-made ground** **-clay** **-sand** **-peat** **-rock** **-not known**				
Depth of water table below ground level (m)				
Source Protection Zone (SPZ): **-SPZ1 – Inner Protection Zone** **-SPZ2 – Outer Protection Zone** **-SPZ3 - Final Source Catchment Protection Zone** **-SPZ4 – Special Zone of Interest**				
Is the tank <5 km from the coast?				
Additional Information				

*** Defined locally**

TABLE 2 - COMPONENT RANKING

Component	Ranking				
	+2	+1	0	-1	-2
Tank surround	Clay / Not known	-	-	Concrete	-
Soil type	Sand & Gravel / Not known	Loam	-	Clay	-
Age of tank (years)	>25	20 - 25	10 - 20	5 - 10	<5
Coastal location?	-	Yes	-	No	-
Externally coated?	No / Not known	-	-	Yes	-
Internally coated?	No / Not known	-	-	Yes	-
Source Protection Zone (SPZ)	SPZ1 (Inner Protection Zone)	SPZ2 (Outer Protection Zone)	SPZ3 (Final Source Catchment Protection Zone)	SPZ4 (Special Zone of Interest)	-

A tank is deemed to be at high risk when the cumulative score exceeds the value of 6.

Example A:		**Example B**	
Tank surround is concrete	-1	Tank surround is clay	+2
Soil type is clay	-1	Soil type is clay	-1
Tank is 40 years old	+2	Tanks is over 25 years old	+2
Tank is inland	-1	Tank is inland	-1
Tank is not externally coated	+2	Tank is not externally coated	+2
Tank is internally coated	-1	Tank is not internally coated	+2
SPZ2	+1	SPZ1	+2
Total	**+1**	**Total**	**+8**

It is important to note that the factors listed above are not weighted.

ANNEX C - NON-DESTRUCTIVE TESTING FOR TANKS

1. Non-destructive testing, sometimes referred to as Level 2 testing should be undertaken only by a qualified contractor with relevant experience. The MMO should advise on the need for additional survey work and contractors.

2. **Tanks with restricted entry** – Where the entry to an underground single skinned tank is deemed to be unacceptable due to the high risks involved, non-destructive testing is to be undertaken from the outside. Proprietary precision tightness test methods are to be utilised which do not require product removal but do necessitate the tank being out of operation whilst the test is in progress. Test methods available can be divided into:

a. Volumetric Methods – use techniques that detect any change in height of liquid in the tank to define a leaking or tight tank. Examples of this type of test are those that measure product height:

i. Electronically
ii. Using Ultrasonic Testing

b. Non Volumetric Methods – do not rely on detecting a change in height measurement to determine a leaking or tight tank. Examples of this type of test are those that use a chemical tracer or those that apply vacuum and/or pressure using inert gas and:

i. Measure pressure loss/decay over time
ii. Measure mass decay over time
iii. Listen for ingress of groundwater and/or air

a. It should be noted that the chemical tracer method requires the installation of underground test probes and that any chemical additive to the fuel must have been previously tested and approved for use on the MOD Estate

b. Regardless of the test method selected, a pass/fail certificate should be obtained that is in accordance with a recognised standard such as the United States Environmental Protection Agency Standard test procedure for evaluating leak detection methods

3. **Motor Transport Fuelling Installations** – Underground single skinned steel tanks at motor transport fuelling installations shall undergo non-destructive testing in years 20, 25, 30 and every 2 years thereafter as a minimum and more frequently if the inspector deems this necessary.

4. **Non-Destructive Testing requiring internal access** - These tanks need to be emptied, cleaned and gas-freed prior to any activities commencing.

a. **Underground Horizontal Cylindrical Tanks**

i. A detailed visual inspection should be completed for all accessible areas

ii. Corrosion and pitting in the tank walls should initially be assessed using a technique such Magnetic Flux Leakage (MFL) or Saturated Low Frequency Eddy Current (SLOFEC) or a similar technique, which is good at detecting inner and outer side metal loss. This test should cover the entire wall area

iii. Ultrasonic scanning should be used to confirm the initial material thickness, where there is significant material loss detected by the MFL or SLOFEC inspection (typically greater than 40%) and the dished ends of the tank, the shape of which will normally preclude the use of scanners. A series of spot thickness checks on the dished ends may suffice, but a series of Ultrasonic scans will improve coverage and assist in keeping more detailed records

iv. Welds can be tested using a technique that is suitable for the application such as vacuum box or magnetic particle inspection (MPI) and these will require coating removal. If coating removal is not programmed, techniques such as Eddy Current (ECT) may be used, which can inspect welds through paint and other similar coatings.

v. It should be noted that above ground horizontal cylindrical tanks can be subjected to non-destructive examination without the requirement for internal access. As all external surfaces should normally be accessible, a visual inspection supplemented with UT checks to determine the depth of any observed corrosion or pitting and weld testing if considered necessary, should be sufficient. Where examination of tank bottoms is not practicable, special measures may be necessary to ensure that the integrity of the tank can be verified, should concerns arise.

b. **Mounded Tanks**

i. A detailed visual inspection should be completed for all accessible areas and components of the tank.

ii. Corrosion and pitting in the tank floor should be assessed using a technique such as MFL or SLOFEC or a similar technique, which is good at detecting inner and outer side metal loss. This test should cover the entire floor area (scanners are not able to cover 100% of the floor area and will have “dead” zones).

iii. Ultrasonic scanning should be used to confirm the initial material thickness and where there is significant material loss detected by the MFL or SLOFEC inspection (typically greater than 40%). Ultrasonic measurement of all indications is not always required with all computerised mapping systems, but a sample number of checks should be performed to confirm the accuracy of results

iv. Ultrasonic corrosion sizing should be completed for the sump plates and all tank nozzles

v. MPI testing should be completed on the sump and nozzle welds (coating removal required). Alternative suitable techniques that do not require coating removal may be employed.

vi. Vacuum Box testing should be completed on all floor plate welds (coating removal required). Alternative suitable techniques that do not require coating removal may be employed such as Alternating Current Field Measurement (ACFM).

vii. Floor to shell plate welds can be tested using MPI or vacuum box (coating removal required). Alternative suitable techniques that do not require coating removal may be employed.

viii. MFL or SLOFEC testing should be completed on at least 5% of the tank shell plus any associated corrosion sizing with Ultrasonic testing. Sample areas at various positions around the tank should be inspected and coverage should be increased if issues are detected

ix. Several vertical ultrasonic line scans of the shell, in accordance with the requirements of EEMUA 159, should be completed

x. A visual inspection of the internal tank roof should be completed from ground level using a video camera to enable later analysis of potential problems associated with the outer concrete protection

xi. Mounding material that is directly in contact with roof mounted nozzles should be temporarily removed to determine the condition of any wrapping and whether there is corrosion at the interface. The inspector may consider it necessary to remove further mounding dependant on initial inspection results.

xii. Where there is concern or analysis of the video recording indicates potential problems with the outer concrete protection, a specialist will need be employed to carry out a detailed survey. This survey may include exposing a section of the external roof, material sampling and an examination of any membrane and the re-bar. Further guidance should be obtained from DIO Technical Authority before proceeding.

c. **Above ground vertical cylindrical tanks**

1. The inspection should be carried out or overseen by an inspector certified to API 653 or EEMUA 159 to provide the required level of quality assurance.

2. A detailed visual inspection should be completed for all accessible areas and components of the tank as per the EEMUA 159 / API 653 visual check list, this will include but not be limited to: -

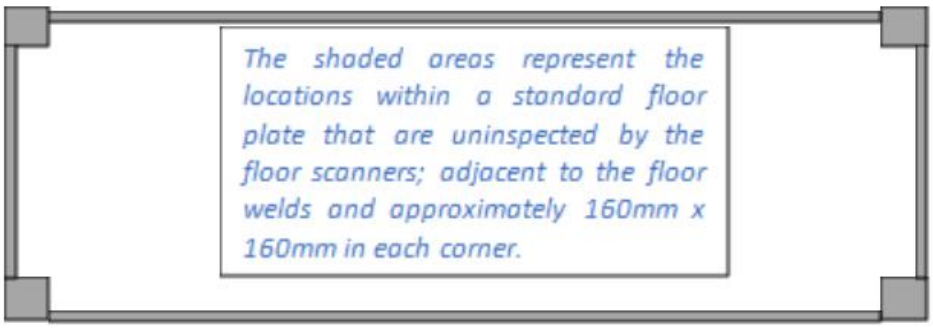
   - Foundation Assessment: Settlement, verticality, corrosion of annular, earth bonding etc.
   - Tank Bottom: General corrosion, weld condition, buckling and ripples in plates, heating coils (if installed).
   - Tank Shell: Buckling, general plate condition, welds, nozzles and manways, handrails and stairs, wind stiffeners and paintwork.
   - Roof: Plate condition, roof supports, seal welds, and seal weld of roof- to-shell connection (frangible joint), nozzles, vents and handrails.
   - Peripheral Equipment: Earth bosses, venting device, level gauge, level float, dip hatch.

3. Corrosion and pitting in the tank floor should be assessed using a technique such as MFL or SLOFEC or a similar technique, which is good at detecting inner and outer side metal loss. This test should cover the entire floor area.

4. Ultrasonic scanning should be used to confirm the initial material thickness and where there is significant material loss detected by the MFL or SLOFEC inspection (greater than 40%). Ultrasonic measurement of indications should be performed to confirm the accuracy of results.

5. Electromagnetic floor scan of all floor and annular/sketch plates. To report all relevant plate defects both topside and underside greater than 40% wall loss. All indications are to be confirmed with UT scans and/or pit depth gauges, to their full extent. All reportable defects will be measured and recorded.

   Note: 100% coverage with floor scanners is not possible; this is due to the design of the scanner heads and the geometry of the floor plates. The dead zones are predominately at the areas adjacent to the floor welds, at the corners of each standard plate, non-standard (Triangular) plates, around existing patch plates/support plates, sump areas and around the periphery of the tank floor area. These areas are to be inspected with hand scanners or scanned with UT as thoroughly as practically possible. For guidance, refer to the below extract from HSE Report 481.



   The GREY areas, which represent the floor scanner dead zones, are for illustrative purposes only and are not to scale.

6. Ultrasonic corrosion sizing should be completed for the sump plates and all internal and external tank nozzles.

100% UT thickness scans in and around all sump plates, with a minimum of 9 spot readings recorded and the minimum recorded thickness.

UT thickness scans on all accessible first course internal and external tank nozzles, recording readings at 12, 3, 6 and 9 o'clock.

UT thickness checks on all accessible first course external compensation pads, recording readings at 12, 3, 6 and 9 o'clock.

7. MPI testing should be completed on the sump and nozzle welds (coating removal required). Alternative suitable techniques that do not require coating removal may be employed.

   For internally lined tanks: -

   All internal welds selected for inspection, will be tested with an appropriate Eddy Current Technique (ECT).

8. Vacuum Box testing / Alternating Current Field Measurement (ACFM) should be completed on all floor plate welds.

   Visual inspection of all internal floor welds that can be inspected through the lining, any visual concerns should be investigated with ECT.

9. Floor to shell plate welds can be tested using MPI or vacuum box (coating removal required). Alternative suitable techniques that do not require coating removal may be employed.

   For internally lined tanks: -

   Internal floor to shell welds will be tested with an appropriate Eddy Current Technique (ECT).

   MFL testing should be completed on at least 5% of the tank shell plus any associated corrosion sizing with Ultrasonic testing. Sample areas at various positions around the tank should be inspected and coverage should be increased if issues are detected.

10. Several vertical ultrasonic line scans of the shell, in accordance with the requirements of EEMUA 159, should be completed.

11. Full visual inspection and ultrasonic corrosion sizing of the tank roof should be completed in accordance with the requirements of EEMUA 159.

12. Ultrasonic corrosion scan of external floor plate protrusion should be completed and dimensional measurements recorded to ensure sufficient protrusion. This will not be necessary on those older tanks with no protrusion.

13. Verticality and differential settlement checks should be completed in accordance with the requirements of EEMUA 159.

14. If bottom ripples are observed during the internal inspection, they must be evaluated against the requirements of EEMUA 159.

15. Remaining life calculations and interval to next inspection shall be calculated for the shell, roof and bottom plates.

16. The inspection report shall summarise the findings and make recommendations.

17. The standard API 653 can be substituted for EEMUA 159 and there may of course be variations depending on tank and circumstances.

18. Inspection reports shall summarise the findings, make recommendations on any remedial work, project remaining tank life and date of next examination.

19. All remedial work should be completed in accordance with the original design specification if known and to an accepted standard such as EEMUA 159 or API 653.

20. All reports associated with non-destructive examination and any subsequent work or repairs must be retained in the relevant facility jacket and made available to subsequent work teams and Professional Inspectors so that annualised corrosion rates can be interpolated and to aid consistency.

21. Detailed position drawings including measurements and dimensions, will be made of all reportable defects.

22. Photographs to be taken of all inspected areas and any relevant defects.

23. Provide a comprehensive final report, comprising of the following:

    - All NDT results.
    - Sketches/CAD floor, roof and shell plate GA drawings.
    - Sketches/CAD floor, roof, shell, plate and weld defect drawings.
    - Relevant photographs.
    - NDT procedure reports.
    - Remaining life calculations as per the specification of EEMUA 159 / API 653 latest editions.
    - Recommendations for repair, to be assessed as critical and non-critical repairs.
    - Suggested inspection intervals will be given, as per the specification of EEMUA 159 / API 653 latest editions.

ANNEX D – BURIED STEEL FUEL PIPELINES: COATING CONDITION AND CATHODIC PROTECTION MONITORING

INTRODUCTION

1. The professional inspection shall take account of the condition of buried steel pipelines. When making judgement on the condition the inspector is to consider similar criteria as detailed in Annex B together with evaluation of records provided by the MMO of the maintenance, testing and inspection regime. Where there are doubts or a lack of assurance regarding the condition of a buried steel fuel pipeline, the inspector shall consider recommending suitable surveys that can be used to evaluate both coating and cathodic protection systems. The information contained in this annex describes some of the methods available.

2. The following fuel systems are covered by this annex

a. Airfield bulk fuel delivery pipelines

b. Airfield cross-base pipelines between Bulk Fuel Installations

c. Aircraft hydrant systems

d. Oil fuel depot receipt/issue pipelines

3. This annex is not applicable to pipework installed at Mechanical Transport Fuelling Installations.

4. The two major causes of pipeline failure are mechanical damage and external corrosion.

5. External corrosion may be caused by damage to the protective wrapping or by failure of the cathodic protection system. Not all buried pipelines are cathodically protected and the application is dependent on the results of a geological survey, which should have been carried out during design.

6. If the pipeline is cathodically protected, previous test results (see paragraphs 16 and 17) are to be reviewed to determine whether the cell has decayed to a level at which a protective circuit has not been established. If considered likely then a further set of test results will be needed to determine the extent of restoration required.

7. If the pipeline is not cathodically protected or if test results indicate that an effective cell is not still in place then a coating survey is required to determine the condition of the wrapping.

8. The pipeline surveys described in this annex are specialised and should be undertaken only by appropriately qualified and experienced contractors. Although this annex suggests survey methods, the final decision should rest with the specialist contractor in consultation with site personnel.

9. It should be noted that proprietary equipment rather than the survey methods listed in this annex should be used to determine the location and routing of pipelines for which all survey drawings have been lost.

SELECTION OF THE TYPE OF SURVEY

10. The information required from the survey determines the technique to be used. The following surveys are available:

a. Close Interval Potential – to provide initial cathodic protection data for new pipelines to assess cathodic protection levels and areas of poor protection to identify major coating defects

b. DC Voltage Gradient – to identify specific areas of coating defects together with an estimate of the defect size

c. Pearson Coating – to identify specific areas of coating defects

d. Signal Attenuation Coating – to rapidly assess the coating condition and identify the worst areas

A Signal Attenuation Coating Survey can be followed by a more detailed DC Voltage Gradient or Pearson Coating Survey. In this way the pipeline can be appraised in a cost effective manner. A Signal Attenuation Coating Survey can take 10% of the time of a Pearson Coating Survey and 30% of the time of a DC Voltage Gradient Survey.

SURVEY METHODS

11. The Close Interval Potential Survey measures the pipe to soil potential level at intervals between 1 and 5 metres with the cathodic protection system both 'on' and 'off'. The latter is achieved by fitting all the cathodic protection stations and pipeline bonds with synchronised current interrupters. The potential is measured by a high impedance voltmeter connected to a Cu/CuSO4 reference electrode and to the pipeline at a test point by means of a trailing wire. The 'off' potential is known as the polarised potential and is indicative of the level of cathodic protection achieved. An immediate voltage drop will be apparent when the cathodic protection is switched 'off'. A further drop of at least 0.1V should occur after the initial drop to indicate the effectiveness of the system.

The information to be produced is a graph of soil to pipe voltage against pipeline distance referred to a datum point. Each graph will have two sets of readings to denote the cathodic protection system in the 'on' and 'off' mode. Defects will appear as troughs on the graph.

12. The DC Voltage Gradient Survey measures the voltage gradient between the pipe and the soil when a direct current at a pulsed frequency is applied to the pipe. The existing cathodic protection system can be used to apply the current, or temporary earth rods may be installed along the route.

Pipelines which are well coated have a high resistance to earth but those with defects can readily impart the currents through the soil and hence a voltage gradient is set up in the vicinity of the defect. The larger the defect, the greater the gradient. The voltage gradient is detected by a meter connected to two probes.

As the pipeline is walked the meter needle will deflect as a defect is found. If a deflection is noticed it is indicative of the probes measuring a voltage gradient. By relocating the probes the deflection will disappear; this indicates an equipotential being measured. The defect is therefore between the probes. After the defect has been located a series of readings laterally to the pipe are taken which, when viewed in conjunction with the signal strength, determine the magnitude of the defect.

13. The Pearson Coating Survey measures the voltage gradient between the pipe and the soil when an alternating current is applied to the pipe via either the existing cathodic protection system or a suitable exposed part of the pipeline whilst the other terminal is connected to a remote earth. The coating provides the resistance and any defect provides a current leakage path, which can then be detected at ground level. The strength of the emitted signal will vary according to location and size of coating defects.

The survey is conducted by two operators walking along the route of the pipeline, one behind the other. The distance between them depends on the diameter of the pipeline and can be 6 to 12 metres. As the leading operator approaches a coating defect the signal will gradually increase and peak as he passes over the defect. The signal will gradually reduce to a null when the defect is midway between the two operators

The information provided would be a graph of signal responses against pipeline distance referred to a datum point.

14. The Signal Attenuation Coating Survey measures the signal strength in decibels emanating from the pipeline when an alternating current is applied to the pipe, via either the existing cathodic protection system or a suitable exposed part of the pipeline. The other terminal is connected to a remote earth.

A receiver connected to an antenna is then walked along the pipeline and the signal strength recorded. A plot of signal strength against pipeline distance is then produced and from this a plot of signal loss against pipeline distance can be determined. The final output is a histogram of signal loss/distance against pipeline distance. The greater the signal loss/distance against distance value the more probability there is of a defect.

CATHODIC PROTECTION MONITORING

15. Cathodic protection is provided to buried pipelines either by impressed current or by sacrificial anodes. The effectiveness of either system can be determined from a Close Interval Potential Survey. Protection potentials are contained in BS EN 12954 Table 1.

16. A sacrificial anode system requires little maintenance or inspection beyond an evaluation of effectiveness. Should there be a reduction in the cell voltage commensurate with design life then the sacrificial anodes require replacement. The frequency of functional checks should be in accordance with BS EN 12954 Table 2 and are to comprise:

a. Measurement of anode current and potential

b. Measurement of the pipeline to soil potential

17. An impressed current system consists of an ac power supply, transformer/rectifier, distribution boxes, control boxes and ammeters. The frequency of functional checks should be in accordance with BS EN 12954 Table 2 and are to comprise:

a. Measurement of transformer/rectifier current and potential

b. Inspection of transformer/rectifiers for oil leaks, oil temperature, oil level (all as appropriate), cable connections, fuses, surge diverters and local earthing facilities

c. Measurement of distribution, control and junction box current and potential

d. Inspection of cable connections, fuses, shunts, resistors, ammeters and surge diverters

e. Measurement of the pipeline to soil potential

ANNEX E – NON-DESTRUCTIVE EXAMINATION OF STEEL PIPELINES

INTRODUCTION

1. Non-destructive examination of steel pipelines can be viewed not only as one part of the strategy for complying with the law, but can also deliver significant benefit in reducing failures of operationally sensitive plant. These failures can result in lengthy periods of down time, risks to the health and safety of operators and can result in environmental pollution.

2. Non-destructive examination is a term that covers a wide range of techniques from visual inspections through to the use of highly specialist equipment, whereas non-destructive testing (NDT) is the application of measurement techniques in order to identify damage and irregularities in materials. Some techniques such as visual inspections are very cost effective and the more specialist inspections can extend the useful life of significant plant, thus reducing the need for an expensive replacement programme. Consequently, neither necessarily needs to be viewed as expensive, especially when considering the longer term.

DOCUMENTATION

3. For non-destructive examination to be most effective the following documentation is an example of what should be available to the inspector:
    - A data file that includes information on the original construction standards, the various material specifications, welder qualification and commissioning certificates and other construction details
    - Information on any fittings or other associated equipment
    - As-installed drawings
    - Piping and Instrumentation Drawings (P&ID drawings)
    - Reports on all types of previous inspections, whether in-service or invasive
    - Maintenance records
    - Records of repairs and/or modifications and the standards to which they were completed
    - Operating records

4. Non-destructive testing of pipelines should be conducted in line with the requirements of the extant Technical Standard for 'The Inspection, Maintenance and Testing of Equipment Installed at Petroleum Installations – Mechanical and Electrical'. Careful consideration must be given to the statement of requirements to ensure that the required outcomes are achieved. It is also essential that one output of a non-destructive examination is a report that not only lists raw data, but also interprets that data against agreed standards, makes recommendations with timeframes for completion and explains the consequences of not completing those recommendations.

STANDARDS

5. Where possible, non-destructive examination (and any associated repairs) should be completed to a recognised standard and inspectors should be able to demonstrate competence through recognised qualifications and appropriate experience. The non-destructive examination itself should also be completed against the appropriate standard for the pipeline.

6. One standard available for use in determining the remaining life of a steel pipeline using the results of some of the above techniques is the American Society of Mechanical Engineers Supplement ASME B31G – Manual for Determining the Remaining Strength of Corroded Pipelines.

DAMAGE MECHANISMS

7. Non-destructive examination is used to detect damage mechanisms in order to prevent uncontrolled failures, predict plant life and to determine future maintenance requirements. Damage mechanisms for pipelines can include the following:
    - Corrosion
    - Erosion
    - Fatigue
    - Mechanical damage
    - Brittle fracture

TECHNIQUES

8. Some of the more common techniques available for examining pipelines include the following:
    - Tightness testing (pressure and vacuum)
    - Intelligent Pigging
    - Liquid dye penetrant
    - Radiography (RT)
    - Ultrasonic Thickness (UT)
    - Long Range Ultrasonic Thickness (LRUT) / Guided Wave
    - Phased array ultrasonics
    - Magnetic flux leakage (MFL)
    - Magnetic particle inspection (MPI)
    - Acoustic emissions
    - Eddy current

9. The use of intelligent pigging for the in-line inspection of buried pipelines or those that are hard to access can be advantageous as they are available in various sizes and can travel significant distances in a single run. For in-line inspection, pigs will normally utilise either MFL or UT for data collection.

10. If the examination and testing of pipelines involves the use of an intelligent pig, the removal of the asset from service will be required and careful co-ordination with the Operating Authority will be necessary.

11. The term pig is a generic term signifying any independent, self-contained or tethered device, tool or vehicle that moves through the interior of the pipeline for inspecting, dimensioning or cleaning. A pig may or may not be an in-line inspection tool.

12. The frequency of non-destructive examination should consider factors such as the product involved, the operating conditions, the operating climate, the age of the plant and the results of past testing.

SMALL BORE PIPELINES (Nominal Bore of 50mm or Less)

13. Above ground small bore single skinned steel pipelines will not normally require any testing, but must be subject to a visual inspection and maintenance regime that is designed to preserve the primary containment and detect any damage or leaks.

14. Below ground small bore single skinned steel pipelines (without leak detection) must be tightness tested before use and every five years thereafter.

15. A Small Bore Buried Steel Fuel Pipeline Assessment must be completed for each small bore below ground pipeline in accordance with and using the following form.

Small Bore Buried Steel Fuel Pipeline Assessment		
Pipeline identification/asset ref.		
Pipe length		
Pipe diameter		
Wall thickness		
Product carried by pipeline		
Fill line or draw off line		
	Yes, No, N/A or N/K	**Comment Reference No.**
Has Level 1 risk assessment been undertaken?		
Has the pipework been tightness tested?		*Steps must be taken, so as to minimise the risk of damage by impact so far as is reasonably practicable and the pipework must have no mechanical joints, except at a place which is accessible for inspection by removing a hatch or cover.* *If fitted with a leakage detection device which is used to continuously monitor for leaks, the device must be maintained in working order and tested at appropriate intervals to ensure that it works properly* *If made of materials which are liable to corrosion, it must be adequately protected against corrosion.*
Is further assessment recommended?		
Pipe Material: Mild Steel Galvanised steel Copper/Sleeved Durapipe Other Not Known		
Jointing Method: Welded Threaded Socket Not Known		
External Coating: Bitumen Enamel Tape Wrap Fusion bonded epoxy (FBE) Extruded polyethylene None Not known		
Is the pipe electrically isolated from above ground equipment by isolating joints or insulated flanges?		

Cathodic Protection: Sacrificial anodes Impressed current None Not Known		
Do monitoring records show the pipework is fully cathodically protected?		
Have any coating surveys/inspections been undertaken?		*Insert Coating survey (specify type), excavation inspections (No. /Date)*
Corrosion found from above survey/inspection?		
Has the pipe ever leaked?		*If yes, give details*
Local Ground Conditions: Local Soil type Cohesive (clay) Chalk Loam Sand Peat Other (specify) Not Known		
Is area well drained?		
Depth of water below ground level in metres, along the pipeline route Not Known Pipe Depth		
General comments: 1. *Include comments on any other issues or observations here.*		

ANNEX F – GUIDANCE ON THE GRADING AND REPORTING OF COMMON DEFECTS AND ISSUES

INTRODUCTION

Although this Technical Standard prescribes the reporting style through a standard report format, much of the technical content is left to the competency and professionalism of the certified inspector. This document provides guidance to inspectors on the grading of commonly observed defects and the subsequent reporting style in order to provide consistency in these areas.

The report's defect grading regime is summarised as follows:

Grade D (Major Non-Conformance) – This rating may be awarded for statutory or mandatory non-compliance. For example, an above ground single skin storage tank that has no secondary containment would be a contravention of environmental legislation.

Grade C (Minor Non-Conformance) – This rating may be awarded for risk to safety, the environment, operational effectiveness or serious dilapidation. For example, access steps on a storage tank which have degraded to a point where there is a safety risk.

Grade B (Observation) – This rating may be awarded for risk of an increased cost to maintenance if delayed and where work is required to maintain the value or utility of the estate. For example, light surface corrosion to primary containment.

GUIDANCE

Commonly observed defects covered by this Guidance are as follows:

- Coating defects
- Corrosion
- Signs
- Secondary containment defects
- Housekeeping
- MTFI earthing systems

Reporting style issues covered by this Guidance are as follows:

- Multiple defects of one type associated with one item of plant
- Multiple maintenance issues associated with one item of plant or one area
- Increasing grade severity for uncompleted actions
- Acknowledging good performance
- Reporting specific issues as opposed to defects
- Highlighting the importance of completing B grade action points
- Reporting actions that will take more than 12 months to clear
- Extensions to Certificates of Fitness for Continued Use

Commonly observed defects

Coating defects

1. Minor coating defects - grade B unless there is an underlying corrosion issue, in which case refer to the Corrosion section below.

Corrosion

1. Corrosion that is so light that the annual rate cannot yet be calculated or where the calculated annual rate is so small it will not affect primary containment efficacy, structural integrity or impact the structure's design code for the foreseeable future – grade B.
2. More defined corrosion where the visual condition or the calculated annual rate indicates that it will not affect primary containment efficacy, structural integrity or impact the structure's design code for a period of at least 24 months – grade B.
3. Significant corrosion where the visual condition or the calculated annual rate indicates that it is likely to affect containment efficacy, structural integrity or impact the structure's design code within a period of 24 months – grade C. The time period allowed should normally be 12 months unless the visual condition or rate of corrosion dictates a shorter period is warranted.

4. These design codes may include such standards as API 650 and BS EN 14015 for larger vertical tanks and ASME B31 for pipelines.
5. Maintenance repairs of corrosion defects must be followed by the appropriate repairs to the outer coating.

Signs

1. Product signs, tank capacities and other signs that have no specific immediate safety implication or are not a statutory requirement – grade B.
2. Signs that are a statutory requirement, such as "Ex" signs and signs that can be identified as having a specific immediate safety implication – grade C. The time period allowed should normally be 12 months unless the specific immediate safety implication dictates that a shorter period is warranted.

Secondary containment defects

1. Weed growth on the surface of secondary containment joints that has not penetrated to the point where will impact integrity within the following 12 months period – grade B
2. Weed growth in secondary containment joints that due to its severity, is likely to impact integrity within the following 12 months period – grade C. The time period allowed should be commensurate with the damage observed.
3. Minor shrinking or partial lifting of joint sealant that in the inspector's view will not impact integrity within the following 12 months period – grade B
4. Joint sealant damage that in the inspector's view will impact integrity within the following 12 months period – grade C. The time period allowed should be commensurate with the damage observed.
5. Surface cracking either on the inner or the outer face of the secondary containment that will not impact integrity within the following 12 months period – grade B
6. Cracks in the secondary containment that in the inspector's view will impact integrity within the following 12 months period – grade C. The time period allowed should be commensurate with the damage observed.
7. An integrity check of the secondary containment using water can be requested if there is doubt regarding the severity of the observed defects.

Housekeeping

1. Housekeeping issues such as extraneous combustible material in flammable dangerous goods stores, should where practicable, be resolved before leaving site, removing the necessity to list as an action point.
2. Where the option to resolve these housekeeping issues quickly has been offered but not actioned – grade B.
3. If there is a significant accumulation of combustible material over a prolonged period of time that is repeatedly not cleared, this should be explained in the Summary of Recommendations sections – grade C

Reporting style

Multiple defects of one type associated with one item of plant

1. Where multiple defects of one type are observed on one piece of plant, they should where possible be reported as one action point.
2. An example of this may be different areas of corrosion observed on and around one particular storage tank. This can be reported as "Minor areas of corrosion were observed on the roof, shell, underside of the wind girders and import pipeline of Tank T1" instead of listing separate action points.

Multiple maintenance issues associated with one item of plant or one area

1. Where multiple maintenance issues are observed with one item of plant, with one area of an installation, or with one installation, they should where possible be reported as one action point.
2. An example of this method of reporting is as follows "Records indicate that pressure gauges have not been calibrated, valve stems have not been greased and automatic control valves have not been serviced across the site" instead of listing separate action points.

Increasing grade severity for uncompleted actions

1. Action points graded B in a previous year's report should not automatically be increased in severity to a higher grade due to non-completion.
2. An increase in grade should only be awarded to an action if the risk has increased commensurately. This can be in line with the guidance as outlined in Section 2.3 above.

Acknowledging good performance

1. Where appropriate, it should be considered good practice to acknowledge good performance in the main summary of recommendations. This will provide a measure balance to a report, the primary purpose of which is to highlight defects and shortcomings.
2. This can be achieved with phrases such as "Good progress has been made in addressing action points during the last 12 months" and "Those defects that remain outstanding are funded and programmed for completion in the period…."

Reporting specific issues as opposed to defects

1. Where specific issues arise, these can be brought to the attention of the report's audience in the Summary and Recommendations section.
2. An example of this type of issue would be the successive non-completion of grade B actions that do not yet warrant an increased grade severity.

Highlighting the importance of completing B grade action points

1. In order to address the potential problem of B grade defects not being funded or actioned, a standard phrase should be inserted into the "Summary and Recommendations" section of the report under the "General" heading.
2. The standard phrase to be used is as follows, "Assigning a B grade to an identified defect, which is also listed in the "Table of defects and rated seriousness" does not imply that the defect need not be addressed, but simply that there is currently not the level of risk to warrant a C grade. It should be noted that B grade actions can be elevated to a C grade in subsequent reports if the level of risk increases, for whatever reason, to warrant that more serious grade".
3. If there are specific areas of concern where grade B actions are repeatedly not completed due to a lack of funding, this should be specifically highlighted in the relevant section of the Summary and Recommendations.

Reporting actions that will take more than 12 months to clear

1. Significant or complex projects can in many cases take considerably longer to complete than the 12 month cycle of the PG06/12 inspection. This can lead to C or D grade actions points that cannot possibly be completed within the current maximum specified period. It should be noted that grade D defects may require additional mitigation measures, such as shutdown or isolation, due to the high risk that this type of defect represents.
2. Where you request actions points that will involve significant lead times for planning, design and execution of the task, you should consider a phased approach for your report requirements.
3. A simple non-specific example of this is a desired outcome achieved by using the first 12 months to ensure that funding is approved and a plan is produced, with the second 12 months to complete the design and tender the work and the final 12 months to execute the plan.
4. This approach may only be appropriate where the risk of the original defect is considered to be manageable.

Extensions to Certificates of Fitness for Continued Use

1. Where time limited C and D grade action points have not been completed for a particular installation within the time frame allowed, it is not unusual to be asked by site for an extension to the Certificate of Fitness for Continued Use. It should be noted that grade D defects may require additional mitigation measures, such as shutdown or isolation, due to the high risk that this type of defect represents.
2. A primary objective of the inspector may be seen as ensuring completion of the desired remedial work, but before any decision is taken, all the relevant factors should be carefully considered.
3. These factors should include, but not necessarily be limited to the following:
    a. Was the original grading and time frame allowed unrealistic?
    b. Has the remedial task expanded in scope beyond that originally envisaged?
    c. Has the risk associated with the defect changed?

    d. Is there a clear commitment to fund the proposed work?
    e. Has the work package been awarded to a contractor yet?
    f. Is there a firm programme for the works with a defined completion date?
4. It is not a required function of the PG06-12 inspection or the role of the inspector to consider the availability of funds or the shortage of labour when making his decision.
5. If you are satisfied however that the risk associated with the defect has not increased to an unacceptable level, it may be appropriate to review the original limitations on the Certificate of Fitness for Continued Use.
6. If you choose to extend a Certificate of Fitness for Continued Use, your decision and rationale must be articulated in the Summary and Recommendations section of the report.
7. If you choose to extend a Certificate of Fitness for Continued Use in the period between annual inspections, your decision and rationale must be articulated in a confirmatory email to site.

ANNEX G – STANDARD REPORT FOR THE PROFESSIONAL INSPECTION OF FUEL INSTALLATIONS AND FLAMMABLE GOODS STORES

1. The objective of this standard report format is to:

    a. Ensure that specific items of the inspection are always covered

    b. Ensure that inspections are completed to a uniform minimum standard

    c. Provide a method of reporting by which clear comparisons can be made with previous reports and comparable installations.

2. This standard report format is structured to enable the inspector to delete non-applicable sections.

3. The text in italics in this standard report format is intended to provide guidance and to indicate where site/inspection specific information is to be inserted. It is not intended to be prescriptive or to constrain the inspector from recording those observations that are considered relevant.

4. Photographs may be included within the report to highlight particular issues provided that site procedures for photographic equipment are adhered to and the resultant file size is not excessive.

5. Additional observations that the inspector wishes to make regarding subjects not covered by the standard report format should be recorded in the separate boxes marked General Comments (guidance regarding the type of comments to be included is given in italics).

Ministry of Defence

INSPECTION OF FUEL INSTALLATIONS AND FLAMMABLE DANGEROUS GOODS STORES

CONTRACT: *The name of the MMO contract or organisation operating the sites*

SITES COVERED BY THIS REPORT:

1. *Site*
2. *Site*

AUTHOR: *The name of the Inspecting Engineer*
CHECKED BY: *The name of the Checking Engineer*

DATE OF INSPECTION: *The date the inspection was carried out*

CONTENTS

1.0 INTRODUCTION

The purpose of this inspection is to:

a. Confirm compliance with appropriate legislation.

b. Confirm that there is a maintenance management system in place and that the installations are being maintained to the appropriate standard.

c. Report on the visual condition of the installations.

d. Review non-destructive examination data to ensure appropriate future actions are programmed.

e. Confirm that the installations can continue to be used until the next annual inspection or to define the actions required.

Date of inspection	*Enter the date that the inspection took place*
Date of previous inspection	*Enter the date that the previous inspection took place*
Date of existing Certificate for Continued Operation/FSAA	*From site records*
MMO Name	*The name of Maintenance Management Organisation*
MMO Site Contact **Email address**	*Name* *email address*
DIO Facility Manager or Site Estates Team Leader **Email address**	*Name* *email address*
Operating Authority **Email address**	*Name* *email address*
Fuel and Gas Safety Regulator **Email address**	DSA-DLSR-FGSRInspGroup@mod.gov.uk
DIO Technical Authority **Email address**	DIO-ptsaudits@mod.uk
AP PET **Email address**	*Enter the name of the lead AP PET and email address for forwarding a copy of the report*
AE PET **Email address**	*Enter the name of the AE PET for the site and email address for forwarding a copy of the report*
Inspector **Email address**	*Name* *email address*

2.0 SUMMARY AND RECOMMENDATIONS

This summary of recommendations and the following table of defects should be read in conjunction with the complete report, which contains further detail and actions.

This visual inspection has been carried out in accordance with the extant Technical Standard for the Inspection of Petroleum Installations and Flammable Dangerous Goods Stores and the installations inspected were identified from the schedule provided.

Insert the appropriate numbers relating to the asset types in the table below.

Asset type	Total number	Fit for continued use	Fit for continued use with restrictions	Not fit for continued use
Bulk fuel installations				
Semi permanent aviation installations				
Motor transport fuelling installations				
Product receipt enclosures				
Pipelines				
Hydrant systems				
Flammable dangerous goods stores				
Ancillary installations				

During the inspection, a number of defects and areas of improvement were noted and the most significant are detailed as follows:

Bulk Fuel Installations – *This section should include comments on airfield BFIs, PSDs, slops tanks, buffer tanks and other bulk fuel storage.*

Semi Permanent Installations – *This section may refer to proprietary skid mounted aircraft equipment or other similar installations.*

Product Receipt Enclosures – *This section may refer either to a separate fenced enclosure or to an area within another installation, such as a BFI pump room that includes the equipment.*

Marine Facilities – *This section may be used where the Inspector feels that comment on any aspect of the marine off loading facilities or their records is warranted.*

Pipelines – *This section should include comments on cross country, cross base, naval jetty pipelines or similar and pig installations where appropriate. It does not apply to small bore pipelines (50 mm or less).*

Hydrant Systems – *This section should include comments on the hydrant and de-fuel line, any associated valve pits and the hydrant couplers.*

Motor Transport Fuelling Installations – *This section refers to fixed dispensing installations but should also include any ad hoc installations observed.*

Flammable Dangerous Goods Stores – *This section should include comments on any buildings, barns or open compounds inspected.*

Ancillary Installations – *This section should include the statement regarding who has carried out the checks on these tanks, whether there are any non compliance issues associated with Statutory Duties, whether there is an appropriate inspection and planned maintenance regime in place and whether that maintenance regime is being implemented by the MMO.*

Maintenance – *This section should be used to provide a general statement on the maintenance records based solely on the checks carried out during the inspection and any significant issues observed.*

General – *Include here anything that does not fit under the headings above. For example comments on maintenance, installation records, spillage response plans or compliance issues with specific legislation. Also, any instances of items (that require an inspection) noticed on site during the inspection, but that are not on the inspection list.*

Include here a statement that an out-brief has taken place and include the names and roles of attendees.

Table of defects and rated seriousness

The defects noted during the inspection are listed in the following table. Alongside each entry is a rating to indicate the seriousness of the defect with regard to the long-term life and maintenance requirements of the facility.

Serial No.	Location	Defect	Rating
	To include the local identifier e.g. building number or asset number	*A description of the defect and/or suggested remedial action*	*As per Section 4*

3.0 CERTIFICATE OF FITNESS FOR CONTINUED USE *(Shown as example)*

This certificate confirms that the petroleum installations and flammable dangerous goods stores are either:

Fit for continued use until the next inspection or for a period of twelve months, whichever is sooner

or

Fit for continued use for a specified period or under other restrictions to allow defined actions to be implemented

or

Not fit for continued use

Asset description and ID	Status	Action close out
Bulk Fuel Installation *RAF Anywhere – BFI 1* *RAF Anywhere – BFI 2*	***Not fit*** *for continued use until the completion of actions 5, 8, 13, 18 19, 49, 53, 54, 56, 59, 64 and 65. Thereafter fit for continued use* ***only until*** *[date] to allow completion of tasks 15 and 17* *Fit for continued use*	*Date, job reference, file reference*
Semi Permanent Installation	*N/A*	
Product Receipt Enclosure	*N/A*	
Cross Base Pipeline	*N/A*	
Hydrant System	*N/A*	
Motor Transport Fuelling Installation *RAF Anywhere – MTFI 3*	*Fit for continued use*	
Flammable Dangerous Goods Store *RAF Anywhere – Building 4*	*Fit for continued use* ***only until*** *[date] to allow completion of tasks 25 and 27*	
Ancillary Installations	*The MMO declaration was provided and confirms that these tanks comply with current legislation and are subjected to an appropriate maintenance regime.*	

	Name	Signature	Date
Inspector			
Counter-signature (if required)			

4.0 INSPECTION PROCEDURES

The following installations were inspected:

INSTALLATIONS INSPECTED	IDENTIFICATION
Bulk Fuel Installations	*In each of these sections, the installations examined should be recorded using the local identifier e.g. building or asset number*
Semi Permanent Installations	
Product Receipt Enclosure	
Pipelines	
Hydrant Systems	
Mechanical Transport Fuelling Installations	
Flammable Dangerous Goods Stores	
Ancillary Installations	

The inspection commenced with a visual examination of the installations listed above to check on the condition of plant, to note any defects and to look for indications that maintenance was being carried out. Any signs of recent work (such as the replacement or removal of valves, or the renewal of filter elements in separators) were noted such that the information could be used for auditing the maintenance records. Defects were also noted.

The second part of the inspection involved an examination of a sample of the maintenance management organisation's detailed records to see if the required maintenance records were present, to check that any maintenance recently carried out (as witnessed by the visual inspection) had been recorded and to check that the frequency of planned maintenance operations is suitable and sufficient and in line with relevant reference documents. Other documents associated with the Dangerous Substances Explosive Atmospheres Regulations (DSEAR) and the Unit Spillage Response Plans were reviewed

During the course of the inspection, a representative of the Operating Authority was approached to describe the operation and maintenance of the installations. In carrying out these various inspections, the views of the maintenance management organisation and operators of the installations were sought to see if there were any problems experienced relating to the operation and maintenance of the installation.

This visual inspection report includes an opinion on each part of the facility regarding its ability to perform its duty and includes a description of its visual condition. In describing a defect, a relevant rating is applied to provide an indication of the seriousness.

The rating is an indication of the seriousness of the defect; this will be arrived at by considering the number of defects, whether the defect is contrary to statute (law) and the risk of continued use of the installation. Other factors will include conformance to MOD mandated publications, manufacturer's requirements, current usage, age and historical data for the type of installation.

The grading methodology follows the JSP 434 framework.

KEY TO GRADING:

Grade D (Major Non-Conformance/s) – The Regulator may award an Immediate Prohibition Notice as a result of this rating. This rating may be awarded for statutory or mandatory non-compliance.
Immediate action will be to make safe, by physical (mechanical and/or electrical isolation) or enhanced operational procedures put in place, with a programme of repair implemented and time scales defined.

Grade C (Minor Non-Conformance/s) – The Regulator may award an Immediate Prohibition Notice or an Improvement Notice as a result of this rating. This rating may be awarded for risk to safety, the environment, operational effectiveness or serious dilapidation.
Asset has continued use with a programme of repair implemented within a specified time scale.

Grade B (Observation/s) – The Regulator may award an Improvement Notice as a result of this rating. This rating may be awarded for risk of an increased cost to maintenance if delayed and where work is required to maintain the value or utility of the estate.
Asset has continued use, with these observations monitored. Funding required within three years.

Note: Within this grading structure where required actions have not been taken there is potential that where the risk is perceived to have increased, a Grade B (Observation) can become a Grade C (Minor Non-Conformance) and Grade C (Minor Non-Conformance) can become Grade D (Major Non-Conformance).

5.0 VISUAL INSPECTION OF THE INSTALLATIONS

Mounded or Below Ground BFI - Visual Inspection Report		
ID	*The local identifier e.g. building or asset number*	
Type of installation	*The type e.g. horizontal single or twin skin or NATO type vertical cylindrical single skin splinter protected etc. and its purpose e.g. aviation fuel for helicopter refuelling. Enter the manufacturer of the installation if known*	
Number of tanks	*Number of tanks in the BFI*	
Capacity of each tank (litres)	*As marked on the tank or from the records*	
Product	*As marked on the tank or from the records*	
Date constructed (approx)	*On the tank information plate or in the records*	
Date internally lined	*The date of the last lining application*	
Last inspection date	*As marked on the tank or from the records*	
Next inspection date	*As marked on the tank or from the records*	
Last clean date	*As marked on the tank or from the records*	
Next clean date	*As marked on the tank or from the records*	
Last non destructive test type & date	*Ultrasonic, MFL etc. report ref. & date completed*	
Number, make and model of FWS	*From a visual inspection of equipment or records*	
Number, make and model of pumps	*From a visual inspection of equipment or records*	
Number, make and model of FWM	*From a visual inspection of equipment or records*	
Last dispense meter calibration	*From the maintenance records*	
Last electrical test date	*From the maintenance records*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Condition of tanks: Rust on exposed metal? Access steps and handrails sound? PV valves in good condition? Evidence of leakage? Paintwork acceptable? Valve stems greased? Cathodically protected? Evidence of instability of mound? Level gauging?		
Comments: 1. *Are the access steps and associated handrails to the top of the tank, handrails around the top and any tank top walkways sound?* 2. *Does the tank have PV valves or open vents? Do the PV valves look maintained and if open vents have protective mesh, are they clear of paint and other debris?* 3. *Are the tanks cathodically protected and are there any reported problems?* 4. *Does the earth mound look like it is becoming unstable, perhaps through the activity of rabbits or heavy rain?* 5. *Check for cracks or signs of leakage on weld joints, manways and reinforcing plates.* 6. *Record the type of gauging e.g. radar, servo etc. Check for damage, its general condition and whether there are reported problems.*		
Condition of pump and filter area: Rust on piping? Rust on equipment? Paintwork acceptable? Pressure gauges acceptable? Differential pressure gauges acceptable? Evidence of leakage? Notices in order? Schematic shown?		

Neat and tidy? Valve stems greased? Filters last/next change date?		
Comments: 1. *Do the gauges and differential pressure gauges appear operational and calibrated?* 2. *Check for cracks or signs of leakage on weld joints and flanges.*		
Condition of dispense points: Rust on piping? Rust on equipment? Paintwork acceptable? Meter acceptable? Pressure gauges acceptable? Valve stems greased? Hose condition acceptable? Earth system acceptable?		
Comments: 1. *Do the gauges and differential pressure gauges appear operational and calibrated?* 2. *You should determine whether the hoses are pressure tested, you should record the test date and age of hose.* 3. *Is the earth system sound and secure?*		
Condition of road offload points: Rust on piping? Rust on equipment? Paintwork acceptable? Pressure gauges acceptable? Valve stems greased? Earth system acceptable?		
Comments: 1. *Do the gauges and differential pressure gauges appear operational and calibrated?* 2. *You should determine whether the hoses are pressure tested, you should record the test date and age of hose.* 3. *Is the earth system sound and secure?*		
Condition of control room: Clean and tidy? Level gauges working? Temperature gauges working? Fire panel working? Alarms functioning? Damaged equipment? ATG regularly maintained? ATG system backed up and stored in a separate safe location? Silent hours leak detection alarms routed to permanently manned location? ATG incorporates independent high/high alarms that stop pumps or isolates the installation?		

Comments: 1. *If there is an automatic tank gauging system, you should ask to see it working and confirm that the readings being displayed for level and temperature are reasonable. You should also ask the Operating Authority whether there are any known problems*		
Condition of generator house: Generator in good condition? Leaks in generator area? Diesel bulk tank rusty? Leaks from bulk tank? Valve stems greased? Bulk tank equipment acceptable? Level gauges working? Paintwork acceptable?		
Comments: 1. *Is the generator and oil tank system in a condition that gives cause for concern about its ability to function as intended?*		
Condition of secondary/tertiary containment: Would a failure of the storage tank be detected or contained? Would a failure of the ancillaries be detected or contained? Risk assessment for tertiary containment completed? Do the tertiary containment measures appear adequate?		
Comments: 1. *You should ask about the measures that are in place/deployable should there be a breach of the secondary containment or where there is no defined secondary containment.* 2. *The risk assessment can utilise COMAH, EA & CIRIA guidelines.*		
Condition of interceptor: Operational and in sound condition? Emptied regularly? Clean and tidy? Access available?		
Comments: 1. *Record whether access was available and if possible your observations regarding signs, general condition and any contamination observed.*		
Condition of electrical equipment: Hazardous area classification plan? Equipment appropriate for hazardous area in accordance with the ATEX equipment register? Exposed SWA on gland terminations? Unauthorised equipment modifications or additional holes? Are tanks, FWS, pumps and supports earthed and earth straps across pipeline flanges? Are earth tapes/conductors identified with equipment description?		

Are main earth bars identified, including test point for mat/electrode? Are junction boxes for Intrinsically Safe (IS) circuits clearly identified as such?		
Comments: 1. *Record whether there was a hazardous area classification plan available in accordance with the requirements of DSEAR.* 2. *Check the protection rating for equipment to determine whether it complies with the hazardous zone classification and equipment register*		
General comments: *1. Include comments on any other issues or observations here.* *2. Are signs adequate?* *3. What is the general housekeeping like?* 4. *State whether there is an up to date Certificate for Continued Operation displayed or FSAA available*		

Above Ground BFI - Visual Inspection Report	
ID	*The local identifier e.g. building or asset number*
Type of installation	*The type e.g. horizontal cylindrical or vertical, whether single skinned in a bund or integrally bunded and its purpose e.g. aviation fuel for aircraft refuelling. Enter the manufacturer of the installation if known.*
Number of tanks	*Number of tanks in the BFI*
Last non destructive test type & date	*Ultrasonic, MFL etc. report ref. & date completed*
Number, make and model of FWS	*From a visual inspection of equipment or records*
Number, make and model of pumps	*From a visual inspection of equipment or records*
Number, make and model of FWM	*From a visual inspection of equipment or records*
Last dispense meter calibration	*From the maintenance records*
Last electrical test date	*From the maintenance records*

Condition of tanks:

For each storage tank in the installation, the following points should be addressed

Tank No. *Local identifier* **Capacity (litres)** *From records* **Product** *From records*
Constructed *From records* **Date lined** *From records* **Last cleaned**
Last inspection **Next clean** **Next inspection**
Last NDT type and date *Ultrasonic, MFL etc. report ref. & date completed*

Concrete ring or exposed foundation –
Is there broken concrete or cracks? Is there obvious settlement and is there vegetation against the bottom of the tank?

Tank –
Is there rust on exposed metal and is the paintwork acceptable? Are the access steps and associated handrails to the top of the tank, handrails around the top and any tank top walkways sound? Does the visible base appear sound and is the tank to visible base seal intact? Check for cracks or signs of leakage on weld joints, manways and reinforcing plates. Are cable connections to earthing lugs sound? Is there grooving, corrosion, pitting or coating failure on the visible internal surfaces of floating roof tanks?

Pipework –
Check for cracks or signs of leakage on weld joints and flanges. Is there rust on exposed metal and is the paintwork acceptable for the pipework, valves and other fittings? Are valve stems greased?

Secondary containment – *You should address each of the questions below*
Contains at least 110% of the largest tank or 25% of total storage, whichever is greatest?
Impermeable to water and/or oil?
Intact and without openings or valves for drainage?
Pipes that pass through sealed adequately?
Vent pipes, taps and valve arranged so that oil will be retained?
Signs of product staining?
Access acceptable?
Area outside the bund clear of signs of spillage?
Expansion joints in both bund floor and walls, intact?
Fire resistant structural integrity, joints and pipework penetrations?
Expanding fire resistant sealing to current standards?

Level gauge –
Record the type of gauging e.g. radar, servo etc. Check for damage, its general condition and whether there are reported problems.

PRVs –
Is there thermal pressure relief across main tank and main pipework isolating valves and does it look maintained?

Vents –
Does the tank have PV valves or open vents? Do the PV valves look maintained and if open vents have protective mesh, are they clear of paint and other debris?

Access –
Are the access steps and associated handrails to the top of the tank, handrails around the top and any tank top walkways sound?

General –
Is the tank cathodically protected and are there any reported problems? What is the general housekeeping like and are signs adequate?

Tank No. *Local identifier* **Capacity (litres)** *From records* **Product** *From records*
Constructed *From records* **Date lined** *From records* **Last cleaned**
Last inspection **Next clean** **Next inspection**
Last NDT type and date *Ultrasonic, MFL etc. report ref. & date completed*

	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Condition of pump and filter area: Rust on piping? Rust on equipment? Paintwork acceptable? Pressure gauges acceptable? Differential pressure gauges acceptable? Evidence of leakage? Notices in order? Schematic shown? Neat and tidy? Valve stems greased? Filters last/next change date?		
Comments: 1. *Do the gauges and differential pressure gauges appear operational and calibrated?* 2. *Check for cracks or signs of leakage on weld joints and flanges.*		
Condition of dispense points: Rust on piping? Rust on equipment? Paintwork acceptable? Meter acceptable? Pressure gauges acceptable? Valve stems greased? Hose condition acceptable? Earth system acceptable?		
Comments: 1. *Do the gauges and differential pressure gauges appear operational and calibrated?* 2. *You should determine whether the hoses are pressure tested or visually inspected, you should record the test date and age of hose.* 3. *Is the earth system sound and secure?*		

Condition of road offload points: Rust on piping? Rust on equipment? Paintwork acceptable? Pressure gauges acceptable? Valve stems greased? Earth system acceptable?		
Comments: 1. *Do the gauges and differential pressure gauges appear operational and calibrated?* 2. *You should determine whether the hoses are pressure tested, you should record the test date and age of hose.* 3. *Is the earth system sound and secure?*		
Condition of control room: Clean and tidy? Level gauges working? Temperature gauges working? Fire panel working? Alarms functioning? Damaged equipment? ATG regularly maintained? ATG system backed up and stored in a separate safe location? Silent hours leak detection alarms routed to permanently manned location? ATG incorporates independent high/high alarms that stop pumps or isolates the installation?		
Comments: 1. *If there is an automatic tank gauging system, you should ask to see it working and confirm that the readings being displayed for level and temperature are reasonable.* 2. *You should also ask the Operating Authority whether there are any known problems.*		
Condition of generator house: Generator in good condition? Leaks in generator area? Diesel bulk tank rusty? Leaks from bulk tank? Valve stems greased? Bulk tank equipment acceptable? Level gauges working? Paintwork acceptable?		
Comments: 1. *Is the generator and oil tank system in a condition that gives cause for concern about its ability to function as intended?*		
Condition of secondary/tertiary containment: Would a failure of the storage tank be detected or contained? Would a failure of the ancillaries be detected or contained? Risk assessment for tertiary containment completed?		

Do the tertiary containment measures appear adequate?		
Comments: 1. *You should ask about the measures that are in place/deployable should there be a breach of the secondary containment or where there is no defined secondary containment.* 2. *The risk assessment can utilise COMAH, EA & CIRIA guidelines.*		
Condition of interceptor: Operational and in sound condition? Emptied regularly? Clean and tidy?		
Comments: 1. *Record whether access was available and if possible your observations regarding signs, general condition and any contamination observed.*		
Condition of electrical equipment: Hazardous area classification plan? Equipment appropriate for hazardous area in accordance with the ATEX equipment register? Exposed SWA on gland terminations? Unauthorised equipment modifications or additional holes? Are tanks, FWS, pumps and supports earthed and earth straps across pipeline flanges? Are earth tapes/conductors identified with equipment description? Are main earth bars identified, including test point for mat/electrode? Are junction boxes for Intrinsically Safe (IS) circuits clearly identified as such?		
Comments: 1. *Record whether there was a hazardous area classification plan in accordance with the requirements of DSEAR available.* 2. *Check the protection rating for equipment to determine whether it complies with the hazardous zone classification and equipment register.*		
General comments: 1. *Include comments on any other issues or observations here.* 2. *Are signs adequate?* 3. *What is the general housekeeping like?* 4. *State whether there is an up to date Certificate for Continued Operation displayed or FSAA available.*		

Semi Permanent Aviation Installations - Visual Inspection Report		
ID	*The local identifier e.g. building or asset number*	
Type of installation	*Enter the manufacturer of the installation, the type e.g. horizontal cylindrical skid and its purpose e.g. aviation fuel for helicopter refuelling*	
Capacity of tank (litres)	*As marked on the tank or from the records*	
Product	*As marked on the tank or from the records*	
Date constructed (approx)	*On the tank information plate or in the records*	
Single skin or integral containment	*Single skin with separate bund or integral containment*	
Type of filters installed	*E.g. coalescing, particulate etc*.	
Make and model of pump	*From a visual inspection of equipment or records*	
Last dispense meter calibration	*From the maintenance records*	
Last electrical test date	*From the maintenance records*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Condition of tanks: Rust on exposed metal? Adequate secondary containment? Interstitial monitoring? PV valve or open vent in good condition? Evidence of leakage? Paintwork acceptable? Instruments acceptable? Access to tank top acceptable?		
Comments: 1. *Is the secondary containment at least 110% of the volume of the primary containment, is there adequate means of monitoring the interstitial space and are there sufficient instruments to fulfil the required tasks?* 2. *Does the tank have a PV valve or open vent? Does the PV valve look maintained and if open vents have protective mesh, are they clear of paint and other debris?*		
Condition of pump/dispense area: Rust on piping? Rust on equipment? Paintwork acceptable? Meter acceptable? Pressure gauges acceptable? Differential pressure gauges acceptable? Evidence of leakage? Notice in order? Planometric shown? Neat & tidy? Valve stems greased? Filters last/next change date? Adequate secondary containment? Hose condition acceptable? Earth system acceptable? Alarms adequate?		
Comments: 1. *You should decide whether the gauges, any differential pressure gauges and meters appear operational and calibrated.* 2. *You should determine whether the hoses are pressure tested, record the date and age of hose.* 3. *Confirm that the earth system is sound and secure and that the flying lead is long enough.*		

4. *You should confirm that the secondary containment is adequate for this part of the installation, that it can be emptied and that the relevant alarms are acceptable.*		
Condition of secondary/tertiary containment: Would a failure of the storage tank be detected or contained? Would a failure of the ancillaries be detected or contained? Risk assessment for tertiary containment completed? Do the tertiary containment measures appear adequate?		
Comments: 1. *You should ask about the measures that are in place/deployable should there be a breach of the secondary containment or where there is no defined secondary containment.* 2. *The risk assessment can utilise COMAH, EA & CIRIA guidelines.*		
Condition of interceptor for installation: Served by an interceptor? Operational? Emptied regularly? Clean & tidy?		
Comments: 1. *Record whether the area in which the installation is placed is served by an interceptor and if not, whether an appropriate environmental risk assessment has been completed.* 2. *If there is an interceptor, record whether access was available and if possible your observations regarding general condition and any contamination observed.*		
Condition of electrical equipment: Hazardous area classification plan? Equipment appropriate for hazardous area in accordance with the ATEX equipment register? Exposed SWA on gland terminations? Unauthorised equipment modifications or additional holes? Are tanks, FWS, pumps and supports earthed and earth straps across pipeline flanges? Are earth tapes/conductors identified with equipment description? Are main earth bars identified, including test point for mat/electrode? Are junction boxes for Intrinsically Safe (IS) circuits clearly identified as such?		
Comments: 1. *Record whether there was a hazardous area classification plan in accordance with the requirements of Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) available and comment on any areas of disagreement with suggested changes.* 2. *Check the protection rating to determine whether it complies with the hazardous zone classification and equipment register.*		
General comments:		

1. *Include comments on any other issues or observations here.*
2. *Are signs adequate?*
3. *What is the general housekeeping like?*
4. *State whether there is an up to date Certificate for Continued Operation displayed or FSAA available.*

Product Receipt Enclosure - Visual Inspection Report		
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Condition of PRE facility: Rust on pipework? Evidence of leakage? Paintwork acceptable? Pressure gauges acceptable? Valves greased?		
Comments: *1. Do the gauges and differential pressure gauges appear operational and calibrated?*		
Condition of microfilters: Rust on pipe work? Evidence of leakage? Paintwork acceptable? Pressure gauges acceptable? Differential pressure gauges acceptable? Flow indicators acceptable? Dosing pots acceptable? Valves greased?		
Comments: 1. *Do the gauges and differential pressure gauges appear operational and calibrated?* 2. *You should ask the Operating Authority whether there are any known problems with the filter.*		
Condition of back flush tank: Rust on tank? Rust on piping? PV valve in good condition? Evidence of leakage? Paintwork acceptable? Pressure gauges acceptable? Level gauges acceptable? Pump acceptable? Valves greased?		
Comments: *1. Does the PV valve on the back flush tank appear to be maintained?* *2. If the level gauge is part of the fuel management system, you should you should ask to see it working and confirm that the readings being displayed are reasonable.* *3. You should also ask the Operating Authority whether there are any known problems.*		
Condition of electrical equipment: Hazardous area classification plan? Equipment appropriate for hazardous area in accordance with the ATEX equipment register? Exposed SWA on gland terminations? Unauthorised equipment modifications or additional holes?		

Are pumps and supports earthed and earth straps across pipeline flanges? Are earth tapes/conductors identified with equipment description? Are junction boxes for Intrinsically Safe (IS) circuits clearly identified as such?		
Comments: 1. *Record whether there was a hazardous area classification plan available in accordance with the requirements of DSEAR.* 2. *Check the protection rating to determine whether it complies with the hazardous zone classification and equipment register.*		
General comments: 1. *Include comments on any other issues or observations here.* 2. *Comment on any common / linked safety, alarm and shut down systems between the site and the Oil and Pipeline Agency.* 3. *What is the general housekeeping like and are signs adequate?* 4. *Include comments on pigging facilities where they are included.*		

Pipeline - Visual Inspection Report		
BFIs connected to pipeline	*Use the local identifiers*	
Date constructed (approx)	*From the records*	
Pipeline diameter	*From the records or your measurement*	
Above or below ground	*E.g. buried, partially buried or above ground*	
Last non destructive test type & date	*E.g. pressure test, coating survey etc. report ref. & date completed*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Condition of pipeline: Is the route marked? Is the pipeline cathodically protected? Isolation flanges acceptable? Adequate provision for thermal expansion? Leak detection system acceptable? Evidence/signs of leakage? Pipeline supports acceptable? Signs of ground settlement? Is fuel reconciliation accurate enough to detect leaks?		
Comments: 1. *Are the routes of buried pipelines clearly identified with marker posts and have above ground pipelines been designed with adequate provision for thermal expansion?* 2. *Where cathodic protection is by impress current you should record any known problems and you should check both a sample of test points to ensure that they are intact and that isolation flanges look in good condition.* 3. *State location/position of the CP supply and control panel.* 4. *Where fitted, does the leak detection system have any known problems?*		

List of valve pits inspected:										
Condition of valve pits: Covers removable? Rust on exposed metal? Evidence of leakage? Paintwork acceptable? Valves acceptable? Water accumulation? Valve stems greased?	1	2	3	4	5	6	7	8	9	10
Comments: 1. *When answering these questions you should consider whether the evidence indicates that the isolation, drain and vent valve pits are being maintained.*										
General comments: 1. *Include comments on any other issues or observations here. Include comments on pigging facilities where they are included.*										

Hydrant Pipeline - Visual Inspection Report										
BFIs connected to pipeline	*Use the local identifiers*									
Date constructed (approx)	*From the records*									
Pipeline diameter	*From the records or your measurement*									
Last non destructive test type & date	*E.g. pressure test, coating survey etc. report ref. & date completed*									
	Yes, No, Not Applicable or Not Known					**Comment Reference No.**				
Condition of pipeline: Is the route marked? Is the pipeline cathodically protected? Isolation flanges acceptable? Leak detection system acceptable? Evidence/signs of leakage? Pipeline supports acceptable? Signs of ground settlement? Is fuel reconciliation accurate enough to detect leaks?										
Comments: 1. *Are the routes of buried pipelines in soft ground clearly identified with marker posts?* 2. *Where cathodic protection is by impress current you should record any known problems and you should check both a sample of test points to ensure that they are intact and that isolation flanges look in good condition.* 3. *State location/position of the CP supply and control panel.* 4. *Where fitted, does the leak detection system have any known problems?*										
Line valve pits inspected:										
Condition of line valve pits: Covers removable? Rust on exposed metal? Evidence of leakage? Paintwork acceptable? Valves acceptable? Water accumulation? Valve stems greased?										
Comments: 1. *This section refers to the main valve pits for the hydrant line to the dispersal area and de-fuel line if appropriate.* 2. *You should consider whether the evidence indicates that the isolation, drain and vent valve pits are being maintained.*										
Condition of Hydrant pits: Covers removable? Dust caps serviceable? Signs of fuel leak? Lanyard to the pilot valve intact? Pilot valve operates without leaks? Deadman's handle intact? Rust on seats? Earth point sound?	1	2	3	4	5	6	7	8	9	10

Comments:

1. *Some hydrant couplers will have a visible pilot valve to release pressure on the seat and no Deadman handle, which will be on the hydrant cart and some will not have a visible pilot valve, but will have a Deadman handle.*
2. *Where possible, opening and closing the pilot valves will indicate whether the main valve seats leak.*
3. *You should check the adjacent earth point to ensure that it is sound.*

General comments:

1. *Include comments on any other issues or observations here.*

Mechanical Transport Fuelling Installations with Below Ground Storage Tanks - Visual Inspection Report		
ID	*Use the local identifiers*	
Type of installation	*Single or twin skinned horizontal cylindrical etc. and material. Most tank installations will be below ground, but if above ground, an Above Ground Ancillary Storage Tank Installation sheet must be completed in addition, which will include comment on the underground pipework.*	
Number of tanks	*Number of tanks in the installation*	
Type of leak detection	*From the records*	
Capacity of each tank (litres)	*As marked on the tank or from the records*	
Type of wet stock management system	*Automatic (record manufacturer) and/or dips* *This may include an Automatic Fuelling Dispensing System (AFDS) and/or an automatic tank gauging (ATG) system*	
Number, make and model of dispensers	*From a visual inspection of equipment or records*	
Product	*As marked on the tank or from the records*	
Date constructed (approx)	*As marked on the tank or from the records*	
Electrical supply arrangements	*Record whether TT, TN-S or TNC-S* *Where an existing electrical installation is supplied from a TNC-S system in which the neutral and protective functions are combined in part of the system to provide PME, stray currents passing through metalwork located in potentially hazardous areas may pose an increased risk of fire or explosion.*	
Make, type and capacity of OWI	*From the records or data plate*	
Last non-destructive test type & date	*E.g. precision tank tightness test (integrity test) etc. report ref. & date completed*	
Last dispense pump calibration	*From the maintenance records*	
Last electrical test date	*From the maintenance records*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Condition of tanks: Rust on exposed metal? Paintwork acceptable? Evidence of leakage? Leak detection system working? Manway free of product? Manway free of water? Vents clear from obstruction – 3m radius? Tanks and vents correctly labelled? Vapour recovery system fitted? Vapour recovery system operating instructions available?		
Comments: 1. *If there is leak detection installed, are there any known problems with the system?*		
Condition of fuel dispenser pumps: Rust on exposed metal? Evidence of leakage? Staining of floor? Paintwork acceptable? Hose condition acceptable? Pistol condition acceptable?		

Dispense pump condition acceptable? Stage 2 vapour recovery fitted?		
Comments: 1. *The hose should be sound, free of serious damage and fitted with safety break couplings.* 2. *For all self service installations the latching pins should be removed from the pistol and the pistol should be free from leaks.*		
Forecourt surfaces: Impermeable material used? Cracks in surface? Joints in sound condition? Perimeter drainage adequate and clear of debris? Does the OWI have a visual or audible alarm? Is any diesel exhaust fluid stored correctly?		
Comments: *1. Record the material used for the forecourt and its general condition* *2. If the OWI is a forecourt model, it will be fitted with an auto-closure device and alarm* *3. As diesel exhaust fluid (AdBlue) is an aqueous urea solution, it must be stored properly*		
Condition of electrical equipment: Hazardous area classification plan? Equipment appropriate for hazardous area in accordance with the ATEX equipment register? Exposed SWA on gland terminations? Unauthorised equipment modifications or additional holes? Are main earth bars identified, including test point for mat/electrode?		
Comments: 1. *Record whether there was a hazardous area classification plan in accordance with the requirements of DSEAR available.* 2. *Check the protection rating for equipment to determine whether it complies with the hazardous zone classification and equipment register.*		
General comments: *1. Include comments on any other issues or observations here.* *2. What is the general housekeeping like and are signs adequate?* *3. State whether there is an up to date Certificate for Continued Operation displayed or FSAA available.* *4. State whether there are any issues with the interceptor.* *5. Are fire extinguishers available and regularly inspected?*		

Underground Tank and Pipework Assessment		
ID	*Use the local identifiers*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Level 1 assessment undertaken?		*Appropriate for steel tanks only*
Non-destructive testing undertaken?		*Appropriate for single skinned tanks but may also include single skinned pipework associated with double skinned tanks*
Further testing required?		*Based on age, last test or the inspector's opinion*
Comments: 1. *You should comment on the impact of the scoring from the level 1 assessment, the requirement for further non-destructive testing and you should recommend the type of test that is appropriate.*		

Mechanical Transport Fuelling Installations with Above Ground Storage Tanks - Visual Inspection Report		
ID	*Use the local identifiers*	
Type of installation	*Single or twin skinned horizontal cylindrical etc. and material. If the tank is used for storage of class I product, comment on construction standards for the tank UL2085 etc.*	
Number of tanks	*Number of tanks in the installation*	
Type of leak detection	*From the records*	
Capacity of each tank (litres)	*As marked on the tank or from the records*	
Type of wet stock management system	*Automatic (record manufacturer) and/or dips* *This may include an Automatic Fuelling Dispensing System (AFDS) and/or an automatic tank gauging (ATG) system*	
Number, make and model of dispensers	*From a visual inspection of equipment or records*	
Product	*As marked on the tank or from the records*	
Electrical supply arrangements	*Record whether TT, TN-S or TNC-S* *Where an existing electrical installation is supplied from a TNC-S system in which the neutral and protective functions are combined in part of the system to provide PME, stray currents passing through metalwork located in potentially hazardous areas may pose an increased risk of fire or explosion.*	
Make, type and capacity of OWI	*From the records or data plate*	
Date constructed (approx.)	*As marked on the tank or from the records*	
Last non-destructive test type & date	*E.g. precision tank tightness test (integrity test) etc. report ref. & date completed*	
Last dispense pump calibration	*From the maintenance records*	
Last electrical test date	*From the maintenance records*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Location: Is the tank situated more than 10 metres from a watercourse? Is the tank situated more than 50 metres from a well or borehole? Is the tank protected from impact damage?		
Comments: *1. Refer to the appropriate regulations for the UK and/or host nation relevant to where fuel installation is located.2.Does the tank have adequate mechanical protection, especially if it does not sit in a conventional bund?*		
Condition of tank: Rust on exposed metal? Paintwork acceptable? Is the underside of the tank accessible for inspection? Access steps and handrails sound? Evidence of leakage? Bund alarm fitted to integrally bunded tanks? Automatic over fill protection device fitted and working? Vents clear from obstruction – 3m radius? Instruments acceptable? Sight gauge properly supported and protected from damage?		

Sight gauge fitted with self-closing valve? Tank drain valve locked or blanked? Outlet valve from tank located within secondary containment? Syphon outlet from tank, anti-syphon valve fitted? Correct signage displayed for the tank and its contents?		
Comments: 1. *If there is leak detection installed, are there any known problems with the system?* 2. *Comment if the tank is so badly corroded that in your opinion it is likely to leak.* 3. *Signs should include tank ID, product and capacity as a minimum.*		
Condition of fuel dispenser pumps: Rust on exposed metal? Evidence of leakage? Paintwork acceptable? Hose condition acceptable? Pistol condition acceptable? Dispense pump condition acceptable? Stage 2 vapour recovery fitted?		
Comments: 1. *The hose should be sound, free of damage and fitted with safety break couplings.* 2. *For all self service installations the latching pins should be removed from the pistol and the pistol should be free from leaks.*		
Forecourt surfaces: Impermeable material used? Cracks in surfaces? Joints in sound condition? Road tanker delivery stand correct size? Perimeter drainage adequate and clear of debris? Does the OWI have a visual or audible alarm? Is any diesel exhaust fluid stored correctly?		
Comments: 1. *Record the material used for the forecourt and its general condition* 2. *If the OWI is a forecourt model, it will be fitted with an auto-closure device and alarm* 3. *As diesel exhaust fluid (AdBlue) is an aqueous urea solution, it must be stored properly* 4. *The road tanker delivery stand should be a minimum of 15m long x 5m wide.*		
Secondary containment: At least 110% of the largest tank or 25% of total storage, whichever is greatest? Impermeable to water or oil? Intact and without openings or valves for drainage? Pipes that pass through sealed adequately?		

Are vent pipes, taps and valve arranged so that oil will be contained? Signs of product staining? Access acceptable? Adequate leak detection for underground pipework? Leak detection maintained?		
Comments: 1. *Is there evidence that the integrity of the bund may be suspect and is the overall condition satisfactory?*		
Condition of ancillaries: Ancillaries within secondary containment? Fill point acceptable? Tank vent visible from fill point? Protected from impact and damage? Protected from corrosion? Paintwork acceptable? Evidence of leakage? Adequate leak detection for underground pipework? Leak detection maintained?		
Comments: 1. *Underground pipelines should not have mechanical joints unless it is possible for them to be inspected.*		
Condition of exposed pipework: Rust on exposed metal? Evidence of leakage? Paintwork acceptable? Lagging intact, where fitted? Valve stems greased? Mechanical joints satisfactory?		
Comments: 1. *Inspect the exposed mechanical joints for evidence of failure.*		
Condition of electrical equipment: Hazardous area classification plan? Equipment appropriate for hazardous area in accordance with the ATEX equipment register? Exposed SWA on gland terminations? Unauthorised equipment modifications or additional holes? Are main earth bars identified, including test point for mat/electrode?		
Comments: 1. *Record whether there was a hazardous area classification plan in accordance with the requirements of DSEAR available.* 2. *Check the protection rating for equipment to determine whether it complies with the hazardous zone classification and equipment register.*		

General comments:

1. *Include comments on any other issues or observations here.*
2. *What is the general housekeeping like and are signs adequate?*
3. *State whether there is an up to date Certificate for Continued Operation displayed or FSAA available.*
4. *State whether there are any issues with the interceptor.*
5. *Are fire extinguishers available and regularly inspected?*

Flammable Dangerous Goods Store - Visual Inspection Report		
ID	*Use the local identifiers*	
Type of structure	*Record the structure type*	
Date constructed (approx)	*From the records*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Storage: Substances segregated by UN Class? Substances separated by minimum distances? Separate area for repacking of damaged containers? Separate room for acid storage?		
Comments: 1. *You should comment on what is being stored by UN Class and any departures from the requirements of Design and Maintenance Guide 03 – Storage of Dangerous Substances, Section 3 Product Segregation.*		
Store construction: All walls fire rated? Explosion relief roof design? Storage areas bunded? Prevention of aqueous substances from reaching the drainage system?		
Comments: 1. *You should comment on whether the structure is purpose built and complies to the requirements of Design and Maintenance Guide 03 – Storage of Dangerous Substances, Section 4 Storage Buildings/Compounds.*		
Building services: Equipment appropriate for hazardous area in accordance with the ATEX equipment register? Fire fighting equipment? Lightning protection? Emergency telephone? Adequate ventilation? Drench shower and eyewash for acid store? Are appropriate signs displayed?		
Comments: 1. *Are the appropriate UN Class product signs displayed on the door or access gate?* 2. *Are there signs in accordance with the requirements of DSEAR?* 3. *Steel stores and other structures may not need lightning protection in accordance with guidance contained in BS EN 62305.*		
General comments: *1. Include comments on any other issues or observations here.* *2. What is the general housekeeping like?* *3. Record whether there was a hazardous area classification plan in accordance with the requirements of Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) available.*		

Above Ground Ancillary Storage Tank Installations – Visual Inspection Report		
ID	*Use the local identifiers*	
Type of installation	*E.g. horizontal or vertical, cylindrical or rectangular, single skinned with separate secondary containment or integrally bunded and its purpose e.g. standby generator or heating. Record the material of construction and enter the manufacturer of the installation if known.*	
Number of tanks	*Number of tanks in the installation*	
Type of fuel measurement system	*As observed on the tank*	
Type of leak detection	*From the records*	
Capacity of each tank (litres)	*As marked on the tank and from the records*	
Product and classification	*As marked on the tank and from the records*	
Date constructed (approx)	*As marked on the tank and from the records*	
Last non destructive test type & date	*E.g. precision tank tightness test (integrity test) etc. report ref. & date completed*	
Last inspection date	*From the records*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Location: Is the tank situated more than 10 metres from a watercourse? Is the tank situated more than 50 metres from a well or borehole? Is the tank protected from impact damage?		
Comments: *1. Refer to the appropriate regulations for the UK and/or host nation relevant to where fuel installation is located 2. Does the tank have adequate mechanical protection, especially if it does not sit in a conventional bund?*		
Condition of tanks: Rust on exposed metal? Evidence of leakage? Is the underside of the tank accessible for inspection? Paintwork acceptable? Instruments acceptable? Correct signage displayed for the tank and its contents? Bund alarm fitted to integrally bunded tanks? Outlet valve from tank located within secondary containment? Syphon outlet from tank, anti-syphon valve fitted? Tank drain valve locked or blanked? Automatic over fill protection device fitted and working? Sight gauge properly supported and protected from damage? Sight gauge fitted with self-closing valve?		
Comments: 1. *Comment if the tank is so badly corroded that in your opinion it is likely to leak.* 2. *Signs should include tank ID, product and capacity as a minimum.*		
Secondary containment:		

At least 110% of the largest tank or 25% of total storage, whichever is greatest? Impermeable to water or oil? Intact and without openings or valves for drainage? Pipes that pass through sealed adequately? Are vent pipes, taps and valve arranged so that oil will be contained? Signs of product staining? Access acceptable? Adequate leak detection for underground pipework? Leak detection maintained?		
Comments: 1. *Is there evidence that the integrity of the bund may be suspect and is the overall condition satisfactory?*		
Condition of ancillaries: Ancillaries within secondary containment? Tank vent visible from fill point? Protected from impact and damage? Protected from corrosion? Paintwork acceptable? Valves locked when not in use? Evidence of leakage? Fill point acceptable? Flexible connections/draw-off pipes fitted? Auto closure valve fitted to flexible? Flexible stowed correctly when not in use? Flexible pipework <10 years old? Pump set fitted? Non-return valve fitted to pump set suction line? Pump set protected from misuse or accidental damage?		
Comments: 1. *Underground pipelines should not have mechanical joints unless it is possible for them to be inspected.*		
Condition of exposed pipework: Rust on exposed metal? Evidence of leakage? Paintwork acceptable? Lagging intact, where fitted? Valve stems greased? Mechanical joints satisfactory?		
Comments: 1. *Inspect the exposed mechanical joints for evidence of failure.*		
General comments:		

1. *Include comments on any other issues or observations here.*
2. *What is the general housekeeping like?*

Underground Ancillary Storage Tank Installations – Visual Inspection Report		
ID	*Use the local identifiers*	
Type of installation	*E.g. horizontal cylindrical and its purpose e.g. standby generator or heating. Record the material of construction and enter the manufacturer of the installation if known.*	
Number of tanks	*Number of tanks in the installation*	
Type of fuel measurement system	*As observed on the tank*	
Type of leak detection	*From the records*	
Capacity of each tank (litres)	*As marked on the tank and from the records*	
Product and classification	*As marked on the tank and from the records*	
Date constructed (approx)	*As marked on the tank and from the records*	
Last non destructive test type & date	*E.g. precision tank tightness test (integrity test) etc. report ref. & date completed*	
Last inspection date	*From the records*	
Next inspection date	*From the records, from the age or from the condition*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Condition of tanks: Rust on exposed metal? Evidence of leakage? Paintwork acceptable? Contents gauges, overfilling alarm/device acceptable? Tank interstitial space leak detection acceptable? Correct signage displayed for the tank and its contents?		
Comments: 1. *Comment of the visible aspects of the tank.* 2. *Signs should include tank ID, product and capacity as a minimum.*		
Condition of ancillaries: Instruments acceptable? Tank vent visible from fill point? Automatic over fill protection device fitted and working? Protected from corrosion? Paintwork acceptable? Valves locked when not in use? Evidence of leakage? Adequate leak detection for underground pipework? Leak detection maintained? Pump set fitted? Pump set protected from misuse or accidental damage?		
Comments: 1. *Underground pipelines should not have mechanical joints unless it is possible for them to be inspected.*		
Condition of exposed piping: Rust on exposed metal? Evidence of leakage? Paintwork acceptable? Lagging intact, where fitted? Valve stems greased? Mechanical joints satisfactory?		

Comments: 1. *Inspect the exposed mechanical joints for evidence of failure.*
General comments: *1. Include comments on any other issues or observations here.*

Underground Tank and Pipework Assessment		
ID	*Use the local identifiers*	
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Level 1 assessment undertaken?		*Appropriate for steel tanks only*
Non-destructive testing undertaken?		*Appropriate for single skinned tanks but may also include single skinned pipework associated with double skinned tanks*
Further testing required?		*Based on age, last test or the inspector's opinion*
Comments: *1. You should comment on the impact of the scoring from the level 1 assessment, the requirement for further non destructive testing and you should recommend the type of test that is appropriate.*		

6. INSPECTION OF MAINTENANCE RECORDS AND SUPPORTING INFORMATION

6.1 Spillage Response Plans

Record here whether spillage response plans are available, note the date that they were last amended and issued, the name and role of the signatory and any other pertinent comments.

6.2 Installation Records

Record here your comments on the installation records, noting in particular whether there is original design data, design drawings, P&IDs and information on repairs, modifications and other changes

6.3 Dangerous Substances Explosive Atmosphere Regulations (DSEAR) Records

Confirm here whether the following documentation is available:

a. *MoD Form 5014 Stage 1*
b. *MoD Form 5014 Stage 2*
c. *Flammable Materials List & Characteristics*
d. *Source of Release Risk Assessments*
e. *Retrospective Ignition Risk Assessments for Non-Electrical Equipment for use in Potentially Explosive Atmospheres*
f. *Facility Risk Assessments*
g. *A site drawing indicating the location of all classified hazardous areas identified*
h. *Drawings of each asset or installation incorporating a classified hazardous area on a separate drawing shown in plan view and in section or elevation as appropriate. The plan view shall show the classified hazardous areas in context to the site features within 2 metres of the hazardous zone. This should include buildings, culverts or other man-made structures and clearly indicate the required temperature class and gas group for any equipment to be used in that area.*

6.4 Inspection, Maintenance and Testing Regime

Record here whether there is an Inspection, Maintenance and TestingA Regimein accordance with the requirements of Inspection, Maintenance and Testing of Equipment Installed at Petroleum Installations on MOD Property' Technical Standard Petroleum – 01. The document is to clearly identify the inspection and testing regime to ensure that the entire electrical installation is subject to the following:

a) *12 month Visual Inspection in accordance with BS EN 60079 part 17 - 50% of installation*
b) *12 month Close Inspection in accordance with BS EN 60079 part 17 - 50% of installation*
c) *36 months Detail in accordance with BS EN 60079 part 17 - 100% of installation (this may be carried out 33.3% every 12 months)*

Record whether the above aligns with the planned maintenance schedule and the equipment registers for the installations.

Confirm whether records of inspection, maintenance and testing are accessible to those undertaking these tasks, whether they are kept for the life of the equipment/installation and whether they are compared against current records to identify any deterioration that is taking place.

Confirm that a verification dossier in accordance with the requirements of BS EN 60079-14 is available for the electrical installations and that the dossier has been updated to reflect any changes since the original installation date.

6.5 List of Maintenance Work

Following the visual inspection, a review of the maintenance regime was carried out. The maintenance work is managed using *(record here the name of the system being used)* computer based system, the scope of which is based upon the extant Technical Standard for 'Inspection, Maintenance and Testing of Equipment Installed at Petroleum Installations on MOD Property' Technical Standard Petroleum – 01 and Technical Standard Petroleum - 04.

Evidence was sought for the following:

List here those installations checked and the tasks e.g. MTFI mechanical maintenance and calibration

6.6 Maintenance Register

A maintenance register should be kept listing all maintenance operations, their frequencies of requirement, special notes on repairs carried out and any observations of problems noticed.

The extant Technical Standard for 'Inspection, Maintenance and Testing of Equipment Installed at Petroleum Installations on MOD Property' Technical Standard Petroleum – 01 and Technical Standard Petroleum – 04 define the frequency at which the various items of equipment should be maintained.

Mechanical Maintenance Register - Document Inspection Report		
ID	*Record here the local identifier e.g. Building Number*	
Tasks checked:		
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
Are all the tasks above being completed? Are the tasks completed at the correct frequency? Are all the tasks dated correctly? Are all the tasks signed off?		
Is the equipment shown as satisfactory/not satisfactory? If "not" does the register record the reasons? Is incidental or repair work recorded in the register?		
Are the separator element changes recorded? If "Yes" does date match that on the separator body?		
General comments: 1. *You should record the maintenance tasks that you have checked and the dates that they were last completed.* *E.g. Jacket No. 1 for BFI No. 2 – Last 3 monthly tasks completed 01/04/08.* 2. *You should also comment on the maintenance standard being followed, relevant tasks not being completed and disparities between the records and observations during the site visit.*		

Electrical Maintenance Register - Document Inspection Report		
ID	*Record here the local identifier e.g. Building Number*	
Tasks checked:		
	Yes, No, Not Applicable or Not Known	**Comment Reference No.**
DSEAR compliance survey completed?		
Is there a Hazardous Area classification drawing available in accordance with the requirements of DSEAR?		
Is there an equipment register available, does it align with installed equipment, including tag identification?		
Are all the above tasks being completed? Are the tasks completed at the correct frequency? Are all the tasks dated correctly? Are all the tasks signed off?		
Is the equipment shown as satisfactory/not satisfactory? If “not" does the register record the reasons? Is incidental or repair work recorded in the register?		
Are appropriate earth checks completed?		
Are electrical test reports completed in accordance with Section 17 of PG 2017/02 and for installations other than MTFI acknowledged by the MMO on test sheet Form 1a?		
Are alarms and shutdown functions tested in accordance with Technical Standard Petroleum - 02?		
Are motors subject to condition monitoring (see jobs 23.2 & 23.3 of Technical Standard Petroleum - 02?		
Are motor protective devices tested every 5 years?		
General comments: 1. *You should record the maintenance tasks that you have checked and the dates that they were last completed. E.g. Jacket No. 1 for BFI No. 2 – Last hazardous area electrical test completed 01/04/08*. 2. *Include comments on any other issues or observations here.*		

APPENDIX A MMO ANCILLARY TANK INSTALLATION DECLARATION

All ancillary tank installations comply with current legislation, which include The Control of Pollution (Oil Storage) (England) Regulations, Control of Pollution (Oil Storage) Regulations Northern Ireland or The Water Environment (Oil Storage) (Scotland) Regulations along with associated guidance for above ground storage tanks (ASTs); and the Groundwater Regulations 1998 along with associated guidance for underground storage tanks (USTs).

With the exception of:

Tank Location	Tank ID	Construction	Size (litre)	Product	Deficiencies

An action plan is in place to carry out the remedial works listed above which should be completed by {*date*}

An appropriate maintenance regime is in place and implemented for all ancillary tank installations.

The following ancillary tank installations do not comply with current legislation, no funding has been released from the client following the previous inspection and these installations are to be included within the main inspection regime completed in accordance with the extant Technical Standard for the Inspection of Petroleum Installations and Flammable Dangerous Goods Stores.

Tank Location	Tank ID	Construction	Size (litre)	Product	Deficiencies

Signed: Date:

{*Name*}

{*Position*}

{*Company Name*}

APPENDIX B ANCILLARY INSTALLATIONS ASSET LIST

Ancillary Installations
Above ground storage tanks (ASTs) – Underground storage tanks (USTs)

Asset / building number	Installation / Product	Tank size (Capacity) Litres	Date installed	Type	Material	Compliance Assessments / inspections/ integrity tests completed No, Not Known or date completed				Remedial works required	Comment
						ASTs	USTs	Underground pipework	PPM task		
Local identifier	*Serving a boiler or generator and product*			*Horizontal, cylindrical above ground etc.*	*Steel, fibreglass, HDPE etc.*						

Ancillary Installations
Above ground storage tanks (ASTs) – Underground storage tanks (USTs)

Asset / building number	Installation / Product	Tank size (Capacity) Litres	Date installed	Type	Material	Compliance Assessments / inspections/ integrity tests completed No, Not Known or date completed				Remedial works required	Comment
						ASTs	USTs	Underground pipework	PPM task		

General comments:

Has the MMO completed a tank inspection declaration?

Is the tank declaration acceptable?

The asset list on the pre-planned maintenance data base, MIS IFS, requires updating: ……

The above asset list is complementary to the Spill Plan for…… USRP – which has a comprehensive list of the petroleum tank installations for the sites, but does not include the Flammable Dangerous Goods Stores (FDGS).

AST = Above ground storage tank. UST = Under-ground storage tank. HDPE = High Density PolyEthylene (Plastic). PPM = Pre-Planned Maintenance.
Tanks within buildings and underground storage tanks (USTs) do not have to comply with SI 2001 No 2954 and the respective Pollution Prevention Guides (PPGs); however integrity and control must still be maintained in accordance with the Ground Water Regulations. USTs should be assessed in accordance with the extant Practitioner Guide for the Inspection of Petroleum Installations and Flammable Dangerous Goods Stores.

The following also requires to be referenced: -
OFTEC Standards: OFS T 100 - plastic tanks; OFS T 200 - steel tanks; T 19 tank base construction
CIRIA publications: CIRIA 163 bunds; CIRIA 535 above ground tanks
DEFRA: Guidance document: Ground Water Protection Code (Water Resources Act and Groundwater Regulations)
(Note reference required as pipework may be sited under-ground)
There are a number of British Standards, for sectional steel tanks, USTs, ASTs, steel cylindrical tanks, GRP tanks and rigid plastic tanks etc. Most of which are referenced in the above, and would be applicable to the manufacturer and their manufacturing processes.
B.S. 5410 part 1. – Domestic < 45kw; B.S. 5410 part 2. – Industrial / commercial > 45kw. B.S. 799 – Steel tanks