



Health and Safety Executive		Operational Minute	
Field Operations Directorate		OM 2001/119	
Cancellation Date	23/09/2006	Open Government Status	Fully Open
Version No & Date	1: 23/09/2001	Author Unit/Section	FOD Safety Unit

To
All HSE Inspectors

**FOD COMMENT ON SAFED DOCUMENT
GUIDELINES FOR THE OPERATION OF STEAM BOILERS**

This OM draws attention to a document produced by The Safety Assessment Federation (SAFed), *SAFed Guidelines Operation of Steam Boilers*, giving guidance on the design and operation of steam boiler plant. The document is available to the public on the SAFed website <http://www.safed.co.uk> under 'public resources', 'steam boiler guidelines'.

Some sections of the document provide useful information on the design of boiler plant and its safe operation, eg the recognition of a range of boiler hazards other than low water and the section on training, but there are flaws in the application of risk assessment principles to the design of safety related control systems. In addition, the specification of boiler hardware conflicts with existing or emerging standards. **Therefore the SAFed document does NOT have HSE support.**

SAFed are aware of HSE objections but are unwilling to address these concerns.

DISCUSSION

1 Using the headings from the SAFed document, this OM sets out some of the detailed objections raised by HSE.

Introduction

2 It is stated that the SAFed guidelines have been drafted to assist competent persons when considering the controls and limiters fitted to existing boiler installations and are not intended as a specification for boiler controls in new installations. However, it appears to HSE that the document specifies, in detail, the design requirements for new plant. Furthermore these design requirements are not in accordance with the requirements of the Pressure Equipment Regulations 1999 and the supporting European harmonised standards for boilers.

3 Reference is made to International Standard IEC 61508, *Functional safety of electrical/electronic/programmable electronic safety related systems*, which is now commercially available, ie not in draft form, but the principles in this key reference are not followed in the guidelines.

Definitions

4 The definitions do not adequately describe safety related aspects of a steam boiler control system which require specific attention with regard to design, operation, use, maintenance

and examination. For example, a limiter is described as a transducer and the document does not differentiate between requirements for operation in safety and non-safety-related functions. In addition, the terms are not the same as those used in the European harmonised standards for boilers.

Personnel

5 The legal duties on the competent person (CP) as defined in the Pressure Systems Safety Regulations 2000 (PSSR) do not require the CP to comment on the training and competence of boiler attendants.

6 The requirements for demonstrating competence for maintenance personnel should be more clearly specified in terms of, for example, a structured scheme that takes into account experience with particular types of boiler on the site, the full range of maintenance tasks (including work on safety-related control systems), and training courses focused on enhancing the ability of a maintenance technician.

Risk assessment and boiler controls

7 The risk assessment performed by the plant owner/operator should properly consider the design of the control system and the effective staffing levels at a boiler installation. The SAFed document does not indicate how this can be achieved and does not take into account other personnel (which may include off-site personnel) who may be placed at risk in the event of a boiler failure.

8 The 4 safety levels given in the document appear to be an arbitrarily assigned hierarchy without a clear linkage to measures that can be taken in the design of the boiler control system to minimise dangerous failures. The safety levels in the SAFed document do not correspond with assignments of safety performance criteria described in existing and emerging standards, eg IEC 61508.

9 A gas-fired manually-controlled boiler shown in Arrangement 0 would not be acceptable for typical industrial applications.

10 It is stated that Arrangement 3 'facilitates a completely unmanned site with status monitoring by a remote telemetry system where appropriate'. It also states that 'checks' by the boiler attendant may be extended where justified by further risk assessment. This is not supported by HSE and gives the strong impression that the level of supervision and testing of safety-related boiler systems can be altered at will if the user carries out a further risk assessment. The design of the safety-related control system and the level of testing follow directly from the initial risk assessment carried out by the designer and the required safety integrity level. Consequently, any change in the design of the system or the level and frequency of testing will require a complete design review of the system. This should only be undertaken by someone with a high level of competence and familiarity with the system and who fully understands the consequences of any changes to the design or maintenance regime. There may be occasions when the user possesses sufficiently detailed knowledge of the system design to carry out such assessments but these are likely to be rare.

Components

11 Much of the section on components concerns design issues which are already covered by existing or emerging boiler standards.

Communications

12 The section on communications states that 'the communications system should be tested for correct functioning whenever the boiler controls are tested'. This is unlikely to be an acceptable testing frequency for a communications system relaying alarms to a remote location.

Testing of water level and related controls

13 The subsection headed 'special circumstances' concerns the testing of safety-related control systems, eg low water, in cases where complete shutdown of the source of heat during a functional test is not possible or desirable. These are matters which are best addressed during the design of the plant, eg using gas bypass arrangements, or the design of the safety related control system rather than relying on special testing regimes.

Maintenance, repair and modification

14 These sections of the guidance do not provide sufficient information for boiler plant users/owners to verify the safety performance of protective systems after maintenance and any subsequent modifications. This is particularly significant for modern complex boiler control systems where software and/or hardware modifications may be introduced during the service lifetime of a plant.

ADVICE TO INSPECTORS

15 Inspectors finding steam boilers operating in accordance with the SAFed guidance need to satisfy themselves that the design, operating and maintenance procedures fully meet the requirements of the Pressure Systems Safety Regulations 2000. New boilers installed after the 29 May 2002 will need to comply with the Pressure Equipment Regulations 1999. Boilers supplied before 29 May 2002 may meet the requirements of either the Pressure Equipment Regulations 1999 or the design requirements of the legislation in force on 28 November 1999, ie the Pressure Systems and Transportable Gas Containers Regulations 1989.

REFERENCES

16 The following documents provide further useful guidance:

- - 1) L122 - *Safety of pressure systems Pressure Systems Safety Regulations 2000* Approved Code of Practice (FOD Subject File 308);
 - 2) GN PM5 - *Automatically controlled steam and hot water boilers* (FOD Subject File 306);
 - 3) GN PM 60 - *Steam boiler blowdown systems* (FOD Subject File 306);
 - 4) [OM 2000/112](#) - *Pressure Equipment Regulations 1999*;
 - 5) [OM 2000/113](#) - *Pressure Systems Safety Regulations 2000*; and
 - 6) European Commission Website on pressure equipment (<http://ped.eurodyn.com/>) for information on the Pressure Equipment Directive.

Date first issued: 23 September 2001

(220\FOD\1034\2001)

Ref: J:\Editors\intranet\omfiles\2001\119.lwp

[A TOP](#)