ANNEX 1: Guidance on Proportion Factors

A1.1 - Work by RAPU and ESAU

Le Guen, Hallett and Golob produced a paper on the "Value of preventing a Fatality" which was circulated to HSE Board members and presented to the Risk Assessment Liaison Group (RALG) (RALG/Sep00/03). That paper discussed the ratio of the cost of preventing a fatality (CPF) to the value of preventing a fatality (VPF). The starting point for VPF was taken to be the DETR figure of approx. £1m (value at that time) used in new road schemes. Other values of VPF were then described. These were 2 x DETR for deaths from cancer and 3 x DETR for some aspects of railway safety. It is HID CI4c's contention that the values of 2 and 3 represent proportion factors (PF) similar to those described in paragraphs 40-45 earlier.

The paper also examined the implied ratios of CPF to VPF in a number of Cost Benefit Analyses and Regulatory Impact Assessments carried out prior to the implementation of a number of sets of regulations. Part of that table is reproduced below. To this has been added a column reflecting a estimate for the number of people who may be affected in any given incident controlled by the relevant Regulations (taken from, or implied by, the text in the Board paper):-

Regulations	Year	CPF/VPF (or PF)	N_{max}?
Control of Legionellosis Regs. And ACOP	1990	2.6 - 8.5	6
Gas Safety (Management) Regs.	1996	1.4 - 1.7	1 to 2
Adventure Activities Licensing	1996	5.4	>2?
Confined Spaces	1996	1.0 - 2.2	1 to 2
Railway Safety	1999	7.1 - 10.5	Approx. 30? (Ladbroke Grove)

Whilst in no way definitive, the above data could be seen to show an increase in PF with increase in numbers affected.

A1.2 - Technical Note on Proportion Factors by ERM, 2009

This work was commissioned to inform the Societal Risk Development Project, and took a similar approach to that above, calculating implied PF for a range of regulatory decisions. Some of the data is tabulated below.

Regulations	Year	CPF/VPF (or PF)	N_{max}?
Building Regulations, Part P – Electrical Safety	2004	3.4	1 - 4
Iron Gas Main Replacement Programme	2001	11 - 22	4 - 8
Buncefield – MIIB final report	2008	4.1	Based upon 15

The report concluded with a list of factors which appeared to influence the decisions on a suitable PF:

- higher PF tends to be associated with the potential for multiple
- fatalities;
- higher PF tends to be associated with the potential for fatality of
- vulnerable persons;
- higher PF tends to be associated with changes following incidents;
- higher PF tends to be associated with incidents with significant
- media attention;
- lower PF tends to be associated with risks which are relatively well
- understood by the public;

One conclusion of this work was that it is difficult to find sufficient well-documented cases to draw more than general indications on the size of PF. Examples from outside of the Major Hazards sector need to be used with care, as factors such as voluntariness of the risk taken, vulnerability of those at risk, etc. may differ from the cases HID CI is considering, making the comparisons misleading. Copies of the ERM report are available on request from HID CI5A.

A1.3 - DNV Offshore Guidance

The document "A Guide to Quantitative Risk Assessment for Offshore Installations" prepared by DNV includes some guidance on gross disproportion and the value of statistical fatalities.

Section 25.8.3 of that document states:-
"The necessary degree of disproportion is generally considered to be low near the negligible criterion, rising to in effect infinity at the maximum tolerable criterion"; and
"In the UK NRPB (1986) criteria, factors of between 1 and 15 are used, depending on the individual risk"

Section 25.8.5 of that document gives a number of examples of expenditure on RRMs and concludes that there is general agreement that the PF should range between 1 and 10.

A1.4 - NORSOK Standard

The NORSOK Standard Z-013 ("Risk and Emergency Preparedness Analysis) includes an annex discussing cost benefit analysis. Section E5.2 of this annex includes information on the valuation of benefits to personnel and the cost of an improvement to Norwegian helicopter based SAR preparedness. These values can be use to derive an implied PF of approximately 2.5. Generally, PFs up to approximately 15 might be justified.