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TO:

Staff in CD 2-4; LD 1-4 (Bands 1-4)

COMAH SAFETY REPORTS: INFORMATION ABOUT THE EXTENT AND SEVERITY OF THE CONSEQUENCES OF IDENTIFIED MAJOR ACCIDENTS

PURPOSE

To provide an operational policy line to take for assessors of COMAH safety reports when considering whether there is the minimum information present as required by Schedule 4 part 2 para 4 b, "assessment of the extent and severity of the consequences of identified major accidents".

To supplement the guidance present in HSG 190 and L111.

BACKGROUND

1. During assessment of COMAH safety reports, many operators have been asked to provide further information on extent and severity of their major accident hazards. Early guidance to assessors required the number of potential casualties, serious injuries and hospitalisations to be determined for each major accident hazard scenario. Operators have been reluctant to provide such information given that it will be placed on the public register. This SPC aims to provide reasons for requesting such information and explain ways that such information may be presented in a report.
2. Information on extent and severity is essential and must be included in a safety report. However, it is not immediately clear what is actually meant by 'extent and severity'. In simple terms, extent may be broadly equated to hazard range and severity to consequences. Identical hazardous installations in different surroundings will have the same extent (i.e. hazard) but different severity (i.e. consequences). Even with this simplification, further guidance is needed on the depth of information required in a safety report.

3. The 'ALARP debate' is one of the drivers for insisting on clear information on extent and severity. In the latest (and probably final) solicitor's draft entitled 'Principle and Guidelines to assist HSE in its judgments that duty holders have reduced risks ALARP' states "in setting enforcement priorities, HSC considers that risk and sacrifice must be assessed in its social context.....We believe it is right that, in all cases, the judgment as to whether measures are grossly disproportionate should reflect societal risk, that is to say, large numbers of people being killed in one go." This means that judgments on the reasonable practicability of measures to prevent, control and mitigate major hazards must take into account the potential for many people being killed in one go.
4. The guidance on the regulations and preparing safety reports (L111 & HSG 190) and the SRAM provide limited explanations on what is required and why. There is also guidance under assessment criterion 3.5 in SRAM and the Safety Report Assessment Guides (SRAGs) on HID's webpage.

PROVISION OF INFORMATION ON 'EXTENT AND SEVERITY' FOR THE PURPOSES OF DEMONSTRATING ALARP AND EMERGENCY PLANNING:

5. There are two reasons why information on extent and severity are required:
 - a. For the purpose of determining the depth of risk analysis and demonstrating that the necessary measures have been taken.
 - b. For the purpose of supplying sufficient information to enable an off-site plan to be drawn up in order to take the necessary measures in the event of a major accident.
6. In any health and safety risk assessment whether it be for COMAH or the Management Regulations, the simple question 'who might get hurt and how badly' must be answered to resolve one part of the 'risk' combination. Schedule 4, Part 2, Para 4 (b) 'extent & severity' addresses this. The likelihood/frequency/probability of this happening is the other part of the risk combination and is addressed by Schedule 4, Part 2 Para 4 (a).
7. In simple terms, the 'extent and severity' information is essentially who might get hurt, how badly and how many it might be? The 'who?' not only refers to individuals but to groups of people i.e. societal risk. To do this, the hazard assessment of the identified major accidents must be carried out and then a prediction of the consequences made. In practice, this means providing information on casualties (both on site e.g. employees, contractors, etc. and people living and working nearby) for the representative set of major accident hazard scenarios, which form the operator's risk analysis. Criterion 3.5 of the SRAM and SRAG suite provide guidance on this aspect of the consequence assessment.
8. It is important for Operators to show a clear understanding of the potential extent and severity as part of taking responsibility for ensuring and

demonstrating they have the necessary measures in place to prevent or limit a major accident. Operators should not expect the Competent Authority (CA) to decide on the company's behalf that they have taken the necessary measures. It is, however, the CA's duty to consider whether the measures are seriously deficient as part of its safety report assessment and follow up other deficiencies as part of inspection.

9. The operator should use the information on extent and severity to guide their determination of what depth of demonstration is needed to show that their prevention, control and mitigation measures adequately control risks ALARP. The establishment may have a series of measures in place, but are they sufficient for the specific circumstances? They may well be, but it is the duty of the operator to demonstrate this in their safety report.
10. The second reason why information on 'extent and severity' is part of the minimum information required in a safety report is for **emergency planning** purposes. HSG 190 at Para 324 states that for the assessment of the extent and severity, the range of scenarios considered must be representative and suitable for emergency planning. HSG 191 (Emergency Planning for Major Accidents) paragraph 75 explains Local Authority Emergency Planners require information, amongst other things on:
 - The potential effects of the dangerous substances on people;
 - The possible consequences of a release of dangerous substances to people;
 - What events could give rise to a release;
 - What distances the substances will be dangerous to people;
 - What level of harm will the dangerous substances pose;
 - How likely and how potentially serious are the events.
11. The guidance says that this key information is required from the operator's safety report. The report must provide clear information on the impact of the potential major accident scenarios to satisfy the requirement of Schedule 4 part1 Para 4.

HSE SOLICITOR'S ADVICE

12. HSE's Solicitors office has confirmed that the line to take as outlined below, in relation to the information to be provided under COMAH Sch.4 Part 2 para 4(b); "extent and severity of the consequences..." as being legally correct and enforceable, having regard in particular to the purposes set out in Part 1 of Schedule 4.

LINE TO TAKE

13. Assessors should expect to see the safety report combine harm criteria, predicted hazard ranges and establishment specific data for on/off site populations. This severity information, combined with the likelihood of the major accident scenarios provides an indication of the risks posed by the site. The operator should then be able to judge the "level of proportionality" required in the demonstration that the necessary measures have been taken. If this is all clearly documented, the assessor will be able to confirm that the demonstration is adequate. (i.e. do they only need to benchmark against standards or provide a case specific ALARP demonstration?)
14. The presentation of the severity information which is the minimum information required by schedule 4 part 2 para 4 (b), can be in several forms:
 - i. Numbers of fatalities, serious injuries, hospitalisations, for each of the major accident hazard scenario representative set. Numbers may be quoted in tabular form for accident scenarios, however, they can only be considered indicative. This is because there are uncertainties in consequence models as well as harm criteria (e.g. toxic dose concentrations). These numbers should be used as guides to the level of severity and operators asked to examine if changes in assumptions might make a difference to their conclusions on measures.
 - ii. Banding of events in terms of consequence to people. e.g. people at risk of fatality, 1 - 5, 5 - 20, 20 - 100, 100 - 500, 500 - 1000, >1000. This removes some of the problems associated with quoting exact numbers. However, this approach is open to a tendency to inappropriately adopt the lower bands, e.g. estimates of 50 - 150 fatalities can be reduced by selection of the 20 - 100 as the band for that scenario.
 - iii. Cross-referencing of effects distances from events, on to maps of the site and surrounding area with a description of clearly identified estimations of numbers, centres and types of populations both on and off site. This information should be pulled together in the report to summarise the establishment's risk picture.
15. Reports may provide hazard ranges and maps of the site and surrounding area. Some may super-impose the hazard ranges onto the maps. This may be acceptable for omni-directional events only if there is accompanying text providing a commentary on the extent and severity of the scenarios. However for flash fires, toxic gas dispersion and other directional events such as jet fires, simple maps with hazard ranges are insufficient. The report must discuss the importance of typical cloud widths, wind direction, atmospheric conditions and location of on-site and off-site personnel.
16. The level of demonstration required is determined from the level of risk predicted including any societal risk (i.e. killing or harming large numbers of people in one event). The report should draw the information together to establish their 'level of proportionality' i.e. what are the risk dominating scenarios and how bad are they? The next step is for the operator to have a process by which it decides whether the measures they have in place are

those that are necessary given the circumstances of their site. Where there is potential for large numbers of fatalities or injuries, the demonstration that the measures in place are all that are necessary needs to be clear and robust. (More detailed guidance on ALARP in COMAH safety reports is available within SPC/Permissioning/12.) The information should also be drawn together for the purposes of emergency planning.

17. Whichever way the information is presented, high consequence - low frequency major accidents scenarios must be included. Where risks cannot be shown to be broadly acceptable (for example by comparison to published criteria i.e. R2P2) then a more detailed examination of the measures in place and decisions on whether they are all that are reasonably practical (given the nature of the potential severity), should be carried out.
18. The Safety Report Assessment Guides SRAGs (available on the HSE web site <http://www.hse.gov.uk/hid/content/subject/index.htm>) all currently ask for numbers of casualties, criteria. 3.5, 3.5.4 and 1.7 refer. Assessors should take into consideration the above guidance when assessing reports against criteria 3.5 and 1.7.

FURTHER INFORMATION

For further information, contact CD2 (OPU), St Anne's House, Bootle, (VPN 523 4062) or 0151 951 4062