

**AMENDMENT TO COUNCIL DIRECTIVE 96/82/EC ON THE CONTROL OF
MAJOR ACCIDENT HAZARDS INVOLVING DANGEROUS SUBSTANCES
(SEVESO II)**

REGULATORY IMPACT ASSESSMENT (PARTIAL)

PURPOSE AND INTENDED EFFECT

Issue

1. This partial Regulatory Impact Assessment examines the costs and benefits of an amendment to Council Directive 96/82/EC (known as the Seveso II Directive) on the control of major-accident hazards involving dangerous substances.

Background

2. The Seveso II Directive aims to prevent major accidents and limit their consequences for people and the environment. It sets out measures, which apply to establishments, which hold or use specified dangerous substances, or specified generic classes of dangerous substances, above listed qualifying quantities given in the Directive. There are two levels of regulatory oversight determined by the quantities of dangerous substances present. The lower level of control requires notification, development of a major accident prevention policy, the application of a land use planning policy and inspection. In addition the upper level requires a detailed safety report, production of emergency plans and provision of information to the public. The Directive was implemented in Great Britain through the Control of Major Accident Hazards Regulations 1999.

Objectives

3. The amending Directive is aimed at broadening the scope of Seveso II rather than a major revision. It takes account of recent industrial accidents (particularly a mining accident in Baia Mare in Romania in 2000 that resulted in cyanide entering a river, and an explosion at a fireworks factory in Enschede in the Netherlands in 2000 in which 20 people were killed), and also the results of studies on carcinogens and substances dangerous for the environment carried out by the Commission on request of the Council when the Directive was adopted in 1996.

4. Key features of the amending Directive are:

- a broadening of scope in respect of mining/quarrying;
- a redefinition of ammonium-nitrate to cover lower percentage composition, and new classes covering self-sustaining decomposition and reject material;
- new thresholds for potassium nitrate fertilizers;
- seven new carcinogens, and raised threshold limits for all carcinogens;
- a new definition of automotive petrol to include diesel and kerosene, with thresholds that have been halved;

- the redefinition of classes for explosives;
- lower qualifying thresholds for substances dangerous to the environment;
- a change to the aggregation rule to be applied to all substances classified as toxic, dangerous to the environment, flammable and oxidising; and
- administrative provisions for establishments newly covered by the Directive to have a period of time to comply.

Risk assessment

5. A large part of risk control at large premises involving dangerous goods will be aimed at the prevention of a very serious accident, which occurs infrequently, but has very serious consequences. The accident record is unreliable with respect to estimating safety risks, which are typically subject to quantitative risk assessment. Data on the number of reported accidents at sites that will be newly brought under the scope of the Directive, for example, are not centrally collated. Hence it is not possible to establish an accurate 'baseline' level of risk against which the benefits of the amendment can be assessed. In the benefits section, we use a study of accidents in the UK chemical industry to indicate possible levels of risk and benefit in terms of physical damage to plant from bringing new sites under the scope of the COMAH regulations. However, in advance we recognise that the characteristics and risks associated with the newly introduced sites may differ from those in the study.

Options considered

6. The nature of the provisions in the amending Directive is such as to require implementation through regulations; implementation through an Approved Code of Practice or guidance would be insufficient and could lead to infraction proceedings. There are no provisions in the amending Directive that GB would wish to either over- or under-implement

Information sources

7. This partial assessment uses cost and risk information about the COMAH regime as a whole that has already collected. In addition Det Norske Veritas (DNV)¹ was commissioned by the Department For Environment, Food and Rural Affairs to undertake two studies to assess the number of sites which will be brought into scope of COMAH based on the storage of 'Substances Dangerous for the Environment', R50, R50/53 and R51/53 substances at current and suggested alternative thresholds. The substances examined by the study were those which will be included solely because of the risk they pose to the environment and will not be included under "toxic (to humans)", "flammable" or any other heading. The Environment Agency have examined the reports and provided estimates of the number of sites affected, but the Agency notes that the numbers are subject to some uncertainty because of the age of the reports and some further assumptions about inventories that have had to be made.

1. Latest report: "COMAH Site Threshold Levels", Det Norske Veritas, Job number 804003, July 2001

Costs and Benefits

Business sectors affected

8. The amendments will bring a number of sites into the scope of the COMAH regime for the first time and will also result in the upgrading of a number of sites from lower tier to top tier status. The sites affected will mainly be operated by businesses in the basic chemical, petroleum products, electricity and water supply sectors and also those involved in the manufacturing and storage of explosives. Sites in other sectors will be affected if they store above the threshold quantities of dangerous substances as specified by the Directive. On a preliminary basis using data from several sources we estimate that the amendments will affect a total of 223 sites, although this may be revised as we receive further information. The numbers of sites in the different risk categories are given in the paragraphs and table below.

Carcinogens

9. Studies on carcinogens carried out by the Commission proposed adding seven substances to the list of ‘carcinogens’ already contained in Annex I, Part 1 of the Directive. Qualifying limits for the whole group of carcinogens have also been increased. The increase will have the effect of excluding some establishments (such as hospitals or research institutes) from the scope of the Directive that were not originally targeted by the inclusion of the list of carcinogens, and that are not currently COMAH sites. An initial examination by HSE of the effect of these changes indicate that around 15 sites will be brought into the COMAH regime at the lower tier, 16 will be brought into COMAH at top tier and 34 existing COMAH sites will move from lower tier to top tier. These estimates can only be considered preliminary, and may be subject to re-evaluation.

Explosives

10. It is proposed to amend the definitions to reflect the hazards of different types of explosives. It was also felt that, although consumer fireworks represented a hazard and should therefore come under the Directive, the hazard was substantially less than that of other fireworks and explosives and should therefore be treated differently. The coverage of pyrotechnic establishments in the UK under the COMAH system already goes beyond that required by the Directive. A preliminary survey by HSE indicates that the changes will bring 10 sites into the COMAH regime at lower tier and 20 existing COMAH sites will move from lower tier to top tier.

Petroleum substances

11. Amendments will be made to the named substance “automotive petrol and other petroleum spirits” to include medium oil distillates (gasolines, naphthas, kerosene and gasoils), the qualifying thresholds were also reduced. Using data from the DNV report suggests that the changes will bring a minimum of 34 sites into the COMAH regime at lower tier and a minimum of 20 existing COMAH sites will move from lower tier to top tier. Allowing for some uncertainty in these figures, the Environment Agency have advised that a maximum estimate of the numbers affected could be 39 and 22 respectively. We take the mid-point of this range as a central estimate, but recognise these uncertainties.

Substances dangerous to the environment

12. In the light of the incident in Baia Mare/Romania and the outcome of studies by the European Commission the thresholds are to be lowered for substances dangerous to the environment. The DNV report indicates that this amendment will bring 29 sites into the COMAH regime at lower tier and 23 existing COMAH sites will move from lower tier to top tier.

Ammonium Nitrate

13. The Commission amendment on ammonium nitrate is in response to the explosion at a fertiliser factory in Toulouse, France in 2001. The amendment essentially maintains the current classes of ammonium nitrate, but makes a detonation test mandatory, adds a class for fertilizers that are capable of self sustaining decomposition (i.e. once alight continue to burn producing toxic gases), and adds an additional class for reject material from the manufacturing process.. This is likely to bring in some more sites within scope of the Seveso, however, it is very difficult to give a good estimate of the numbers as it is not known how much reject material is produced e.g. fines or caked materials and how it is managed when handling imported items. Our best estimate is for two top tiers and 20 lower tier sites.

Table 1 : Number sites affected by amendments to the directive, by sector and effect

Risk category	Effect on site			
	Enters COMAH as lower tier	Enters COMAH as top tier	Moves from lower to top tier	Total
Carcinogens	15	16	34	65
Explosives	10	0	20	30
Petroleum substances	34	0	20	54
Substances dangerous to environment	29	0	23	52
Ammonium Nitrate	20	2	0	22
Total	108	18	97	223

BENEFITS

Health and safety benefits and other benefits

14. We cannot estimate the benefits relating to those sites brought into scope of the proposals, since this information is very much site specific. However, we can look at the potential benefits of the COMAH regime as a whole, and then form a judgment as to whether the particular hazards subject to these proposals are less than or greater than what could be termed a 'typical' major hazard.

15. Research on previous published estimates on the scale of losses incurred following high cost chemical/petrochemical accidents has been undertaken by HSE in conjunction with AW

Atkins². The report found a lack of reliable data in the public domain, and conflict between reported values in cases where data was available. These differences are ascribed to the wide scope of costs involved, commercial sensitivity, and changes in monetary values over time and simple clerical error.

16. However, the report estimated that the total cost of the 20 major chemical/petrochemical accidents since Flixborough was at least £500 million in 1996 prices. Included in these costs are the costs of reconstruction and lost production (as well as the costs associated with any legal action). Costs excluded from these incidents include indirect production costs (such as loss of business, or forced sale of raw material), off-site damage; personnel costs associated with injury events, civil emergency response, and public relation/legal costs (etc). Mitigating this to a certain extent is the fact that damaged plant and equipment would have been replaced at some point in the future. Nevertheless, these costs are equivalent to a figure of around £25 million each year at current values.

17. These published costs would tend not to include the full cost of business interruption. An analysis of 119 events at petrochemical, chemical and refinery sites³ concluded that the business interruption losses were on average 2.7 times the property damage losses (with wide variation between the individual cases). This would increase the yearly loss figure to around £50 million on a conservative basis, allowing for some overlap in the coverage of costs between the reports. Incidents on this scale would typically be associated with several injuries or fatalities. However, using the current DTLR baseline valuation of preventing the risk of future fatalities, this figure of £50 million can be thought of to include the monetary valuation of injury risks, which would be in the order of several millions of pounds.

18. Future catastrophic risks will be lower than these figures indicate, since safety has improved over the last two decades. However, the monetary figures above only relate to the very highest risks, over a quantum of risk which includes many less than catastrophic incidents that nevertheless could cause significant disruption and damage, require plant evacuation and shut-down, and possibly result in injuries to on-site personnel. It is impossible to estimate the total risk in monetary terms. However, allowing for events that would have (and would still) occur at a frequency of less than one in one thousand years would suggest that the *current* risk at high hazard sites would probably still be in the order of magnitude £10 million to £100 million per year in monetary terms, even if the part of the risk relating to the most serious incidents has been significantly reduced.

19. In addition, whether the risks at those sites bought under scope by these changes are similar to those of the majority of COMAH sites is a matter of judgment. These issues are explored further in the comparison of costs and benefits section below.

20. Finally, action to mitigate risks will also benefit members of the public. We do not have details of incidents involving members of the public in sufficient detail to make estimates of the risk from smaller scale events, and we know that no member of the public has been killed off-site as a result of a serious incident in chemical/petrochemical manufacture. However, quantita-

2.P Fewtrell (WS Atkins) and I Hirst (HSE, CHID) "A review of high-cost chemical/petrochemical accidents since Flixbourough (1974)", IChemE Loss Prevention Bulletin, 140, 1998.

3.Loss Control Newsletter, January 1997.

tive risk assessments do indicate the presence of significant risks, which would be mitigated to some extent by the proposals (or action prompted by the proposals).

COSTS

Costs of compliance for new COMAH sites and those with change of COMAH status

Administrative costs

21. HSE has examined the cost of compliance with the COMAH regulations following their implementation (COMAH replaced the previous CIMAH regulations). The essential findings of this previous assessment are reported below, as we would expect them to apply to the new sites.

22. All new COMAH establishments will have to familiarise themselves with the regulations and notify the competent authority (CA). These are one-off costs. Estimates provided by industry suggest that a central estimate of £1,500 per establishment for notification and around £500 for familiarization (i.e. around 10 days in total for several specialist personnel) would be appropriate. These initial costs are likely to be lower for lower tier sites.

23. COMAH sites are required to have a Major Accident Prevention Plan (MAPP). The requirement for a MAPP applies to both top tier and lower tier establishments, although top tier establishments will subsume the MAPP information into the Safety Report. A lower tier operator who has produced a safety policy under HSWA and a risk assessment that meets the requirements of MHSWR may not have a great deal of additional work to do in order to produce a MAPP. However, many will have to undertake further work specifically on major accidents to turn the existing information into a MAPP. Furthermore, MHSWR does not cover risks to the environment, which will need to be incorporated into the MAPP.

24. If further action is required, this could range from quite straightforward refinement of existing documentation, at a modest cost to the establishment operator, to more substantive costs if operators have to consider, and document, new factors or new requirements, particularly if they wish to seek outside assistance. Previous consultations with industry have elicited a range of views on the cost implications. We have been advised by industry that lower tier establishments may well have to use consultants to help them prepare a MAPP and, on this basis, industry suggested an average cost of £25,000 per MAPP would appear a reasonable central estimate.

25. Safety reports must be prepared for all new top tier establishments. The COMAH safety report will also have to address major accident hazards throughout the establishment and not just those that could be caused by the installation, which holds qualifying inventories of dangerous substances. Information provided by the CBI and other industry sources suggest that £75,000 might be a reasonable central estimate for a top tier establishment (which will include preparation of the MAPP). For sites whose status changes from lower tier to top tier we assume that the additional cost of preparing a safety report is £50,000, which will subsume the sites existing MAPP. We assume these sites will re-incur the one-off administrative costs relating to notification, since they are likely to reappraise their inventory and notify the new classified substances.

26. The estimated initial costs per site are shown in the table below.

Table 2 : Initial cost for sites affected by amendments (per site)

Effect on site	Cost (£)
Enters COMAH at lower tier	27,000
Enters COMAH at top tier	77,000
Moves from lower to top tier	52,000

Control costs

27. These costs do not include any further action taken to control risks, once the COMAH assessment has been made. These costs will be very much site specific, and cannot be quantified. It is not possible for us to give examples of these site-specific costs, as the data is not available. This is discussed in the comparison of costs and benefit section below.

Total compliance costs for new COMAH sites and those with change of COMAH status

28. Using the above information on the number and unit costs per site gives a total cost of the amendment at £9.4 million. There is also likely to be expenditure improving control at the affected sites and small ongoing administration costs, which are unquantified at present. The total costs by risk category are shown in the table below.

Table 3 : Total costs to new sites and change of COMAH status sites of the amendment by risk category (£m)

Risk category	Total cost (£m), over Appraisal Pe- riod	Annualized Cost
Carcinogens	3.4	0.34
Explosives	1.3	0.13
Petroleum substances	2.0	0.2
Substances dangerous to environment	2.0	0.2
Ammonium Nitrate	0.7	0.07
Total	9.4	0.94

Cost to existing and new COMAH sites

29. Amendments to the Sevesco II Directive now require top tier operators to provide a map, image or equivalent description as part of their safety report. Latest figures from HID in-

dicate that currently there are 360 top tier COMAH sites. This figure will rise to 475 sites, as the amended directive will lead to a further 18 establishments entering COMAH for the first time at top tier level and another 97 will move from lower to top tier status. The existing COMAH regime already requires operators to provide information in the safety report on effect/consequence data. As this can often be complicated, some sites already opt to show these effects in map form. Furthermore, HID estimate that at least 50% and as many as 66% of all operators currently choose to provide this information in a map form to the competent authority.

30. The cost of supplying a map, at approximately £1 per map, is estimated at £430 over 10 years in present terms, annually therefore we are estimating a very small cost of £43. This cost assumes that 50% (lower end of the range) already have maps and that they will be updated every 5 years. We are aware these maps or images would also need to be updated if there were any modification to these top tier COMAH sites, however we estimate that this cost will be off-set due to the fact we have taken the lower end of the scale for those who already have this map or image.

31. COMAH has a number of other requirements, which will result in some modest ongoing cost, principally to do with notification and accident reporting. This requires operators to notify the competent authority of any modifications that could have significant repercussions on major accident hazards. HID estimate that this amendment could result in less than 10 notifications a year. Notification costs are discussed in Paragraph 16 of this RIA, and estimate a cost of £1,500 per site was given. We, however, believe that modification reporting will be less than the original notification cost as we are assuming the process will no longer be new to the operators and thus will be less resource consuming.

32. We estimate the cost of notifying the competent agency of any significant changes at the site to be within the range of £500 - £1000 per notification. Discounted, over 10 years this gives the amendment a net present value between £44,000 and £88,000 or between £4,400 and £8,800 per annum, based on 10 notifications per year.

33. Finally, Article 13 of the original Directive (96/82/EC) requires member states to ensure that the safety report is made available to the public, whilst ensuring information that is sensitive because of commercial and security reasons can be withheld. In these circumstances, the operator now has to ensure that they supply an amended safety report, excluding those matters, to the authority and is again made available for the public. We expect the cost of this to be negligible as the information is already provided, and this is a simple matter of data editing and extraction.

Total Costs to existing and new COMAH sites

34. Using the above information on the map/image and modification costs, the total cost of the amendment for all sites is estimated between £44,000-88,000.

Other costs

35. There are no other costs associated with the proposals.

Costs to HSE

36. There may be some incremental enforcement costs associated with new COMAH sites. These have not been quantified.

Total costs to society

37. These consist of £9.4m costs of compliance for new COMAH sites and for those with a change in COMAH status, and the £0.044 - £0.088m costs to all existing and new COMAH sites. This gives total costs of £9.44 - £9.48m over the 10 years appraisal period, and £0.944 - £0.948m costs annually.

Impact on small and medium sized businesses

38. None of the top tier COMAH sites are likely to be operated by small companies. Costs may be disproportionately higher for those sites (if any) that are operated by medium sized companies, although costs should a major incident ever arise are far less likely to be able to be absorbed by a medium size company, especially if the company only operates one site.

Competition Assessment

39. [to be completed]

Environmental Impacts

40. The environmental benefits of preventing a serious incident where a substance hazardous to the environment is released on a wide spread scale could be very significant, and we therefore expect the environmental impact of the proposals to be very positive. This is discussed below.

Balance Of Costs And Benefits

41. The total administrative cost of complying with COMAH for a newly classified top tier site is estimated to be around £77,000. In addition, we would expect further significant expenditure on control in some cases, commensurate with a more detailed assessment of risks. The total cost for all sites affected by the amendment is estimated at £9.3 million over ten years in present terms. It should be noted that these figures exclude control costs, which are unquantified. The total cost figures are subject to uncertainty, since they use previous research, and the current situation may have changed to some extent.

42. We have estimated, in the Health and Safety benefits section that the total risk at existing COMAH sites in monetary terms is in the order of magnitude between £10 million and £100 million each year. The total number of sites, who either enter COMAH for the first time, or move to a higher classification, is 223 out of the total of 1,330 COMAH sites. This represents approximately 15% of the existing total of sites.

43. If risks both at new sites and sites now subject to a higher classification are commensurate with those at existing COMAH sites, then we would expect the monetary value of the total risk from the sites affected to be in the order of magnitude between £1.5 million and £15 million each year, which is equivalent to £11.7 million to £117 million over ten years in present terms. Even allowing for substantial expenditure on control, the benefits of the COMAH regime *in general* are highly likely to outweigh the costs. However, the changes act to bring in sites at the lower end of the risk scale. The balance of costs and benefits under the specific categories cannot be estimated without reference to quantitative assessment of the sites.

44. With respect to explosives, the hazards represented by the amended classifications clearly have the potential to be as large as the events we have already illustrated. However cur-

rent UK legislation is very stringent, and (for example) would have prevented or greatly mitigated the recent event at Enschede in the Netherlands. The current legislation means that risks at non-COMAH explosive sites are already highly controlled, and it is not clear whether the additional benefits would match the costs. Balancing the possible limited additional benefits is the argument that compliance costs at these sites could be significantly lower than we have anticipated since there will already be a large amount of work done on risk estimation, and also significant in-house expertise to draw on. We would also not expect any significant further expenditure on control.

45. Benefits with respect to substances that can cause severe environmental damage are more difficult to quantify fully than those whose primary hazard is fire and explosion. Damage and safety risk at the plant may be far lower, but the effects of any pollution may be very widespread and involve considerable clean-up costs, as the events noted in the Directive. However, this type of event is only thought to be a relevant risk at a minority of sites that will be brought into scope, depending on the possibilities of migration of the toxic hazard.

46. The changes to petroleum substances will bring sites in at the lower end of the risk spectrum for these sites. However, even in these lower quantities, the hazard remains very significant both in safety and environmental terms.

47. Finally, the amendment on ammonium nitrate is intended to bring into scope the material implicated in the explosion in Toulouse, France, in 2001. That incident killed 30 people, injured a further 3,000, and caused damage costing approximately £1.6 billion (2.3 billion Euros). The costs of a similar incident occurring in the UK are therefore likely to significantly outweigh the costs of implementing the amendment.

48. Overall, the total cost and benefit figures indicate that even if risks were at the lower end of the range we have estimated, the benefits of risk control would still be of approximately the same order as the implementation costs, recognising the great uncertainties in the estimation of the benefits. There are unlikely to be any sectors as a whole where costs greatly outweigh benefits.

Uncertainties

49. These are as stated in the text.

Arrangements for monitoring and evaluation

50. To be decided.