

**PROPOSAL FOR A PHYSICAL AGENTS (ELECTROMAGNETIC FIELDS)
DIRECTIVE**

REGULATORY IMPACT ASSESSMENT.

PURPOSE AND INTENDED EFFECT

Issue

1. The Danish Presidency of the European Union introduced a proposal for a Physical Agents (Electromagnetic Fields (EMF)) Directive on 17 December 2002. It is the third in a sequence of physical agents directives that amend the European Commission's original 1993 proposal for a Physical Agents Directive covering noise, vibration, EMF and optical radiation.
2. Negotiations in the European Council Social Questions Working Group began under the Greek Presidency and concluded in September 2003 under the Italian Presidency. The text was then presented to the Employment, Social Policy, Health and Consumer Affairs Council on 20 October when political agreement was reached. It will now be considered by the European Parliament at its second reading.
3. The proposal has changed considerably from the original Danish version and it now largely reflects the concepts and details of the guidelines produced by the International Commission on Non-Ionising Radiation Protection (ICNIRP). It also recognises that since ill-health effects do not occur below the exposure limit values, there is no purpose in further reduction in exposure. The UK has been very successful in securing changes to the proposal that will reduce the impact on industry and ensure that compliance costs are as low as possible. In particular, the original requirements for reducing exposure and the extensive provisions on health surveillance have been removed. These important changes along with other amendments to the original proposal mean that the initial costs of implementation have been considerably reduced.

Objectives

4. The proposal lays down minimum health and safety requirements regarding the exposure of workers to the risks arising from EMFs and the objective is to achieve harmonisation of control regimes between Member States. It aims to achieve this by using the well accepted guidelines for restrictions on exposure that have been produced by ICNIRP. These scientifically based guidelines, which are very conservative, are designed to prevent the known acute effects on health that can occur at extremely high levels of exposure. What the proposal specifically does not do is address the suggested long-term effects such as carcinogenic effects for which there is no conclusive evidence.
5. The proposal places a range of duties on employers, the most significant of which are;

- to assess and if necessary, measure and possibly calculate the levels of electromagnetic fields to which workers are exposed;
- where these levels exceed the action values, to assess and or/calculate whether the exposure limit values are exceeded;
- to ensure that the exposure limit values are not exceeded;
- to erect warning signs in areas where the electromagnetic field levels may cause the exposure limit values to be exceeded and
- to provide appropriate information and training.

Risk assessment

6. Electromagnetic fields (EMFs) are a form of radiation that can interact with people in a complex way that varies according to the frequency of the radiation. The symptoms of acute exposure are well defined. At low frequencies, induced currents can cause effects on the function of the central nervous system and at high frequencies there can be both whole body and localised heating leading to a rise in body temperature. These well established acute effects will only occur as a result of intense exposure and are extremely rare. They will not occur in people during their day-to-day living and should not occur at work. However, there may be an effect on the functioning of medical devices such as metallic prostheses and cardiac pacemakers from exposure to electromagnetic fields.

7. The main international guidelines to protect against the acute effects are those published by ICNIRP and in the UK by the National Radiological Protection Board (NRPB). There is no essential difference between the two sets of guidelines for occupational exposure. They define what are called ‘basic restrictions’ which are essentially exposure limits on induced current density or energy absorption in the body. These basic restrictions are set at a level well below that at which adverse effects might be expected. But current density and energy absorption in the body cannot be measured directly. So another set of figures is used that ICNIRP calls ‘reference levels’. These figures represent the external electromagnetic field strengths produced by the source and they can be measured.

8. If the measured field strengths are lower than the appropriate reference level it means that the basic restriction has not been exceeded and no further action is necessary. If however, they are greater than the reference level, then the basic restriction may or may not have been exceeded. In this case, further investigations need to be carried out.

9. The draft Directive employs a different terminology by referring to the basic restrictions as ‘exposure limit values’ and to the reference levels as “action values”.

10. Currently there is no UK legislation specific to EMFs. The general duties to assess and control risks contained in the Health and Safety at Work etc Act 1974 and the Management of Health and Safety at Work Regulations 1999 apply. HSE expects employers to refer to NRPB’s guidelines in order to comply with these general duties when considering exposure to EMFs. As the NRPB guidelines are virtually identical to the ICNIRP occupational

guidelines, those requirements of the Directive that borrow directly from the ICNIRP guidelines should not impose any additional burdens on compliant employers. Although exposure to EMFs can occur in any workplace that uses electrical equipment, the emissions of EMFs will not normally cause the basic restrictions (exposure limit values in the Directive's parlance) to be exceeded. However, there are particular industrial processes where emissions may be high enough to approach the exposure limit values in the proposal. Such industries include those that use equipment and processes such as resistance welders, induction furnaces and dielectric heaters.

Options considered

11. The original proposal contained extensive requirements for reduction of exposure to EMFs and health surveillance at the action values. During negotiations, UK officials pressed continually to amend these inappropriate requirements and ensure that the proposal was modelled on the ICNIRP approach to ensure a minimal impact on industry. They asserted that compliance with the ICNIRP basic restrictions would ensure that there is no risk to the health and safety of workers from exposure to EMFs and this is now essentially incorporated into the revised proposal. When the Directive is finally adopted, it will have to be transposed into UK law within four years. We plan to collaborate with industry so that the Directive can be implemented in a way that places minimum burdens on employers.

Information sources

12. Information has been gained from the following organisations:

- The Civil Aviation Authority
- National Grid Transco (on behalf of the electricity industry)
- MoD
- DfT
- DTI
- The Maritime and Coastguard Agency
- The Radiocommunications Agency
- Brunel University
- The UK Mobile Operators Association
- The Engineering Employers Federation

13. Information has also been sought from individual companies as well as from technical experts within HSE.

14. The base year for the cost estimates is 2002, and future costs have been discounted using the Treasury's recommended 3.5% discount rate.

BENEFITS

Health and safety benefits

15. At or below the exposure limit values set in the draft Directive, there will be no adverse health effects for workers (except possibly for some people with body implants). If workers were to be exposed at levels substantially in excess of these values, adverse health effects would be observed. At extremes, these health effects could include cardiac arrhythmias and heat stroke, and therefore the consequences would be potentially life threatening, although we are not aware of any fatalities caused by EMF exposure.

16. Indeed the only HSE knowledge of ill-health or injury concerns substantial EMF over-exposure as a result of very infrequent accidents or incidents. Although the Directive should have the effect of increasing awareness of the risks of over-exposure, the effect on such incidents is likely to be minimal. We are therefore unable to identify any health and safety benefits from the Directive.

17. Workers with particular types of body implants (both active and passive) could be at risk when exposed to EMF below the limit values. HSE currently has no information on either the proportion of workers in the affected sectors that are subject to this particular risk, the levels of exposure at which they may be affected, and the possible incidence. Consequently no attempt has been made to estimate the health benefits to workers with implants.

Other benefits

18. A harmonised level of protection would ensure that there was a 'level playing field' across the European Union in relation to the control of exposure to EMFs. Hence, as the Directive states, would "...create a minimum basis of protection for all Community workers, in order to avoid possible distortions of competition." The harmonization ensures all Community states adhere to the same maximum level of EMF exposure, thus not perpetuating disproportionate costs on any one member state.

COSTS

Business sectors affected

19. Research conducted by the NRPB¹ has identified business sectors and industrial processes that potentially expose workers to EMF that exceed the action levels stated in the EU Directive. NRPB's coverage was limited by the amount of empirical research that the Board has been able to conduct, and therefore its list of EMF emitting equipment may not be exhaustive.

20. According to currently available information from the NRPB, the potentially affected workers are:

¹ NRPB R265 and NRPB-W24

- Those maintaining antennae, for example in broadcasting, navigation and telecommunications
- Those working with electricity generation and distribution
- Those working with dielectric and induction heating systems
- Those working with resistance welders
- Drivers of electric locomotives
- Those involved in electro-chemical processing
- Those using diathermy, hypothermia and nuclear magnetic resonance equipment, for example in the health services
- Those using tape erasing equipment to erase data stored on tapes and other magnetic media.
- Those using crack detection equipment for the non-destructive testing of metallic components
- Those using plasma etchers in the semi-conductor business
- Those using RF sputterers to apply coatings to components used in a variety of industries
- Those working with Electronic Article Surveillance (EAS) equipment used to prevent theft from shops, libraries etc.

Data gathered from industry sources during the preparation of this RIA, combined with HSE's best estimates, has allowed HSE to develop a picture of the number of potentially affected businesses, sites and workers in a subset of the industries implied by the list above. Table 1 presents these estimates.

Type of equipment	Sectors	Estimated no. of businesses/ organisations	Estimated number of relevant sites	Estimated pieces of equipment	Estimated no. of workers potentially affected
Radio transmitters	Broadcast	2	1350		1550
Radio transmitters	Telecoms	5	28,000	35,000	800-1000*
Navigation masts	Marine and aeronautical navigation	36	430		500-1000
Radar installations	Air traffic control, Coastguard	27	189		500-1000
Electricity generators, transformers, pylons etc	Electricity production and distribution	125-225	173000		6000
Induction furnaces		1000-3000		3,000	9,000
Electric locomotives	Rail	30	NA	7,100	7000-14000
Dielectric heaters	Various	250-1000		500-1000	1500-10000
Physiotherapy equipment	Medical	300-700	700	3200	9000
Magnetic resonance equipment	Medical	200-500		250	1250

* Information from the telecommunications industry indicates that none of these workers is routinely exposed to levels in excess of the draft Directive's action values

Thus far in its investigations, HSE has been unable to estimate the number of businesses, sites and workers who would be affected in industries that use the following types of equipment:

- Electro platers
- Resistance welders
- Tape erasers
- Crack detection equipment
- Plasma etchers
- Radio Frequency Sputterers
- Electronic Article Surveillance

21. Consequently, HSE's estimates represent only a partial picture of the overall compliance costs faced by businesses and other organisations in Great Britain. HSE is still endeavouring to acquire more information.

22. The use of much of the equipment referred to above is not specific to a particular industry. This applies especially to resistance welders and electroplaters. Furthermore, some businesses within a relevant SIC group will use specific types of EMF generating equipment, while others will not. This further complicates the task of estimating the number of businesses that would potentially be affected by the Directive.

23. The task of estimating the number of businesses is simplified in cases where equipment users are easily identifiable as coming from one particular industry. This is the case for the "production and distribution of electricity" industry (SIC 401) and the "transport via railways" industry (SIC 601), and we can make reasonable assumptions about the number of businesses involved using Small Business Service data. Within the electricity production and distribution industry, 125 firms (60 micro², 25 small, 15 medium and 25 large)³ would be affected (assuming all firms in this group employ workers exposed to EMF). In addition there is an unknown number of contracting firms that provide services to the electricity industry. Within the rail industry, approximately 30 companies would be affected (assuming that only the large and medium sized firms in this SIC code operate electric locomotives). Other information on the number of affected businesses (Table 1) has come directly from industry representative organisations.

Compliance costs to business, charities and voluntary organisations

24. Some firms are already compliant with at least some of the measures contained in the draft Directive. This is for two reasons: Firstly, media coverage and therefore public awareness of potential problems in specific industries has, in some cases, forced all of the affected firms to conform with high industry specific standards (which generally follow NRPB or ICNIRP guidelines). In particular, this applies to the mobile telecommunications industry. Secondly, the Management of Health and Safety at Work Regulations 1999 require employers to assess risks, take measures to reduce the risks identified and provide appropriate health

² Between one and nine employees (pers. comm. SBS statistical service)

³ Source: Small and Medium Enterprises (SME) Statistics for the United Kingdom 2001, Small Business Service October 2002.

surveillance. The regulations do not specifically mention EMF as a potential health hazard, and consequently the level of awareness of the risk among most employers is probably low. However, the NRPB publishes EMF exposure guidelines, which, although not legally binding, currently act as a benchmark.

25. HSE has assumed that few workers in the telecom industry are exposed above the action values in the draft Directive. The impact on the industry should therefore be minimal.

26. The incidence of exposure to EMFs above the action values in all other affected industries is unknown, and HSE has no basis for making an assumption in this regard. There remains the issue of the extent to which the non-telecoms industries already comply with the draft Directive's Article 4 ("Determination of exposure and assessment of risks"). As guidelines from the NRPB are available, though not compulsory, HSE has assumed that between 5 and 20% of the relevant firms may already conduct suitable risk assessments⁴. We would welcome any further information or other data, particularly where the action values may be exceeded, that will allow more refined costs to be calculated.

27. HSE also has no knowledge of the number of workers who might be exposed above the exposure limit values, as the information is currently not available. HSE has therefore not costed these exposure calculations. The draft Directive prohibits exposure above the exposure limit values, and requires an employer to assess and if necessary calculate whether the exposure limit values are exceeded. Information does not exist on the proportion of firms performing risk assessments to ensure compliance with the NRPB guidelines, which would ensure compliance with the Directive.

28. Compliance costs are considered in this RIA under the following headings: Familiarisation and planning (time spent by company management understanding the Directive and discussing how to respond to it); determination of exposure and assessment of risks (Article 4 of the Directive); provisions aimed at avoiding or reducing risks (Article 5); worker information and training (Article 6); consultation and participation of workers (Article 7).

Familiarisation and planning:

29. HSE's inability to establish with certainty the total number of companies affected by the Directive means that overall familiarisation and planning costs to UK companies can only be tentatively estimated. We assume that familiarisation and planning requires an average of four hours of management time per business, and that the hourly cost of an appropriate manager is approximately £24⁵, the following range of one-off implementation costs would apply: £0.2 to £0.5 million⁶.

⁴ Indications from industry, particularly the electricity industry, indicate that EMF risk assessment are not common.

⁵ Source: New Earnings Survey 2002. SOC124 average hourly wage rate £18.64, multiplied by 1.3 to account for non-wage labour costs.

⁶ The management cost of £24 multiplied by 4 hours familiarisation time, gives us a per business cost of £96.93. The directive could affect between 1975 and 5525 businesses/organisations, as suggested in Table 1.

Determination and Assessment of risks.

30. The Directive does not prescribe how firms should conduct EMF risk assessments. HSE has therefore made several assumptions in order to estimate compliance costs. The first assumption is that there will be numerous cases where, in the judgement of responsible and knowledgeable staff, there is no reasonable expectation that the action values will be exceeded. No further action would be required in such cases. However, where there is any doubt, some kind of additional assessment would have to be made. The least onerous type of assessment (type 1) would apply where manufacturers' information (or information from other reputable sources) is available on the EMF fields generated by the equipment in question. In theory, such assessments should only have to be conducted once. However, type 1 assessments would only be valid if the equipment was installed on a stand-alone basis (so that EMF from different pieces of equipment did not combine to create EMF of greater overall strength), and if the equipment was not dismantled for repairs and maintenance. In the latter case, assessments using measuring equipment should be conducted to ensure that the re-assembled equipment does not emit EMFs that exceed the action levels in strength. Type 1 assessments are assumed to be performed by an electrical technician on a one-off basis.

31. Type 2 assessments would become necessary where the conditions for type 1 assessments are not fulfilled, or where there are concerns about certain particular types of workers, especially those with body implants. In most cases, they would involve an electrical technician using monitoring equipment for varying lengths of time, depending on the number of measurements that have to be taken. The cost of a technician is assumed to be £14.40 per hour⁷. In a proportion of cases, company managers may decide to hire a consultant either because of the complexity of the assessment or because there is no in-house expertise (the likelihood in small firms). HSE cannot be certain how many cases this will affect thus we have estimated that this could occur between 25% and 50% of all cases, and that the full cost of hiring a consultant would range between £900-£1500⁸ per day (which is set deliberately high to allow for a slight fee increase as a result of greater demand for consultant services).

32. HSE plans to produce simple guidance for employers that will help them in making whatever assessments may be necessary. This may take the form of generic guidance that could be used by small and medium enterprises.

33. Type 2 assessments would have to be repeated after major repair and maintenance events. Currently we do not have any industry specific information on this matter, and we have assumed that re-assessments need to occur every two years for some types of equipment and every five years for others (refer to table 3).

34. All sites operating equipment that may expose workers to EMF greater than the action values will be required to make a type 1 or type 2 assessments. Table 2 gives the assumed regularity and duration of type 1 assessments, while Table 3 gives the same information for type 2 assessments.

⁷ Source: New Earnings Survey 2002, ONS. SOC 302 average hourly wage rate £11.08 multiplied by 1.3 to include non-wage labour costs.

⁸ Source: Information received from consultancy.

Type of establishment/equipment	Regularity of assessment (years)	Duration of assessment per site (average days)	Number of units of assessment (sites/pieces of equipment)
Broadcast antennae	Once only	0.125	500-1000
Resistance welders	Once only	0.03	Insufficient Information
Electricity production and distribution	Once only	0.125	155900

Type of equipment/equipment	Regularity of assessment (years)	Duration of assessment per site (average days)	Number of units of assessment (sites/pieces of equipment)
Broadcast antennae	2	2	350
Telecommunications antennae*	2	2	0
Marine and aeronautical navigation aids	2	0.5	430
Marine and aeronautical radar	2	1	189
Electricity production and distribution	5	0.5	17100
Induction furnaces	2	0.33	1000-2000
Medical departments (MRI)	2	0.5	100-250
Electro platers	2	2	Insufficient Information
Dielectric heaters	2	2	500-1000
Rail companies (electric locomotives)	5	0.25	7,100
Resistance welders	5	0.03	Insufficient Information
Diathermy	5	0.5	700
* Assumed already to be compliant with Directive			

35. EMF measuring equipment will either have to be hired or purchased by the company that requires a type 2 assessment. HSE judges that the cost of hiring such equipment would be £75 per day.

36. Downtime is assumed to be negligible because equipment will have to be operating in order for measurements to be taken.

37. Costs under “determination of exposure and assessment of risks” are estimated to lie in the following ranges: First year costs (which are not one-off but which vary in subsequent years) are between £3.6 and £5.5 million, with ten year discounted costs with a present value of £5.6 to £12 million. On average, therefore annual costs range between £0.56m and £1.2m.

Provisions aimed at avoiding or reducing risks :

38. Article 5.1 requires employers to reduce risks to a minimum. It is not at all clear what this can mean beyond compliance with the basic restrictions, since it is accepted that risk is prevented with such compliance. There should, therefore, be no costs in complying with Article 5.1 for employers already compliant with the NRPB guidelines.

39. In Article 5.2, the Directive states that “...once the action values...are exceeded, the employer, unless the assessmentdemonstrates that the exposure limit values are not exceeded and that safety risks can be excluded, shall devise and implement an action plan comprising technical and/or organisational methods intended to prevent exposure exceeding the exposure limit values. Costs will only be incurred by those employers currently exceeding the exposure limit values. In order for us to make more informed assumptions in our costing, we need to have better estimates of the types and number of situations where the exposure limit values may be exceeded as this will determine what further actions need to be undertaken and therefore allow any costs to be estimated. We would welcome any additional information.

Worker information and training:

40. The Directive will require employers to “ensure that workers who are exposed to the risks from electromagnetic fields at work and/or their representatives receive any necessary information and training relating to the outcome of the risk assessment”. Although workers are only exposed to risk above the exposure limit value this provision can only make sense if it applies to workers at the action value, since a risk assessment will have to have been undertaken at that value.

41. For the purposes of the RIA HSE has assumed that information is required where the risk assessment is required, that 10 to 25% of workers from assessed workplaces will require training, that the transfer of training and information will take one half hour per year per worker and that the average full labour cost of employing such workers is £13 per hour⁹. Furthermore, HSE has assumed that management will provide the information and training, requiring on average five minutes per worker per year, at an average cost of £24 per hour¹⁰.

42. Costs under “worker information and training” are estimated as follows: Annual recurrent costs of between £44,000 and £163,000, with a ten year present value of between £379,000 and £1,404,000. These are implementation costs.

Consultation and participation of workers:

43. This process would be handled through existing channels, and therefore the incremental costs are assumed to be negligible.

Health surveillance:

44. This Directive requirement refers back to duties in the Framework Directive which have already been transposed in the UK by the Management of Health and Safety at Work Regulations 1999. The Directive therefore places no new duties on industry.

⁹ A review of relevant SOC codes suggests that an hourly wage rate of £10 is a representative average. This figure is multiplied by 1.3 to account for non-wage labour costs.

¹⁰ NES 2002, SOC 124. An hourly wage rate of £18.64 is multiplied by 1.3 to account for non-wage labour costs.

Compliance costs for a 'typical' business

45. The diversity of the businesses affected by the Directive means that a single “typical business” is impossible to identify. However, in cases where the whole of a sector is affected, a typical business is identifiable. An obvious example (for which information is available) is the electricity distribution sector. The information presented below is averaged across the fourteen distribution network operators.

Table 4. Compliance costs of a “typical” company in electricity distribution		
	Estimated compliance cost (£)	
	First Year costs	Ten year P.V.
1. Familiarisation and planning	1,000	1,000
2. Determination and assessment of risks	315,000	315,000
3. Worker information and training	0	16,000
TOTAL	316,000	332,000
* Estimated by the electricity industry. These costs are incomplete and therefore represent a minimum under the electricity industry’s assumptions		

Total implementation compliance costs

Table 6. Summary of compliance costs (£m)				
	First Year costs		10 yr PV	
	Lower Estimate	Upper Estimate	Lower Estimate	Upper Estimate
Implementation costs:				
Familiarisation and planning	0.2	0.5	0.2	0.5
Worker information and training	-	-	0.4	1.4
<i>Total implementation costs</i>	<i>0.2</i>	<i>0.5</i>	<i>0.6</i>	<i>1.9</i>
Policy costs:				
Determination and assessment of risks	5.0	11.9	8.4	30.2
<i>Total policy costs</i>	<i>5.0</i>	<i>11.9</i>	<i>8.4</i>	<i>30.2</i>
Total Policy and Implementation costs	5.2	12.4	9.0	32.1

46. Please note: Due to the unavailability of data, these costs do not present a complete picture of implementation and policy costs.

47. The undiscounted estimated annualised costs are in the range £900,000 to £3,210,000.

Impact on small and medium sized businesses

48. HSE contacted four small businesses and sought the views of the Engineering Employers’ Federation in order to assess the potential impact of the draft Directive. One of the contacted businesses was an oil and gas company that generates electricity from by-products, while the other three businesses were engineering firms that serve niche markets for intermediate manufactured products.

49. The responses from all parties were broadly similar. The costs of risk assessment and health surveillance would not have a significant impact because they vary in proportion with firm size (as measured either by number of employees or pieces of equipment). The implementation costs associated with familiarisation and planning were not regarded as significant, and worker training, information and communication would be handled through existing channels. However, should any of the firms be required to take action to reduce workers' exposure to EMF, above the limits values, the implications for small businesses could be significant. The impact could be disproportionate compared with the impact on larger firms because the actions may involve substantial costs that are not directly related to firm size, however now that automatic action above action values is no longer necessary, the likelihood of such disproportionate impact has decreased.

Competition assessment

50. As noted in the "Business sectors affected" section, the Directive will affect a large variety of businesses, and therefore may have an impact on competition in numerous markets. Two of the more important and easily identifiable markets are associated with the electricity generating and broadcasting industries.

51. The electricity generating industry includes several large and many smaller companies. Although there are some geographical limits to where certain companies can sell their power, there is a clear link between supply and demand through the network that means that the geographical market covers the whole of Great Britain. There is a small degree of market concentration, with three or four particularly large producers. However, their combined output does not exceed 50% of the market (as measured crudely by generating capacity). Some smaller firms may be affected substantially more than larger firms because the costs of actions to reduce EMF exposure are likely to contain a large proportion of fixed costs. However, with the removal of the automatic requirement to reduce exposure as soon as the action value has been exceeded (as was required in the draft Directive), the likelihood that firms will have to take action has reduced substantially. New entrants will not encounter greater set-up and on-going costs than faced by companies already in the industry.

52. The broadcast industry is highly concentrated with just two major players in the market. These companies operate a nationwide network of broadcast antennae that service the needs of radio and television organisations. Substantial substitution between terrestrial antennae and other types of broadcast technology is unlikely in the medium term due to customers' high fixed cost investments in their current systems. All broadcast firms would experience very similar compliance costs and therefore neither will be affected more than others. Market structure would not change and new entrants to the market would not bear greater costs than those already in the market. Although technological change occurs within the industry, the pace is not rapid. The Directive would not affect firms' choices.

53. Overall, the proposals contained in the Directive are not expected to have a significant impact on competition. However, it is possible that some small firms in some sectors will bear disproportionately high compliance costs. Whether this would have implications for competition would depend upon the scale of compliance costs and the existing level of concentration in the affected market. By contrast, competition in sectors that have already taken action to control the risk from EMF adequately, will not be affected. This particularly applies to the mobile telecoms industry.

Costs to HSE

54. HSE anticipates that the resource costs of enforcing the Directive would be absorbed in existing inspection resources.

55. The draft Directive requires HSE to report to Brussels on a five-year basis. The costs of doing this are regarded as negligible.

Other government costs

56. The MoD operates military radar systems and would be responsible for conducting risk assessments, personnel training and health surveillance. HSE has been unable to establish how many radars the MoD operates and has been unable to estimate the implementation costs that the Department would face.

Total costs to society

57. In the absence of quantifiable public sector costs, the total costs to society are the same as those for “businesses, charities and voluntary organisations” (which contain no transfer payments). First year costs are in the range £5.2 to £12.4 million and the ten year present value is in the range £9.0 to £32.1 million.

ENVIRONMENTAL IMPACTS

58. None has been identified.

BALANCE OF COSTS AND BENEFITS

59. Quantification of the benefits of the draft Directive has not been possible and hence the balance of costs and benefits is impossible to state quantitatively. The Directive has the potential to reduce the risks of workers being exposed to levels of EMF greater than the limit values, although most incidents where harmful exposure occurs are as a result of accidents. The draft Directive does not address the prevention of accidents.

60. First year costs are in the range £5.2m to £12.4 million and the ten year present value is in the range £9.0m to £32.1 million.

61. Because of current information gaps, the costs estimated in this RIA are very conservative. We shall continue to refine our estimates as we acquire more information. Whilst we recognise that the benefits of the Directive are very limited, the cost/benefit ratio has been significantly reduced as a result of changes achieved during negotiations.

Uncertainties

62. A large degree of uncertainty still exists over much of the data used in this RIA. In most cases, the industries potentially affected by the Directive have yet to analyse its implications and consequently HSE made a large number of assumptions. Indeed, so little information is available from industries using certain types of equipment that HSE has been unable to estimate some of the relevant costs. Efforts will be made to provide estimates once more in-

formation becomes available through continued contact with businesses and their representative organisations. In the meantime, the cost estimates in this RIA should be regarded as understating overall costs within Great Britain.

Arrangements for monitoring and evaluation

63. The Directive, if adopted, would need to be implemented in the UK by regulations under the Health and Safety at Work etc. Act 1974. A survey to assess awareness of the amended regulations and compliance with them would be commissioned within two years of their introduction.

Securing compliance

64. There is already a duty under general health and safety legislation to assess and control risk. Employers should already be complying with NRPB guidelines that, for occupational exposure, are virtually the same as the ICNIRP guidelines specified in the Directive.

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