CEEP RESPONSE

Brussels, March 2011

CEEP answer to draft directive on the workers protection from the risks related to exposure to electromagnetic fields at work

Foreword:

- CEEP agrees that workers in all sectors should be protected by the Directive.
- To date, there is still no scientific evidence of any adverse health effect, including for the long term effects, concerning the European workers exposure to the electromagnetic fields within the framework of the usually entrusted activities.
- Contrary to what is generally communicated, the threshold of appearance of phosphenes reported in the literature is higher than 15 milli Tesla in the extremely low frequencies (50Hz/60 Hz)".
- Phosphenes are the first manifestation of the magnetic fields on the body for the frequencies below 100 KHz and do not represent an adverse health effect.
- An extension to the implementation period would be required to ensure all new requirements are incorporated into member state legislation.
- CEEP cannot see the need for binding health surveillance, as most effects are short term and reversible.

General overview of the new project

Exposure limits must be scientifically based. In the current draft (circulating November 2010), the proposed limits are a combination of the new ICNIRP health guidelines (2010) and the BMAS report (2009) for the ELF frequency range (below 100 kHz), and are the same as in the first Directive (2004) for the higher frequency range. We discuss hereafter only the ELF part of the Directive, with a particular focus on the power frequency (50 Hz in Europe).

The first Directive 2004/40/EC has defined 2 types of limits: the Action Values (first level of limits, expressed in terms of measurable quantities), and the Exposure Limit Values (fundamental limits corresponding to a physiological effect inside the body, and therefore not directly measurable). The Action Values were explicitly defined as conservative and therefore, exceeding of these Action Values was allowed, providing that compliance to the Exposure Limit Values should be demonstrated.

Nevertheless, such a compliance demonstration is technically complex and requires in some cases the use of sophisticated computation tools. As a result, this first directive raised some difficulties in some industrial sectors, and also for SMEs which have not the technical and financial capability to achieve such a compliance demonstration.

The new Directive draft aims at circumventing this technical difficulty and correcting this iniquity. It proposes a new set of measurable limits, associated to a zoning approach. The main objective, which we support, is clearly to facilitate the risk assessment and the compliance demonstration. In addition to these measurable limits, the new project keeps a fundamental exposure limit corresponding to a physiological effect inside the body. The principle is similar to the 2004 Directive but, accordingly to

the 2010 update of the scientific basis by ICNIRP, the relevant quantity is now the induced electric field, and no longer the induced current density.

Specific remarks on the new project

The article 3.6 is contradictory.

On one side, it clearly states that "*workers shall not be exposed above the values higher than the upper limit of Zone 2* ", and on the other side, Member States are allowed to put in place a system of derogations. From our point of view, this raises two major concerns:

- It will create different situations between Member States, depending on whether or not they will allow any derogations, and also depending on the associated conditions;
- It will also create iniquity between companies: if a Member State established a derogation system without framing the associated conditions and/or a method to demonstrate compliance to the ELV, every company will make its own demonstration, therefore going back to the critical situation raised up by the 2004 Directive.

At final, such a derogation system is contradictory to the main objective of the Directive, which is to establish a common frame of protection for workers all over the European Union.

Considering the fact that there is still no scientific evidence of any adverse health effect, including for the long term effects, concerning the European workers exposure to the electromagnetic fields within the framework of the usually entrusted activities, CEEP considers, as mentioned in the draft directive, that for few sector's activities:

- ✓ with an important benefit for the society;
- ✓ and when a particularly strong safety culture exists in the sector concerned;
- ✓ and if any prevention and/or protection actions can ensure that workers are not exposed under the binding limit value;

it is possible to accept an exemption from this binding exposure limit values for the workforce.

Our proposal addressing article 3.6:

- A unique system, **identical for all** (and, of course, a unique scientific basis);
- A system facilitating the compliance assessment: therefore **we support the new approach which prioritizes measurable limits**.

In addition to its improved coherency, such a system will also greatly facilitate the communication to the workers and the sharing of the risk assessment.

The association of limits to different part of the body is unclear.

According to the draft Directive, some limits are defined regarding the "truck only", and others refer to an exposure of the "head or whole body". This should be understood as a whole body or a localised exposure (generally applicable to the central nervous system of the head). In the present drafting of the Directive, these definitions are ambiguous and even non-consistent. This is due to the fact that the draft Directive has tried to make a compromise between two different scientific basis: ICNIRP and BMAS.

CEEP considers that it can only result in a complex and hardly consistent text.

In addition, whereas this approach (whole body or localised exposure) is convenient regarding exposure to magnetic fields, it is clearly irrelevant for low frequency electric fields, for which the idea of localised exposure is scientifically false: living tissues (therefore including the human body) are sufficiently conducting for the body to be considered as a Faraday cage regarding low frequency E-fields. In other words, whatever the spatial distribution of the electric field (uniform or not), the interaction of this field with the human body finally results in a uniform whole body exposure.

Our proposal: a unique scientific basis.
Practically, as ICNIRP is the reference international organisation (its publications are open to public comments and published in peer-review journals, what is not the case for the BMAS report) and as the 1998 ICNIRP Health Guidelines were the scientific basis of the 2004 Directive, **we support the 2010 ICNIRP Guidelines as the unique scientific basis of the new Directive**.

Zone-0 associated limits

In the current draft Directive (November 2010), the limits associated to Zone-0 and Zone–1 are identical regarding electric fields, but not regarding magnetic fields. Moreover, the Zone –0 limit proposed for magnetic fields is not based on the same scientific reference as the Zone-1 limit.

Our proposal: in order to have a unique and consistent approach all over the directive, **the limits for Zone-0 should be the reference levels applicable to the public, as recommended in the 2010 ICNIRP Guidelines**.

At the power frequency in Europe (50 Hz), these reference levels are respectively 5 kV/m and 200 µT for the electric field and the magnetic field.

Zone-1 associated limits

Accordingly to the 2004 Directive, the measurable limits associated to Zone 1 must be the Reference Levels applicable to workers, such as defined by the 2010 ICNIRP guidelines. At the power frequency in Europe (50 Hz), the corresponding values are 1000 µT for magnetic fields and 10 kV/m for electric fields.

Our proposal:
The Zone-1 limits should be the reference levels applicable to the workers, as defined in the 2010 ICNIRP Guidelines.

The present Zone-2 associated limits are not acceptable

In the current draft Directive, the proposed Zone-2 limits raise several concerns:

- As previously explained, their definition referring to different parts of the body is ambiguous and not scientifically relevant with regard to low frequency electric fields;

- The proposed values are hardly applicable. For example, for 50 Hz magnetic fields, the limit corresponding to Zone 1 (where the main commitment for the employer is to put in place an adequate signalisation) is 1000 µT whereas the Zone-2 limit (not to be exceeded, according to current article 3.6) is only at 1360 µT. So, there is only a ratio of 1.3 between the information threshold and the forbidden-zone threshold.

At last, CEEP considers that this proposal seems:

- Difficult to apply and non-realistic: regarding many field sources, the differences between the zones 1 and 2 will often remain within a few centimetres. It should also be noted that the usual size of the field measuring probes is in the same order of magnitude. Taking also the measuring uncertainties into account, it appears that such a small margin between Zone-1 and Zone-2 limits is not sufficiently discriminating, with regard to measurement constraints;

- not scientifically based: when proposing exposure limits, ICNIRP aggregates many security factors, and it is well admitted that the first established effects occurs at exposure levels about 10 times higher than the Exposure Limit Values. Therefore a 1.3 ratio between the Zone-1 and –2 limits is not scientifically relevant;

- misleading: just in opposite to the high security factors adopted by ICNIRP, such a small margin between the two zones, and a such precise value for Zone-2 limits gives the feeling that the safety margin is narrow. This will be a critical difficulty for the communication/information to the workers when implementing the Directive.

It should also be noted that there is no other security/protection issue applying such a small margin between the information area and the forbidden zone. So the current draft of EMF Directive is not consistent with other security policies.

As previously explained, stating different limits for the zone 2 regarding whether the exposure is localized or global (over the whole body) is only relevant for magnetic fields. The 2010 ICNIRP Guidelines indicate that a measurable limit of 3 mT applicable to the central nervous system in the head is conservative with any other local exposure on localized part of the body (the computational dosimetry taken as reference by ICNIRP show that a level of 13 mT is necessary to reach the exposure limit values on any part of the body but the head).

The need, if any, to analyse the localised exposure due to particular sources should be offered to standardization. For the Directive and its essential requirements, it is reasonable and conservative to keep for the Zone-2 limit the protective value applicable to the head.

What can be the Zone-2 limits?

The current approach of the 2010 project is remains unchanged, what means that a high pre-eminence is given to measurable limits, and that the possible exceeding of the Zone-2 limits is restricted: exceeding the zone 2 limits is submitted to particular provisions and/or particular risk assessment.

The Zone-2 limits should be determined from reference published studies considered by ICNIRP. Practically, and according to ICNIRP 2010 guidelines, the occupational reference levels (identical to Zone-1 limits) are derived from computational considering that "*An additional reduction factor of 3 was applied to these calculated values to allow for dosimetric uncertainty*". The Zone-2 limits should not take into account this additional reduction factor.

CEEP considers that this approach is ethically acceptable considering, firstly that the fundamental limits (the Exposure Limit Values) already include security factors, and secondly that the computational results taken into consideration are the worst case result of all the studied configurations.

As an example, regarding the exposure to 50 Hz electric fields, the calculated value of 25 kV/m was obtained in a computational case where the human body is in perfect electrical contact with the

ground. This never happens in real workplaces: workers in high voltage substations always wear on protective shoes, which are non-conducting. The computation result is therefore conservative with regard to real situations.

Our proposal:
The article 3.6 can keep the general idea of limiting the possibilities of exceeding the Zone-2 limits.

The few cases where the exceeding of the Zone-2 limits may be accepted must be offered to all. **We recommend that the occupational situations exceeding the Zone-2 limits should be explicitly offered to standardisation bodies**, in order to analyse, in an open and consensual way, these particular situations and determine the adequate process to apply in order to demonstrate compliance with the exposure limit values.

The proposed zone-2 limits are the field levels equivalent to the exposure limit value, derived from the worst case computational result of published studies taken as reference by ICNIRP 2010 guidelines. Practically, the Zone-2 limits are in a 3-fold increase range with regard to Zone-1 limits. At 50 Hz, these limits are 3000 µT (applicable to the CNS of the head, as being conservative with regard to any other localised exposure of the body) and 25 kV/m (whole body).

Conclusions:

CEEP considers that this proposal is self-consistent (a single and consistent approach, a single scientific reference).

A Directive endorsing such an approach would have the advantage of being more simple, clear, consistent and easy to understand by the workers. Considering a workers health protection issue, and the commitment to have a shared approach between workers and employers, this seems to be a great advantage.