The Secretary

NSW Planning & Environment

ATTENTION: Emily Dickson, Key Sites Assessments

Dear Sir or Madam

I refer to the Department's letter of 24 January 2019 regarding Notification of Modification Request for the Eastern Creek Business Hub Concept Plan, (SSD 5175 MOD 6) at Rooty Hill Road South, Eastern Creek for 'Modification to the concept approval (SSD 5175) to transfer 500m2 of gross floor area (GFA) from large format retail to the child care centre, resulting in a child care centre with a total GFA of 1,200m2 and re-located to the south western corner of Lot 2'. Submissions need to be made to the Department by 8 February 2019.

Please find attached a copy of Endeavour Energy's previous submission made to the Department on 26 November 2018regarding:

- SSD 5175 MOD 4: Modification to the concept approval to amend the stormwater drainage system, construct a new roundabout on the internal access road between Lots 1 and 2, with associated realignment of the lot boundaries.
- SSD 8588 MOD 2: Modify the development consent to amend the layout of the Lot 2 car park and building envelope, to reflect the above concept plan modification.

The recommendations and comments made therein are also valid for this Modification Request.

As shown in the below site plan from Endeavour Energy's G/Net master facility model (and extract from Google Maps Street View) in regards to the proposed child care centre site there are:

- No easements benefitting Endeavour Energy (active easements are indicated by red hatching).
- Low voltage and 11,000 volt / 11 kilovolt (kV) high voltage overhead power lines to the opposite side of Rooty Hill Road South.
- Low voltage overhead power lines crossing Rooty Hill Road South to a streetlight located in proximity of the site.

Please note the location, extent and type of any electricity infrastructure, boundaries etc. shown on the plan is indicative only. Generally (depending on the scale and/or features selected), low voltage (normally not exceeding 1,000 volts) is indicated by blue lines and high voltage (normally exceeding 1,000 volts but for Endeavour Energy's network not exceeding 132,000 volts / 132 kV) by red lines (these lines can appear as solid or dashed and where there are multiple lines / cables only the higher voltage may be shown). This plan only shows the Endeavour Energy network and does not show electricity infrastructure belonging to other authorities or customers owned electrical equipment beyond the customer connection point / point of supply to the property. This plan is not a 'Dial

Before You Dig' plan under the provisions of Part 5E 'Protection of underground electricity power lines' of the *Electricity Supply Act 1995* (NSW).

Subject to the foregoing and the following recommendations and comments (having regard that, Endeavour Energy has no objection to the Modification Request.

- Earthing

The construction of any building or structure (including fencing, signage, flag poles, hoardings etc.) whether temporary or permanent that is connected to or in close proximity to Endeavour Energy's electrical network is required to comply with Australian/New Zealand Standard AS/NZS 3000:2018 'Electrical installations' as updated from time to time. This Standard sets out requirements for the design, construction and verification of electrical installations, including ensuring there is adequate connection to the earth. Inadequate connection to the earth to allow a leaking/fault current to flow into the grounding system and be properly dissipated places persons, equipment connected to the network and the electricity network itself at risk from electric shock, fire and physical injury.

In regards to a child care centre, Endeavour Energy's Substation Primary Design Section have previously provided the following comments for a development application involving the construction of a child care centre with a padmount substation located on the site.

Endeavour Energy's 'Design certification checklist for ASP L3' the design must comply with Endeavour Energy's 'Earthing Design Instruction EDI 001 – Earthing design risk assessment' in which child care centres are regarded as a 'special location' – please see the following extract of EDI 001.

Special location
The "special" location category implies an area within close proximity to or within a premise where there is a high likelihood that shoes will not be worn and/or the risks associated with the earthing system has the potential to be exposed to a number of people simultaneously through contact with affected metalwork. This includes (but is not limited to) schools, pre-schools, day care centres, aquatic centres, recreational swimming areas and beaches.

If the child care centre is in proximity of a padmount substation, the applicant should check with the proponent and their ASP responsible for the network connection to the site that any padmount substation earthing has been designed to comply with the 'special location' requirements under EDI 100 ie. at the time the ASP did the design they may not have been aware of the intended use of part of the site as a child care centre.

- Prudent Avoidance

The electricity network is operational 24/7/365 ie. all day, every day of the year. The electricity industry has adopted a policy of prudent avoidance by doing what can be done without undue inconvenience and at modest expense to avert the possible risk to health from exposure to emissions form electricity infrastructure such as electric and magnetic fields (EMF) and noise which generally increase the higher the voltage ie. Endeavour Energy's network ranges from low voltage (normally not exceeding 1,000 volts) to high voltage (normally exceeding 1,000 volts but not exceeding 132,000 volts / 132 kV).

In practical terms this means that when designing new transmission and distribution facilities, consideration is given to locating them where exposure to the more sensitive uses is reduced and increasing separation distances. These emissions are generally not an issue but with Council's permitting or encouraging development with higher density, reduced setbacks and increased building heights, new development can impact on existing electricity infrastructure. Where development is proposed in the vicinity of electricity infrastructure, Endeavour Energy is not responsible for any amelioration measures for such emissions that may impact on the nearby proposed development. Endeavour Energy believes that likewise Council should also adopt a policy of prudent avoidance by the siting of more sensitive uses away from any electricity infrastructure – including any possible future electricity infrastructure required to facilitate the proposed development.

Please find attached a copy of Energy Networks Association's 'Electric & Magnetic Fields – What We Know, January 2014' which can also be accessed via their website at http://www.ena.asn.au/.

> *Electric fields are strongest closest to their source, and their strength diminishes rapidly as we move away from the source.*

> *The level of a magnetic field depends on the amount of the current (measured in amps), and decreases rapidly once we move away from the source.*

Typical magnetic field measurements associated with Endeavour Energy's activities and assets given the required easement widths, safety clearances etc. and having a maximum voltage of 132,000 volt / 132 kV, will with the observance of these separation distances not exceed the recommended magnetic field public exposure limits.

Endeavour Energy's Network Environment Assessment Section has provided the following advice for a child care centre proposed in proximity of existing electricity infrastructure.

As far as I know there are no restrictions in legislation that stop a child care centre being placed next to an easement for electricity infrastructure.

Prudent avoidance measures must however be implemented. Prudent avoidance was a policy recommended by former Chief Justice of the High Court of Australia, Sir Harry Gibbs, as a result of an inquiry he conducted into community needs and high voltage transmission lines including issues in relation to EMF back in 1991. The findings in the Gibbs report are consistent with subsequent inquiries and are still relevant today.

Prudent avoidance is defined as doing what can be done without undue inconvenience and at modest expense to avert the possible risk to health from exposure to new high voltage transmission facilities. In practical terms, this means designing new transmission and distribution facilities having regard to their capacity to produce EMFs, and siting them having regard to the proximity of houses, schools and the like.

Although the Gibbs report was particularly aimed at electricity distributers to consider when placing their infrastructure, and bearing in mind that there are childcare centres and schools adjacent to our infrastructure in various locations right across our franchise area, it is nonetheless Endeavour Energy's recommendation it that a child care centre not be built adjacent to electricity infrastructure.

Should such a development proceed, the design of the child care centre should also consider prudent avoidance measures such as any rooms which the children will occupy (play areas, sleeping rooms, eating areas) be arranged such that they are on the side of the site/building which is furthest away from the electricity infrastructure.

I appreciate that not all the foregoing issues may be directly relevant or significant to the Modification Request ie. there may end up being no significant / high voltage electricity infrastructure on or in proximity of the child care centre site. However, Endeavour Energy's preference is to alert proponents / applicants of the potential matters that may arise should development within closer proximity of the existing and/or required electricity infrastructure needed to facilitate the proposed development on or in the vicinity of the site occur.

Could you please pass on a copy of this submission and the attached resources to the applicant? Should you wish to discuss this matter, or have any questions, please do not hesitate to contact me or the contacts identified above in relation to the various matters. Due to the high number of development application / planning proposal notifications submitted to Endeavour Energy, to ensure a response contact by email to property.development@endeavourenergy.com.au is preferred.

Yours faithfully

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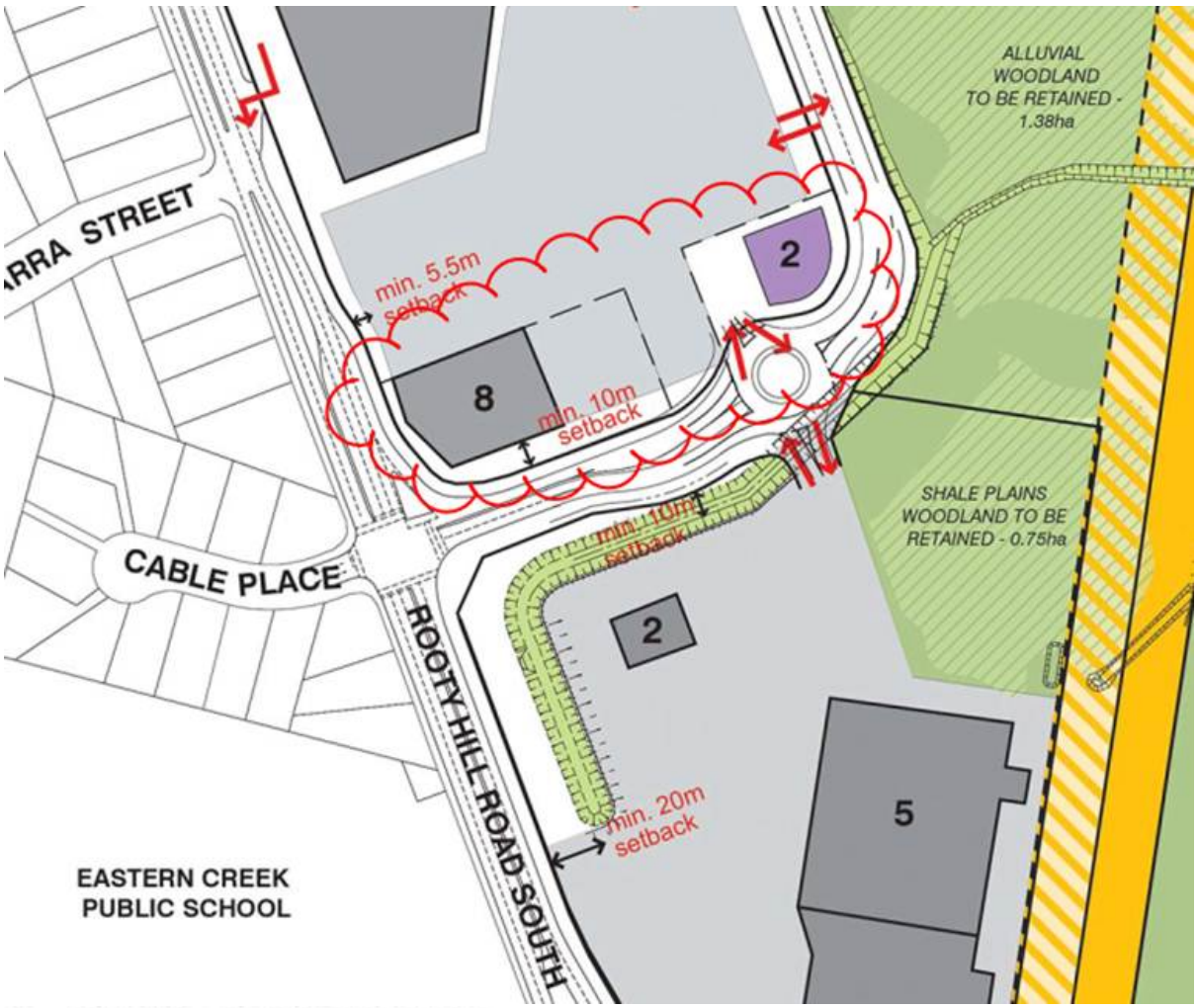
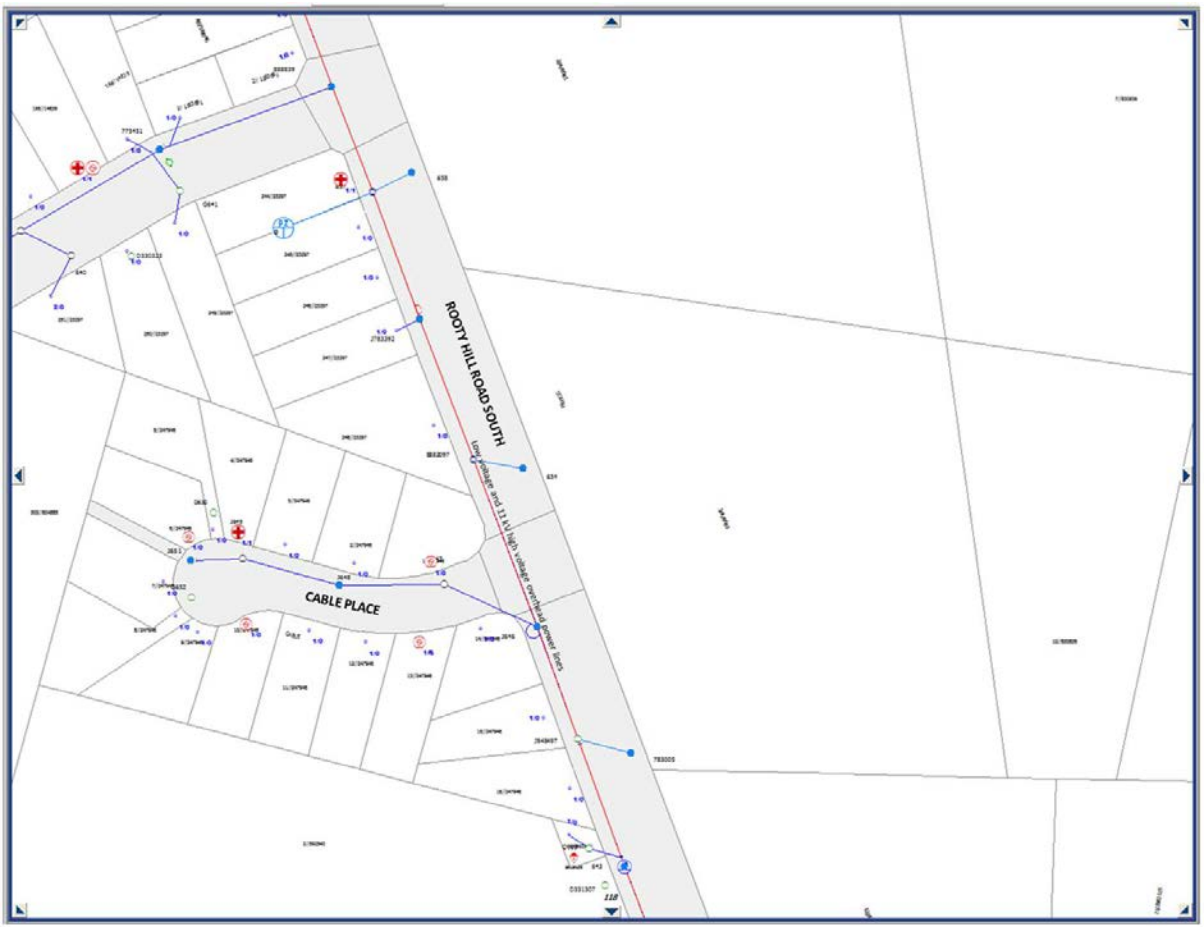


8 - CHILD CARE CENTRE


ROOTY HILL ROAD SOUTH
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ELECTRIC & MAGNETIC FIELDS – WHAT WE KNOW

ABOUT EMFS

ELECTRIC AND MAGNETIC FIELDS – OR EMFS – ARE FOUND EVERYWHERE THERE IS ELECTRICITY. THEY ARE INVISIBLE.

For many years, questions have been raised about whether EMFs affect people's health. It remains a controversial issue although research over more than 40 years has greatly increased our understanding. There have been thousands of studies – some suggesting a link, others not, and some raising further questions. As electricity is so widespread in our society, questions about electricity and health are important to people. The purpose of this brochure is to inform the public about the issue – what we know, and what we are doing about it.

WHAT ARE ELECTRIC FIELDS?

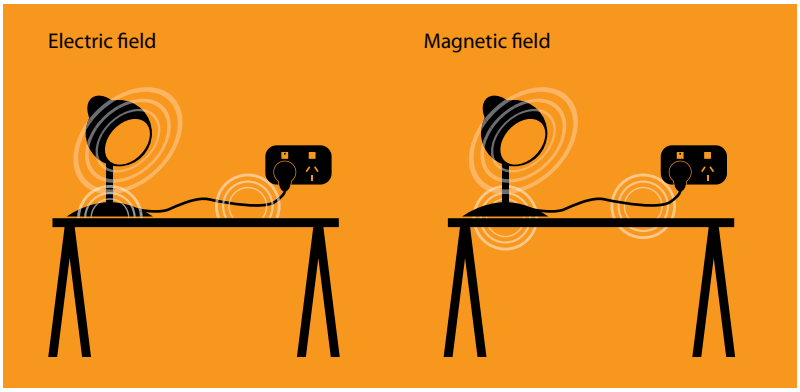
An electric field is a region where electric charges experience an invisible force. The strength of this force is related to the voltage, or the pressure which forces electricity along wires. Electric fields can be present in any appliance plugged into a power point which is switched on. Even if the appliance itself is turned off, if the power point is on, an electric field will be present.

Electric fields are strongest close to their source, and their strength diminishes rapidly as we move away from the source, in much the same way as the warmth of a fire decreases as we move away from it. Many common materials such as brickwork or metal will block electric fields. As such, walls, tables and bench tops can act as a shield.

WHAT ARE MAGNETIC FIELDS?

A magnetic field is a region where magnetic materials experience an invisible force produced by the flow of electricity, commonly known as current. Unlike electric fields, magnetic fields are only present when electric current is flowing. In other words, if an appliance is operating, a magnetic field is produced. For most appliances, once the appliance is switched off, the current stops flowing and there is no magnetic field. However, for an increasing number of appliances, particularly electronic equipment, some current flows even when they are switched off, but on standby. For these appliances, a magnetic field is present unless the appliance is switched off at the wall.

The strength of a magnetic field depends on the size of the current (measured in amps), and decreases rapidly once we move away from the source. While electric fields are blocked by many common materials (see illustration), this is not the case with magnetic fields. This is one reason why power lines may contribute to magnetic fields in the home and why burying power lines will not eliminate them.



DO EMFS CAUSE ADVERSE HEALTH EFFECTS?

Research on EMFs and possible health effects has been conducted for over 40 years. This includes over 2,900 studies at a cost of more than $490 million internationally. Many questions have been answered but not all questions.

The research has generally focused on the magnetic field component as this has raised more issues than electric fields. There have been two main areas of research, *epidemiology* and *laboratory* studies. Both areas would need to provide links between EMFs and adverse health effects for causality to be accepted by health authorities.

Epidemiology is about people's health. This research looks at statistics to see if there are patterns of disease in large groups of people. The difficulty with large statistical studies is that they take several years to produce meaningful results, and even then, there are different opinions about how the results should be interpreted. There may be other factors in the study (such as how EMFs are measured or patient histories) which could complicate the interpretation of the results. Some studies have reported statistical links between EMFs and cancer while others have not. Scientists generally agree that the epidemiological studies aren't strong enough by themselves to establish that adverse health effects exist.

In the laboratory researchers have studied living cells as well as animals and human volunteers to see if EMFs have any effects.

There have been many hundreds of these studies reported, and scientists examine them for results which can be successfully repeated in different laboratories. In over 40 years of research there have been no such reproducible results. Hence the evidence from the laboratory is that low level EMFs of the type experienced by the public do not cause the health effects that some have claimed. Lack of consistency in the results of the laboratory studies is one reason why scientists treat the weak positive results from some epidemiological studies with scepticism.

SCIENTIFIC REVIEWS

It is well accepted by scientists that no one study considered in isolation will provide a meaningful answer to the question of whether or not EMF can contribute to adverse health effects. In order to make an informed conclusion from all of the research, it is necessary to consider the science in its totality. All of the research is reviewed periodically by expert panels which are established by national or international bodies with the purpose of trying to determine whether or not human exposure to EMF is related to adverse health effects.

The most recent extensive review was carried out by the World Health Organisation (WHO) in 2007 which found:

"Scientific evidence suggesting that everyday, chronic low-intensity (above 0.3–0.4 μT) power-frequency magnetic field exposure poses a health risk is based on epidemiological studies demonstrating a consistent pattern of increased risk for childhood leukaemia. Uncertainties in the hazard assessment include the role that control selection bias and exposure misclassification might have on the observed relationship between magnetic fields and childhood leukaemia. In addition, virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern."

WHAT DO HEALTH AUTHORITIES ADVISE?

In Australia, the relevant health authority is the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), an arm of the Commonwealth Department of Health and Aging. ARPANSA (in their Fact Sheet 19 Electricity and Health) advise that:

"The scientific evidence does not firmly establish that exposure to 50 Hz electric and magnetic fields found around the home, the office or near power lines is a hazard to human health."

"At the present time there is no proven evidence that exposure to low level electric fields is a health hazard (excluding of course electric shock)."

The WHO advises that:

"Despite the feeling of some people that more research needs to be done, scientific knowledge in this area is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields."

ARE THERE EMF GUIDELINES FOR ESTABLISHED HEATH EFFECTS?

The Australian electricity industry follows the "Interim guidelines on limits of exposure to 50/60 Hz electric and magnetic fields" as developed by the National Health and Medical Research Council (NHMRC) in 1989. The NHMRC Guidelines suggest a magnetic field public exposure limit of 1,000mG. These Guidelines are currently recommended by ARPANSA pending finalisation of their new Guideline.

The two internationally recognised exposure limit guidelines originate from the

- Institute of Electrical and Electronics Engineers (IEEE) of the USA, and
- International Commission on Non-Ionizing Radiation Protection (ICNIRP), an expert advisory body to the WHO.

Under the IEEE Standard of 2002 the recommended magnetic field public exposure limit is 9,040 milligauss.

Under the ICNIRP guidelines of 2010 the recommended magnetic field public exposure limit is 2,000 milligauss.

GUIDE TO COMMON EMFS

These days it is relatively easy to measure magnetic fields using a gaussmeter.

The fields are measured in a unit of milligauss (mG) or microtesla (μT). 1 microtesla (μT) equals 10 milligauss (mG).

To give you an idea of the relative strengths of EMFs, the following guide shows the typical magnetic fields close to appliances and under power lines.

Note that owing to variations in the design of electrical appliances and the loadings on power lines, the levels of magnetic fields can vary. The following table is based on a consistent set of measurements undertaken by power authorities in Australia using similar techniques and protocols to overseas measurements. Due to the difference in appliance design and voltages overseas, the field levels shown in overseas publications can often be different from those in the table.

Typical magnetic field measurements and ranges associated with various appliances and power lines are outlined below:

Localised EMFs may also be encountered in specific situations such as near substations, underground cables, specialised electrical equipment, or at elevated locations near lines. Note that the strengths of EMFs decrease rapidly with distance from the source.

FIGURE 1: TYPICAL MAGNETIC FIELD MEASUREMENTS AND RANGES

	Typical Measurement (mG)	Range of Measurement (mG)
Stove	6	2-30
PC	5	2-20
TV	1	0.2-2
Electric blanket	20	5-30
Hair dryer	25	1-70
Refrigerator	2	2-5
Toaster	3	2-10
Kettle	3	2-10
Fan	1	0.2-2
Overhead distribution line (under the line)	10	2-20
Overhead transmission line		
» under line	20	10-200
» edge of easement	10	2-50

Appliance Measurements taken at normal user distance

WHAT IS THE BEST RESPONSE?

Electricity utilities continually review scientific developments related to EMFs and are guided by relevant health authorities. In Australia, ENA recommends that electricity utilities provide balanced and accurate information to the community and design and operate electrical power systems prudently within relevant health guidelines. This includes such actions as:

- providing training to staff;
- informing the community;
- measuring field levels for the public and employees;
- ensuring that fields are within established guidelines set by health authorities; and
- practising "prudent avoidance" when building new electrical facilities.

Prudent avoidance involves reducing magnetic field exposure where this is practicable and can be done at modest cost. If utilities can easily keep people out of fields or in lower fields, then that, the industry believes, is a common sense thing to do.

So what can you as an individual do to reduce exposure to EMFs? There are some things you can do very easily. Since EMFs drop off rapidly as you move away from their source, you can modify your use of electrical appliances such as clock radios. You can locate beds away from a wall that has a switchboard outside and you can switch off your electric blanket before you get into bed. These actions will reduce exposure to EMFs but remember that no-one knows if doing any of these things will improve health outcomes at all.

Organisations which can provide further information about EMFs include:

- your local electricity utility or the Energy Networks Association (ENA);
- the Radiation Safety Unit of your state Health Department;
- the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) - www.arpansa.gov.au
- the World Health Organisation (WHO) – www.who.int

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