PROPOSED ELECTRICITY SAFETY REGULATIONS

Submission to the Ministry of Economic Development
29 February 2008

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1. BACKGROUND TO IPENZ

The Institution of Professional Engineers New Zealand (IPENZ) is the lead national professional body representing the engineering profession in New Zealand. It has approximately 10,000 Members, including a cross-section of the engineering community from students to senior Fellows in management or governance positions in important design or construction organisations. IPENZ is non-aligned and seeks to contribute to the community in matters of national interest giving a learned view on important issues, independent of any commercial interest.

In making these comments IPENZ has drawn particularly on the knowledge of its Members, or members of kindred bodies, who supervise, work with, or work alongside electrical workers, or are otherwise aware of the issues.

2. BACKGROUND TO ACENZ

The Association of Consulting Engineers New Zealand (ACENZ) is the professional business association representing consulting engineering firms in New Zealand. ACENZ has 176 corporate members, in total employing over 8,400 people. Nearly half of these are professional engineers or professional architects. Collectively ACENZ members generate over $1 billion in services per year. ACENZ is a member of the International Federation of Consulting Engineers.

3. EXECUTIVE SUMMARY

IPENZ and ACENZ thank the Ministry of Economic Development (MED) for the opportunity to comment on the *Proposed Electricity Safety Regulations* discussion paper.

IPENZ and ACENZ are of the view that MED should publish a second discussion document, or a series of short position papers each of which addresses a specific point, containing exactly the wording of the proposed regulations. We can then give a more definitive response to the proposals.

IPENZ and ACENZ are strongly of the view that there is no advantage and in fact a great deal of resistance to any proposal requiring engineers already assessed as currently competent to be registered with the Electrical Workers Registration Board (EWRB).

IPENZ and ACENZ note the inclusion of "design" as part of prescribed electrical work (PEW) in the Electricity Act as amended in 2006. We suggest that this can be managed in the regulations by deeming chartered professional engineers, engineering technologists, and engineering design technicians assessed as currently competent to be automatically registered for appropriate areas of PEW without applying to or paying any fees to the EWRB. This suggestion follows and extends a precedent set in the Building Act 2004.

4. SUBMISSION

4.1 PRINCIPLES UNDERLYING THE REGULATIONS

IPENZ and ACENZ note and approve of MED's desire to ensure that the regulations adhere to core public safety imperatives without introducing extra requirements. We regret that "design" has been added to the list of prescribed electrical work (PEW) in the amended Electricity Act, for this has the potential to introduce extra requirements without adding anything to ensure public safety or avoid property damage.

Providing for regulation where there is a benefit to the consumer, the environment or public health and safety is an admirable goal, but including design in PEW delivers none of these benefits.

We agree that the regulatory regime must be credible with consumers, industry and international partners, but design as PEW is not credible with that part of the industry represented by professional electrical engineers.

Minimising compliance costs is a necessary goal of regulations, one enthusiastically supported by IPENZ and ACENZ. However, any suggestion that electrical engineers should have to become licensed electrical workers in addition to their registration as chartered professional engineers will be opposed, in part because it adds to compliance costs.

We agree that the regulations should be consistent with international best practice. We do not know of any other country where professional engineers are required to be licensed by a trades body in order to do design work. Hence, we see no advantages in requiring professional engineers in New Zealand to be licensed by the EWRB.

4.2 PRELIMINARY PROVISIONS

4.2.1 Conformity Assessment Body (CAB)

IPENZ and ACENZ note that the proposed CAB will be defined in such a way as to replace the current definition of suitably qualified auditor. We ask MED to specify the CAB's proposed relationship with the EWRB, and will look for clarification in a second discussion paper which gives the exact wording of the proposed regulations. In the meantime, we hold in abeyance our agreement to this definition.

4.2.2 Electrically safe

We discuss this in section 4.4 below.

4.2.3 Electrical Safety Certificate (ESC)

IPENZ and ACENZ approve of MED's proposal for an ESC issued by a person approved by the EWRB who certifies that any inspection, testing and checking is in compliance with the general safety requirement. We presume that the general safety requirement is that given on pages 10–14 of the discussion document.

We note with approval that if the design has been done by another person the ESC will not have to certify the design of the installation.

We agree with the thrust of the proposed definition.

4.3 APPLICATION OF THE REGULATIONS

IPENZ and ACENZ agree that the regulations need not apply where there are other acceptable controls over the electrical work.

4.3.1 Chartered professional engineers

The purpose of the Chartered Professional Engineers of New Zealand Act 2002 (CPEng Act) was to establish a registration system for chartered professional engineers, require a code of ethics and a disciplinary process to apply to chartered professional engineers, and require a professional body to carry out these functions. This Act interprets "registration authority" to mean IPENZ.

IPENZ takes the view that its statutory function to administer the CPEng Act provides a mechanism to control the work practices of electrical engineers. These controls operate through the disciplinary processes and the code of ethics and, in the view of both IPENZ and ACENZ, should be seen by MED as an acceptable method of control.

4.3.2 Engineers who are also electrical workers

Under the now repealed Engineers Registration Act, registered professional electrical engineers were able to carry out PEW as of right.

As a transition measure, this right was continued for engineers who had been registered prior to 1992 to ensure that they did not lose a right which had previously been afforded to them.

The amended Electricity Act repealed the definition of qualified engineer. The discussion paper has no proposal to restore the right for previously qualified engineers to do PEW, but IPENZ and ACENZ recommend that a way be found to do so.

With the exception noted above, IPENZ and ACENZ agree that professional engineers acting as electricians should continue to be certified by the ERWB.

4.3.3 "Connectable installations" in caravans and similar vehicles

IPENZ and ACENZ agree that connectable installations should be excluded from the regulations because of the more specific rules administered by Land Transport New Zealand.

4.3.4 "Conveyances"

IPENZ and ACENZ agree that ships, aircraft, trains, locomotives, trams and trolley buses should be excluded from the regulations because of the more specific rules administered by other regulatory bodies.

We are aware of a problem with the ground power units which drive the electrical systems of aircraft parked outside a terminal, and will be happy to work with MED in resolving this.

We agree that pleasure craft should be excluded from the regulations.

We raise the issue of off-shore oil and gas production facilities such as platforms and the converted oil tankers at fixed moorings known as floating production, storage and offloading vessels (FPSOs). It is not clear whether these are excluded from the regulations, and we ask MED to clarify this in a further discussion paper.

4.4 SAFETY OF ELECTRICITY

IPENZ and ACENZ agree with MED's overarching objectives of promoting health and safety of the public and preventing damage to property.

IPENZ and ACENZ agree that definitions should be consistent across different pieces of legislation. The Health and Safety in Employment Act 1992 (HSE Act) affects many fields of engineering, especially mechanical engineering through the Pressure Equipment, Cranes, and Passenger Ropeways Regulations, and we agree that electrical safety should be defined in its regulations in a way that is consistent with those.

IPENZ and ACENZ agree that safety of electricity for the public lies properly within the Electricity Act, but worker and workplace safety lies within the HSE Act.

4.4.1 Current state of knowledge

How will this term be defined? What documents will be consulted to determine the current state of knowledge?

IPENZ and ACENZ suggest that the current state of knowledge is that embodied in certain named documents. These will include the current version of AS/NZS 3000 and its "companion installation standards".

We would like to see a second discussion paper or specific position paper that gives the exact wording before we agreed to the proposed definition of "electrically safe".

4.4.2 Updating

Will there be a general requirement for alterations or additions to old systems, designed in accordance with knowledge that existed at a past time, to comply with new knowledge? A precedent for not requiring updating exists in the Building Act 2004, where s 112(1)(b) requires that an altered building continues to comply with the building code to at least the same extent as before the alteration. IPENZ and ACENZ support this provision, and suggest that a corresponding one be included in the regulations.

This may take the form of stating that any works, installation or appliance deemed to be safe under earlier regulations shall not be deemed to be electrically unsafe but must satisfy the "all practicable steps" and "risk as low as reasonably practicable" requirements in order to be deemed electrically safe.

IPENZ and ACENZ suggest that this area would benefit from further development and ask MED to propose suitable wording in a second discussion document or position paper taking into account practicality, cost benefit, risk etc.

4.4.3 Earthing and protection measures

IPENZ and ACENZ support in principle MED's proposal to permit earthing systems other than multiple earthed neutral (MEN) for the supply of electricity where appropriate, and so replace the Electrical Code of Practice ECP 35 by the industry code of practice (ICoP) developed by the Electricity Engineers' Association. We are aware that this ICoP is out for public consultation, and so some changes may occur.

4.4.4 Residual current devices (RCDs)

IPENZ and ACENZ agree that RCDs should become mandatory in new commercial and industrial locations for currents up to 20 A.

Whilst IPENZ and ACENZ support the safety objectives of retrofitting RCDs into existing connectable installations, the practicalities of achieving this need to be carefully considered. For example:

- Such a mandatory requirement would impose a compliance cost, thus undermining one of the principles discussed in 4.1 above.
- This requirement would be a specific violation of the general principle discussed in 4.4.2 above.
- The logistics for achieving this would need to reflect the time required for compliance and the resources available (in an under-resourced construction industry where are the electricians to undertake the work?).

4.5 QUALITY OF SUPPLY

One of the roles of the Electricity Commission is to facilitate the trade-off between the quality and cost of electricity. The boundary between what the Commission is required to do and what is in the regulations needs to be clear from a jurisdictional point of view.

Any regulation on the range of nominal supply voltage and frequency should be consistent with the role of the Electricity Commission.

4.6 PRESCRIBED ELECTRICAL WORK

4.6.1 "Design" as prescribed electrical work

In 2005 IPENZ made submissions on the Electrical Safety Bill, as it then was. IPENZ noted that the Bill included "design" alongside installation, testing and commissioning, and stated the assumption that the goal was to ensure that design work carried out by electricians was to an adequate standard. IPENZ also noted that qualified engineers must be allowed to carry out [PEW] as part of their professional practices.

The word "design" can be applied to a wide range of electrical activities:

- Looking up a table of prescribed conductor sizes for a new house.
- Calculating the sizes of conductors required in a substation transformer.
- Specifying multiphase heavy current switching equipment for an uninterruptable power supply for a data centre.
- Developing software for complex industrial control systems or building control systems.

Professional engineers spend a lot of time studying "design" during their degree courses, and even more time practising "design" during the course of their careers. Some hold that design as a creative activity involving conceptualisation, analysis and specification is one of the defining characteristics of professional engineering practice.

Workers in skilled trades do undertake design activities. For example, they do so when following prescriptive standards, such as Part 2 of AS/NZS 3000:2007, or NZS 3604:1999, or the acceptable solutions in the building code.

Documents such as these specify well-tested solutions to common problems, so professional engineers also use them in order that their creative energies may be applied to problems outside the scope of these prescriptive documents. Such problems frequently occur in professional practice, and it is then necessary that the design follows a performance-based criterion outside the prescriptive solution.

Because much professional engineering lies outside the bounds of prescriptive standards, a professional body exists to promote engineering performance, both technically and ethically. The CPEng Act requires IPENZ, as the professional body, to enforce the acceptable behaviour of engineers. It is appropriate that IPENZ enforces acceptable behaviour in the field of engineering design, and if the decisions of its disciplinary committees are appealed, the law courts do so.

By contrast, the EWRB deals with skilled tradespeople and technicians whose activities are largely installation, commissioning and repair. IPENZ understands that "design" was added to PEW to remedy a problem faced by electricians required to certify that "design" as well as installation was safe. This is inappropriate, precisely because the electrician has not done the design.

The situation would become even more bizarre if a professional engineer (registered with IPENZ) doing design was required to be supervised by an electrician (registered with EWRB). Yet that is the situation implied by the words in the last bullet point on p 28 of the discussion document: "[PEW covers] testing, certification, inspection or supervision of the [design] work described above".

4.6.2 Voltage levels

The discussion paper uses the phrases "low voltage" and "extra low voltage" without definition. Here, IPENZ and ACENZ take the definitions from AS/NZS 3000:2007 clause 1.4.98:

- Extra-low voltage: Not exceeding 50 V a.c. or 120 V ripple-free d.c.
- Low voltage: Exceeding extra-low voltage, but not exceeding 1000 V a.c. or 1500 V d.c.
- High voltage: Exceeding low voltage.

We note that the present regulations use the same values but slightly different words.

4.6.3 Extra-low voltage exclusions from PEW

The discussion paper proposes that "work" on installations and appliances that operate at extra-low voltage will be excluded from PEW. Many industrial control systems, some television transmitters, and medical devices operate at extra-low voltage, and the design of these is properly part of the work of professional engineers and engineering technologists.

IPENZ is concerned at the lack of control on the design and installation of "alternative energy systems". These can present a considerable fire hazard as they often include storage batteries of considerable capacity. Hence we agree with the discussion paper that there are special circumstances for which the designer and installer should be required to be competent.

4.6.4 Low voltage exclusions from PEW

The discussion paper suggests that the design of installations that comply with Part 2 of AS/NZS 3000:2007 will be excluded from PEW. Part 2 is an extremely prescriptive document, even more so than the 2000 edition it replaced, and we see it as acceptably prescriptive with respect to safety.

This suggests that any person, regardless of qualifications or training, who can follow the design prescriptions of AS/NZS 3000:2007 Part 2 may do so. Arguably this is one of the benefits of this exclusion from PEW, as it will allow such people as architects, lighting designers and underfloor heating designers to continue their design practices without requiring them to be registered with the EWRB.

If the installation cannot comply with the prescriptive solutions of Part 2, it must comply with the "alternative" solutions of Part 1. Clause 1.9.4.5 requires that persons undertaking designs that depart from Part 2 shall be competent, and clause 1.4.30 defines a competent person as one who has acquired, through training, qualification or experience or a combination of these, the knowledge and skill enabling that person to perform the required task correctly. This work would be PEW, and thus would be regulated by the EWRB unless other provisions exist.

4.6.5 High voltage exclusions from PEW

The discussion paper makes no mention of high voltage in the context of PEW design. It appears that high voltage design work is not to be regulated by the EWRB, and so professional engineers can continue to design power stations, substations, transmission lines, and high voltage transformers without reference to the EWRB. IPENZ and ACENZ ask MED to confirm this point in a second discussion document or position paper.

We note that regulation 69A applies to all installations (the customer's system). Hence, AS/NZS 3000:2007 clause 1.9.4.5 applies if Part 2 does not, thus the design has to be done by a "competent person" as defined by clause 1.4.30.

We note that AS/NZS 3000:2007 Appendix K High voltage electrical installations applies in Australia but not in New Zealand. We ask MED to clarify the reason for this in a second discussion document or position paper.

The situation is not clear if the design is for works (the supply system up to the customer's point of supply). We ask the MED to clarify this in a second discussion document or position paper.

4.6.6 Low voltage design included in PEW

It appears that the only electrical design work to be included in PEW is low voltage installations that cannot comply with Part 2 of AS/NZS 3000:2007, and so must comply with the "alternative solutions" of Part 1. IPENZ takes the view that Part 1 designers will have to document their work to show how they comply with Part 1. Documentation of this type is normally done by engineers and selected other people who would be competent in terms of clause 1.4.30.

Many industrial plants and all habitable buildings, shopping malls, office buildings and schools operate at low voltage. Many electrical engineers and technologists design the circuits that provide power to these buildings, and none have expressed any desire to add to their conformance costs by being registered with the EWRB. They have, in fact, expressed their displeasure at this prospect in vivid terms, using arguments presented more politely in 4.3.1 and 4.5 above.

4.6.7 A possible solution

A solution is available by following a precedent introduced by the Building Act 2004. Licensed building practitioners (LBPs) in 13 different categories are being introduced by the Department of Building and Housing to perform or supervise "restricted building work". Some of these categories involve trades, such as carpentry, roofing and bricklaying. Some involve professional work, such as designing a substantial building. All LBPs will be required to be licensed by the Building Practitioners' Board, a body somewhat analogous to the EWRB. Section 291 of the Building Act provides for automatic licensing of people registered under other enactments. Thus chartered professional engineers are deemed to hold LBP Design 3 licences, and are not required to register with or pay any fees to the Building Practitioners' Board.

The LBP regime recognises three classes of design licence, known as Design 1, Design 2 and Design 3 in order of increasing complexity. IPENZ and ACENZ suggest that if design is to be regulated as PEW a comparable electrical regime be developed.

IPENZ and ACENZ suggest that chartered professional engineers be deemed to hold licences that permit them to design and supervise PEW on works and installations at all voltage levels, and that similar but more restricted provisions be made for design technologists and design technicians. We recommend that MED discuss this suggestion in a further discussion document or position paper

4.7 SUPERVISION, TESTING, INSPECTION AND CERTIFICATION

4.7.1 Inspection

IPENZ and ACENZ believe that all workers, tradespeople and professionals, should check their own work. Where formal review or inspection is required, we agree that a second person with the appropriate competence must carry out this task.

4.7.2 Certification

IPENZ and ACENZ agree that MED should take the opportunity to clarify, but not add to, the regulations. We agree with MED's proposal to have a single form of certificate to replace CoCs, CoVs and WOEF.

4.8 REGISTRATION AND LICENSING

4.8.1 Employer licences

IPENZ and ACENZ do not favour a requirement for employers of professional engineers to gain employer licences with the EWRB. Such a requirement would add to compliance costs, and thus would contravene the general principle agreed in 4.1 above.

We recognise that some electricity generation companies and others do find it expedient to maintain employer licences enabling their staff to maintain and repair the companies' equipment. IPENZ and ACENZ have no objection to this.

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