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Smart Metering Implementation Programme
Department of Energy and Climate Change
3 Whitehall Place
London
SW1A 2AW

8 October 2012

**Smart Metering Implementation Programme:
Consultation on the second version of the Smart Metering Equipment Technical
Specifications (URN 12D/258).**

Thank you for consulting on the second version of the Smart Metering Technical Specification. This response is based on individual professional expertise from members of the IET under the joint oversight of the Energy, Communications and IT Policy Panels.

The IET's headline comments are as follows and our detailed response to the consultation questions is attached.

Interoperability

Technical interoperability is central to the delivery of the business case for smart metering and must be assured. The IET therefore welcomes the Government's proposal that communications hubs are procured and owned by the Communication Service Providers (CSPs) to the Data and Communications Company (DCC).

Home Area Network

The proposal is that both 2.4 GHz and 868 MHz based solutions are permitted. The IET believes that priority has to be given to the development of 868MHz in order to achieve an optimal roll out to the greatest number of homes. The wired HAN trial needs to be completed and shown to be successful, and included as part of an integrated solution before decisions are taken regarding the installation requirements & process.

Government is proposing that the ZigBee SEP / DLMS applications layer standard is mandated for GB smart metering. Further clarity is needed to define these protocols explicitly for the GB market to ensure interoperability. IET would also consider that the companion specifications for both protocols need to form part of the International standards, and be maintained as such to ensure changes are managed according to the needs of the GB Smart Metering infrastructure.

Security

Throughout the programme, the IET has repeatedly stressed that secure operation of individual components of the smart metering system, though important, cannot guarantee system security. End to end system security is critical. A new design element, the Consumer Access Device (CAD) has recently been added to the draft SMETS 2 HAN system and the repercussions of this have not yet been fully worked through. The fact that a significant change to system architecture has been proposed at this late stage cannot fail to ring alarm bells. The tight time constraints should not be allowed to compromise the fullest end to end stress test and security analysis of the resulting system.

EU Energy Efficiency Directive

We note that following agreement by the European Council and Parliament in June 2012, the text of the Directive is likely to be published in the autumn and Member States will then have 18 months to implement the requirements. The Directive includes a requirement on the provision of easy access to historical consumption data via the internet or the meter interface. This data is to include daily/weekly/monthly/annual consumption data for at least 24 months ***or the period since the start of the supply contract if this is less*** and cumulative data for at least three years ***or the period since the start of the supply contract if this is less***. We look forward to the results of the Government's assessment of whether any additional steps need to be taken through the Smart Meter Programme to meet this requirement. However we feel it important that, in the UK where the ability to switch supplier is one of the key ways of ensuring competition and lower prices, ready access to historical data should not be lost when a customer switches supplier.

Installation capacity

Recruiting and training sufficient installers capable of dual fuel meter installations and the required communications connection, together with customer training is a significant challenge. The requirements are spelt out in the Smart Metering Installation Code of Practice which includes instructing consumers on using the new equipment and information on energy efficiency. The energy supply companies are preparing for this in collaboration with The National Skills Academy for Power, Energy UK, the ENA, HSE and training providers. A poor installation experience could have negative impacts on customer acceptance and threaten the overall programme objectives. There is concern that programme delays will compress the roll-out period which would stress an already challenging timetable by requiring an even greater number of installers over a shorter period..

The IET's responses to particular consultation questions follow.

If the IET can be of further assistance to DECC on any of the issues covered matters please do not hesitate to contact me.

Yours sincerely

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IET response to DECC

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KEY POINTS

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CHAPTER 4 - SMETS 2 DEVELOPMENT

Home Area Network Solution

1. Do you have any comments on the criteria used in the evaluation of the application layer standards?

No comment.

2. Do you agree with the proposal to adopt ZigBee SEP / DLMS as the HAN application layer standards for GB?

There is some confusion here. The Zigbee component should provide the wireless data transport layer capable of interfacing with an appropriate application layer to interwork with a protocol such as DLMS. The current ZigBee SEP solution is designed in such a way as to make it difficult to separate application functionality from the data transport layers which in turn complicates the migration paths for system enhancements. Whilst not fully developed, the ZigBee SEP2 looks to be offering a route for better segmentation of the communication stack from the application layers.

Before any mandatory standards are agreed, it is essential that a security review is carried out with published results that have been peer-reviewed by security experts, and tested thoroughly to ensure effective operation and performance can be delivered.

3. Do you agree that equipment should be required to comply with SMETS and a GB Companion specification for ZigBee SEP / DLMS?

Yes. Such standardisation is very important to drive down costs and enable interoperability. In order to achieve the economies of scale, there should be an

emphasis on ensuring that any implementation does not have too much customisation for GB specific applications, so that manufacturers can leverage their developments in other markets.

Compatible specifications are essential for both ZigBee SE on the HAN and for DLMS . The report from the DECC Application Layer Working Group produced in July 2011 detailed the work required and should be noted.

It is also noted that HAN operation at different bands (2.4Ghz/868Mhz) within the spectrum is likely to require different companion specifications and work is needed to ensure full compliance with interoperability rules in time to meet roll-out timeframes.

4. Do you agree with the overall approach proposed in relation to the HAN physical layer? If not, please provide a rationale and evidence for your position.

Yes, Subject to the prioritisation of a 868 MHz additional carrier band, in order to attain the coverage required. A dual band option may be required in order to address transition from existing 2.4Ghz solutions to enduring 868Mhz solutions, however this should be minimised to reduce cost to customers.

The wired HAN trial needs to be completed and shown to be successful in order to provide a solution in cases where a wireless solution is not feasible.

5. Do you have any comments on the criteria used in the evaluation of the physical layer of the HAN?

No comment

6. What are your views on the compatibility of the reserved spectrum 870-876MHz with 868 MHz and the value of considering the use of this band?

This option needs to be investigated as a means of reducing the potential conflict caused by a busy unlicensed band with the 'secure mission critical' technical services as provided by Smart Metering.

7. Do you consider that additional measures should be taken to encourage the development of an 868 MHz solution?

Yes, initial stimulus will be needed by potential suppliers to invest in this technology. This may be as simple as giving a forecast of the market size, a full view of the trial results to give the confidence that the technology is not a "dead end" and the commitment of government to roll SMIP out to almost all GB homes. **8. Do you agree with the approach to allow the market to determine the balance between 2.4 GHz and 868 MHz? If not, please provide rationale and evidence.**

The balance between 2.4GHz and 868 MHz will be determined by the proportion of installations that require a specific frequency in order to function reliably. It is clear that it will be unacceptable both in terms of cost of roll-out and customer dissatisfaction if a large proportion of the GB building stock is unsuitable for Smart Meter installation due to the selection of the wrong HAN frequency. DECC has conducted tests which indicate that 868Mhz far exceeds the propagation characteristics of 2.4GHz in relation to the cross-section of building types evaluated and on this basis Government should be confident to impose obligations on this basis to protect the interests of the consumer.

9. What are your views on the costs and benefits of the three options identified for deploying wireless solutions (i.e. 2.4 GHz as the default; dual-band communications hubs; or market led)?

The best technical solution should be selected, according to suitability for maximising installation success across the 30 million properties involved. The DECC programme must focus on delivering a properly designed solution, which minimises risk of failure or of incurring additional costs for suppliers and inconvenience to customers from subsequent visits or changes.

The question looks at the HAN side of the Communications Hub (CH). The WAN side of the CH should not be ignored as the options will have a bearing on the overall cost.

On the WAN side, it is likely that the Communications Service Providers (CSPs) will need at least two technologies to address all dwelling types, maybe more.

This gives rise to at least 4 combinations of interface between HAN and WAN, maybe more. The choice therefore comes to making cost of the CH high, but making installation easy through a single comms hub supporting all HAN and WAN variant, and making economies of scale through a greater manufacturing run, or making the price of the CH low, but making the choice of CH at installation more complex and losing the economies of scale associated with larger manufacturing runs.

On this basis, Option 2 looks to be the optimum solution though the IET is not in a position to comment on the cost benefit issues. Part of the evaluation both of this decision and of the CSP bids must be on the whole-life cycle, including end of life costs. Installation, maintenance as well as unit cost should be included.

10. Do you agree with the proposal for a 'fit for purpose' installation obligation on suppliers?

Yes, it is essential that Suppliers minimise the risk of abandoning or aborting installation visits due to poor overall design of the Smart Metering solution, and that when complete, the installation will be fit for purpose for the intended life of the assets.. However we do not comment on the legal nature of the obligations Suppliers may or may not be prepared to enter into, or how they would price such obligations.

This requirement needs to be confirmed as part of the installation process and will involve specialist test equipment to test the quality of the data comms, packet loss / data throughput etc. A record of the test and the results should be recorded as part of the installation certification process.

The Wired HAN trial needs to be completed and shown to be successful in order that a solution exists in situations where a wireless option is not feasible.

11. Do you have any views on the proposed approach to developing a wired HAN solution?

We accept that there are circumstances such as high-rise flats, where a wireless HAN would be difficult to implement. There are various wired technologies available including Power Line Carrier (PLC) that could be used without physical disruption to the building.

We agree that developing a wired HAN solution is essential. Typical of properties that will require a wired HAN solution are high-rise residential buildings (flats); particularly those with communal meter positions. Generally (though not exclusively) such flats tend to be occupied by consumers in the lower socio-economic groups and it is essential that such consumers are not disadvantaged in terms of being able to enjoy the full benefits of a fully functional smart metering solution, including prepayment facilities.

A wired HAN based on PLC technology would provide a practical alternative but a 'short hop' radio link would be needed for gas. It may be possible to devise an ATEX approved wired link to the gas meter.

If a wired link is acceptable, then it may be possible to power the gas module from the electricity meter thereby removing the need for a battery in the gas meter. This approach would work where the two meters are located close to one another as in many modern houses.

In addition, in instances whereby PLC is employed within the HAN, steps need to be taken to ensure no other Computer based PLC equipment within or in close proximity to the property is able to interfere / degrade the PLC communication links with the meter / IHD etc

Communications Hub

12. Do you agree with the proposed scope of functional requirements for a communications hub? Are there any other functions that should be included and what would be your rationale for including those functions (including estimated costs and benefits)?

Yes. The proposed scope of the communications hub is sufficient. We recommend minimising the functionality of the communications hub and centralising other functionality in the supplier. This will minimise the cost to the consumer and allow the market to drive the capabilities required, offering the potential for service differentiation by suppliers.

The communications hub needs to form an integral part of the CSP WAN solution and the E2E architecture the operating model and the security policies of the entire system. To this end further requirements may emerge as the DSP and CSP collaboration develops non-functional specifications that will require changes across the architecture.

13. Do you have views on the specification for an 'intimate' interface between electricity meters and communications hubs?

The intimate communications hub would be a sensible approach and this is how other countries have proceeded.

Communications Hub - Responsibilities

14. Do you agree with the Government's marginal preference for the CSP-led model for communications hub responsibilities, or do you prefer the supplier-led model? Please provide clear rationale for the advantages and risks associated with your preferred option.

Interoperability is central to the delivery of the business case for smart metering and must be assured. To support this, we welcome the government's proposal that communications hubs are procured and owned by the DCC Communications Service Providers (CSPs). Under this approach, a requirement to provide energy suppliers with communications hubs that comply with the Communications Hub Technical Specification (CHTS) would be included in the DCC licence. It would also provide benefits due to a single procurement exercise rather than many.

Communications Hub – Opted out non-domestic consumers

15. Do you agree with the proposal that a CHTS-compliant communications hub should not be mandated for opted out non-domestic sites and that suppliers should be free to use whatever type of communications equipment best supports their processes and WAN service?

Yes. While we agree it need not be mandatory, we believe there are benefits in encouraging opted-in arrangements for non-domestic sites. These include maintaining the benefits of interoperability for non-domestic consumers and making information from such sites available to DNOs for network and power outage management.

16. Do you agree that the gaining supplier should bear the costs of installing an appropriate communications hub if they decide to switch between opted in and opted out?

Yes, although we understand that this may not be straightforward depending upon the contractual arrangements entered into between the installing supplier and the customer.

SMETS Additional Capabilities

Additional DNO Functions

17. Do you agree that the design and implementation of outage reporting functionality should be assigned to CSPs, documented in the communications hub technical specification?

Yes, on the assumption that this provides a more cost effective solution to that proposed for meter/comms hub reporting of de-energisation.

It will be important to ensure that the obligation is precisely defined in terms of the quality and speed (latency) of information provided.

18. Do you agree that it would be inappropriate to require meters operated outside DCC to be required to implement outage reporting? Please provide rationale to support your views

No. On balance, we believe that it would be more appropriate for meters outside the DCC to be required to implement outage reporting.

The balance of arguments depends upon the proportion of meters operated outside the DCC. This proposal is acceptable if the number remains small and is relatively evenly distributed through the population of meters. In such circumstances, outages affecting meters outside the DCC will rely on adjacent meters within the DCC to act as a “proxy” in reporting network outages. If however, the proportion of meters outside DCC is likely to become significant, say over 10% of the relevant meter population, or becomes

concentrated, then no advantage is gained and the cost of maintaining existing outage management mechanisms by the DNOs would have to be maintained.

If outage reporting is not made a requirement, it would need to be clearly explained to consumers who are offered opted-out solutions that they will not benefit from the power outage functionality. This might be a concern to business customers who, by their nature, might particularly benefit from the network operator being aware of an outage occurring outside normal business hours.

As opt-out can be reversed, it would be appropriate that all functionality needed for compliance with opt-in should be available in the event a customer chooses to take advantage of the full smart metering benefits.

Maximum Demand Recording

19. Do you agree that maximum demand registers should be included in SMETS? Please provide evidence to support your position and provide evidence on the cost implications of delivering this functionality via back office systems or via the meter.

Yes. We refer to the cost/benefit analysis provided to DECC by the ENA, the results of which are consistent with input from other contributors to this response.

Additional Voltage Alerts

20. Do you agree with the proposal not to include the capability to generate additional voltage alerts based on counter thresholds in SMETS 2? Do you have any evidence that could justify including this functionality in SMETS 2?

Not answered.

Access to remote disablement by multiple parties

21. If DNOs were permitted to access remote disablement functions, should control logic be built into DCC systems or meters? If the logic should be built into meters, should the logic be specified in SMETS 2? Please provide rationale to support your position including estimates of the cost of delivering this functionality under the different options being considered and any evidence relating to safety issues associated with each option.

DNOs require this capability since it allows a far more granular control of load in the case of overload. It also allows priority consumers to be protected from outages. The IET agrees that DNOs should have the ability to access remote disablement functions, subject to detailed specification and cost benefit analysis being agreed and full compliance with Security policies in accordance with the operation of critical national infrastructure.

The logic for this functionality should not be built into the meter, but rather managed at some centralised point. Logically this would be the DCC.

The meter is a commodity item and one of the major cost contributors to the overall programme. Therefore the cost and functionality resident on the meter should be minimised.

The safety concerns raised in paragraph 113 will arise whichever option is chosen since a WAN failure will prevent the message getting to the meter, whether the functionality is held centrally or remotely. A full hazard analysis should be carried out to see whether additional functionality will be required in the meters to ensure that all possible state transitions in the network can be shown to be safe.

Electricity Meter Variants

22. Do you agree that variant smart electricity meters should be specified in SMETS 2 and that the cost uplift for variant smart meters is similar to that for variant traditional meters? Please provide evidence of costs to support your views on cost uplifts.

Failure to clearly specify variants and manage changes associated with variants, could lead to loss of interoperability and risks unnecessary premature replacement of meters increasing costs to consumers.

Randomisation of auxiliary load control switches

23. Do you agree that randomisation offset capability should be included for auxiliary load control switches and registers as described above? Do you have views on the proposed range of the randomisation offset (i.e. 0 – 1799 seconds)? Please provide evidence on the cost of introducing this functionality.

Yes. Randomisation is necessary function, for the reasons discussed in the consultation document. Failure to incorporate this functionality could lead to serious step-changes in both system voltage and frequency and hence lead to destabilisation of the national system.

The proposed range is a reasonable range.

Interface Requirements

24. Do you support Option 1 or Option 2 for ‘pairing’ a CAD to the HAN? Please present the rationale for your choice and your views on the implications that these options have for the technical design of the solution.

Not answered. The inputs received were divided on this issue.

25. If Option 2 were adopted, do you agree that obligations should be placed on energy suppliers to support this process by submitting ‘pairing requests’ to the DCC on request from their consumers?

IET members were divided on this issue:

- On the one hand, without such an obligation there is a risk that an energy supplier might elect not to support such functionality, thereby frustrating a consumer’s desire for better energy control and defeating one of the aims of the programme.
- The view was also expressed that the option is flawed as it creates the need for Suppliers to operate call centres with systems in place to handle any issue arising from adding devices to the network and this need will increase with time

as more devices become available. This option would commit suppliers to provide a service for an unknown and increasing workload.

26. Do you consider that other CAD installation options should be pursued? If yes, please explain the approach you favour and your reasons.

The IET recommends a thorough review of options in accordance with good design practice, and compliance with the end to end design baseline. Clearly the provision of the 'right' design for a CAD could provide a key step in facilitating the energy efficiency and carbon agenda that government aims to achieve and fits with the developing smart home initiatives.

Prepayment Interface Device

27. Do you agree with the proposal to include in SMETS 2 a specification for a PPMID, connected via the HAN, as described above?

Not answered.

28. Would including the capability to enable gas and electricity supply through a PPMID connected via (a) a wireless HAN or (b) a wired HAN meet GB safety requirements? What impact would including this capability have on the cost of smart metering equipment? Please provide evidence to support your answers.

Not answered.

Providing the rules/policies are clear then compliant designs should be developed to meet them, and appropriate testing undertaken to prove suitability and provide assurance.

Not answered.

Microgeneration Meters

29. Do you agree with the proposal that the communications hub should be specified such that it can support multiple smart electricity meters?

Yes, the IET strongly supports the proposal. Given DECC's latest projections for micro-generation - in particular solar PV - it will become increasingly important to measure (rather than estimate) the electrical energy generated by each micro-generator. This would ensure that consumers are properly remunerated under the FIT. From a technical perspective, Distribution Network Operators need to be able to monitor the development of 'latent' demand which micro-generation will give rise to.

Latent demand is the additional demand that would be presented to the network should the micro-generator cease to operate or disconnect. In the absence of micro-generator metering it will not be apparent to network operators how much latent demand exists. Microgeneration will cease operating if there is a loss of infeed to a network with micro-generation connected, or in the event of an upstream event which gives rise to either a significant voltage reduction or drop in frequency.

Should latent demand in a locality grow to the extent that demand presented to the network on restoration of supplies following a fault were to exceed network capacity,

then network operators could face significant difficulties in terms of being able to sustain supply restorations. Such a scenario could lead to extensive delays in securing supply restorations to consumers.

Whilst the consultation advocates this being an elective service, given the importance of this information to network operators in terms of their statutory obligation to develop, maintain and operate efficient, coordinated and economical systems for the distribution of electricity, we would suggest that the service (to network operators) could be legitimately regarded as core.

How many smart electricity meters should be supported by each communications hub?

While the question relates only to electricity meters, already we have the case of the gas meter feeding into the comms hub so it is relevant to speculate on the full range of possibilities that might one day need separate meters and connection. As well as import electricity, import gas, and export electricity (Microgeneration), possibilities include EV charging – import and export (as this may be provided by a third party as a service and have different tariffs or tax implications one day); water and community heating. Our initial understand is that this future-proofing could be at low or negligible cost but this needs further investigation

Hand held Terminals

30. Do you agree that a specification for a HHT interface to the HAN should be defined? If yes, please identify the functions that this interface would need to support and the scenarios in which such functionality could be required.

It is preferable that Smart Meters should be able to be installed without the need for a HHT, however IET would recognise that in certain circumstances a HHT may be necessary to address commissioning or maintenance issues to ensure a successful outcome.

Although the ideal installation is for a plug-and-play, this may prove to be only an ideal. Therefore the installer should be able to influence or direct the pairing of devices (potentially including CADs) to the CH, status checking the comms hub and basic pairing with the WAN (depending on the WAN solution), status checking on the meters and gas mirror and reading of the different registers (which would be displayed, but not stored).

The ability to send the equivalent of a “ping” message to the home devices and the DCC are also necessary.

Ideally (and this should be more than an ideal) device identities will be pre-programmed, or, in the case of the comms hub, downloaded on install. These should not be managed by the HHT, but the HHT should be able to access identities and record them.

CHAPTER 5 - GOVERNANCE AND ASSURANCE OF SECURITY AND INTEROPERABILITY

Governance of Security Requirements

31. Do you agree with the proposed approach to the governance of security requirements? If you propose alternative arrangements please provide evidence to support your views.

Yes. We support the proposal for a technical subcommittee reporting to the SEC Panel. Given the importance both from a data privacy and system security perspective, it is imperative that security experts are commissioned to oversee the governance of the smart metering system from a security perspective.

Network operators in particular will need to be assured that any security threat (including any potential cyber security threat) that could conceivably impact their ability to meet their statutory obligation to develop, maintain and operate efficient, coordinated and economical systems for the distribution of electricity, is adequately mitigated by appropriate attention to the design and operation of the smart metering system.

The term 'end to end security' is used in this section but there is no definition of the ends, i.e. system boundaries or interfaces.

The question of **liability** is a central issue to be considered for all security policies that affect consumers.

- a) Who is liable if there is a security/privacy breach that affects consumers adversely?
- b) What level of compensation will be available to affected consumers?

Assurance of Security Requirements

32. Do you agree with the proposal to establish independent assurance procedures for DCC and DCC users? Please explain your views and provide evidence, including cost estimates where applicable, to support your position. Comments would also be welcome in relation to the impacts and benefits of the proposed approach with regard to small suppliers.

Certification against security standards will only assure that the mandated processes have been followed, NOT that the resulting products and systems are adequately secure. A well-established principal of security economics is that the losses resulting from a security or privacy breach should fall on the organisation supplying the product or service that is claimed to be secure. This ensures that the supplier makes the level of investment in security that minimises their losses from breaches.

33. Do you agree with the proposal that re-testing should occur at least at set intervals and more frequently when significant changes to systems or security requirements are introduced? Please explain your views.

Independent assurance will go some way to ensuring system integrity. The suggestion that testing need only be carried out when significant changes are made is inadequate. Full regression testing will be required for any change no matter how small.

Computer scientists know that testing can only show the presence of defects and vulnerabilities, never their absence. Security should therefore be demonstrated primarily by analysis and proof, not by testing only.

Independent assurance of smart metering equipment

34. Do you agree with the proposal to establish an independent security certification scheme for smart metering equipment? Do you have any views on the proposed approach to establishing a certification scheme or evidence of the costs or timelines for setting up such a scheme or submitting products for certification?

Yes, however we repeat our earlier comment about testing. The scheme (and SMETS) should not use the word “test” as if it were the only or primary way to demonstrate that a computer based product or system has adequate security.

35. Do you agree that sanctions for non-compliance with security requirements should be included in the SEC? Do you have views on the nature of the sanctions that might be imposed?

Yes. Non-compliance with security requirements poses a risk to critical national infrastructure and must be treated accordingly.

Security for smart meters not enrolled in the DCC

36. Do you agree with the proposal to, in effect, extend the arrangements already proposed for SMETS installations prior to DCC operation, to all installations being operated outside DCC? Please provide evidence of the costs that might be incurred and the impact of this approach on small suppliers.

Yes. The cost the country of a major infrastructure failure will be huge compared to the cost of establishing proper security measures.

Assurance of Equipment

37. Do you agree that interoperability is central to the development of a successful smart metering solution and that activities related to the assurance of SMETS equipment should be governed by SEC? Please provide views on the governance arrangements that would be appropriate for assuring interoperability of smart metering equipment.

Yes – Interoperability is vital. Smart meters should be entirely interchangeable, and there should be no technical or systemic obstacle to a seamless Change of Supplier procedure. The remit for assurance should include all aspects of interoperability including compatible functionality, protocols, communications systems and interfaces, and even extending to physical dimensions.

Opinion was divided between DCC providing a “gold standard” of assurance of interoperability and relying on the testing regimes provided by the ZigBee Alliance.

38. Do you agree with the creation of an ‘approved products’ list and the requirement on suppliers and CSPs to obtain, retain and provide evidence of appropriate certification should apply regardless of whether they intend to enrol the equipment in DCC?

Not answered. Opinion on this question is divided.

39. Do you agree that protocol certification (against a GB Companion Specification) should provide adequate assurance that a product will meet interoperability requirements? Please explain your views and identify any additional assurance testing that you consider to be necessary and the rationale for including such testing.

Not answered.

CHAPTER 6 – OPERATIONAL LICENCE CONDITIONS

Questions 40 - 45 not answered.

CHAPTER 7 – NEXT STEPS

Questions 45 - 50 not answered.