

	<b>Report</b>	<b>Technology</b>
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Title: **TECHNICAL EVALUATION  
CRITERIA FOR NON-LETHAL  
ENERGIZED PERIMETER  
DETECTION SYSTEM (NLEPDS)  
AT ERICA SUBSTATION**

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## **1. Introduction**

This document contains the technical evaluation criteria for a commercial enquiry for the design, supply, installation, testing and commissioning of the Non-Lethal Energised Perimeter Detection System (NLEPDS). This document contains both the evaluation criteria used for Desktop evaluation and Demonstration/Factory evaluation.

**Note:** The terms Non-Lethal Electric Fence and Non-Lethal Energized Perimeter Detection System (NLEPDS) will be used synonymously in this document and shall refer to the same system.

## **2. Supporting clauses**

### **2.1 Scope**

This document contains the technical evaluation criteria for the design, supply, installation, testing and commissioning of the Non-Lethal Electrified Perimeter Detection System (NLEPDS) at Erica Substation.

#### **2.1.1 Purpose**

The purpose of this document is to define the technical evaluation criteria for commercial enquiry for the design, supply, installation, testing and commissioning of NLEPDS.

#### **2.1.2 Applicability**

This document shall apply to Eskom Transmission and Eskom Telecoms.

## **2.2 Normative/informative references**

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

### **2.2.1 Normative**

- [1] 240-48929482 Tender Technical Evaluation Procedure
- [2] 240-78980848 Specification for Non-Lethal Perimeter Detection System (NLEPDS) for Protection of Eskom Installations and its Subsidiaries
- [3] 240-170001114 Scope of work for Non-Lethal Energised Perimeter Detection System (NLEPDS) at Erica Substation
- [4] 240-83684419 PTM&C Technology Development

### **2.2.2 Informative**

None

## **2.3 Definitions**

### **2.3.1 Disclosure classification**

**Controlled disclosure:** controlled disclosure to external parties (either enforced by law, or discretionary).

## **2.4 Abbreviations**

Abbreviation	Description
NLEPDS	Non-Lethal Energized Perimeter Detection System

Abbreviation	Description
TET	Technical Evaluation Team

## 2.5 Roles and responsibilities

As per 240-48929482: Tender Technical Evaluation Procedure

## 2.6 Process for monitoring

N/A

## 2.7 Related/supporting documents

None

## 3. Tender Technical Evaluation Criteria

- The technical evaluation method has three sub-categories; Mandatory Criteria evaluation, Desktop evaluation and Demonstration/Practical evaluation.
- Tenderers must pass the Mandatory Criteria evaluation. Tenderers that do not pass the Mandatory Criteria evaluation will not be evaluated further.
- The Desktop evaluation and Demonstration/Practical evaluation subcategories carry equal weightings of 50% respectively.
- The Desktop Evaluation shall comprise scoring of the submitted response to Technical A/B schedule for NLEPDS (listed in Appendix A of this document) along with the Functional Design Specifications/System Design Reports and Detailed Design report. The A/B schedule for NLEPDS use a default weight of 1 for each scored item. Critical items are assigned higher weights. For example, a weight of 3 indicates that the item will count the same as three items with weight 1. See Appendix A.
- The Demonstration/Practical evaluation will comprise scoring the functionality of the offered equipment at the Tenders or local OEM's test facility. See Appendix B.
- Threshold to be deemed technically compliant is 70%.

### Notes:

- This report and any actions that are listed or recommended as a result of the assessments are by no means a confirmation or guarantee that any contract will be entered into by Eskom.
- Any actions undertaken by the tenderer as a consequence of this report is for the tenderer's account. Any liability for the said actions undertaken by the tenderer is not transferrable to Eskom in any way.
- The assessment team has no authority or responsibility in the decision taken by Eskom with respect to contracting for a product or service.
- Any statements, intentions and/or actions expressed by the assessment team during the assessment and after the assessment should not be interpreted as the awarding of a contract and does not constitute any liability to Eskom with regards to contract placement or post-contract performance guarantees.

### 3.1 Mandatory Criteria Evaluation

This evaluation exercise is performed by the Eskom evaluating representatives. This part of the technical evaluation starts when submissions are opened for the first time. The Eskom evaluating representatives will peruse the tender submissions to ensure that the Mandatory criteria are met. Submissions that receive a "No" on any of the Mandatory criteria will not be able to proceed to the Desktop Evaluation and therefore will fail the technical evaluation.

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**Table 1: Mandatory Criteria Evaluation**

Item	Criteria	Comply	Comments
1.1	Submission of Technical Schedules A/B from the Technical specification 240-78980848 (Written in English).		
1.2	Submission of PSIRA registration certificate.		
	<b>Threshold</b>	<b>Compliance to all of the above</b>	

### 3.2 Qualitative evaluation

Qualitative evaluation will comprise of the Desktop evaluation and Demonstration/Practical evaluation as shown in Table 2 below:

**Table 2: Qualitative evaluation**

Item	Criteria	Weight (%)	Score obtained (%)	Comment
2.1	Desktop Evaluation: Compliance with Technical Schedules A/B in Appendix A. (Full compliance = weight of line item weights x 3 = 882 points (i.e. 100%)), which equates to a 50% in this table.	50		
2.2	Demonstration/Practical evaluation: Compliance with demo tests functionality in Appendix B. (Full compliance = weight of line item weights x 3 = 51 points (i.e. 100%)), which equates to a 50% in this table	50		
	<b>Total</b>	<b>100</b>		
	<b>Threshold</b>	<b>70</b>		

#### 3.2.1 Scoring criteria for Desktop Evaluation

- For Desktop Evaluation, Tenderers are required to indicate compliance and also provide supporting evidence to the requirements listed in the accompanying Technical Schedules A/B for NLEPDS (Appendix A).
- The Technical Schedules A/B use a default weight of 1 for each scored item. Critical items are assigned higher weights. For example, a weight of 3 indicates that the item will count the same as three items with weight 1. Each item will be scored according to Table 3 and cross-checked against the supporting documents tendered
- It is expected of Tenderers to state clearly, for each clause that requires a statement of compliance in the Schedule of Requirements A/B, either "Comply", "Partially Compliant" or "Do not comply".
- If a clause in the Schedule of Requirements A/B requires a statement of compliance and additional information e.g. a description etc. Tenderers are requested to state clearly either "Comply – followed by Evidence and References in support of compliance – i.e. explanations, document reference (title, paragraph/page number)
- Any deviations from the technical specifications should be indicated in the deviations schedules provided.
- The total score for the Technical Schedules A/B will be expressed as a percentage of the maximum possible score of 882 (weight of item from Technical Schedules A/B x (Score "3" from Table 3)). This score value will be recorded under item 2.1 in Table 2.

### 3.2.2 Scoring criteria for Demonstration/Practical evaluation

- a) The purpose of testing at this phase is to test whether the equipment proposed is capable of meeting the specifications. To this end, equipment needs to be demonstrated to meet the functional requirements. These tests need not be carried out on site. They may be carried out on equipment already installed on a 3<sup>rd</sup> party site by the tenderer or setup for demonstration purposes.
- b) Demonstration/Factory evaluation will be based on the requirements listed in the accompanying 'Demonstration/Practical evaluation' listed in Appendix B.
- c) During the Demonstration/Practical evaluation the tenderer shall demonstrate how the different functional and technical requirements have been incorporated in the system design (refer to the accompanying Demonstration/Practical evaluation listed in Appendix B).
- d) The Demonstration/Practical evaluation uses a default weight of 1 for each scored item. Critical items are assigned higher weights. For example, a weight of 3 indicates that the item will count the same as three items with weight 1. Each item will be scored according to Table 3.
- e) The total score for the Demonstration/Practical evaluation will be expressed as a percentage of the maximum possible score of 51 (weight of item from Demonstration/Practical evaluation x (Score "3" from Table 3)). This score value will be recorded under item 2.2 in Table 2.
- f) The Tenderer shall use the offered equipment/system to demonstrate how Eskom's requirements are met. The test system shall be configured so as to represent the architecture envisaged for the complete solution.
- g) It is the responsibility of the tenderer to have complete demo units and test instruments available. The tenderer will be responsible to do all testing and programming required by Eskom.
- h) The tenderer will be required to setup a demonstration system comprising of the following system components:
  - i. Electric fence conductors
  - ii. Power supply
  - iii. Control unit
  - iv. Graphical User interface / Display unit
  - v. Synchronising equipment/mechanism
  - vi. Relay cards (where applicable)
  - vii. Energizer(s)
  - viii. kiosks
- i) The tenderer will be informed in advance to arrange and facilitate for the practical evaluation to take place.

*Note: Eskom reserve the right to use the results of the previous Demonstration/Factory evaluations in the evaluation of subsequent similar commercial enquiries issued not more than 6 months apart.*

### 3.2.3 Scoring method for Qualitative evaluation

The scoring method for both Desktop evaluation and Demonstration/Practical evaluation is shown in Table 3 below:

**Table 3: Scoring method of NLEPDS**

Compliance	Score
Fully compliant	3
Partially compliant (minor deviation)	1
Non-compliant (major deviation)	0

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## 4. Authorisation

This document has been seen and accepted by:

Name	Designation
Mario Peterson	Manager – PTM&C Planning and Project Support

## 5. Template Revisions

Date	Rev.	Compiler	Remarks
July 2021	6	R Moshoeshoe	Revised the criteria to align to the revised specification

## 6. Development team

The following people were involved in the development of this document:

- Chris Van Reenen

## 7. Acknowledgements

N/A

**Appendix A: Technical Schedule A/B for NLEPDS (specification number: 240-78980848)**

	TECHNICAL SCHEDULES A AND B FOR STANDARD FOR NON-LETHAL ENERGIZED PERIMETER DETECTION SYSTEM 240-78980848				
	<b>Schedule A:</b> Purchaser's specifications				
	<b>Schedule B:</b> Guarantees, compliance, and technical particulars of equipment offered				
	<ul style="list-style-type: none"><li>• The clauses and numbering in this table are not necessarily the verbatim clauses as per 240-78980848. Therefore it is OBLIGATORY on the TENDERER to review the applicable clauses in 240-78980848 in order to provide an informed response.</li><li>• When completing the Schedule B and the References section, The Tenderer is required to state clearly, for each clause that requires a statement of compliance, with one of the following options:<ul style="list-style-type: none"><li>a) Comply – Confirmation of FULL Compliance to all clauses of the applicable section of the Technical Standard. No deviations</li><li>b) Partially Comply – Confirmation of PARTIAL Compliance and that FULL Compliance is not possible. Deviations taken.</li><li>c) Do Not Comply - Confirmation of Non-Compliance to ALL requirements in the applicable section</li></ul></li><li>• Reference to evidence in the form of datasheets, equipment manuals, drawings, hyperlinks shall be included in the References section</li><li>• Where there are any deviations taken from the clauses in the applicable section, these should be indicated under the References and Deviations section</li><li>• The Comments section shall be used by the Tenderer to provide any further information to complement/explain the compliance/Non-Compliance and evidence provided.</li></ul>				
	Description	Schedule A	Schedule B	References/Statement (supporting evidence)	Weight
&					
Deviations					
3	Requirements for high quality NLEPDS				

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<b>3.1</b>	<b>Overview of NLEPDS</b>				
<b>3.2</b>	<b>Types of NLEPD systems</b>				
3.2.1	The energizer shall support Multi-zone monitoring.	comply			1
3.2.2	The system shall support Multi-sector monitoring (resistive sectorizing).	comply			1
<b>3.3</b>	<b>General Environmental conditions</b>				
a)	All elements of the system shall be able to function in all climatic conditions in section 3.3 a) of 240-78980848 without the performance being out of limits or the life cycle being shortened.	Comply with reference			3
<b>3.3.1</b>	<b>Electrical operating environment</b>				
a)	All components of the NLEPDS shall function under electrical environments that are near or under power lines without failure/malfunctioning.	comply			3
b)	The functioning of the NLEPDS components shall be immune to electromagnetic interference.	comply			3
c)	All components of the NLEPDS shall be able to adapt and function without being affected by high voltage switching.	comply			3
d)	All components of the NLEPDS shall not generate any interference, which could hinder their own performance or the performance of the other equipment in the vicinity.	comply			1
<b>3.4</b>	<b>Requirements for energizers</b>				
<b>3.4.1</b>	<b>General</b>				

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a)	The energizer shall be a Type A energizer as defined in SANS 60335-2-76.	Comply with reference			1
b)	The energizer shall meet the applicable requirements of a class II appliance as outlined in SANS 60335-1 with respect to protection against electric shock.	Comply with reference			1
<b>3.4.2</b>	<b>Certification requirements</b>				
a)	The energizers shall be certified as compliant to SANS 60335-2-76. Certificates stating compliance and type test reports shall be provided with tender documentation	Comply with reference			3
<b>3.4.3</b>	<b>Electrical requirements</b>				
<b>3.4.3.1</b>	<b>Power supply</b>				
a)	Ancillary equipment and energizers shall have the capability to be supplied with power through the substation AC and DC supply routed from the AC & DC distribution boards.	comply			1
b)	The power supply to the energizer shall be provided through the site's 220V (± 10%), 50Hz (± 2%) AC and/or DC.	Comply			1
c)	The AC and DC supply shall be protected by Class 1 and 11 surge protection.				1
d)	There shall be no system malfunctioning on the failure, restoration, under or over voltage of the power supply to the unit.	comply			3
d)	The existing standby power systems at site shall be used as the primary standby power source, provided that the standby time (autonomy) requirements of the site are not adversely affected.	comply			1

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e)	Standby power systems shall comply with requirements of section 3.4.3.1(e) of 240-78980848.	comply			3
<b>3.4.3.2</b>	<b>Energizer High Voltage Output requirements</b>				
a)	The energy delivered to the 500Ω load shall be above 5J but not exceed 8J.	Comply with reference. Submit certificate of compliance to SANS 60335-2-76 including test reports			3
b)	Maximum voltage delivered to the load shall not exceed 10kV.	Comply with reference. Submit certificate of compliance to SANS 60335-2-76 including test reports			3
c)	The impulse repetition rate shall not exceed 1 Hz.	Comply with reference. Submit certificate of compliance to SANS 60335-2-76 including test reports			3
d)	The impulse duration shall not exceed 10 ms.	Comply with reference. Submit certificate of compliance to SANS 60335-2-76 including test reports			3
<b>3.4.4</b>	<b>Mechanical requirements</b>				
<b>3.4.4.1</b>	<b>Energizer IP rating</b>				
a)	Energizer(s) shall have an IP rating of IP51 at minimum.	Comply with reference			1
<b>3.4.4.2</b>	<b>Markings used on energizer</b>				

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a)	The general markings on the energizer shall comply with SANS 60335-1 and at minimum shall include marking listed in section 3.4.4.2 (a) of 240-78980848	comply			6
<b>3.4.5</b>	<b>Functional requirements</b>				
<b>3.4.5.1</b>	<b>General</b>				
a)	A minimum of two energizers shall be used per installation to improve the reliability and availability of the system.	comply			1
b)	The minimum expected life of the energizer and associated equipment (PC hardware & software, relay card(s), synchronisation mechanism etc.) shall be 10 years.	comply			3
c)	The energizer shall be self-monitoring and alarm any out-of-bounds condition or system failure to the master control unit.	comply			3
d)	The NLEPDS shall be triggered by either Electric fence conductors been short circuited or Electric fence conductors been cut (open circuit)	comply			3
e)	When a NLEPDS is triggered/alarmed the following sequence of events and interoperation of different security technologies deployed at site shall be possible:				
i	Each violation shall be reported to the security control centre remotely and/or locally.	comply			3
ii	The security perimeter lights shall be illuminated at the affected fence zone(s) or sector(s).	comply			3
iii	The security controller shall be able to confirm the arrival of the responders on site following an alarm/intrusion event.	comply			3

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f)	All security alarms and events shall be date-and-time stamped accurately for traceability and investigation purposes.	comply			3
<b>3.4.5.2</b>	<b>Synchronising equipment/mechanism</b>				
a)	A synchronising mechanism shall be used to synchronize multiple energizers in order to be regarded as one energizer with multiple outputs, all firing at the same time, as one single pulse.	comply			3
<b>3.4.5.3</b>	<b>Energizer safety</b>				
a)	The Energizer shall be constructed so that in normal use, they function safely so as to cause no danger to persons or surroundings, even in the event of carelessness that may occur in normal use.	comply			1
b)	There shall be a safety mechanism (such as a watchdog) to ensure that the energizer(s) output voltage and energy levels are within the legal non-lethal levels. When the maximum level is exceeded, then the output shall be shut down and an alarm generated.	comply with reference			3
c)	The energizers shall shut down if there is a synchronisation failure.	Comply with reference			3
<b>3.4.5.4</b>	<b>Electric fence zones / sectors</b>				
a)	The non-lethal energised fence shall comprise of various zones or sectors (depending on the NLEPD system).	comply			1
b)	The controller shall be used to configure the electric fence into zones or sectors.	comply			3
c)	It shall be configurable to accommodate at least the number zones or sectors along an electric fence's perimeter specified in the technical schedules	comply			1

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d)	It shall be possible to allocate and generate alarms for intrusions to each individual zone or sector.	comply			1
e)	The alarms shall be routed to individual relays for triggering other security systems.	comply			3
<b>3.5</b>	<b>Requirements for the NLEPDS equipment kiosks</b>				
<b>3.5.1</b>	<b>General</b>				
a)	Electrical equipment including the energizers, power supply circuitry, isolation switches, relays and relay cards (where required), surge protectors and lighting switches shall be housed in Eskom approved kiosk.				1
<b>b)</b>	<b>The electric fence installations shall consist of three types of kiosks:</b>				
i	Energiser kiosks which can support either two or four kiosks	comply			1
ii	Electric fence control kiosk	comply			1
iii	User interface / display (GUI) kiosk	comply			1
<b>3.5.2</b>	<b>Requirements for the energizer kiosks</b>				
a)	Two types of energizer kiosks are specified, the first which caters for two energizers and a kiosk which caters for four energizers.	comply			1
b)	The energizer kiosks can be applied in a number of ways to cater for various substation configurations and requirements. For a multi-sector application the kiosks will typically be installed in the same room as the master control unit kiosk. For a multi-zone application only the nearest energizer may be installed in the room and the rest of the kiosks will be installed outside along the electric fence.	comply			3

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<b>3.5.3</b>	<b>Requirements for the Graphical User interface / Display unit kiosk</b>				
a)	The intension is that this kiosk will typically be installed in the guard house away from the Control and Energiser kiosks.	comply			1
b)	The display unit shall be able to display the configured zones or sectors of the fence including all fence alarms.	comply			3
c)	Alarmed zone(s) or sector(s) of the fence shall be clearly depicted (shape and size) on the display unit.	comply			3
d)	The User interface shall be used to view, acknowledge and reset zone or sector alarms.	comply			3
e)	A panic button / switch shall be provided to send an alarm via the electric fence control unit and SCADA to remote control facilities. The panic button shall also trigger a siren outside the guard house / control room.	comply			3
f)	A security light override switch shall also be installed to switch on all security lights when required.	comply			3
g)	Strict configuration rights management shall be applied such that only authorised users can make configuration changes to the system.	comply			3
<b>3.5.4</b>	<b>Requirements for the control unit kiosk</b>				
a)	The intension is that this kiosk will typically be installed in a room adjacent to the guard house with controlled access. For a multi-sector application the energizer kiosks may typically also be installed here and for a multi-zone application only the nearest energizer may be installed here.	comply			1

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b)	The control unit kiosk will house the master control unit, a keypad or touch screen to apply and change configuration settings, a synchronisation unit (where required), a light relay card / relays, an alarm relay card / relays, contactors for the security lights, panic siren contactors and an IDF frame for routing the alarms to SCADA.	comply			3
<b>3.5.4.1</b>	<b>Master Control unit</b>				
a)	Strict configuration rights management shall be applied such that only authorised users can make configuration changes to the system.	comply			3
b)	Alarm conditions shall be resettable and acknowledgeable from the graphical user interface.	comply			3
c)	Alarms received from the energisers and GUI (where applicable) will be routed to the alarm relay card, panic siren and security light relay card.	comply			3
d)	The system shall have an option of sending security alerts and confirmations through email and SMS.	comply			3
e)	All security alarms and events shall be date-and-time stamped accurately for traceability and investigation purposes.	comply			3
<b>3.5.4.2</b>	<b>Alarm relay card</b>				
a)	The alarm relay card will receive alarms from the master control unit and GUI and route them through to the SCADA interface in the substation.	comply			3
b)	The relay card shall cater for at least eight alarms listed in Table 2 of 240-78980848	comply			8

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c)	If analogue alarms are used, then all status and alarm indication relays shall use change-over contacts, so that either NO or NC contacts can be wired to the IDF as and when required.	comply			1
d)	The alarm relay card outputs shall be capable of triggering the security systems listed in section 3.5.4.2 (d.) of 240-78980848	comply			4
e)	The indications shall be supplied as potential free change over contacts.	comply			1
f)	Remote resetting of alarms shall be possible. Compliance to Eskom's cyber security standard (240-55410927) shall be ensured.	comply			3
g)	If analogue alarming is used, then an IDF frame shall be provided which will accommodate minimum of 20 alarm input / outputs.	comply			1
<b>3.5.4.3</b>	<b>Security lights relay card</b>				
a)	The security lights relay card will receive alarms from the master control unit and GUI and switch the lights on at affected zones or sectors.				1
b)	The relay card shall cater for at least ten relays.				3
c)	The relay outputs will be routed to contactors which will switch the security lights in the affected zones or sectors.				3
d)	A security lights override relay/switch will ensure that all the security lights can be switched on through the security lights bypass button on the GUI kiosk.				3
<b>3.5.5</b>	<b>Kiosk earthing requirements</b>				

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a)	The earthing of the equipment in the kiosk shall comply with requirements of Eskom standard for earthing of secondary plant equipment in substations				1
<b>3.5.6</b>	<b>Miniature circuit breaker (MCB) specification</b>				
a)	The rating of the MCBs shall be adequate for the protection of installed equipment. The Contractor shall be responsible for selection of the appropriately sized MCB.	comply			1
<b>3.5.7</b>	<b>Surge arrester specification</b>				
a)	Surge arrestors shall be installed to protect the kiosks electrical equipment from surges. The surge arrester shall be the metal oxide, DIN rail mount type with indication suitable for Zone 1 protection. The arrester shall comply with SANS 61643-1 and bear the SANS mark.				1
b)	The technical specification for the surge arresters shall be as listed in Table 3 of 240-78980848				7
<b>3.5.8</b>	<b>Isolation switches</b>				
a)	The energizer unit shall have a visible isolating switch for switching off the HV of the electrified fence. In the off state, the isolating switch shall be connected to earth.				3
b)	The energizer isolation switch shall have visible ON/OFF positions and the contacts designed to handle high voltages.				1
3.5.9	Wiring shall comply with requirements listed in section 3.5.9 of 240-78980848				5
3.5.10	Trunking shall comply with requirements listed in section 3.5.10 of 240-78980848				2
3.5.11	Notices, labelling and packaging shall comply with requirements listed in section 3.5.11 of 240-78980848				3

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<b>3.6</b>	<b>Communication infrastructure</b>				
a)	All cables including power and communication cables shall ensure that there are no data losses/disruptions due to harsh operating conditions and voltage/current surges, as such cabling shall not be limited to copper cable only.	comply			1
b)	Communication between all components of the NLEPDS shall be through a communication medium (e.g. fibre optic cables) that will be immune to interruptions due to other devices in the equipment room as well as immune to EMI.	comply			1
c)	Communication protocols supported shall be made available to Eskom upon request to ensure integration of equipment from different suppliers.	Comply with reference			1
d)	Communication to remote security monitoring centres shall be via Eskom Telecom's infrastructure. Where no Eskom Telecom's infrastructure is installed, a third party communication infrastructure may be used while ensuring compliance to Cyber security standard for operational technology standard (240-55410927).	comply			1
<b>3.7</b>	<b>Requirements for Electric fence conductors</b>				
<b>3.7.1</b>	<b>Electric fence conductors</b>				
a)	Conductors shall comply with requirements of SANS 10222-3 Electrical Security installations – Part 3: Electric fences (non-lethal).	comply			1
b)	Conductors shall be manufactured from 2.24mm diameter solid fully galvanised steel wire for inland installations. For coastal regions Eskom may opt to use a 1.6mm aluminium conductor, there shall be provision made for both these requirements.	comply			1

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c)	Ferrules used for crimping conductors shall be of similar material as conductor (e.g. steel on steel).	comply			1
<b>3.7.2</b>	<b>HT cables</b>				
a)	High Tension (HT) armoured cable shall be used to connect the energizer electrical output connectors to the conductor / trace wires of the NLEPDS structure.	comply			1
b)	The HT cables shall be UV stabilised and double insulated.	comply			1
3.8	Insulators shall comply with requirements of section 3.8 of 240-78980848	comply			4
<b>3.9</b>	<b>General lightning and over current requirements</b>				
a)	The system will be installed where it will be subject to voltage surges due to lightning, a variety of line faults, power interruptions and high voltage switching conditions. The system shall be able to operate without failure under all of the above mentioned conditions. Therefore, it is imperative that the system be adequately earthed.	comply			1
b)	Protection against high voltage transients shall be provided on both the signal and power circuitry, without impairing the system's electrical parameters, sensitivity, or performance.	comply			1
c)	Lightning arrestors shall comply with the requirements of SANS 10222-3.	comply			1
3.10	Earthing shall comply with requirements listed in section 3.10 of 240-78980848	comply			3
3.11	Warning signs shall comply with requirements listed in section 3.11 of 240-78980848	comply			3

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3.12	Equipment shall be supplied with information listed in section 3.12 of 240-78980848	Comply with reference			10
<b>3.13</b>	<b>Installation and Site Acceptance Testing (SAT)</b>				
a)	The supplier shall install the system on site (energizers, relays, control unit, synchronisation equipment, graphical user interface, fence conductors & communication infrastructure) inclusive of all interconnections between the system modules	comply			1
b)	The supplier shall avail themselves for Site Acceptance Testing at site after installation.	comply			1
c)	All test procedures required to ensure the correct functioning shall be specified with a list of required test equipment and tools.	comply with reference			3
<b>3.14</b>	<b>System life-cycle</b>				
a)	The minimum system life-cycle of the proposed product must be ten (10) years.	comply			3
b)	The life-cycle of the product must be further supported in terms of spares availability for a minimum period of seven (7) years after discontinuation of the product.	comply			3
<b>3.15</b>	<b>Warranty and support</b>				
a)	The system shall carry a minimum local (South African) warranty of 36 months with on-site as well as telephonic support from date of the system being commissioned. Eskom shall thereafter have the option to access on-going support in terms of a subsequent agreement.	comply			3
b)	The supplier must have a technician on call on a 24-hour basis for purposes of telephonic support.	comply			3

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c)	Supplier spares holding should include minimum replacement spares to restore service of the system in its entirety.	comply			3
d)	All support shall also include all firmware upgrades of the initial system version installed over the operational life of the system.	comply			3
e)	The support shall include first line level maintenance training.	comply			3
f)	The supplier shall also provide operator training on site to the end-user.	comply			3
g)	Product support must include national as well as international support through the local branch.	comply			3
h)	The supplier shall be willing to enter into an SLA with Eskom	comply			3
i)	The supplier should have a history of supplying products of this nature in South Africa for at least a minimum period of five (5) years.	Comply with reference			3
j)	The supplier to provide a list of reference sites where the product on offer has been installed and the year of implementation.	Comply with reference			3
<b>4</b>	<b>Functional and Detailed Design specifications</b>				
a)	Functional design specification (basic design)	The Tenderer shall submit a functional design specification as per section 4.1 of 240-78980848	submit a functional design specification as per section 4.1 of 240-78980848		10

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b)	Detailed design specification	The Tenderer shall submit a detailed design specification as per section 4.2 of 240-78980848	submit a detailed design specification as per section 4.2 of 240-78980848		20
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### **Appendix B: Demonstration/Practical evaluation**

- The purpose of testing is to test whether the equipment proposed is capable of meeting the specifications. To this end, equipment needs to be demonstrated to meet the functional requirements. These tests need not be carried out on site. They may be carried out on equipment already installed on a 3<sup>rd</sup> party site by the tenderer or setup for demonstration purposes.
- Demonstration/Factory evaluation will be based on the requirements listed in the table below
- The Tenderer shall use the offered equipment/system to demonstrate how Eskom's requirements are met. The test system shall be configured so as to represent the architecture envisaged for the complete solution.
- It is the responsibility of the tenderer to have complete demo units and test instruments available. The tenderer will be responsible to do all testing and programming required by Eskom.
- The tenderer will be required to setup a demonstration system comprising of the following system components:
  - i. Electric fence conductors
  - ii. Power supply
  - iii. Control unit
  - iv. Graphical user interface / Display unit
  - v. Synchronising equipment/mechanism
  - vi. Relay cards
  - vii. Energizer(s)
  - viii. Kiosks

Item #	Functionality requirement	Weight	Score	Remarks
<b>1</b>	<b>General requirements</b>			
1.1	Create an intrusion on the fence and clear the alarm. If the operation can be completed in 10 minutes the system is considered easy to operate.	1		
1.2	The controller or user interface with control software shall be able to configure the electrified fence into zones.	1		
1.3	Alarmed zone(s) of the fence shall be viewable /highlighted on the user interface/ display screen.	1		
1.4	Alarm conditions to be resettable and acknowledgeable.	1		
1.5	All settings of the energizers shall be configurable from the controller.	1		
1.6	System on status to indicate that the energizer is powered and armed	1		
1.7	Demonstrate fence intrusion alarm	1		

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1.8	Demonstrate mains supply fail alarm	1		
1.9	Synchronize multiple energizers in order to be regarded as one energizer with multiple outputs, all firing at the same time, as one single pulse.	1		
<b>2</b>	<b>Energizer output requirements:</b>			
<b>Note:</b>	The energizer characteristic shall be checked by operating the energizer at rated voltage with a 500Ω load connected across the terminals.			
2.1	Peak value of voltage must be above 7.5kV, but not exceeding 10kV	1		
2.2	Maximum energy delivered to a load of 500Ω must not be less than 5J but not exceeding 8J.	1		
2.3	The impulse repetition rate shall not exceed 1 Hz	1		
2.4	Impulse duration shall not exceed 10 ms.	1		
2.5	The energizer unit shall have a visible isolating switch for switching off the HV of the electrified fence. In the off state, the isolating switch shall be connected to earth.	1		
2.6	There shall be a safety mechanism (such as a watchdog) to ensure that the energizer(s) output voltage and energy levels are within the legal non-lethal levels and take corrective steps where exceedance is detected.	1		
2.7	There shall be a safety mechanism (such as a watchdog) to ensure that the energizer(s) output voltage and energy levels are within the legal non-lethal levels and take corrective steps where exceedance is detected.	1		
2.8	There shall be a safety mechanism (such as a watchdog) to ensure that the energizer(s) output voltage and energy levels are within the legal non-lethal levels and take corrective steps where exceedance is detected.	1		