REVENUE PROTECTION

This document does not have the status of a South African National Standard.
This specification is issued by
the Standardization Section, Eskom,
on behalf of the
User Group given in the foreword.

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Foreword

This code of practice was prepared on behalf of the Electricity Suppliers Liaison Committee (ESLC) and approved by it for use by electricity utilities.

The code of practice was prepared by a working group which, at the time of publication, comprised the following members:

- D Byker (Chairman) South African Revenue Protection Association
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A Manufacturers' Interest Group (MIG) was consulted on the contents of this code of practice and its comments were incorporated where the working group was in agreement. The MIG comprised the following members:

- C Coetzer Integrity Control Systems
- T Coetzer Integrity Control Systems
- J Mouton PSU
- L Vermaak Utility Systems

This edition supersedes NRS 055:2007 (edition 2).

Reference is made in the definition of "accredited" to "legal specifications" and in 4.2.7.4 to "training as stipulated by law". In South Africa this means the Electricity Regulation Act, 2006 (Act No. 4 of 2006) and the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

Reference is made in the definition of "supplier" to "national authority". In South Africa this is the National Energy Regulator of South Africa (NERSA).

Reference is made in the note to 4.1.2.6 to the "relevant association". In South Africa this is the South African Revenue Protection Association (SARPA).

Reference is made in 4.1.3.4.1 and in E.3(c) to "relevant legislation", in 4.1.3.6.1 (introductory sentence) to "legal framework", and in 4.1.3.6.1(a) to "national legislation". In South Africa this means the Electricity Regulation Act, 2006 (Act No. 4 of 2006) and Common Law with relation to fraud and theft.

Reference is made in 4.1.3.4.1, 4.1.3.4.12, 4.1.3.5.2, 4.1.3.5.10, 4.1.3.5.12, 4.1.3.6.1(a), 4.5.6, 4.5.16.3(c) and B.1.6.3 to "by-laws" and in 4.3.3.4 and 4.3.7.3 to "legal bypassing". In South Africa this means the local municipal by-laws.

Reference is made in 4.1.3.5.2 to "applicable legislation". In South Africa this means the Electricity Regulation Act, 2006 (Act No. 4 of 2006).
Foreword (concluded)

Reference is made in 4.1.3.5.11(c)(1) to "legislation". In South Africa this means the Prescription Act, 1969 (Act No. 68 of 1969).

Reference is made in the note to 4.1.3.6.1(f) to the "websites of the relevant associations". In South Africa these are SARPA and the Amalgamated Municipal Electricity Undertakings (AMEU).

Reference is made in 4.2.5.2(j) to the "relevant labour authority". In South Africa this means the Department of Labour.

Reference is made in 4.2.6.1(c)(7) to "the relevant authority". In South Africa this means the Electrical Industrial Council (EIC).

Reference is made in 4.2.6.1(c)(7) to "legislation". In South Africa this means the Labour Relations Act, 1995 (Act No. 66 of 1995).

Reference is made in the note to B.1.3(d) to "health and safety legislation". In South Africa this means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

Reference is made on the reverse sides of C.1 and C.2 (Conditions of supply) to "relevant legislation". In South Africa this means the Electricity Regulation Act, 2006 (Act No. 4 of 2006).

NOTE 1  The relevant by-laws applicable to the supplier concerned should also be taken into consideration.

NOTE 2  Wherever reference is made to "the police", in South Africa the reference is deemed to be to the South African Police Service (SAPS).

Annexes B, D, H and I form an integral part of this code of practice. Annexes A, C, E, F, G, J and K are for information only.
Introduction

This code of practice, which is based on documents from Eskom, the municipalities, and the South African Revenue Protection Association (SARPA), has been prepared to establish and promote uniform best practices for revenue protection by electricity utilities and their contractors. The code of practice outlines the duties and required conduct of revenue protection personnel to ensure good revenue protection and, at the same time, to maintain good customer relations and an acceptable service level. The application of the measures given in this code of practice should enable utilities to be given a better risk rating by financial institutions. Although it is primarily intended for electrical utilities, this code of practice could also be used by other service utilities such as water, gas and municipal services.

The ESLC expresses the wish that all utilities will adopt this code of practice in so far as their particular conditions will permit. Any differences between the requirements of this code of practice and the supplier’s requirements should be submitted for consideration in future revisions of this code of practice.

The theft of the transformer neutral and neutral earthing copper conductors is not dealt with in this document but is covered in NRS 059.

Sealing of metering equipment is covered in NRS 096-1.

The theft of utility service metals is covered in NRS 101.

All safety-related issues applicable to utilities are covered in the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

NOTE Further information on revenue protection can be obtained from the following sources:

a) the South African Revenue Protection Association (SARPA), on the World Wide Web: <http://www.sarpa.co.za>.


Keywords

bypass, credit control, disconnections, fraud, inspection, losses, metering, meters, revenue protection, SARPA, tampering, auditing, remedial action, loss recovery.
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REVENUE PROTECTION

1 Scope

1.1 This code of practice provides best practices in the field of revenue protection and credit control for electricity utilities. It can also be adapted for use by other service providers, where applicable.

1.2 This code of practice outlines the basic procedures, resources and training for utilities and their contractors and customers which should be in place to ensure good revenue protection.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this code of practice. All documents are subject to revision and, since any reference to a document is deemed to be a reference to the latest edition of that document, parties to agreements based on this code of practice are encouraged to take steps to ensure the use of the most recent editions of the documents listed below. Information on currently valid national and international standards can be obtained from the SABS Standards Division.

NRS 047-1, Electricity supply – Quality of service – Part 1: Minimum standards.

NRS 096-1, Electricity metering – Ancillary specifications – Part 1: The sealing of electricity meters.

SANS 474/NRS 057, Code of practice for electricity metering.

3 Terms, definitions and abbreviations

For the purposes of this code of practice, the following terms, definitions and abbreviations apply.

3.1 Terms and definitions

accredited
formal recognition by industry or the utility that a body or person is competent to carry out specific tasks and conforms to legal (see foreword) and other relevant specifications

approved
acceptable to, and approved in writing by, the utility or its authorized representative

auditing process
process of verifying the integrity of a metering installation including the meter, the associated equipment, seals and data

NOTE This includes the identification of irregularities and evidence of tampering and verification of the integrity of the complete installation.
bypass
partial or complete circumvention of the metering equipment

circumvention of the metering equipment
any attempt to bypass or interfere with the metering equipment that would affect the integrity and accuracy of the equipment

NOTE   This is a form of tampering; it can be either partial or complete circumvention.

contactor
revenue protection contractor
company or organization that provides revenue protection services to a supplier

credit control
action required to safeguard revenue

NOTE   This includes disconnections, reconnections, normalizing installations, follow-up procedures and verifying data integrity. It also includes a debt collection process but excludes debt collection initiatives (civil actions etc.)

customer
person or entity that purchases a commodity or service from the supplier

illegal connection
connection to any system that is not authorized or approved by the utility or its authorized agent

meter error
malfunction of a meter when the meter does not record, measure or function accurately within the specified requirements

normalizing of installation
restoring the prescribed metering function on a installation that was tampered before

revenue protection
steps taken to prevent, minimize, eliminate or recover the loss of revenue owing to theft, non-payment or any other similar causes, for services supplied

service provider
entity (individual or organization) that offers a service or services

split meter
split prepayment meter
prepayment meter that consists of a customer interface unit and a measurement unit

NOTE   The intention of using a split prepayment meter is to allow credit token interaction between the customer and the customer interface unit without allowing access to the mains conductors in order to minimize the possibility of tampering (unauthorized interference).

supplier
utility
supplier of electricity authorized by the national authority (see foreword)

NOTE   The supplier might also be a supplier of water, or gas, or other services.

tampering
unauthorized interference with the supplier's equipment

NOTE   This could include the removal of the supplier's seals from the protective devices or metering equipment, or the illegal connection of cables to the utility's infrastructure.
theft
unauthorized and illegal use of electricity

3.2 Abbreviations

CT: current transformer
GIS: geographic information system
GPS: global positioning system
HR: human resources
KPA: key performance areas
KPI: key performance indicators
LPU: large power user
PPE: personal protective equipment
RLMF: Revenue loss management forum
RP: revenue protection
SLA: service level agreement
UPS: unlimited power supply

4 Requirements

4.1 General

4.1.1 Management and processes

4.1.1.1 This code of practice addresses non-technical losses and the management thereof.

4.1.1.2 This code of practice will assist in understanding and quantifying the total extent of revenue losses. The effective management of revenue losses should include KPAs or KPIs that have been agreed upon between the utility’s management and relevant personnel.

4.1.1.3 Revenue protection and related credit control functions may be undertaken by specialized staff within the supplier’s organization or may be contracted out partially or wholly to another suitably approved organization.

4.1.1.4 Revenue protection and credit control should be ongoing processes and not regarded as once-off actions. Processes, procedures and resources for revenue protection should be set up on a permanent basis. Initially, additional effort and resources may be necessary to establish the revenue protection processes, to take remedial action in the field and to catch up on payment arrears, etc.

4.1.1.5 It is essential that members from the RP department and the credit control department collaborate on certain key issues pertinent to revenue management and subsequent actions.

4.1.1.6 Policies should be established by the RP department and the credit control department in order to perform revenue management effectively.

4.1.1.7 The RP department should work closely with the utility’s treasury or financial department.
4.1.2 Revenue loss management forum (RLMF)

4.1.2.1 It is recommended that a utility initiate and maintain a Revenue loss management forum.

4.1.2.2 Representatives of all departments and entities involved in an RLMF should be suitably mandated and the forum should meet at least once a month during the initial phase of the developing processes, in order to minimize revenue losses within the utility. Once the RLMF processes are fully implemented and an effective future action plan is in place, the meetings may be held less frequently.

4.1.2.3 The following departments should be included on an RLMF on a needs basis:

a) metering;
b) customer services;
c) revenue protection;
d) billing and credit control (finance department);
e) legal;
f) law enforcement;
g) stores;
h) planning;
i) tariff development;
j) housing, township development, new works;
k) repairs and maintenance; and
l) energy management

4.1.2.4 An RLMF should monitor all revenue protection projects throughout the area of responsibility of the utility. Task groups should be appointed to deal with specific projects or problems.

4.1.2.5 An RLMF should insist on regular communication opportunities where it could provide detailed feedback to management regarding statistics of revenue protection actions and credit control projects.

4.1.2.6 All processes and procedures that are directly linked to revenue protection should be analysed and updated by the RLMF. Experts should be called in as necessary to evaluate these processes and procedures and recommend improvements that should be considered by the forum. The cost-effectiveness of revenue protection actions should be considered and analysed on a regular basis.

NOTE The relevant association (see foreword) may be approached for guidelines in this regard.

4.1.2.7 General

When a difficult project or specific aspect of RP is being tackled, it is recommended that a small task group be formed to research the project or specific aspect. Where necessary or practicable a pilot study should be conducted initially before embarking on the bigger project.
4.1.3 RP processes

4.1.3.1 General

There are several RP related processes which are generally determined by the utilities’ policies and systems. The processes are described in 4.1.3.2 to 4.1.3.4.

4.1.3.2 Audit process

4.1.3.2.1 The meter auditing process has been found to be the best revenue protection tool to detect non-technical losses. There are different methods that could be utilized to audit meters. Each one could be used effectively to reach a specific goal. It is therefore essential that RP managers and project managers understand the value of each method and know when and how to use them effectively. The goal of a specific project or revenue department should be the point of departure when it is being decided what method should be used.

4.1.3.2.2 The different methods could be summarized as given in (a) to (e) below.

a) Sample audit: this method is used to obtain just enough information regarding consumers and installations to be able to decide what processes should be utilized to normalize the area and what method of audit should be utilized (see target audits in (d));

b) Data audit: this method is used to obtain new consumer or metering information or for updating of existing information) (see data audits in annex A);

c) Tamper detection audits: this method is used to inspect metering installations to detect the illegal usage of utility services (see sweeping audits and normal audits in annex A);

d) Target audits: this method is used to obtain specific information or deal with certain specific issues (see low/zero consumption audits in annex A);

e) All-inclusive audit: this method is used to collect information regarding consumers, metering installations, illegal acts, unsafe conditions, leaks, faulty equipment and also conduct the process of consumer education (see full audit in annex A).

4.1.3.2.3 The audit process shall include verification of the revenue protection data requirements given in annex I. The audit process covers checks of the following:

a) metering and installation integrity (on-site inspection);

b) meter-reading integrity;

c) database integrity (customer and technical data);

d) customer consumption analysis;

e) billing and vending;

f) tariff verification;

g) township development (subdivision and consolidation of data, geographic information system);

h) identify non-compliance, inadequate or non-existent internal processes and procedures (for example, sealing registers, stock control, stores procedures); and

i) the use of check meters (zone meters) or a statistical programme to highlight illegal connections; and

j) process integrity.
4.1.3.3 Tamper detection process

4.1.3.3.1 Tampering with meters is an illegal activity that involves the deliberate interfering with a metering device. Different kinds of tampering take place, some of which are described below:

a) interfering with the mechanical mechanism of a meter (for example slowing down the rotation of the disk on a conventional electricity meter to record a lower reading);

b) cutting of wires (for example cutting the “watchdog wire” on a prepaid meter to bypass the alarm and reconfiguring the wires to illegally connect electricity);

c) reversing a meter reading (for example turning a conventional water meter back to reverse the reading);

d) by-passing a meter (for example attaching wires to the base plate of a prepaid meter);

e) reconfiguring the wiring (for example on a conventional electricity meter);

f) putting foreign items or objects inside a meter to interfere with the meter’s operation (for example bugs and water);

g) removing or reconfiguring the wiring on electricity three-phase meters (for example interfering with current transformers on conventional meters).

4.1.3.3.2 The main goal of revenue protection managers and operators is to detect meters that were tampered with and find methods of restoring the correct metering functions (normalize the installation).

4.1.3.3.3 Whenever a utility member finds a tampered meter, it is essential that the illegal act be reported as soon as possible to the correct authority and that remedial actions are taken in accordance with the revenue protection or credit control policy of the utility.

4.1.3.3.4 There are two options available to RP operators (including auditors, technicians or electricians) with regard to the disconnection of a tampered meter, i.e.

a) to disconnect the supply and remove the “tamper” (remove the tampering device for safekeeping purposes); or

b) to disconnect the supply and “seal the tamper in” (leave the tampering device in place and remove it only during the normalizing process). There are specific coloured seals for this purpose as recommended in NRS 096-1 (blue or red).

NOTE Both options have a purpose and the procedures should dictate the preferred option to be utilized in the relevant situation.

4.1.3.3.5 Where practicable, a second (off-site) meter should be installed to record actual consumption while the investigation is taking place. This is particularly effective when customers are being targeted who have access to supply mains in the roof space before the meter or customers who are not aware of the tampered meter that has been identified.

4.1.3.4 Investigation process

4.1.3.4.1 Investigations in respect of tampering and fraud shall be aligned with local by-laws (see foreword), or relevant legislation (see foreword), or service level agreements.
4.1.3.4.2 Investigations should be carried out by trained technical staff. It is recommended that staff should be paired, where possible, for both security purposes and for verifying that which transpires between the consumer and the investigator.

4.1.3.4.3 When tampering and fraud are being investigated, the task should be allocated to a person or persons with the necessary investigation experience and the appropriate authority.

4.1.3.4.4 When tampering and fraud are being investigated, breached, damaged, or alien seals found on the metering equipment (where applicable) should be retained as part of an evidence management procedure.

4.1.3.4.5 Successful prosecution is dependent on several factors, such as:

a) collecting evidence;

b) clearly labelling and storing equipment;

c) taking photographs;

d) compiling statements;

e) training role players;

f) interacting with prosecutors; and

g) outsourcing the RP function.

4.1.3.4.6 Accredited bench calibration meter-testing facilities shall be used and calibration certificates obtained in accordance with SANS 474.

4.1.3.4.7 In the case of metering installations where significant loss of value is identified, the following actions should be taken:

a) ensure that all evidence is securely sealed and stored pending the outcome of the legal action or the satisfactory recovery of all outstanding funds;

b) it is recommended that the meters be retained, as required, and that this arrangement should be identified in the utility's policies or local by-laws;

c) in the event of proceedings with a criminal charge that are taking place, the evidence should be retained until the case has been satisfactorily concluded.

4.1.3.4.8 Where it's anticipated that legal action could be pursued,

a) all evidence found on site should be placed in a sealable bag or container;

b) the bag or container shall be sealed in the presence of at least two witnesses, who shall then submit sworn statements to this effect;

c) each bag or container shall be clearly labelled and indicate the meter number, the consumer's name and address and the date of the incident. If the investigating officer keeps an internal investigation register or if the case is reported to the police, the relevant case numbers shall also be recorded;

d) all bags or containers that contain evidence should be kept in a locked room or safe and only one person shall take responsibility for the safekeeping of the key.
4.1.3.4.9 Normal investigations for the detection of tampering should be conducted on a regular basis.

4.1.3.4.10 Where necessary, consumers shall be advised regarding the procedure to follow where tampering has been identified.

4.1.3.4.11 Confidential investigations should be conducted into fraudulent actions by subcontractors and internal staff should there be suspicion that they (subcontractors and staff members) could be involved in tampering or receiving bribes (or both).

4.1.3.4.12 If required to do so (by local by-laws) (see foreword) investigators should assist technical staff members at the local police station in opening criminal cases for illegal acts committed.

4.1.3.4.13 Investigators should follow such cases through the judicial system, i.e. from arrest up to conviction.

4.1.3.4.14 Investigators should attend the relevant law enforcement meetings in the area and advise management on all the pertinent issues.

4.1.3.4.15 The use of electronic or digital photographs as evidence shall be accompanied by an affidavit that confirms the photograph’s authenticity. All electronic or digital photographs handed in as evidence should not be digitally altered or enhanced in any way, in order to preserve the original pixel count (as this is the way in which experts can determine if the photograph has been tampered with). When photographs are printed for use during hearings, at least two witnesses should submit sworn statements confirming that the photographs were not tampered with.

4.1.3.4.16 In the case of fraud, the following shall be proved:

a) intent;

b) that an illegal act was committed;

c) deliberate misrepresentation; and

d) prejudice suffered.

4.1.3.5 Remedial processes

4.1.3.5.1 Remedial actions in respect of tampering and fraud, in the case of municipalities, shall be performed in accordance with local municipal by-laws.

4.1.3.5.2 Remedial actions shall be appropriate to the different levels of severity of the incident (for example a culprit might have repeatedly committed the same offence; another culprit might have committed the same offence for the first time. When remedial action is decided upon, reference should be made to the respective municipal by-laws (see foreword), or service level agreements, or applicable legislation (see foreword).

4.1.3.5.3 Specialized audits should be conducted when tampering by large power users or important persons in the community is being investigated.

4.1.3.5.4 Investigations into unsafe leads and illegal connections should be done on an ongoing basis and workable suggestions on how to prevent these should be forwarded to management. See annex B for additional information.
4.1.3.5.5 In all cases action should be taken to deter the recurrence of illegal activity. The following remedial actions might apply:

a) the type of metering could be changed, for example common base prepaid dispensers or credit meters could be replaced with split prepaid meters;

b) a meter could be relocated to the outside of the premises or the property, or to a secure environment;

c) where tampering of accessible conductors has taken place, the conductors should be recessed or sleeved in metal conduit in an attempt to render them inaccessible; or

d) the entire supply cable could be removed should tampering persist.

4.1.3.5.6 Where tampering or fraud has taken place, a contravention notice indicating a tariff-based amount to be paid for corrective action should be issued to the consumer and the supply should be disconnected. A tariff-based amount is derived by calculating the actual cost to the municipality for inspections done, remedial actions that have to be taken, including items such as meters that have to be replaced or repaired as a result of fraudulent activities.

4.1.3.5.7 Where corrective work is done by a contractor, a certificate of compliance should be issued by the contractor after the work has been completed. All corrective work done shall be for the account of the consumer.

4.1.3.5.8 Once the work has been properly undertaken by the contractor and the tariff charges have been paid in full or suitable arrangements have been made to pay them, the supply should be reconnected.

4.1.3.5.9 Regular monitoring of the consumption or purchase patterns of perpetrators of illegal electricity activities should be carried out on an on-going basis.

4.1.3.5.10 In the case of municipalities, procedures that lead to the adjustment of accounts to recover the cost of electricity consumed but not paid for, for

a) defective metering,

b) meter tampering and bypassing,

c) inaccurate metering equipment, and

d) billing data errors,

need to comply with the municipality’s by-law that governs the supply of electricity in its region of jurisdiction.

4.1.3.5.11 The following should be covered in the procedures mentioned in 4.1.3.5.10:

a) the period needed to determine normal consumption on which the adjustment will be based: a minimum period of three months is recommended;

b) the application of seasonal variation factors to account for differing levels of consumption in summer and winter months: a minimum period of one year is recommended;
c) the period over which an adjustment can be calculated in respect of faulty equipment shall be in accordance with

1) legislation (see foreword): three years,
2) local by-laws, and
3) contractual agreements.

NOTE: In the event of tampering – section 12 (2) of the legislation given in (c)(1) becomes applicable and the period is not limited to a prescribed period of three years.

d) written advice to the customer advising of the pending adjustment to his or her account to be effected within a stated period as determined by the utility and giving him or her an opportunity to dispute the tampering or adjustment (or both) and substantiate the basis for the dispute;

NOTE: Substantive evidence is required.

e) the adjustment of the account on the billing system.

4.1.3.5.12 Accurate records of meter test results and the calculations resulting from the test period shall be kept to substantiate any adjustments if queried by the customer. It is also important to retain the specific electricity meter pertinent to the case, for a practicable period of time, for subsequent verification by an independent accredited test facility or to be used as evidence during a possible future dispute.

4.1.3.5.13 Accurate records shall also be kept of the dates, times and content of all discussions and meetings with the customer in order to have this information available if challenged at a later date.

4.1.3.5.14 Disputes of adjustments shall be recorded and resolved timeously, based on substantive evidence submitted by the customer.

4.1.3.6 Legal process

4.1.3.6.1 All activities shall take place within the legal framework (see foreword) with particular reference to the following:

a) only actions permitted in terms of by-laws (see foreword) and national legislation (see foreword) may be taken against tamperers and fraudsters;

b) in the case of municipalities, by-laws should be consulted to assess their relevance with regard to RP functions. These by-laws or RP functions should be reviewed and revised when necessary to eliminate possible problem areas;

c) intervention by municipal courts: summons or spot fines should be introduced. There should be no uncertainty at any time as to which systems are in operation, for example in the case of fines;

f) the preferred route would be to consider fines to rectify the problem as a first option instead of going to court to recover funds.

NOTE: Updates should be obtained from other utilities (or from websites of the various associations (see foreword)) on legal successes and failures as far as successful cases of revenue protection are concerned.

4.1.3.6.2 In the event of tampering, utilities may impose a disconnection fee on customers. This fee should be a percentage of the consumption. When tampering is detected, the customer’s meter should be changed to a prepaid meter (if the original was a conventional meter). This aspect should be added to the by-laws of the area and the credit control policy of the utility, in order for it to be legally implemented. This should be at the customer’s cost.
4.1.3.6.3 Reducing the disconnection fee due to tampering in certain areas has proven to be very successful and although there is always the risk of re-tampering, this can be minimized by on-going monitoring of such customers or checking their purchasing records on a regular basis. This process is therefore only as successful as the way in which it is managed. On the second tamper, the fee should be escalated significantly.

4.1.3.7 Customer interaction process

4.1.3.7.1 The utility and its contractors should always maintain applicable customer service level agreements as described in NRS 047-1 and should introduce and operate a customer communication forum to support revenue protection actions.

4.1.3.7.2 Customer communication forum staff should be trained in customer relations, be familiar with local regulations and by-laws and be able to give the customer accurate information regarding his or her account, meter status, the credit control policy and its implementation and, where appropriate, the steps to be taken to have the supply restored.

4.1.3.7.3 Customer communication forum staff should be adequately trained to be able to handle all revenue protection enquiries. A list of all disconnections of tampered and unsafe leads should be forwarded to the customer communication forum staff on a daily basis.

4.1.3.7.4 Premises and security measures should be set up to ensure the safety of staff especially for when they deal with irate customers.

4.1.3.7.5 Revenue protection field staff likely to be in contact with customers should be trained in customer relations and should always refer customers to the customer communication forum for queries regarding their normal accounts.

4.1.4 Customer convenience

4.1.4.1 The customer’s convenience (time and place) for payments or the purchasing of tokens is an important consideration in a revenue protection project and should be in accordance with NRS 047-1.

4.1.4.2 Consideration could be given to the levying of fines to cover the cost of remedial action required to restore effective metering instead of taking legal action. This has been found by many organizations to be very effective and avoids the need for staff to spend time attending court cases which can result in many hours away from their revenue protection functions.

4.1.4.3 Such fines would need to be approved by the relevant decision making authority in the organization or the council in the case of municipalities.

4.1.4.4 Fees and fines may differ; they are based on

a) the cost of materials, labour and transport to restore correct metering functions,

b) relocation of meters to locations less prone to tampering,

c) replacement of meters with different types of meter to reduce the chances of tampering in the future,

d) recurring incidents of tampering on the same premises.
4.1.5 Key customers and commercial or industrial customers

4.1.5.1 As key customers, commercial and industrial customers normally bring in the largest proportion of the monthly revenue to an electricity supply service provider, special attention should be given to this group of customers.

4.1.5.2 The following aspects in respect of electricity supply to key customers and commercial or industrial customers should be noted:

a) their monthly consumption should be verified;

b) a check meter should be installed to facilitate the verification in (a);

c) correct tariffs shall be applied in the billing system;

d) the correctness of current and voltage transformer ratios shall be ensured;

e) it shall be ensured that the multiplication factors aligned to the current and voltage transformer ratios are accurately entered into the billing system;

f) key customers’ change of address or premises should be tracked carefully;

g) special contracts should be entered into with all large power users;

h) the notified maximum demand recorded in the contract should be monitored monthly;

i) the supply authority should hold adequate security deposits or guarantees to cover the probability of the account not being paid on time;

j) careful attention should be paid to the procedure and accuracy during the commissioning of complex metering installations;

k) auditing of newly commissioned metering installations should be carried out soon after its commissioning;

l) information that relates to large power users should be stored securely;

m) metering errors should be resolved as soon as possible to ensure the integrity of monthly maximum demand readings;

n) the application of a remote meter reading system should be considered;

o) graphical representation of all components of the bill is recommended in order to easily identify changes, irregularities or anomalies which should be investigated and reported;

p) special attention should be given to the synchronization of metering clocks used for time-of-use and peak tariff or off-peak tariff categories;

q) it is recommended that an independent investigation of all critical incidents be undertaken to determine the root cause to prevent recurrence.

r) appropriate reporting processes should be followed.

4.1.6 Service contract

4.1.6.1 Each customer should have a service contract that defines the terms and conditions of the electricity supply.
4.1.6.2 The supplier shall take reasonable steps to ensure that the customer understands the implications of the service contract. A typical service contract is shown in annex C.

4.1.7 Community education

4.1.7.1 Where appropriate, an awareness programme should form part of any revenue protection project that deals with residential communities. This programme should include meetings, workshops and issuing of information brochures, etc., as a minimum.

4.1.7.2 The topics for community education should include explanations of the following:

a) the difference between a legal connection and an illegal or unsafe connection;

b) what is an illegal connection;

c) what is an illegal reconnection;

d) what constitutes tampering with the meter;

e) which services are available (from which locations, when and at what times);

f) safety issues.

4.1.7.3 A special effort should be made to involve the community in order to identify the right person(s) with whom to liaise on these issues.

NOTE See also NRS 047-1.

4.1.8 Different types of customer

4.1.8.1 Different revenue protection approaches (such as technology based or culture based) should be considered for different types of customer (individual residential, residential communities, sub-metered, industrial and municipal).

4.1.8.2 Each of these customer types needs to have a revenue protection approach that takes the unique circumstances of the customer into consideration.

4.2 Manpower

4.2.1 Structures – Link between revenue protection and credit control departments

4.2.1.1 The manner in which the utility is structured will determine the functions of the departments tasked with detecting and correcting incidents of tamper and bypassing of meters (the Revenue Protection department), and the department tasked with the disconnection of supply for non-payment of accounts (the Revenue Management department).

4.2.1.2 The functions of a Revenue Protection department should include the detection of tampered meters, re-instatement of correct meter equipment, and the calculation and recovery of the cost of electricity which was consumed but not paid for. This department would also be responsible for the calculation of the adjustment of accounts that result from inaccurate meter equipment or incorrect billing data recorded on the organization’s billing system.

4.2.1.3 The Revenue Management department’s functions should be the application of the utility's credit control and debt collection policy, including the disconnection of supplies for non-payment of accounts and the reconnection after the arrears owed are paid or arrangements have been made to pay the debts.
4.2.1.4 There needs to be close liaison between these two departments to minimize losses to the utility. In this regard special attention shall be paid to the recommendations in 4.2.2 since one of the Revenue loss management forum’s core functions is to facilitate liaison between all departments.

4.2.1.5 In smaller utilities the above functions could reside within a single department.

4.2.2 Human resources management indicators

4.2.2.1 The following HR indicators should be monitored as they influence the success of a RP programme:

a) performance management of personnel;

b) structures in the organization;

c) personnel's skills requirements; and

d) personnel's skills development.

4.2.2.2 The selection of revenue protection staff is crucial to the success of RP. The traditional way of selecting RP staff in many utilities was to deploy their "redundant staff" or the "cheapest contractor" for these tasks. This approach is a sure way to failure. However, it is possible that many of these staff members could be developed and become competent over a period of time with the right training and guidance.

4.2.2.3 It is important to note that due to the dangerous nature of their tasks and the challenges they will face every day, revenue protection operators are more effective if they are highly motivated and well equipped. This is very easy to achieve if the correct staff are recruited, specialized equipment is supplied upfront and staff are effectively trained to perform their necessary tasks before they are required to begin field work.

4.2.3 Characteristics and skills of RP auditors and operators

4.2.3.1 General

RP auditors and operators should possess the skills given in 4.2.3.2 to 4.2.3.3 as minimum requirements.

4.2.3.2 RP auditors

RP auditors should

a) be trustworthy,

b) be dedicated,

c) be physically capable to perform all the required functions,

d) have good administrative skills,

e) have good investigative and analytical skills,

f) be alert,

g) be literate,

h) be good communicators,
i) have the necessary technical skills to operate specialized equipment, and
j) have the necessary technical skills to audit meters.

4.2.3.3 RP operators

RP operators should
a) be trustworthy,
b) be dedicated,
c) be physically capable to perform all the required functions,
d) have good investigative and analytical skills,
e) be alert and observant,
f) be literate,
g) be good communicators or negotiators (or both),
h) be able to handle crisis situations,
i) be decision makers,
j) have the necessary technical skills to operate specialized equipment, and
k) be versatile.

4.2.3.4 Regular feedback sessions

Regular feedback sessions should be held with the revenue protection auditors and operators, in order to address all problems immediately and ensure a high level of motivation. Teambuilding exercises have proven to be the best motivational tool to ensure that operators are highly motivated and will support management through difficult times.

4.2.3.5 Accreditation

The high turnover ratio of contractor staff is a concern and can be effectively eliminated through a system of accreditation or the introduction of minimum training requirements for different tasks that auditors and operators will perform (as currently implemented by certain utilities in, for example, level 1 to 3 training).

4.2.4 Skills of credit control personnel

Credit control personnel should possess the following minimum skills:

a) good communication skills;
b) decisiveness;
c) excellent data cleaning skills;
d) good computer skills (IT);
e) analytical skills;
f) reporting skills;
g) knowledge of industry.

4.2.5 Responsibilities of the RP manager

4.2.5.1 It is the responsibility of the RP manager to oversee and control the revenue protection processes and procedures, even if some or all of the functions are contracted out.

4.2.5.2 The RP manager should interact or collaborate with other entities that have an impact on revenue loss matters such as billing, debt control, credit control, debt collection and meter reading. Such entities could include:

a) the customer service manager;
b) the RP contractor manager or consultant (if applicable);
c) the utility's finance department;
d) the utility's metering department;
e) the utility's information technology (IT) department;
f) RP training facilities;
g) the relevant political and municipal authority, or RP ombudsman;
h) law enforcement agencies such as the police and community policing forums;
i) criminal and municipal courts;
j) the relevant labour authority (see foreword).

4.2.6 Outsourcing RP services

4.2.6.1 If RP services are outsourced, RP contractors should comply with the following:

a) a comprehensive tender specification should be supplied that defines the scope of a contractor's work;

b) the contractor's staff shall be fully trained and suitably mandated or authorized (or both) for the work. The qualifications of prospective staff should have been verified by the contractor before staff members are appointed to perform any work on behalf of the utility;

c) contractors should be appointed on formal contract. The contract should define the terms and conditions of the appointment and may include the following conditions:

1) contractors' staff should be issued with and make use of personal protective equipment for their tasks, where applicable, and should carry identification;

2) contractors' staff should not become involved in, or express opinions on, customer or community politics;
3) the contractor should indemnify the utility against third party damage claims;

4) contractors' staff shall comply with all the supplier’s safety requirements;

5) contractors' staff shall ensure that their actions do not in any way cause a health or safety hazard to customers or the general public (or both);

6) contractors and their staff should comply with the code of conduct for RP contractors as detailed in annex D; and

7) contractors shall agree to the minimum wage rates as specified by the relevant authority (see foreword), and shall also comply with working conditions as specified in legislation (see foreword). These conditions shall be covered in all contractual specifications as prescribed and governed by the relevant authority (see foreword).

4.2.6.2 It is recommended that utilities purchase their own seals to maintain integrity and accountability of meters. If contractors need to procure seals as part of their scope of work, the supply authority needs to authorize this in writing.

4.2.6.3 Contractors’ and their employees’ accounts with the utility shall have no history of tampering or issues related to non-payment. All accounts shall be paid up to date.

4.2.6.4 Support staff shall be available to effectively manage the information that the contractor collects.

4.2.6.5 A cost-benefit analysis should be performed to ensure a positive return on investment within a suitable time frame.

4.2.7 Training of RP managers, supervisors and other utility staff members

4.2.7.1 General

All staff within the RP environment, other key utility staff and contractors that perform revenue protection tasks should receive special training on procedures, processes and problem-solving techniques in accordance with the competencies listed in annex E. The staff should be briefed on a regular basis to ensure that everyone understands the revenue protection processes implemented in the utility.

NOTE Utility staff includes personnel who install meters, maintenance personnel who attend to breakdowns, and supervisory staff.

4.2.7.2 Sensitizing staff members from other departments

All staff members from departments other than the revenue protection department, who have a role to play in the reduction of revenue losses in the utility, should be sensitized to the goals and objectives and the different processes involved in revenue protection.

4.2.7.3 Induction course

All new RP auditors should complete a theoretical and a practical induction course before being allowed to perform field work (see also on-the-job training in 4.2.7.7).

4.2.7.4 Technical training

All RP operators involved in the disconnection and reconnection of tampered meters, illegal connections, unsafe leads and non-payment, should receive the necessary minimum training as stipulated by law (see foreword) to operate live electricity systems. Soft disconnections or reconnections (switching of circuit-breakers on ground level) require a low level of training, whilst disconnecting of service cables, removing of jumpers, climbing of poles and the removal of meters
require a higher level of training. The decision on the level of training required is hugely dependent on the procedure implemented in each utility. Some utilities categorize the abovementioned competency level training into low-voltage official “Phase 1 and Phase 2”, whilst others require qualified electricians to perform all the abovementioned tasks.

NOTE: If work is to be done on the metering installations, workers and contractors should be accredited in accordance with the requirements of SANS 474.

4.2.7.5 Management courses

Supervisors and operators should receive basic revenue protection management training preferably before they start an important project. RP managers and any other managers, whose task is to assist in minimizing revenue losses in a utility, should also receive advanced management training.

4.2.7.6 Mentorship

Since managers are usually allocated from other projects or departments to take over an RP department or project, they will have very little operational experience in this field. Therefore, in order to ensure that new RP managers are able to perform their duties immediately (as is usually required in most revenue protection projects), this can be achieved by allocating a mentor to such individual, in order to assist him or her in making the right decisions from inception.

4.2.7.7 On-the-job training

Once a revenue protection team (operator and auditors) have been adequately trained and have been operational for a few months, the number of auditors may be doubled by allocating a new member to each existing person in the team to be trained on the job. The minimum period of this type of training is approximately two weeks. Supervisors should monitor this process and test personnel before they are allowed to work on their own.

4.2.8 New technology

RP members should be regularly updated and trained on new metering and data systems that are being installed or implemented in the utility. This would enable them to analyse the threat of tampering and put measures in place to prevent such actions from taking place. New testing equipment shall also be purchased upfront and RP members should be trained to operate such equipment in the field.

4.2.9 Safety

4.2.9.1 It is recommended that every workman attend a safety refresher course every two years.

4.2.9.2 Meter workers shall be authorized to work on installations (LV and HV authorization).

4.2.10 Training courses

Several utilities offer in-house training. Synergies should be identified and co-operation should be encouraged among utilities.

4.3 Meter management

4.3.1 General

A meter management system should cover the aspects given in (a) to (f).
a) Track and control: it should be possible to track and control meters at all stages of delivery, calibration, storage, issue and return.

NOTE Poor job control and checking can easily lead to corruption of data and loss of meters issued. (See SANS 474.)

b) Meter movement: a clearly defined meter management process shall be in place to monitor the movement of meters from the time of purchase until the time they are scrapped (i.e. the full life cycle audit trail). New placements or replacements of meters should be reflected in the database within 24 h, and immediately in the case of pre-paid meters on online vending. See figure 1 which illustrates the RP process for new meter installations.

c) Database: the database shall be updated immediately after each movement of the meter installation cycle. Control over the meter shall be maintained by the relevant person.

d) Returned meters should be checked for indications of tampering. If a meter has been tampered with, the revenue protection department should be notified. The final reading of all returned or replaced meters shall be kept on record in accordance with SANS 474.

e) Test facilities: utilities should either have a test facility or should send meters to an accredited test authority.

f) Linking of meters to the billing system: it is important to define when a meter is formally linked to the billing system (i.e. whether the meter is linked before installation or upon issuing of the meter to the contractor).

4.3.2 Identify revenue losses through energy balancing

Energy balancing is the process of measuring energy sales at the customer's premises and comparing that with energy delivered (injected) into the network at which the customers are linked, for a defined time period.

The difference between sales and energy delivered is the total energy loss. To ensure that the energy balancing process is accurate and meaningful, all sales should be associated with the correct network.

Energy balancing is encouraged at all levels of distribution to facilitate corrective action.

4.3.3 Meter installation commissioning

4.3.3.1 Procedures should be established to ensure that all unmetered connections have a meter installed in the shortest possible time. This is particularly important for commercial installations.

4.3.3.2 All meter installations shall be appropriately sealed in accordance with NRS 096-1.

4.3.3.3 A reasonable stock of meters should be allocated to the respective workmen to prevent the bypassing of faulty meters by these persons. A no-bypass-of-meter policy shall be adopted by own staff.

4.3.3.4 The legal bypassing (see foreword) of a meter to establish a supply when metering equipment is not available should only be considered if a verified audit trail and register are in place to rectify or verify legal bypassing.

4.3.3.5 A documented procedure is required to ensure that data is captured accurately by, for example, doing a weekly 100% check, at least on LPUs, on captured data for new installations.
Figure 1 — Illustration of RP process for new meter installations
4.3.3.6 Data capturers shall be trained regularly.

4.3.3.7 Each data capturer shall be supplied with a list of codes, street names, suburbs and new meters in stock, or the data system shall be upgraded to automatically identify spelling errors and wrong meter numbers.

4.3.3.8 Each entry shall be "flagged" for corrective action.

NOTE Special procedures should be in place to verify that the installation metering constants (k-factors) are aligned to the billing metering factor that appears on the customer's bill.

4.3.4 Inspection of meter installations

4.3.4.1 Meter installations should be inspected on a regular basis or in accordance with the utility's revenue protection policies and procedures. This acts as a deterrent to meter tampering.

4.3.4.2 The frequency of inspections shall depend on the rate of tampering within the particular area.

4.3.4.3 A sample audit report sheet is shown in annex F. This should ideally be an electronic form which would reduce error rate.

4.3.4.4 Standard notification or a numbered form for record purposes and proof of issuing the notice in cases where access to inspect the connection has been refused or the premises could not be accessed on the first visit, is shown in annex G.

NOTE Where possible, the inspection audit form should be headed by system-printed data that gives all relevant details of the customer, meter(s) and previous visits.

4.3.4.5 Inspection of meters in CTs should be given priority as these installations account for the greater part of a utility's revenue.

4.3.4.6 Irregularities identified by meter readers and other persons (tip-offs, etc.) should be referred to the relevant RP body for remedial action. These should be logged for tracking purposes and resolution.

4.3.5 Meter identification, testing and calibration

4.3.5.1 Meter identification shall be done in accordance with SANS 474 as given in 4.3.5.2 to 4.3.5.4.

4.3.5.2 Conduct sample test calibration of meters in accordance with the meter manufacturer's recommendations.

4.3.5.3 Record serial numbers and constants of current transformers and voltage transformers in the database.

4.3.5.4 Record meter internal and external constants in the database.

4.3.6 Access to metering equipment

4.3.6.1 Access to metering equipment shall be restricted. Specifications for CTs should be provided to the supply authority. Sealable covers should be done in accordance with SANS 474. NRS 096-1 provides for the restriction of keys using electronic seals and the sealing of CTs and fuses.

4.3.6.2 It is recommended that CTs with terminal covers be used to accommodate seals.
4.3.7 Meter replacement and sealing

4.3.7.1 When a meter is being replaced and sealed, ensure that safety standards are maintained for proper protection of the meter. (See figure 2).

4.3.7.2 Tampering shall be deterred and minimized by using seals and the appropriate sealing equipment as detailed in NRS 096-1.

4.3.7.3 The bypassing of faulty meters should only be considered if a verified audit trail and register are in place to rectify legal bypassing (see foreword), and procedures are enforced to remove such bypassing in the shortest time possible.

4.3.7.4 All activities and types of fault related to the meter shall be recorded.

4.3.7.5 All seals shall be recorded in a seal register against the number of the relevant meter, which tie in with GPS co-ordinates or GIS, as described in NRS 096-1.

4.3.7.6 When new seals are placed on the meter, they should ideally be of a different colour, or of a different type of seal, or they should have different markings on the seal to signify the status of the equipment in question. (See annex H.)

4.4 Data management

4.4.1 Data analysis or interrogation

4.4.1.1 Data analysis or interrogation is an essential activity to ensure successful revenue protection.

4.4.1.2 Data obtained from sweeps, or audits, or inspection processes should be compared to data and billing management systems to identify data or billing errors or omissions (or both).

4.4.1.3 Errors or omissions shall be corrected immediately and the necessary financial adjustments processed in terms of the relevant by-laws, or supply agreements, or policies (or both).

4.4.1.4 Analysis of customers’ consumption patterns is an effective method to identify abnormal reduction in consumption which may indicate possible meter faults or tampering.

4.4.1.5 All abnormal reduction in consumption should initiate an investigation to determine the cause of such reduction and appropriate action should be taken if there were irregular or illegal activities.

4.4.1.6 Common errors are

a) incorrect meter details,

b) incorrect supply group codes,

c) incorrect meter or billing constants,

d) incorrect billing tariffs.
Figure 2 — Illustration of RP process for replacement of meters
4.4.2 Inactive debtors (applicable to all municipalities)

4.4.2.1 A debtor’s activity status plays an important role in credit control action and should be kept up to date. It should be updated once the debtor becomes inactive and no services, including rates, are levied against the debtor.

4.4.2.2 Some billing systems automatically determine whether services are still connected or not during a transfer of ownership or tenant change (Out/In) and update the status accordingly. Otherwise, this status shall be maintained manually. The risk of move in/move out shall be managed. An adequate security deposit for the new owner or tenant needs to be applied.

4.4.2.3 Often municipal staff will find a way to avoid moving the services from one debtor to another without using the appropriate functions, which results in a debtor’s status reflecting incorrectly and sometimes indicating that the metered and unmetered services are still connected to the debtor that has moved out.

4.4.2.4 The credit control procedure for inactive debtors differs from that of active debtors in that a notice route should be followed for inactive debtors rather than a disconnection procedure (which is followed for active metered debtors). Disconnecting a property incorrectly because of debt from inactive debtors will be avoided if this status is kept up to date.

4.4.2.5 Debtor status can be verified and corrected by implementing a desktop data cleaning exercise.

4.4.2.6 In the case of blocks of flats, the property owner should be the one targeted for disconnections and not the tenants, especially once it has been proven that the tenants have made payments to the property owner.

4.4.3 Factors that cause incorrect consumption statistics

4.4.3.1 Corrective journal entries passed without also adjusting the consumptions accordingly will give incorrect statistics. Some billing systems can be configured to prevent this from happening.

4.4.3.2 All incorrect consumptions have a domino effect on consumption statistics, revenue management and protection, infrastructure planning, budgets and tariff calculation.

4.4.4 Unallocated payments

4.4.4.1 It is important for an authority to set up payment priorities to optimize credit control. Outstanding debt will accumulate against metered services if payment is first allocated to rates and unmetered services (applicable to municipalities).

4.4.4.2 Effort should also be made to allocate unallocated payments to the correct debtors, otherwise disconnection action will be taken against debtors who have paid, but the payments were not reflected on their accounts. Unallocated payments will also result in interest being raised which shall be reversed once the unallocated payment has been allocated to the correct debtor.

4.4.5 Active debtors (other factors that affect credit control)

4.4.5.1 Other factors that affect credit control are given in 4.4.5.2 to 4.4.5.5.

4.4.5.2 Indigent debtors: it is important to identify debtors who qualify as indigent. This will have an impact on the subsidy that is claimed from national government.

4.4.5.3 Handed-over debt: debtors may not be disconnected for debt that has been handed over for further legal action.
4.4.5.4 Prescription: action is restricted once debt is older than three years.

4.4.5.5 Disconnection control indicator: this entails an audit on changes to track patterns of change. This indicator is often abused by staff to prevent debtors from appearing on the disconnection list.

4.4.5.6 It is essential that customer security deposits are reviewed regularly to minimize the risk of possible financial loss.

4.4.6 Revenue protection database

4.4.6.1 A prime requirement of revenue protection is an accurate, up-to-date database that should be used to trigger events in the revenue protection processes and to record outcomes of investigations and RP actions, for example fees charged, correspondence sent and adjustments to the account.

4.4.6.2 It is recommended that the database should be one that can be integrated to other databases (real time/offline).

4.4.6.3 The entering and updating of information should be the responsibility of fully trained and reliable data controllers.

4.4.6.4 Effective revenue protection is dependant on accurate customer and meter records. Customer, meter, seals and tariff information should be recorded in a central management database.

4.4.6.5 All revenue protection actions including meter replacements, disconnections, reconnections and audit actions shall be updated on the revenue management system within two working days. Where possible, GIS information should also be recorded.

4.4.6.6 GIS data is an effective tool in locating and identifying electricity connections, especially in the rural areas where proper physical addresses are non-existent or very vague. Technology that allows for the geographical representation of all connections and their status on aerial maps is currently available. Technology also exists to electronically transfer data to a GPS device that may be used to locate connections. Utilities are encouraged to make use of these technologies to improve their revenue management.

4.4.6.7 Customer data should be synchronized with installation data.

4.4.6.8 Ideally, a utility should have a single database. Many utilities operate separate independent databases for customers, accounts billing and installation information which are not linked or synchronized. Stringent work flow processes are required to ensure timeous synchronization of data that would eliminate omissions and errors.

4.4.6.9 Procedures related to revenue protection data should cover the following:

a) data collection – revenue protection data should be provided as required in annex I;

b) timeous data entry into the database;

c) data integrity (see to the verification and cross-checking of information); and

d) confidentiality of data (disclose only to designated utility staff and not to any third party).
4.4.7 New installations

The integrity of an electrical installation shall be verified by the RP department after commissioning by the operational staff, and special attention shall be paid to LPUs and sealing.

4.5 Credit control

4.5.1 Billing and credit control

4.5.1.1 For effective billing and credit control, accurate bills should be given to customers. Meter constants, meter dials, incorrect readings and estimates will impact on consumption calculation. It is therefore important to ensure that the correct constants and meter dials are applied and readings are as accurate as possible.

4.5.1.2 Meter reading deviation reports should be used to identify incorrect consumptions before billing and to correct readings, factors and meter dials before the final billing run. Meter reading deviation reports can also be used to identify meters that do not give readings and meters that do not indicate consumption.

4.5.1.3 Correct tariffs allocated to the services impact billing amount calculation.

4.5.1.4 Unsuccessful meter reading takes place when a reading was taken but does not appear on the billing system for a variety of reasons. These readings impact on the revenue loss calculations and accurate billing. It is recommended that utilities read meters on a monthly basis. Estimated readings are not recommended. Actual readings are used for billing purposes.

4.5.2 Access control to processed readings

4.5.2.1 Care should be taken that only authorized staff have access to functions that can change the most current processed readings.

4.5.2.2 Changes to the most current readings should also be monitored as experience has shown that certain staff members sometimes change these readings which then results in a lower consumption once the new readings are processed.

4.5.2.3 Where possible, these processes need to be automated.

4.5.3 Regular follow-up of non-payment

4.5.3.1 Debtor categories, age analysis, high consumption, high outstanding debt and metered debtors who did not pay deposits should be used to prioritize credit control procedures.

4.5.3.2 Debtors flagged as "disconnected" and changed by the system to "connected" once payment is received will enable an authority to follow up on debtors that are still disconnected after a certain period.

4.5.3.3 Regular follow-ups will also enable an authority to track debtors who continue to use electricity but are deemed "disconnected" by the system.

4.5.4 Arrears debt arrangement

4.5.4.1 Debtors who have made arrangements to repay arrears and have honoured their arrangements should not be disconnected.

4.5.4.2 The same debt arrangement policy should be applied to all customer types including indigent customers.
4.5.5 Control procedures

4.5.5.1 Credit control scheduling should form part of the overall billing scheduling and the schedule should be communicated timeously to all interested and affected parties.

4.5.5.2 Payment processing affects the disconnection process and calculation of interest. It is thus important that payments are processed and updated on a daily basis.

4.5.5.3 It is accepted that daily processing is not always possible and more often so in remote receipting areas. However, there are only a few factors that prohibit daily processing, i.e.

a) non-existent or faulty data networks, which will require physical collection of the receipt data,

b) faulty cash receipting software or hardware: this will require manual receipts and information will have to be captured electronically at a later stage, and

c) faulty server software or hardware: this will, however, impact on all processing, and addressed effort should be made to follow the original schedule plan.

4.5.6 Debt management by-laws (in the case of municipalities)

4.5.6.1 It is important that debt management by-laws be in place and enforced.

4.5.6.2 By-laws shall be supported by sundry tariff framework to support revenue protection activities (for example appropriate tamper, reconnection and disconnection fees).

4.5.7 Data purification process

4.5.7.1 The goal of the data purification process is to take raw data from any system and change the format to such an extent that field workers can understand the information very easily and perform their work effectively.

4.5.7.2 It is important to understand the needs of the operators in each project and to align the data accordingly and therefore supply a printout or list of the data which is “operational friendly”.

4.5.8 Information gathering process

It is important to perform a “needs analysis” by gathering the following information from the operators before commencing the “clean-up process”:

a) the area, suburb or township where the operation will be done;

b) the nature and sequence of the information required, for example the number of a plot, the name of a consumer;

c) a summary of each consumer’s purchases for the past three to six months.

4.5.9 The clean-up process

4.5.9.1 The clean-up process should always be based on the information in 4.5.8 and proceed as described in 4.5.9.2 to 4.5.9.10.

4.5.9.2 Start cleaning the finer detail of the data and delete faulty or useless information.

4.5.9.3 Sort the data into the correct format, as indicated in the “needs analysis”.

4.5.9.4 Print a few pages in draft format.
4.5.9.5 First discuss with the field operator what was done so far, in order to check if it is acceptable.

4.5.9.6 Do alterations, if necessary.

4.5.9.7 Print a copy of each individual spreadsheet and place the copies in a folder.

4.5.9.8 Keep a copy on file in the office.

4.5.9.9 Determine when the list should be returned (in order for it to be upgraded).

4.5.9.10 Manage “No Entry” findings and separately capture that information for revisits.

NOTE   Lists should always be drawn up on time, as there is always a need to change the set-up, for one or other unforeseen circumstances. Data integrity validation should be ensured in the database (for example, by allowing only valid meter numbers to be entered).

4.5.10 Ghost vending

4.5.10.1 Ghost vending occurs when a vending system is stolen and used to sell electricity credit tokens illegally.

4.5.10.2 The actions in (a) to (c) are recommended to minimize the possibility of customers buying electricity from ghost vending systems:

a) implement upfront vending: when the pre-set credit limit on the vending machine is depleted, the vending machine will stop working. Authorization from the utility is required to reload the limit on the vending machine;

b) implement an online vending system in conjunction with changing the supply group of installed meters. Stolen machines will not have the new key and will not be able to sell to meters in the field;

c) change the key revision number (KRN) of installed meters. Stolen machines will not have new key revision numbers and will not be able to sell to meters in the field.

4.5.11 Unallocated meters

4.5.11.1 Unallocated meters are meters that have not been allocated to a specific plot, or street number, or name; the consumer is both “active” and purchasing electricity, or the meter is not being read on a monthly basis.

4.5.11.2 The majority of these meters is prepaid meters and is also known in the trade as “ghost meters”.

4.5.11.3 The reason for this type of data problem could be due to:

a) information recorded incorrectly on the installation of the meter,

b) consumer information removed from the system by internal staff members,

c) consumers that take meters with them when moving house,

d) loss of data due to system problems,

e) spelling mistakes on road names,
f) capturing the wrong suburb, and

g) meters allocated to houses under construction or already demolished.

4.5.11.4 Meters can be found by means of targeted and sweeping audits, by placing someone at a vending point to check each consumer's information as he or she purchases electricity and an audit of meters in the store.

4.5.12 Stolen meters

4.5.12.1 Meters stolen from stock or during connection shall be flagged as “stolen meters” in the database and vending system.

4.5.12.2 Where facilities exist, vending to these meters should be prevented by disabling the meter.

4.5.13 Alien meters

4.5.13.1 The necessity of permanently identifying meters as the property of a particular supply authority shall be stressed.

4.5.13.2 With limited suppliers of meters, the chance of meters from other supply authorities or private suppliers being used to create an impression of legality for illegal connections has to be considered.

4.5.13.3 If meters are prominently identified, audits are simplified and prosecution easier.

4.5.14 Check meters

4.5.14.1 Define the process of using check meters (zone meters).

4.5.14.2 The process of installing “check meters” in line with the consumer prepaid meter or consumer credit meter has been very successfully implemented in areas with very high losses or in the case of LPU customers that are suspected of tampering with meters (only at certain times).

4.5.14.3 It is also advisable not to remove credit meters when retrofit operations take place from time to time.

4.5.14.4 The total consumption registered by the check meter shall equal the consumption registered by the customer prepayment meter over the same time period (normally a three month period).

4.5.14.5 The excepted deviation between check meters and prepayment meters should not exceed 4%.

4.5.15 Billing and credit control

For effective billing and credit control:

a) accurate billing data should be given to customers;

b) regular follow-ups of non-payment should be carried out;

c) it shall be ensured that control measures are understood by all parties;

d) billing systems shall be checked for the correct application of meter constants; and

e) the number of meter digits to be controlled shall be specified.
4.5.16 Supply disconnections

4.5.16.1 It is recommended that different coloured seals are utilized for different revenue protection and credit control processes, for example a red seal for non-payment disconnection, a blue seal for tampering, and a green seal for faulty meters. (See NRS 096-1.)

4.5.16.2 The disconnection of meters may be done in many different ways by implementing different specific methods. In order for personnel who conduct disconnections to distinguish between the methods in use, the methods utilized can be grouped under three headings, i.e.

a) soft disconnection, when the electricity supply to a premise is disconnected by switching off the circuit-breaker on the side of the house, or in the meter box, or up the pole,

   NOTE The switch should be sealed in the off position in order to prevent the consumer from freely switching on the supply.

b) hard disconnection, when the electricity supply to a premise is disconnected by removing a wire from the supply side of the meter, removing the jumpers, cutting off the metal inner of a wire and screwing it back, cutting the supply cable, disconnecting the supply cable and burying it in the ground,

c) service removal: it is recommended that, should a utility decide to remove the entire electricity service of a consumer, the supply cable, the circuit-breaker, the backing board (prepaid meter) and the meter be removed at the same time.

   NOTE The distribution board belongs to the consumer and should therefore not be removed.

4.5.16.3 It is recommended that the different disconnection methods be used as follows:

a) soft disconnection in the case of non-payment and first tamper in non-volatile areas;

b) hard disconnection in the case of second tampers and non-payment consumers who have reconnected themselves after a soft disconnection;

c) removal of service in the case of third tampers, malicious damage to the installation, access to the property refused by the consumer, even after he or she had been notified in accordance with local by-laws (see foreword) to provide access for the inspection of metering devices.

4.5.16.4 When a supply is being disconnected,

a) the disconnection shall be done in accordance with NRS 047-1;

b) notice of disconnection shall have been given before the disconnection is done (typical forms of notice of disconnection are given in annex J); and

c) account shall be taken of any extenuating circumstances.

4.5.17 Supply reconnection

The following are vital components when a supply is being reconnected:

a) arrears, reconnection fees or registration (or both) shall have been paid;

b) ensure that requirements of NRS 047-1 are applied; and

c) where required by the utility, a certificate of compliance shall be issued.
4.5.18 Large power users

4.5.18.1 LPUs account for approximately 50% of a utility’s total consumption and, consequently, management of these accounts should be prioritized and accounts sent out timeously.

4.5.18.2 It is imperative that the billing data on these accounts are accurate and any identified faults are timeously corrected.

4.5.18.3 It is recommended that a web-based online metering and direct billing system be used for a utility’s LPUs. This online metering and billing system should manage all aspects relating to the LPU’s accounts. The web-based online system should accommodate the following functionalities:

a) energy meter readings (kVA, kWh, PF (power factor), phase voltages, phase currents, etc.);
b) immediate online billing and automated (subject to an audit) monthly billing;
c) monthly billing history since inception;
d) ability to accommodate complex changed metering tariffs;
e) tamper reporting (for example electronic meter seal alarms);
f) half-hourly profile data of active and reactive energy;
g) instantaneous voltages and currents;
h) fuse failure;
i) CT failure;
j) meter events history;
k) phasor diagrams for each line phase;
l) fault log;
m) data validation checks;
n) customer web access to consumption and billing data at any point in time;
o) demand management.
Annex A
(informative)

Auditing processes

A.1 Auditing processes

A.1.1 Sampling audit

For a sampling audit,

a) divide the area into separate zones;

b) visit a random sample of houses in each zone;

c) carry out only a visual inspection of each meter; and

d) record only basic audit findings on a spreadsheet (for example meter in order, faulty, tampered).

A.1.2 Sweeping audit

For a sweeping audit,

a) conduct house-to-house visits at every house in a pre-selected area;

b) record customer and installation data on an audit form or a handheld device;

c) test the meter's tripping mechanism by using tamper pin codes or any other specific tests as and when required;

d) record all visible findings;

e) check seals and seal all unsealed meters; and

f) report meters that have been tampered with and faulty meters to the revenue protection manager on a daily basis.

A.1.3 Data audit

For a data audit,

a) visit houses in accordance with a list or data printout;

b) check the information given in the list or printout;

c) record customer and installation data on the list or printout;

d) record all visible findings, for example tampers, faulty or broken seals; and

e) report findings to the revenue protection manager once the list is completed.
Annex A (continued)

A.1.4 Normal audit

For a normal audit,

a) conduct house-to-house audits in accordance with a map or a computer printout;

b) test the meter’s tripping mechanism by using tamper pin codes or any other specific test as and when required;

c) switch on an appliance in the house, in order to check the usage rate;

d) notify back-up maintenance teams if the test described in (b) above, fails;

e) record all findings (for example tamper, bypass, already cut off, not tripping, faulty, not sealed, cannot be sealed, meter damaged, not on system);

f) confirm that the anti-tamper seal is in place. If the seal has been tampered with, cover with a protection seal to protect the evidence;

g) record all the basic customer and installation data on an audit form;

h) in the event of tampering, give the customer a written warning not to tamper again;

i) promote safety awareness;

j) check all seals and seal unsealed meters;

k) submit the audit forms to the revenue protection co-ordinator; and

l) revisit homes where access to the meter in the customer’s absence is not possible;

A.1.5 Zero or low consumption audit

For a zero or low consumption audit,

a) visit only specific houses in accordance with a computer printout or a list;

b) verify the reason for the zero or low purchasing of electricity;

c) test the meter’s tripping mechanism by using tamper pin codes or any other specific test as and when required;

d) switch on an appliance in the house, in order to check the usage rate;

e) disconnect any tampered or bypassed meters;

f) in the event of tampering, hand over a tamper notification;

g) replace faulty meters;

h) record customer and installation data;

i) list all appliances in the house;

j) record any specific problem encountered during the audit;
k) submit a copy of every tamper notice to the revenue protection manager every day; and
l) report information to the revenue protection manager once the list is completed.

A.1.6 Full audit

For a full audit,
a) conduct house-to-house audits in accordance with a map or a computer printout;
b) design the audit form to fit the specific needs of each area;
c) design customer information letters for each type of action;
d) test the meter’s tripping mechanism by using tamper pin codes or any other specific test as and when required;
e) switch on an appliance in the house, in order to check the usage rate;
f) open meters that fail the above test;
g) check for tampering and remove tampering apparatus for safe keeping;
h) disconnect the supply if the meter is found to have been tampered with;
i) ensure that the anti-tamper seal is secured with a protection seal;
j) complete the audit form with the customer and installation data (for example, ID and telephone numbers, number of persons in the house, type of house, meter usage totals, credit on meter);
k) list all appliances in the house;
l) record specific findings (for example, tamper, bypass, already cut off, not tripping, faulty, not sealed, cannot be sealed, meter damaged, not on system);
m) check all seals and seal unsealed meters;
n) if no holes, switch off power in the service distribution box (stubby). Remove meter, drill holes, attach seal and record number. Switch on power in service distribution box;
o) if the meter is in tamper mode, contact office for tamper code;
p) notify back-up maintenance teams to deal with tampers and faulty meters;
q) normalize each installation for safety reasons, before leaving;
r) hand in forms to the persons who capture the data on the revenue protection data system;
s) revisit premises where the data is not comprehensive;
t) leave “not at home” warning letters with a contact telephone number, if nobody answers the door;
u) revisit these “not at home” customers until the customer is found at home;
v) compile a spreadsheet of the work completed and submit it to the revenue protection manager;  
and
w) submit management reports to the revenue protection manager on a monthly basis.
Annex B
(normative)

Illegally connected electricity

B.1 Plan of action

B.1.1 By-laws and relevant legislation

Utilities shall have relevant by-laws in place and should make the public aware that it is illegal to connect to a utility's network without paying the relevant installation costs for a metered electrical service. The enforced by-laws are to provide for tampering fees. Where potential customers do not have security of tenure (land rights), a council resolution would be needed before electricity may be supplied to these potential users.

B.1.2 Peace officers

It is recommended that the supply authority’s RP staff undergo peace officer training. This training is required to enforce the local by-laws and to issue “spot fines”. It is advisable that the local municipal enforcement agency follow up on issued spot fines.

B.1.3 Revenue protection

The RP team tasked to remove illegal services should be suitably equipped and protected. The task team shall comprise at least the following minimum personnel:

a) one dedicated electrician;

b) two dedicated electrician assistants;

c) adequate security protection by making use of a dedicated local metro law (in South Africa) enforcement team or police team member; and

d) dedicated vehicles.

NOTE In terms of occupational health and safety legislation (see foreword), the supply authority has the responsibility to remove all identified dangerous situations from its electricity network. To comply with this requirement, the dedicated team should remove illegally connected electricity services on a continuous (at least five days per week) basis.

B.1.4 Removal of illegal electricity connections

The RP team should be briefed daily on the intended plan of action. This plan should include:

a) identification of the priority area (areas) that is (are) to be targeted;

b) identification of the team members and the number of team members;

c) the appointment of a technical or a security team leader (or both).

d) the technical team leader will be responsible for discussing all the safety issues involved in the safety plan with regard to
Annex B (continued)

1) personal protective equipment (PPE) requirements,
2) test requirements,
3) security requirements, and
4) a plan of action, should the team encounter problems,

e) identification of the place for the daily briefing and ensuring that all team members are present;
f) removing and confiscating all identified illegally connected services; and
g) arrest of illegal users, as necessary.

B.1.5 Security of staff

The police shall control all security incidents. If the police are not present, the metro police (in South Africa) shall control security incidents. If, at any time, the technical team leader feels that it is in the best interest of all parties to vacate the area, then all staff shall immediately leave the area under the instruction of the technical team leader.

B.1.6 Arrests of illegal electricity users

B.1.6.1 It is recommended that the RP team leader consult with local prosecutors to devise an adequate arresting procedure.

B.1.6.2 The prosecutor should identify his or her requirements to successfully prosecute an illegal electricity user.

B.1.6.3 The prosecutor should identify the relevant by-laws (see foreword) which enables the on-site police team members to make an arrest.

B.1.6.4 The technical team leader shall identify that illegal electricity is being used at the house concerned, i.e. by photographing his electrical LV tester.

B.1.6.5 The technical team leader shall quantify the monthly “estimated” stolen electricity consumption.

B.1.6.6 The technical team leader shall clarify that no alternative electricity is supplied to the house concerned, i.e. by a generator or UPS with battery backup.

B.1.6.7 The technical team leader shall photograph all installed electrical appliances.

B.1.6.8 A technical affidavit shall be submitted when a case docket is opened at the relevant police station. See B.2 for a sample affidavit.
Annex B (continued)

B.2 Sample affidavit

AFFIDAVIT

1

I, ____________________, Identity number _______________ hereby state under oath in English.

2

I am an adult male/female contracted/employed by (council name to be inserted) as a __________
________________ __________________________. One of my duties is to prevent theft of electricity.

3

My contact telephone number is (Work)_____________ (Cell)________________.

4

On the ______________ I was asked to inspect _________________________ for illegal services.
My definition of an illegal service is a supply of electricity provided to someone who has connected
onto the electrical network of (council name to be inserted), without the department’s authority.

5

At ______________________________________ I inspected ____________________________
of Mr/Mrs/Miss/Ms ________________________, and confirmed this premises had an illegal
connection to the electrical network of ______________ (utility’s name). I confirmed this by
testing with an electronic multimeter tester; make and model: _____________________________
which indicated the illegal user had a 230 V unmetered supply. The following equipment was being
fed by the illegal electricity supply:

<table>
<thead>
<tr>
<th>Equipment type</th>
<th>Power rating</th>
<th>Estimated hours per day usage</th>
<th>Estimated monthly usage</th>
<th>Tariff in rands</th>
<th>Estimated total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kWh</td>
<td></td>
<td>kWh</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total estimated monthly stolen electricity consumption:

I further confirmed that there was no alternate source of electricity supply, i.e. battery, generator, LP
gas, or paraffin-fed appliances. I estimate that the abovementioned person was using illegal
electricity to the value of R____________ per month.

6

In accordance with (relevant legislation to be identified and quoted) it is illegal to abstract
electricity for personal use, without (relevant municipal name to be inserted) municipality’s
permission to do so and I state that this illegal user needs to be found guilty on a charge of theft.
7

I hereby state that under no circumstances did (relevant municipal name to be inserted) electrical department give any illegal user permission to illegally abstract electricity from my department’s electricity network.

8

I would like to bring it to the court’s attention that (relevant municipal name to be inserted) electrical department is losing an estimated (rand value to be inserted) million rand a year in stolen sales revenue and that the illegal, un-monitored use of electricity further compounds this issue and impacts on our tariff structures, i.e., this stolen electricity has to be accounted for in terms of inflated tariffs.

9

I declare that the above declaration is true to the best of my knowledge and belief and that I make this affidavit knowing that if tendered as evidence, that I will be liable for prosecution if I wilfully state anything which I know to be false or which I do not believe to be true.

10

I know and understand the contents of this declaration. I have no objection in taking the prescribed oath. I consider the prescribed oath to be binding on my conscience. I swear that the contents of this declaration are true, so help me God.

DEPONENT

Name: ____________________

I certify that the deponent knows and understands the contents of this declaration which was sworn before me and the deponent’s signature was placed thereon in my presence at (area to be inserted) on ___________________________ at _______________.

COMMISSIONER OF OATHS
A typical service contract for use in South Africa

C.1 Application for supply of electricity (credit meter)

<table>
<thead>
<tr>
<th>Surname &quot;a&quot; :</th>
<th></th>
</tr>
</thead>
</table>

*NB State title (e.g. Prof; Dr; Mr; Ms;). Applicant(s) (i.e. person(s)) responsible for the payment of this account) to furnish details. If a close corporation or public company, state name and designation of signatory. (The signatory is duly authorized, in writing, to act on behalf of the organization.) If not a limited liability company, state full names of partners.

<table>
<thead>
<tr>
<th>First names in full:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td></td>
</tr>
<tr>
<td>Spouse</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address where supply is required (include stand No.):</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date when supply is required:</th>
<th></th>
</tr>
</thead>
</table>

**Purpose for which premises are to be used (please tick box)**

<table>
<thead>
<tr>
<th>Rate 1: Domestic rate:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>House</td>
<td>Boarding house</td>
</tr>
<tr>
<td>Apartment</td>
<td>Residential institution</td>
</tr>
<tr>
<td>Hospital</td>
<td>Hotel</td>
</tr>
<tr>
<td>Hostel</td>
<td>Nursing and convalescent home</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rate 2: General rate:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shop</td>
<td>Office</td>
</tr>
<tr>
<td>Factory</td>
<td>Restaurant</td>
</tr>
<tr>
<td>School</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rate 3: Off-peak</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Warehouse</td>
<td>Store room</td>
</tr>
<tr>
<td>Fun-fair</td>
<td>Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postal address of applicant:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Employment address. If self-employed, residential address:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Current address where electricity is supplied in your name, or last residential address in the (supplier’s name) area of supply:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Until date</td>
<td></td>
</tr>
</tbody>
</table>

If/We hereby request supply of electricity at the tariff rate indicated above, but agree that if this rate is not applicable to my/our installation, to take supply at the rate applicable. I/We acknowledge and further agree to comply with the conditions of supply as set out on the reverse side of this form. Positive identification is required at the time of the application.

<table>
<thead>
<tr>
<th>Applicant’s name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity number</td>
<td>Signature ………………….. Date ……………</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicant’s name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity number</td>
<td>Signature ………………….. Date ……………</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(Supplier’s representative) For and on behalf of the supplier:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature ………………….. Date ……………</td>
<td></td>
</tr>
</tbody>
</table>

**For departmental use only**

<table>
<thead>
<tr>
<th>Year</th>
<th>Meter No.</th>
<th>Reading Rate</th>
<th>Maker’s No.</th>
<th>Make</th>
<th>Size</th>
<th>Division of first dial</th>
<th>No. of dials read</th>
<th>Dial constant</th>
<th>Stock sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common meter position?</th>
<th>Yes/No</th>
<th>Meter kiosk No.</th>
<th>Meter labelled?</th>
<th>Yes/No</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Form checked by</th>
<th>Recorded by</th>
<th>Meter records</th>
<th>Meter installer/transfer clerk</th>
</tr>
</thead>
</table>
Conditions of supply
(Reverse side of C.1)

The applicant hereby applies to (supplier's name) for the supply of electricity for the purposes specified overleaf, and agrees to pay for such supply at the rates determined by (supplier's name). The applicant further undertakes the liability to pay in accordance with the charges laid down for such rates in (supplier's name) electricity tariff, as amended from time to time, for all electricity consumed, or, in the event of no electricity having been consumed, for the monthly minimum charges until the expiration of two full working days’ notice in writing given by the applicant to the (details of supplier's representative) requesting discontinuance of supply. In the event of there being more than one applicant, applicants hereby agree to be held jointly and severally liable.

The supply of electricity applied for is governed by (supplier's relevant by-laws), as amended from time to time.

Routine monthly reading of meters will be taken on predetermined dates.

Metering equipment should be suitably accommodated and protected and be readily accessible to officials of (supplier's name) at all reasonable times. The respective clause should be included in local by-laws as stipulated in the relevant legislation (see foreword).
Annex C (continued)

C.2 Application for supply of electricity (prepayment meter)

Surname*: 

*NB State title (e.g. Prof; Dr; Mr; Ms). Applicant(s) (i.e. person(s)) responsible for the payment of this account) to furnish details. If a close corporation or public company, state name and designation of signatory. (The signatory is duly authorized, in writing, to act on behalf of the organization.) If not a limited liability company, state full names of partners.

First names in full

Self

Spouse

Address where supply is required (include stand No.):

Date when supply is required:

Mark as appropriate (please tick box)

Premises used as:

Domestic

Business

Transfer

New supply

Convert existing supply to energy dispenser

Employer street address. If self-employed, residential address:

Telephone

Current address where electricity is supplied in your name, or last residential address in the (supplier’s name) area of supply:

Until date

I/We acknowledge and further agree to comply with the conditions of supply as set out below. Positive identification is required at the time of the application.

Applicant’s name:

Identity number:

Signature: …………………….. Date: …………………..

Applicant’s name:

Identity number:

Signature: …………………….. Date: …………………..

(Supplier’s representative) For and on behalf of the supplier:

Signature: …………………….. Date: …………………..

Conditions of supply

(Reverse side of C.2)

The applicant hereby applies to (supplier’s name) for the supply of electricity for the purposes specified overleaf, and agrees to pay for such supply at the rates determined by (supplier’s name). The applicant further undertakes the liability to pay in accordance with the charges laid down for such rates in (supplier’s name) electricity tariff, as amended from time to time, for all electricity consumed, or, in the event of no electricity having been consumed, for the monthly minimum charges until the expiration of two full working days’ notice in writing given by the applicant to the (details of supplier’s representative) requesting discontinuance of supply. In the event of there being more than one applicant, applicants hereby agree to be held jointly and severally liable.

The supply of electricity applied for is governed by (supplier’s relevant by-laws), as amended from time to time. Routine monthly reading of meters will be taken on predetermined dates.
Annex C (concluded)

Metering equipment shall be suitably accommodated and protected and be readily accessible to officials of (supplier's name) at all reasonable times.

The applicant understands and agrees that, in the case of arrears relative to consumption of electricity, such arrears should be paid by means of a suitable levy as determined by (supplier's finance department) on the electricity tariff of the energy dispenser.

Electricity will be sold at selected outlets and will be subject to a certain minimum charge per transaction as determined from time to time. The respective clause should be included in local by-laws as stipulated in the relevant legislation (see foreword).
Annex D
(normative)

Code of conduct for revenue protection contractors

D.1 General

This code of conduct is intended to define minimum standards with which all RP contractors who perform work on behalf of utilities are required to comply.

D.2 Instructions

D.2.1 If unsure about the legality of the instruction, the supervisor or manager (or both) shall seek clarity from the engineering manager in charge.

D.2.2 Under no circumstances shall any contractor or his workmen perform any function that he or she is not authorized to perform. In any case of doubt, the matter shall be referred to the supervisor or manager, or to the engineering manager.

D.3 Behaviour

D.3.1 Customers shall be addressed in a respectful and courteous manner at all times.

D.3.2 Contractor’s staff shall not retaliate when subjected to abuse by an irate customer. In the event of any abuse, this shall be referred to the engineering manager.

D.4 Dress code

D.4.1 All staff, including skilled, semi-skilled and unskilled staff, shall be appropriately dressed. Where required, staff shall be supplied with and shall wear the necessary protective clothing whilst on duty. Staff engaged in any physical work shall wear overalls whilst on duty.

D.4.2 Protective clothing shall not have any metal buttons or zips.

D.4.3 Protective clothing may bear the name or logo (or both) of the company, but no clothing shall bear the name or logo of another company.

D.4.4 Staff shall be neatly dressed at all times whilst on duty. Protective clothing shall be replaced regularly. Old or torn clothing shall not be worn.

D.4.5 Staff engaged in any manual work shall wear safety shoes that have steel toe caps. Sneakers (takkies), sandals or slippers shall not be worn.
Minimum competencies of RP officers and supplier’s staff

E.1 RP auditor (level 1)

An RP auditor shall
a) be familiar with different types of meter and have the ability to educate investigators in the design and specification of meters,
b) have knowledge of the utility’s network,
c) be familiar with test instruments,
d) be computer literate,
e) have the ability to identify tampering methods, and
f) have knowledge of billing and equipment register databases.

E.2 RP operator (level 2)

An RP operator shall have
a) passed a revenue protection course in auditing (minimum qualification: qualified electrician),
b) experience in the removal of tampers on meters,
c) experience in meter removal and replacement,
d) knowledge of cut-off procedures,
e) knowledge of switching,
f) knowledge of utility plumbing,
g) knowledge of safety procedures, and
h) knowledge of first aid.

E.3 RP investigator (level 3)

An RP investigator shall have
a) passed a revenue protection auditor course and a revenue protection operator course,
b) knowledge of by-laws and credit control procedure,
c) knowledge of relevant legislation (see foreword),
d) experience in evidence collection, and
e) experience in case preparation and court procedures.
Annex E *(concluded)*

E.4 Common courses

All RP officers shall have successfully passed courses in

a) customer relations,

b) problem solving,

c) negotiating skills, and

d) emergency handling and self-defence.
Sample audit report sheets

NOTE   Utilities are encouraged to adapt this form to suit their particular requirements.

Table F.1 — Standard audit report sheet

<table>
<thead>
<tr>
<th>Standard audit report sheet</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Account details</strong></td>
<td></td>
</tr>
<tr>
<td>Account No.:</td>
<td>Information obtained from (Please tick box)</td>
</tr>
<tr>
<td>Debtor name:</td>
<td>Database Customer</td>
</tr>
<tr>
<td>Debtor address:</td>
<td>Database Customer</td>
</tr>
<tr>
<td>Billing area:</td>
<td>Database Customer</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Property codes</td>
<td>Database OK</td>
</tr>
<tr>
<td>Stand:</td>
<td>Township:</td>
</tr>
<tr>
<td>Address</td>
<td>Street name:</td>
</tr>
<tr>
<td>Street No.:</td>
<td></td>
</tr>
<tr>
<td>Building/business name:</td>
<td></td>
</tr>
<tr>
<td>Customer name:</td>
<td></td>
</tr>
<tr>
<td>Billing area</td>
<td>North South East West</td>
</tr>
<tr>
<td>Meter location on premises:</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is easy access to meter(s) available? (✓)</td>
<td>Yes No</td>
</tr>
<tr>
<td>Are keys from the customer required to access meter(s)? (✓)</td>
<td>Yes No</td>
</tr>
<tr>
<td>Are meter readers required to pass customer security checks? (✓)</td>
<td>Yes No</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>
### Annex F (continued)

#### Miscellaneous details

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the meter box locked?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the meter box damaged?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the meter box door damaged?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meters in chambers: Are the chamber lights working?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the fuse holders on the meter board sealed in place?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage monitor on the meter board:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which light-emitting diode is on (where fitted)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation of premises?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meter(s) serial No.</th>
<th>Meter reading</th>
<th>Meter make</th>
<th>Meter model</th>
<th>kWh / demand type?</th>
<th>Demand type?</th>
<th>Multiplying factor on meter?</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter 1</td>
<td>kWh</td>
<td>Dem</td>
<td>kWh</td>
<td>kWh Dem</td>
<td>kVA kW</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Meter 2</td>
<td>kWh</td>
<td>Dem</td>
<td>kWh</td>
<td>kWh Dem</td>
<td>kVA kW</td>
<td>No</td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Meter 3</td>
<td>kWh</td>
<td>Dem</td>
<td>kWh</td>
<td>kWh Dem</td>
<td>kVA kW</td>
<td>No</td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Meter 4</td>
<td>kWh</td>
<td>Dem</td>
<td>kWh</td>
<td>kWh Dem</td>
<td>kVA kW</td>
<td>No</td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Meter 5</td>
<td>kWh</td>
<td>Dem</td>
<td>kWh</td>
<td>kWh Dem</td>
<td>kVA kW</td>
<td>No</td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Multiplying factor =**

<table>
<thead>
<tr>
<th>Meter phases?</th>
<th>1Ø</th>
<th>3Ø</th>
<th>1Ø</th>
<th>3Ø</th>
<th>1Ø</th>
<th>3Ø</th>
<th>1Ø</th>
<th>3Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter body sealed?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Terminal cover sealed?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Reset button sealed?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Signs of tampering?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Meter working?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Voltage fuses healthy?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Faulty fuses replaced?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Miniature circuit-breaker in on position</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Meter damaged?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Metering installation:**

- High tension supply (110 V meters) or low tension supply (220 V meters)?

**NOTE**

- HT: high tension
- LT: low tension
Table F.2 — Standard RP inspection audit form for credit and prepayment meters

<table>
<thead>
<tr>
<th>Customer details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: Erf/Stand number:</td>
</tr>
<tr>
<td>Township:</td>
</tr>
<tr>
<td>Full name of occupant (if known):</td>
</tr>
<tr>
<td>Occupant ID No. (confirmed):</td>
</tr>
<tr>
<td>Physical address:</td>
</tr>
<tr>
<td>Service address:</td>
</tr>
<tr>
<td>Occupant present? Yes No</td>
</tr>
<tr>
<td>Has an inspection notice been issued to the occupant? Yes No</td>
</tr>
<tr>
<td>Reasons for inspection request:</td>
</tr>
<tr>
<td>Meter details – Credit or prepayment</td>
</tr>
<tr>
<td>Meter number (s)</td>
</tr>
<tr>
<td>Meter(s) sealed? Yes No</td>
</tr>
<tr>
<td>Meter(s) tampered? Yes No</td>
</tr>
<tr>
<td>Meter(s) out of credit? Yes No</td>
</tr>
<tr>
<td>Prepaid units left</td>
</tr>
<tr>
<td>Replacement meter details (if replaced)</td>
</tr>
<tr>
<td>NUMBERS</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Old meter(s)</td>
</tr>
<tr>
<td>New meter(s)</td>
</tr>
<tr>
<td>Check-meter(s)</td>
</tr>
<tr>
<td>Installation details</td>
</tr>
<tr>
<td>LED OK? Yes No</td>
</tr>
<tr>
<td>Breaker test insert sample token? Yes No</td>
</tr>
<tr>
<td>Circuit-breaker cover fitted? Yes No</td>
</tr>
<tr>
<td>Lights tested? Yes No</td>
</tr>
<tr>
<td>Supply connected? Yes No</td>
</tr>
<tr>
<td>Description of tampering or illegal connection:</td>
</tr>
</tbody>
</table>

Installation inspected/audited by: ……………………… Signature: ………………………

Date: …………………

Data captured by: ……………………… Signature: ……………………… Date: …………………
### Annex G

**Two-notice procedure for inspection notification**

**Table G.1 — Two-notice procedure for inspection notification**

<table>
<thead>
<tr>
<th>Notice 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inspection notification</strong></td>
</tr>
</tbody>
</table>

**TO THE HOUSEHOLDER**

**REFERENCE No.** ......................

**ADDRESS:** ...........................................................................................................................................

...........................................................................................................................................

...........................................................................................................................................

**DATE OF VISIT:** ...................................................................................................................................

**CONTRACTOR’S (or employee’s) NAME:** .................................................................................................

**Dear Customer**

**INSPECTION OF ELECTRICITY METER BOX**

In terms of (relevant by-laws), (supplier’s name) reserves the right to inspect their electricity meter at any time.

It would be appreciated if you would arrange access for the meter(s) to be inspected during the course of the next two weeks. Please contact (details of supplier’s contact person) to make the necessary arrangements.

It should be noted that failure to comply with this request could result in the disconnection of your electricity service. Your electricity service will then be reconnected only after the meter has been inspected.

Please quote the abovementioned reference number in all enquiries.

Thank you for your co-operation.

Yours faithfully

..........................................

(Supplier’s representative) Artisan’s Man No./Call sign.................................
### Notice 2

**Inspection notification**

<table>
<thead>
<tr>
<th>TO THE HOUSEHOLDER</th>
<th>REFERENCE No. .......................</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS:</td>
<td>....................................................................................................................................</td>
</tr>
<tr>
<td></td>
<td>....................................................................................................................................</td>
</tr>
<tr>
<td></td>
<td>....................................................................................................................................</td>
</tr>
<tr>
<td></td>
<td>....................................................................................................................................</td>
</tr>
<tr>
<td>CONTRACTOR’S (or employee’s) NAME</td>
<td>..........................................................</td>
</tr>
<tr>
<td>DATE:</td>
<td>...........................................</td>
</tr>
</tbody>
</table>

**Dear Customer**

**INSPECTION OF ELECTRICITY METER**

Further to my previous letter requesting your assistance in gaining access to your premises for inspecting the electricity meter(s), staff, acting on behalf of (supplier's name), were again unable to gain access to your meter. As a result of non-compliance with previous requests to gain access to your premises for inspection purposes, (supplier's name) staff have disconnected your electricity supply. Please contact (details of supplier's contact person) as soon as possible to make arrangements for an inspection to be carried out.

Please quote the abovementioned reference number in all enquiries.

Yours faithfully

(Supplier's representative)   Artisan's Man No./Call sign.................................

Contact details:
Annex H
(normative)

Sealing

H.1 Objective of sealing

The primary objective of sealing any item of metering equipment is to ensure that access to certain sensitive parts of that device is restricted. This is especially so where energy meters is concerned, since these form the basis from which revenue is obtained by the electricity supply utility. Uniquely numbered seals create an audit trail of activity surrounding that piece of metering equipment. Seals can also restrict access to metering equipment as a safety objective. Numeric sealing of metering equipment is a critical component of any revenue protection initiative.

H.2 Definition of a seal

A security seal is a passive, one time locking device, with a unique number, identification, or barcode that is used to provide a reliable indication of tampering. Tampering in this context is defined as unauthorized removal or entry. By virtue of its construction, the security seal provides limited resistance to an intentional, premeditated attempt to open it or remove it, to gain access to the metering equipment that is sealed with the seal. Seals require close inspection to indicate whether tampering has occurred or entry has been attempted. The seal provides visual evidence of breach. Seals should not be able to be manipulated to construct a secondary, functional seal from the tampered component parts without clear visual evidence thereof.

H.3 Requirements for sealing

NRS 096-1 sets out the requirements for sealing of electricity meters and related ancillary metering equipment. It provides guidelines on the roles and responsibilities related to the management of seals, the process for the management of seals and provide information on the requirements for various types of seals. It emphasises the need to establish strict sealing standards within a utility. It details the steps in implementing an effective sealing policy (from authorized procurement to seal disposal), it explores various sealing options available to the industry and highlights their advantages and disadvantages, thereby also discussing common industry practice and preference. The document proposes a colour code to be used to identify various tasks performed on metering equipment or to signify the status of that particular meter. There has subsequently been discussion around the inclusion of numbering formats for seals to enhance the traceability of seals back to source and to include more information in user specific coding.

H.4 Security

When a type of seal is being selected, users need to consider the following criteria:

a) is the seal suitable in terms of the application?

b) are the seal’s inherent security and functionality matched to the risk of the environment in which the seal will be used?

c) if it is a high risk area, does the seal exhibit features which makes it that much more difficult to manipulate and counterfeit, thereby enhancing tamper detection?

d) can the seal be traced back to source?

e) are the seals of such a design complexity or material sophistication that pre-installation tampering is minimized?

f) are authorized employees or contractors installing seals qualified to ensure correct installation?
## Annex I
(normative)

### Minimum revenue protection data requirements

**Table I.1 — Minimum revenue protection data requirements**

<table>
<thead>
<tr>
<th>Meter details and location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer surname</td>
</tr>
<tr>
<td>Customer initials</td>
</tr>
<tr>
<td>Street number</td>
</tr>
<tr>
<td>Street name</td>
</tr>
<tr>
<td>Stand number</td>
</tr>
<tr>
<td>GPS co-ordinates</td>
</tr>
<tr>
<td>Latitude</td>
</tr>
<tr>
<td>Longitude</td>
</tr>
<tr>
<td>Electrical address</td>
</tr>
<tr>
<td>Transformer</td>
</tr>
<tr>
<td>Circuit</td>
</tr>
<tr>
<td>Pole</td>
</tr>
<tr>
<td>Suburb/Township name</td>
</tr>
<tr>
<td>Town/City name</td>
</tr>
<tr>
<td>PO Box</td>
</tr>
<tr>
<td>Postal code</td>
</tr>
<tr>
<td>Telephone area code</td>
</tr>
<tr>
<td>Telephone number</td>
</tr>
<tr>
<td>Meter premises</td>
</tr>
<tr>
<td>Informal dwelling / small house / large house / townhouse / flat / shop / office / industrial area / town</td>
</tr>
<tr>
<td>Meter street number</td>
</tr>
<tr>
<td>Meter street name</td>
</tr>
<tr>
<td>Meter plot number</td>
</tr>
<tr>
<td>Meter suburb/township</td>
</tr>
<tr>
<td>Meter town/city name</td>
</tr>
<tr>
<td>Service contract number</td>
</tr>
<tr>
<td>Customer account number</td>
</tr>
<tr>
<td>Present account balance</td>
</tr>
<tr>
<td>Average monthly kWh</td>
</tr>
<tr>
<td>Supply presently active?</td>
</tr>
<tr>
<td>Yes / No</td>
</tr>
<tr>
<td>Previous tampering?</td>
</tr>
<tr>
<td>Yes / No</td>
</tr>
<tr>
<td>Meter type</td>
</tr>
<tr>
<td>Meter serial number</td>
</tr>
<tr>
<td>Meter seal number</td>
</tr>
<tr>
<td>Date of last calibration</td>
</tr>
<tr>
<td>Meter calibration constant 1</td>
</tr>
<tr>
<td>Meter calibration constant 2</td>
</tr>
<tr>
<td>Meter calibration constant 3</td>
</tr>
<tr>
<td>Meter calibration constant 4</td>
</tr>
<tr>
<td>Metering constant</td>
</tr>
<tr>
<td>Billing constant</td>
</tr>
<tr>
<td>Current transformer voltage</td>
</tr>
<tr>
<td>Current transformer ratio</td>
</tr>
</tbody>
</table>
Annex J
(informative)

Notices of disconnection owing to non-payment and tampering

J.1 Notice of disconnection owing to non-payment

Table J.1 — Notice of disconnection owing to non-payment

<table>
<thead>
<tr>
<th>Notice of disconnection owing to non-payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO THE HOUSEHOLDER</td>
</tr>
<tr>
<td>ADDRESS: .............................................................................................................</td>
</tr>
<tr>
<td>METER No.: ...............</td>
</tr>
<tr>
<td>CIRCUIT No.: ...............</td>
</tr>
<tr>
<td>DATE: ........................................................</td>
</tr>
</tbody>
</table>

Dear Customer

DISCONNECTION OF SUPPLY

I hereby advise you that the electricity supply to your premises has been DISCONNECTED owing to non-payment.

Before the supply can be restored, it will be necessary for you to pay the following:

1. A deposit of (apply by-law tariff) or, if an existing deposit of R........ has been paid, then an additional deposit of R ........... will be required.

   PLUS

2. A reinstatement fee of R........... is payable before service will be reinstated.

Please quote the abovementioned reference number in all enquiries.

IT IS ILLEGAL AND DANGEROUS TO ATTEMPT TO RECONNECT THE ELECTRICITY SUPPLY YOURSELF AND ANY SUCH ATTEMPT WILL RESULT IN YOUR PROSECUTION.

Yours faithfully

Signature (customer/witness):

(Supplier's representative)  Artisan's Man No./Call sign
### J.2 Notice of disconnection owing to tampering

#### Table J.2 — Notice of disconnection owing to tampering

<table>
<thead>
<tr>
<th>Notice of disconnection owing to tampering</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TO THE HOUSEHOLDER</strong></td>
</tr>
<tr>
<td><strong>REFERENCE No.</strong></td>
</tr>
<tr>
<td><strong>ADDRESS:</strong></td>
</tr>
<tr>
<td><strong>METER No.:</strong></td>
</tr>
<tr>
<td><strong>SUBSTATION No.:</strong></td>
</tr>
<tr>
<td><strong>CIRCUIT No.:</strong></td>
</tr>
<tr>
<td><strong>POLE No.:</strong></td>
</tr>
<tr>
<td><strong>DATE:</strong></td>
</tr>
</tbody>
</table>

Dear Customer

**DISCONNECTION OF SUPPLY**

I hereby advise you that the electricity supply to your premises has been DISCONNECTED owing to tampering.

Before the supply can be restored, it will be necessary for you to pay the following:

1. A deposit of (apply by-law tariff) or, if an existing deposit of R……….has been paid, then an additional deposit of R …………. will be required.

   PLUS

2. A reinstatement fee of R…………. is payable before service will be reinstated.

   PLUS

3. An estimated consumption for the period during which your meter has been tampered. Please contact (supplier's contact details) for this estimated charge before making the payment.

These charges shall be paid in full to (supplier's name) before the supply can be reconnected. Payment can be made at (details of supplier's payment centres) not earlier than 72 hours after disconnection. Please produce this letter when making the payment. Please quote the above-mentioned reference number in all enquiries.

**IT IS ILLEGAL AND DANGEROUS TO ATTEMPT TO RECONNECT THE ELECTRICITY SUPPLY YOURSELF AND ANY SUCH ATTEMPT WILL RESULT IN YOUR PROSECUTION.**

Yours faithfully Signature: (customer/witness)

(Supplier's representative) Artisan's Man No./Call sign
# Annex K

(Informative)

Definitions related to revenue protection auditing

Table K.1 — Definitions related to revenue protection auditing

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>audit form</td>
<td>form used to capture data regarding the customer, meter and house during the auditing process</td>
</tr>
<tr>
<td>buying pattern</td>
<td>rate of purchasing prepaid electricity by a customer over a period of time</td>
</tr>
<tr>
<td>bypass</td>
<td>method of tampering with an installation by diverting the supply past the metering point</td>
</tr>
<tr>
<td>check-again meter</td>
<td>meter that was audited but the auditor is not sure if the finding is correct and has indicated that a technician should check it again</td>
</tr>
<tr>
<td>cleaning the data</td>
<td>process to change raw data into an “audit friendly” list or spreadsheet that can be used by auditors in the field</td>
</tr>
<tr>
<td>cut-off action</td>
<td>disconnection of a service to a premise by revenue protection operators</td>
</tr>
<tr>
<td>daily worksheet</td>
<td>feedback from field teams, summarizing the day’s work</td>
</tr>
<tr>
<td>data integrity</td>
<td>correctness of RP data to be utilized in auditing projects</td>
</tr>
<tr>
<td>fire damaged meter</td>
<td>meter partly damaged by a fire, but still in working order</td>
</tr>
<tr>
<td>fire destroyed meter</td>
<td>meter completely burned out or damaged to the extent that it is unserviceable</td>
</tr>
<tr>
<td>full audit</td>
<td>audit of meters by checking the meters' functions, capturing the customer and meter data and performing the remedial actions in a “one stop service” approach</td>
</tr>
<tr>
<td>holiday house</td>
<td>house that is only used during holiday periods and long weekends and therefore can only be audited during those times</td>
</tr>
<tr>
<td>illegal connection</td>
<td>connection on a cable before the metering point, and therefore obtaining electricity that is not metered</td>
</tr>
<tr>
<td>illegal use of electricity</td>
<td>phrase used to describe the illegal act of obtaining free electricity services by tampering with the meter or cable</td>
</tr>
<tr>
<td>low consumption audit</td>
<td>audit of meters in accordance with a list of customers who are consuming less than before, or below the area’s average usage</td>
</tr>
<tr>
<td>meter plugs</td>
<td>plastic plugs placed into the holes where the screws, which attach the meter to the base, are situated</td>
</tr>
<tr>
<td>meter seal</td>
<td>sealing device that consists of a wire and locking device, which should have an identification number, and placed in such a way that the meter cannot be opened and tampered with</td>
</tr>
<tr>
<td>monthly reporting</td>
<td>feedback from the RP supervisor to the RP manager on a monthly basis in order to compile the monthly statistics report for management</td>
</tr>
<tr>
<td>negative findings</td>
<td>findings identified during an audit, which contribute towards the revenue losses</td>
</tr>
<tr>
<td>no access</td>
<td>nobody found to be home during an auditing visit</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>normal audit</td>
<td>audit of meters by checking the meters’ functions, capturing the customer and meter data and reporting the “negative findings”</td>
</tr>
<tr>
<td>normalize</td>
<td>removal of the tampering devices and repair of damaged wiring after the payment of a tampering fee to the local relevant authority and ensuring that the meter functions correctly</td>
</tr>
<tr>
<td>not at home list</td>
<td>feedback regarding houses where nobody was found at home and the meter could therefore not be audited</td>
</tr>
<tr>
<td>one stop RP service</td>
<td>auditing group, team or company that perform all possible revenue protection tasks whilst on a premise</td>
</tr>
<tr>
<td>pin tamper</td>
<td>meter tampered by placing a pin under the external circuit-breaker of a prepaid electricity meter</td>
</tr>
<tr>
<td>probing audit</td>
<td>audit of a random sample of meters in an area, which will be audited in the future, in order to determine the tamper rate</td>
</tr>
<tr>
<td>refuse entry</td>
<td>customer who refuses to allow an RP auditor to enter the premises</td>
</tr>
<tr>
<td>retrofitting</td>
<td>changing of a conventional metering installation into a prepaid installation</td>
</tr>
<tr>
<td>revenue loss forum</td>
<td>meeting between all the role players who co-ordinate all revenue protection projects in the area</td>
</tr>
<tr>
<td>ring-fenced area</td>
<td>problem area that has been identified and “zoned off”, in order for several RP processes to take place until the problem is solved</td>
</tr>
<tr>
<td>RP data system</td>
<td>dedicated data system to capture RP data on, and calculate arrears and payments by customers who have tampered with the meter</td>
</tr>
<tr>
<td>RP procedure</td>
<td>procedure that describes RP processes to be followed by operators</td>
</tr>
<tr>
<td>RP revisit</td>
<td>repeated visit to a house or a meter to investigate an audit finding</td>
</tr>
<tr>
<td>RP team</td>
<td>more than one RP operator who work together as a team whilst performing audits (normally two persons)</td>
</tr>
<tr>
<td>sealing procedure</td>
<td>guideline to advise RP operators on how to attach and control seals</td>
</tr>
<tr>
<td>sweeping audit</td>
<td>audit of meters by starting in one place and visiting every house in the project area</td>
</tr>
<tr>
<td>tamper equipment</td>
<td>internal tripping switch built into a meter connected to a light sensitive switch or spring-loaded switch, in order to trip the meter in the event of tampering</td>
</tr>
<tr>
<td>tamper mode</td>
<td>mode when a meter has tripped due to tampering</td>
</tr>
<tr>
<td>tamper notification</td>
<td>form handed over to the customer after a tamper or bypass has been detected on the customer’s meter</td>
</tr>
<tr>
<td>tampered meter</td>
<td>meter that has been interfered with in such a way as to prevent it from correctly metering the supply to the premises</td>
</tr>
<tr>
<td>targeted audit</td>
<td>meter audited upon a request from a role player</td>
</tr>
<tr>
<td>unsafe lead</td>
<td>cable connected to a plug after a metering point and leading to another dwelling, but in such a way that is dangerous to other people who move through the area</td>
</tr>
</tbody>
</table>
### Annex K (concluded)

<table>
<thead>
<tr>
<th></th>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>zero consumption audit</td>
<td>audit of meters in accordance with a list of customers who have stopped purchasing electricity for a period of more than three months</td>
</tr>
<tr>
<td>2</td>
<td>exception report</td>
<td>report which identifies or highlights mismatched or conflicting data and any discrepancies</td>
</tr>
<tr>
<td>3</td>
<td>metering ancillary equipment</td>
<td>includes CTs, VTs and installation wiring</td>
</tr>
<tr>
<td>4</td>
<td>multi-ratio CT</td>
<td>offers multiple output ratios of which only one may be selected to suit the required application</td>
</tr>
<tr>
<td>5</td>
<td>prepayment metering</td>
<td>system whereby a prepayment meter is installed at the consumer’s premises, instead of the credit type disc meter</td>
</tr>
<tr>
<td>6</td>
<td>revenue recovery</td>
<td>methods and procedures to quantify losses due to incorrect metering and recover them</td>
</tr>
<tr>
<td>7</td>
<td>summation CT</td>
<td>instrument transformer in which the secondary currents from two or more current transformers (CTs) are summated to provide a total secondary current which is proportional to the total primary current registered by the individual CTs.</td>
</tr>
</tbody>
</table>

**NOTE** Incorrect metering can be caused by tampering or meter errors.
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Standards and general documents

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Eskom procedure, ESKPVAAR. Procedure for handling complaints with regard to metering equipment. 2001.


Eskom procedure, ESKPVAAR3. Procedure for the maintenance of metering and measurement installations.


Eskom procedure, SCSPVAAV1. ED sealing and anti-tamper.

Eskom procedure, TRR/T98/TSD/05. Technologies on combating electricity theft.


NOTE 1 Eskom procedures, reports and standards can be obtained from the Eskom Corporate Information Office. See inside cover of this document for contact details.

NOTE 2 Parts of NRS 057 are in the course of preparation and could be relevant in the context of NRS 055.

SANS 1524-1, Electricity payment systems – Part 1: Prepayment meters.

SANS 10142-1, The wiring of premises – Part 1: Low-voltage installations.

Legislation


Electricity Regulation Act, 2006 (Act No. 4 of 2006).

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