



Electrical inspection

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Introduction or Purpose	
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An inspection has been carried out on ING's electrical installations by a 'Organismo de Control Autorizado' (OCA), in this particular case by 'Bureau Veritas'. A serie of recommendations have been produced. This document is intended to dictate what exactly of the report should be implemented, after considering the current legislation in place.

After the inspection further advice on the recommendations made was sought. ORM site manager, Juan Carlos Perez Arencibia put us into contact with German Pescador (operations manager at OT). He further suggested that we ask for an assessment of the recommendations by Felipe F. Felipe Felipe (Chano) from Onazol & F4, who are responsible for 15Kv re-modulation. They are an authorized company to implement and correct any improvements or recommendations done by a 'OCA'.

Scope	
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This document will refer to the report of recommendations that was done by Alan Chopping in which all safety critical issues are discussed; this will be indicated in *Italic*.

Exceptions	
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In this report technical detail why certain tasks are safety critical or not will not be discussed. For this we refer to [report](#) done by Alan Chopping

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In 2007 'Bureau Veritas' did an inspection on all electrical systems at ING. An extensive list of recommendations was produced.

This was a voluntary inspection, since it was considered necessary to have an independent assessment of our electrical installations. In theory it is possible that we could have an compulsory inspection from the department of 'Industria' from the 'Gobierno de Canarias'. We are not aware that compulsory inspections are planned nor have they been carried out at the Observatories in Tenerife.

Taking into consideration the items listed in the Bureau Veritas report against the official technical instructions for low voltage installations (Instruccion Tecnica Complementaria para Baja Tension: ITC-BT-05 Verificaciones e inspecciones) the majority of faults would be classified as slight (Leve)

In the Veritas report no levels of priority or severity were indicated. If a forced official inspection would take place the state of the electrical installation will be indicated. There are three possible categories:

1. Favorable, no changes to electrical installations have to be made.
2. Conditional, a period of time will be given to implement the recommended changes
3. Negative, the electrical installations

This is derived from Spanish legislation:

http://www.mtas.es/Insht/legislation/rd/itc_bt_05.htm#apartado4_1

- Como resultado de la inspección, el Organismo de Control emitirá un Certificado de Inspección, en el cual figurarán los datos de identificación de la instalación y la posible relación de defectos, con su clasificación, y la calificación de la instalación, que podrá ser:

1. **Favorable:** Cuando no se determine la existencia de ningún defecto muy grave o grave. En este caso, los posibles defectos leves se anotarán para constancia del titular, con la indicación de que deberá poner los medios para subsanarlos antes de la próxima inspección; Asimismo, podrán servir de base a efectos estadísticos y de control del buen hacer de las empresas instaladoras.
2. **Condicionada:** Cuando se detecte la existencia de, al menos; un defecto grave o defecto leve procedente de otra inspección anterior que no se, haya corregido.: En este caso:

- a. Las instalaciones nuevas que sean objeto de esta calificación no podrán ser suministradas de energía eléctrica en tanto no se hayan corregido los defectos indicados y puedan obtener la calificación de favorable.
 - b. A las instalaciones ya en servicio se les fijará un plazo para proceder a su corrección, que no podrá superar los 6 meses. Transcurrido dicho plazo sin haberse subsanado los defectos, el Organismo de Control deberá remitir el Certificado con la calificación negativa al Órgano competente de la Comunidad Autónoma.
3. **Negativa:** Cuando se observe, al menos, un defecto muy grave. En este caso:
- a. Las nuevas instalaciones no podrán entrar en servicio, en tanto no se hayan corregido los defectos indicados y puedan obtener la calificación de favorable.
 - b. A las instalaciones ya en servicio se les emitirá Certificado negativo, que se remitirá inmediatamente al Órgano competente de la Comunidad Autónoma.

The Bureau Veritas report gives no information about the qualifications of the electrical installation. For this reason uncertainty rose about the legal requirement to implement all their recommendations.

The report then was assessed by Alan Chopping who is the ING electrical competent person. He summarized the Bureau Veritas report and identified the items in the report that cause a real safety hazard. Independent of the legal requirement that could exist, these items should be addressed in accordance to ING's policy to provide a safe working environment and equipment. The complete report can be found [here](#)

In summary it concludes the following:

After careful consideration, I believe the improvements listed below which will produce a reduction of risk and be of an improvement would cost in the region of 3000 Euros.

1. *Change the existing white cables in the generator distribution board to blue, by the actual cable replacement or heat shrink covers. Estimated work time in house at three days, materials cost negligible as we have items on site*
2. *Correction of the emergency lighting distribution, provision of new feeds and additional lighting and the removal of electrical back feeds in the WHT. Estimated cost of contractors 2,080 Euros probable one weeks work with close requirement of in house supervision.*
3. *Distribution connection checks of all distribution boards, estimated at one weeks work with ING supervision at around 780 Euros.*

To carry out the recommendations of Bureau Veritas would cost in the region of 26,207.36 Euros this doesn't take into account the down time and disruption of telescope time nor the ING hours necessary in liaising and planning the contractual work to achieve it.

It was decided that we needed to get more information on the legal requirement or obligation for ING to respond to the recommendations made in the report. Contact was made with the IAC, through Juan Carlos, the ORM site manager. He put us in contact with the Teide observatory site manager, German Pescador. We explained the inspection that was done and asked what their experience is with these regulations.

Main conclusion from this contact was that since we had a voluntary inspection, no legal requirement is present to respond to the recommendations. In future it could be possible that a compulsory inspection could be planned by the department of 'Industrias' of the 'Gobierno de Canarias'. Any severe faults then would have to be addressed within a defined period of time. All faults in the Veritas report were indicated as 'leve' (slight).

After this we made contact with Felipe F. Felipe Felipe (Chano) from Onazol & F4. The report was discussed with him and he commented that it shows that ING's electrical installations are in good condition. First statement was that ING's electrical installation was installed under the legislation at that time and therefore there is no reason to think the installation is not executed correctly.

He confirmed that there are no severe faults mentioned in the report. He stated that the condition of our installations would be favourable, with the points indicated by Bureau Veritas as recommended actions to improve ING's electrical installation. We should see it as an assessment of the condition of the installation. We should plan and prioritise the work we want and can execute. He explained that the issues identified by Bureau Veritas are debatable, the breakers for example, if we can demonstrate the fitted cables are actually rated for lets say 30 Amps, by having a circular circuit, or the pyro cables, there is no need to change them. He said that Bureau Veritas have just applied the regulations as stated in the current legislation, without taking into consideration possible countermeasures for identified hazards.

Chano suggested that during the maintenance program that Alan undertakes, he could check the different circuits and identify if there is a need to change a breaker or that proper counter measures are in place. This is something that could be done over the next couple of years. Another advantage of this approach is that we only bring a contractor in to address a specific problem, instead of changing all of them just for the sake of it. Obviously this would lead to a great reduction in cost as well.

Summary	
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In the short term the actions as identified in the report done by Alan Chopping should be addressed and already some of these actions have taken place. Whether we need to respond to all the recommendations done in the report is not clear. It is obvious that considerable amounts of time and money are needed to implement these. Since we have no indication whether the 'faults' would lead to rejection of obtaining the certificates we don't know whether they really need to be addressed or not. I find it hard to believe that if a compulsory inspection would take place that we would be under time pressure to address them especially since they are qualified as 'leve'.

I recommend we carry on working on implementing the actions from Alan Chopping's report. If a compulsory inspection would be planned I think we still are in the position to respond to this in time.

If we would be required to respond to all recommendations we could apply for a subsidy from the 'Gobierno de Canarias'.

<http://www.gobiernodecanarias.eu/ayudas/fichaayudasgestiones.jsp?ws=ay&codigo=876&unidad=427>

References	
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http://www.mtas.es/Insht/legislation/rd/itc_bt_05.htm#apartado4_1

http://www.gobcan.es/cicnt/doc/industriayenergia/industria/organismos/estadistica_ocas.pdf