Case Study: 
Cable strike to 11kV wire armoured cable

The above image highlights a cable strike to an 11,000 volt cable.

The task was to locate a coal seam by excavating with a JCB excavator on grassland. A trial hole was to be excavated at another location; however the planned trial hole was abandoned due to the possibility of damaging tree roots. The above cable strike location was chosen as an appropriate area to locate the coal seam. Contractors on site had access to cable records, however on relocating to this proposed area the cable records were not consulted prior to machine excavations taking place.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.

Always assume cables are live.

Emergency contact

In an emergency, or if there is any damage to SP Energy Networks cables or plant, call the appropriate number:

SP Energy Networks North
Central & Southern Scotland
0845 272 7999

SP Energy Networks South
Cheshire, Merseyside & North Wales
0845 272 2424

All Cable Deviation Requests /Service Alterations enquiries should be addressed to:

SP Energy Networks (North)
Customer Connections
55 Fullerton Drive
Cambuslang
Glasgow G32 8FA
T: 0141 614 9997

SP Energy Networks (South)
Customer Connections
PO Box 290
Lister Drive
Liverpool L13 7HJ
T: 0151 221 2110

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T: 0141 567 4155 or 0141 567 4455
E: Requestforplansscotland@scottishpower.com

SP Energy Networks (South)
Data Management
(Correspondence)
North Cheshire Trading Estate
Prenton Way
Prenton
Birkenhead CH43 3ET
T: 0151 609 2373
E: Requestforplansmanweb@manweb.co.uk
Case Study:
Cable strike to 33kV cables with earth spikes

The above Image demonstrates the dangers of driving earth spikes into the ground.

The task was to insert the 1metre long earth rods to provide an earth for a private street-lighting cabinet which was in close proximity to a canal. The 33KV cables were protected with concrete tiles, however the earth rods broke through the concrete tiles and damaged both cables. One of the cables was operating at 11,000 volts and the other cable was temporarily out of use. The investigation into this incident discovered that no cable records had been consulted prior to the earth spikes being driven into the ground and that the use of a cable locator had not taken place.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.
Case Study:
33kV wired armoured cable damaged during piling operations

The above image highlights a situation where a 33KV cable was struck while carrying out piling operations.

The damage to the cable could easily have been avoided, the contractors had ScottishPower cable records on site, however adherence to HSG47 was not implemented prior to piling operations commencing. **Trial holes were not carried out at the locus of the cables** to determine line and depth of the cable route. Fortunately on this occasion no operatives were injured. HSG47 is the key to excavating safely, avoiding injuries to operatives and damage to utilities plant.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.

Reference: HSE leaflet “Avoiding Danger From Underground Services” HSG47

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Case Study:
Cable strike to 33kV oil-filled cable with JCB

The above image highlights the consequences of lack of planning when a JCB came into contact with a 33,000 volt oil filled cable.

The task was to install a metal post into the ground to support a gate at the location of ScottishPower underground apparatus. JCB proceeded to damage the cable with oil from the cable leaking into the surrounding excavation. To facilitate the repair to the cable a mature tree also had to be removed from the locus. The environmental issues highlighted and the cable strike could have been avoided if the correct planning processes had taken place. To avoid contact with ScottishPower underground plant adherence to HSG47 is strongly advised.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.

Reference: HSE leaflet “Avoiding Danger From Underground Services” HSG47
Case Study:
Cable strike to HV cable with 360° track excavator

The above image clearly highlights an HV cable strike which took place when a track excavator pulled the cable from the ground.

The task was to conduct excavations to install an astroturf pitch for a school. No ScottishPower cable records on site the client/contractors were unaware the HV cable was present at this location. ScottishPower underground cables can be found in many unlikely locations including, football pitches/golf courses/racing tracks/forests. To avoid contact with electricity cables, records should always be obtained prior to excavations commencing.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.

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Case Study:
Cable strike to HV cable with steel road pins

The above image highlights a dangerous occurrence which could have been avoided at the planning stage of the project.

The client/contractors were aware of the location of the HV cables, however no contact with ScottishPower to have the cables diverted had taken place. The contractors worked around the cables until an operative whilst installing a kerb log struck the HV cable with a steel road pin. The operative sustained burn injuries to his hands and arms. The need for cable deviations should have been investigated at the planning stage of the project. Cable deviation enquiries are to be directed to ScottishPower Customer Connections Department on the telephone number below.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.

Always assume cables are live.
Case Study:
HV wire armoured cable strike with graph shovel

The above image demonstrates the fault energy released when the graph shovel came into contact with a wire armoured HV cable.

The operative’s task was to erect a fence around a sub-station; however excavations were complicated due to tree roots at the locus. All excavations can have completely different situations to overcome and the dangers to operatives during excavations can be numerous. To overcome contact with the electricity network a risk assessment should always be carried out prior to any ground penetrating works progressing. To reduce/eliminate the risk a safe system of work should be implemented with constant risk assessment monitoring taking place as excavation works proceed.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.

Always assume cables are live.

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SP Energy Networks South
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0845 272 2424
Case Study:
HV cable damage covered with insulating tape during excavations to install drainage pipes

The above image highlights an HV cable damage with a covering of insulating tape applied by an operative.

The employee placed himself in danger by applying the insulating tape, the level of damage to the cable could easily have led to the cable blowing out onto the operatives face whilst the tape was being applied with the real possibility for severe burns/loss of sight/facial disfigurement. When a cable strike has taken place the correct course of action is to evacuate the excavation immediately, secure/protect the area and report the incident to ScottishPower’s emergency number (shown opposite).

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.

Always assume cables are live.

Emergency contact
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Liverpool L13 7HJ

t: 0151 221 2110
Case Study:
HV cable damaged, operatives continued to work around cable

The above image demonstrates a damaged HV cable which has been lifted from its original ground position and placed on top of a plastic drainage pipe.

The cable strike was not reported timeously to ScottishPower, blast marks can clearly be seen on the drainage pipe from when the HV cable has been switched back in. The consequences to the operatives could have been severe or even fatal. When a cable strike occurs the correct course of action is to clear the area of operatives immediately and secure the site to protect all operatives and the public from gaining access to the point of damage. Contact ScottishPower emergency number and ensure nobody enters the excavation area without the permission of ScottishPower engineers.

Report all Cable Strikes Immediately.
Always assume cables are live.
Case Study:
HV wire armoured cable damaged with moling appliance

The above image highlights a wired armoured HV cable damaged with a moling device.

The operative’s objective was to install an underground pipe at 90 degrees to the cables. Cable records did highlight HV cables in the vicinity, however not at the precise location in question. Cable records are only indicative and the recommended course of action should have been to C.A.T. - scan the area the mole was intended to travel. If there was an indication of underground plant with the cable locator between the mole launching excavation and the receiving mole excavation a trial excavation should have taken place to establish the presence of utilities.

Prior to launching a moling device it is imperative that all utilities apparatus line & level in the working vicinity has been clearly established.

Report all Cable Strikes Immediately.
Always assume cables are live.
Case Study:
High Voltage Polymeric cable joint

The above image highlights a high voltage cable joint on a Polymeric to Polymeric electrical cable (red cable), operatives undertaking excavations may not have come across this type of joint before, the joint is a sleeve made up of a composition of plastic and rubber (XLPE) and is fit for purpose. Using cables as a step or hand hold to enter or exit excavations is not recommended.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.

Always assume cables are live.

Access and egress routes at excavations should be clearly defined.
Case Study:
High Voltage fireclay cable joint damaged with earth spike

The above image highlights a situation when a 1.2 metre long earth spike was driven into a high voltage fireclay cable joint, the task was to provide an earth for a lighting conductor to a block of flats. The company concerned, took the contract over from a previous contractor and did not apply for ScottishPower cable records. How do companies expect their operatives to avoid injuries/damage to underground apparatus if the relevant utility records are not being supplied to their operatives? Cable record enquiries are to be directed to ScottishPower Data Management section on the telephone number below.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.
Case Study:
HV cable damaged with pneumatic gun

The above image highlights a situation where a contractor came into contact with a high voltage cable with a pneumatic gun. The task being undertaken was to install a lamp-post. On this occasion the operative fortunately did not receive any injuries. Contractor had not received utility records from the client and was not aware of the presence of electricity cables in the footpath. Prior to excavations taking place the client and contractor has a duty to ensure that all the relevant utility information is available to operatives to avoid injuries and damage to utilities plant. Cable record enquiries are to be directed to ScottishPower Data Management section on the telephone numbers below.

Prior to any excavations taking place cable records should always be consulted.

All SP Energy Networks cable record enquiries are to be directed to the relevant North or South Data Management team.
Case Study:
HV wired armoured cable strike (non-adherence to HSG47)

The above image demonstrates a situation where an HV wire armoured cable was damaged with a JCB excavator. The excavations were taking place to divert a utility; site manager had utility records on site and proceeded to tool-box talk the operatives prior to excavations taking place. Site manager highlighted the presence of cables at the locus to the contractor. The cable routes were clearly marked on the ground, however because the ground conditions were difficult, the contractor decided to carry out excavations with a JCB machine without trial holes taking place to locate line and depth of the cables. An assessment of the ground conditions should have taken place with a safe system of work-method statement implemented to avoid contact with ScottishPower Plant.

Adherence to HSG47 advised.
Case Study: Cable strike with excavator

The above image demonstrates the result of an excavator coming into contact with an HV cable (11,000 volts).

The operatives on site had been supplied with cable records and proceeded to excavate the required spoil from around the cables in a safe manor (HSG47) ready for the cables to be worked on. Overnight there was a rain storm with the excavation filling with water, the cable strike occurred when the excavator was used in an attempt to remove the excess water with the excavator bucket. The correct course of action should have been to use a water pump to drain the water from the excavation.

Prior to starting work around underground electrical cables take five minutes to risk assess the possible consequences of your actions.

Emergency contact

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Central & Southern Scotland
0845 272 7999

SP Energy Networks South
Cheshire, Merseyside & North Wales
0845 272 2424
Case Study:
Cable Fault incident at Secondary Sub-Station

These images highlight the blast and power from a cable fault at a secondary sub-station high voltage switch (11,000V to 415-230 V).

Sub-stations are extremely dangerous places and should only be accessed by ScottishPower trained staff, danger of death notices will be displayed in prominent positions. Every ScottishPower sub-station has the name of the sub-station placed on the entry gate/door with emergency contact telephone details to report any incidents pertaining to ScottishPower apparatus.

SP Energy Networks Emergency Contact No.
North: 0845 272 7999 / South: 0845 272 2424

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SP Energy Networks (North)
Data Management
(Correspondence)
55 Fullerton Drive
Cambuslang
Glasgow G32 8FD

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e: Requestforplansscotland@scottishpower.com

t: 0151 609 2373
e: Requestforplansmanweb@manweb.co.uk

t: 0141 614 9997

In an emergency, or if there is any damage to SP Energy Networks cables or plant, call the appropriate number:
Case Study:

33kV cable joint preparation and completed cold shrink joint

The top image demonstrates a fault on a 33kV cable in the process of being prepared for jointing.

The lower image highlights the completed cold shrink joint on the 33kV cable.

Notice the repair on the cable has three single core cables, rather than one large cable, repairs to 33kV cables will continue to be replaced with single core cables, normally laid in trefoil formation.

33kV single core cables are installed in trefoil formation