

**Energy Resilience for Climate Adaptation Project (ERCAP)  
Environmental Code of Practice (ECOP)  
for**

**COMPONENT 2: Demonstration Measures to Enhance Resilience of Energy Sector  
(Measures to Enhance Resilience of Distribution Substations for Maintaining System  
Operations and Improve Capabilities for Better Systems Operation and Management in  
Order to Increase Adaptive Capacity)**

*Background:* As part of an overall program to improve and strengthen the resilience of the power distribution system, the project will provide support to enhance resilience of distribution substations by upgrading existing substation buildings in proximity to the Belcogen (biomass) and Bapcol (stand-by diesel) power plants which have previously been damaged by storms, and uprating/construction of transmission line connection from the Belcogen substation to associated power plant. This component will also provide for construction of a new building for battery banks and for the purchase and installation of a mobile control center as well as strengthening the operational capacity of load control & dispatch center

| ISSUES/RISKS  | MITIGATION MEASURE   |
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| <b>UPGRADING EXISTING SUBSTATION BUILDINGS, CONSTRUCTION OF A NEW BUILDING FOR BATTERY BANKS and UPGRADING TRANSMISSION LINE CONNECTION FROM THE BELCOGEN AND BAPCOL POWER PLANTS TO ASSOCIATED SUBSTATIONS</b> |  |
| Dust generation/ Air pollution  | <ul style="list-style-type: none"> <li>• The Contractor implement dust control measures to ensure that the generation of dust is minimized and is not perceived as a nuisance by local residents, maintain a safe working environment, such as:               <ul style="list-style-type: none"> <li>- watering dusty roads and construction sites;</li> <li>- covering of material stockpiles;</li> <li>- Exposed soil and material stockpiles shall be protected against wind erosion.</li> </ul> </li> </ul>  |
| Noise and vibration   | <ul style="list-style-type: none"> <li>• All construction vehicles must have mufflers in good condition to avoid excessive noise emissions</li> <li>• Conduct activities during normal working hours.</li> <li>• If activities must be conducted in the evening and/or weekend, provide local affected groups with at least one week notice of start and completion times.</li> <li>• Any construction equipment deemed too noisy by the Department of Environment (DOE) and/or complaints from locally affected groups, the equipment shall be replaced.</li> </ul>   |
| Water pollution   | <ul style="list-style-type: none"> <li>• If sanitary facilities are not currently available at the subproject sites, portable or constructed toilets must be provided for construction workers either on site and/or at any work camps (if such camps will be established). There should be no direct discharges of human sewage to any water body.</li> <li>• Do not wash cars, trucks or machinery in or near natural water bodies or drinking water sources.</li> <li>• Any construction wastewaters are to be sent to temporary storage facilities to be collected by companies licensed to receive and manage construction wastewaters or individually treated</li> </ul> |
| Drainage and sedimentation  | <ul style="list-style-type: none"> <li>• The Contractor shall ensure any drainage system is always maintained cleared of mud and other obstructions.</li> </ul>  |
| Solid waste   | <ul style="list-style-type: none"> <li>• At all places of work, the Contractor shall provide litter bins, containers and refuse collection facilities.</li> </ul>  |

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|  | <ul style="list-style-type: none"> <li>• Solid waste may be temporarily stored on site in a designated area approved by the Construction Supervision Consultant and the Department of Environment (DOE)/Solid Waste Management Authority prior to collection and disposal.</li> <li>• Waste storage containers shall be covered, tip-proof, weatherproof and scavenger proof.</li> <li>• No burning, on-site burying or dumping of solid waste shall occur. If burning is the only alternative, prior approvals should be obtained by the DOE.</li> <li>• Recyclable materials such as scrap steel, scaffolding material, packaging material, etc. shall be collected and separated by the Contractor on-site from other waste sources for reuse, for use as fill, or for sale only to operators officially licensed to conduct recycling/recovery</li> <li>• Under no circumstances shall the contractor dispose of any material in environmentally sensitive areas, such as in areas of natural habitat or in watercourses.</li> <li>• When removed off site, solid waste or construction debris shall be disposed of only at sites identified and officially designated by the DOE and/or Solid Waste Management authority.</li> <li>• Components such as old transformers, capacitors and other electric equipment, etc. having a remaining useful life are to be stored and/or used at other sites as needed. If such components have no remaining useful life they are to be handled as recyclable materials indicated above. (Note: polychlorinated biphenyls-PCBs-have been outlawed in Belize since the 1990s. In 2008, BEL conducted a PCB testing program and determined all the transformers in their systems were free of PCBs). Nevertheless, in the event a transformer without nameplate is identified, a Chlor-n-oil test should be conducted onsite to determine PCB content. If test results show PCB content above DOE's recommended threshold of 50 ppm, confirmatory testing should be done at an approved laboratory. DOE should also be consulted to guide BEL in the disposal of the equipment and its contents. Follow BEL's procedure for PCB in appendix #1.</li> </ul> |
| <p>Chemical or hazardous materials and/or wastes (spent lubricants, paints, adhesives, solvents)</p> | <ul style="list-style-type: none"> <li>• Used oil and grease shall be removed from site and sold to a recycling company approved by the DOE.</li> <li>• Used oil and lubricants, from the maintenance of any vehicles and machinery shall be stored in sealed labeled drums or collected in holding tanks and removed from site and sold to an oil recycling company approved by the Department of Environment or disposal of through the Solid Waste Management Authority.</li> <li>• Do not use toxic materials, including lead-based paints on any structures: coating materials for steel or concrete structures should be approved by the DOE. Refer to the Pesticide Control Board of Prohibited Pesticides listing.</li> <li>• In the event materials are to be used containing chemicals not previously regulated in Belize, the Contractor should obtain approval by the Pesticides Control Board and/or the DOE.</li> <li>• Asbestos materials are not to be used as either construction (roofs, interior or exterior walls etc.) or insulating materials (piping, ductwork, etc.) in any buildings.</li> <li>• Any existing building containing asbestos materials, the Contractor is responsible for having these materials removed with guidance from the DOE. Refer to the Asbestos Removal Protocol.</li> </ul> <p>Other hazardous wastes are to be stored with appropriate warning labeling at temporary facilities on-site or brought to a central facility at the transfer station</p>  |

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|   | <p>at Mile 3 George Price Highway that is well ventilated with impervious floors and locked when not in use. Final disposal should be done with guidance from the Solid Waste Management Authority and or DOE.</p>   |
| <p>Disruption of vegetative cover and ecological resources<br/>(New building for battery banks)</p> | <ul style="list-style-type: none"> <li>• Areas to be cleared should be minimized as much as possible.</li> <li>• To the extent possible, existing roads/routes to pole sites should be used. If access roads must be established, they should cause minimal disruption to local habitats. The same access road used for construction/installation should be used for maintenance operations</li> <li>• The Contractor shall remove topsoil from all areas where topsoil will be impacted on by rehabilitation activities, including temporary activities such as storage and stockpiling. Any stripped topsoil shall be stockpiled in temporary areas agreed with the Construction Supervision Consultant and be adequately protected from loss by rain, wind etc. Subsequently, topsoil shall be given to BAPCOL and BELCOGEN for reuse in agriculture or backfill where applicable.</li> <li>• Application of pesticides (herbicides) for vegetation clearing and/or maintenance is not permitted, unless approved by the Pesticide Control Board and the DOE. Preference for land clearance/maintenance should be for either manual or mechanical or both.</li> <li>• Disposal of vegetative cover should not be burned, but sent to a government approved site for disposal.</li> <li>• For removal of virgin vegetation, the Contractor shall obtain an environmental clearance or permit issued by the DOE/Forestry department.</li> <li>• When needed, the Contractor shall erect temporary protective fencing to efficiently protect the preserved trees before commencement of any works within the site.</li> <li>• The Contractor shall ensure that no hunting, trapping shooting, poisoning of fauna takes place by Contractor personnel.</li> </ul> |
| <p>Traffic management</p>   | <ul style="list-style-type: none"> <li>• Traffic Management shall be in accordance with BEL's Motor Vehicle Policy section 1.14. In addition to BEL's traffic control measures, during the construction phase of the project, BEL shall seek guidance from the Belize Traffic department in the event: <ul style="list-style-type: none"> <li>a) there is significant increases in vehicle trips</li> <li>b) there is a need to re-route traffic taking into account sensitive areas such as schools and hospitals.</li> <li>c) there is a need to install lighting at night for traffic circulation.</li> </ul> </li> <li>• The Contractor shall place signs around the construction areas to facilitate traffic movement providing direction to various components of the works, and provide safety advice and warning.</li> <li>• If materials are to be transported during rush hour, the Belize Traffic department must be notified by the Contractor and if necessary, provide assistance.</li> <li>• Before rehabilitation activities start, BEL shall carry out consultations with local government and community and with the traffic department.</li> </ul>  |
| <p>Interruption of utility services</p>   | <ul style="list-style-type: none"> <li>• Provide information to affected households on working schedules as well as planned disruptions of water/power at least 2 days in advance.</li> <li>• Any damages to existing utility systems of cable, telecommunications, water supply etc. shall be reported to authorities and repaired as soon as possible. Associated costs shall be the responsibility of the Contractor. (TO BE INCLUDED IN THE PROCUREMENT DOCUMENTS)</li> </ul>  |

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| <p>Restoration of affected areas</p>        | <ul style="list-style-type: none"> <li>• Cleared areas such as disposal areas, site facilities, workers' camps, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works shall be restored by the Contractor using landscaping, adequate drainage and vegetation.</li> <li>• Soil contaminated with chemicals or hazardous substances shall be removed, transported and treated as hazardous waste. Disposal shall be based on documented guidance from the Solid Waste Management Authority.</li> </ul>  |
| <p>Worker and public Safety</p>             | <ul style="list-style-type: none"> <li>• Belize's requirements for worker health and safety will be followed in accordance with the Belize Labor Law, Part XIII: Safety, Health and Housing where applicable. In addition, worker health and safety will be followed in accordance with BEL's Corporate Safety Policy and Standards.</li> <li>• Training workers on occupational safety regulations and provide sufficient personal protective equipment clothing for workers in accordance with applicable Belize laws and BEL's procedure. (Refer to BEL's Personal Protective Equipment Procedure)</li> <li>• Alcohol use by workers during work hours is strictly prohibited</li> <li>• Use of personal protective equipment (PPE) by workers will be strictly enforced.</li> </ul> <p><i>For construction work <u>not</u> being performed within existing BEL/BELCOGEN property fence line:</i></p> <ul style="list-style-type: none"> <li>• The Contractor shall install fences, barriers, dangerous warning/prohibition site around construction areas showing potential danger to the public.</li> <li>• The contractor shall provide safety measures such as installation of fences, barriers warning signs, lighting systems to prevent traffic accidents as well as other risk to people and sensitive areas.</li> </ul>  |
| <p>Communication with local communities</p> | <ul style="list-style-type: none"> <li>• The contractor shall coordinate with local authorities (leaders of local communes, leader of villages) for agreed schedules of construction activities at areas near sensitive places (such as hospitals, schools, libraries, etc.) or at sensitive times (e.g., holidays, weekends, religious festival days etc.).</li> <li>• Copies of these ECOPs and of other relevant environmental safeguard documents shall be made available to local communities and to workers at the site upon commencement of the project.</li> <li>• Disseminate project information to affected parties (for example local authority, enterprises and affected households, etc.) through community meetings before construction commencement.</li> <li>• Provide a community relations contact from whom interested parties can receive information on site activities, project status and project implementation results.</li> <li>• Inform local residents about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, blasting and demolition, as appropriate.</li> <li>• Notification boards shall be erected at all construction sites providing information about the project, as well as contact information about the site managers, environmental staff, health and safety staff, telephone numbers and other contact information so that any affected people can have the channel to voice their concerns and suggestions.</li> <li>• Do not create nuisances and disturbances in or near communities.</li> <li>• In the event there is a nuisance or disturbance, it should be submitted to BEL's Safety, Health and Environment (SH&amp;E) Unit in writing. The notification board should have the email address of the SH&amp;E Unit, where all concerns are documented.</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>Each case will be dealt with in a timely manner no longer than two months after the concern has been received.</li> </ul>   |
| <p>Chance find procedures<br/>(New building for battery banks)</p>                         | <p>If the Contractor discovers sites/artifacts of archeological, historical, significance, including graveyards and/or individual graves during excavation or construction, the Contractor shall:</p> <ul style="list-style-type: none"> <li>Stop the construction activities in the area of the chance find immediately;</li> <li>Notify the Construction Supervision Consultant who in turn will notify responsible authorities in charge of the Cultural Property</li> <li>Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, constant guarding of the site shall be arranged until the responsible authorities take over;</li> <li>Delineate the discovered site or area; (to be done by Dept. of Archeology/NICH</li> <li>Relevant authorities would be in charge of protecting and preserving the site before deciding on subsequent procedures.</li> <li>Decisions on how to proceed shall be taken by the responsible authorities.</li> <li>If the cultural sites and/or relics are of high value and site preservation is recommended by professionals and required by the cultural relics authority, the Project's Owner will make necessary design changes to accommodate the request and preserve the site;</li> <li>Decisions concerning the management of the finding shall be communicated in writing by relevant authorities;</li> <li>Construction works could resume only after written permission is granted from the responsible authorities concerning safeguard of the heritage.</li> <li>Any worker removing or damaging such artifacts; shall be dismissed and subjected to legal action</li> </ul> |
| <p><b>STRENGTHENING THE OPERATIONAL CAPACITY OF LOAD CONTROL &amp; DISPATCH CENTER</b></p> |  |
| <p>Solid Waste Management</p>  | <ul style="list-style-type: none"> <li>Procure quality and certified equipment with test certificates and warranty in accordance with accepted industry standards for eg. National Electrical Safety Code and American National Standards Institute.</li> <li>Support services should be availed from BEL's accepted sources.</li> <li>Solid Waste mainly of packaging and wrappings should be disposed through licensed waste handlers.</li> <li>Where possible re-cycling and re-use should be promoted.</li> <li>Obsolete electrical equipment determined to be free of PCBs or other hazardous materials should be disposed of through a registered and licensed Electrical Waste handler for recycling and not to be disposed into a landfill.</li> <li>Promote waste segregation for obsolete equipment by marking non-hazardous IT waste and hazardous IT waste appropriately. Hazardous IT waste should be managed in a manner previously described)</li> </ul>  |
| <p>Occupation safety and health hazards.</p>   | <ul style="list-style-type: none"> <li>Only trained, competent and authorized staff approved by the HR department, Senior Manager Energy and Material Supply should operate and man the SCADA/EMS system</li> <li>Follow BEL's Standard Protection Code electrical safety rules and regulations. Safe working procedures should be observed at all times.</li> <li>During installation and maintenance of the SCADA/EMS equipment and load switches use the applicable personal protective clothing and equipment based on BEL's PPE procedure.</li> </ul>   |

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|   | <ul style="list-style-type: none"> <li>• Periodic medical tests especially eye tests for the controllers exposed to the Visual Display Units should be conducted annually. Rotation of staff and minimal exposure hours to the Visual Display Units will enhance eye protection. Use of flat screens with anti-glare should be promoted.</li> <li>• Maintain clear markings and hazard communication signals and where necessary auto closure systems in case of emergencies</li> <li>• Proper servicing and maintenance of equipment to ensure their optimal performance and safety</li> </ul> |
| <p>Risk of fire and other emergency situation</p> | <ul style="list-style-type: none"> <li>• Provide dry agent fire protection systems.</li> <li>• Ensure staff is trained in BEL's emergency and preparedness response procedures as it relates to fires.</li> <li>• Ensure fire protection systems are properly labelled and inspected to maintain integrity.</li> </ul> <p>In the event of a hurricane, follow BEL's Hurricane Preparedness Plan.</p>  |

Appendix 1: DOE Transfer of Transformer Oil



**BELIZE**

*Please Quote:*

*Telephone Numbers:* 822-2542/822-2816

*Fax No.* 822-2862

*E-mail:* [envirodept@bel.net](mailto:envirodept@bel.net)

*Department of the Environment*

*10/12 Amburgis Avenue*

*Belizepan,*

*Belize C.B.*

29<sup>th</sup> March, 2006

Mr. Raul Villanueva  
EMR  
Belize Electricity Limited  
Magazine Road  
Belize City

**REF: TRANSFER OF TRANSFORMER OIL**

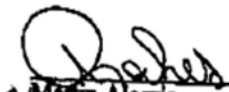
Dear Mr. Villanueva,

The Department of the Environment (DOE) would like to acknowledge receipt of your correspondence (e-mail) dated 29<sup>th</sup> March, 2006, with respect to the above-captioned subject. The Department hereby grants Environmental Clearance, to the Belize Electricity Limited (BEL) to carry out such activity on the condition that the following guidelines are adhered to:

1. Only the from transformers with nameplates stating that "Non-PCB" or "PCB Free" oil will be emptied into the 60,000 gallons tank of used oil. This will be contingent on the fact that these transformers had not been serviced or replenished with oil from older transformers.
2. The content from transformers without nameplate or with a nameplate that does not refer to its PCB content WILL be emptied into a separate water tight container. Prior to these being emptied, the oil from each of these transformers should be tested individually before they are emptied in a common container where cross-contamination can occur. Testing will be done using the Clor-N-Oil kits or by a certified lab capable of doing such tests.
3. Oils found to have a PCB level of less than 50 ppm will be considered PCB free and will be placed inside the 60,000 gallons tank. Copies of the test results must be forwarded to the DOE for their review after which a letter of clearance will be issued granting permission for disposal of the oil within the said tank.
4. Samples of oil found to contain PCB Levels of 50 ppm or greater, will be further tested at a certified laboratory. Should the laboratory analysis indicate that there is a high PCB content, then the oil will be stored in plastic container(s) at the BEL Ladyville Compound. These containers must be water tight, clearly labeled as "Hazardous" and must be stored in a containment area to prevent further contamination should there be any spillages.
5. Oil found to contain PCB Level of over 50 ppm will be disposed of using a qualified contractor that has been approved by the Department of the Environment.
6. All transfers and testing of oil will be done within a contained area to prevent spillages from spreading. All spills will be reported to the DOE and any contaminated soil and/or material will be properly disposed of by a method to be approved by the DOE.
7. Since we have been informed that some of the transformers may still have an electrical charge in them, they must be properly grounded and prepared by BEL personnel prior to anyone opening, testing and/or transferring the oil.
8. All personnel working with transformers and/or transformer oil MUST wear personal protective equipment (PPE) at all times.
9. After completion of this activity, the Department will be informed so that an inspection can be conducted to ensure that the transformers are free of all oil prior to them being exported

Kindly note that subsequent to our final inspection and approval, the Department will issue BEL with a permit for the export of the said transformers. We thank you for your kind attention and cooperation in addressing this issue of mutual concern.

Respectfully,



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Martin Alegria  
Chief Environmental Officer  
Department of the Environment



