



Quality Assurance (QA) Plan

Project Name: **A & C Lines Electric Transmission Rebuild**

January 2014

This Quality Assurance Plan meets and exceeds the requirements of Certificate Condition #146.

STEP 1: Identify important Quality Assurance activities specific to the project using the following questionnaire:

Question:	YES	NO	UNDETERMINED
Is there specialized work to be performed requiring specific worker certifications? <i>(example – certification for welding)</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is there specialized work that warrants a pre-qualification process for contractors or vendors?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Do specifications require any specific factory testing or certifications of equipment or materials prior to shipping?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are pre-shipment inspections of equipment by Central Hudson specified or warranted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Do specifications require any field testing? <i>(examples – testing of breakers, transformers, relays, concrete, compaction, welds)</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is controlled backfill part of the work scope?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are photographs deemed necessary for subsurface work?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
After project is built, is functional testing required? <i>(making sure the product(s) function exactly as intended)</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are there warranties on materials and equipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are contractors (or subcontractors) contractually responsible for quality control of their respective work?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are contractors (or subcontractors) providing materials/equipment for which formal review/approval of such products is warranted? <i>(submittal process)</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Does project warrant a formal Punchlist process near conclusion of project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are there any other quality assurance measures that the Project Team deems appropriate for this project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. <i>Ensure that any materials received with damage are detected prior to installation.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. <i>Ensure that materials received conform with project specifications.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. <i>Post-completion quality control procedures for insulators.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

STEP 2: Use the table below to plan Quality Assurance (QA) for any of the questions answered “yes” above:

PLAN QUALITY: Component Requiring QA	PERFORM QUALITY ASSURANCE: Plan to Check, Measure Quality	PERFORM QUALITY CONTROL: Monitor, Record Assess Performance	Person(s) Responsible*
Materials Warranties	Prior to receiving materials, obtain product warranties from manufacturer of major material products: <ul style="list-style-type: none"> a. Poles and Components b. Insulators c. Conductor 	Review product warranty to ensure compliance with company standards (if applicable). Review for any conditions that are out-of-the-norm for specific type of product, and address as deemed necessary. File all warranties for record and future use.	Kyle Bragg
Insulators Testing	Obtain factory test results of any polymer insulators to be used on the project.	In conformance with Certificate Condition #56 , submit test results to DPS staff upon receipt of the issuance of the Certificate.	Kyle Bragg
Insulators Handling	Prior to Central Hudson’s receipt of insulators from manufacturer, transmission design engineer shall obtain handling and storage instructions from manufacturer.	Handling and storage instructions shall be forwarded to storeroom staff, Central Hudson’s project foreman, and the installation Contractor. Central Hudson foreman shall oversee transportation to the site, and ensure that Contractor’s field personnel are instructed in proper handling and storage.	Kyle Bragg; Central Hudson storeroom; Chris Calogero; Contractor responsible for installing insulators.
Pole Handling	Dragging of new poles is PROHIBITED. Poles shall be handled carefully to avoid any damage using appropriate rigging techniques and transporting in appropriate vehicles or trailers.	Central Hudson foreman shall ensure that Contractor field personnel are aware of this requirement and comply.	Chris Calogero; Contractor responsible for installing poles.

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<p>Structure Layout</p>	<p>Locations of all new pole locations shall be laid out by a certified land surveyor who can ensure and attest to the accuracy of all pole locations in the field.</p>	<p>Should any marked field locations not appear to be in conformance with locations on drawings and/or should have differing locations with respect to surrounding field features, then the transmission design engineer and surveyor shall be notified for resolution prior to hole excavation.</p>	<p>Chris Calogero</p>

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<p>Contractor Quality Assurance (for installation of structures and conductor)</p>	<ol style="list-style-type: none"> 1. Ensure proper language included in Contractor's Request-For-Proposal (RFP) and contract, binding them to quality control for work they perform. Contractor shall be responsible to visually inspect all materials for both damage and defects. Contractor shall be responsible to check that materials being installed are those specified in plans and specifications. In either case, Contractor shall report any deficiencies immediately to Central Hudson. 2. Weekly and monthly visual field inspections performed by Central Hudson. 	<p>Once quality assurance language is included in RFP and contract, then all monitoring and record keeping shall occur as follows:</p> <ol style="list-style-type: none"> 1. Central Hudson foreman shall visually inspect Contractor's work weekly (at a minimum) and ensure that any deficiencies are corrected via direct communications with contractor. Only significant deficiencies that cannot be corrected within a 2-week period will be recorded (via monthly report in conformance with Certificate Condition #144). 2. Transmission design engineer shall visually inspect Contractor's work every-other-week to determine compliance with design, and communicate any deficiencies to Central Hudson foreman, for subsequent Contractor notification. This inspection and monthly reporting shall be in conformance with Certificate Condition #144. Inspections may coincide with monthly site-compliance inspections held with DPS staff, as required by Certificate Condition #78. 	<p>Mike Torcello (RFP and contract administration);</p> <p>Pat Harder (RFP and contract administration);</p> <p>Chris Rottkamp (RFP and contract administration);</p> <p>Chris Calogero (contractor field supervision and weekly inspections);</p> <p>Kyle Bragg (inspections every-other-week)</p>

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<p>Controlled Backfill</p>	<p>After pole hole excavations are made, and prior to pole installation, excavated soils shall be visually inspected to determine if soils are suitable to be re-used for backfill in the pole hole. Excavated soils would not be considered suitable for backfill if:*</p> <ul style="list-style-type: none"> • Visual inspection showed an unusually high moisture content (mud or “soupy”); • Visual inspection showed a significant amount of large rocks that would potentially prohibit proper backfilling, compaction or settling around the structure. • Visual inspection showed a high content of organic matter that would prevent adequate compaction. <p><i>* Reference EM&CP text, 22.2.2 Use of Fill.</i></p> <p>Should excavated soils be deemed un-usable for backfill, then imported backfill shall be used (Item #4 gravel, per drawing detail 6/sheet 18).</p>	<p>Specific monitoring or recording not required.</p>	<p>Contractor responsible for installing poles.</p>

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Materials: Pre-install damage and specification conformance inspections	Perform inspections as described below for each type of material:		
a. Poles and Components	During delivery and off-loading, Central Hudson shall: <ol style="list-style-type: none"> 1. Visually inspect each component for any damage or defects. If any components are received in packaged crates or pallets, then spot checking may occur (minimum 20% shall be checked); 2. Compare components received to both bill of lading and purchase order to ensure components received matches components ordered. <p>Prior to installation, Contractor shall check pole and components to ensure that these materials being installed are same as those specified for that particular structure and location. Discrepancies shall be communicated to Central Hudson foreman immediately for resolution prior to installation.</p>	Written records are necessary only for items that do not pass their quality assurance inspections. <p>In accordance with Certificate Condition #147, within 5 days following completion of inspection that identifies that one or more structures or components purchased for installation did not conform to the specification, Central Hudson shall provide to Staff a report of inspection that includes: (i) a description of the results of the inspection; and (ii) any notes pertinent to the subject matter of such inspection which were made at inspection meetings by Central Hudson personnel and contractors who performed the inspection.</p>	Pat Harder; Contractor responsible for installing poles and components.

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<p>b. Insulators</p> <p>c. Conductor</p>	<p>During delivery and off-loading, Central Hudson shall:</p> <ol style="list-style-type: none"> 1. Visually inspect crates, pallets, reels or similar packaging for any damage that may also damage the insulators or conductor. If any damage is found then notify both the manufacturer as well as the transmission engineer for further review and resolution; 2. Compare items received to both bill of lading and purchase order to ensure items received matches those ordered. <p>Prior to installation, Contractor shall visually inspect insulators and conductor for damage and defects, and also check to ensure that these materials being installed are same as those specified. Damage, defects or discrepancies shall be communicated to Central Hudson foreman immediately for resolution prior to installation.</p>	<p>Written records are necessary only for items that do not pass their quality assurance inspections.</p> <p>In accordance with Certificate Condition #147, within 5 days following completion of inspection that identifies that one or more structures or components purchased for installation did not conform to the specification, Central Hudson shall provide to Staff a report of inspection that includes: (i) a description of the results of the inspection; and (ii) any notes pertinent to the subject matter of such inspection which were made at inspection meetings by Central Hudson personnel and contractors who performed the inspection.</p>	<p>Central Hudson Storeroom Staff;</p> <p>Contractor responsible for installing insulators.</p>

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Optical Ground Wire (OPGW)	<p>Request, receive and review factory-performed testing from manufacturer for each reel of OPGW received.</p> <p>Once product is received by Central Hudson, perform product testing by a certified testing company capable of testing OPGW at the following times:</p> <ol style="list-style-type: none"> 1. Upon receipt at storeroom, and prior to delivery to field; 2. Upon installation of each pull-section prior to splicing sections; 3. Upon final project completion (test entire length from substation to substation). 	<p>Upon receipt of test results, results shall be checked against product standard and expected acceptable results. Should any results be unsatisfactory, then resolve issue through any/all necessary actions such as troubleshooting, repairs and/or product replacement.</p> <p>Re-test as necessary until satisfactory results are achieved.</p> <p>On-site coordination and supervision of the testing company shall be performed by the Central Hudson foreman.</p>	<p>Kyle Bragg; Chris Calogero</p>
Punchlist	<p>As portions of the project are substantially completed (poles in place, new conductor attached), Central Hudson shall develop a Punchlist of items still requiring completion for each portion.</p>	<p>The Punchlist shall be used for the planning of completion of identified work, and be periodically updated as items are completed. At time(s) mutually agreed upon by DPS staff, perform final walkthroughs with DPS staff and continue to amend the Punchlist as needed until all items are complete and verified.</p>	<p>Chris Calogero</p>

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<p>Insulators – Post Construction Once Facilities Are in Use</p>	<p>In accordance with Certificate Conditions #57, 58, 59, 60:</p> <p>57. The Certificate Holder shall provide DPS Staff with the testing procedure used to test insulators once they are installed and are operational. DPS Staff shall be informed whenever this procedure is changed.</p> <p>58. The Certificate Holder shall replace any insulators on the A and C lines covered by this Certificate that fail with ceramic insulators except for insulators damaged by vandalism. The color of the replacement insulator shall be consistent with the original installation color.</p> <p>59. The Certificate Holder shall keep records of any polymer insulators on the A and C lines covered by this Certificate that fail or are replaced for any reason. The records to be maintained shall include: the location of the replacement, the year of manufacture, the year of original installation, the year of replacement, information on the failure or other reason for replacement, and any available information on transportation, storage, and handling. The Certificate Holder shall provide this information to DPS Staff on request. The Certificate Holder shall provide an annual insulator performance report to DPS Staff with the Certificate Holder’s annual Article VII Forecast.</p> <p>60. The Certificate Holder shall provide DPS Staff with the opportunity to examine any polymer insulator on the A and C line covered by this Certificate that fails or is replaced within fifteen days of notification by email and certified mail that the insulator is available for examination. After DPS Staff’s examination or the fifteen day period lapses, any polymer insulator on the A and C Lines covered by this Certificate that fails will be sent to the manufacturer, EPRI, or an equivalent qualified testing facility to perform a failure analysis. DPS Staff will be offered the opportunity to observe such testing. The testing facility shall provide a copy of the resulting report to DPS Staff simultaneously with the Certificate Holder for review.</p>		

*** Qualifications of Responsible Persons:**

- Kyle Bragg: Assistant transmission line engineer with 6-years experience.
- Mike Torcello: Director of electric transmission with 26-years utility experience.
- Chris Rottkamp: Project manager with 22-years construction project management experience.
- Chris Calogero: Transmission line foreman with 28-years experience in electric utility industry.
- Pat Harder: Mechanical engineer with 14-years electric utility experience, 31-years overall engineering experience.