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May 14, 2012

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Re: *In the Matter of PORTLAND GENERAL ELECTRIC Request for Proposals for Capacity and Baseload Energy Resources*  
PUC Docket No.: UM 1535

Enclosed are an original and one copy of Report of the Independent Evaluator for PGE 2012 Capacity Power Supply Resources RFP.

Sincerely,

Stephanie S. Andrus  
Senior Assistant Attorney General  
Business Activities Section

SSA:mme/#3392709  
c: UM 1535 Service List



**REPORT OF THE INDEPENDENT EVALUATOR**



**Portland General Electric Company's  
2012 Capacity and Energy Power Supply Resources RFP**

**May 11, 2012**

Submitted by:

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**REPORT OF THE INDEPENDENT EVALUATOR  
Portland General Electric  
2012 Capacity and Energy Power Supply Resources RFP**

**I. EXECUTIVE SUMMARY**

Accion Group, Inc. serves as the Independent Evaluator (“Accion” or “IE”) for the Portland General Electric (“PGE”) Request for Proposals (“RFP”). As part of our evaluation of the RFP, Accion engineers reviewed the materials provided by PGE for the design and construction of new generation at the Port Westward site and the Carty site. This report addresses the sufficiency of the materials provided for the Engineering Procurement Contract (“EPC”) for construction on the two sites. These materials, without the “owner’s costs”, were reviewed for their sufficiency when used to bid a Build-Own-Transfer (“BOT”) proposal.

The IE reviewed the design specifications provided by PGE, both in draft and final forms, and further conducted site visits at each site. IE engineers met with PGE personnel from the two sites and the Self-build Team engineers to review the design/build specifications. In addition, Accion also met with engineers from the firm advising the PGE evaluation team.

The IE reviewed the site specification documents, the EPC documents and the owner’s costs documents as they were uploaded to the IE website. These materials are available for review by prospective bidders and Intervenors, subject to the execution of corresponding Non-disclosure Agreements (“NDA”). Review by the IE engineers included the designation of documents into the three levels of disclosure, because the designation controls who has access to each document. The IE found the designations to be acceptable.

The IE review was made to determine if the design specifications were sufficient and extensive enough for potential EPC contractors to submit a competitive bid. The IE review focused on identifying any missing or needed documents that would be required by bidders. Any missing or needed documents identified during the review of specifications were reported to PGE for inclusion in the final design specification and EPC. All requested materials were provided by April 27, 2012, with the exception of certain transmission overview maps. The IE believes the final versions released to prospective bidders address all areas that need to be included for bidders. Also, the IE believes the list of owner’s costs identifies in detail the activities that will not be required of an EPC bidder.

It should be noted that the materials are voluminous, as summarized in ATTACHMENT A, *Port Westward II Documents/Port Westward II General Technical Specifications*, and ATTACHMENT B, *Carty Documents/Carty General Technical Specifications*, and provide the details expected for a construction project. The IE notes that some of the materials were provided only ten business days prior to the date this report is to be filed with the Oregon

Public Utility Commission (“Commission”). Accordingly, the review by IE engineers is limited to an overview of what would normally be assembled when designing a comparable generating unit. Finite details, such as the number of cubic yards of concrete or the number and size of conduits, were not reviewed. The IE did not review the data used to calculate the owner’s costs. The IE reviewed the scope of items designated as owner’s costs, and believes the designations are reasonable. Rather, the IE reviewed the materials for sufficiency of the scope and detail, and to confirm that all normally anticipated construction obligations are identified. The division of responsibility between what a bidder must provide and what will be the responsibility of PGE were also reviewed to confirm that all construction elements are identified and assignment of responsibility disclosed.

The IE believes there will certainly be changes in the design, and likely the cost, when any project of this size moves from design to actual construction. The IE believes that a project of this size will require work order changes during construction to account for fluctuating pricing for major components and redesigns that only become apparent during construction. The project contingency is appropriately sized for the scope of work, and the IE believes it should be included as proposed.

The IE believes the documentation provided by PGE is sufficiently complete and provides a bidder with the information necessary to prepare a responsive bid for either a BOT or EPC bid. The owner’s costs identify the portions of the construction for which a bidder will not be responsible, as well as the costs that will be added to each bid, including each self-build proposal. Furthermore, the owner’s costs data confirms that PGE made sufficient arrangements to have a fuel supply for each site and transmission services available when a new unit at either site is operational. The fuel supply and transmission services are contingent, pending determination of the need for services at one of the sites.

The IE believes it is likely that one or more bidders will seek clarification on certain details, if for no other reason than to confirm understanding of the documents. PGE is prepared to provide site visits to each plant, and will provide a “technical review session” at each site. These site visits are intended to provide EPC bidders with the opportunity to confirm understanding of all design materials, and to ensure that full documentation is available. All questions and responses during those site visits and technical review sessions will be provided in written form on the RFP website, so that bidders have access to the same written information.

The IE identified no defects in the documentation, or areas of construction that were unidentified. Accion engineers believe that an experienced construction firm could provide a comprehensive bid using the materials as provided. Also, the IE notes that during evaluation the IE will confirm that any self-build proposal from PGE will be to the same standards and detail. Indeed, since the bids will be received electronically and maintained as individual data

entries, it will be possible for the IE, and the Commission, to review and compare each data entry for fidelity to the bid requirements.

Since the EPC/self-build option is not the only possibility for procuring the necessary capacity for either the flexible capacity or energy need identified in the PGE IRP, the IE sought to identify other elements of the EPC/self-build option that need to be treated equitably with other bidding structures. These considerations include:

- Should a value be assigned to the land at each site?
- Are transmission upgrade costs adequately captured?
- Are a portion of all shared services used during development or construction being assigned to the project?
- Are all other project development costs being excluded from separate cost recovery?
- Are there project risks that these bids may be exposed to that other bidding structures might not be?
- Conversely, are there additional benefits that this structure may bring that other structures may not bring?

Because the purpose of this report is to assess the sufficiency of the design specifications of the two (2) EPC options, the answers to these questions are not germane to this report. However, the IE has reviewed these considerations during the EPC assessment and will address them sufficiently during the evaluation.

## II. RECOMMENDATIONS

The IE offers the following recommendations:

1. If the Commission determines that PGE is to evaluate EPC or BOT bids proposing generating turbines other than the ones identified in the materials provided by PGE, the bidder should be required to identify the proposed alternative to the IE no later than June 15, 2012. Without identifying the prospective bidder, the IE would then share the technical information with PGE and together a review of the hardware would be undertaken. This approach would provide sufficient time for evaluation modeling to be adjusted, as well as time for the IE to seek additional information that may be needed, so the RFP review process would be held to the established schedule. As part of the technical review, the IE would identify for the bidder if there are areas, such as the power island, that need to have additional information provided as part of the bid. This is the approach successfully employed to review alternative technologies, such as the use of batteries.

2. ATTACHMENT C contains a list of possible areas for clarification of the design materials already provided by PGE. The IE is mindful that it is not uncommon for two people to read the same sentence, and each come away with different interpretations. Construction engineers are expected to demand exact and detailed information as they translate design specifications into dollars. The accompanying list includes the sort of questions the IE and the PGE Evaluation Team consultants anticipate could be asked during the technical session that will be held during each of the site visits. The IE encourages PGE to review the list and consider addressing some or all of the items prior to the site visits. However, the IE does not believe any of these items should be taken as a flaw in the drafting of the design specifications and ample opportunity exists for bidders to gain clarifications through the established process.

### III. BACKGROUND AND PROCESS

PGE personnel have planned for the possibility of expansion of generation at both Carty and Port Westward for a number of years. That process included identification of activities and costs that are required "inside the fence", and those that are external and would be provided by PGE, regardless of who builds on the site. The external activities include fuel supply and transmission services, which require years of planning and negotiations with suppliers. The IE believes it is appropriate for these services to be considered owner's costs, and added to each bid, regardless of whether or not they are from a third party bidder or from the PGE Self-build Team. Indeed, requiring bidders to negotiate and provide the fuel supply and transmission path would, in effect, make it impossible for a third party to bid, if for no reason other than the bidder's inability to confirm these services in time to meet the in-service requirement.

Site visits for the IE were scheduled for the Carty Generation Station site and the Port Westward Plant. On April 2, 2012, the IE attended a meeting in the Boardman Plant conference room and a tour of the Carty Generation Station site. PGE engineers provided a review of the proposed construction program, and the site operator provided a site review.

On April 3, 2012, the IE met with PGE engineers and the plant operators at the Port Westward Unit 2. A full tour of the facility and a review of the proposed construction program were provided.

The purpose of the site visits was for the IE to understand the plant site layout, review the design specifications and the owner's cost allocations and the sufficiency of each to meet bidder's requirements to respond to the RFP. The site visits also permitted the IE to determine whether sufficient planning had been performed so that comprehensive design/build specifications would be provided for each specific site.

In both plant visits the IE was escorted by project management personnel and plant operation personnel. The IE was extended full access to any written documentation used in

briefings and allowed to conduct a complete physical examination of the plant site and equipment. The water supply systems were walked and visually examined. The electric transmission systems, the future transmission routing, transmission structural design, switchyard and substation equipment were described during the driving and walking tours of the sites. The gas supply system and routing immediately adjacent to the plants were also described during the plant tour. Lay down areas and potential batch plant locations were noted during the plant tours. Plant security, fencing and construction personnel access to the plant sites during construction were described.

The plant tours were very informative and all relevant information was disclosed to the IE. The meeting and tours gave the IE a clear understanding of the project scope and the future plant site layout. The IE questions were answered in full by the PGE operations personnel and PGE engineering personnel.

Each site visit included a technical session with PGE personal along with the respective plant operators. Representatives of Black & Veatch Engineering, the plant design engineer, and representatives of the Evaluation Team engineer joined the discussions via teleconference.<sup>1</sup>

During the site visits the IE emphasized the importance of uploading the EPC and BOT specifications and related documents to the website as soon as possible. The IE and the Evaluation Team engineers were provided the Port Westward documents starting on April 4, 2012. The bulk of the Carty project specifications were not available until the week of April 22, 2012. Notwithstanding the fact that PGE identified these sites for potential expansion years ago, the IE did not receive any documents to review until after completion of the site visits. In some cases, the IE first received relevant documents when they were released publicly, on April 27, 2012.

The IE made repeated requests for production of the Carty documents, even in draft form, in advance of the April 27, 2012, filing date. Indeed, these requests started in the autumn of 2011. As shown on ATTACHMENTS A and B, some of the documents ultimately provided were in existence since 1975, with the majority created specifically for the RFP. It would have been far easier for the IE to complete review of the designs had more time been available. However, it should be noted that the materials with the longest shelf life are support for owner's cost items, such as transmission paths, and not design/build specifications that will be of most interest to a bidder. The delay in providing the documents was an inconvenience, but the IE does not believe the information was withheld in a deliberate attempt by PGE to obstruct

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<sup>1</sup> During the development of the design/build documents there were discussions with the PGE Self-build Team engineers and representatives of the PGE Evaluation Team. The IE participated in these discussions, either in person or via telephone, and is unaware of any discussions between these parties that were held without the participation of the IE. With the filing of the PGE on April 27, 2012, the IE understands the interaction of these two teams terminated.



the IE's investigation. Rather, from numerous telephone conversations and meetings the IE believes the delay was the product of PGE engineers attempting to have all documentation in final, and by their standards, perfect order before sharing them with individuals from outside of the company. While the IE appreciates the dedication to perfection, Accion believes better cooperation could have been provided during the formative stages of the site design work.

#### **A. The Sites**

Two electric power generating plant sites were identified by Portland General Electric. The Carty Generation Station is a discrete, 90 acres of the 2,400 acre Carty Generating site near the Carty Reservoir and the Port Westward site is located within the Port Westward Industrial area in Columbia County, Oregon.

The Port Westward Generating Plant is located in the Port Westward industrial area in Columbia County, Oregon. PGE currently owns and operates Port Westward Unit 1. Unit 1 is a natural gas fueled, 425 MW, 1 on 1 (one high efficiency CTG and one HRSG). Unit 2 will be one of two technology options. The administrative facilities and existing infrastructure will be utilized and expanded to accommodate the Unit 2 equipment. The IE notes that the site and existing generating facilities are naturally bordered by the river on one side and railroad tracks on another. Any construction on the site will require close coordination and cooperation between the existing operators and the construction crew. While we expect that any firm qualified to build on the site would provide the highest degree of professionalism, there will be challenges in scheduling that any bidder should explore before completing a bid.

#### **B. Sufficiency of Design Information**

The bidders need a conceptual and general plan description, the general design criteria, and the site location and site conditions. For both the Carty and the Port Westward II ("PWII") sites the bidder will also need to know the specific design connections to existing plant systems and those to any common facilities. Bidders must have access to information on the existing plant operation and operations philosophy. They will require a specific, detailed design and scope of civil/structural, mechanical and electrical/control systems construction responsibility and a construction schedule, that is, the critical path plan/schedule. In addition, bidders need a startup and training schedule and the associated division of responsibility.

The detail and volume of material is evident from the following chart.

**Chart 1**

|                         | <b>Total Documents</b> | <b>Total Pages</b> | <b>Total Size (KB)</b> |
|-------------------------|------------------------|--------------------|------------------------|
| <b>Port Westward II</b> | 153                    | 2,109              | 678,6899               |
| <b>Carty</b>            | 84                     | 5,875              | 301,823,761            |

The materials are voluminous, and the IE believes comprehensive and sufficient for use by a qualified firm when pricing these construction options. In the Recommendations, above, the IE identified specific areas that would benefit from additional detail. These clarifications were identified as the IE and the PGE Evaluation Team's engineers compared individual reviews of the materials. This list was compiled in an attempt to imagine the reaction of engineers reading the materials for the first time and before attending a briefing from PGE personnel during a site visit.

The IE anticipates that PGE will address the concerns identified in the Recommendations section, and then provide modified documents. This would be consistent with the opportunity bidders have to request clarifications before bidding.<sup>2</sup> However, it should be noted that the list of possible areas for clarification identified in ATTACHMENT C include the sorts of things PGE should anticipate being raised in the technical sessions during the individual site visits by serious bidders. With that qualifier, the IE believes the documentation provides adequate detail to permit a qualified firm to provide a comprehensive bid. Based on our review of the materials, the site visits and the technical review provided during the site visits, the IE found the materials as provided by PGE to be complete and to provide the detail commonly encountered when undertaking construction of comparable projects. As noted, detail is provided about the owner's costs, even though bidders will not be required to bid to complete those system additions. The identification of items included as owner's costs is complete and should remove any question as to the responsibilities of the bidder.

#### **IV. PORT WESTWARD**

The Port Westward Unit 2 system operating design is to load follow and supply system balance during the operations of wind turbines. The reciprocating electric power generators are required to startup in ten minutes and meet a 30 minute emission compliance guarantee. The Port Westward site presents a unique set of issues because it will have to be integrated into the

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<sup>2</sup> We note that to date no questions have been posted on the RFP website regarding any of the materials posted on April 27, 2012.

existing plant footprint. The Unit 2 construction will not only present a congestion challenge, but will also require precise planning so as not to interfere with the operations of Port Westward Unit 1 during common system (shared systems) connection tie-ins or during maintenance (scheduled and unscheduled) outages on Port Westward Unit 1.

A design basis document as well as reciprocating engine generator specification was written for the Wartsila reciprocating engine generator. The Wartsila reciprocating engine generators were chosen by PGE for their electric output per generator. Each unit is rated at 18.7 MW. Twelve generators will allow PGE to meet the 200 MW (net) system need. PGE does not have operations or maintenance experience with the Wartsila 12X18V50Sg reciprocating engines. The engine is probably the largest engine built and only recently introduced to the market. PGE operating personnel will require more extensive training on the operations and maintenance of the generating units than would be needed for some other turbines, such as the GE models. There is clearly some risk associated with inexperience throughout the initial years of operations and maintenance of the units.

PGE is also considering two aero-derivative combustion turbines as an option for the Port Westward II plant addition. A design basis document and an aero-derivative combustion turbine generator specification were written for two General Electric ("GE") LMS 100 Combustion Turbines. Each unit has a net capacity of 100 MW, which meets the 200 MW system need. Site congestion issues are similar for the combustion turbines. The planning and scheduling issues associated with the continued and uninterrupted operations and maintenance of Port Westward Unit 1 during common systems (shared systems) connection tie-ins are similar. PGE Port Westward Unit 1 operations and maintenance personnel are experienced with aero-derivative combustion turbine generator operations and maintenance. The Port Westward Unit 1 is a 425 MW, 1 X 1 combined cycle plant. The risk associated with the successful and continuous operation and maintenance of the aero-derivative combustion turbine generators are minimal.

The IE has no experience with the Wartsila technology, because it has limited deployment in the United States. During technical sessions, PGE personnel discussed the potential benefits of the technology and explained the due diligence conducted, including a site visit where the Wartsila units are in service. The IE accepts that PGE made the decision to include the Wartsila turbines as possible resources based on legitimate reasons, given the 10 minute start-up requirement, the 30 minute exhaust gas emission compliance requirement and the rigorous annual cycling requirements. The Wartsila 12: 18.7 MW units also offer some availability and forced outage advantages. For example, a forced outage for a 100 MW combustion turbine removes 100 MW from the plant availability. A forced outage for the Wartsila option removes one (1) 18.7 MW generator from the plant availability. The example

implies a potential to achieve a higher annual plant equivalent availability with the Wartsila reciprocating engine generators.

PGE entered into a binding Precedent Agreement (“Agreement”) with North West Natural Gas Company (“NW Natural”) for firm storage capacity in the Emerald Storage Facility in Colombia County, Oregon, NW Natural’s existing Mist Storage Facility. The Agreement provides “no notice service” to the proposed PWII Generating Station for daily injections and withdrawals from the Emerald storage Facility to PWII generating plant. The initial term of the agreement is thirty (30) years, with provisions for a cumulative service term of eighty (80) years. If the PWII power plant is selected, PGE and NW Natural will execute a firm storage agreement and NW Natural will obtain all of the required permits. NW Natural will construct and own the Emerald Storage Facility which would include the development of the new storage reservoirs, the compression station, gathering lines, the pipeline from the Emerald Storage field to a metering station for PWII generating station and all support facilities and equipment. If the PWII generating station is constructed ahead of the commencement date of the Emerald Storage Facility, NW Natural will provide service from the Mist Storage Facility or other sources in sufficient quantities to meet the PGE needs until the Emerald Storage facility is completed. The IE believes that the NW Natural Agreement is adequate and will assure a reliable supply of natural gas for PGE to meet the PGE power generation dispatch needs.

## **V. CARTY**

The Carty site is approximately 2,400 acres. The Carty Generating Station will be designed as a 900 MW natural gas fueled combined-cycle generating plant. The plant is two blocks consisting of one each; one or more high efficiency combustion turbine generator(s) (“CTG”), a heat recovery generator(s) (“HRSG”), a steam turbine generator(s) (“STG”), a water cooled condenser and the associated balance of plant equipment. The Carty Generating station will be designed and constructed for one (1) combined cycle plant (Unit 1), with provisions for an additional combined cycle plant of equal size. The combined nominal rating for the units will be 300 to 500 MW with gas duct firing. Generator transformers would be constructed to step the voltage to 500-kilovolts (kV). Transmission has to be constructed from the new Grassland switchyard to the existing 500-kV Boardman to Slatt transmission with a single or double conductor. Approximately 0.75 miles of transmission and eight (8) transmission towers would be constructed. Two (2) mechanical draft cooling towers would be constructed using the existing Carty reservoir to dispose of waste heat. Natural gas fuel would be supplied to the plant from an existing pipeline operated by Gas Transmission Northwest Corporation (“GTN”). A gas lateral approximately 24 mile, 20” diameter pipe will connect the Carty station to GTN.

The Carty site does not present any site congestion challenges. It is a natural gas-fueled combined-cycle plant designed to produce up to 900 MW of electrical power. The proximity of

the plant is approximately within 3/5 of a mile to 3/4 of a mile from the Boardman Generating Plant. This Carty Generating Plant is located far enough from the Boardman Generating Plant that the Carty plant construction, planning and systems integration could be completed with little disruption to maintenance and operations of the existing Boardman Generating Plant.

## **VI. OWNER'S COSTS**

Placeholder documents with topics and description of the owner's costs were uploaded to the IE website on April 18, 2012. Final owner's costs documents were uploaded to the IE website on April 26, 2012. Review of the final owner's costs documents commenced on April 26, 2012.

The site materials are divided into three categories: Technical Specifications; Site specific data; and Owner's Costs. An overview of the owner's costs is provided with the site specific data for each of the two sites, without, of course, the cost data. The IE reviewed the identification of the items included as owner's costs and found the designations to be appropriate.<sup>3</sup> Bidders will receive the owner's cost data when they commit to submit an EPC bid. However, the summary that is available as part of the site specific data identifies the costs that will be borne by PGE, and in turn assigned to each bid.

The owner's costs designations are presented with descriptive identification. To the extent a prospective bidder is uncertain of the specific delineation between a bidder's responsibility and PGE's, the RFP process provides two opportunities for clarification. The RFP website provides a Question and Answer ("Q&A") option for each of the three categories of participation noted above. Only individuals coded for access to the specific category of data will have access to that specific Q&A "silo", so there will be no inadvertent release of information to anyone who is not pre-authorized for the appropriate level of access. By using the Q&A feature, all participants for each category will have access to the same information at the same time PGE responds to questions. Bidders will also have the opportunity to attend a technical session with PGE engineers as part of a site visit to each of the two plants. Questions asked and answered during the site visits will be made available through the website to persons qualified for that access.

The IE reviewed the owner's costs to confirm that PGE had, in fact, made arrangements for delivery of fuel and transmission services that would permit a third party bidder to have services on the required in-service date. The IE believes the detail of owner's costs information is sufficiently detailed for bidders to know the scope of services that will be provided by PGE, and that sufficient arrangements have been made to permit a unit constructed on either the

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<sup>3</sup> The IE did not review background information that would support the amount designated as owner's costs and did not have access to that information. The determination of actual amounts incurred for each category, should one of these projects be built, will be reviewed by the Commission at a future date when PGE proposes to include a unit in rate base.

Carty site or the Port Westward site, to be accepted by PGE as a service-ready facility on the established schedule.

The owner's costs for the Carty Generation Station represent a comprehensive listing of costs that include annual fixed costs, outage maintenance costs, and total variable costs. Project management costs, plant startup and commissioning costs, legal, IT, facility, permitting and environmental costs were defined and quantified as the owner's costs.

Natural gas supply, gas lateral permitting, gas lateral (24.2 miles) costs and transport costs placeholders are included as owner's costs. Additionally, the electric transmission and substation costs (AFUDC-TBD) are listed as owner's costs. Other owner's costs include:

- site development costs;
- initial fills and material purchases;
- initial capital spares (operational);
- initial capital spares for long-term service agreement ("LTSA");
- environmental mitigation;
- outside services and testing;
- carbon offset payments;
- regulatory licenses and fees;
- permanent plant equipment and tools;
- Boardman Co-Owners payments;
- pre-COD LTSA costs, owner's contingency; and
- placeholders for builders' risk insurance.

Test fuel and test power revenue, as well as capitalized property tax, are also included as owner's costs. The IE believes the owner's cost estimates and contingencies are reasonable and are categorically accurate for the project.

Owner's costs for the Port Westward Unit 2 were prepared for both the reciprocating energy technology and the combustion turbine technology. The smaller scale project, as an addition to the existing site, was considered in a comprehensive list that included total annual O&M fixed costs and total annual O&M variable costs for both technologies. Project management costs, plant startup and commissioning costs, owner engineer and miscellaneous consultant costs, IT costs, facilities costs, and permitting and environmental compliance costs are included as the owner's costs for each of the two technologies. Gas supply costs, transmission and substation costs are included as owner's costs. Plant site development costs, initial fills and material purchases, initial capital spares environmental mitigation, site services and testing, CO2 offset payments, IT and communications costs, and pre-COD LTSA costs were identified as owner's costs. The project contingency and placeholders (TBD) for builders' risk insurance, test fuel and test power revenue, capitalized property taxes and allowance for funds

during construction (“AFUDC”) were identified as owner’s costs. The owner’s costs estimates and contingency are reasonable and categorically accurate for the project. Note that there are expected variances in costs, given the differences in the two technologies. This list of the owner’s costs is included with the site specification and is available to bidders before they decide whether to request the actual cost delineation.

## **VII. TURBINES**

PGE identified specific turbines by make and model which the company believes would be appropriate for addition to the fleet. These selections were based on PGE personnel’s experience with existing units, and the exploration of alternatives, such as the Wartsila turbines. Also, PGE provided the IE with confirmation that at least one turbine manufacturer declined to provide responsive information, resulting in one less turbine design for consideration.

There are legitimate reasons to limit the variety of turbines included in a generation fleet. Reasons for limitation of turbine variety include existing long term service agreements, familiarity of personnel with particular turbines to limit training and spare part investment, and, in addition, the availability of turbines. The IE is mindful of the Commission’s position on permitting bidders to propose alternatives to the turbines identified by the purchasing utility, and has addressed this matter with PGE personnel. At the same time, the IE does not question the appropriateness of the turbines identified by PGE for the identified uses. With the exception of the Wartsila reciprocating engine generator, Accion engineers have experience with the operation and maintenance of combustion turbines and combined cycle construction.

Should the Commission require that PGE must consider alternative turbines, its directive will be honored and the evaluation modeling will be redesigned to accommodate additional comparisons. At the same time, the IE believes it would be appropriate for prospective bidders to be required to disclose their intent to propose a different turbine well in advance of the bid date, and further, to share the make and model of each alternative turbine. This would provide the PGE evaluation team and Accion more time to prepare the evaluation modeling, and to gather information necessary to include the alternative turbine as part of a timely evaluation. As presented with Recommendations, above, the identity of an alternative turbine could be provided to the IE, who in turn would share the information with the PGE Evaluation team, without disclosing the identity of the prospective bidder.

## **VIII. TRANSMISSION**

The IE reviewed the planning done by PGE to meet the transmission requirements for additional generation at the Carty site. This review centered on existing documents and filings, and concentrated on the transmission additions for Cascade Crossing and for South of Allston.

The need for these proposed projects, and proposed costs, was examined. Transmission path contract availability was also reviewed. PGE transmission planning process documents were reviewed and updates were requested. Updates were also requested for more recent cost estimates for the Cascade Crossing and South of Allston transmission project additions. This analysis led to a follow-up request for more information and a discussion with PGE transmission planning staff.

The review established the following:

- The request for incremental transmission capacity across South of Allston was withdrawn in January of 2011;
- At present PGE does not have any conditional firm transmission capacity under contract, but bidders are not precluded from submitting bids using such contracts as a bridge of firm transmission;
- Key transmission cutplanes are fully subscribed;
- The decision on whether to build Cascade Crossing will not be made until after the results of the RFPs are available, thus PGE is not able to establish a future transmission rate for Cascade Crossings;
- The only bids that will be able to rely on Cascade Crossing are bids that use the Carty site, these bids would also be able to use BPA transmission to deliver energy to PGE loads; and
- Cost estimates for the construction of Cascade Crossing were updated on November 23, 2011, and the range of cost provided by PGE for the single circuit configuration appears to be reasonable. A range is provided to accommodate the possibility of different routes. The range of cost provided for the double circuit was similarly reasonable, and also accounted for the possibility of different routing.

The IE notes that during the initial review of the RFP documents some parties raised concerns regarding the allocation of Cascade Crossing costs, expressing the fear that those costs would not be fairly allocated. The IE's review included determination of the existence of a plan for a transmission path, and whether that plan provided sufficient detail. Also, the IE reviewed the data provided in the owner's costs regarding the apparent reasonableness of the costs presented for the scope of work required to complete the transmission interconnection. The IE did not complete an exhaustive review of the owner's costs because all bids, regardless of the source, will have the same costs assigned. While the IE believes the range of costs identified for the Cascade Crossing interconnection appear to be reasonable, the IE offers no opinion on how the Commission should allocate those costs should the extension be constructed. Rather, the IE understands that determination would be the subject of evidentiary hearing before the Commission, and as such it would be inappropriate for the IE to offer an opinion in the context of this review. If the Commission determines that the Cascade Crossing



is to be constructed, the IE understands the issue of cost allocation will be addressed at that time.

## **IX. CONCLUSION**

The IE reviewed the materials provided by PGE for the possible generation additions at Port Westward and Carty. The design/build specifications are voluminous and provide sufficient detail to permit a knowledgeable engineering firm to prepare a comprehensive and conforming bid at either site. The owner's cost materials are of sufficient detail that bidders will know which aspects of the projects are the responsibility of PGE, and not the bidder. Similarly, the owner's costs provide sufficient detail to assure the bidders that PGE has plans in place that would permit a bidder to meet the in-service obligation at either site.

In every instance PGE provided the information requested by the IE, with the exception of a detailed transmission corridor map that is still in development. The IE would have preferred a more timely production of existing documents, but does not believe the delay in delivering materials to the IE was intended to hinder review.

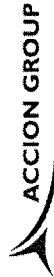
The IE expects that serious bidders will attend the site visits and the accompanying technical session at each site, and will use the opportunities to seek clarification of details. While the IE provides a list of areas that could be clarified with additional detail (ATTACHMENT C), these are possible clarifications that may be helpful to serious bidders, but should not be seen as a suggestion by the IE that any of the documents are flawed. Rather, the list is the sort of clarifications the IE anticipates will be sought during a site visit technical session.

The IE found the transmission-related data to be consistent with industry standard data and was adequate to establish that PGE has a plan for completing transmission interconnection, should construction be undertaken at either site. The information, including transmission cost estimates, was in sufficient detail to permit a competent bidder to prepare a comprehensive and conforming response.

**ATTACHMENT A**

**Port Westward II Documents/Port Westward II General Technical Specifications**

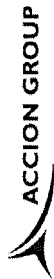
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**ATTACHMENT B**

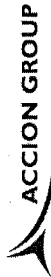
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|           | S-06-08_Ex_A_Att_F_Approved_Vendors_and_Service_Suppliers_List_R0_NDA1.pdf | 26474    | 10          | 4/26/2012 4:22:12 PM | 110  | 4/25/12      |
|           | S-06-10-02_Ex_A_Att_H2_Boardman_Ref_Drawings_Site_R0_NDA1.pdf              | 9235696  | 14          | 4/26/2012 4:22:47 PM | 91   | 4/3/12       |
|           | S-06-36_Ex_A_Att_M001_Combustion_Turbine_and_Auxiliaries_R0_NDA1.pdf       | 171058   | 46          | 4/26/2012 4:22:57 PM | 111  | 4/26/12      |
|           | S-06-38_Ex_A_Att_M003_Steam_Turbine_and_Auxiliaries_R0_NDA1.pdf            | 154563   | 39          | 4/26/2012 4:23:06 PM | 112  | 4/26/12      |



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|  | S-06-53_Ex_B_Att_A_Switchyard_and_Transmission_Drawings_R0_NDA1.pdf     | 20392693         | 17          | 4/26/2012 4:24:04 PM  | 113  | 3/6/12       |
|  | S-01-71-01_Data_to_Be_Submitted_with_Bid_R0_NDA1.xlsx                   | 66446            | 7 sheets    | 4/27/2012 11:19:02 AM | 247  | 4/25/12      |
|  | S-01-71-02_Data_to_Be_Submitted_with_Bid_Critical_Features_R0_NDA1.xlsx | 44705            | 2 sheets    | 4/27/2012 11:19:10 AM | 249  | 4/25/12      |
|  | S-01-71-02_Data_to_Be_Submitted_with_Bid_Critical_Features_R0_NDA1.pdf  | 107226           | 15          | 4/27/2012 11:19:31 AM | 97   | 4/25/12      |
|  | S-06-50_Ex_A_Att_G003_Project_Controls_Requirements_R0_NDA1.pdf         | 32098            | 4           | 4/27/2012 1:48:00 PM  | 284  | 4/25/12      |
|  | S-06-02_Ex_A_Plant_Design_Basis_Document_R0_NDA1.pdf                    | 1461592          | 273         | 4/27/2012 1:48:21 PM  | 98   | 4/25/12      |
|  | S-06-03-01_Ex_A_Att_A1_Site_Certification_Application_R0_NDA1.pdf       | 296895575        | 1783        | 4/27/2012 2:38:55 PM  | 286  | 2/2011       |
|                                                                                     | <b>Total</b>                                                            | <b>301823761</b> | <b>5875</b> |                       |      |              |



**ATTACHMENT C**  
**Major Comments to Specifications**

| Item # | Document #               | Section in Document               | Potential Area for Clarification                                                                                                                                                       | Suggested Clarification                                                  |
|--------|--------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 1      | General                  | Multiple Documents                | Details of Unit 1 equipment and systems which must be interfaced with or modified during Unit 2 EPC should be provided.                                                                | Can more details be provided for Unit 1 equipment that will be modified? |
| 2      | S-01-71-01               | Maximum Load Expected Performance | Bidder is to provide data for expected performance for Summer Peak Conditions with evaporative coolers at 0% makeup. Evaporative coolers will have makeup.                             | Please clarify if makeup is required.                                    |
| 3      | S-03-25                  | 10.8 Operator Control Console     | It is not clear who will purchase Control Room console furniture                                                                                                                       | Please clarify who is responsible to purchase the control console.       |
| 4      | S-04-11                  | Section 3.2.21, bullet 6          | This section indicates all cable trays must be aluminum which is not customary near cooling towers.                                                                                    | Please clarify if fiberglass trays are required for cooling tower area.  |
|        | S-04-11                  | Section 2.2.3 para 3              | System Definition WSA discusses the addition of a clarifier, and this is not discussed in the Design Basis Document, nor shown on the PFD's                                            | Please clarify.                                                          |
|        | S-04-11 and S-05-11      | Table 3-1, line 1                 | Use of carbon steel up to 800F is not commonly allowed.                                                                                                                                | Please verify this is acceptable.                                        |
| 5      | S-04-12                  | 3.7                               | The list does not address an uninstalled spare which is also required                                                                                                                  | Please clarify if 3 GSU's are required.                                  |
| 6      | S-04-13-01               | 1.4                               | Required spares for MCC are defined in 3.2.9 of S-04-11, but this says none are required.                                                                                              | Please clarify.                                                          |
| 7      | S-04-14-02 and 03 and 08 | Engine Hall                       | Explain the note on item 18 rupture disk which indicates typical of 25, when other documents identify two per engine (only 22 shown on drawing); S-04-14-08 indicates 52 are required. | Please clarify.                                                          |
| 8      | S-04-21                  | Section D100                      | Does not match those in the DBD (S-04-11) Table 2-1                                                                                                                                    | Please clarify.                                                          |



|    |            |                                  |                                                                                                                                                                   |                                                                            |
|----|------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
|    | S-04-21    | Section 15562.2.8                | The first sentence isn't clear; should it be "on-engine"? Also, isn't the GRU included with the engine rather than being separate?                                | Please clarify wording and verify if GRU's are "separate" or "integrated". |
|    | S-04-21    | Section 15562.2.8.3              | Supply pressure of 90-100 psig conflicts with System Definition FGA (S-04-13-18 section 1.4) which calls for 64-125 psig                                          | Please clarify.                                                            |
|    | S-04-21    | Section 15562.19.10 Overpressure | One rupture disk is specified, but the PFD and other documents have two in the exhaust system                                                                     | Please clarify.                                                            |
| 9  | S-04-21    | Section 11509.2.1                | No CO rate is given in Section 15132                                                                                                                              | Can CO rate be provided?                                                   |
|    | S-05-11    | Section 1.2, para 19             | Stack height is 80 ft above MSL. S-05-21 has 90 ft above grade and by Supplier; air permit is 40'.                                                                | Please clarify.                                                            |
|    | S-05-11    | Section 3.1.8.1                  | The site arrangement drawing shows an Oil-Water Separator for each GT block, but the text was modified to identify one OWS. PFD shows one OWS.                    | Please clarify.                                                            |
| 10 | S-05-12    | 3.7                              | Design Basis Document states "three two winding three phase GSU transformers" while DOR shows two transformers                                                    | Please clarify.                                                            |
| 11 | S-05-13-09 | page 4, end                      | Use of Unit 1 blowdown to keep Unit 2 basin from freezing is not clearly defined.                                                                                 | Can more details be provided?                                              |
| 12 | S-05-13-23 | Tank coating                     | Epoxy coating is normally used for demin water in CS tank                                                                                                         | Please clarify if requirement for epoxy coating if necessary.              |
| 13 | S-05-15    | FGA system                       | The drains from Unit 2 slug catchers and compressor suction scrubbers are routed to Unit 1 drain tanks, but not shown on tie-point list S-03-12.                  | Can additional information be provided and added to S-03-12?               |
|    | S-05-15    | WSH system                       | This spec references an Engine Hall Wall which we do not think is present. It also states supply to Unit 2 is from Beaver, not Unit 1 as shown on Tie-point list. | Please clarify.                                                            |

|    |         |                                                                 |                                                                                                                                                                                                                                                             |                                                                                                    |
|----|---------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|    | S-05-15 | WSA system                                                      | New clarifier and associated booster pumps not shown but discussed in System Definition WSA                                                                                                                                                                 | Please clarify.                                                                                    |
| 14 | S-05-21 | Section 01500.1.5                                               | This section allows the use of threaded connection to GE's skid.                                                                                                                                                                                            | Please verify use of threaded connections is acceptable.                                           |
|    | S-05-21 | Section 15562.2.15                                              | This section mentions factory FSNL test, but that is not listed in 15562.2.5.2 Factory Tests.                                                                                                                                                               | Please clarify.                                                                                    |
|    | S-05-21 | Section 15132.1 and Section 15562 Specification Sheet           | Different number of unit starts (400-700 vs 300-400) and operating hours (3000 vs 3000-4000) in the two places.                                                                                                                                             | Please clarify.                                                                                    |
|    | S-05-21 | Section 15135 Specification Sheet and 15562 Specification Sheet | Stack height is specified as 90 feet in 15562.3 with no mention of ID; in 15135.2.9 the height is left up to the Supplier and ID is stated as 13.5'. The air permit states the CTG exhaust stack height is 40' with a 15' diameter.                         | Please clarify.                                                                                    |
| 15 | S-06-02 | Section 1.3                                                     | Performance guarantees values for electrical output and heat rate are not specified.                                                                                                                                                                        | Please provide performance guarantee values if required.                                           |
|    | S-06-02 | Section 2.1.2                                                   | Design Criteria for rainfall is 2 inches for a 24 hour duration. Confirm this design criteria is for a 25 year/24 hour event. Reason: Design of storm water swales (Section 2.2.5) is required to be a rainfall cycle of 25 years (duration not specified). | Please clarify.                                                                                    |
|    | S-06-02 | Section 3.1.3.2                                                 | Recirculation system is to consist of one 100% capacity recirculation pump. Per Section 2.3.1, OEM equipment shall be designed with full redundancy of all equipment and systems.                                                                           | Please confirm redundancy is not required for HRSG recirculation pump.                             |
|    | S-06-02 | Section 3.1.5                                                   | General Comment: DBD does not identify standards to which any storage tank or vessel is to be designed and constructed (e.g. demin storage tank shall be per AWWA D100).                                                                                    | Please identify standards or codes applicable to tank or vessel design and construction if needed. |

|         |                               |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                  |
|---------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S-06-02 | Section 3.1.8.2               | DBD document states that the boiler blowdown tank be sized for a maximum blowdown flow and a 0.5 psig back pressure. This design requirement differs from The National Board of Boiler Inspectors (NBBI) Guide for Blowdown Vessels (NBBI document NB-27).                                 | Please clarify if revision to match NBBI document NB-27 for a MAWP of 50 psig and openings sized such that the pressure within the vessel will not exceed 5 psig is appropriate. |
| S-06-02 | Section 3.1.9.3.c             | Section states that one (1) 100% dual tower desiccant type air dryer shall be provided. RFP conceptual P&ID, Equipment List, and System Description (Section 3.6.4) indicates two dryers are to be provided.                                                                               | Please clarify.                                                                                                                                                                  |
| S-06-02 | Section 3.1.10.3.6            | It is not standard practice to install water based suppression systems in electrical rooms or control rooms. More damage could be caused to sensitive or critical electrical equipment due to water spray than by the fire.                                                                | Please advise if a non-water-based suppression system could be considered.                                                                                                       |
| S-06-02 | Section 3.1.11.1 and 3.1.11.2 | Sections state that chemical feed systems are to be located inside chem feed building(s). Conceptual P&IDs indicate some systems are indoors (via bldg wall break) and some are not.                                                                                                       | Please clarify.                                                                                                                                                                  |
| S-06-02 | Section 3.1.12.1              | Section states that the service water system shall be comprised of carbon steel piping. No other piping materials is discussed although HDPE is typically used for underground portions of this system.                                                                                    | Please advise if HDPE pipe material for the underground service water system piping could be considered.                                                                         |
| S-06-02 | Section 3.1.xx                | There are not sections that clearly discuss Contractors scope of supply regarding components/system requirements for Nitrogen, Hydrogen and CO2 storage systems. Section 3.1.21 is vague and refers to cylinder racks but Section 3.6.20.1.4 talks about CO2 and H2 trailer parking areas. | Please clarify storage system design requirements and contractor's scope of supply as needed. Should considerations be given to CO2 refrigerated storage units and vaporizers?   |





|    |            |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                          |
|----|------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 16 | S-06-05    | Section 4 -<br>Procurement                   | Not all major pieces of equipment to be procured by EPC are identified (e.g. auxiliary boiler, ammonia storage and transfer equipment, boiler feed pumps, fire pumps, fuel gas conditioning equipment, water storage tanks, condenser vacuum equipment, etc.). The catch-all "BOP Equipment" in Section 4.16 is subjective if not defined elsewhere (e.g. systems and equipment as shown on the RFP P&IDs or as listed in the Equipment List). | Can major BOP systems and equipment to be procured by EPC be identified? |
| 17 | S-06-07    | Terminal Point List                          | Terminal Point Number T4 is indicated as "not Used" but is still shown as a fire water tie point on general arrangement drawing 1STA-S1000.                                                                                                                                                                                                                                                                                                    | Please clarify.                                                          |
|    | S-06-07    | Terminal Point List                          | Terminal Point Number T10 is indicated as "not Used" but is still shown as construction power tie point on general arrangement drawing 1STA-S1000.                                                                                                                                                                                                                                                                                             | Please clarify.                                                          |
| 18 | S-06-14    | Carty Overall 1-line diagram                 | STG ISO PHASE BUS DUCT 1GTA-IBS-003 shows rating of 1200A however a rating of 200-500A appears to be appropriate.                                                                                                                                                                                                                                                                                                                              | Please verify required rating.                                           |
|    | S-06-14    | Carty Overall 1-line diagram                 | CTG ISO PHASE BUS DUCT 1GTK-IBS-003 shows rating of 1200A. This seems high. 800A rating should be sufficient.                                                                                                                                                                                                                                                                                                                                  | Please verify required rating.                                           |
|    | S-06-14    | Carty Overall 1-line diagram                 | GSU X winding shows rating of 285MVA, which is good for ~9,000 amps @ 18KV. CTG ISO PHASE BUS DUCT 1GTK-IBS-002A shows 12,300A however 9000-10000A seems more appropriate.                                                                                                                                                                                                                                                                     | Please verify/confirm that this isophase rating is desired/required.     |
|    | S-06-14    | Carty Overall 1-line diagram                 | GSU Y winding shows rating of 205MVA, which is good for ~6,500 amps @ 18KV. STG ISO PHASE BUS DUCT 1GTA-IBS-002A shows 7,300A.                                                                                                                                                                                                                                                                                                                 | Please verify/confirm that this isophase rating is desired/required.     |
| 19 | S-06-30-01 | STANDBY XFMR SPEC, SECTs 1.2, 1.7, 1.9, 1.10 | The following ratings are not specified: MVA, Surge Arresters BL, CT's, Impedance                                                                                                                                                                                                                                                                                                                                                              | Please provide the ratings, if available.                                |






|    |            |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                      |
|----|------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| 20 | S-06-30-02 | UNIT AUX XFMR<br>SPEC SECTS 1.2, 1.7,<br>1.8, 1.9, 1.10 | The following ratings are not specified: MVA, Surge Arresters, Bushings, CT's, Impedance                                                                                                                                                                                                                                                                                                                                   | Please provide the ratings, if available.            |
| 21 | S-06-30-03 | GSU XFMR SPEC,<br>SECTS 1.2, 1.7, 1.8,<br>1.9, 1.1      | The following ratings are not specified: MVA, Surge Arresters, Bushings, CT's, Impedance                                                                                                                                                                                                                                                                                                                                   | Please provide the ratings, if available.            |
| 22 | S-06-33    | MV SWGR SPEC,<br>SPECIFICATION<br>SHEETS                | Spec shows SUS XFMR Breaker current rating of 720A; Per 1-Line drawing, SUS XFMR rating is 2667KVA, thus 400A breaker should be sufficient                                                                                                                                                                                                                                                                                 | Please verify the breaker current rating is correct. |
| 23 | S-06-46    |                                                         | Comments to Document are as follows:<br>(1) Specification does not address equipment required for emergency and rescue purposes.<br>(2) Specification does not address shower/eyewash combination units.<br>(3) Marking requirements are not addressed.<br>(4) Containment sizing is not specific in regard to rainfall (e.g. 25 year/24 hour event?).<br>(5) Spill Containment for truck unloading area is not addressed. | Please clarify.                                      |

CERTIFICATE OF SERVICE

I hereby certify that on the 14<sup>th</sup> day of May, 2012, I served the foregoing Report of the Independent Evaluator for PGE 2012 Capacity Power Supply Resources RFP upon the persons named on the service list below, who have waived such service by mail, by serving a full, true and correct copy thereof at their e-mail address, as follows.

|                                                                                                                                                                                                     |                                                                                                                                      |                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
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DATED: May 14, 2012

  
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