



Civil/Mechanical Engineering
Steam Distribution Engineering
Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N.Y. 10003

SPECIFICATION S-11996-1

REQUIREMENTS FOR STEAM CUSTOMER SITED STEAM SUPPLY PILOT PROGRAM

SERVICE UNDER STEAM TARIFF RIDER G

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SECTION I. DEFINITIONS

- 1.0 “Anniversary Date” is the first day of the calendar month during which the Customer first exported steam to the Company.
- 2.0 “Blowdown” means the process of removing contaminants from the liquid phase of process fluid, used for the future of steam production, when chemical limits are approached or exceeded.
- 3.0 “Chemical Carryover” means the process by which contaminants from CHP water are transferred to steam. There are two types of carryover: vaporous carryover and mechanical carryover. Vaporous carryover is the process by which contaminants from the CHP water enter the steam phase because they are soluble in steam. Mechanical carryover is the carryover of droplets of CHP water into the steam.
- 4.0 “CHP” (Combined Heat and Power) means technology that captures waste heat as a byproduct of electric production. For the purposes of this program waste heat is used to heat water to generate high pressure steam. Applicable technologies used within the CHP process are, Gas Turbines, Micro Turbines, Steam Turbines, and Reciprocating Engines.
- 5.0 “Company” means Consolidated Edison Company of New York, Inc.
- 6.0 “Company EMS (Energy Management System)” is the name of the Supervisory Control and Data Acquisition (SCADA) Energy Management System used by the Company to operate the steam system.
- 7.0 “Condensate (System)” for the purpose of this procedure, means any condensed steam that is being re-used for example as in the steam cycle production or being discharged. Total condensate also includes the any condensate collected from various devices including but not limited to: drip pots, steam traps, moisture separator outlet, etc.
- 8.0 “Conductivity” for the purpose of this procedure, is a measurement of condensate and feed water purity. The units of conductivity are microsiemens/cm ($\mu\text{S}/\text{cm}$).
- 9.0 “Contracted Export Quantity” or “CEQ” is the quantity of steam, expressed in Mlb/hr, that the Customer contracts to export in each calendar month over a 12-month period commencing on the Anniversary Date. An CEQ shall be neither less than 2 Mlb/hr nor more than 40 Mlb/hr. “NYISO” is an acronym for the New York Independent System Operator a not-for-profit corporation established pursuant to the ISO Agreement.
- 10.0 “CSS” is an acronym for Customer Sited Supply.
- 11.0 “Customer” includes both a present consumer of and an applicant for the Company's steam service or the provider of steam under this Specification. For the purpose of this Specification a Customer Sited Supplier may be interchangeable with Customer. It may also refer to a third party the customer designates to act on its behalf related to matters under this procedure; for example, a Consulting Engineer, or a Registered Architect, or Managing agent of the Customer Sited Supplier.
- 12.0 “Delivery Point-Steam” or “Point of Exit” is used interchangeably throughout the procedure and it represents the steam export mechanical interconnection location between the Customer and the Company.
- 13.0 “Design Limits” are maximum pressures and temperatures at which the steam system is designed to operate continuously.
- 14.0 “Desuperheating” means a process used to control steam temperature, accomplished by spraying water into the steam. This may be done by attenuating sprays within CHP system or desuperheating stations prior to steam being sent out either to Steam Customer's Building (Host Load) or the Company's steam distribution system.

- 15.0 "DNP-3" is a communication protocol, used by the Company, to transmit data from point A to point B, using serial and IP communication. It is indented for SCADA (Supervisory Control and Data Acquisition) Application and typically used by utilities.
- 16.0 "DOB" is an acronym for New York City Department of Buildings.
- 17.0 "ECC" or "Company ECC" is the Company's Energy Control Center. The Energy Control Center is Con Edison's central location or alternate location for monitoring, operating, and managing the activities on the bulk power system, the electric distribution system, and the steam system.
- 18.0 "Excursion" means an exceedance of the required steam pressure, temperature or steam purity and quality design limits.
- 19.0 "High Pressure Steam System" is a steam piping system operating at a pressure more than 15 psig as defined by the NYC Department of Buildings.
- 20.0 "Maintenance Outage" is an outage that can occur any time during the year with approval from Con Edison, has a flexible start date, has a predetermined estimated duration, and is usually much shorter than a planned outage. The start and end date must be agreed upon before it is granted.
- 21.0 "Maximum Steam Export Quantity" is the highest value of the Contracted Export Quantity, used to determine the Contract Demand under this Pilot.
- 22.0 "Meter" means the steam-metering device used by the Company to measure the service supplied to the Customer, including any equipment furnished by the Company as part of such metering device.
- 23.0 "Mlb" equals 1,000 lb, lb = pounds. The pound or pound-mass (lb) is a unit of mass. It is mostly used in the procedure in reference of the steam flow rate, expressed in Mlb/hr.
- 24.0 "NERC" is an acronym for the North American Electric Reliability Corporation.
- 25.0 "New Customer" is a customer who was not the last previous Customer at the premises to be served, regardless of whether such Customer previously was or is still a Customer of the Company at a different location.
- 26.0 "Planned Outage" is an outage that is scheduled in advance and is of a predetermined duration, lasts for several days or weeks and occurs only once or twice a year. Unit overhauls or inspections are typical planned outages.
- 27.0 "Point of Entry" (POE) is used interchangeably with the term "point of service termination" "Point of Service Termination" means the point at which the Company terminates its service line and the Customer piping begins.
- 28.0 "ppm" is an acronym use to represent "parts per million". It is the unit of measurement for steam contaminant. One ppm is equal to one milligram of contaminant per liter of condensed steam. One PPM equals 1,000 parts per billion (ppb). A ppb is an alternate unit of measurement for steam contaminant.
- 29.0 "Primary operating period" is: (a) all hours during the calendar months of December through March, plus (b) Monday through Friday, 6 am to 6 pm, during the calendar months of April through November.
- 30.0 "PSC" is an acronym for the New York State Public Service Commission.
- 31.0 "Rate Schedule", also sometimes referred to as the "Tariff" means the Company's Schedule for Steam Service as filed with the New York State Public Service Commission.

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- 32.0 "RTU" is an acronym for Remote Telemetry Unit and is the cabinet or enclosure that houses the electronics used for measuring and sending data and control signals electronically over a telecommunications line.
- 33.0 "Rules" or "Regulations" or "Rules and Regulations of the Public Service Commission" or "16 NYCRR" or any combination thereof, refer to the rules and regulations duly adopted by the Public Service Commission for publication in Title 16 of the State of New York Official Compilation of Codes, Rules and Regulations (NYCRR), and to any lawful orders of the Public Service Commission.
- 34.0 "Secondary operating period" is all hours during the calendar months of April through November except for Monday through Friday, 6 am to 6 pm.
- 35.0 "Service Line" means the pipes and equipment used for delivering or receiving steam between the Company's distribution system and Customer's building or premises.
- 36.0 "Service" or "Steam Service" means the supply of steam provided by the Company.
- 37.0 "Steam Distribution System" or "Company Steam System" means the system piping and fittings existing between the boundaries of the Steam Operations production facility property line and the Customer's property line.
- 38.0 "Steam Host" is the recipient of steam production.
- 39.0 "Steam Percent Quality" means the percentage of steam in a steam and water mixture.
- 40.0 "Steam Purity" represents the level of steam contaminants, which are any matter present in the steam other than water or water vapor. Chloride, sodium, magnesium, phosphate, sulfate and calcium ions are steam contaminants.
- 41.0 "Steam Tables" are tables of steam properties, including specific volume, enthalpy, and entropy for varying pressures and temperatures.
- 42.0 "Transient Operations" refers to the shut down or startup mode of the CHP, where steam output is increasing or decreasing within given ramp rates.

SECTION II. GENERAL REQUIREMENTS FOR CUSTOMER SITED SUPPLY

1.0 APPLICABILITY

- 1.1 This specification ("Customer Sited Supply Procedure") applies to a CHP facility that captures the heat waste as a byproduct of electric production and has or will have an application for steam service submitted before December 31, 2020 and has:
- 1.1.1 A natural gas-fuel fired "CHP" facility, that utilizes the Company's firm gas service, on its premises, is connected to Company's steam system and whose primary purpose is to provide power, heating, and lighting to such premises.
 - 1.1.2 Excess steam generation capacity of no less than 2 Mlb/hr and no more than 40 Mlb/hr, intended for delivery to the Company steam distribution system.
 - 1.1.3 The capability of producing the steam quality and purity in compliance with the Section II subsection 5 of this procedure.
 - 1.1.4 An available contracted steam export quantity at all times for Company's purchase.
 - 1.1.5 In addition to the requirements contained in this procedure, a Customer must be in compliance with Company's Steam Rate Schedule and with **SECTION II** of the Company Specification S-11965 latest revision ("**General Requirements for Steam Service**"). The specification can be found at the following link on the Company's website: <http://www.coned.com/steam/engspecs.asp> by selecting link General Requirements for Steam Service (S-11965) Including CHP Interconnect.
 - 1.1.5.1 Section II outlines the general requirements that apply to this Customer Sited Supply Program requirements for:
 - a. Steam service (new or modified)
 - b. Certificate of Inspection
 - c. Steam piping design requirements
 - d. Requirements for energizing steam service
 - e. Steam meter station requirements
 - f. Design and mechanical drawings requirements
 - g. Stress analysis requirements
 - h. Company and customer furnished equipment
 - i. Welding requirements
 - 1.1.5.2 Unless otherwise noted herein or in Specification S-11965, the Customer Sited Supplier shall be responsible for all costs (including required maintenance and labor) associated with providing steam to the Company's steam system.
- 1.2 In addition to the requirements contained in this Specification, a Customer must be in compliance with all of the requirements set forth in Rider G, which can be found at the following website http://www.coned.com/documents/steam/Tariff_Leaves.pdf
- 1.3 The requirements set forth herein are subject to the Company's objective that participation under this Specification should preserve the safety, reliability, and operational efficiency of the steam distribution system, consistent with the need to

provide the lowest cost to the customer. Accordingly, the requirements set forth herein may vary for a particular on-site generator.

1.4 Application Process

1.4.1 Following forms shall be submitted during the application processes:

- a. Requirement as per Section II, subsection 2.0 of the General Requirements for Steam Service
- b. Application for CSS Program (attachment # 1)
- c. Steam Chemistry Application Form (attachment # 8)
 - i. The application form (c.) shall be filled in for the existing or proposed steam cycle and be in compliance with the Company's steam purity and quality requirements. The Customers must supply the Company with all specific chemical injection location(s) within the steam process, water, and condensate cycles.
 - ii. The application form (c.) shall at minimum, specify the following; (a) how the steam quality and purity is monitored; (b) a list of all chemical treatment used to purify the steam; (c) the source of the water; and whether it is city water or gray water such as sewer water (gray water is not permitted) and (d) a list of all chemicals used in all CHP processes, including but not limited to steam, water, condensate, make-up water, and cooling systems.
 - iii. Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) along with the Technical Data Sheet for each chemical used in the water treatment process shall be submitted along with the application. The Technical data sheet shall include the following statement: "This product only contains materials compliant with CFR Title 21, Sec. 173.310 Boiler water additives and contains no products contained in paragraph (d) of that section". (Please refer to section 5.2.2 for more details)

1.4.2 The Company will notify applicants as to whether they were accepted to participate under this Rider, and if selected, the Contracted Export Quantity will be approved by the Company. Selected applicants must confirm their agreement, either electronically or in writing, within 10 business days after receipt of the Company's notice.

1.4.3 If, in a future year, the Customer requests to change the CEQs as of the Anniversary Date, the Company will review the Customer's explanation for the changes and prior 12-month performance.

1.4.4 Until the Customer starts participating in Rider G, the Customer must provide project progress annually, by the end of each Q3, regarding its commitment to participate.

1.5 Data Review and Reporting Requirements

1.5.1 Company is required by the PSC to file an annual report on effectiveness of the CSS Program in managing the steam peak load and the overall costs and

benefits of the program. In addition, this annual report will include details on the contract executed and those in the application process. The report will include a summary of data collected and reviewed, including lessons learned from such data.

- 1.5.2 Participants must agree to gather and retain performance information on time-of-day basis, including steam volumes, outage rates, heat rates and emission data. If required, the Company will develop appropriate protective measures to protect confidentiality of such information.
- 1.5.3 The CSS annual report is due on January 1st of each year, with the first report due January 1st, 2013.

- 1.6 This Specification can be amended as the CSS Program progresses. The Company will notify the Customers participating in the CSS Program of any changes.

2.0 OPERATION, MAINTENANCE, AND DISPATCH REQUIREMENTS

2.1 General

This section outlines the Company's requirements for establishment, operation, maintenance, and dispatch of Customer's facilities connected to the Company steam distribution system.

2.2 Initial Requirement for Interconnection

2.2.1 Metering to "Company EMS"

- a. For Customers interconnected directly to the Company's steam system, the following points will be required to be telemetered to the "Company EMS" for real time monitoring and control: steam flows (total CHP output and net export), export pressure, export temperature, export trip valve position, and select chemistry parameters and alarms.
- b. Export-only customers are not required to provide their total CHP output indication but shall provide their net export flow indication and all other indicators noted in a. above.
- c. All telemetering shall be transmitted via the local RTU at the Customer's site to the ECC.

- 2.2.2 The Company has the right to order a Customer to stop exporting steam from its CHP system if in the sole opinion of the Company, the steam sent out from the Customer's CHP system causes an unsafe condition or if the Customer is in violation of the provisions of this Procedure. If the Customer fails to comply with the order, the Company has the right to close the street service valve in order to disconnect service to the Customer.

- 2.2.3 The Company will purchase the full Contracted Export Quantity from the Customer unless :

- a. The Customer's steam does not comply with the Company's specifications set forth in either the Rate Schedule or the CSS Procedure
- b. The Customer's steam becomes a supply management risk, such as, but not limited to, providing erratic deliveries that could over-pressurize the Company's steam system;

- c. the Company's Energy Dispatcher determines that there is;
 - (i) an actual or potential system minimum load condition or an operational transient, or contingency,
 - (ii) the need to preserve steam system operating integrity, or
 - (iii) an emergency event on the steam system (i.e., a situation that threatens the safety of a person, the surrounding area, or the integrity of the Company's distribution system).
- d. The Customer's CHP facility is no longer operated to supply the Customer heating and power needs at its premises;
- e. The Customer is not receiving service under SC 4 but uses the Company's steam system to back-up or supplement steam from the CHP unit at its premises; or
- f. A prolonged failure or multiple failures in the remote communications equipment prevents the Company from measuring the Customer's steam parameters and monitoring its steam purity and quality.

2.2.4. Export, Trip Valve Control and Indication to "Company EMS"

- a. The Steam export trip valve shall be configured for local and remote operation by Con Edison and local operation only by the Customer. Valve Operation will be verified and tested by the Company prior to the interconnection. Customer shall periodically test the steam export trip at the frequency recommended by OEM.

2.2.5 Customers Required Diagrams

- a. The Customer must provide the Company with appropriate diagrams as per Section II, subsection 8 of the General Requirements for Steam Service.
- b. In addition, the following documents shall be submitted:
 - (1) Piping and Instrumentation Diagram (P&ID):
The diagram shall include Customer's steam system (piping, valves, meters, etc.) for Company review prior to interconnecting to the Steam Distribution System point of exit.
 - (2) Signage and Naming Convention:
The Customer shall provide a listing of all signage and naming conventions used in item (a) at the facility for equipment that is connected to the Company steam system. The signage shall be verified for conformance by the Company prior to energization.
- c. Upon Company's final comments and review of submitted documents, the final approved drawings should be supplied to the Company in Computed Aided Design (CAD) electronic format.

- d. All diagrams shall be labeled with the drawing number and revision number. Any updated drawings or diagrams shall be sent to Company for the records within five (5) business days of drawing update.

2.2.6 Communications

- a. The Customer shall have a direct telephone line that is maintained and answerable twenty four (24) hours a day, seven (7) days a week. The line will be connected to the ECC and will be used by the Customer to receive and confirm dispatch orders. Cellular phones are not an acceptable form of communication.
- b. The Customer must also provide secondary direct dialup numbers for backup if the primary direct line is out of service.

2.2.7 Acceptance Letter

- a. Prior to placing a Customer's facility in service for testing or commercial use, written certification that the equipment is ready for service shall be provided to the Company.

2.2.8 List of Qualified Operators

- a. The Customer shall maintain with the Company a current listing containing the names and title of qualified operators who will be in contact with the Company ECC (attachment #1, part #2).

2.2.9 Equipment Ratings

- a. The Customer shall provide to the Company all applicable equipment ratings for the interconnection to the Steam Distribution System. This includes ratings of steam mains, CHP name plate indicating maximum flow rate, PRV's and other piping components.

2.2.10 Adherence to Safe Work Practice

- a. Personnel at all Customer facilities exporting to the Company's distribution system must adhere to all applicable environmental, health, and safety laws, regulations and national consensus standards, including but not limited to OSHA 29 CFR 1910 and applicable standards from DOL, ASME, and ASTM.

- 2.2.11 The Company will be permitted to review the Customer's equipment maintenance and calibration records as well as be permitted on the Customer's premises to make unannounced audits of the Customer's CHP and equipment.

2.3 Company Energy Control Center/Steam Desk Responsibility as Related to this Specification

2.3.1 Commits steam resources each day to meet forecasted system loads.

- 2.3.2 Issues orders to each steam generating station to maintain specified flow rate, specified station exit pressure, or specified distribution system telemetric pressure.

- 2.3.3 Takes actions necessary to maintain steam system pressures within the desired operating limits and below alarm limits; ensures that such pressures are maintained within normal operating limits. .
- 2.3.4 Coordinates scheduling of all main and station outages to avoid conflicting outages, supply shortages, and pressure excursions.
- 2.3.5 Responsible for the remote operation of export trip valve in order to preserve steam system operating integrity.
- 2.3.6 Responsible for knowing valve position of export steam valves which could be used for manual isolation prior to point of entry/exit to Steam Distribution System.
- 2.4 Company Steam Distribution Department Responsibility as Related to this CSS Procedure
 - 2.4.1 Maintains all steam distribution and transmission system piping, valving, and telemetric equipment located in Company's steam system.
 - 2.4.2 Schedules steam main outage with customer locations and notify customers of the scheduled turn-off.
- 2.5 Customer Responsibility
 - 2.5.1 Monitoring Parameters in the Facility:

The Customer is responsible for monitoring and controlling exported steam pressure, temperature, flow rates, required chemical parameters and alarms (where available) as follows:

 - a. Steam export temperatures are maintained no higher than 413 °F.
 - b. Export pressures shall vary, but at no time shall exceed 200 psig and during normal operation shall not exceed the upper operating range (hi-hi operating alarm) of 185 psig; The Customer shall install a control system that shall have automatic pressure regulation such that when the steam pressure measured downstream of Customer-installed control valve(s) is greater than the steam pressure measured at a location as close to the point of exit as possible.
 - c. Steam purity and quality is monitored in accordance with Section II, subsection 5 of this procedure.
 - d. The Customer is responsible for maintaining accurate calibration of all steam sendout pressure, temperature, flow metering, telemetric equipment, steam purity and quality required parameters and steam sendout control and trip devices.
 - e. The Customer shall perform periodic maintenance and calibration, if applicable, on all components (data logger, master controller, control valves, trip valves, traps, GP transmitters, and other equipment) to meet the Company's specifications unless the manufacturer recommends a more frequent schedule for maintenance. Failure by the Customer to perform periodic maintenance as required in this procedure and

contractual agreements with the Company will result in a discontinuance of service until this requirement is satisfied.

- f. The Customer is responsible for the local operation of the export trip valve as ordered by the ECC.
- g. The Customer is responsible for maintaining an active log containing the maintenance history and status of the CHP facility.
- h. **Change of Status**
CHP unit status change record, including exact time reference of such a change, shall be maintained for the duration of the CSS Program. The status category shall be consistent with the category used in the daily dispatch availability log (attachment # 6), that is required to be submitted a day ahead and will be resubmitted a day after if the actual status is different from the day ahead submittal.

A - Station is online and available to full capacity

T - Station is online performing test (Export Capacity or Ramp Rate)

FP - Station has a forced partial derate

SF - Start up failure, forced off during the start-up

FO - Station is forced off line

MTC - Station is on maintenance

SCH - Station is on a scheduled maintenance outage

RSD - Station is on reserve shutdown

- i. The Customer shall prepare and execute a site-specific Operation and Maintenance procedure prior to steam delivery and provide same to the Company for review.
- j. The Customer is responsible for complying with all requirements contained in this specification.

2.5.2 Monitoring and Controlling System Pressures and Temperatures

- a. The Customer must maintain acceptable steam system pressures and temperatures within design limits at all times and take action as necessary to respond to excursions.

2.5.3 Maintaining Export Pressures and Temperatures

- a. CHP Facility export pressures and temperatures should be measured as close as practical to the point of exit where the send out main connects into the Company steam system.

2.5.4 Implement Immediate Corrective Actions as Necessary

- a. The Customer must take immediate corrective actions when steam system pressures and/or temperatures exceed the prescribed limits listed below.
- b. When steam system pressures exceed the Hi-Hi Operating limits at the Customer's POE, the customer must take corrective actions including:

- Validating the accuracy of the reading by comparing field instrumentation and or other parameters
 - Notifying the ECC of pressure, temperature and steam purity and quality excursions
 - Determining the appropriate actions necessary to bring pressures below the Hi-Hi Operating limit as per Table A. and communicate the plan to the ECC
 - Reducing flow rate, at the direction of the ECC or as required, preventing steam export pressures from exceeding the design limits. If steam export is required to be reduced to prevent pressure from exceeding limits, the Customer must immediately notify the ECC after reducing steam export.
- c. In the event steam pressure continues to rise and pressure and/or temperature exceed the Hi-Hi operating alarm parameters, the Customer shall take, a final corrective action, which includes ceasing export flow immediately.
- d. The Hi-Hi Operating alarms for the Customer's CHP system are to be determined (TBD) by Customer and approved by Company but at no cases shall exceed alarm listed in the Table A and or Maximum Design Temperature.

Table A. Design Operating Parameters for CSS Program Participants

Maximum Design Pressure	Maximum Design Temperature	Hi-Hi Operating Pressure Alarm	Hi-Hi Operating Temperature Alarm
200 psig	413 °F	185 psig	TBD

2.6. Comply with Dispatch Requirements

- 2.6.1 The Customer shall confirm available total quantity for the steam export in Mlb/hr for each hour of the day and for each operating period as per their nominated CEQ's to Company on a daily basis. This information shall be transmitted day-ahead via e-mail via daily dispatch availability log (see attachment #6). If the available steam export does not match to their CEQ nomination, the reason shall be stated and the CHP unit status shall be adjusted for forced partial derate (FP) as it is indicated in the section 2.5.1 (h). Any changes of the unit status than will occur during the course of the day, shall be reflected and resubmitted on the following day.
- 2.6.2 The customer must change steam export flow under direction of the ECC. Upon the request, the Customer must immediately execute change to export flow.
- 2.6.3 The Customer must obtain permission from the ECC before making changes to the steam export flow. If a change to the export flow is made without permission from the Company, due to an emergency condition, the Customer must immediately notify the Company of the change and the reason for the change.
- 2.6.4 The Customer must be able to execute steam export within 1 HOUR of being notified by the Company ECC.

- 2.6.5 The Customer shall notify the ECC of any issue impacting the integrity of Customer's facility or the Company's steam mains. The Customer will notify the ECC of any automatic operations by the electric equipment, change of unit status, change of valve status, and/or other protective devices at his facility. The equipment at the Customer location causing the operational issue shall not be placed in service until the problem has been resolved and permission has been obtained from the ECC.
- 2.6.6 Whenever possible, the Company will notify the Customer of any potential interruptions associated with the Company facilities directly connected to the Customer's system.

2.7 Required Performance Testing

- 2.7.1 The Company will make arrangements with the Customer to perform those operating tests that are required upon initial interconnection. After the initial tests, the Customer shall coordinate with the ECC to perform such tests seasonally. Test results shall be submitted to the Company. If the test results are unsatisfactory, the Customer shall rerun the test within thirty (30) days.

2.7.2 Ramp Rate Test

Before commencing service under this Pilot program, the participant must submit the Ramp Rate Test Procedure (if applicable) and the initial test results for the Company's review and approval:

- a. The Ramp Rate Test is intended to verify the published reserve ramp rate of the particular unit. The test is the acceleration rate at which the CHP unit can increase or decrease their steam send out to the Company's Steam Distribution System. The ramp rate is measured in Mlb/hr per minute.
- b. Reaction Time is the time it takes for unit to start increasing/decreasing steam send out after receiving a request from the ECC. The Customer is responsible to keep record of the reaction time during the test.
- c. The purpose for the Ramp Rate Test is for the Company to verify and confirm the maximum committed ramp rate recall time for the Maximum Steam Export Quantity to be available for reliable export to the Company Steam Distribution System.
- d. At a minimum of twice a year, including at least once in the winter period and once in the summer period, each unit will be called upon to perform a Ramp Rate Test.
- e. At the start of the test, the ECC will announce to the CHP operator that a ramp rate test is being conducted by clearly stating – "System Operation is conducting a Ramp Rate Test on unit 'X'. Please increase the steam sends out on unit 'X' by 'Y' Mlb"
- f. If test results are unsatisfactory, e.g. the CHP unit's recall time is more than 1 hour, the CHP operator will be asked to rectify the

problem, which will be followed by a retest. If the Ramp Rate Test results indicate that CHP unit cannot meet the required 1 hour recall time, the unit will be excluded from the available Customer Sited Supply dispatch until the results of a new test can prove otherwise.

2.8 Performance Review

2.8.1 The following indicators will be used to evaluate the performance of the CHP unit. These will be calculated annually to establish the individual CHP Plant Performance. The calculation will be based on the existing "NYISO" calculation methodology

- a. EFOR, Equivalent Forced Outage Rate
- b. EAF, Equivalent Availability Factor
- c. SR, Starting Reliability
- d. NCF, Net Capacity Factor
- e. HR, Heat Rate (MMBTU/lb)
 - The total amount of Natural Gas (MMbtu) used to produce one pound of steam being purchased by Con Edison is required for the purpose of CO2 emissions calculations.
 -
- f. Excursions of required operating parameters such as:
 - Export Temperature
 - Export Pressure
 - Steam Quality and Purity

2.8.2 The Company will be using the following methods/unit categories for the benchmarking of the Customers annual Performance Indicator:

- a. NERC standards of similar type and size units.
- b. Con Edison System wide results
 - Con Edison High Pressure Boilers
 - Con Edison Cogenerating units
 - Con Edison Package Boilers

2.8.3 The Company's expectation is to have the CSS Participant's annual performance be at a minimum, as good as the Company's five (5) year average performance of the worst performing unit category.

2.9 Maintenance and Outage Scheduling

2.9.1 Outages Due to Company Request

- a. Planned Maintenance Outages for Company Equipment Installed at Customer's Premises

- (1) Before work is to be performed inside a Customer's facility on any equipment maintained by the Company, an authorized Company representative will notify the Customer (usually the engineer's office) and will close the meter inlet and/or outlet valves of an individual metered run of a multi-metered run station in order to perform the needed work safely.
- (2) In the event the individual metered run isolation is not sufficient to provide a complete isolation of steam for work to be performed safely, the Company will plan a steam outage for the building. In this case, the street service valve shall be closed.
- (3) Export Steam Piping. For assurance that steam from the Customer's CHP plant shall not flow into the isolated equipment or area where Company personnel are working, the Customer shall install a double block and bleed valve arrangement upstream and downstream of the meter inlet and outlet headers. The block valves located upstream of the meter inlet header shall be designated as the customer's House valves. The block valves located downstream of the meter outlet header shall be designated as the Export Service Valves ("ESV") (attachment # 4C). All valve(s) shall be ASME/ANSI B16.34 Class 300 valves. The Customer shall close the House valves and open the 1" bleed valve before Company personnel performs any work. The Company will wire seal the House valves in the closed position and the associated bleed valves in the open position. The wire seal and tag must remain on the valves until all work has been completed.
- (4) Import Steam Piping. The Customer shall install a double block and bleed arrangement for each house valve associated with the onsite cogeneration plant steam system. The Customer must install an additional stop valve ('secondary house valve') downstream of the house valve and a 1" bleed valve in-between the two valves. All valve(s) shall be ASME/ANSI B16.34 Class 300 valves. The Customer shall close the House valve(s) AND open the associated bleed valve(s) before Company personnel performs any work. The Company will wire seal and tag the house valves in the closed position and the associated bleed valves in the open position. The wire seal and tag must remain on the valves until all work has been completed.
- (5) After the work has been completed by the Company, the Company will energize the steam service up to the Customer's closed block valves.

2.9.2 Steam Service Shutoff and Turn-on Requests

- a. If the Company is to perform scheduled street work or require an outage they will contact the customer, by phone, in advance. However during an emergency notification will be as soon as practical.
- b. Export Steam Piping. The Customer shall close the House valves and open the associated bleed valve before Company personnel performs

any work. The Company will wire seal the House valves in the closed position and the associated bleed valves in the open position. The wire seal and tag must remain on the valves until all work has been completed.

- c. Import Steam Piping. The Customer shall close the House valve(s) AND open the associated bleed valve(s) before Company personnel performs any work. The Company will wire seal and tag the house valves in the closed position and the associated bleed valves in the open position. The wire seal and tag must remain on the valves until all work has been completed.
- d. After the work has been completed by the Company, the Company will energize the steam service up to the Customer's closed block valves.

2.9.3 Outages Due to Customer Request

- a. The customer shall prepare and execute a site-specific Operation and Maintenance procedure prior to steam delivery and provide same to the Company for review.
- b. Outage window dates will be reviewed and subjected for approval by the Company in order to meet the continued supply demands of the Company's steam system Customers. Any outage not approved by the Company will be considered a Forced Outage.
- c. All outages on Customer facilities that are connected to the Company's steam system will be coordinated with the Company ECC.
- d. If the customer requires an outage for repairs or other reason, they will contact the Company by phone to schedule the outage. The steam service will be isolated by street service valve.
- e. Export Steam Piping. The Customer shall close the House valves and open the associated bleed valve before Company personnel performs any work. The Company will wire seal the House valves in the closed position and the associated bleed valves in the open position. The wire seal and tag must remain on the valves until all work has been completed.
- f. Import Steam Piping. The Customer shall close the House valve(s) AND open the associated bleed valve(s) before Company personnel performs any work. The Company will wire seal and tag the house valves in the closed position and the associated bleed valves in the open position. The wire seal and tag must remain on the valves until all work has been completed.
- g. After the work has been completed, the Company will energize the steam service up to the Customer's closed block valves.

2.9.4 Maintenance Outage Scheduling.

- a. The Customer must provide the Company with no less than five (5) days advance e-mail notification of a request to conduct a Maintenance Outage. Information provided shall include:

- (1) Unit or equipment to be taken out of service
- (2) Capacity derates of the outage in Mlb/hr
- (3) Work to be performed
- (4) Duration required for the outage
- (5) Estimated recall time to return unit to service
- (6) Other relevant information

2.9.5 Planned Outage Scheduling

- a. The customer must provide the Company with no less than one year advance notice of a request to conduct a Planned Outage including providing a six (6) months update of finalized outage scope and duration by May 1st and November 1st of each year. Planned outages are taken in the spring (March 15th to June 1st) and/ or fall (September 1st to December 1st) shoulder seasons. Information provided will include:
 - (1) Unit or equipment to be taken out of service
 - (2) Capacity derates of the outage in Mlb/hr
 - (3) Work to be performed (such as firm-up)
 - (4) Duration required for the outage

2.9.6 Emergency Outage Scheduling

- a. Emergency Outage. During an emergency the customer can close their Inside Service valves and Export Service valves and notify the Company as soon as practical. Only the Company is authorized to turn the service back on.

2.10 Communicating Oral Orders and Information Requests

- 2.10.1 This section describes oral communication requirements for personnel issuing and receiving orders to perform operations that are required for safe and reliable operation of the steam system. When issuing and receiving oral directions that affect specified equipment or when making and receiving an oral request for information on system facilities, personnel must identify, clarify, and repeat the information exchanged as outlined in this section. It is crucial that operating communication be timely, accurate and conducted in a professional manner.
- 2.10.2 All oral communications between the ECC and the Customer will be recorded by the Company ECC.
- 2.10.3 Identification and Clarification Requirements. When receiving an oral order to perform specified operations on equipment or when making or receiving a request for information on any system facility, personnel must speak clearly, slowly, directly,

and precisely. The parties involved discuss only those matters that relate to the specific directive or information requested.

- 2.10.4 When it is apparent to the person receiving the order that a request would cause unsafe or undesirable results, he or she must inform the person issuing the order and requests further information.
- 2.10.5 Personnel and Equipment Identification. At the beginning of each conversation, all parties must give their names, positions, and work locations.
- 2.10.6 The person issuing an order must identify the purpose of the communication and the equipment involved. Equipment is identified by the designations shown on the applicable mechanical or electrical drawings, where available.
- 2.10.7 Conveying Information. When communicating information that contains numerical designations of more than ONE digit, each digit shall be stated separately.
- 2.10.8 When communicating information that contains letter designations, military terms are used to ensure clarity. For example, "Disconnect switch MD4-5C" is stated: "Disconnect switch M as in Mike, D as in Delta, 4 dash 5, C as in Charlie." (attachment #5)
- 2.10.9 Communicating and Verifying Current Status of Equipment. The person issuing an order must specify the current status of the equipment. When all necessary information has been communicated and written down, the person receiving the order shall repeat the status of each piece of equipment or oral orders and obtains agreement from the issuing party that all information has been received accurately.
- 2.10.10 Three-Way Communication. Three-way communications are for orders or directions that involve the operations of plant equipment. Three-way communication requires the operator receiving the order to repeat the order and wait for acknowledgement of the order by a "That is correct" response prior to starting the task.
- 2.10.11 Two-way communication. Two-way communications are for providing information relative to the status of a CHP facility.
- 2.10.12 Reporting Completion of an Order. The person who performs the work shall notify the issuing party that an order has been completed as specified. Both parties must verify and agree on the final status of the equipment involved.

3.0 TELEMETRY REQUIREMENTS

3.1 General

- 3.1.1 This section outlines the Company's requirements for the establishment, operation, maintenance, and dispatch of Customer Sited Supply (CSS) facilities connected to the Company steam distribution system. Site-specific information is not included in this section.
- 3.1.2 This section covers the technical requirements for the Remote Terminal Unit (RTU) used for the continuous remote monitoring and control of motor operated

butterfly valves and steam purity and quality required parameters located on customer premises. The RTU shall be designed for communicating data with DNP-3 communication protocol which is currently in use at the ECC.

- 3.1.3 It is not the intent of this specification to specify all technical requirements or to set forth those requirements adequately covered by applicable codes and standards. The vendor shall furnish the telemetry equipment meeting the requirements of the specification and industry standards. The customer's vendor may also quote any material or design alternatives that will exceed this specification's minimum requirements.
- 3.1.4 The RTU is to be located in the Steam Metering room of the customer facility.
- 3.1.5 The RTU will be compatible with the Company's Energy Control Center EMS, which utilizes DNP-3 communication protocol. The RTU will be installed in a control cabinet with all associated communication and control hardware needed to operate the export trip valves, and serve as an interface between the field device and a communication line, which will transmit data to the master RTU located at ECC. The master RTU will serve as a data concentrator and is scanned by the Company EMS System. The Company EMS host computer will enable the ECC to remotely trip the Export Trip valve in the customer facility.
- 3.1.6 The RTU shall be programmed for the automatic trip (closing) of the export trip valve(s) when pressure, temperature, pH, conductivity or sodium thresholds are exceeded as defined in section II subsection 5 of this procedure. The thresholds must be sustained for a user defined length of time defined in minutes. There will also be control logic to enable operation of the trip valve(s) locally or remotely from ECC.
- 3.1.7 The RTU will contain all of the associated instrumentation, communication, and control hardware to transmit and record all process variables that are described below in the Detail Scope Section. In addition, the RTU will measure and calculate steam flows, and allow remote control of the motor operated valve via redundant Frame Relay circuits connected to ECC.
- 3.1.8 The RTU shall be dual ported and be able to communicate to a second master using, if required, a different communications protocol.
- 3.1.9 The equipment furnished shall be in accordance with, but not limited to, the latest issues of applicable ANSI/IEEE or IEC standards, including all addenda, in effect at time of purchase order. In addition, the vendor shall comply with applicable New York State and New York City Electrical laws, regulations, statutes and ordinances.

3.2 Detail Scope

- 3.2.1 The customer shall ensure that the vendor of its RTU shall supply all material, including but not be limited to RTU hardware & controls, communication modems, SCADA and HMI software, engineering and programming, system documentation, calibration and testing, start-up, commissioning, and training for the implementation of this system.
- 3.2.2 In addition to supplying components associated with the RTU, the customer shall require that its vendor be responsible for the purchase, manufacture, calibration

and installation of all material within the RTU and Control Cabinet except as noted in this specification. The checklist below itemizes all other major components and work scope for the assembly of this cabinet. The Vendor may provide alternate solutions pending Company approval.

3.2.3 Software for communication and operation between the master RTU and the Control Cabinet (includes HMI Panel, steam meters, and RTU hardware)

3.2.4 Control Cabinet and Remote Terminal Unit Hardware

- a. Two (2) DCB (Data Communication for Business) FRAD units. Model BPF1/DSU64
- b. Local HMI Touch Screen Display
- c. 8 hour battery back-up
- d. All internal & interconnection wiring
- e. States link terminal blocks
- f. Cabinet inside temperature sensor and local display
- g. Thermostat controlled cabinet heater
- h. Power isolation switch and fuse for 120 VAC, 1 phase
- i. One duplex 120 VAC outlet
- j. Mounting of instruments in the cabinet enclosure
- k. Stainless steel enclosure with 3-point lockable door
- l. "Door Open" switch
- m. Switchable Cabinet lighting
- n. Documentation Pocket

3.2.5 Digital Display

The RTU will have a digital indication of the following process variables:

- (1) Steam Pressure
- (2) Steam Temperature
- (3) Steam Flow
- (4) Conductivity
- (5) pH
- (6) Sodium
- (7) Export Trip Valve Open/ Close Position

3.2.6 Other Requirements

- a. Con Edison Control Systems Engineering would be required to approve the specification for the Customer RTU selection.

- b. RTUs shall withstand a surge voltage of 2.5 kV applied between input and output terminal and ground.
- c. The customer shall require that its Vendor provides internal nameplates indicating cabinet tag number, location, purchase order and manufacturing date of the RTU. Individual nameplates shall be tagged on all switches, circuit breakers, indicators and replaceable parts.
- d. Internal wiring shall be copper, signal and control wiring shall be #16 AWG, copper, twisted shielded with EPR or XLP Hypalon Neoprene or approved equivalent. PVC or asbestos insulating material shall not be used.
- e. Terminal blocks shall be mounted so as to give easy access to wiring terminations and give a clear view of the arrangement of the cable tails. Each wire shall be connected to an individual terminal, which shall have a clearly lettered marking strip corresponding to the wiring diagram.
- f. Three 12-point terminal blocks will be designated for Hot, Neutral, and Ground termination for 110 VAC.
- g. The RTU shall be housed inside a stainless steel cabinet constructed from a minimum of 0.1 inch sheet steel and designed to withstand an ambient temperature from -10°F to 160°F , 0 to 100% relative humidity (RH), under direct sunlight and withstand all other severe outdoor environmental exposure in New York City streets. Vents or louvers shall be provided for adequate ventilation. Floor opening shall have stainless steel metal screen and replaceable dust filters. Thermostatically controlled heaters with switches shall be furnished for prevention of condensation. The cabinet shall be NEMA IV type and be installed above ground, along street curbside.

3.2.7 Grounding

- a. The customer shall ensure that its Vendor provides a heavy-duty copper grounding pad on the cabinet that is sufficient to accommodate #2 AWG to #4/0 AWG grounding cable connection to manhole equipment and piping.

3.2.8 Communication

- a. The RTU shall be able to simultaneously communicate through frame relay network, Mod-Bus TCP or DNP-3 to the HMI Display, and serially to a laptop.

3.2.9. Metering

- a. Interconnecting Facilities shall furnish and install a Remote Terminal Unit (RTU), or equivalent intelligent device (referred to as RTU in this document), at Interconnecting Facilities' locations.
- b. The RTU shall communicate to the Con Edison Energy Management Systems (EMS) at the ECC and AECC via redundant and diverse MPLS circuits. Mapping information shall be provided by Con Edison.

- c. Interconnecting Facilities shall conform to all System Operation requirements for proper SCADA communications as directed by System Operation's Technical Support Group.
- d. Interconnecting Facilities shall pay for the installation of the telephone circuits and monthly lease charges.
- e. The RTU shall be powered by reliable DC feeds including battery backup.
- f. The Master Terminal shall have appropriate test switches to facilitate testing and isolation of external wiring for troubleshooting.
- g. Interconnecting Facilities shall fulfill Con Edison's requirements to make the RTU (and its connections) compliant with NERC Cyber Security Standards, when applicable.
- h. The new RTU shall communicate with the EMS using the DNP3 protocol, including the support of quality points.
- i. The RTU shall communicate continuously and shall use digital communication methods and shall be of high reliability. The data shall be updated at a rate of every 2 seconds or faster.
- j. Con Edison shall have the right and capability to access the routers (sometimes referred to as FRADs or modems) remotely and make configuration changes, if necessary.
- k. Interconnecting Facilities shall be responsible for the immediate repair of circuits and/or RTU when requested by Con Edison. Interconnecting Facilities shall bear the costs of the repair. If needed in the case communications problems are detected, Con Edison shall have the permission to turn the circuits in to the telecomm company for repair; Interconnecting Facilities shall be billed by the telecomm for the repair costs.
- l. A RTU metering point assignment list, with full scale values sufficient to cover the maximum values for corresponding telemetered points, shall be submitted to the Company for review and approval.
- m. The RTU shall support the following data types:
 - i. Digital In (should use DNP3 Class 1)
 - ii. Digital Out
 - iii. Analog In (should use DNP3 Class 2)
 - iv. Analog Out
 - v. Set Point
 - vi. Select Before Operate (SBO)
 - vii. Sequence Of Events (SOE)
- n. A complete point to point testing should be performed on the telemetry points based on the RTU point assignment list. If testing is not possible based on actual conditions then simulation testing must be performed where indication (discrete) points are toggled between all possible states. Similarly, analog points must be tested for 0, 25, 50, 75 and 100% of their scales by isolating them and injecting a test signal. Quality, polarity shall be tested as well.

4.0 STEAM METERING REQUIREMENTS

- 4.1 Export Steam Metering. The steam meters and associated equipment installed by the Customer to meter the steam delivered to the Company steam system shall meet the following requirements:
 - 4.1.1 Shall be designed as per Section II, subsection 7 of the General Requirements for Steam Service
 - 4.1.2 Shall be installed as close as possible to the point of exit.
 - 4.1.3 Shall be separate and independent of new or existing steam meter stations installed to meter imported steam flow into the building.
 - 4.1.4 The Customer's export steam flow shall be maintained during the operation at no less than the required minimum flow rate as per the CSS program and thus the smallest meter will be sized for steam flows at no less than ten percent (10%) of the meter's rated capacity being the minimum required flow.
 - 4.1.5 The Company shall be provided access to the Customer's metering equipment at all times. The Company metering equipment shall be sealed and the seals shall be broken by the Company only upon occasions when the meters are to be inspected, tested, maintained or adjusted, and representatives of the Customer shall be afforded reasonable opportunity to be present upon such occasions.
- 4.2 CHP Plant Steam Flow Metering. Customer shall install their own meters to monitor the total steam flow output of all onsite steam generating units. These meters shall be maintained by the Customer. All costs associated with the installation and maintenance of these meters shall be borne by the Customer. The customer shall submit all equipment specifications, installation drawings, maintenance and calibration procedures to the Company for review and acceptance prior to installing the steam meters.

5.0 STEAM PURITY AND QUALITY REQUIREMENTS

5.1 General

This section identifies the steam purity and quality limits permitted in steam that is provided to all process Steam Hosts and outlines the steps to be taken to ensure the limits are not exceeded. Purpose of this specification is to ensure that the steam purity and quality limits are not exceeded. Steam Hosts may utilize steam for direct humidification, sterilization of surgical equipment, dish washing and other applications where steam will personally be consumed. Therefore, the steam delivered must be acceptable for human consumption at all time.

5.2 Steam Purity and Quality Requirements

- 5.2.1 The steam produced by Customer must meet FDA purity requirements.
- 5.2.2 All chemical(s) used for CHP water treatment shall conform to the regulations contained in the Code of Federal Regulations, Food and Drugs, Title 21, Part 173, Section 310, Boiler Water Additives, including the special requirements for steam used in milk production.
- 5.2.3 All treatment chemicals used in the process, make-up and cooling system must be FDA approved.
- 5.2.4 Leak sealants are prohibited to use within any piping system used for steam production, as it can have adverse effects on the Company's distribution piping and/or equipment.

- 5.2.5 The Customer, at its own expense, shall install upstream of the meter station equipment capable of continuously monitoring required parameters for the quality and purity of the steam delivered to the Company's distribution system. Throttling Calorimeter is required to be installed upstream of the meter station, to measure the steam quality after the steam exit from the moisture separator.
- 5.2.6 The steam produced by the customer shall have make-up water treatment resulting in a water product conductivity not exceeding 1.0 $\mu\text{S}/\text{cm}$ and a condensed steam product of purity in the table below, Steam Purity Parameters and limits.
- 5.2.7 Any water supplied to steam generator for make up or desuperheating water shall have less than 30 ppb of dissolved oxygen.
- 5.2.8 Water used for desuperheating the steam must be free of all contaminants and must not include any additives.
- 5.2.9 When steam is condensed, it shall be clear, colorless, and odorless and have a pH between 5.5 and 8.5.
- 5.2.10 The steam delivered to Company must continually and consistently meet the following limits at all times, No steam is to be send out to Company's distribution system if limitation as described in table below are exceeded.
- 5.2.11 The Customer shall immediately notify the Company in advance concerning any changes in CHP configuration or CHP chemistry.
- 5.2.12 Hydrazine, cyclohexylamine, morpholine, hydorquinone and any other chemical whose reaction or decomposition products include ammonia, must not be used for the condensate, feedwater system, CHP water treatment, desuperheating water or steam systems.
- 5.2.13 Whenever the limits outlined below are exceeded, corrective action as per Section 5.5 must be taken immediately by the Customer. A log of excursions must be maintained. Each log entry must record the time, duration, and magnitude of the excursion, and the suspected reason for the excursion.

Table 1. Steam Purity and Quality Parameters and Limits

	Monitor by Company			Monitor by Customer		
	<i>Real Time Telemetry & Alarms to ECC</i>			<i>Monthly Report submitted to Company</i>		
<i>Sample Source</i>	<i>Steam Send-out</i>	<i>Drip-Pot (Note 1)</i>		<i>Desuperheat water</i>	<i>Make-up</i>	
<i>Parameter</i>	<i>Limit</i>	<i>Limit</i>	<i>Sampling Frequency</i>	<i>Limit</i>	<i>Limit</i>	<i>Sampling Frequency</i>
pH	5.5-8.5	5.5-8.5	C,M	6.0-8.0	trend observe	S
Conductivity	1.0 µS/cm	trend observed	C,M	trend observe	trend observe	S
Sodium ion	<10 ppb	N/A	C,M	N/A	N/A	
Sulfate / Sulfite ions	<100 ppb	N/A	M	N/A	N/A	
Magnesium ion	<100 ppb	N/A	M	N/A	N/A	
Calcium ion	<100 ppb	N/A	M	N/A	N/A	
Chloride ion	<100 ppb	N/A	M	N/A	N/A	
Phosphate ion	<100 ppb	N/A	M	N/A	N/A	
Ammonia	0 ppm	N/A	M	N/A	N/A	
Silica	< 20.0 ppb	N/A	M	N/A	N/A	
Dissolved Iron	None	N/A	M	N/A	N/A	
Dissolved Copper	None	N/A	M	N/A	N/A	
Organics (TOC)	<100 ppb	N/A	M	N/A	N/A	
Color	None allowed	N/A	M	N/A	N/A	
Odor	None allowed	N/A	M	N/A	N/A	
Steam Quality	100% minimum as measured by a throttling calorimeter	N/A	M	N/A	N/A	
Total Dissolved Solids (TDS)	<1.0 ppm	N/A	M	N/A	N/A	
Dissolved Oxygen	N/A	N/A	M	<30 ppb	<30 ppb	S

Legend C= Continuous monitoring; M = Grab sample once a month; S = Grab sample once per Shift Note 1: Case-by-Case, as per Company discretion upon review of the Customer's chemical cycle.

- 5.2.14 The Customer, at its own expense, shall install continuous pH and conductivity monitoring equipment from drip-pots as per mutual agreement between Customer and Company and review of the Customer's steam production (chemical) cycle. Drip pots shall be located at the on-site steam generators, upstream of the meter station and as close to the "Delivery Point-Steam"
 - 5.2.15 If the pH or conductivity monitoring equipment registers levels outside the required limits, the Customer must immediately determine and ensure that the monitoring equipment is properly calibrated and the drip pots are properly functioning and test the other condensate drip pots, if available, sample to confirm the levels. The Company must be notified immediately if an irregular level has been confirmed. The Company has the right to refuse steam delivery from the Customer until the Customer demonstrates to the Company's satisfaction that the cause of the irregular level has been corrected.
 - 5.2.16 The customer shall grant to the Company access to the steam sample location for the purpose of inspection, taking monthly grab samples for routine analyses and troubleshooting purposes. Routine monthly grab samples are usually done during the business days from 9 a.m. to 3:30 p.m.
 - 5.2.17 The Company reserves its right to have access to Customer premises for purpose of inspecting the CHP Plant including its water treatment system, Steam line, Metering and Sampling station during reasonable business hours and upon reasonable notice to the Customer.
 - 5.2.18 The Company also reserves the right to request access to perform additional sampling, if the Company have reasonable suspicion, that the Customer water treatment system may result in the potential contamination to be exported to the Company,
- 5.3 Steam Sampling Systems Requirements
- 5.3.1 All steam samples shall be taken from the horizontal center of the main using an isokinetic probe described in ASTM 1066-97 (Reapproved 2001).
 - 5.3.2 All sampling must be done in accordance with ASTM D1066-97 (Reapproved 2001).
 - 5.3.3 Steam Sample Cooling Coil. As per ASTM D3370-95a (Reapproved 2003).
 - 5.3.4 The Customer is required to install moisture separator capable of delivering steam with 99.9% steam quality. The separator shall be installed as close as practical upstream to the meter. The condensate outlet from the separator must have available inspection port for boroscopic inspection.
 - 5.3.5 The Customer is responsible for maintaining steam sampling systems (attachment #3) and all required instrumentation. The steam sampling systems consist of:
 - a. An isokinetic probe
 - b. Cooling coil
 - c. Drain line for sample (separate from cooling water drain to avoid sample Contamination)
 - d. Calorimeter with thermometer or temperature/pressure transmitter; Pressure gage

- e. Short, smooth, down sloping, insulated stainless steel sample line

5.4 Instrumentation Requirements

- 5.4.1 The Customer, at its own expense, shall install continuous pH and conductivity and sodium and steam quality monitoring equipment with all associated components. All the instrumentation must be in compliance with this specification and all applicable ASTM standards for isokinetic steam sampling. The customer shall submit all equipment specifications and installation drawings to the Company for review and acceptance prior to purchase and installation.
- 5.4.2 pH and Conductivity must be monitored by one (1) instrument.
- 5.4.3 The steam sampling system shall be maintained and calibrated in accordance with the manufacturer's specifications as well as ASTM, ASME and AICHE. The customer must maintain the calibration record for the minimum of one year and must have it available within one week upon the request of the Company.
- 5.4.4 Instruments must have rudimentary keypad password/code access.
- 5.4.5 Unauthorized access to locally overwrite the alarm set point parameter is not permitted and violates this procedure.
- 5.4.6 Following minimum alarms are required on the local display of the steam purity monitoring equipment:
 - a. loss of signal and/or communication to RTU
 - b. loss of instrument power
 - c. lost or reduced sample flow
 - (1) In the event any of above occurs, Customer must inform ECC immediately or within 15 minutes of the excursion. Following corrective action must be performed immediately or Customer will be asked to come offline until the problem is resolved. ECC will make ultimate decision whether the Customer will remain online.
 - (2) Customer must do the following at minimum within 2 hours of initial notification to ECC.
 - start taking hourly grab sample immediately
 - restore the instrumentation reading within 24 hours of initial notification to ECC.
- 5.4.7 Basic Specifications for Continuous Steam Purity Monitoring for both steam send out and drip pots Instrumentation are described in Table 2.
- 5.4.8 Conductivity, Sodium and pH monitoring must be provided with 4-20 milliamp required output from monitor will be used for the telemetry signal feedback to Company's ECC.
- 5.4.9 For basic requirements for Steam Sampling Station refer to attachment #3.

Table 2. Basic Requirements for Steam Purity Continuous Monitoring Equipment

Parameter	Sodium	pH	Conductivity
Measuring Range	0-1000 ppb	0-14	0-20 $\mu\text{S/cm}$
Resolution	0.1 ppb	0.01	0.01 $\mu\text{S/cm}$
Upper Limit	100 ppb	8.5	1.00 $\mu\text{S/cm}$
Lower Limit	NA	5.5	NA
Sample Flowrate	100-200 ccm	100-200 ccm	100-200 ccm
Calibration Method	2pt standard injection	2 pt Buffer (NIST)	Factory traceable
Calibration Frequency	Monthly	Weekly	Monthly
Sample Inlet Pressure	10-40 psig	10-40 psig	10-40 psig
Sample Outlet Pressure(Backpressure)	Atmospheric vent within 6"	Atmospheric vent within 6"	1" H ₂ O head pressure and Atmospheric vent within 6"
Sample Temperature	10-40 $^{\circ}\text{C}$ (50 -104 $^{\circ}\text{F}$)	10-40 $^{\circ}\text{C}$ (50-104 $^{\circ}\text{F}$)	10-40 $^{\circ}\text{C}$ (50-104 $^{\circ}\text{F}$)
Automatic Temperature Compensation	Yes	Yes	Yes
Measurement Accuracy (%of Reading)	5% of Reading	0.1 pH	0.1 $\mu\text{S/cm}$
95% Response Time	5 minutes	5 minutes	0.5 minutes
Drift	2 ppb /wk	0.1 pH / Wk	0.1 mmhos/wk
Power Supply	120 Vac 60Hz	120 Vac 60Hz	120 Vac 60Hz
Signal Outputs	4-20 mA 500 ohm	4-20 mA 500 ohm	4-20 mA 500 ohm
Alarm Relays	2- SPDT 1A 250 VAC	2- SPDT 1A 250 VAC	2- SPDT 1A 250 VAC
Ambient Temperatures	0-40 $^{\circ}\text{C}$ (32-104 $^{\circ}\text{F}$)	0-40 $^{\circ}\text{C}$ (32-104 $^{\circ}\text{F}$)	0-40 $^{\circ}\text{C}$ (32-104 $^{\circ}\text{F}$)
Solids	<10 micron	<10 micron	<10 micron
Keypad Security	Yes	Yes	Yes
Special Sample Requirements	10 < pH > 4	Conductivity <10 $\mu\text{S/cm}$	Checked with calibrated portable instrument
Sample Conditioning Panel Requirements:	Alarm on reduced sample and on complete loss of	Alarm on reduced sample and on complete loss of	Alarm on reduced sample.

	sample or instrument power	sample or instrument power	Alarm on complete loss of sample.
Sample Conditioning Panel Recommendations:	Protect Sensors from overpressure. and over- temperature	Protect Sensors from overpressure and over- temperature	Protect Sensors from overpressure and over- temperature

5.5 Alarms and Corrective Actions

- 5.5.1 pH, Sodium and Conductivity are required to be monitored on the steam send out continuously.
- 5.5.2 Alarms from required Continuous Monitoring Equipment as per Table 1 will be connected to the ECC.
- 5.5.3 If the steam purity sample exceeds the alarm limit for more than 15 minutes, the ECC should be notified immediately.

Table 3. Required Alarms for Continuous Monitoring

Description	Normal Range		Alarms		Shutdown	
	High	Low	High	Low	High	Low
Steam send-out	High	Low	High	Low	High	Low
pH	8.5	5.5	8.0	5.5	8.5	5
Conductivity	1.0 μ S/cm	N/A	1.0 μ S/cm	N/A	5.0 μ S/cm	N/A
Sodium	0.0 1ppm	N/A	0.01 ppm	N/A	0.1 ppm	N/A

- 5.5.4 Customer shall have a corrective action procedure for all required steam purity and quality parameters. These procedures must be submitted to Company for the review prior implementation.
- 5.5.5 Upon notification of alarm state from any of the required steam purity and quality monitored parameters, the Customer shall immediately take corrective action to rectify the problem and a log entry stating the time, duration, magnitude of the excursion, and the suspected reason for the excursion.
- 5.5.6 When any of the steam purity and quality parameters is in the alarm status, Customer shall perform corrective action to rectify the problem, that includes, but not be limited to following:
- manual reading verification
 - ensuring proper instrument calibration, confirmed by grab sampling (minimum once per shift) with a calibrated meter in compliance with Customer's corrective action procedure
 - test another sample, if available, to confirm the alarm status
- 5.5.7 If the Customer is not able to address the problem that caused the alarm status and the readings exceeds the Hi or Low alarms, the trip valve at the Delivery Point-Steam will receive local signal from the instrument to close after the instrument readings remain at shutdown conditions for more than two (2) hours.
- Readings must return to the non-alarm conditions after the alarm or shutdown condition.
- 5.5.8 The customer must install a moisture separator as close as possible to the "Delivery Point-Steam". The calorimeter will be used to determine

Customer steam quality and must be installed after the moisture the separator and before "Delivery Point-Steam". The customer must submit equipment specification and fabrication drawings of the moisture separator and calorimeter to the Company for review and acceptance prior to purchase and installation.

5.5.9 Conductivity Readings

- a. The Customer must take appropriate corrective action if Conductivity readings are between 1.0 to 5.0 $\mu\text{S}/\text{cm}$. The operating alarm point for conductivity is 1.0 $\mu\text{S}/\text{cm}$. Company must be notified 15 minutes after the readings are in the alarms status. If the readings reaches 5.0 $\mu\text{S}/\text{cm}$ for more than two (2) hours the export trip valve will automatically shut down to prevent the customer's steam from entering the Company's steam distribution system.

5.5.10 Sodium (Na) Constituents

- a. The customer must take appropriate corrective action if Sodium readings are between 0.01 to 0.1 ppm. The operating alarm point for sodium is 0.01 ppm. Company must be notified 15 minutes after the readings are in the alarms status. If the readings reaches 0.1 ppm for more than two (2) hours the export trip valve will automatically shut down to prevent the customer's steam from entering the Company's steam distribution system.

5.5.11 pH Readings

- a. The customer must take appropriate corrective action if pH readings are between 5.5 to 8.5. The operating high alarm point for pH is 8.0 and low alarm is 5.5. Company must be notified 15 minutes after the readings are in the alarms status. If the readings reach above 8.5 or below 5.0 for more than two (2) hours the export trip valve will automatically shut down to prevent the customer's steam from entering the Company's steam distribution system.

5.5.12 TDS, SiO_2 , PO_4 , and NaCl

- a. During normal operations, the parameters given in Table 1. for total dissolved solids (TDS), silica (SiO_2), phosphates (PO_4), and salts are typically maintained by controlling blowdown, if available. The steam percent quality is maintained by monitoring steam temperature and pressure.

5.6 Non Destructive Examination (NDE)

- 5.6.1 The Customer will be required to perform preventive maintenance on the steam export piping and its components as necessary in Customer location.
- 5.6.2 The objective is to access the level of degradation of the inside pipe internal diameter (pipe ID) due to the corrosion or other failure mechanism and create a baseline and trend for internal deposits or other impurities.

- 5.6.3 The NDE will be required to be performed if the Customer experiences multiple chemical excursions or if Company has a reason to believe that Customer's steam supply can jeopardize steam system integrity or become a risk for public or Company safety.
- 5.6.4 The following NDE will be required to be performed based on the individual circumstances or as per mutual agreement between Company and Customer but no less than once per year, at two (2) customer piping locations; representing both vapor and liquid phase of the exported steam purity:
- a. Steam export piping location.
Ultrasonic Testing (UT) will be required to determine the wall thickness on designated pipe location after the moisture separator. Customer must install a removable section of pipe insulation to allow for the UT testing.
 - b. Condensate leg location
Boroscope inspection of the condensate line will be required to obtain visual representation of the piping internal condition, discoloration, deposits, etc. The exact location will be determined based on the actual customer system set-up either and will either be from the moisture separator condensate outlet or from the closest trap system to the Delivery Point-Steam or Point of Exit.
- 5.6.5 The Company will determine the baseline (reference) of required tests prior to initiation of the steam export service.
- 5.6.6 The Company will coordinate above efforts with the Customer during scheduled maintenance time approved by the ECC.
- 5.6.7 All of the NDE Testing must be done as per ASME applicable codes with properly calibrated instruments.
- 5.7 Monthly Report Requirements
- 5.7.1 The customer shall prepare monthly reports to the Company as per requirements further defined in this section and outlined in Table 1.
- 5.7.2 The customer shall prepare and submit to the Company, on a monthly basis, no later than the 5th day of the following month, a report summarizing the following information:
- a. Copy of operation log containing once per shift reading of the grab sample results on desuperheating and make-up water's pH, conductivity and dissolved oxygen. Once per shift reading needs to indicate sampling location, date and time.
 - b. Report of hourly readings on steam send out and drip pot (if applicable) continuous monitoring of pH, conductivity and sodium.
 - c. Completed Monthly Steam Purity Summary Report (attachment #7) stating the minimum and maximum reading from the once

per shift grab sample results (item a) and the minimum and the maximum reading from the hourly readings on steam send out and drip pot (if applicable) (item b). In addition, report shall indicate any excursion stating the time, duration, magnitude, the suspected reason for it and action taken.

- 5.7.3 Six months after the date the first monthly report described above, the customer and Company shall mutually consider the usefulness of providing such reports on a monthly basis, and the Company shall reasonably determine if such practice should be continued.

5.8 Transient Operation (start up and shut downs)

- 5.8.1 Following practice shall be applied prior to unit start-up and during the transient conditions to prevent alarm conditions.

- a. Checks the continuous steam sampling system to assure there is a continuous flow of both cooling water and condensed steam sample. If the accuracy of the in-line instrument is in doubt, manual checks of steam may be made, with frequency of minimum two samples during the start-up.
- b. Checks if the continuous monitoring meter is on (it may take up to one half-hour for the pH and sodium instrument to stabilize and up to an hour to get an accurate conductivity measurement with the in-line analyzer due to instrument warm-up and air bubbles and contaminants in the sample line); If the accuracy of the in-line instrument is in doubt, manual checks of steam conductivity may be made.
- c. Checks that the instrument's weekly calibration has been performed. If required, perform a buffer calibration.

5.9 Steam Export Initial Sampling

- 5.9.1 Prior to CHP commissioning for export to the steam system, the Company will be collect an initial steam sample to determine the baseline. The Export trip valve will not be allowed to open until after all required steam purity and quality parameters are in compliance.

6.0 PRESSURE, TEMPERATURE AND FLOW CONTROL REQUIREMENTS

- 6.1 The Customer, at its own expense, shall install instruments to measure the steam pressure and temperature, if superheated steam, at points upstream and downstream of the Company steam meter station(s) as required for proper flow control and as close as possible to the point of exit. The Customer shall also install, at its own expense, adequate control valves and trip valves required to automatically regulate and control the direction of import and export steam flow and to protect its piping system and the Company steam system.
- 6.2 The Customer shall produce steam within the pressure and temperature operating limits as defined in this specification.

- 6.3 Whenever the pressure and temperature limits are exceeded Hi-Hi Operating Alarm, corrective action must be taken immediately by the Customer. A log of excursions must be maintained. Each log entry must record the time, duration, and magnitude of the excursion, and the suspected reason for the excursion.
- 6.4 The CHP Site and Company must agree upon the Site's discharge steam pressure and temperature, for site specific operating parameters to be within the range of min 100 psig and max of 200 psig with a steam temperature not to exceed 413 °F for Distribution Main Interconnection.
- 6.5 This agreement must be made in writing prior to commencing with the design of the interconnection to the Company steam system and prior to commencing with the design of the Customer's Sited Supply's CHP unit if it has not yet been designed. The temperature required is relative to the type of interconnection, and the degree of required super heat is relative to the location of the connection within either system.

6.6 Control valve(s):

- 6.6.1 Must be an ASME/ANSI B16.34 Class 300 valve. The sealing materials must be rated for a steam temperature of 413 °F.
- 6.6.2 Must allow positive closure for isolation - ANSI B16.104/FCI 70.2 Class 5 shut off or higher leakage rate classification. The control valve(s) must be certified at least once every five years to have an ANSI B16.104/FCI 70.2 Class 5 shut-off or higher leakage rate classification. The Customer shall maintain all certification documentation for inspection by the Company.
- 6.6.3 Cannot be a check valve.
- 6.6.4 Must be properly sized and automatically controlled to continuously maintain the pressure differential between predetermined points upstream and downstream of the control valve. Parallel valve arrangement may be necessary to maintain proper pressure and flow control during high or low demand periods. The steam pressure required for proper flow control must be measured by a gauge pressure transmitter that has a high degree of accuracy.
- 6.6.5 Must be designed for throttling service. The control valve(s) cannot be a gate valve or any other type of valve that is prone to erosion of the valve seat/disk if throttled.
- 6.6.6 Cannot have any provision or means of bypassing the control valve(s) or means of fixing the control valve(s) in one position. The control valve(s) must always modulate to maintain the required direction of flow.

6.7 Export Trip valve(s):

- 6.7.1 The Customer shall install trip valve(s) ("Export trip valve(s)") that shall be set to close immediately under certain conditions.
- 6.7.2 The export trip valve(s) must be an ASME/ANSI B16.34 Class 300 valve.
- 6.7.3 The export trip valve(s) must be a non-modulating valve designed for on-off service. It must have an ANSI B16.104/FCI 70.2 Class 5 shut off or higher leak rate classification.
 - a. A trip valve functionality test must be performed by the Customer at least once every calendar year. The valve must be observed to operate as designed based upon the original installation requirements.

- b. To verify that the trip valve(s) are not leaking through when the valve is in the closed position, a valve seat tightness test must be performed at least once every calendar year. The seat tightness test shall be performed while the valve is in the fully closed position and the steam pipe upstream of the valve is fully pressurized with high-pressure steam. The steam pressure in the pipe shall be at normal operating pressure. The steam pipe downstream of the valve should be pressure-free (no steam in the pipe). A blow-off valve must be installed in the steam pipe downstream of the trip valve(s). The blow-off valve must be fully open during the valve seat tightness test. No steam vapor or condensate droplets discharging from the fully opened blow-off valve must be observed visually during the test. If the trip valve(s) is found to be leaking through, then it must be replaced immediately.
 - c. The Company requires written certification that the functionality test and the valve seat tightness test were successfully performed.
 - d. The Company reserves the right to witness the functionality test and the valve seat tightness test. The Customer should notify the Company at least ten business days in advance of the test to give the Company the opportunity to determine whether Company personnel should be present during the test.
 - e. The trip valve(s) must be certified at least once every four years to have an ANSI B16.104/FCI 70.2 Class 5 shut-off or higher leakage rate classification. The Customer shall maintain all certification documentation for inspection by the Company.
- 6.7.4 The export trip valve(s) shall immediately close when one or more of the following events occur:
- a. Loss of electric power to the control valve controls, loss of electric power to the trip valve controls, or loss of electric power to any auxiliary equipment needed to maintain control valve or trip valve operation as designed.
 - b. Loss of electric power to the Master Controller
 - c. Control valve(s) is out of service for any reason or manually bypassed
 - d. Loss of pressure signal from any of the gauge pressure transmitters installed
 - e. The allowable tolerance of plus or minus two (2) psig between the monitoring and control gauge pressure transmitters is exceeded.
 - f. Exceed pressure and temperature limits as defined in this specification
 - g. Exceed steam purity limits as defined in this specification.
- 6.7.5 Export trip valves shall have the capability to be remotely controlled by Con Edison ECC to trip close.
- 6.7.6 Once the trip valve closes, trip valve control logic must have permissive that will not allow the trip valve to re-open locally unless all the continuously monitored steam parameters and limits are met.
- 6.7.7 Trip valves shall be manually reset after each automatic closure caused by an excursion

6.8 Gauge Pressure (GP) and Temperature Transmitter(s):

- 6.8.1 The steam pressures and temperatures must be measured by gauge pressure transmitters and RTD temperature transmitters, respectively.
- 6.8.2 The transmitters must have 0.1% of span or better accuracy.
- 6.8.3 Each GP transmitter must have a calibrated measuring range between 0 to 250 psig and send an analog signal (4-20 milliamps or 1-5 volts) to a data logger capable recording the steam pressure at least every minute and storing the data electronically for at least forty-five (45) days.
- 6.8.4 GP transmitters must be installed by the Customer at the various locations determined on a case-by-case as required for flow control, system condition monitoring, and system protection and integrity.
- 6.8.5 Each GP transmitter installed for the purpose of controlling the positioning of the control valve(s) or triggering the trip valve(s) must be installed in duplicate. One gauge pressure (GP) transmitter shall be used for normal operation/control of the valve(s); the other GP transmitter, for performance monitoring and comparison.
- 6.8.6 Each GP transmitter sensing line shall be piped to different pressure taps (cannot share the same pressure tap) and checked for leakage at least once a week by the Customer.
- 6.8.7 The GP transmitter used for monitoring shall be the reference pressure measurement ("the standard") at that pressure tap location. The allowable tolerance shall be plus or minus two (2) psig – in other words, the control GP transmitter must be within two (2) psig of the monitoring GP transmitter at all times. If the tolerance is exceeded, the associated trip valve shall immediately close. An alarm must be generated immediately to alert the Customer that the control GP transmitter must be calibrated immediately in accordance with Company requirements.
- 6.8.8 Calibration Test Requirements.
 - a. Each pressure transmitter must be calibrated with a precision deadweight tester.
 - b. The deadweight standard shall have an accuracy that is 0.025% of indicated reading or better and traceable to the National Institute of Standards and Technology (NIST).
 - c. The calibration test for transmitters shall consist of "as-found" and "as-left" tests. The as-found test readings should be taken before the transmitter is calibrated; the as-left pressure readings, after the transmitter has been calibrated.
 - 1) Each pressure transmitter test should show the deadweight pressure input reading, actual pressure reading from transmitter, percent difference between deadweight input and actual pressure reading for each pressure data point. The expected current output, the actual current output and the percent difference between the two should also be recorded at each pressure data point. Pressure data points should be taken as follows: increasing from zero percent (0%) of full scale to one-hundred percent (100%) of full scale and decreasing back to zero percent of full scale at increments of ten percent (10%) of full scale. All data points on the as-left test must be within the

- allowable accuracy of 0.1% of span or better as compared to the deadweight standard pressure readings or expected current output readings.
- 2) Each temperature test should show the reference temperature reading, actual temperature reading from transmitter, percent difference between reference instrument and actual temperature reading for each pressure data point. The expected current output, the actual current output and the percent difference between the two should also be recorded at each temperature data point. Temperature data points should be taken as follows: increasing from zero percent (0%) of full scale to one-hundred percent (100%) of full scale and decreasing back to zero percent of full scale at increments of ten percent (10%) of full scale. All data points on the as-left test must be within the allowable accuracy of 0.1% of span or better as compared to the reference instrument readings or expected current output readings.
- d. Each GP transmitter installed for performance monitoring shall be checked once each quarter of the calendar year against a precision deadweight tester. The deadweight standard shall have an accuracy that is 0.025% of indicated reading or better and traceable to the National Institute of Standards and Technology (NIST). The GP transmitter shall be checked at an increment of 10% from 0 to 100% of full scale. The allowable tolerance between the GP Transmitter and the deadweight standard should not exceed plus or minus 0.1% of span. If this tolerance is exceeded, then the monitoring GP transmitter must be calibrated immediately in accordance with the calibration test requirements.
- e. The Customer must submit a detailed test procedure to the Company for approval. The test procedure must establish that the required tolerances for calibration tests and quarterly performance checks meet the Company's requirements.
- f. The Customer is responsible for the testing and a qualified individual must perform the calibration tests in accordance with the transmitter's manufacturer's published calibration procedures. Qualified, trained individuals include professional engineers; factory trained and certified technicians; and experienced instrumentation and controls technicians.
- g. The Company reserves the right to witness the testing and require written certification that the testing was successfully performed. The Customer should notify the Company at least ten business days in advance of the calibration test or performance check to give the Company the opportunity to determine whether Company personnel should be present during the test.
- h. Each transmitter must be calibrated every twelve months; or when the transmitter is out of tolerance; or when the transmitter is replaced. The Company must receive a copy of the factory certification that each newly installed transmitter has been tested in accordance to the above standards.
- 6.8.9 The Customer should maintain the annual calibration test reports and the quarterly performance check reports for review upon request by the Company to demonstrate that the transmitters are maintained and functioning properly.

- a. The Company shall be given access to inspect the transmitters and associated piping at any time.
 - b. Raw test data and the completed tests must be stored for a minimum of six (6) years and made available for the Company's review at any time.
 - (1) Data Logger / Master Controller Requirements
 - The data logger must be capable of storing the pressure and temperature data for forty-five (45) days minimum. The recorded data shall then be transferred to a data repository device for a minimum of one year.
- 6.9 The Company shall witness the Master controller, control valve(s), and trip valve(s) operation before the disconnect(s) is (are) removed.

SECTION III. IMPORT AND EXPORT

SERVICE UNDER SC4 and RIDER G STEAM SERVICE

7.0 APPLICABILITY

- 7.1 This applies to an existing Customer who has installed on site distributed generation or a new Customer planning to apply for steam service by November 1st, 2011 and who are in compliance with Applicability requirements outlined in Section II subsection 1 of this specification.
- 7.2 Service Classification: Applications for service must be separately submitted for service under either SC 4 or Rider G. A Rider G customer must be billed under SC 4 for its back-up/supplementary service or isolated from the Company's steam system for its on-site steam requirements.
- 7.3 Interconnection exists inside a Customer's building when steam pipe installed to transport steam from the Customer's steam generating equipment is connected to a steam piping network inside the building that is directly supplied by the Company's street steam distribution system. The interconnection can occur at one or more junctions (hereinafter referred to as "tie-in points").
- 7.4 Physical separation(s) (hereinafter referred to as "disconnect(s)") at or before the tie-in points must exist and remain in place until the requirements of any authority having jurisdiction and requirements of the Company have been satisfied. If the Customer's steam generating equipment has been installed and tied-in prior to satisfying the Company requirements for interconnection, a disconnect must be installed and remain in place until such requirements have been met.
- a. A disconnect can be a closed valve. The valve must be an ASME/ANSI B16.34 Class 300 valve and will be wire sealed by the Company in the closed position. A blank, steel plate ("frying pan") must be installed between one of the flanges of the valve and the flange of the pipe. The plate must have a diameter slightly less than the diameter of the inner-circle formed by the bolt holes of the flange and a thickness capable of withstanding the total thrust force exerted from the steam (200 psig).
 - b. A disconnect can be a physical break in the pipe. All open-ended pipes must either be capped off with a boiler cap or blanked with an ANSI B16.34 Class 300 blind flange.

- c. A disconnect can be any means that maintain a complete separation between the high-pressure steam piping system supplied by the Company steam distribution system and the high-pressure steam piping system served by the Customer's steam generating equipment.

8.0 REQUIREMENTS FOR INTERCONNECTION

- 8.1 All of the following Company requirements must be satisfied before interconnection with Company steam system can occur:

- 8.1.1 The Company must have received a load letter from consulting engineer of record. The load letter must provide a detailed breakdown of the winter and summer steam load requirements for the building as it relates to the installation of the steam generating equipment. The load letter should clearly show a breakdown of the peak winter and summer steam load requirements for the building when the Customer's cogeneration plant is in service and not in service. All uses (heat, domestic hot water, air conditioning, etc.) for the hot water and/or steam produced by the Customer's cogeneration plant must be clearly defined in the load letter. The steam equivalent in pounds per hour for the hot water load of the Customer's cogeneration plant must be submitted. The load letter should include the planned operating hours of the Customer's cogeneration plant.
- 8.1.2 The customer's drawings, design and shop, must be reviewed and accepted by Steam Distribution Engineering (SDE). Submittal of drawings must be as per Section II, subsection 8 of the General Requirements for Steam Service. The design drawings must include piping schematics for all piping to/from the CHP/steam generating equipment (i.e., hot water supply/return piping system and steam piping system). The drawings should clearly show how the CHP/steam generating equipment interconnects with the steam piping system supplied by the Company. Schedules and equipment specifications for all CHP/steam generating equipment (steam generators, heat exchangers, pumps, pressure reducing valves, condensate return system, etc.) shall also be submitted to the Company for review.
- 8.1.3 The Company shall review its distribution piping system and determine if an extension or reinforcement of the Company's main is required to transport the requested loads.
- 8.1.4 A stress analysis must be performed as per Section II, subsection 5 of the General Requirements for Steam Service. A street service valve, if none exists, shall be installed by the Company at the Customer's expense. The street service valve shall be installed prior to the time steam service is required by the Customer.
- 8.1.5 Service under either SC 4 or Rider G will be separately metered as defined in section II subsection 4 of this procedure.
- 8.1.6 All equipment used by the Customer shall be designed, manufactured, installed and tested in accordance with the latest applicable industry standards, including ASME, ASTM, NFPA, ANSI, IEEE, NEC, NESC, OSHA, UL, NEMA and local or City rules, regulations or ordinance codes, unless otherwise specified.
- 8.1.7 The Customer's steam plant design and installation shall have the necessary protection and design features to prevent:

- a. Over-pressurization (operating at steam pressures that exceed the design pressure of the Customer's steam generating equipment) of the Customer's steam generating equipment and associated steam piping system
 - b. Over-pressurization (operating at steam pressures that exceed the 200 psig) of the 200-psig steam piping system
 - c. Over-pressurization (operating at steam pressures that exceed the 200 psig) of the Company's 200 psig underground steam distribution piping system
 - d. Excursions from required steam quality and purity limits as defined in this specification.
- 8.1.8 The proper Certificate of Inspection, as per Section II, subsection 3 of the General Requirements for Steam Service, must be received by the Company.
- 8.1.9 The Customer shall furnish and install, as specified in this specification, at the Customer's expense, adequate metering and communication equipment to transmit to the ECC, information that will then allow Company to monitor the Customer's generation of steam and interconnection status.
- 8.1.10 The Customer shall pay to the Company any applicable charges, fees and payments required for interconnection as defined in the current NYS PSC steam rate tariff.
- 8.1.11 For a new Customer. A signed Application for Steam Service and Application for CSS Program (attachment #1) must be received by the Company.

9.0 STEAM FLOW CONTROL PROCESS

9.1 Existing Customers will be required to replace the following valves: Inside Service Valve (ISV), Steam Meter Inlet and Meter Outlet valves.

9.2 The Customer shall install a control system that satisfies the following minimum requirements:

9.2.1 Import Steam Flow Control system. The Customer shall install a control system that shall have automatic pressure regulation such that, when the Customer's plant is supplying steam to an onsite steam distribution system that is being supplied by the Company steam system, the steam pressure measured downstream of Customer-installed control valve(s) shall be less than the steam pressure of the imported steam.

a. Import Control Valve(s):

- (1) Control valve(s) ("Import Control valve(s)") shall be installed after the House valve(s) to control the flow of Import steam (attachment # 4B)
- (2) A predetermined pressure differential shall be maintained across the import control valve(s) such that the flow of steam is always into the customer's building towards the customer's onsite steam distribution system. The import control valve(s) should modulate to maintain the predetermined pressure differential as measured by GP transmitters located at the meter outlet header and some point after the import control valve(s).

- b. The pressure measured at the meter outlet header shall always be greater than the pressure ("Company Import Steam Pressure") measured after the import control valve(s).
- c. When the steam demand of the customer's facility is satisfied by the CHP's output, the import control valve should remain in the closed position. The import control valve(s) should automatically open upon demand when the customer steam needs exceeds the CHP's output or when the CHP is off line.

9.2.2 CHP Control Valve(s):

- a. Control valve(s) ("CHP Control Valve(s)") shall be installed downstream of the customer's steam generators but upstream of the tie-in points of the onsite steam distribution system (attachment # 4B).
- b. The CHP control valve(s) shall modulate to maintain a predetermined pressure differential across the CHP control valve(s) such that the flow of steam is always towards the onsite steam distribution system.
- c. The predetermined pressure differential shall be the difference between the pressure measured at some point upstream of the CHP control valve(s) and the pressure ("CHP Steam Supply pressure") measured at some point downstream of the CHP control valve(s). Each pressure shall be measured by GP transmitters.
- d. The CHP Steam Supply pressure shall always be greater than the Company Import Steam pressure.
- e. If the CHP Steam Supply pressure exceeds 200 psig, a trip valve(s) ("CHP Steam Supply Trip valve") installed upstream of the tie-in point(s) of the onsite steam distribution system shall close immediately.

9.2.3 Export Steam Flow Control System. The Customer shall install a control system that shall have automatic pressure regulation such that when the steam pressure measured downstream of Customer-installed control valve(s) is greater than the steam pressure measured at the some point as close to the point of exit as possible (attachment # 4B).

- a. Export Control Valve(s):
 - (1) Control valve(s) ("Export Control valve(s)") shall be installed upstream or downstream of the export steam meter and shall be capable of maintaining the direction of steam flow towards the point of exit into the Company steam system.
 - (2) The Customer shall cause the pressure of the steam delivered to the Company to be sufficient to allow the steam from the building to flow into the Company steam system (attachment # 4B)
 - (3) The export control valve(s) shall modulate to maintain a predetermined pressure differential across the valve(s) such that the flow of steam is always towards the point of exit. The pressure differential shall be the difference between the pressures ("Export Steam Pressure") measured at some point downstream of the export control valve(s) and CHP Steam Supply pressure measured at some point upstream of the export control valve(s).

- b. The Export Steam pressure shall always be greater than the pressure ("Company Street Steam pressure") measured at some point as close as possible to the point of exit. If under any conditions or circumstances that the Company Street Steam pressure is equal to or greater than the Export Steam pressure, then the export trip valve shall be set to close immediately to prevent steam from back flowing through the export steam meter into the Customer's building.
 - c. The export trip valve(s) shall also immediately close when any of the conditions defined in section II. subsection 6.7.4 occurs.
 - d. The export control valve(s) and the trip valve(s) shall never be installed downstream of the export service valves that's installed at the point of exit.
 - e. The Export Steam Trip valve(s) shall be installed as close to the point of exit as possible
 - f. If the same service pipe is used to import and exporting steam, the export trip valve(s) shall be installed on the CHP side of the tie-in point.
- 9.2.4 The piping schematic included as an attachment to this procedure is for reference and informational purposes only (attachment #4B). The final placement of control valve(s) and trip valve(s) shall be determined on a case by case basis in order to best serve the steam energy needs of the building. Final piping schematics and 'As-Built' schematics are to be maintained by the Customer and the Company.
- 9.2.5 The design features of the Customer's steam control system must not include any component of the Company steam meter station. The steam meter station must operate freely and independently of any control scenario. The steam meter station includes the common headers connecting the individual meter piping runs and all the pipe, fittings, and valves that are installed between the common headers. The common headers are normally designated by the Company as the meter inlet header and the meter outlet header (attachment #4A).

SECTION IV. EXPORT ONLY

SERVICE UNDER RIDER G STEAM SERVICE

10.0 APPLICABILITY

- 10.1 This applies to Customers with a CHP facility with a natural gas-fueled cogeneration configuration that utilizes the Company's firm gas service for the delivery of gas supply to the CHP facility and captures the heat waste as a byproduct of electric production.
- 10.2 Customers taking service under the Demand Response Pilot Program (Rider F), operating a boiler-only plant (i.e., a boiler that is not associated with a CHP unit), or operating a CHP unit not associated with a host load in a building are not eligible to take service under this Rider.
- 10.3 Customers the requirements set forth herein are subject to the Company's objective that the interconnection should preserve the safety, reliability, and operational efficiency of the steam distribution system, consistent with the need to provide the lowest cost to the customer. Accordingly, the requirements set forth herein may vary for a particular on-site generator.

11.0 REQUIREMENTS FOR INTERCONNECTION

11.1 All of the following Company requirements must be satisfied before interconnection with Company steam system can occur:

- a. The consulting engineer of record must mail a load letter to the Company. The load letter must provide a detailed breakdown of the winter and summer steam load requirements for the building as it relates to the installation of the steam generating equipment. The load letter should clearly show a breakdown of the peak winter and summer steam load requirements for the building when the Customer's cogeneration plant is in service and not in service. All uses (heat, domestic hot water, air conditioning, etc.) for the hot water and/or steam produced by the Customer's cogeneration plant must be clearly defined in the load letter. The steam equivalent in pounds per hour for the hot water load of the Customer's cogeneration plant must be submitted. The load letter should include the planned operating hours of the Customer's cogeneration plant.
- b. The Customer's drawings, design and shop, must be reviewed and accepted by Company. Submittal of drawings must comply as per Section II, subsection 8 of the General Requirements for Steam Service with section II subsection 2.2.4 of this procedure. The design drawings must include piping schematic.
- c. Schematics for all piping to/from the CHP/steam generating equipment (i.e., hot water supply/return piping system and steam piping system). The drawings should clearly show how the CHP/steam generating equipment interconnects with the steam piping system supplied by the Company. Schedules and equipment specifications for all CHP/steam generating equipment (steam generators, heat exchangers, pumps, pressure reducing valves, condensate return system, etc.) shall also be submitted to the Company for review.
- d. The Company shall review its distribution piping system and determine if an extension or reinforcement of the Company's main is required to transport the requested loads.
- e. A stress analysis, as per Section II, subsections 5 of the General Requirements for Steam Service and must be reviewed and accepted by Company.
- f. A street service valve, if none exists, shall be installed by the Company at the Customer's expense. The street service valve shall be installed prior to the time steam service is required by the Customer.
- g. All equipment used by the Customer shall be designed, manufactured, installed and tested in accordance with the latest applicable industry standards, including ASME, NFPA, ASTM, ANSI, IEEE, NEC, NESC, OSHA, UL, NEMA and local or City rules, regulations or ordinance codes, unless otherwise specified.
- h. The Customer's steam plant design and installation shall have the necessary protection and design features to prevent:
 1. Over-pressurization (operating at steam pressures that exceed the design pressure of the Customer's steam generating equipment) of the Customer's steam generating equipment and associated steam piping system
 2. Over-pressurization (operating at steam pressures that exceed the 200 psig) of the 200-psig steam piping system
 3. Excursions from required steam quality and purity limits as defined in this specification.

- i. The proper Certificate of Inspection, as per Section II, subsection 3 of the General Requirements for Steam Service, must be received by the Company.
- j. The Customer shall furnish and install, as specified in this specification, at the Customer's expense, adequate metering and communication equipment to transmit to the ECC, information that will then allow Company to monitor the Customer's generation of steam and interconnection status.
- k. The Customer shall pay to the Company any applicable charges, fees and payments required for interconnection as defined in the current NYS PSC steam rate tariff.
- l. For new Customer a signed Application for Steam Service must be received by the Company.

12.0 STEAM FLOW CONTROL PROCESS

12.1 The Customer shall install a control system that satisfies the following minimum requirements:

- 12.1.1 The Customer shall install a control system that shall have automatic pressure regulation such that when the steam pressure measured downstream of Customer-installed control valve(s) is greater than the steam pressure measured at the some point as close to the point of exit as possible (attachment #4C).
 - a. Export Control Valve(s):
 - (1) Control valve(s) ("Export Control valve(s)") shall be installed upstream or downstream of the export steam meter and shall be capable of maintaining the direction of steam flow towards the point of exit into the Company steam system.
 - (2) The Customer shall cause the pressure of the steam delivered to the Company to be sufficient to allow the steam from the building to flow into the Company steam system (attachment #4C).
 - (3) The export control valve(s) shall modulate to maintain a predetermined pressure differential across the valve(s) such that the flow of steam is always towards the point of exit. The pressure differential shall be the difference between the pressure ("Export Steam Pressure") measured at some point downstream of the export control valve(s) and CHP Steam Supply pressure measured at some point upstream of the export control valve(s).
 - b. The Export Steam pressure shall always be greater than the pressure ("Company Street Steam pressure") measured at some point as close as possible to the point of exit. If under any conditions or circumstances that the Company Street Steam pressure is equal to or greater than the Export Steam pressure, then the export trip valve shall be set to close immediately to prevent steam from back flowing through the export steam meter into the Customer's building.
 - c. The export trip valve(s) shall also immediately close when any of the conditions defined in section II subsection 6.7.4 of this procedure occurs.
 - d. The export control valve(s) and the trip valve(s) shall never be installed downstream of the export service valves that's installed at the point of exit.

- e. The Export Steam Trip valve(s) shall be installed as close to the point of exit as possible.
- 12.1.2 The piping schematic included as an attachment to this procedure is for reference and informational purposes only (attachment #4C). The final placement of control valve(s) and trip valve(s) shall be determined on a case by case basis in order to best serve the steam energy needs of the building. Final piping schematics and 'As-Built' schematics are to be maintained by the Customer and the Company.
- 12.1.3 The design features of the Customer's steam control system must not include any component of the Company steam meter station. The steam meter station must operate freely and independently of any control scenario. The steam meter station includes the common headers connecting the individual meter piping runs and all the pipe, fittings, and valves that are installed between the common headers. The common headers are normally designated by the Company as the meter inlet header and the meter outlet header (attachment #4A).

SECTION V. PAYMENT TO BE MADE BY COMPANY

13.0 THERMAL ENERGY PAYMENT

- 13.1 The Company's tariff, Rider G, describes how payments will be made.
- 13.2 The Company will utilize "New York Mercantile Exchange ("NYMEX") last three days ("L3D") plus Platt's Inside FERC's ("IF") Gas Market Report Transco Zone 6 N.Y. ("Transco Z6NY") basis" method for determining the monthly gas price.
- 13.3 NYMEX Gas Price
 - 13.3.1 The Gas price is the value of NYMEX for any given month and it shall be equal to the average settlement price as traded in for Henry Hub Gas deliveries in such month of the last three days (L3D) of futures trading in the prior month, as reported in *The Wall Street Journal*.
 - 13.3.2 Customers can view the daily settlement gas price at several public or subscribed sources. Company will use CME Group, subsidiary of NYMEX, public source for determination of gas prices. <http://www.cmegroup.com>
- 13.4 Gas Delivery Basis
 - 13.4.1 Transco Z6NY basis is defined as difference between the Transco Z6NY IF index for the month as publish in the Inside FERC's monthly gas report minus the NYMEX last day settle (LDS).
 - 13.4.2 Both Gas price and Transco Z6NY basis will be expressed in \$/DTH (DTH=1 Dekatherm = 1 MM Btu = 1 Million British Thermal Units).
- 13.5 Company will provide, upon Customer request, details for determination of the individual days used for L3D average gas price; however Company cannot share Transco Z6NY index information and customer will have to obtain it from subscribed source.

SECTION VI. REFERENCE DOCUMENTS

1. Power Piping Code, ASME B 31.1
2. Department of Buildings of the City of New York Rules & Regulations
3. PSC no. 3 Steam Tariff, Schedule for Steam Service
4. NERC Generating Availability Data System (*GADS*) Data Appendix F Performance Indexes and Equations
5. ASTM Standard D1066-97 (Reapproved 2001), Standard Practice for Sampling Steam
6. ASTM Standard D3370-95a (Reapproved 2003), "Standard practices for Sampling Water from Closed Conduits"

REVISION 1

Revision 0 was in effect from December 2011

Next Scheduled Review: as needed

SECTION VII. ATTACHMENTS

ATTACHMENT # 1 APPLICATION FOR CUSTOMER SITED SUPPLY PILOT PROGRAM

Welcome! This is your dispatch form for service under Rider G pursuant to the Company's Schedule for Steam Service. Read all questions carefully and answer them to the best of your knowledge. If you have any questions please call us at 1-212-460-2011. **Please print/type your answers and sign the application in Part 3.**

Part 1. Customer Information

Today's date ____/____/____

GENERAL INFORMATION

1. Account number (if applicable): _____
2. Type of business
☐ Commercial ☐ Residential ☐ City of New York ☐ Schools/Colleges/Universities
☐ Cultural ☐ Hospital ☐ Hotel ☐ Multi-Use Bldg ☐ Museum ☐ Religious
☐ Restaurant ☐ US Government ☐ Retail ☐ Other_____
3. Direct telephone line answerable (24) hours a day, seven (7) days a week (cell phones are not allowed).
On-location phone _____

CHP INFORMATION

4. What CHP technology do you used?
☐ Gas Turbines ☐ Micro Turbines ☐ Steam Turbines ☐ Other_____
☐ Compression Ignition (CI) Reciprocating Engine ☐ Spark Ignition (SI) Reciprocating Engine
5. CHP name plate rating
a_Thermal Output_____Mlb/hr
b. Electric Output _____ KWhr

6. CHP maximum steam flow rate available for export _____Mlb/hr
7. CHP minimum steam flow rate available for export _____Mlb/hr
8. CHP latest Summer/Winter Demonstrated Net Maximum Capability test rating (if applicable)?

9. Describe CHP normal Operation hours? (e.g. week, weekends, morning, afternoon, evening)

10. CHP ramp rate_____Mlb/hr/min
11. CHP minimum required start up time _____minutes
12. CHP Fuel type used? _____
13. Start up or emergency back-up fuel if different from above?_____
14. Maximum available export pressure range _____Psig
15. Maximum available export temperature range _____°F
16. CHP capability of producing superheated steam? Yes ☐ No ☐
- If yes, what is the maximum degree of superheat that CHP's steam can be generated? _____°F
16. What is the contingency and/or action to be taken to provide us with the export load?

-
17. Please check all uses your CHP provides: ☐ Heat ☐ Kitchen
☐ Hot Water ☐ Ventilation
☐ Air Conditioning ☐ Humidification
☐ Sterilization ☐ Other_____

18. Are you planning to reduce any service in order to provide the export load? ☐ Yes ☐ No
If yes, please specify

19. Are you a Con Edison electric customer? ☐ Yes Account # _____ ☐ No

If yes, are you part of an Electric Demand response program? ☐ Yes ☐ No

20. Are you a Con Edison gas customer? ☐ Yes Account # _____ ☐ No

If yes, interruptible gas ☐ firm (non-interruptible) gas ☐

21. Do you require steam back-up/ supplementary service under Service Class 4 ☐ Yes ☐ No

- a. What is your back-up plan in the event of CHP unit trip? Would you require Con Edison to provide 100% steam back-up service? If yes, how much steam back-up service is required?

22. CHP Installation Schedule Milestones

- a. CSS Application Submittal Date
- b. CSS Application Received Date (complete by Company)
- c. Application Acceptance Date (complete by the Company)
- d. Design Completion Date
- e. Installation Start Date
- f. Installation Completion Date
- g. Steam Export Date

Part 2 Operator Information

Name	Title	Primary Contact	Secondary Contact	Availability
1				
2				
3				
4				
5				

Part 3 Signature

To the best of my knowledge, the information provided here is accurate, and no attempt has been made to misrepresent the facts.

Application submitted by:

Print name _____

Contact e-mail _____

Contact phone _____

Relationship to person responsible for account (e.g., proprietor, partner, corporate officer, agent)

Signature _____

Title _____ Date ____/____/____

To expedite the process, you can fax the completed forms to us at 1-212-473-2538. However, because we must have an original signature on file, we ask that each form be signed and mailed to the Steam Business Development Department at Con Edison, 4 Irving Place, Room, 7fl SE, New York, NY 10003. www.conEd.com/steam

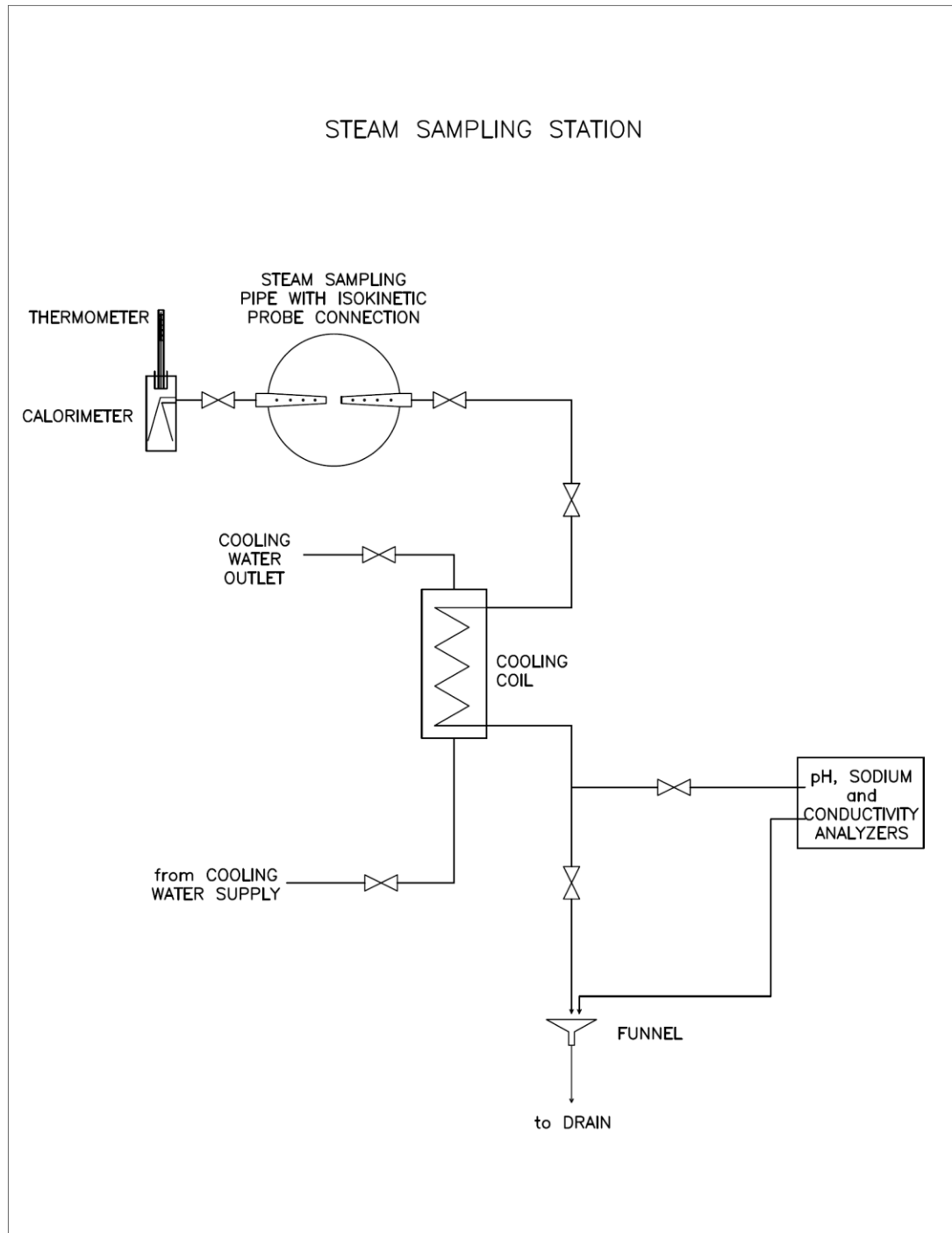
ATTACHMENT # 2 CUSTOMER EXPORT QUANTITY (CEQ) NOMINATION SHEET

Calendar Month*	Primary Operating Period (Mlb/hr) December to March all hours and from April to November Monday to Friday 6am to 6pm	Secondary Operating Period (Mlb/hr) April to November all hours except Monday through Friday 6am to 6pm
January		N/A
February		N/A
March		N/A
April		
May		
June		
July		
August		
September		
October		
November		
December		N/A

*The Customer must contract to export steam during the primary operating period in all 12 months and, at the Customer's election, may contract to export steam during the secondary operating period in the months of April through November. Different CEQs may be established for each of the 12 months and for the primary and secondary operating periods in the months of April through November.

ATTACHMENT #3, STEAM SAMPLING STATION

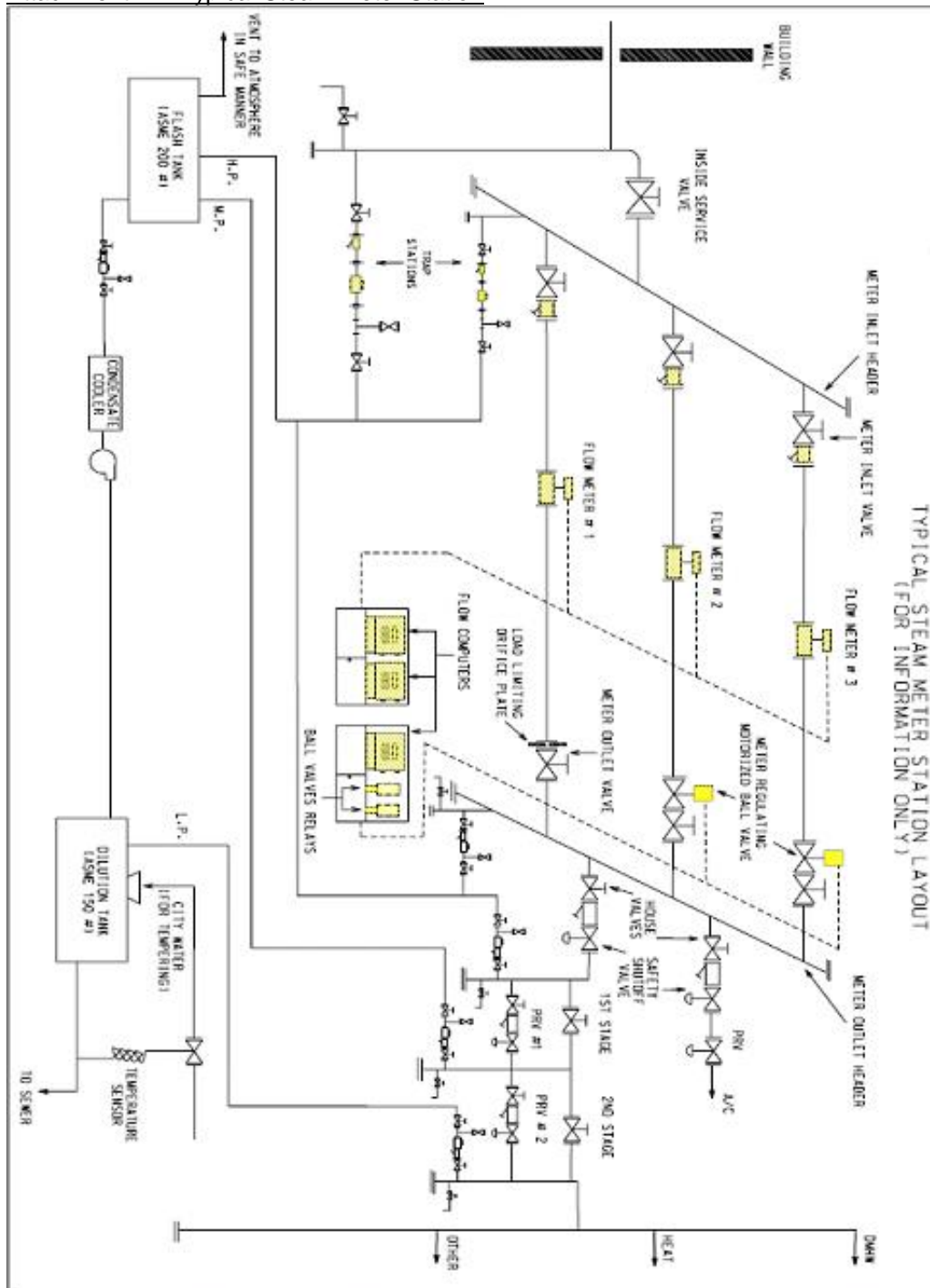
For Reference and Informational Purposes Only



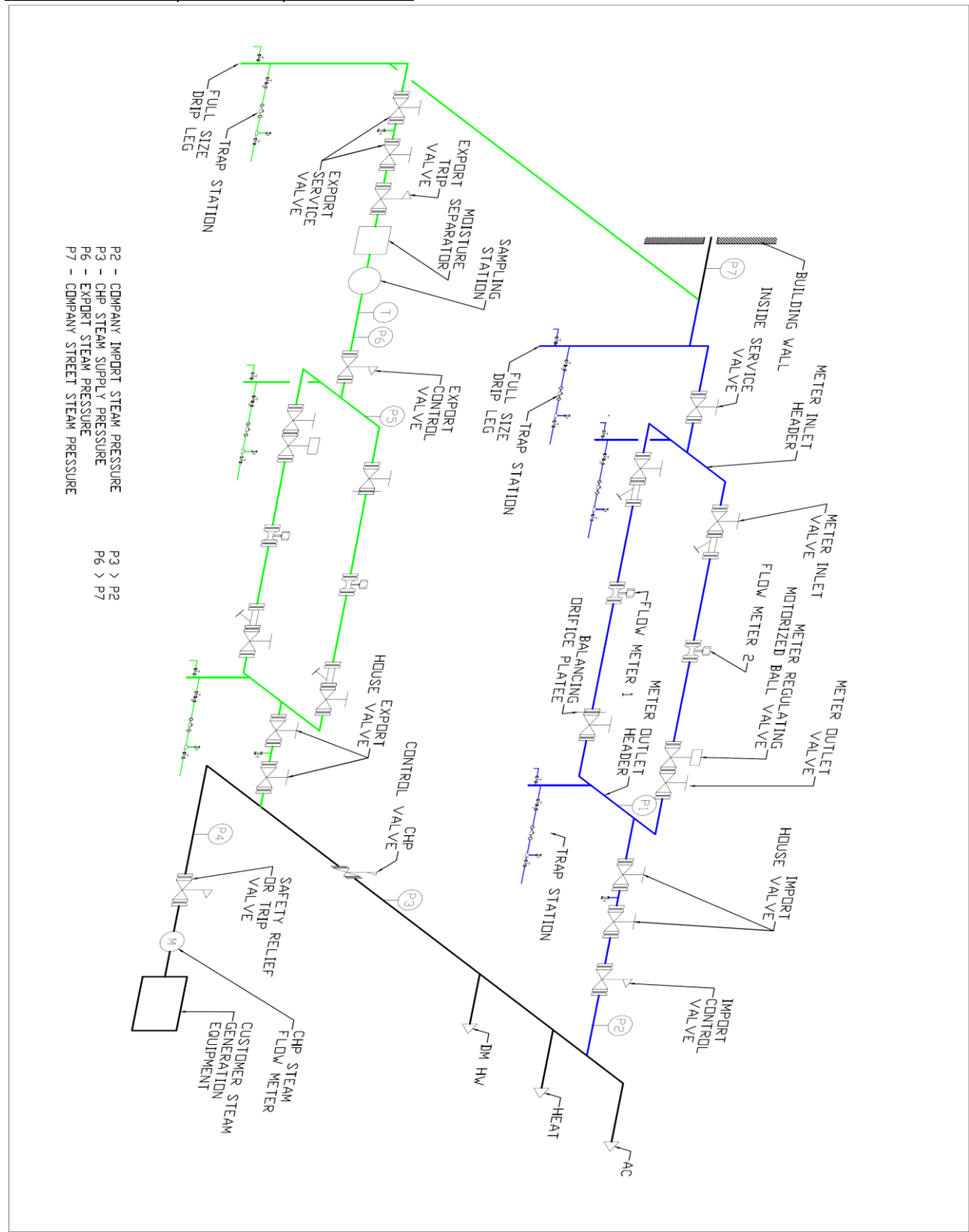
ATTACHMENT #4, STEAM METER STATION

Schematic below is for reference and informational purposes only. The meter station and H.P. piping system depicted may not reflect the actual installation inside Customer's building

Attachment 4A: Typical Steam Meter Station

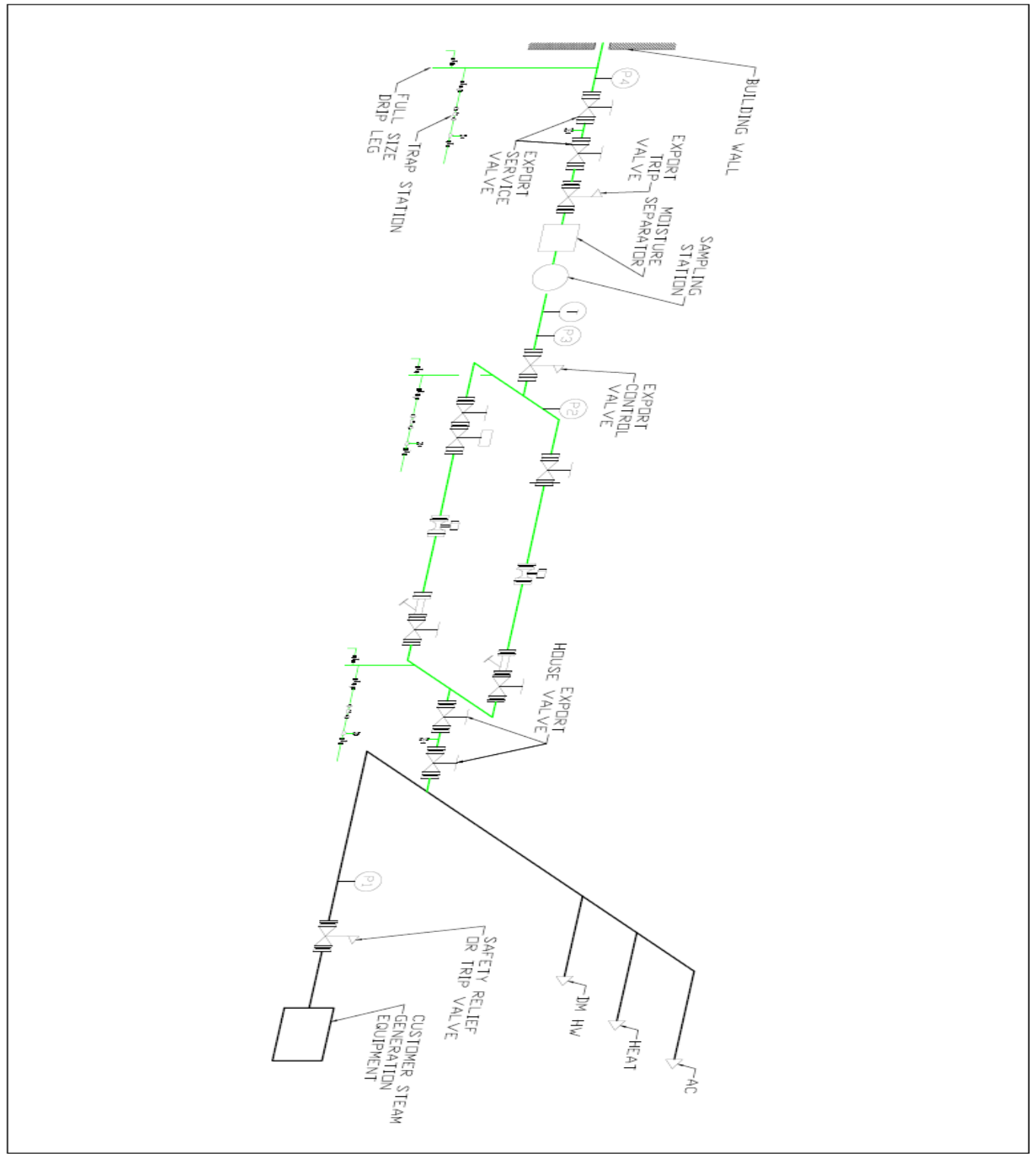


Attachment 4B: Import and Export Customer





Attachment 4C: Export Only Customer



ATTACHMENT #5, PHONETIC ALPHABET

Listed below is the phonetic alphabet of the International Civil Aviation Organization:

A - Alpha	N - November
B - Bravo	O - Oscar
C - Charlie	P - Papa
D - Delta	Q - Quebec
E - Echo	R - Romeo
F - Foxtrot	S - Sierra
G - Golf	T - Tango
H - Hotel	U - Uniform
I - India	V - Victor
J - Juliet	W - Whiskey
K - Kilo	X - X-Ray
L - Lima	Y - Yankee
M - Mike	Z - Zulu

ATTACHMENT #6, DAILY DISPATCH AVAILABILITY LOG

Customer Generation Facility Availability Status Report

“CEQ” is Contracted Export Quantity as nominated in the program’s application

Customer Name:		“CEQ” Primary Operating Period (Mlb/hr)	“CEQ” Secondary Operating Period (Mlb/hr)
Date of Status:			

Hour Beginning	Available Export Quantity (Mlb/hr)	CHP Status:		ADMIN ONLY	
				Dispatch	Actual
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

CHP Status Legend:

- A** Station is online and available to full capacity.
- T** Station is online performing test (Export Capacity or Ramp Rate)
- FP** Station has a forced partial derate
- SF** Startup failure, forced off during the start-up

FO	Station is forced off line.
MTC	Station is on maintenance.
SCH	Station is on a scheduled maintenance outage.
RSD	Station is on reserve shutdown.

ATTACHMENT #7, MONTHLY STEAM PURITY SUMMARY REPORT

Name

Date

Address

Account Number

	Limit	Monthly Range	Excursion (if any) and Duration	Suspected Reason for Excursion	Action Taken
Desuperheating Water					
pH	6.0 - 8.0	Min			
		Max			
Conductivity (µS/cm)	Trend Observe	Min			
		Max			
Dissolved Oxygen (ppb)	< 30 ppb	Min			
		Max			
Make-up Water					
pH	6.0 - 8.0	Min			
		Max			
Conductivity (µS/cm)	Trend Observe	Min			
		Max			
Dissolved Oxygen (ppb)	< 30 ppb	Min			
		Max			
Steam Send-out					
pH	5.5 - 8.5	Min			
		Max			
Conductivity (µS/cm)	1 µS/cm	Min			
		Max			
Sodium (ppb)	< 10 ppb	Min			
		Max			
Drip pot (Note 1)					
pH	5.5 - 8.5	Min			
		Max			
Conductivity (µS/cm)	Trend Observe	Min			
		Max			
Dissolved Oxygen (ppb)	< 10 ppb	Min			
		Max			

Note 1: Case by case, as per Company discretion upon review of the Customer's chemical cycle.

Maximum and Minimum values for desuperheating and make-up water shall be taken from the operating log

Maximum and Minimum values for steam send out and drip pot shall be taken from the hourly readings

ATTACHMENT #8, STEAM CHEMISTRY APPLICATION FORM

Instructions:

The diagram below is a generic representation of basic CHP production cycle and it is for illustrative purpose only. Please fill in as applicable and/or submit own process diagram. Use extra sheets as necessary to explain your existing or proposed water treatment system to comply with the steam quality and purity requirements.

