UTILITY COMMITTEE
AGENDA

SEPTEMBER 28, 2015 - 5:00 P.M.

CITY HALL COUNCIL CHAMBERS
15 LOOCKERMAN PLAZA
DOVER, DELAWARE

PUBLIC COMMENTS ARE WELCOMED ON ANY ITEM AND WILL BE PERMITTED AT APPROPRIATE TIMES. WHEN POSSIBLE, PLEASE NOTIFY THE CITY CLERK (736-7008 OR E-MAIL AT CITYCLERK@DOVER.DE.US) SHOULD YOU WISH TO BE RECOGNIZED.

AGENDA ADDITIONS/DELETIONS

1. **CRITICAL REPAIR - VANSANT EXHAUST PLENUM** (*DUE TO TIME CONSTRAINTS, THIS ITEM HAS BEEN PLACED ON THE COUNCIL AGENDA FOR THE MEETING BEING HELD LATER IN THE EVENING*)
   (STAFF RECOMMENDS DELAYING INSPECTION AND REPAIRS ON THE UNIT #3 COOLING WATER LINE AND FUNDING THE CRITICAL REPAIRS NEEDED ON THE VANSANT EXHAUST PLENUM, TRANSITION PIECE, AND EXPANSION JOINT IN ACCORDANCE WITH THE COMPLETION DATE OF JUNE 1, 2016)

2. **REVIEW OF PJM CAPACITY PERFORMANCE AUCTION**
   (COMMITTEE ACTION NOT REQUIRED)

3. **ADJOURNMENT BY 5:50 P.M.**

/TM
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THE AGENDA ITEMS AS LISTED MAY NOT BE CONSIDERED IN SEQUENCE. THIS AGENDA IS SUBJECT TO CHANGE TO INCLUDE THE ADDITION OR THE DELETION OF ITEMS, INCLUDING EXECUTIVE SESSIONS.

ACTION FORM

PROCEEDING: Utility Committee & City Council
DEPARTMENT OF ORIGIN: Electric Department - Power Plant (NAES) **DATE SUBMITTED**: 08/28/15
PREPARED BY: Don Mordus, Plant Manager
SUBJECT: Critical Repairs – Van Sant Exhaust Plenum
REFERENCE: Braden Manufacturing, LLC Proposal Rev 1 46569
RELATED PROJECT: Project # EG1612
REVIEWED BY: Electric Director, City Manager, Controller/Treasurer
EXHIBITS: Exhibit A – Infrared Thermography Inspection Report – Van Sant Generating Station
EXPENDITURE REQUIRED: **$430,000 (Estimated)** **AMOUNT BUDGETED**: **$469,000**
FUNDING SOURCE (Dept./Page in CIP & Budget): Public Utilities - Electric Generation, Unit #3 Cooling Water Line Inspection - Repairs, CIP EG1612
TIMETABLE: Engineering and material fabrication to start in the 4th quarter of 2015 with equipment delivery and installation to be performed at the end of the 1st quarter or early in the 2nd quarter of 2016.
RECOMMENDED ACTION: Delay inspection and repairs on the Unit #3 cooling water line and fund the critical repairs needed on Van Sant exhaust plenum, transition piece and expansion joint in accordance with the completion date of June 1, 2016.

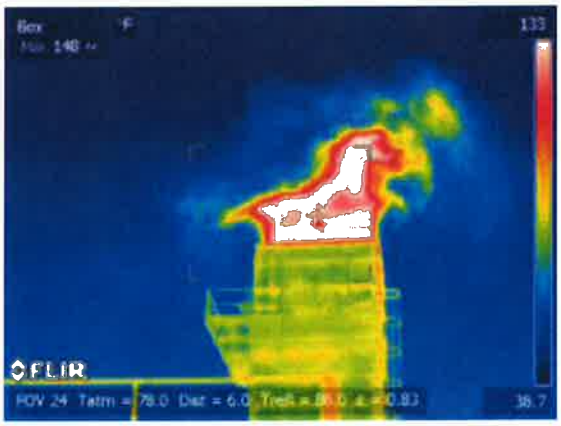
BACKGROUND AND ANALYSIS

The Van Sant Frame 6B Combustion Turbine (CT) exhaust plenum, transition piece, and expansion joint have degraded over time and now require replacement. Since beginning commercial operation in 1991, there have been occasional upkeep repairs made to the referenced components with the latest repairs in the fall of 2014 and the summer of 2015. The depleted condition of the plenum wall(s) allows heat infusion into the CT compartment which has started to cause damage to the ignitors, flame scanners, and other associated control wiring instruments. This could affect the unit reliability and availability and we are requesting expedited processing of this request to allow NAES to complete the necessary engineering, obtain contractor quotes and contractor selection to manufacture the new plenum and install the plenum, transition piece and expansion joint before the PJM Capacity Performance operational period for the 2016/2017 operational periods.

A Request for Proposal package was advertised by NAES. NAES is currently reviewing the submissions for the advertisement. This work is an Original Equipment Manufacturers specialty item with a limited number of organizations familiar enough with the installation requirements to support our desired replacement schedule. The estimate we have received for the above work is from the original manufacturer of the plenum for Van Sant, Braden Manufacturing, LLC. This preliminary estimate from Braden does not include replacement of the transition piece or expansion joint. In addition to Braden Manufacturing, LLC NAES will obtain at least three (3) proposals from other contractors familiar with this work, Consolidated Fabricators and Universal Acoustics and Emissions Technology. NAES will continue to research additional resources capable of performing this work to ensure we have the best capable contractor and cost estimate(s). NAES would like approval and permission, based on this action form, to proceed with and select the highest evaluated bidder to immediately award the project once the bids are received and reviewed. This request is only to promulgate the expeditious manufacture of the material component parts necessary to perform these repairs, without further review by City Council. The proposals will be evaluated using cost, experience, and completeness of bid to select the contractor who will perform the work. All work must be completed prior to June 1, 2016.

Compliance Environmental, Inc.
150 S. Bradford Street, Dover, Delaware 19904
(302) 674-4427 www.compliancecanhelp.com

Infrared Thermography Inspection At The Van Sant Generating Station Electric Avenue, Dover, Delaware June 23, 2015 By Compliance Environmental, Inc.



Compliance Environmental, Inc.	Infrared Thermography Inspection At The: Van Sant Generating Station	Date: June 23, 2015

Inspection Site Information

Customer	Van Sant Generating Station
Address	Electric Avenue, Dover, Delaware
Contact person	Phil Marvel, Maintenance Supervisor
Phone number	302-672-6307
E-mail address	phil.marvel@mckeerun.com
Thermographer	Valentino P. De Rocili, ITC Level III No. 5300 vderocili@compliancecanhelp.com

Information:

The infrared thermography inspection was performed using a FLIR Model P660 Infrared Camera. The inspection included the Van Sant Generating Station during 10 MW generation. Inspected electrical panels were opened and closed by plant personnel. The inspection was performed on June 23, 2015. An oral summary of findings was provided at the end of that day's infrared scanning activities.

Current load varied and some circuits were not in service during the inspection period. Thermal anomalies at circuits with low or no current value cannot be detected. Also, the severity of anomalies increases exponentially as current increases. Therefore, the recommended action level in this report is provided based upon a particular condition and will change with changes in conditions. You should assume that all locations listed in this report have had thermal impact requiring further investigation as-soon-as-possible to determine the cause and will most-likely fail in the future possibly due to the consequence of energy build-up (e.g., increased resistance, corrosion) which is accelerated by increases in current load.

Compliance Environmental, Inc. (CEI) performed this inspection in accordance with our approved scope-of-work. This inspection was performed in accordance with generally accepted practices of this profession undertaken in similar studies at the same time and in the same geographical area. CEI has endeavored to meet this standard of care. In doing so, we explain the scope and limitations of the inspection. No warranties, express or implied, are intended or made with respect to this report or CEI's services. The inspection results reveal conditions observable on a particular day and time. Only relative and direct temperature measurements needed for thermal anomaly opinions were made during this qualitative inspection. The actual temperature may vary. You are advised that this inspection is *time sensitive* in that the presence of thermal anomalies is directly influenced by conditions (such as current, temperature, and wind). These conditions will vary over relatively short periods of time.

Recommended Action Levels:

0: Batteries (Only) (> 1 °C Differential from reference)
1: Minor Deficiency (10-30 °C Differential from reference)
2: Major Deficiency (30-40 °C Differential from reference)
3: Catastrophic Deficiency (> 40 °C Differential from reference or criticality of equipment)

Note: The decision to prioritize the order of repair is determined by the Client and should consider the criticality of the equipment and not just temperature measurements provided in this report.



itc INFRARED™ TRAINING CENTER

CERTIFIED

Level III Thermographer

THIS IS TO CERTIFY THAT

Valentino DeRocili

HAS SUCCESSFULLY COMPLETED
THE FOLLOWING REQUIREMENTS FOR CERTIFICATION:
ATTENDING OUR TRAINING COURSE,
PASSING THE REQUIRED EXAMS, AND
SUBMITTING A FIELD ASSIGNMENT.

Certified Instructor

CERTIFICATION NO. 5300
EXPIRATION DATE: NOVEMBER 2, 2016

Infrared Training Center – United States

25 ESQUIRE RD. NORTH BILLERICA, MA 01862 – AN ISO 9001 REGISTERED COMPANY

LEVEL III
itc INFRARED TRAINING CENTER
CERTIFIED INFRARED THERMOGRAPHER

Summary of Inspection

Location	Equipment	Fault	Recommendation	Page Number
East Side, Plenum at Base of Stack - Above Catwalk	Exterior Stack Plenum	(3)	Repair ASAP	5
East Side, Plenum at Base of Stack - Above Catwalk	Exterior Stack Plenum	(3)	Repair ASAP	6
East Side, Plenum at Base of Stack - Under Catwalk	Exterior Stack Plenum	(3)	Repair ASAP	7
North Side Stack	Exterior Stack	(3)	Repair ASAP	8
West Side Stack	Exterior Stack	(3)	Repair ASAP	9
South Side Stack	Exterior Stack	(3)	Repair ASAP	10
East Side Stack	Exterior Stack	(3)	Repair ASAP	11

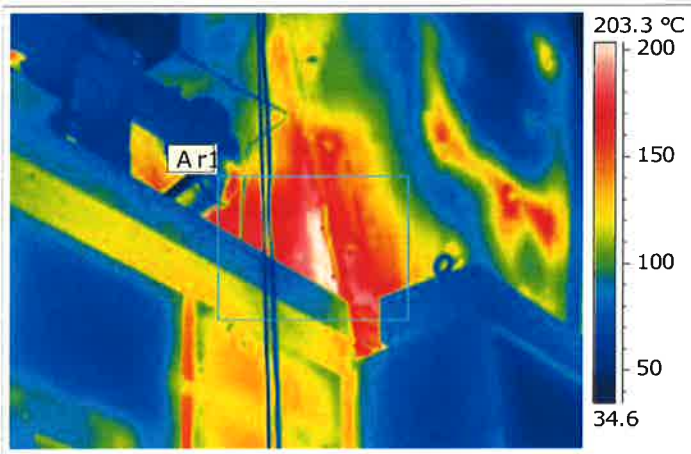
Compliance Environmental, Inc.	Infrared Thermography Inspection At The: Van Sant Generating Station	Date: June 23, 2015

Photo and Identification:



Location	East Side, Plenum at Base of Stack - Above Catwalk
Equipment	Exterior Stack Plenum
Type	Metal - 335 C (635 F) Stack Temperature
Nom Load	Varies
Actual Load	10 MW
Fault	(3)
Recommendation	Repair ASAP

Thermogram: 6/23/2015



Filename	IR_6172.jpg
Date	6/23/2015
Image Time	10:07:09 AM
Atmospheric Temperature	30.0 °C
Relative Humidity	58.0 %
Reflected Temperature	32.8 °C
Ar1 Max. Temperature	221.8 °C

Analysis and Recommended Action:

Further investigation is required to determine the actual cause of the thermal anomaly. Repair or replace as necessary.

Inspected By:	Valentino P. De Rocili	Signature:	Date: June 23, 2015

Repaired By:
Comment:

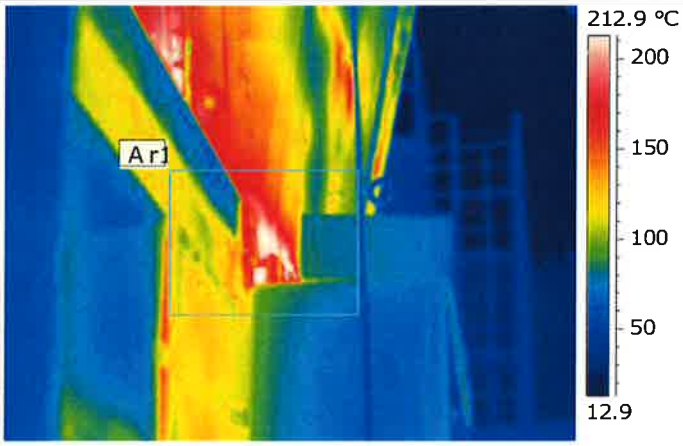
Compliance Environmental, Inc.	Infrared Thermography Inspection At The: Van Sant Generating Station	Date: June 23, 2015

Photo and Identification:



Location	East Side, Plenum at Base of Stack - Above Catwalk
Equipment	Exterior Stack Plenum
Type	Metal - 335 C (635 F) Stack Temperature
Nom Load	Varies
Actual Load	10 MW
Fault	(3)
Recommendation	Repair ASAP

Thermogram: 6/23/2015



Filename	IR_6177.jpg
Date	6/23/2015
Image Time	10:10:44 AM
Atmospheric Temperature	30.0 °C
Relative Humidity	58.0 %
Reflected Temperature	32.8 °C
Ar1 Max. Temperature	258.7 °C

Analysis and Recommended Action:

Further investigation is required to determine the actual cause of the thermal anomaly. Repair or replace as necessary.

Inspected By:	Valentino P. De Rocili	Signature:	Date: June 23, 2015

Repaired By:
Comment:

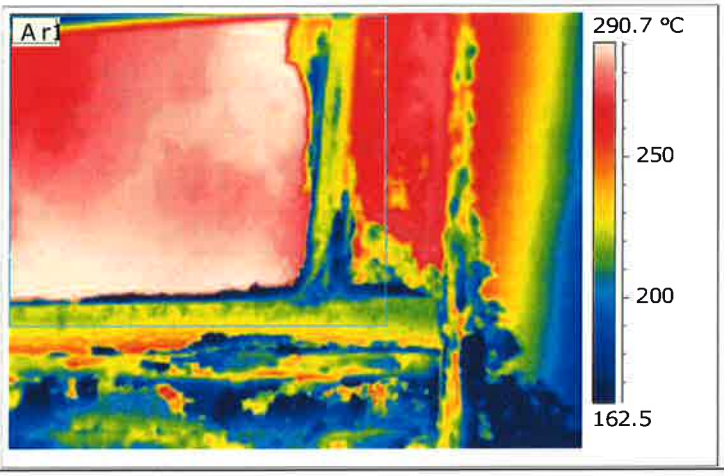
Compliance Environmental, Inc.	Infrared Thermography Inspection At The: Van Sant Generating Station	Date: June 23, 2015

Photo and Identification:



Location	East Side, Plenum at Base of Stack - Under Catwalk
Equipment	Exterior Stack Plenum
Type	Metal - 335 C (635 F) Stack Temperature
Nom Load	Varies
Actual Load	10 MW
Fault	(3)
Recommendation	Repair ASAP

Thermogram: 6/23/2015



Filename	IR_6179.jpg
Date	6/23/2015
Image Time	10:13:05 AM
Atmospheric Temperature	30.0 °C
Relative Humidity	58.0 %
Reflected Temperature	32.8 °C
Ar1 Max. Temperature	293.7 °C

Analysis and Recommended Action:

Further investigation is required to determine the actual cause of the thermal anomaly. Repair or replace as necessary.

Inspected By:	Valentino P. De Rocili	Signature:	Date: June 23, 2015

Repaired By:
Comment:

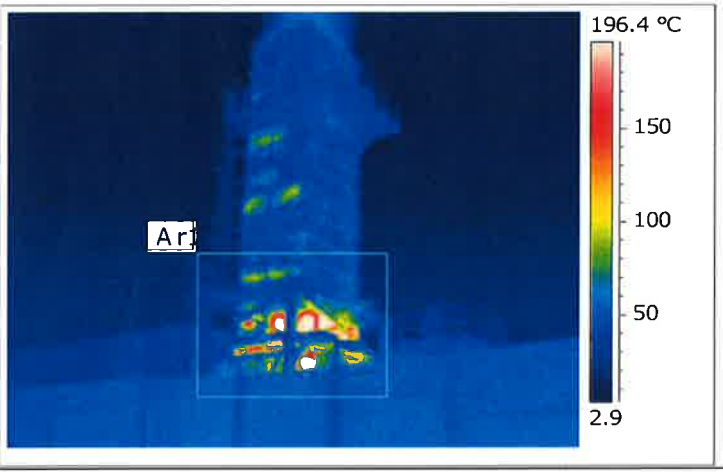
Compliance Environmental, Inc.	Infrared Thermography Inspection At The: Van Sant Generating Station	Date: June 23, 2015

Photo and Identification:



Location	North Side Stack
Equipment	Exterior Stack
Type	Metal - 335 C (635 F) Stack Temperature
Nom Load	Varies
Actual Load	10 MW
Fault	(3)
Recommendation	Repair ASAP

Thermogram: 6/23/2015



Filename	IR_6190.jpg
Date	6/23/2015
Image Time	10:29:07 AM
Atmospheric Temperature	30.0 °C
Relative Humidity	58.0 %
Reflected Temperature	32.8 °C
Ar1 Max. Temperature	259.6 °C

Analysis and Recommended Action:

Further investigation is required to determine the actual cause of the thermal anomaly. Repair or replace as necessary.

Inspected By:	Valentino P. De Rocili	Signature:	Date: June 23, 2015

Repaired By:
Comment:

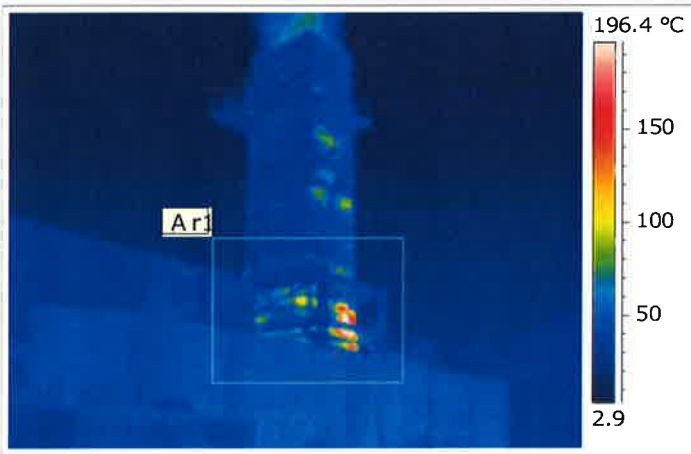
Compliance Environmental, Inc.	Infrared Thermography Inspection At The: Van Sant Generating Station	Date: June 23, 2015

Photo and Identification:



Location	West Side Stack
Equipment	Exterior Stack
Type	Metal - 335 C (635 F) Stack Temperature
Nom Load	Varies
Actual Load	10 MW
Fault	(3)
Recommendation	Repair ASAP

Thermogram: 6/23/2015



Filename	IR_6192.jpg
Date	6/23/2015
Image Time	10:30:41 AM
Atmospheric Temperature	30.0 °C
Relative Humidity	58.0 %
Reflected Temperature	32.8 °C
Ar1 Max. Temperature	247.5 °C

Analysis and Recommended Action:

Further investigation is required to determine the actual cause of the thermal anomaly. Repair or replace as necessary.

Inspected By:	Valentino P. De Rocili	Signature:	Date: June 23, 2015

Repaired By:
Comment:

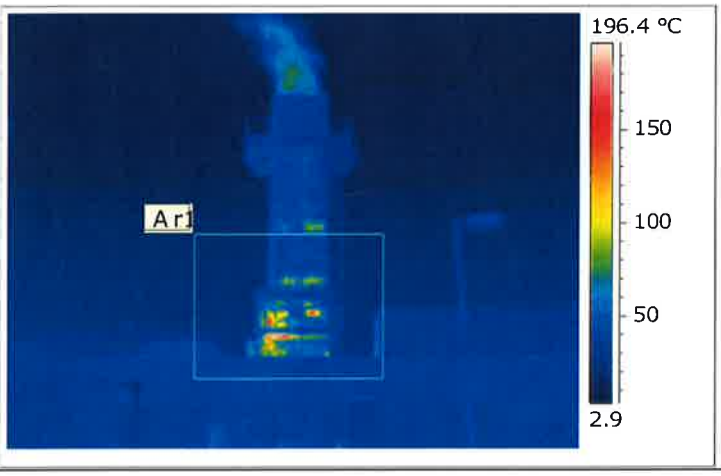
Compliance Environmental, Inc.	Infrared Thermography Inspection At The: Van Sant Generating Station	Date: June 23, 2015

Photo and Identification:



Location	South Side Stack
Equipment	Exterior Stack
Type	Metal - 335 C (635 F) Stack Temperature
Nom Load	Varies
Actual Load	10 MW
Fault	(3)
Recommendation	Repair ASAP

Thermogram: 6/23/2015



Filename	IR_6194.jpg
Date	6/23/2015
Image Time	10:32:35 AM
Atmospheric Temperature	30.0 °C
Relative Humidity	58.0 %
Reflected Temperature	32.8 °C
Ar1 Max. Temperature	214.8 °C

Analysis and Recommended Action:

Further investigation is required to determine the actual cause of the thermal anomaly. Repair or replace as necessary.

Inspected By:	Valentino P. De Rocili	Signature:	Date: June 23, 2015

Repaired By:
Comment:

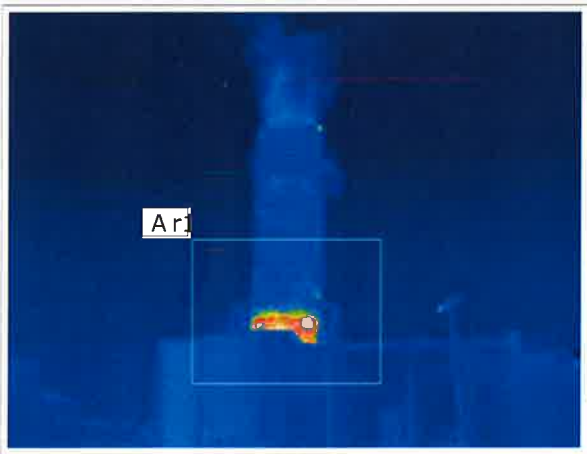
Compliance Environmental, Inc.	Infrared Thermography Inspection At The: Van Sant Generating Station	Date: June 23, 2015

Photo and Identification:



Location	East Side Stack
Equipment	Exterior Stack
Type	Metal - 335 C (635 F) Stack Temperature
Nom Load	Varies
Actual Load	10 MW
Fault	(3)
Recommendation	Repair ASAP

Thermogram: 6/23/2015



Filename	IR_6198.jpg
Date	6/23/2015
Image Time	10:34:33 AM
Atmospheric Temperature	30.0 °C
Relative Humidity	58.0 %
Reflected Temperature	32.8 °C
Ar1 Max. Temperature	247.1 °C

Analysis and Recommended Action:

Further investigation is required to determine the actual cause of the thermal anomaly. Repair or replace as necessary.

Inspected By:	Valentino P. De Rocili	Signature:	Date: June 23, 2015

Repaired By:
Comment:

Review of PJM Capacity Performance Auction

Prepared for Dover, DE City Council

September 28, 2015

Electric System Market Uncertainty

- The City's electric system is exposed to economic uncertainty caused by several risk factors:
  - Energy Market Price Uncertainty
  - **Capacity Market Price Uncertainty**
  - Fuel cost & availability risks
  - Generation operational risks
  - Load growth uncertainty
  - Etc.

Electric System Market Hedging

- Dover purchases fixed price energy hedge contracts several years in advance to minimize energy price uncertainty
- Dover owns generating plants to hedge Capacity market price risks
- Dover has also recently executed a 40 MW, 5-year capacity purchase from Calpine to hedge capacity market price risks

PJM Capacity Market Overview

- PJM established a mandatory capacity market mechanism
  - Generators sell capacity (ability to produce energy) and receive capacity payments from PJM
  - Retail Load Serving Entities ("LSEs" such as Dover) make capacity payments to PJM to insure it has sufficient capacity reserves to serve retail customers
- Capacity is generally purchased from generators through a uniform clearing price auction for 3 years into the future
  - Capacity prices to be paid to generators are known 3 years in advance
  - Capacity prices to be paid by load to PJM are based on the BRA, subject to adjustment as PJM conducts incremental auctions between the BRA and the Delivery Year (DY)

PJM's New Capacity Performance Product

- Implemented for Delivery Year 2018-2019
  - *Partial implementation with partial-market **"transition auctions"** for DY 2016/17 & 2017/18*
- Potential non-performance penalties substantially larger than legacy RPM market design
- Expected to cause capacity prices PJM pays to generation owners to significantly increase
- Retail Load Serving Entities *(such as Dover)* will pay PJM for this cost increase *(Locational Reliability Charge)*

Comparison of Legacy RPM & CP

Legacy RPM

- Non-performance penalty amount based on PJM's peak hour availability short-fall of generating units
- Non-performance penalty price based on Auction Clearing Price
- Dover incurred a penalty of $562,994 for generation short-falls during February 2015 peak hours *(11.3 MW short-fall on 175 MW of UCAP x $136.5/MW-Day x 365 days/year)*

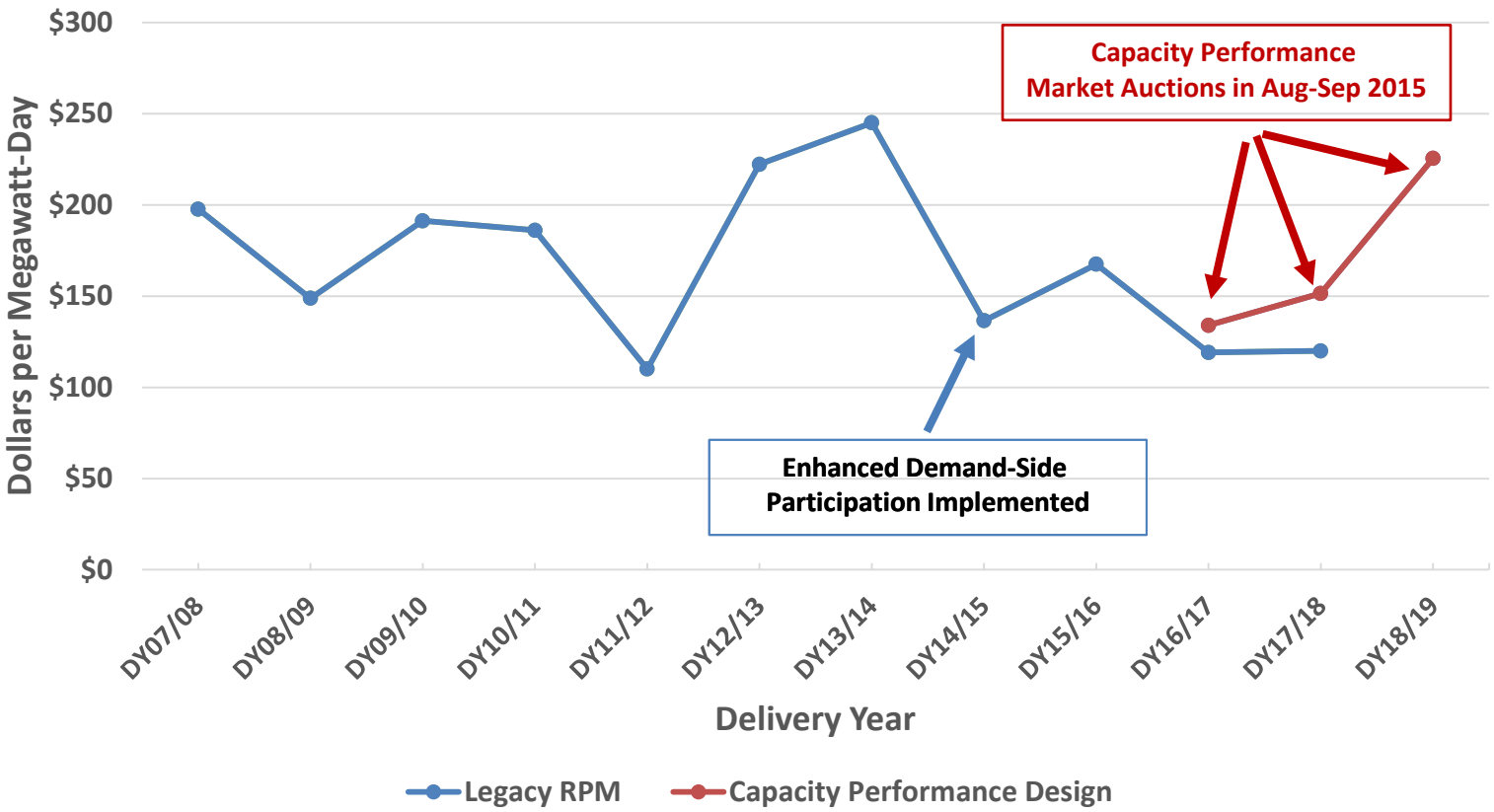
CP (Capacity Performance)

- Non-performance penalty amount based on actual capacity performance during declared emergencies
- Non-performance penalty price based on Net Cost of New Entry divided by assumed 30 hours/year of emergencies
- **This is substantially higher than under legacy RPM**

Dover's Participation in PJM CP Auctions

- DY2016/17 Transition Auction *(Aug. 26-27, 2015)*
  - Offered 45 MW (VanSant only) at near-maximum price
  - Auction Clearing Price of $134/MW-Day
  - Dover **did not** clear this auction
  - **Will receive** $119.34/MW-Day under legacy RPM construct
  - **Will not** be exposed to higher non-performance risks
- DY2017/18 Transition Auction *(Sept. 3-4, 2015)*
  - Offered 145.9 MW (McKee Run 3 and VanSant) at near-maximum price
  - Auction cleared at $151.50/MW-Day
  - Dover **did not** clear this auction either; will retain $120/MW-Day under RPM
  - **Will not** be exposed to higher non-performance risk
- DY2018/19 BRA *(Aug. 10-15, 2015)*
  - Offered 145.9 MW as Self-supply (price taker)
    - Received award of $225.42 per MW-Day
    - **Annual revenues = $12.0 million**
    - **Dover is exposed to new CP non-performance risks**

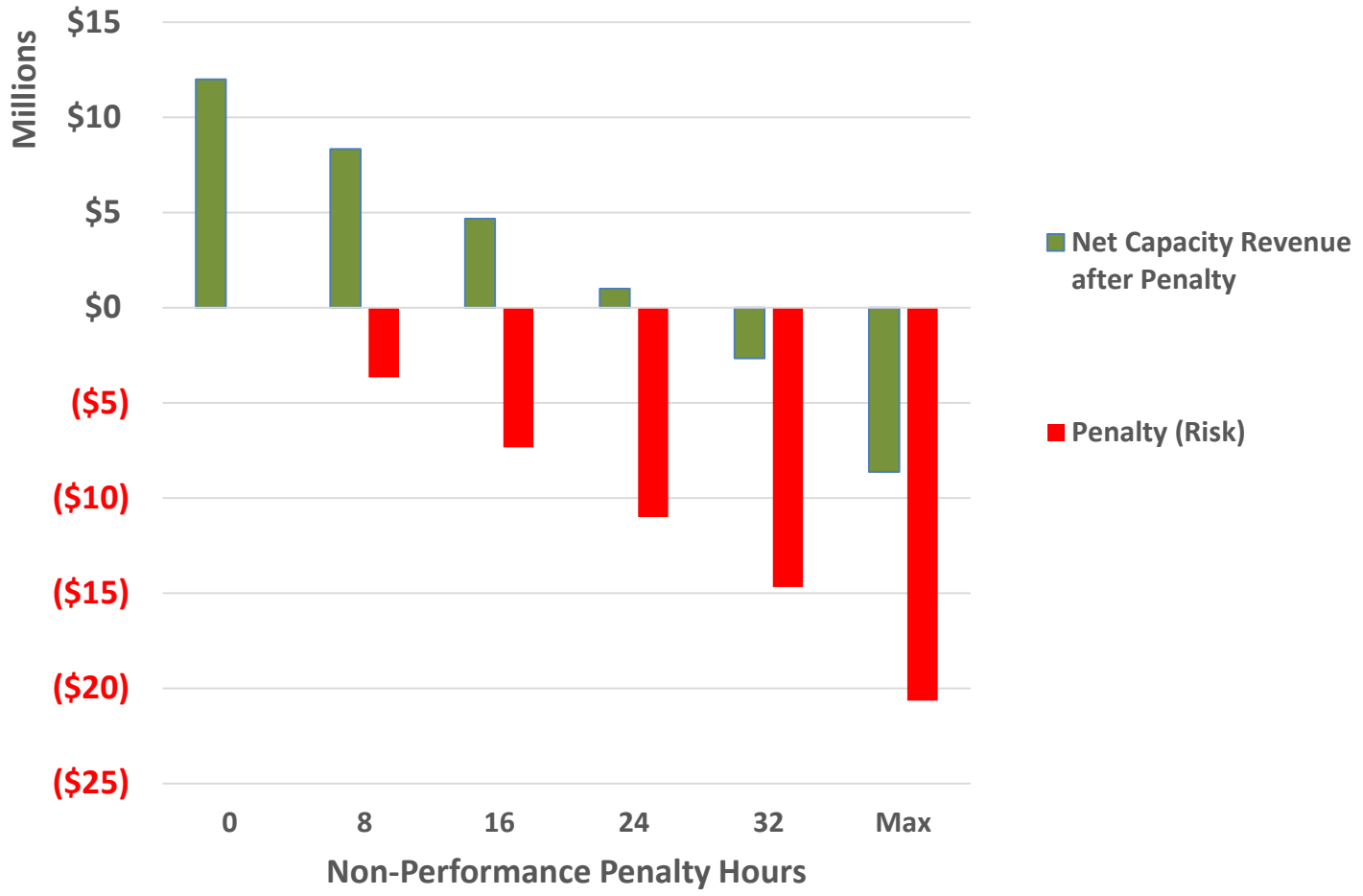
PJM Capacity Price History
PJM Auction Price – DPL South Zone



Dover's Economic Risk of Non-Performance of Generating Units

- Under PJM's new CPM:
  - Penalties are based on the number of hours PJM dispatches Dover's generating units during PJM emergency events
  - The Penalty Rate applicable to Dover for DY18/19 is **$3,143/MWh** of deficiency
  - Market design includes stop-loss limit
- Dover's Expected CP Revenue: $12.0 million
- Max Non-Performance Penalty: $20.6 million
- Net CP Revenue after max penalty: (-$8.6 M)

Capacity Revenue at Risk for Dover's 145 MW of Generation (DY2018/19)



Pro-Active Mitigation Measures

- Dover has now two years to prepare for the changes and set up safe guards to help insulate customer from any rate shock.
- Training the staff on the rules and definition of Peak periods/days.
- These period day are limited to when PJM declares emergency operations. There been very few in past two years.
- Review of critical spare parts to help reduce any generation outages.
- Run the units for shake down before and after each peak periods to finds and repair any found problems.
- Review the possibilities of expanding the Rate Stabilization Reserve account to lower the impact to electric customers.
- Review with the plant operator if any repairs and overhauls need to be perform sooner than later to make sure the units will perform when call on. This is culture change for everyone including the City and the budget process.
- TEA and City staff are currently negotiating firm gas and fuel contracts to guarantee delivery and transmission of fuel requirements.