



Doosan Fuel Cell America, Inc.  
195 Governor's Highway  
South Windsor, CT 06074  
T - 860 727 2200

December 15, 2016

**Responses to PE 1266-(11/22/16 Notice) Interrogatories**

**RE: PETITION NO. 1266 - Doosan Fuel Cell America, Inc. petition for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation of a 1840-kilowatt customer-side fuel cell facility to be located at the Waterbury Water Pollution Control Plant, 210 Municipal Road, Waterbury, Connecticut.**

Please see the attached responses to the interrogatories with exhibits to the questions posed by the Connecticut Siting Council on 11/12/16 for PE 1266.

Address additional questions to:

**Walter Bonola**

195 Governor's Highway

South Windsor, CT 06074

(860) 727-2010

Walter.Bonola@doosan.com

Sincerely,

Doosan Fuel Cell America, Inc.

A handwritten signature in black ink, appearing to read "Dawn Mahoney". The signature is fluid and cursive, with a large, sweeping flourish at the end.

Dawn Mahoney, Esq.

General Counsel

Doosan Fuel Cell America, Inc.

**VIA ELECTRONIC MAIL**

November 22, 2016

Dawn Mahoney, Esq.  
General Counsel  
Doosan Fuel Cell America Inc.  
195 Governor's Highway  
South Windsor, CT 06074

**RE: PETITION NO. 1266** - Doosan Fuel Cell America, Inc. petition for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation of a 1840-kilowatt customer-side fuel cell facility to be located at the Waterbury Water Pollution Control Plant, 210 Municipal Road, Waterbury, Connecticut.

Dear Attorney Mahoney:

The Connecticut Siting Council (Council) requests your responses to the enclosed questions no later than December 6, 2016. To help expedite the Council's review, please file individual responses as soon as they are available.

Please forward an original and 15 copies to this office, as well as send a copy via electronic mail. In accordance with the State Solid Waste Management Plan and in accordance with Section 16-50j-12 of the Regulations of Connecticut State Agencies the Council is requesting that all filings be submitted on recyclable paper, primarily regular weight white office paper. Please avoid using heavy stock paper, colored paper, and metal or plastic binders and separators. Fewer copies of bulk material may be provided as appropriate.

Any request for an extension of time to submit responses to interrogatories shall be submitted to the Council in writing pursuant to §16-50j-22a of the Regulations of Connecticut State Agencies.

Yours very truly,

Melanie Bachman  
Acting Executive Director

MB/CW

c: Council Members

**Petition No. 1266**  
**Doosan Fuel Cell America, Inc.**  
**Waterbury Water Pollution Control Plant**  
**210 Municipal Road**  
**Waterbury, CT**  
**Interrogatories**

1. Please confirm the owner of the host property was provided notice of the proposed project and provide information regarding certified mail receipts for all recipients that were provided notice including the property owner, abutting property owners, state agencies, and state and local public officials.
- R1. Please find all mail receipts in attachment Waterbury-1 Mail Receipts. Doosan certified notice was provided via US First Class Mail to all property owners and abutters on October 28, 2016 as required by RCSA §16-50j-40. Doosan did not receive any returned mail on any of these notices. In an abundance of caution, Doosan sent notice again via Certified Mail, Return Receipt Requested to all abutters on December 14, 2016. Attached are the receipts.
2. Please provide a detailed site plan for the proposed facility including but not limited to, the dimensions and location of the proposed fuel cell facility, cooling module, concrete pads, fence design and bollards (if applicable) and utility connections.
- R2. Please see attached Waterbury-2 Site Plan.
3. Would the proposed fuel cell shut down in the event of a power outage? If so, does it have "black start" capability and the ability to automatically restart?
- R3. When a utility grid outage occurs the powerplant will automatically disconnect from the facility electrical system using an internal breaker. The powerplant will continue to operate, providing all power required to operate the Model 400 internally. Upon return of the utility supply, the powerplant will automatically reconnect to the grid after a 5 minute time-delay.
4. Could the facility continue operating during a power outage and provide seamless uninterruptable power?
- R4. The proposed site will not be configured to provide backup power.
5. What is the operational life of the facility?
- R5. The product has a 20 year life with a projected 10-year overhaul.
6. Please provide an Emergency Response Plan for the proposed facility in accordance with Public Act 11-101, An Act Adopting Certain Safety Recommendations of the Thomas Commission.
- R6. Please see attached Waterbury-3 Emergency Response Plan.

7. Please identify media to be used for pipe cleaning procedures at the proposed facility in accordance with Public Act 11-101, An Act Adopting Certain Safety Recommendations of the Thomas Commission.
- R7. Use atmospheric air under pressure – no solvents or cleaners will be used.
8. Which National Fire Protection Association (NFPA) or other codes and standards apply to fuel cell construction, installation and/or modifications?
  - R8. ANSI FC-1 2014: American National Standard for Stationary Fuel Cell Power Systems. This certification calls out all codes and standards for stationary fuel cell applications.
9. Please provide a noise analysis for the proposed facility, including the cumulative effects of all four fuel cell units proposed, that shows compliance with state noise regulations at the property boundaries.
  - R9. Please find attached a report indicating the methodology used to compute noise levels at various frequencies and distances from the PureCell® model being installed at the proposed facility in attachment Waterbury-4. The proposed facility is located in a Class C land zone. Based on the aforementioned noise study the project will be in compliance with DEEP noise standards for all land use zones A, B & C. In addition, Doosan will perform site specific noise studies at host property boundaries to confirm compliance.
10. Would the proposed fuel cell provide baseload or backup power (or both) for the Waterbury Water Pollution Control Plant? What percentage of the plant's energy usage would the proposed fuel cell facility provide? Would any surplus power be sold to the grid?
  - R10. The proposed design will provide baseload power for the Plant. It has still to be determined what the percent usage of the plant the fuel cell will provide and surplus power will not be sold to the grid on a regular basis.
11. Would any waste heat from the fuel cell be used for the building's internal use such as to provide or supplement domestic heating and/or hot water?
  - R11. Yes the waste heat from the fuel cell is being used to heat the building internally.
12. Would the proposed facility be enclosed by a fence? If so, provide the design specifications of the proposed fence. Has Doosan considered an anti-climb design? Would bollards be used to protect the fuel cell facility from being accidentally struck by vehicles?
  - R12. Yes the project will have a proposed fence. Bollards will be used to protect the facility from vehicles. A fence is not required by the host facility
13. What is the distance and direction of the nearest residence from the proposed fuel cell facility?
  - R13. The nearest residence is approximately 400 yards from the site in a South East direction.

14. What is the municipal zoning of the host property? What surrounding land uses are adjacent to the host property?

R14. Please see attached Waterbury-5 Zoning Map. The proposed facility is located in the General Industrial (GI) Zone. The surrounding land is located in the Limited Industrial Zone & the General Commercial Zone.

15. What is the distance and direction of the proposed facility to the nearest airport? Did the petitioner provide notification to the Federal Aviation Administration regarding the proposed fuel cell facility?

R15. The nearest airport to the facility is Waterbury-Oxford Airport, which is 12 miles away in a South West direction. No notification was given to the Federal Aviation Administration regarding the proposed facility.

16. Would the proposed facility be within the 100-year or 500-year flood zone? If so, could the proposed facility be raised to one-foot about the 100-year flood zone? Please provide a FEMA flood map showing the proposed facility.

R16. Please see attached Waterbury-6 Flood Zone Map. The fuel cell facility is located outside the 100-year and 500-year flood zones.

17. Provide the distance and direction of the nearest wetland.

R17. The nearest wetland is the Naugatuck River located approximately 200 feet West of the proposed site.

18. Is the proposed facility within a Department of Energy and Environmental Protection-designated Aquifer Protection Area?

R18. Waterbury is a town without an Aquifer Protection Areas. As such, a map is not available for this town.

19. What is the distance of the nearest portion of the proposed fuel cell facility to the nearest edge of the Naugatuck River?

R19. Naugatuck River is located approximately 200 feet West of the proposed site.

20. Provide a table showing state criteria thresholds and projected cumulative emissions from the proposed facility for all greenhouse gases listed in the Regulations of Connecticut State Agencies Section 22a-174-1(49) with and without the use of waste heat.

R20. Section 22a-174-1(49) references "greenhouse gases" or "GHGs" mean the aggregate of the following six component gases: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulfur hexafluoride (SF<sub>6</sub>), any hydroflouorocarbon (HFC) or any perfluorocarbon (PFC).

Doosan PureCell® model has negligible CH<sub>4</sub>, SF<sub>6</sub>, HFC or PFC emissions from our unit. The PureCell® virtually eliminates NO<sub>x</sub>, SO<sub>x</sub>, CO, VOCs and particulate matter emissions from the energy production

process. The small emissions are highlighted below in Table 1 for the unit operation with and without heat.

Table 1: PureCell® Model Emissions Data

	PureCell® Output electric only (lb/MWh)	PureCell® Output with heat (lb/MWh)	State Emission Standards (lb/MWh)
NO <sub>x</sub>	0.01	0.01	0.15
CO	0.02	0.02	1
VOC	0.02	0.02	Not Listed
CO <sub>2</sub>	1050	815	1650

21. Provide information regarding available technologies and/or mitigation techniques to reduce greenhouse gas emissions from the proposed facility.
  - R21. Current control technologies are not commercially available to reduce the greenhouse gas emissions from the facility. The utilization of the waste heat in the facility into the buildings on site reduces the greenhouse gas emissions impact on the environment.
22. Would the proposed facility's air emissions rate in pounds of CO<sub>2</sub> per megawatt-hour be lower than the eGRID non-baseload emissions rate for the ISO New England, Inc. territory?
  - R22. We use the 2012 eGrid "Fossil fuel output emission rate (CO<sub>2</sub> lb/MWh)" of 980.27 with a grid loss of 9.17% for a total of 1070 lb/MWh for the NEWE Region. We account for the CO<sub>2</sub> offset to natural gas heating fuel using avoided heat efficiency of 80% in our carbon emissions.
23. Would methane (CH<sub>4</sub>) be emitted from the proposed fuel cell facility?
  - R23. Methane is not emitted from the unit.
24. Does the amount of phosphoric acid in the fuel cell comply with the applicable state and federal regulations?
  - R24. Phosphoric acid is bound within a matrix within the fuel cell stacks and the quantity is proprietary. The amount does comply with the State and Federal regulations.
25. Natural gas has sulfur dioxide injected as an odorant. Please submit a desulfurization plan narrative for the proposed fuel cell facility containing the following information:
  - a) Chemical reaction overview concerning what substances are produced from the desulfurization process, as well as plans for their containment and transport;
  - b) How much solid sulfur oxide would result from the desulfurization process, and methods and locations for containment, transport, and disposal;
  - c) Whether any of these desulfurization substances are considered hazardous, and if so, plans for the containment, transport, and disposal of hazardous substances;
  - d) Anticipated method of disposal for any other desulfurization substances; and

e) Whether any gaseous substances resulting from desulfurization can be expected to vent from the fuel cells, as well as the applicable DEEP limits regarding discharge of these gasses.

R25a. The Model 400 desulfurizer system removes sulfur used as an odorant in natural gas. Sulfur is converted to zinc-sulfide, a non-hazardous waste, within the desulfurizer and remains there until an overhaul is required, nominally after 10 years. At no time is sulfur or zinc-sulfide accessible or removed during the operation or service of the fuel cell. When the desulfurized system is overhauled, it is sealed and transported back to the manufacturing facility for recycling.

R25b. There is no solid sulfur oxide result from the desulfurization process; all natural gas odorant, as noted above, converts to zinc-sulfide and remains sealed within the fuel cell.

R25c. The by-product, zinc-sulfide, is sealed within the fuel cell system, and as noted above, when the desulfurized system is overhauled, it is sealed and transported back to the manufacturing facility for recycling.

R25d. As noted above, the only by-product is zinc-sulfide, which is transported back to the manufacturing facility for recycling.

R25e. No gaseous substances resulting from desulfurization are expected to vent from the fuel cell – as noted above, the desulfurization process is sealed within the fuel cell system.

26. If the proposed facility is approved, approximately when would construction commence and when is it expected to be completed and operational? What are the expected typical work hours and days of the week that construction would occur?

R26. We plan to start construction work by January 2017. The work is to be completed and commissioned by the end of April 2017. Regular work hours are Monday through Friday 7:00am to 5:00pm.

27. Provide a decommissioning plan for the proposed facility.

R27. The decommissioning plan is as follows:

- 1 – Isolate, lock out and disconnect all piping for cooling module at the Power module. Remove gas piping to the unit. Disconnect nitrogen purge system at power module.
- 2 – Disconnect all electrical conductors and conduit at the unit to include electrical power, ACM power, nitrogen pressure switch, RMS power and RMS ethernet. Shore power to be maintained to the unit to maintain temperature as needed.
- 3 – Contractor will work in concert with Doosan Service Dept. personnel during decommissioning and shutdown.

- 4 – Contractor to supply rigging labor and equipment including crane service sufficient to safely lift unit and place on Doosan supplied flatbed truck. Contractor to supply labor to install travel tarp (Doosan supplied) on unit prior to being transported.
  
- 5 – Return facility to original condition with the exception of the concrete pads.



## Attachments

Waterbury-1  
Mail Receipts

Name and Address of Sender:

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2.	MATERIALS INNOVATION & RECYCLING 100 CONSTRUCTION PLAZA HARTFORD, CT 06103											
3.	FRANCISCO & ASSOCIATES 2180 SOUTH MAIN STREET WATERBURY, CT 06706											
4.	CANYON SIGNS & GRAPHICS INC 355 WASHINGTON AVE NORTH HAVEN, CT 06475											
5.	771 PROPERTIES LLC 1625 STRAITS TURNPIKE, SUITE 200 MIDDLEBURY, CT 06762											
6.	VIEIRA SERGIO & GEORGE VINCENT 10 HOPKINS HILL ROAD NAUGATUCK, CT 06770											
7.	C P N MOTEL LLC 2636 SOUTH MAIN STREET WATERBURY, CT 06706											
8.	VINCENT LORUSSO & BATHOLOMEW JR. 42 RENA LANE WATERBURY, CT 06705											

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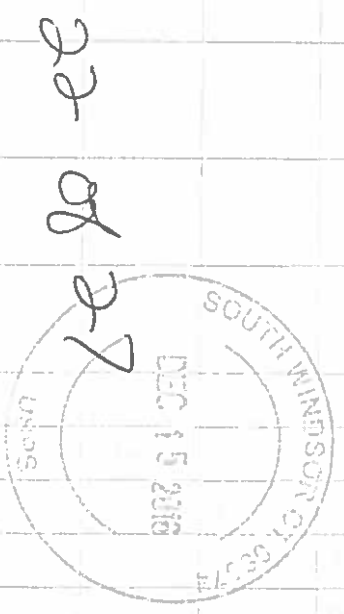


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2.	JOAN BENEDETTO 37 SPART HILL PARKWAY EASTON, CT 06612													<input type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Delivery Confirmation <input type="checkbox"/> Express Mail <input type="checkbox"/> Insured	<input type="checkbox"/> Recorded Delivery (International) <input type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation
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4.	MARK WILKOWSKI & MICHAEL SURV 173 SOUTHWIND ROAD WATERBURY, CT 06708													<input type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Delivery Confirmation <input type="checkbox"/> Express Mail <input type="checkbox"/> Insured	<input type="checkbox"/> Recorded Delivery (International) <input type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation
5.	MUNICIPAL ROAD LLC 15 MULLEN ROAD ENFIELD, CT 06082													<input type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Delivery Confirmation <input type="checkbox"/> Express Mail <input type="checkbox"/> Insured	<input type="checkbox"/> Recorded Delivery (International) <input type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation
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7.	CITY OF WATERBURY 235 GRAND STREET WATERBURY, CT 06702													<input type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Delivery Confirmation <input type="checkbox"/> Express Mail <input type="checkbox"/> Insured	<input type="checkbox"/> Recorded Delivery (International) <input type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation
8.	CONN RAILWAY & LIGHT CO PO BOX 270 HARTFORD, CT													<input type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Delivery Confirmation <input type="checkbox"/> Express Mail <input type="checkbox"/> Insured	<input type="checkbox"/> Recorded Delivery (International) <input type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation
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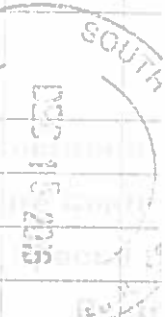
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1. George Jepsen, Attorney General  
Office of the Attorney General  
55 Elm Street  
Hartford, CT 06106

2. JOAN HARTLEY  
SENATE DISTRICT 15  
206 COLUMBIA BLVD  
WATERBURY, CT 05702

3. James P. Redeker, Commissioner  
Department of Transportation  
2800 Berlin Turnpike,  
Newington, CT 06111

4. Catherine Smith, Commissioner  
505 Hudson Street  
Hartford, CT 06106-7106

5. Rep -Jeffrey Berger  
House District 73  
134 Gaylord Drive  
Waterbury, CT 06708

6. REP - Selim Noujaim  
House District 74  
104 Dinatall Drive  
Waterbury, CT 06705

7. State Senator -Joe Markley  
Senate District 16  
47 Elm Street  
Plantsville, CT 06479

8. Senator Richard Blumenthal  
90 State House Square  
Hartford, CT 06103

Rick Dunn  
Executive Director - Naugatuck Valley  
Council of Governments

49 Leavenworth St., 3rd Floor  
Waterbury, CT 06702

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1.

Susan Merrow, Chair  
State Council of Environmental Quality  
79 Elm Street

2.

Benjamin Barnes, Secretary  
Office of Policy and Management  
450 Capitol Avenue  
Hartford, CT 06106-1379

3.

Robert Klee, Commissioner  
State Dept. of Energy/Environmental Protection  
79 Elm Street  
Hartford, CT 06106

4.

US Representative  
Rosa L. DeLauro  
59 Elm Street  
New Haven, CT 06510

5.

Arthur House, Chairman  
Public Utilities Regularity Authority  
Ten Franklin Square,  
New Britain, CT 06051

6.

MAYOR WATERBURY TOWN  
NEIL M. O'LEARY  
235 GRAND STREET, 2<sup>TH</sup> FLOOR  
WATERBURY, CT 06702

7.

STEVEN K REVICZKY - COMMISSIONER  
STATE DEPARTMENT OF AGRICULTURE  
165 CAPITAL AVENUE  
HARTFORD, CT 06106

8.

Jonathan A Harris - Commissioner  
Department of Consumer Protection  
165 Capitol Avenue  
Hartford, CT 06106-6300

REP - Anthony D'Amelio

House District 71

64 Wellington Ave

Waterbury, CT 06708

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1.	<b>Rick Dunn</b> Executive Director - Naugatuck Valley Council of Governments 49 Leavenworth St., 3rd Floor Waterbury, CT 06702	<input type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Delivery Confirmation <input type="checkbox"/> Express Mail <input type="checkbox"/> Insured <input type="checkbox"/> Recorded Delivery (International) <input type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation										
2.	Charles Morrison Land Use Officer 185 South Main Street, 5th Floor Waterbury, CT 06702											
3.	REP - Geraldo Reyes Jr. House District 75 30 Madison St. Waterbury, CT 06706											
4.	REP - Larry Butler House District 72 70 Blackman Road Waterbury, CT 06704											
5.	Melody A. Currey Commissioner dept. of Administrative Services 165 Capitol Avenue Hartford, CT 06106											
6.	E. Gil Graveline Building Official Waterbury 185 South Main Street, 5th Floor Waterbury, CT 06702											
7.	Scott D. Jackson Commissioner Department of Labor 200 Folly Brook Boulevard Wethersfield, CT 06109											
8.	Dora B. Schirio - Commissioner Dept. of Emergency Services and Public Protection 1111 Country Club Road Middletown, CT 06457											

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R2304N11008-12

SOUTH WINDSOR  
NOV 29 20  
Delivery Confirmation  
Signature Confirmation  
Special Handling  
Restricted Delivery

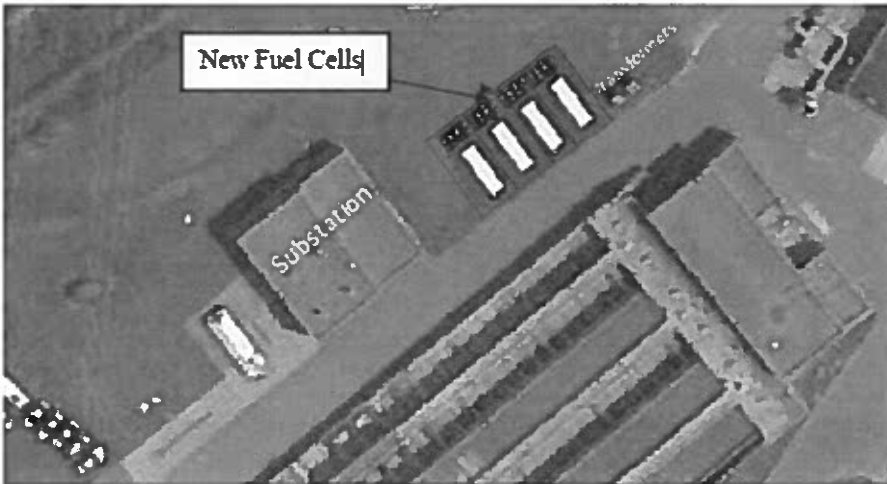
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Waterbury-2

Site Plan

Waterbury Site Layout

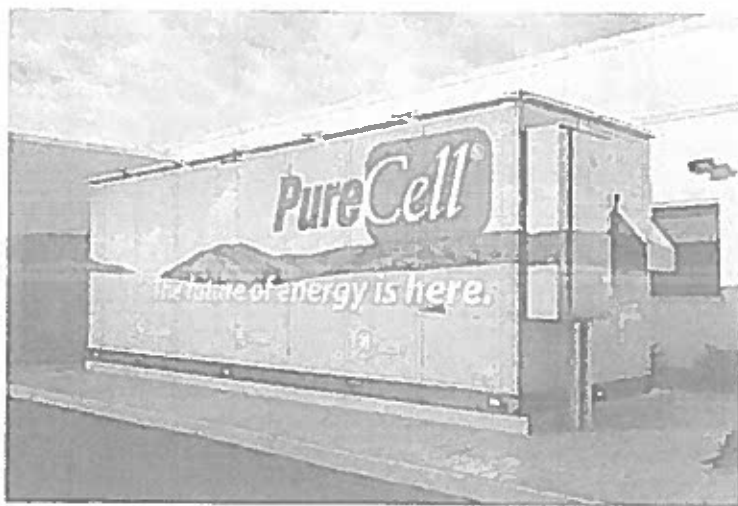


Waterbury-3  
Emergency Response Plan



## Doosan Fuel Cell America, Inc. Fuel Cell Emergency Response Guide

Waterbury Water Pollution Control Plant  
210 Municipal Road  
Waterbury, CT 06708



### DISCLAIMER

Doosan Fuel Cell America reserves the right to change or modify, without notice, the design or equipment specifications of the PureCell<sup>®</sup> system Model 400 without obligation with respect to equipment either previously sold or to be sold. This guide is provided by Doosan Fuel Cell America, and no liability will accrue to Doosan Fuel Cell America based on the information or specifications included herein. No warranties or representations are made by this guide and no warranties or representations shall apply to the equipment except as stated in Doosan Fuel Cell America's standard terms and conditions of sale applicable at the time of purchase, a copy of which will be provided upon request. The Model 400 is designed to provide safe and reliable service when operated within design specifications, according to all applicable instructions, and with the appropriate operating materials. When operating this equipment, use good judgment and follow safety precautions to avoid damage to equipment and property or injury to personnel. Be sure to understand and follow the procedures and safety precautions contained in all applicable instructions, operating materials, and those listed in this guide. All information in this document is as of May 30, 2015.

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**Policy**

The following plan has been developed to minimize the severity of damage to human health, the environment, and property in the event of an unexpected failure.

**Scope**

*This Emergency Response Guide shall be integrated into the site Emergency Response Plan. Information contained in this document shall be customized to meet local requirements and shall be shared with local responders as necessary. This guide is only a template and in no way assumes or transfers liability or ownership. Doosan Fuel Cell America should be contacted if clarification is needed.*

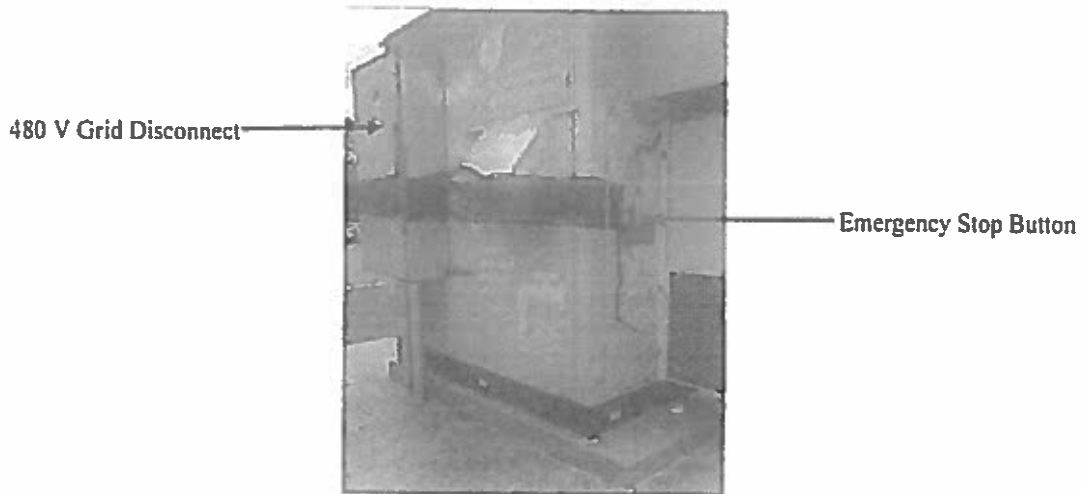
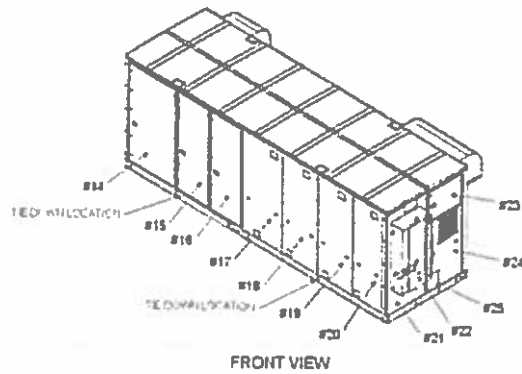
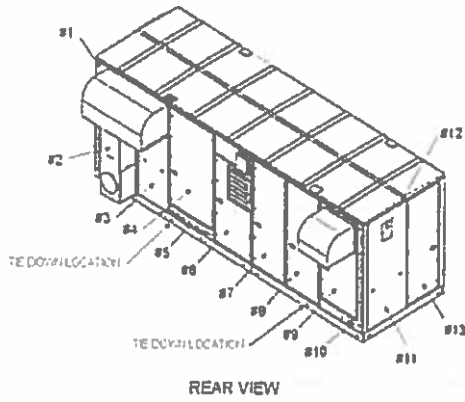
**Emergency Contacts and Numbers**

Local Emergency Number	911
Doosan Fuel Cell America Control Center	(860) 727-2847
Clean Harbors Emergency Cleanup Response	(800) 645-8265
Fire Department – Non-emergency number	Waterbury Fire Department: (203) 597-3444
Hospital – Non-emergency number	Waterbury Hospital 64 Robbins St Waterbury, CT. 06708 (203) 573-6000
Electric Utility Name: Eversource	800-286-2000
Gas Utility Name: Eversource	*Gas Leaks Only: <u>877-944-5325</u>
Local Oil & Chemical Spill Response Division	800-645-8265
EPA - Environmental Protection Agency Region 1	(800) 424-8802 Environmental Emergency
OSHA - Occupational Safety and Health Admin. Emergency Number	(800) 321-6742 National Emergency Number
Poison Control Center	(800) 222-1222 National Emergency Number

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### Fuel Cell Hazard Overview



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Rear View Panel	Primary Hazard	Front View Panel	Primary Hazard
1 (Computer Terminal)	Electrical = 120 VAC	14 (Reformer)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam
2 (Air Conditioner)	Electrical = 480 VAC Chemical = Refrigerant	15 (Reformer)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam
3 (Swing Door)	Electrical = 480 VAC	16 (Reformer)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam
4 (Mechanical Entry)	Electrical = 480 VAC Chemical = Propylene Glycol Thermal = 350°F Steam Pressure = 150 psi Steam	17 (DC Cell Stack)	Electrical = 300 VDC Chemical = Solid phosphoric acid / combustibles
5 (Mechanical Entry)	Chemical = Propylene Glycol Thermal = 350°F Steam Pressure = 150 psi Steam	18 (DC Cell Stack)	Electrical = 300 VDC Chemical = Solid phosphoric acid / combustibles
6 (TMS)	Electrical = 480 VAC Chemical = Propylene Glycol / Deionized Water / Resin Thermal = 350°F Steam Pressure = 150 psi Steam	19 (DC Cell Stack)	Electrical = 300 VDC Chemical = Solid phosphoric acid / combustibles
7 (ILS)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	20 (DC Cell Stack)	Electrical = 300 VDC Chemical = Solid phosphoric acid / combustibles
8 (Fuel Processing Area)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	21	Not accessible
9 (Fuel Processing Area)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	22 (Grid Connect Disconnect)	Electrical = 480 VAC
10 (Gas/Nitrogen Inlet)	Chemical = combustibles	23 (Blower #10)	Electrical = 300 VDC Mechanical = Blower
11 (Reformer)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	24 (Inverter)	Electrical = 1400 VDC / 480 VAC
12 (Reformer)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	25 (Grid Independent Circuit)	Electrical = 480 VAC
13 (Reformer)	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	ALL Roof Panels	Multiple Hazards DO NOT WALK ON ROOF!

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**Conditional Assessment**

<b>Normal Condition</b>	<b>Potential Abnormal Condition</b>	<b>Response</b>
<b>Fuel Cell</b>  White steam exiting power plant at exhaust chimney, above panel #6 (It can be a large amount of white steam depending on ambient conditions)	Dark colored smoke exiting chimney or any other part of enclosure	1. Establish safe perimeter 2. Contact Doosan Fuel Cell America Control Center (860) 727-2847
	Observable fire or heavy smoke at any point on fuel cell	1. Press Fuel Cell 'Stop Button' – Only if safely accessible! 2. Dial 911 or Local Emergency Response Number 3. Establish safe perimeter 4. Contact Doosan Fuel Cell America Control Center (860) 727-2847
<b>Fuel Cell</b>  Moderate humming, clicking and fan sounds	Grinding or loud intermittent noises	1. Contact Doosan Fuel Cell America Control Center (860) 727-2847
	Observable fire or heavy smoke at any point on fuel cell	1. Press Fuel Cell 'Stop Button' – Only if safely accessible! 2. Dial 911 or Local Emergency Response Number 3. Establish safe perimeter 4. Contact Doosan Fuel Cell America Control Center (860) 727-2847
<b>Cooling Module</b>  Fan humming	Smoke or fire coming from module	1. Press Fuel Cell 'Stop Button' – Only if safely accessible! 2. Dial 911 or Local Emergency Response Number 3. Establish safe perimeter 4. Contact Doosan Fuel Cell America Control Center (860) 727-2847
	Grinding or loud noise coming from fans	1. Contact Doosan Fuel Cell America Control Center (860) 727-2847
<b>Cooling Module</b>  No leaking from cooling loop piping or coils	Small leak dripping from joint, valve or connection	1. Contact Doosan Fuel Cell America Control Center (860) 727-2847
	Medium to large leak	1. Follow local spill response protocol or contact Clean Harbors Emergency Cleanup Response (800) 645-8265 2. Contact Doosan Fuel Cell America Control Center (860) 727-2847
<b>Mechanical Hi/Lo Grade Piping</b>  Small amounts of condensate dripping from piping	Small leak dripping from joint, valve or connection	1. Contact Doosan Fuel Cell America Control Center (860) 727-2847
	Medium to large leak	1. Follow local spill response protocol or contact Clean Harbors Emergency Cleanup Response (800) 645-8265 2. Contact Doosan Fuel Cell America Control Center (860) 727-2847
<b>Disconnects/Other Equipment</b>  No leaks or smoke	Smoke or fire coming from equipment	1. Dial 911 or Local Emergency Response Number 2. Establish safe perimeter 3. Contact Doosan Fuel Cell America Control Center (860) 727-2847

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<b>Compressed Gas Manifold (N2/H2)</b>  No leaks, May hear intermittent gas flow during purges	Leaks – may be able to hear hissing sound.	<ol style="list-style-type: none"> <li>1. <b>If Indoors – Evacuate Immediately!</b> Dial 911 or Local Emergency Response Number</li> <li>2. Establish safe perimeter</li> <li>3. Contact Doosan Fuel Cell America Control Center (860) 727-2847</li> </ol>
--	--	--

**Fuel Cell Related Material Safety Data Sheets (MSDS)**

1. Propylene Glycol – DowFrost®
2. Phosphoric Acid – Solid
3. Reformer/ILS Catalysts
4. Anion/Cation Resin
5. Nitrogen / Hydrogen Compressed Gas Mixture (non-flammable)

**Inspections**

Inspection Type	Equipment Requirements	Frequency Required
General Maintenance	Laptop, Service Vehicle	Monthly
General Housekeeping	N/A	Monthly
Waste and Chemical Storage*	N/A	Weekly
Internal Combustible Gas Monitor	AT-160 Calibration Kit	Annual
Fire Prevention	N/A	Monthly

\*When applicable

Fuel Cell operation is monitored and controlled remotely 24 hours a day 7 days a week by the Doosan Fuel Cell America Control Center. Upset or abnormal occurrences outside of normal operating parameters are immediately identified and service technicians are dispatched within 24 hours to respond when required.

**Emergency Procedures**

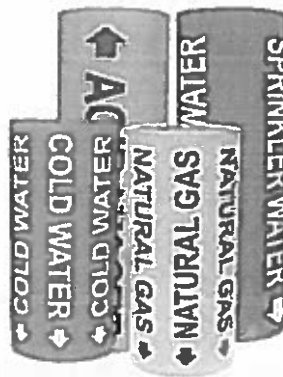
<b>Alarms</b>	There are no audible or visual alarms on Fuel Cell. Alarm conditions are relayed immediately to the Doosan Fuel Cell America Control Center. The Doosan Fuel Cell America Control Center will then contact the appropriate site personnel on the site's emergency contact list.
<b>Emergency Shut Down Onsite</b>	Actuate Fuel Cell Stop Button
<b>Emergency Area Egress - Gas Odor</b>	Evacuate 330 Feet in all directions
<b>Emergency Area Egress - Fire</b>	Evacuate 330 Feet in all directions – CV000 automatic natural gas supply shut off
<b>Emergency Egress - General</b>	Fuel cell is unmanned remotely monitored and controlled. No Doosan Fuel Cell America employees attending unit unless service or maintenance is required.

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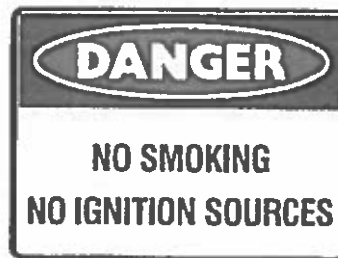


### Signage and Labeling

External service lines will be clearly identified. Labeling will be in accordance with ANSI A13.1. Labeling will be similar to example below:



Perimeter fencing will have signage clearly identifying that "No smoking, no ignition sources" on every side of the fence. Signage will be similar to the sign below:



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## General

### Safety Hazard Analysis

The PureCell® Model 400 fuel cell system has been designed to meet strict ANSI/CSA safety standards to protect against risks from electrical, mechanical, chemical, and combustion safety hazards. The following items are a few of the safety measures incorporated into the design.

### Fire Detection and Protection:

The power plant design incorporates a combustible gas sensor as well as thermal fuses located throughout the power module cabinet to detect fire. The detection of a potential flammable gas mixture, a fire, or the failure of this detection circuit will result in a power plant shutdown and a subsequent inert gas (nitrogen) purge of the fuel cell stack and fuel processing system. This event will also result in an alarm callout notification to Doosan Fuel Cell America service personnel. The power plant is designed with an integral emergency-stop button on the outside of the enclosure to enable immediate shutdown in the event of an emergency. There is also a gas shut-off valve and electrical disconnect switch easily accessible to emergency personnel. There are no restrictions for type of fire suppression equipment.

### Gas Leak:

Augmenting the internal combustible gas sensor, the power plant also monitors the flow rate of natural gas. If the gas flow rate exceeds the equivalent power production of the power plant then a shutdown will result. The largest possible accumulation from a leak prior to shutdown is below combustible limits. Fuel valves inside the power plant are "fail safe" and will return to their normally closed position upon loss of power. The power plant is designed to have a physical barrier that separates the equipment handling combustible gases (fuel compartment) from electrical or potential spark-creating equipment (motor compartment). The fuel compartment is kept at a negative pressure to contain and remove any potential gas leaks, whereas the motor compartment is pressurized by a fan source to prevent combustible gases from entering.

### Hydrogen:

Hydrogen is lighter than air and thus does not pool like other fuels and will readily dissipate with proper ventilation making it less likely to ignite. Although hydrogen has low self-ignition characteristics, the fuel in the power plant is not pure hydrogen. Also, the power plant is not producing or storing hydrogen, it consumes hydrogen-rich gas equal to what it requires to produce power. The fuel cell stack is wrapped in a fire retardant blanket. There are no materials inside the unit that would sustain a flame. There is no large volume of gas or any ignition that occurs within the cell stack.

### Phosphoric Acid:

Phosphoric acid is integral part of the fuel cell system, acting as the electrolyte within the fuel cell stack. Phosphoric acid is a surprisingly common substance that is contained in common cola drinks. A leak of phosphoric acid is not possible because phosphoric acid is not in liquid form once applied in the equipment. There is no reservoir of liquid. Phosphoric acid is contained in the porous structure of the fuel cell stack material by capillary action, similar to how ink is absorbed into a blotter.

### Fluid Leak:

The only fluid source is water. All pressurized water vessels are designed to ASME boiler codes and inspected annually. All piping, welds, etc. meet pressurized piping standards. Water produced through the electrochemical process is "pure" water and is reclaimed and reused by the process. The other source of water is water used in the external cooling module, which is mixed with a polypropylene glycol and a rust inhibitor to prevent rust and freezing in colder climates.

### Hazardous Waste:

The fuel cell does not produce any hazardous waste. Standard Material Safety Data Sheets (MSDS) are available upon request.

Waterbury-4  
Octave Sound Measurements



---

**Objective**

The purpose of this memorandum is to document 1/3 octave sound measurements at various locations around 9582 to support the applications group

**Test Hardware**

Quest Model 1800 Sound Level Meter  
Quest Model OB-300 1/1 – 1/3 Octave Band Filter

**Test Conditions**

Weather: 45°F, Wind NW @ 8mph, mostly cloudy  
Time: 20:23 – 21:45 17 February 2012  
9582 Operating at 400kW, 976 Volts, 440 amps, VSD800 @ 100%, no heat recovery

**Test Plan**

1. Follow the Meter Settings listed below to properly setup and configure the Sound level meter & 1/3 Octave Filter:

**Model 1800 Settings: Sound Level Meter**

*Response:* Slow  
*Weighting:* A  
*Mode:* SPL  
*dB Range:* 40-100  
*Power:* On

**Model OB-300 Settings: 1/3-1/1 Octave Ban Filter**

*Power:* Manual  
*Time Mode:* 1/3  
*Start:* ▲ or ▼ to select *Freq. : (Hz)* (Red LED Indicates Monitor Frequency being displayed)

2. See Location Map for measurement *Location: A,B,C,&D.*
3. Measure distances from power plant in Location A THRU D.
4. Face Sound meter microphone toward PPL and press the 'RUN' button on the 1800 meter. (Noise level displayed in window)
5. Record 1/3 Octave Noise Level readings at each frequency on Data Sheet.
6. Repeat steps 6 thru 9 for all Locations A thru J as shown on Location Map.

**Figure 1: Test Locations**

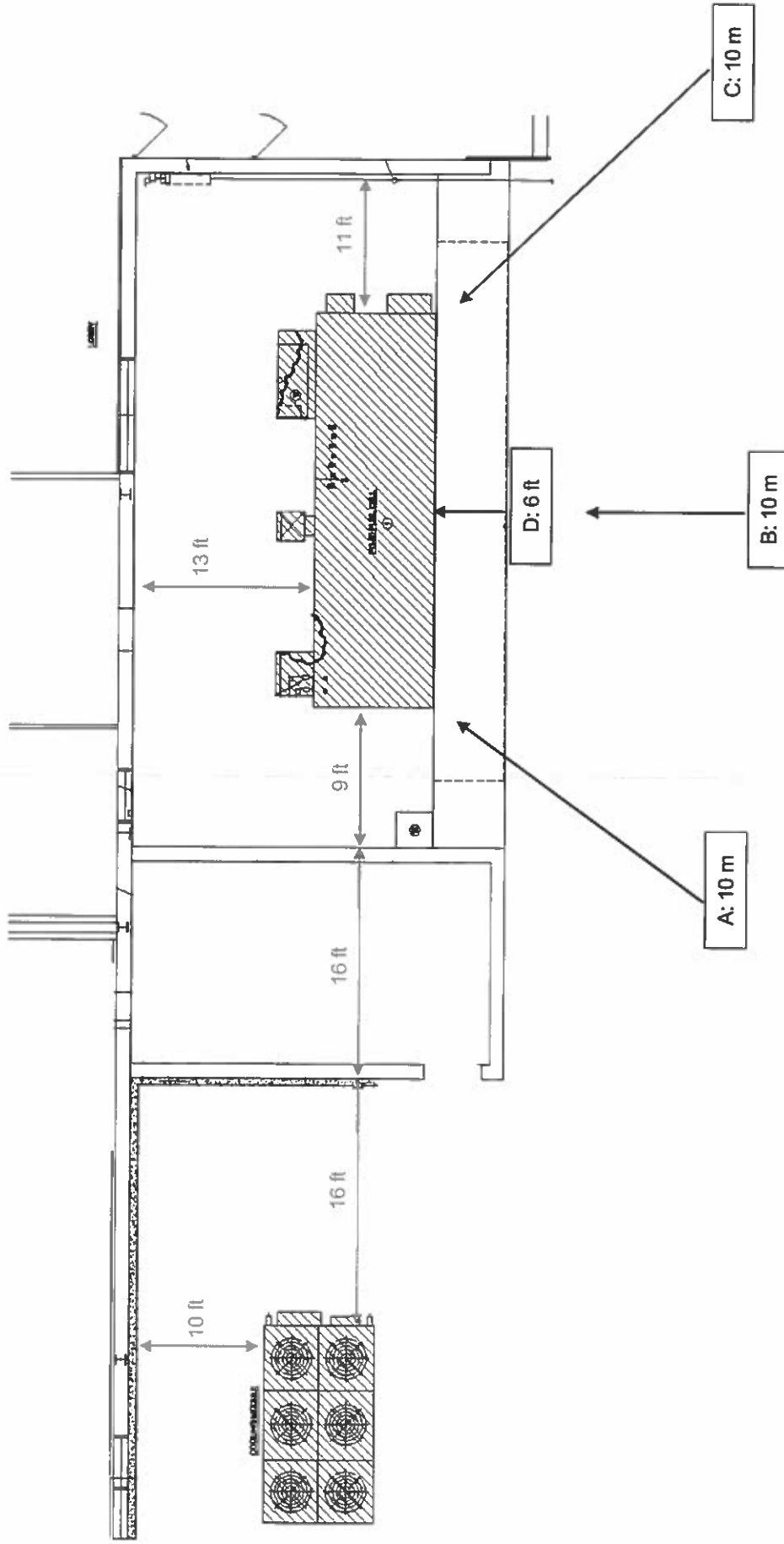
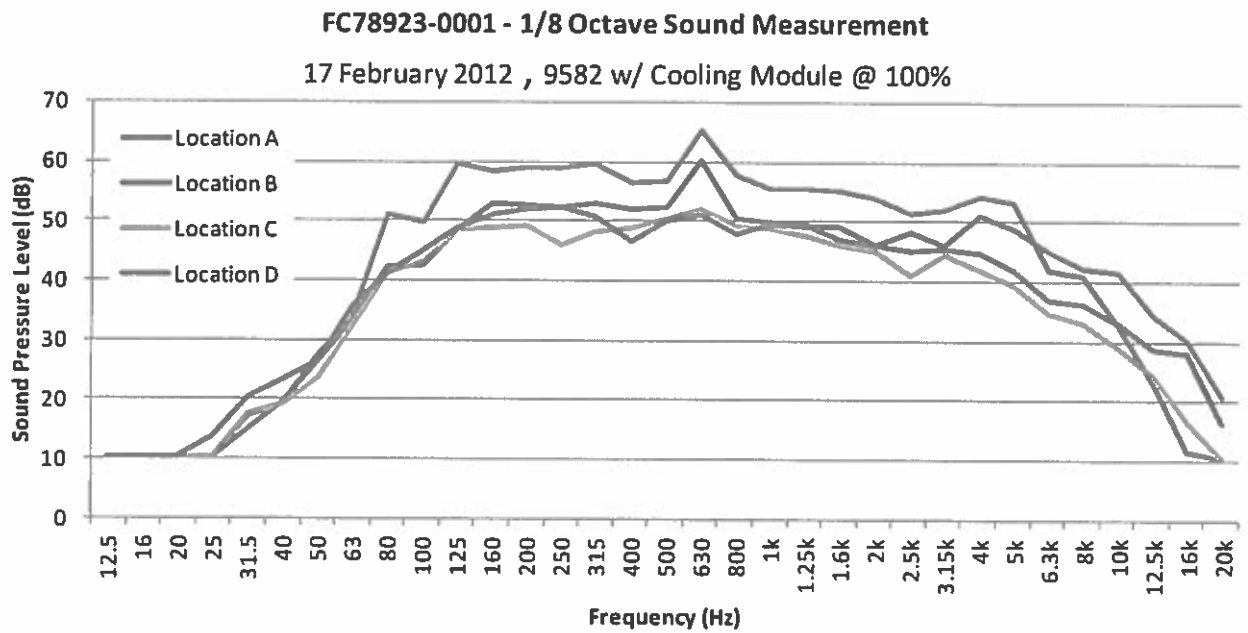




Table 1: 1/3 Octave Noise Data Sheet

<i>Freq.: (Hz)</i>	<i>Location A</i>	<i>Location B</i>	<i>Location C</i>	<i>Location D</i>
dBA	67.7	64.2	60.5	62.5
20k	10.3	16.3	10.3	20.8
16k	11.7	28.0	16.5	30.2
12.5k	23.1	28.7	24.2	34.3
10k	32.8	33.2	29.1	41.5
8k	41.0	36.2	32.9	42.3
6.3k	41.8	36.7	34.5	45.0
5k	53.4	41.9	39.3	48.8
4k	54.2	44.7	41.9	51.2
3.15k	52.1	45.5	44.4	46.0
2.5k	51.3	45.2	41.1	48.2
2k	53.8	46.0	45.2	46.0
1.6k	55.3	47.1	45.9	49.3
1.25k	55.4	49.5	47.5	49.0
1k	55.6	49.7	48.9	49.4
800	57.8	50.3	49.0	48.0
630	65.3	60.2	51.9	51.0
500	56.8	52.2	50.3	50.1
400	56.4	51.9	48.7	46.6
315	59.6	52.9	48.2	50.8
250	59.1	52.3	45.9	52.4
200	58.9	52.5	49.3	52.1
160	58.4	53.0	48.8	51.2
125	59.5	48.4	48.4	48.7
100	49.9	42.6	43.0	44.9
80	50.9	42.3	41.4	41.3
63	33.3	33.2	32.2	35.5
50	27.3	26.4	23.7	26.3
40	19.3	19.5	19.1	23.4
31.5	17.2	15.0	17.5	20.5
25	10.3	10.4	10.3	13.8
20	10.3	10.3	10.3	10.3
16	10.3	10.3	10.3	10.3
12.5	10.3	10.3	10.3	10.3

Figure 2:



**Observations**

Limit of the meter is 10.3 dB

Orientation of the meter is important, it was directed per the arrows in the diagram

**References**

Manual: Quest Technologies Model 1800 Sound Meter- <http://www.ierents.com/Manuals/Quest1800.pdf>

**Revision Record**

REVISION	DATE	AUTHOR	DESCRIPTION
A	2012-02-17	B. Fleming	Initial Release. 12-0320
			•
			•



Waterbury-5  
Zoning Map

# ZONING MAP

## CITY OF WATERBURY

### ZONING COMMISSION

ADOPTED ON:  
APRIL 27, 2011  
WITH REVISIONS TO:  
APRIL 27, 2011



#### ZONING DISTRICTS

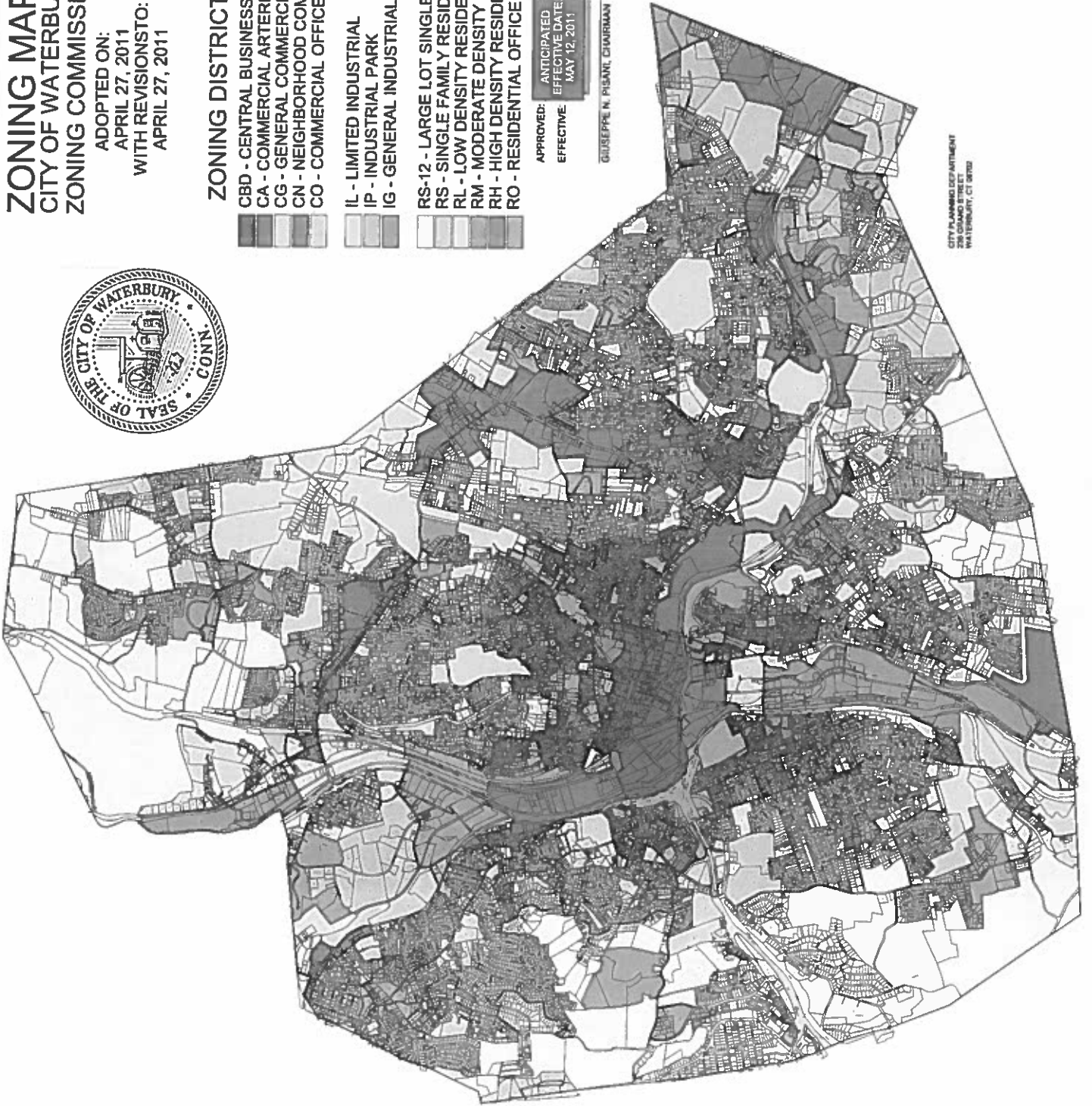
CBD - CENTRAL BUSINESS DISTRICT  
CA - COMMERCIAL ARTERIAL  
CG - GENERAL COMMERCIAL  
CN - NEIGHBORHOOD COMMERCIAL  
CO - COMMERCIAL OFFICE

IL - LIMITED INDUSTRIAL  
IP - INDUSTRIAL PARK  
IG - GENERAL INDUSTRIAL

RS-12 - LARGE LOT SINGLE FAMILY RESIDENTIAL  
RS - SINGLE FAMILY RESIDENTIAL  
RL - LOW DENSITY RESIDENTIAL  
RM - MODERATE DENSITY RESIDENTIAL  
RH - HIGH DENSITY RESIDENTIAL  
RO - RESIDENTIAL OFFICE

APPROVED: [Signature]  
EFFECTIVE: MAY 12, 2011

GIUSEPPE N. PISANI, CHAIRMAN



CITY PLANNING DEPARTMENT  
238 GRAND STREET  
WATERBURY, CT 06726

Waterbury-6  
Flood Map Zone



MAP SCALE 1" = 500'



PANEL 0118H

# FIRM FLOOD INSURANCE RATE MAP NEW HAVEN COUNTY, CONNECTICUT (ALL JURISDICTIONS)

PANEL 118 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL SUFFIX
NAUGATUCK BOROUGH OF	000137	H
WATERBURY CITY OF	0118	H
	0118	H

Notes to User: The Map Number shown below should be used in conjunction with the Community Number shown above to identify the specific map sheet for the subject community.



MAP NUMBER

0609SC0118H

EFFECTIVE DATE

DECEMBER 17, 2010

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

