Richard J. Codey
Acting Governor

State of New Jersey
Department of Environmental Protection
Division of Science, Research and Technology
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Bradley M. Campbe
Commissioner

January 27, 2005

Vaikko Allen
Vortechnics, Inc.
200 Enterprise Drive
Scarborough, ME 04074

RE: Interim Certification of the Vortechs® Stormwater Treatment System by Vortechnics, Inc.

Dear Mr. Allen:

The letter dated July 9, 2004 from the New Jersey Department of Environmental Protection (NJDEP) described the issuance of a **Conditional Interim Certification** for the Vortechs® Stormwater Treatment System (Vortechs® System), which was in accordance with the Energy and Environmental Technology Verification (EETV) Act at N.J.S.A. 13:1D-134. The conditional interim certification was issued based on the New Jersey Corporation for Advanced Technology (NJCAT) initial verification report, dated May 4, 2004. Since the July 9th notification of the conditional interim certification of your technology, the NJDEP has instituted a policy change regarding the interim certification process for stormwater manufactured treatment devices. This letter reflects the new policy and supersedes the letter dated July 9, 2004, with the original interim certification approval not being affected.

As indicated in the NJCAT verification report, **the Vortechs® System sized at a treatment operating rate of no more than 40 gpm/ft^2, with an average influent Total Suspended Solids (TSS) concentration of 187 mg/L and zero initial sediment loading, has been shown to have a TSS removal efficiency of 64% for coarse silt particles ranging from 38-75 microns**. Based on NJCAT's verification report, the NJDEP has a high degree of confidence that the **Vortechs® System** has the capability of achieving in field applications, at a minimum, TSS removal efficiency of 50%. Therefore, NJDEP certifies that the **Vortechs® System** is capable of achieving a minimum TSS removal efficiency of 50% from stormwater runoff, and shall be permitted accordingly. In addition, the following conditions will apply to the conditional interim certification:

1. The Vortechs® System should be the first component, if used as part of a treatment train (i.e. utilized in front of best management practices methods such as detention, retention, and infiltration basins, as defined in the NJ Stormwater Best Management Practices Manual).

2. The Vortechs® System shall be designed in accordance with New Jersey's water quality design storm, as required in the Stormwater Management Rules (N.J.A.C. 7:8).
3. A Quality Assurance Project Plan supporting the Technology Acceptance and Reciprocity Partnership (TARP) Tier II Protocol for Stormwater Best Management Practice Demonstration (July, 2003) shall be submitted to NJDEP and/or NJCAT within six (6) months from the date of this Conditional Interim Certification letter.
4. Field evaluation data that is consistent with the Tier II Protocol and additional NJDEP field test requirements shall be submitted to NJDEP and/or NJCAT by August 31, 2006.
5. This approval letter shall expire on December 31, 2006 unless extended by NJDEP.

Vortechs System Model	Grit Chamber Radius (ft)	Grit Chamber Area (ft^2)	Design Flow Rate (cfs)
1000	1.5	7.1	0.63
2000	2.0	12.6	1.12
3000	2.5	19.6	1.75
4000	3.0	28.3	2.5
5000	3.5	38.5	3.4
7000	4.0	50.3	4.5
9000	4.5	63.6	5.7
11000	5.0	78.5	7.0
16000	6.0	113.1	10.1

Table 1. Design Criteria for Systems Operating at 40 gpm/ft^2.

To design the appropriate systems (operating at 40 gpm/ft^2) for specific applications, the design criteria in Table 1 must be used. For final certification of the Vortechs® Stormwater Treatment System, verified data must be generated from a full scale field demonstration utilizing the TARP Tier II Protocol and additional NJDEP field test requirements. If you have any questions about this Conditional Interim Certification, please contact Ravi Patraju of my staff at (609) 292-0125.

Martin Rosen

Chief - Bureau of Sustainable Communities
and Innovative Technologies

Enclosure

c: Sam Wolfe, Assistant Commissioner, Environmental Regulation
Lisa Jackson, Assistant Commissioner, Land Use Management
Narinder Ahuja, Director, Division of Water Quality
Mark Mauriello, Director, Land Use Regulations
Larry Baier, Director, Watershed Management Program
Eileen Murphy, Director, Division of Science, Research, and Technology
Rhea Brekke, Executive Director, New Jersey Corporation for Advanced Technology

January 17, 2007

Addendum to the Vortech® Stormwater Treatment System
Conditional Interim Certification

Currently, the Vortech® Stormwater Treatment System is in the Tier II field-testing phase, in accordance with the requirements of the TARP Tier II Stormwater Protocol, New Jersey Tier II Stormwater Test Requirements, and an approved Quality Assurance Project Plan (QAPP). Therefore, the New Jersey Department of Environmental Protection (NJDEP) is granting an extension to the Conditional Interim Certification of the Vortech® Stormwater Treatment System until **March 31, 2007**. By this date, the vendor should demonstrate (through sample collection and data analysis) to the NJDEP that credible and substantial progress in the Tier II field-testing phase has been achieved before any further extension to the Conditional Interim Certification is granted beyond March 31, 2007. This addendum will be amended as needed to include revised extension deadline dates and/or conditions regarding the Conditional Interim Certification.

March 27, 2007

Addendum to the Vortech® Stormwater Treatment System
Conditional Interim Certification

On March 15, 2007, CONTECH Stormwater Solutions (CONTECH) submitted a quarterly performance summary of the Tier II field-testing of the Vortech® Stormwater Treatment System. As a result, the NJDEP is satisfied with the progress to date and an extension to the Conditional Interim Certification of the Vortech® Stormwater Treatment System is hereby granted until **September 30, 2007**. Field-testing shall continue and CONTECH shall provide quarterly updates of the progress made before any further extension to the Conditional Interim Certification is granted. This addendum will be amended as needed to include revised extension deadline dates and/or conditions regarding the Conditional Interim Certification.

October 10, 2007

Addendum to the Vortech® Stormwater Treatment System
Conditional Interim Certification

The second quarterly performance summary report with a description of the collected storm samples was recently submitted to satisfy the Tier II field-testing requirement of the Vortech® Stormwater Treatment System. Therefore, the NJDEP hereby grants an extension to the Conditional Interim Certification of the Vortech® Stormwater Treatment System until **December 31, 2007**. Field-testing shall continue and CONTECH shall

provide quarterly updates of the progress made before any further extension to the Conditional Interim Certification is granted.

April 6, 2008

Addendum to the Vortech® Stormwater Treatment System
Conditional Interim Certification

Based on the information submitted regarding the difficulties experienced during the field-testing phase of the Vortech® Stormwater Treatment System, the NJDEP is hereby approving the request to conduct the field test at another test site. Therefore, the Conditional Interim Certification of the Vortech® Stormwater Treatment System is hereby extended until **April 30, 2009** to complete the field-testing and CONTECH shall continue to provide quarterly updates to the NJDEP and NJCAT until the completion of the field test.

Conditional Interim Certification Findings

NJDEP Stormwater Management Technology Project Management Team (PMT)

Manny Patel, Bureau of Sustainable Communities & Innovative Technologies
Ravi Patraju, Bureau of Sustainable Communities & Innovative Technologies
Brian McLendon, Division of Water Quality
Madhu Guru, Land Use Regulation, Compliance & Enforcement
Sandra Blick, Division of Watershed Management

Treatment Technology

Vortechs® Stormwater Treatment System by Vortechnics, Inc.

Applicant Information:

Vortechnics, Inc.
200 Enterprise Drive
Scarborough, ME 04074
www.vortechnics.com

Technology Description

The Vortechs® Stormwater Treatment System is a hydrodynamic separator designed to enhance gravitational separation of floating and settling materials from stormwater flows. Stormwater flows enter the unit tangentially to the grit chamber, which promotes a gentle swirling motion. As stormwater circles the grit chamber, pollutants migrate toward the center of the unit where velocities are the lowest. The majority of solids that settle are left behind as stormwater exits the grit chamber via two apertures on the perimeter of the chamber. Next, buoyant debris, oil and grease are separated from water as it flows under the baffle wall. Stormwater then exits the system through the flow control wall and ultimately through the outlet pipe.

New Jersey Corporation for Advanced Technology (NJCAT) Verified Claim

The Vortechs® System sized at a treatment operating rate of no more than 40 gpm/ft^2, with an average influent Total Suspended Solids (TSS) concentration of 187 mg/l and zero initial sediment loading, has been shown to have a TSS removal efficiency of 64% (per NJDEP treatment efficiency calculation methodology) for coarse silt particles (ranging from 38-75 microns) in laboratory studies using simulated stormwater.

Technology Limitations/Concerns

- TSS resuspension and washout could occur at high operating rates. This was not addressed by the lab tests as they were conducted with zero initial sediment loads.

- The Vortechs® Stormwater Treatment System, based on tested particle size distribution (38-75 microns), should be utilized where TSS is primarily composed of fine sand/coarse silt.
- Backwater conditions could potentially occur at high flow rates due to system outlet design and if downstream hydraulic calculations are not performed properly.
- The Vortechs® Stormwater Treatment System design incorporates standing water in the separation chamber and containment sump, which can potentially be a breeding site for mosquitoes. Vortechnics sells an optional manhole cover insert that allows outgassing, but prevents mosquitoes from entering the system through the manhole covers. Note that insert was not verified by NJCAT as the claim was solely focused on TSS removal efficiency based on lab tests.
- Lack of maintenance may cause the system to operate at a reduced efficiency and eventually fill with sediment.
- Inspections of accumulated pollutants should be performed on a quarterly basis or as recommended by the manufacturer. Inspections may need to be conducted more frequently in the winter where sanding operations may lead to rapid accumulations or sites with heavy sediment loads.

Conditions for NJDEP Conditional Interim Certification

According to NJCAT's verification report, the Vortechs® System sized at a treatment operating rate of no more than 40 gpm/ft^2, with an average influent TSS concentration of 187 mg/L and zero initial sediment loading, has been shown to have a TSS removal efficiency of 64% for coarse silt particles ranging from 38-75 microns. However, NJDEP downgraded the TSS removal efficiency from 64% to 50% since 1) the particle size distribution utilized for the laboratory tests was less conservative than the recommended particle size distribution, and 2) the system was not tested with an initial sediment load as recommended. Calculated peak flow is based on NJ's water quality design storm as recommended in the most current NJ's Stormwater Best Management Practices Manual, and the operating rate is defined as the design peak flow rate divided by the Grit Chamber Area. In addition to the downgrading of the TSS removal efficiency to 50%, the following conditions will apply to the conditional interim certification:

1. The Vortechs® System should be the first component, if used as part of a treatment train (i.e. utilized in front of best management practices methods such as detention, retention, and infiltration basins, as defined in the NJ Stormwater Best Management Practices Manual).
2. The Vortechs® System shall be designed in accordance with New Jersey's water quality design storm, as required in the Stormwater Management Rules (N.J.A.C. 7:8).
3. A Quality Assurance Project Plan supporting the Technology Acceptance and Reciprocity Partnership (TARP) Tier II Protocol for Stormwater Best Management Practice Demonstration (July, 2003) shall be submitted to NJDEP and/or NJCAT within six (6) months from the date of this Conditional Interim Certification letter.
4. Field evaluation data that is consistent with the Tier II Protocol shall be submitted to NJDEP and/or NJCAT by August 31, 2006.