



## FOSTER WHEELER ENVIRONMENTAL CORPORATION

7 August 2003  
RAC II-2003-157

Ms. Sharon Trocher  
Work Assignment Manager  
U.S. Environmental Protection Agency  
290 Broadway, 20<sup>th</sup> Floor  
New York, NY 10007-1866

**SUBJECT: USEPA RAC II CONTRACT NUMBER: 68-W-98-214  
WORK ASSIGNMENT NUMBER: 109-RALR-0238  
VESTAL WATER SUPPLY WELL, OPERABLE UNIT 1  
CORROSION INSPECTION REPORT**

Dear Ms. Trocher:

In December 2001, after approximately two years of operation, the pump installed to remove groundwater for treatment at Vestal Well 1-1A failed. Upon removing the pump from the housing, it was determined that, due to severe corrosion, the well pump separated from the pump column just below the discharge head. Consequently, the entire pump column with pump end dropped to the bottom of the well. To determine the cause of this severe corrosion, Cathodix Incorporated (Cathodix) performed an inspection of the facility for stray electric currents on 17 April 2002.

Cathodix' inspection revealed the presence of two cathodic protection systems adjacent to the Vestal Well 1-1A treatment facility - one on a Mobil Oil pipeline, the other on a local utility company pipeline. According to Cathodix' measurement of stray current, the two cathodic protection systems result in a loss of 18 - 20 pounds of metal per year. Cathodix recommended the installation of an Impressed Current Cathodic Protection system to counteract the corrosion effects from the two adjacent cathodic protection systems. A copy of Cathodix' inspection report is attached.

FWENC has reviewed Cathodix' report, and recommends the following:

- Inspection of the well pump for corrosion to provide a baseline for future inspection. The inspection will also verify that the nickel oxide coating on the new pump bowl is providing corrosion protection;
- Installation of a cathodic protection system as recommended by Cathodix; and
- Procurement of a service contract with Cathodix for semi-annual inspection after one year of operation (The first year of inspection is included with system installation.)




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Upon your approval, FWENC will obtain cost estimates for implementing the above recommendations. Please contact me at (973) 630-8197 if you should have any questions.

Sincerely,



Heidemarie Roldan  
Project Manager

Attachment

cc: James Drumm, NYSDEC



# CATHODIX™

NACE, EPA & QSHA Certified

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April 26, 2002

**Neil Winner, P.E.**

Layne Christensen Company  
Route 30, P.O. Box 917  
Schoharie, New York, 12157

Subject: Well Study, Vestal, NY

Dear Neil:

The study I performed at the Vestal Well was almost a textbook classic (with pictures) of where NOT to install a well. Stray current problems can result in metal structure failure but to have a well sited between two Major cathodic protection systems is incredible. In forty years of cathodic work I have never seen such an unusual situation.

I've enclosed photos showing the power boxes of the two systems, one on the Mobil Oil pipeline, the other on a local utility company pipeline.

The folks at Vestal have two choices, one to shut down and relocate the well, the other to install an Impressed Current Cathodic Protection system to offset the extreme activity of the adjacent operations.

This is the program I have recommended in my attached proposal which includes a printout of the stray current activity as affecting the well.

You are free to use my proposal in your recommendation to Vestal and suggest you add dollars to cover the installation costs, if by your men, as well as profit to Layne.

If you have any questions, please call. I look forward to hearing from you.

Cordially yours,



A. C. Nottage  
Senior Corrosion Engineer  
Senior Corrosion Technologist  
NACE Certification # 6018

encl: Proposal for Vestal  
Photos

**PROPOSED to CITY of VESTAL, NY  
for  
Pumphouse Road Well**

**CATHODIC SYSTEM INSTALLATION**

**Rationale:**

The attached data logger recording obtained on April confirms that electrolysis is taking place as a result of stray current activity from two sources, the Mobil Pipeline Cathodic Protection System and the local Utility Company Cathodic Protection System, both being adjacent to your Well. Our Mean Time to Corrosion Failure indicates a metal loss 18 pounds of metal per year.

Stray current activity is usually difficult to trace inasmuch as stray current intensity can vary with operation, time of year and equipment operations. However in your case the sources are well identified. We need to reverse the polarity in the well and piping structures to prevent further metal loss.

Electrochemical corrosion on the metal of water containing vessels can be retarded by application of a direct current to the metal to be protected and to another metal that acts as the sacrificial anode. The potential applied to the two metal surfaces must be large enough yet controlled to make the protected metal act as a cathode thus preventing further metal loss.

Our objective is to change the Anodic Well and Piping to Cathodic by impressing a current to reverse the polarity of the metal. The impressed current must be controlled precisely to protect your equipment and ensure no damage to the adjacent structures.

Cathodic Protection will not reverse the Oxidation-Reduction process, but will stop it and prevent further metal loss. Metal that is on the verge of failure will probably fail and have to be replaced, but with Cathodic Protection, future failures will not be due to stray current electrolysis.

**CATHODIX DUTIES**

- STEP 1 -** To design, fabricate and supervise installation and start up of a Cathodix Microprocessor controlled rectifier system in NEMA 4 enclosure to raise the Pumphouse Road Well potential to 1.1 volts in respect to a  $\text{Cu/CuSO}_4$  reference cell. The protected Well will receive varying amounts of impressed current to ensure that it remains Cathodic.
- STEP 2 -** Provide and supervise installation into the well, a Telpro MMO Titanium Ribbon anode protected mesh protected with double power feed. Supervise impressed current wiring installation to equipment by personnel. (Layne) Testing and start up of equipment by Cathodix with recording of operation.
- STEP 3 -** Furnish and supervise installation of a permanent Copper/Copper Sulfate reference cell for monitoring results.

**STEP 4 -** Letter report detailing Installation and Start up with control parameters set. Data Logger printout and report of start up to City of Vestal after system has been balanced and deemed, 'In Service'.

**TOTAL PROPOSED COST..... \$ 4,950.00**

**Service:** Cathodix program includes one year of bi-annual inspections with system monitoring by Cathodix personnel. Reports to be submitted after each inspection. After one year, a Semi-Annual Inspection, Data Logger recording, and written report is available to Client for \$500.00 per visit.

**CITY OF VESTAL (Client) DUTIES**

**ITEM 1 -** To provide a location for installation of Cathodix Equipment convenient to the equipment to be protected.

**ITEM 2 -** To provide dedicated 120 volt 60 Hz electrical power supported by a 30 amp breaker. Wiring in conduit to the Cathodix Unit. To Install low voltage wire from the Cathodix unit to the well anode as provided by Cathodix.

**ITEM 3 -** The City of Vestal accepts that the design is proprietary to Vestal and that no interference with the operation of, or attempted modification of, Cathodix equipment will take place without first notifying Cathodix.

**Terms:** Installation of Cathodic Protection System equipment can commence within twenty one (14) days after receipt of Purchase Order with \$2,000 deposit for microprocessor and anode fabrication. Design is custom to Vestal requirement. Balance is due 30 days after start up and verification of system operation.

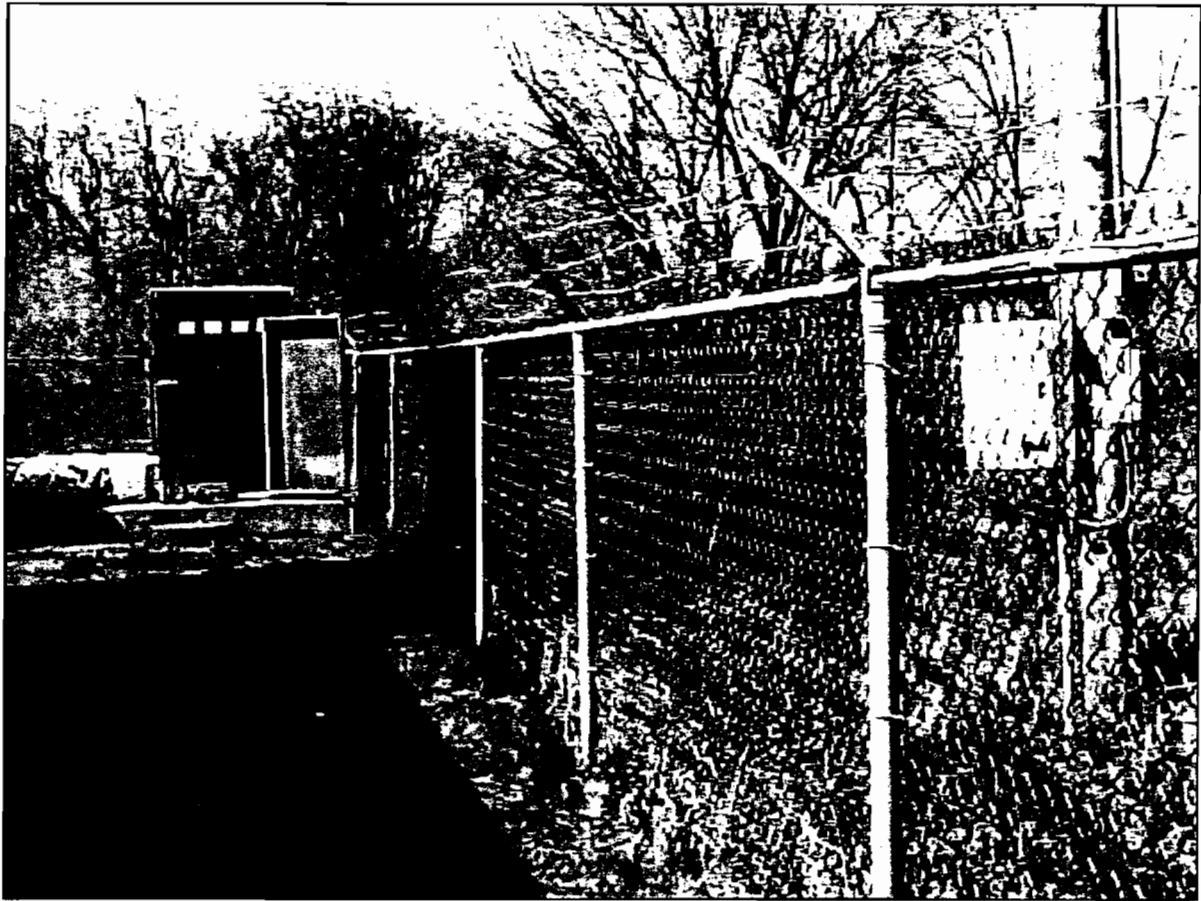
Proposal prices are valid for ninety days (90) from date of proposal.

**CATHODIX™ INC.**

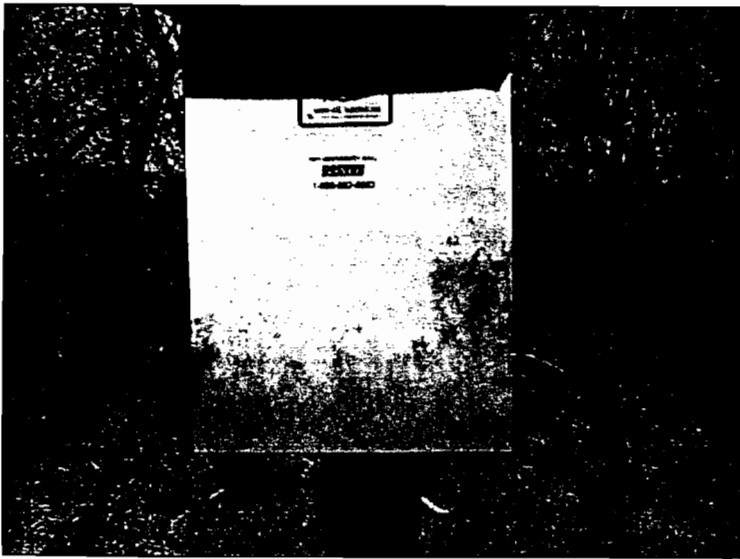


**A. C. Nottage**  
Senior Corrosion Engineer  
Senior Corrosion Technologist  
NACE Certificate #6018

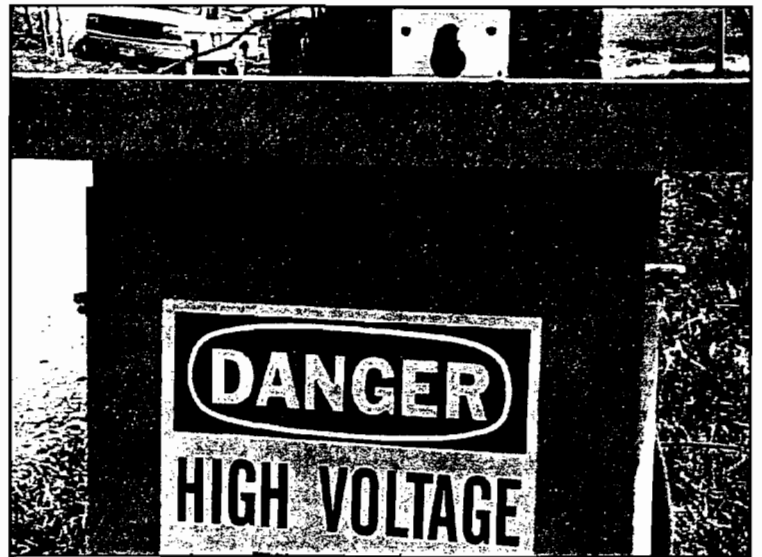




View of Vestal Pump House and adjacent Utility Cathodic Protection Unit



Local Utility Cathodic Rectifier adjacent to anode ground bed



Interstate Pipe Line Cathodic Rectifier adjacent to their anode ground bed

# Cathodix™ Inc

## SUBMITTAL

### ITEM: *Cathodix Microprocessor-Rectifier*

Cathodix Microprocessor Rectifiers are designed to function and provide a source of uninterrupted Cathodic Protection under both normal and severe climactic conditions. The components are modified and assembled to Cathodix specification. All components have UL approval and are installed in standard NEMA 4 water tight enclosure with Hubbell liqui-tite connectors enclosures constructed of 16-gauge zinc coated steel and are designed for exposure to Rain, Sleet, and Noncorrosive liquids.

All Cathodix Microprocessor Rectifiers are non-user adjustable having been designed and set to the Client site specific Cathodic requirements. Construction is modular in design such that power modules can easily be replaced or stacked for additional load output. SCADA interface is available as an option. Initial and subsequent adjustment of operation parameters is by computer data program. The Logic Control® is a separate component, proprietary to Cathodix.

#### Specification: Type A-200-D

AC Input:	45-440 Hz, 110/220 volt
DC Output:	+5.0 volts @ 40.0 amps range track variable
	+12.0 volts @ 10.0 amps range track variable
	-12.0 volts @ 10.0 amps range track variable
	+24.0 volts @ 8.0 amps range track variable
	- 5.0 volts @ 5.0 amps range track variable
Thermal:	Oversize heat sink
Over-voltage:	Auto reset after 20 sec.
Lightning:	Protected

Manufacturer: Advanced Power Supplies Ltd.  
Bishops Stortford  
Herts., Essex, U.K.

Enclosure: 14" x 12" x 6", Weigmann

Equipment Warranty: Ten Years, parts and labor. Total module replacement at Cathodix option.

