NORTON CORROSION LIMITED

8820 222nd Street SE, Woodinville, WA 98072
Phone (425) 483-1616 • Fax (425) 485-1754
e-mail: sales@nortoncorrosion.com

August 2, 2002

CITY & BOROUGH OF JUNEAU
Attention Mr. Joab Cochrane
409 D Street
Douglas, AK 99824

Subject: **OPERATIONAL INSPECTION**
CATHODIC PROTECTION SYSTEM
JUNEAU PARKING FACILITY
STEEL SUPPORT PILES

Dear Mr. Cochrane:

Norton Corrosion Limited (NCL) personnel completed the operational inspection for the Parking Facility's cathodic protection (CP) system on July 11, 2002. The CP system is designed to prevent external corrosion on the submerged surfaces of the parking facility's steel support piles. Authorization to perform this work was issued per Purchase Order No. SJ16840.

TESTING AND CRITERIA

Structure-to-water potentials were measured on the piles to determine the level of protection being obtained. The attached data sheet details the results of the testing. NCL evaluated the data per the following NACE (National Association of Corrosion Engineers) International criteria, where adequate CP is indicated on a structure by obtaining:

- A polarized potential of –0.850 volts or more negative in reference to a copper-copper sulfate (CSE) reference half cell (-0.733 volts in reference to a silver-silver chloride (AgAgCl) reference half cell),

or,

- 100 millivolts of polarization as seen by the difference between the native and instant off potentials.

RESULTS

The potential measurements indicate that partial protection is being achieved. Additional anodes are required if full protection levels are to be obtained. NCL recommends upgrading this galvanic anode system to increase the level of protection presently being seen. Several options are available for installing the anodes. One option is to weld anodes to the piles from a boat. This avoids the cost of a diver, but more anodes are needed for good distribution and occasionally during low tides, the anodes would be out of the water. A

second option is to install anode sleds. This allows larger anodes to be installed for a longer life, better current distribution and the anodes remain submerged, but the cost of a diver to route the wiring is needed along with the cost of a boat with the capacity to handle the anode sleds.

NCL would be pleased to provide you with materials and or engineering to upgrade this system. The following are estimated prices:

Engineering: $1,600

- ⇒ Provide cost estimates and support to determine best method of installation per the City of Juneau's constraints
- ⇒ Installation drawings
- ⇒ Materials list

Materials:

10 year life	$5,000-$7,000
20 year life	$16,000-$18,000

These estimates do not include freight charges.

NCL appreciates this opportunity to be of service to the City of Juneau. If you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,

Eric Shadle, P.E.
Corrosion Engineer

es\NCL\Eng\2002\17006ol_CBJ_Parking Garage.doc
Enclosure
cc: J. Weiser, NCL

NORTON CORROSION LIMITED

CITY & BOROUGH OF JUNEAU
GALVANIC CATHODIC PROTECTION
STEEL SUPPORT PILES
PARKING FACILITY

DATA SHEET: 1 OF 1
NCL JOB #: O-16999-M
DATE: JULY 11, 2002
BY: E. SHADLE

POTENTIAL MEASUREMENTS:

Row	Bent	July 24, 2001 **CSE Ref** High Tide	July 11, 2002 **AgAgCl Ref** Low Tide	Anode output (amps)
A	9	-0.564	-0.601	
A	8	-0.555	-0.587	
A	7	-0.544	-0.583	
A	6	Not Submerged (N/S)	N/S	
B	9.7	-0.591	N/A	
B	9	No Access (N/A)	N/A	
B	8	-0.591	-0.602	
B	7		N/A	
B	6	N/S	N/S	
B.7	9.7	-0.591	-0.637	
B.7	9	-0.591	-0.631	A = N/A
C	10	-0.600	-0.649	
C	9.7	-0.611	-0.643	
C	9	-0.587	-0.650	A = 1.11
C	8	-0.565	-0.617	
C	7		N/S	
C.5	11	-0.606	-0.686	
C.5	10	-0.606	-0.685	A = 1.07
C.5	9.7		-0.680	
C.5	9		-0.671	
C.5	8.5		-0.664	
C.5	8	-0.584	-0.656	
C.5	7.5		-0.631	
C.5	7		N/S	
C.5	6.5		N/S	
C.5	6.3		N/S	
C.5	6	-0.567	N/S	
D	11	-0.601	N/A	
D	10		-0.674	
D	9.7		-0.682	A = 0.90
D	9		-0.655	
D	8.5		-0.636	
D	8	-0.600	N/S	
D	7.5		N/S	
D	7		N/S	
D	6.5		N/S	
D	6.3		N/S	
D	6	-0.601	N/S	