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**DIRECT TESTIMONY
OF
THOMAS B. NICHOLSON, P.E.
ON BEHALF OF THE
PORTSMOUTH WATER AND FIRE DISTRICT**

**In re: Application for Rate Relief
City of Newport Utilities Department, Water Division
Docket No. 3578**

1 **Q. Please provide your full name, title and mailing address for the record.**

2 A. Thomas B. Nicholson, P.E.

3 President and Chief Engineer

4 C&E Engineering Partners, Inc. (C&E)

5 342 Park Avenue

6 Woonsocket, Rhode Island.

7 **Q. What are your current duties in this position?**

8 A. Provide professional civil and environmental engineering services to various clients
9 throughout New England

10 **Q. What is your education and professional background?**

11 A. I have a Bachelor of Science Degree in Civil/Environmental Engineering from
12 Northeastern University in Boston, Massachusetts and a Master of Science Degree in
13 Environmental Engineering from Worcester Polytechnic Institute in Worcester,
14 Massachusetts. I am a licensed Professional Engineer in the States of Rhode Island,
15 Massachusetts and Connecticut. I have 26 years of experience in provide engineering
16 consulting services to the waterworks industry.

17 **Q. Have you ever provided expert testimony before the Rhode Island Public Utilities
18 Commission (RIPUC)?**

19 A. Yes, I have provided expert testimony to the RIPUC on behalf of the City of Central
20 Falls and the Prudence Island Utilities Corporation. In addition, last year C&E was
21 contracted by the State of Rhode Island Division of Public Utilities and Carriers
22 (RIDPUC) to develop an independent engineering opinion of the current status of the
23 Pawtucket Water Supply Board (PWSB) Water Treatment Facilities, located off Mill

24 Street in Cumberland, Rhode Island. This project also included providing expert
25 testimony before the RIPUC in support of the RIDPUC contention that the PWSB water
26 treatment facilities were in danger of failure and the continued reliance in these facilities
27 posed a significant risk upon the rate payers of the PWSB.

28 **Q. What is the purpose of your testimony?**

29 A. The purpose of my testimony is to put forth information concerning a recent engineering
30 evaluation conducted by C&E for the Portsmouth Water and Fire District (PWFD)
31 concerning non-compliance with the Stage I Disinfection Byproduct Rule (DBPR).

32 **Q. What was the nature of this engineering evaluation?**

33 A. In the final quarter of 2002 and the first and second quarters of 2003, the PWFD failed
34 to meet the Maximum Contaminate Level (MCL) for Total Trihalomethanes (TTHMs).
35 As such, the PWFD was ordered by the USEPA, in conjunction with the Rhode Island
36 Department of Health (RIDOH), to investigate various options for compliance including,
37 TTHM treatment of wholesale source water, changes in the PWFD's distribution system
38 hydraulics and modifications in finish water storage (both the PWFD and that of its
39 wholesale supplier) all in an effort to find the best alternative or combination of
40 alternatives for the PWFD to achieve and maintain DBPR compliance on a consistent
41 basis. C&E was hired by the PWFD to conduct this TTHM compliance investigation.

42 **Q. When was this engineering evaluation conducted?**

43 A. C&E was retained in March 2003 and the final report was issued in October 2003 and a
44 revised final report (to account for additional testing data) was issued in December 2003.
45 A copy of the Final Revised Report is attached.

46 **Q. What were the general findings and conclusions of this report?**

47 A. Our findings have concluded that the previously referenced periods of DBPR non-
48 compliance were the direct result of the PWFD receiving water from the Newport Water
49 Department's Lawton Valley Treatment Plant with high levels of TTHM's that often
50 exceed the regulatory limit of 80 parts per billion. Current USEPA Best Available
51 Technology (BAT) for TTHM control focuses primarily on the removal of TTHM
52 precursors rather than the treatment of TTHM removal. Precursors or natural organic
53 matter (NOM), which occurs in water supplies and when combined with chlorine, tend
54 to form TTHMs. Through the removal of NOM, or the use of an alternative disinfectant
55 that is less likely to react with NOM, the formation of TTHMs is most effectively
56 controlled. Such a treatment would have to be conducted by Newport Water at the
57 Lawton Valley Treatment Facility prior to the formation of TTHM's. Such treatment is
58 not possible by the PWFD. Tests have shown that within hours of leaving the Lawton
59 Valley Treatment Facility, TTHMs have increased from an average of 13 PPB to almost
60 80 PPB. These levels not only threaten the PWFD's ability to comply with the DBPR
61 but also the Navy and Newport Water. This makes TTHM reduction an island-wide
62 necessity, not just a concern of the PWFD.

63 **Q. Is there any proof that improvements in the treatment practices at the Lawton**
64 **Valley Treatment Facility will be effective in reducing TTHM levels to the PWFD?**

65 A. Yes, after the initial period of violation, it was reported that Newport Water made
66 relatively minor changes to the disinfection practices at the Lawton Valley Treatment
67 Plant. This consisted of ceasing the practices of chlorinating on top of the filters, a
68 location where chlorine would most likely come into contact with the highest level of

69 NOM. This change resulted in an approximately 35% reduction in TTHM levels almost
70 immediately and allowed the PWFD to achieve compliance in the third quarter of 2003.

71 **Q. Were there any other improvements that were evaluated for DBPR compliance?**

72 A. Yes, the study conducted by the PWFD also evaluated changes in system hydraulics and
73 storage practices to determine if changes in operating procedures of the water system
74 could help in achieving DBPR compliance. Our evaluation showed that the current
75 PWFD system water system was designed in accordance with American Water Works
76 Standards and as such, has adequate distribution storage to meet seasonal peak flows. In
77 addition, the District carries out an annual, unidirectional flushing program since 1991
78 and the distribution is well looped with few dead ends. It was concluded that changes in
79 system hydraulics or storage practices would provide little benefit to the reduction of
80 TTHM formation in that the majority of the TTHMs, that are an issue in compliance
81 with the Stage 1 DBPR, are formed in the Newport Water System prior to entering the
82 PWFD system.

83 **Q. Why is it not possible for the PWFD to institute a treatment for TTHM removal on**
84 **waters entering the PWFD's water system?**

85 A. Though it is technically possible to provide treatment to remove TTHM's it is estimated
86 that it would cost two million dollars in capital expense and an additional two hundred
87 and fifty thousand dollars in annual operation and maintenance expense to remove
88 TTHM after formation. This would result in an estimated 36% increase in cost to the
89 PWFD's rate payers to provide treatment of already treated water a few hundred feet
90 from the Newport Water Treatment Facility which could be providing treated water that
91 is capable of ensuring compliance with the DBPR.

92 In addition such a system would not provide TTHM reduction to the other users of the
93 source water (i.e. Navy and the Newport retail customers). As previously discussed,
94 technology exists and could be implemented so that this problem could be solved at the
95 LV-WTP for the benefit of all Aquidneck Island water users. The cost of such
96 improvements to the water system would be borne by everyone. It makes no sense for
97 PWFD and the Navy to construct several secondary treatment plants to re-treat NWD
98 water.

99 **Q. Does this conclude your testimony?**

100 A. Yes, until I receive the Newport Water Department Compliance Evaluation Report, this
101 concludes my testimony.