

APPENDIX B

INDIAN ORCHARD PROJECT

Water Quality

The Facility is in compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach.

Under Section 401(a)(1) of the Clean Water Act (“CWA”),²³ an applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters must obtain from the state in which the discharge originates certification that any such discharge will comply with applicable water quality standards. The Commission may, therefore, not issue a license for a hydropower project unless the relevant state agency either has issued a water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one year.²⁴ At the time of the issuance of the Exemption from License, the MDEP did not complete a water quality study for the Project and, consequently, did not issue a water quality certificate for the Project.

The existing water quality at the Indian Orchard Project is classified by the MDEP as a Class B, warmwater fishery. In Massachusetts, general standards govern levels of oil and grease, radioactive substances, color, odor, form, turbidity, floating or suspended solids, nutrients, and aesthetics (314 CMR 4.03 (1988)) for all waters. In addition, the Class B warmwater fishery classification requires the water to have a minimum of 5.0 mg/l of dissolved oxygen (“DO”); temperature must be less than 83°F; pH must be between 6.5 and 8.0 standard units, and fecal coliform bacteria counts must not be more than 200 per 100 ml sample.

At the commencement of the license process for the Indian Orchard Project, WMECO filed results of a water quality study, including a dissolved oxygen (“DO”) study²⁵ for the Project. A graph of DO may be found at Appendix B-1 while the entire report²⁶ may be found at Appendix B-3. It is certain that this study of the Indian Orchard Project was submitted to DOI, FWS and MDFW on or about late November 1989 for review and analysis and that none of these agencies raised any objection to its data or conclusions.²⁷ Furthermore, there is no record that any agency conducted its own analysis prior to the issuance of the Exemption from License or subsequently found fault with the WMECO analysis or conclusions. Finally, the DOI letter of July 31, 1992 did not state any reason to deny the Exemption from License due to water quality.

²³ 33 U.S.C. 1341(a)(1).

²⁴ *Id.*

²⁵ See Appendix B-3, WMECO Exhibit E -- Environmental Report, Appendix D – Water Quality Report, dated November 1989.

²⁶ *Id.*

²⁷ For example, see the bottom of page two and the top of page three of the DOI letter (dated July 31, 1992) setting forth its mandatory terms and conditions to WMECO for its Exemption from License.

Regarding the Chicopee River from the confluence of the Wilbraham Pumping Station, Wilbraham/Ludlow to Chicopee Falls, Chicopee, MDWM (“Massachusetts Division of Water Management”) found that the flow is influenced by the Indian Orchard Dam hydropower project.²⁸

The DWM noted that in 2003 that the USGS maintains a gage in Springfield, Massachusetts, on the Chicopee River (Gage 01177000) 1,000 feet downstream from West Street Bridge at Indian Orchard and 1.1 miles upstream from Fuller Brook. The drainage area of this gage is 689 square miles and the period of record is August 1928 to present (pre-November 1938 published as “at Bircham Bend”) (Socolow 2005). The average discharge is 909 cfs (1928-2005) and the maximum discharge occurred on September 21, 1938 (45,200 cfs) while the minimal discharge of 16 cfs occurred several times in 1929-31 (USGS 2007 and Socolow et al. 2005).

The USGS remarks that flow diversion has occurred since 1941 from 186 square miles in Swift River basin and at times since 1931 from 97 square miles in Ware River Basin for Boston Metropolitan District (now MA DCR) (Socolow et al 2005). Diversions have also occurred since 1950 for Chicopee, since 1952 for South Hadley, at times since 1966 for Worcester, and at times since 1955 from 6.5 square miles in Ware River Basin for Fitchburg. Diversion from Ludlow Reservoir for Springfield and, prior to 1952, for Chicopee has also occurred. Flow is regulated by power plants upstream, by Quabbin Reservoir 21 miles upstream on the Swift River since 1939, by Barre Falls Reservoir on the Ware River since 1958, by Conant Brook Reservoir since 1966, and by smaller reservoirs (Socolow 2005). Discharge records are considered to be good except for estimated daily discharges, which are poor. (Socolow et al 2005).

There are two dams on this segment of the Chicopee River: Putts Bridge Dam, at Route 21 between Ludlow and Indian Orchard (part of Springfield), and the Indian Orchard Dam, north of Route 141 adjacent to an old mill on Front Street. The Putts Bridge Dam was constructed in 1918 as a concrete gravity structure. It rises 22 feet from the bed of the Chicopee River. The Indian Orchard Dam is a cut stone dam with 28 feet of height above the river. Both dams are owned and operated by CEEI as hydroelectric power plants. They generate and release minimum flows depending on the release from the Red Bridge Dam (located further upstream on the Chicopee River) (Kleinschmidt Associates and CEEI 1999). This segment of the Chicopee River ends at the Chicopee Falls Dam, which is a hydroelectric facility owned by the City of Chicopee.

DWM conducted water quality monitoring at one station (CH06–River Street/West Street Bridge, Springfield/Ludlow) along this segment of the Chicopee River between April and October 2003 (Appendix B). In-situ parameters were measured on seven occasions, including two pre-dawn occasions. Grab samples were also collected and analyzed for TSS, turbidity, ammonia-nitrogen, and total phosphorus (Appendix B).

Dissolved oxygen, pH and temperature met criteria on all sampling dates. It should be noted though that the DWM station was below the Indian Orchard Impoundment. Total

²⁸ See Appendix B-4, pages 91-94 and Appendices B and D of Chicopee River Watershed 2003 Water Quality Assessment Report. The entire report can be obtained at www.mass.gov/dep/water/resources/36wqar03.pdf.

phosphorus concentrations during June and August 2003 sampling dates were slightly elevated. Ammonia nitrogen concentrations were low on all sampling dates. The Aquatic Life Use is assessed as support for this segment of the Chicopee River based on the good water quality conditions but is given an “Alert Status” due to the presence of CSOs and the potential impacts of hydro modification due to hydropower operations.

Metcalf and Eddy (2006), as part of CSO work for the Connecticut River Bacteria Monitoring Project, collected bacteria samples at the Route 21 Bridge on the Springfield/Ludlow border. This station is upstream from the Indian Orchard Impoundment and upstream from the DWM sampling site. Metcalf and Eddy staff collected two samples along a transect. Samples were taken from the river bank east of the bridge on both sides of the river. Dry weather sampling was conducted on August 8, 2001 and wet weather sampling on three occasions: between September 25 -27, 2001; September 15-16, 2002 and October 16-18, 2002. This project had a Mass DEP-approved Quality Assurance Project Plan. The sampling conducted between September 25-27, 2001 had quality control issues and the data for this sampling are not used for purposes of this assessment report nor detailed in this report. Six samples were collected during one sampling occasions in 2001 and the *E. coli* geometric mean was 22.8 cfu/100 mL. In 2002 sixteen samples were collected during two wet weather sampling events and the *E. coli* geometric mean was 61.8 cfu/100 mL. None of the *E. coli* counts reported by Metcalf and Eddy (2006) and used in this report were greater than 235 cfu/ 100 mL. High fecal coliform counts were found in numerous samples but the corresponding *E. coli* counts were not high.

DWM conducted fecal coliform and *E. coli* bacteria monitoring at one station (CH06– River Street/West Street Bridge, Springfield/Ludlow) along this segment of the Chicopee River between April and October 2003 (Appendix B). This site is downstream from 13 CSOs and located just upstream from the USGS gage at Indian Orchard. There is a dam and a mill upstream from this station. The river channel is large and wide. Samples were collected by the bridge drop method at this station.

The *E. coli* bacteria counts in samples collected by DWM at Station CH06 were generally low. The highest *E. coli* bacteria count of 126 cfu/100 mL was found in the sample collected on October 15, 2003, a wet weather sampling date. It appears the elevated streamflow was largely due to rain in the upper Chicopee watershed as no significant rainfall was recorded at the NOAA rain gauge in Springfield. This wet weather sampling date may not have captured local CSO discharges. The *E. coli* geometric mean for Station CH06 was 35.4 cfu/100 mL.

Parameter	DWM 2003 (n=6)
Fecal coliform (cfu/100mL)	2 - 248
Geometric mean	39.4
<i>E. coli</i> (cfu/100mL)	4 - 126
Geometric mean	35.4

No objectionable deposits, scums or water odor were recorded by DWM field crews although conditions were often unobservable. Water clarity was clear on all days when noted. When observable there were no phytoplankton noted and on the one occasion when periphyton was observable it was characterized as sparse. On three occasions (July 30th, July 31st and

August 20th) dense submerged aquatic plants were noted (principally grasses) while on the rest of sampling days aquatic plants were unobservable.

Given the low *E. coli* bacteria counts the Primary and Secondary Contact Recreation Uses are assessed as support. Due to the presence of CSOs both Primary and Secondary Contact Recreation Uses are listed with an “Alert Status.” Given the lack of objectionable conditions the Aesthetics Use is assessed as support.

The facility area and the downstream reach are currently identified by the US EPA as not meeting the water quality standards pursuant to Section 303(d) of the CWA.²⁹ While the US EPA noted that pathogens are present in the Chicopee River downstream or in its upstream tributaries to the Project,³⁰ their appearance in the Chicopee River just immediately above or below the Indian Orchard Project is neither caused by nor contributed to by Indian Orchard Project.³¹ Thus, the Project does not contribute to any degradation of the water quality of the Chicopee River.

²⁹ At http://iaspub.epa.gov/tmdl_waters10/attains_impaired_waters.impaired_waters_list?p_state=MA&p_cycle=2006, information on this US EPA determination may be found.

³⁰ Ware, Quaboag and Swift Rivers.

³¹ A similar conclusion was reached by the MDEP in its letter dated October 31, 2012. A copy of which may be found at Appendix B-5.