

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES.

NPDES PERMIT NO.: MA0040207

PUBLIC NOTICE DATE:

NAME AND MAILING ADDRESS OF APPLICANT:

**Sidney Chang, Vice President
Chang Farms, Inc.
415 River Road
South Deerfield, MA 01373**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Chang Farms, Inc.
415 River Road
Whately, MA 01093**

RECEIVING WATER: **Connecticut River** (Connecticut Watershed)

Sugarloaf Brook (Connecticut Watershed)

CLASSIFICATION: **B - Warm Water Fishery**

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1. PROPOSED ACTION, TYPE OF FACILITY AND DISCHARGE LOCATION

1.1 Background

The US EPA and the MassDEP jointly issued Chang Farms a NPDES permit to discharge process wastewater (irrigation and wash water) from a bean sprout farming operation in the town of Whately, Massachusetts to the Sugarloaf Brook. This permit, MA0028851, was issued and effective on September 30, 1985. Chang Farms notified EPA on February 10, 1995 that it had ended discharge to Sugarloaf Brook and was instead discharging effluent from the bean sprout operation to the ground for non-bean sprout crop irrigation, on-site. EPA responded in a letter dated March 10, 1995, that because Chang Farms was no longer discharging to waters of the U.S. it would close out their NPDES permit. At some time between 1995 and 2004 discharge for non-bean sprout irrigation ended and was directed by gravity over ground by drainage swale to the Sugarloaf Brook. The DEP and Chang Farms agreed in an administrative consent order (ACO-WE-04-1G001) dated June 1, 2004, that Chang Farms, operating without Massachusetts water withdrawal and discharge permits, would obtain these permits. Chang Farms subsequently submitted a NPDES permit application dated June 30, 2004, with this submittal approved as administratively complete by the EPA April 27, 2005. The ACO includes the requirement that after final issuance of a NPDES permit and water withdrawal permit, and any other necessary federal, state and local permits, Chang Farms has 120 days to complete construction of an effluent sewer and outfall to the Connecticut River.

The draft permit provides conditions for discharge from Outfall 002 which is the current discharge to Sugarloaf Brook, a tributary to the Connecticut River, as well as for Outfall 001, a direct discharge to the Connecticut River which will replace Outfall 002. In accordance with ACO-WE-04-G001, Outfall 001 will be complete and operational within 120 days of the issuance of the final NPDES permit. Therefore, this fact sheet focuses on descriptions and derivations of effluent limits for Outfall 001, since Outfall 002 will be replaced in 120 days. The effluent limits and conditions are identical for both outfalls.

1.2 Proposed Action

The above named applicant has applied to the U.S. Environmental Protection Agency (EPA) for issuance of a National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving waters. The EPA determined that the application was complete in its letter to Chang Farms, Inc. (referred to herein as the permittee, the applicant, or the company) dated April 27, 2005. Please note that portions of the application are included herein, and all such materials are part of the administrative record for the permit. This is a new discharge. This permit, after becoming effective, will expire five years from the last day of the month prior to the effective date.

1.3 Facility Description

Chang Farms is a family run agricultural enterprise that produces bean sprouts in different varieties for the retail market. Sprout production is approximately 22,000 pounds per day. The sprouts are grown in enclosed rooms under a controlled environment, harvested, packaged and shipped from the facility on River Road in Whately (mailing address in South Deerfield). Harvesting and packaging occurs

daily.

The property consists of 73 acres of land. Twenty eight acres located between the Connecticut River (to the east) and River Road (to the west) are used to raise agricultural crops or rented to other farmers. The forty five acre parcel located west of River Road is used for the Chang Farms bean sprout production. A site locus map is provided in Figure 1.

1.4 Discharge Location

The applicant proposes to discharge an average of 150,000 gallons per day (GPD), and up to a peak flow of 180,000 GPD, of process wastewater to the Connecticut River, directly adjacent to the Chang Farms property, as shown on Figure 2.

The facility's discharge outfalls are listed below.

<u>Outfall</u>	<u>Description of Discharge</u>	<u>Outfall Location</u>
001	Process Waste Water	Connecticut River
002	Process Waste Water	Sugarloaf Brook

As discussed in Section 1.1 of this fact sheet, Outfall 002 is a temporary outfall, scheduled to shut down, in accordance with a Massachusetts consent order, within 120 days of the issuance of the final NPDES permit.

2. DESCRIPTION OF THE DISCHARGE

Chang Farms uses well water from their on-site well field for irrigation (including sprout soaking), washing sprout plants and equipment cleaning. The wells are used to fill a 12,000 gallon storage tank. Chang Farms withdraws an average of 150,000 gallons per day (gpd) from thirteen shallow, on-site wells for sprout production. An average of 120,000 gpd, from eleven wells, are used to irrigate and wash/rinse the harvested product growing sprouts and an average 30,000 gpd, from two wells, are used to clean and sanitize process equipment with cleaning agents. The wells are 1-1/4" diameter pipe, driven approximately 25 to 30 feet below grade. Prior to use, irrigation water is heated and fortified with nutrients.

Waste water from the sprout growing, harvesting and packaging process contains coliform bacteria and low levels of suspended solids and biochemical oxygen demand (BOD). Other constituents of the waste water include applied nutrients, liquid acid equipment cleaners and sanitizers, liquid chlorinated alkaline foam cleaners and liquid phosphoric acid foam cleaners. Various chemicals used at the facility may be discharged during normal operation and maintenance. The permittee has provided a list in the NPDES permit application of all chemicals used at the facility. A complete list of these products/chemicals and their purposes is attached, (Attachment A). A quantitative description of the effluent characteristics based on recent facility effluent monitoring data submitted to the Massachusetts Department of Environmental Protection (MassDEP) are shown in Attachment B of this fact sheet. This data was reviewed and used to develop this permit.

The collected process wastewater flows by gravity to a pump station which pumps the wastewater through a static screen and then through a trapezoidal flume for flow measurement. Currently the wastewater flows by gravity over a drainage swale on the facility property, then flowing to the

adjacent Sugarloaf Brook for final disposal. The Sugarloaf Brook flows into the Connecticut River. Since the application was submitted, the applicant has agreed to install an ultra violet (UV) disinfection system which will significantly decrease the fecal coliform and E. Coli bacteria discharged. In addition, the permittee will replace the drainage swale with a pipe as part of the consent order conditions described in Section 1.1. A schematic of the facility's planned disinfection treatment system is included herein as Figure 3.

3. RECEIVING WATER DESCRIPTION

The Connecticut River segment receiving the Chang Farms discharge, beginning at the confluence with the Deerfield River to the Holyoke Dam and designated MA34-04, is currently on the State's "Proposed Massachusetts Year 2004 Integrated List of Waters, April 2004" 303(d) list of impaired waters due to the presence of *Priority organics* and *Pathogens* and is not meeting water quality standards for these parameters. The MassDEP's Connecticut River Basin 1998 Water Quality Assessment Report indicates this river segment to be "not assessed" for primary and secondary contact, but does note that, *...Historically, elevated fecal coliform bacteria levels were documented in this segment of the Connecticut River...* These evaluations and determinations provided in the 1998 assessment report include field and laboratory evaluations of the biology, toxicity and river chemistry, however it does not specifically document possible impacts attributable to the Chang Farms discharge.

4. LIMITATIONS AND CONDITIONS

The proposed effluent limitations of the Draft Permit, the monitoring requirements, and implementation schedules (if required) may be found in Part I (Effluent Limitations and Monitoring Requirements) of the draft NPDES permit.

5. PERMIT BASIS: STATUTORY AND REGULATORY AUTHORITY

5.1 General Requirements

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit unless such a discharge is otherwise authorized by the CWA. The NPDES permit is the mechanism used to implement technology and water quality-based effluent limitations and other requirements including monitoring and reporting. The draft NPDES permit was developed in accordance with various statutory and regulatory requirements established pursuant to the CWA and applicable State regulations. The regulations governing the EPA NPDES permit program are generally found at 40 CFR Parts 122, 124, 125, and 136. In this permit EPA considered (a) technology-based requirements, (b) water quality-based requirements, and (c) all limitations and requirements in the current/existing permit (if one exists), when developing the permit limits.

5.2 Technology Based Requirements

Technology based treatment requirements represent the minimum level of control that must be imposed under Sections 402 and 301(b) of the Clean Water Act (CWA) (see 40 CFR 125 Subpart A). The EPA develops technology-based standards called Effluent Limitations, Guidelines and Standards

(ELGs) for discharges from different industries. These ELGs are based on best practicable treatment control technology (BPT), best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and new source performance standards (NSPS). Where ELGs are not available for certain industrial categories and/or pollutants of concern, Section 402(a)(1) of the CWA and 40 CFR 125.3 of the NPDES regulations authorize the use of best professional judgment (BPJ) to derive technology-based effluent limitations on a case-by-case basis. No ELGs exist for this type of discharge, and therefore, the technology-based limits in the draft permit are based on best professional judgment (BPJ) pursuant to Section 401(a)(1) of the CWA.

5.3 Water Quality Based Requirements

Under Section 301(b)(1)(C) of the Clean Water Act (CWA), discharges are subject to effluent limitations based on Water Quality Standards (WQS). The Massachusetts Surface WQS include the requirements for the regulation and control of toxic constituents and also require that EPA criteria established pursuant to Section 304(a) of the CWA shall be used unless site specific criteria are established. The State will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained.

The permit must limit any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes, has reasonable potential to cause, or contributes to an excursion above any water quality criterion. An excursion occurs if the projected or actual in-stream concentrations exceed the applicable criterion. In determining reasonable potential, EPA considers existing controls on point and non-point sources of pollution, variability of the pollutant in the effluent, sensitivity of certain species to toxicity and, where appropriate, the dilution of the effluent in the receiving water.

The applicable water-quality standards for this discharge include those found in the *EPA Quality Criteria for Water*, Federal Register: December 27, 2002 (Volume 67, Number 249), as adopted by the MassDEP into the state water quality standards, and the specific Massachusetts Water Quality standards (MA WQS). The Connecticut River at the point of discharge is classified as a Class B water body by the Massachusetts Surface Water Quality Standards 314 CMR 4.05(3)(b) which states that Class B waters have the following designated uses: *These waters are designated as habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. Where designated, they shall be suitable as a source of public water supply with appropriate treatment. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value. Class B waters shall be of such quality that they are suitable for the designated uses of protection and propagation of fish, other aquatic life and wildlife; and for primary and secondary contact recreation.* The receiving water is also classified as a warm water fishery, which is defined in the Massachusetts Surface Water Quality Standards (314 CMR 4.02) as waters in which the maximum mean monthly temperature generally exceeds 68° F (20° C) during the summer months and are not capable of supporting a year-round population of cold water stenothermal aquatic life.

6. EXPLANATION OF EFFLUENT LIMITATION DERIVATION

6.1 River Flow and Dilution Calculation

Water quality based limitations are established with the use of a calculated available dilution. Title

314 CMR 4.03(3)(a) requires that effluent dilution be calculated based on the receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, recorded over a 10-year recurrence interval. The 7Q10 for many streams is calculated based on data from the United States Geological Survey (USGS) low-flow frequency statistics for gauging stations. Additionally, the facility design flow is used to calculate available effluent dilution.

The receiving waters' 7Q10 used to calculate the effluent limits in the draft permit is 1,687 cfs, per the South Deerfield POTW NPDES discharge permit (MA0101648) as listed in Appendix C of the Connecticut River Basin 1998 Water Quality Assessment Report. The facility's design flow is 180,000 GPD or 0.28 cubic feet per second (CFS). The resulting dilution is 6,026:1.

$$\frac{\text{Daily average design effluent flow} + \text{River flow (7Q10)}}{\text{Daily average design effluent flow}} = \text{Dilution Factor}$$

$$\frac{0.28 + 1,687}{0.28} = 6,026$$

6.2 Flow

Chang Farms has applied for and received a well withdrawal permit (#9P1-106-337.01) for 150,000 gpd with a peak of 180,000 gpd. According to the permittee, well withdrawals have remained below this level to date. Effluent monitoring data submitted to EPA for the period of July 2004 to June 2006 (the 'review period'), (summarized in Attachment B) indicated some flow measurements well in excess of the permitted well withdrawal due to an apparent foaming problem in the trapezoidal measurement flume. According to Mr. Mark Kremarik of Dennis Group (telephone discussion of July 20, 2006) the foaming problem has since been addressed by spraying the foam in the flume down with clean well water. The facility's effluent discharge occurs year round and is not a seasonal discharge.

The draft permit includes an average monthly flow limit of 150,000 gpd in accordance with the flow expected by the permittee and the limits of the well withdrawal permit. The mass limits for five day Biochemical Oxygen Demand (BOD₅) and total suspended solids (TSS) in the draft permit have been derived the average monthly flow limit and the maximum daily withdrawal flow of 180,000 gpd, as discussed in section 6.4.

6.3 pH

The Massachusetts Surface Water Quality Standards, 314 CMR 4.00, for Class B waters require pH to be within the range of 6.5 to 8.3 and prohibit discharges that cause the in-stream pH to change more than 0.5 units outside of the background range. For the review period the pH levels have ranged between 6.6 and 7.5 standard units.

The draft permit includes the above pH requirements. These pH requirements are consistent with other NPDES permitted dischargers to the Connecticut River. The pH shall be monitored after any treatment/disinfection process at the facility, just prior to discharge, with measurements required daily.

6.4 Biochemical Oxygen Demand (BOD₅) & Total Suspended Solids (TSS)

An excess of oxygen demanding substances (measured as BOD₅) can cause depletion of the in-stream dissolved oxygen levels thereby causing harm to aquatic life. TSS discharged to receiving water

increases turbidity, contributes to oxygen depletion and may contain toxic agricultural and/or industrial compounds such as pesticides and heavy metals.

Effluent monitoring data for the review period (summarized in Attachment B), and information provided in the permit application, indicate maximum daily BOD and TSS concentrations of 61 mg/l and 16 mg/l respectively.

The draft permit establishes monthly average and maximum daily BOD limitations of 26.6 and 41.5 mg/l respectively. TSS limits are established at a 15.5 mg/l and 23.2 mg/l respectively, based on reported effluent monitoring results (Attachment B) and statistical analysis (see Attachment C). These BOD & TSS limits are more restrictive than other NPDES dischargers upstream of Chang Farms, such as the South Deerfield POTW with secondary standards of 30/45 mg/l for average monthly TSS/BOD. The draft permit also includes mass limitations for these parameters, a state certification requirement, based on the draft permit flow limit of 150,000 GPD and the maximum daily flow rate of 180,000 GPD anticipated by the permittee. The mass limits for BOD and TSS were calculated as follows,

Mass Loading (lbs/day) = Concentration Limit (mg/l) x Flow Limit (MGD) x 8.34 conversion factor

BOD = Monthly Average = (26.6 mg/l) (0.15 MGD) (8.34) = 33.3 lbs/day

= Maximum Daily = (41.5 mg/l) (0.18 MGD) (8.34) = 62.3 lbs/day

TSS = Monthly Average = (15.5 mg/l) (0.15 MGD) (8.34) = 19.4 lbs/day

= Maximum Daily = (23.2 mg/l) (0.18 MGD) (8.34) = 34.8 lbs/day

6.5 Chlorine

A minor amount of chlorine is introduced to the Chang Farms facility wastewater from the use of cleaning products for washing and rinsing when harvesting the sprouts, and for the required periodic cleaning of the growing rooms and handling equipment. The applicant's effluent monitoring results indicate the highest concentration of Total Residual Chlorine (TRC) was 0.81 mg/l during the review period.

Chlorine and chlorine compounds can be extremely toxic to aquatic life. Ambient receiving water limits for maximum daily and average monthly total residual chlorine (TRC) are based on the acute and chronic values defined in *EPA Quality Criteria for Water 1986 (EPA 440/5-86-001)* and *National Recommended Water Quality Criteria*, published in the Federal Register on December 10, 1998 (63 FR 68354), as adapted into the Massachusetts Surface Water Quality Standards (314 CMR 4.00). This guidance specifies that the average TRC in freshwater should not exceed 11 micrograms per liter ($\mu\text{g/l}$) to protect aquatic life from chronic toxicity, and the maximum daily concentration should not exceed 19 $\mu\text{g/l}$ for acute toxicity. TRC effluent limits are calculated by multiplying the chlorine criteria by the dilution factor. Because the dilution factor for this proposed discharge is 6,026 (as calculated previously) the resulting calculated TRC limit is considerably greater than 1.0 mg/l. However, the draft permit chlorine limit has been set lower to be consistent with the *Massachusetts Implementation Policy for the Control of Toxic Pollutants in Surface Waters*, MassDEP, 1990. This policy requires that receiving waters shall be protected from unnecessary discharges of excess chlorine. In receiving waters with dilution factors greater than 100, the maximum permissible effluent concentration of chlorine shall not exceed 1.0 mg/l TRC. Therefore based on past effluent TRC concentrations as high as 0.81 mg/l, and because of the facility's occasional use of chlorine containing cleaning products at

the facility, it has been determined that the discharge has a reasonable potential to exceed water quality criteria for chlorine. The draft permit has specified effluent TRC limits of 1.0 mg/l for both maximum daily and monthly average, with sampling required weekly.

No cleaning agents or biocides, except for those listed in Attachment A, shall be used without written approval from the Regional Administrator and the Commissioner.

6.6 Nutrients (Nitrogen and Phosphorus)

Nutrients are compounds containing nitrogen and phosphorus. High concentrations of nitrogen and phosphorus in a water body can cause eutrophication, a condition in which aquatic plant and algal growth is excessive. Decomposition of the plants and algae reduces dissolved oxygen concentrations in the water, creating poor habitat for fish and other aquatic animals.

It has been determined that excessive nitrogen loadings are causing significant water quality problems in Long Island Sound, including dissolved oxygen. The State of Connecticut has begun to impose nitrogen limitations on Connecticut River discharges to Long Island Sound and its tributaries. EPA agrees there is a need to determine the loadings of nitrogen from sources in Massachusetts which are tributary to Long Island Sound, and to help determine what limits, if any should be imposed on discharges in Massachusetts.

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) includes the requirement that a discharge “*shall not exceed the site-specific limits necessary to control accelerated or cultural eutrophication*”. Currently a Total Maximum Daily Load (TMDL) analysis and plan for nutrients, including specific numerical criteria limits, for the Connecticut River is not available. A TMDL is a calculation of the maximum amount of pollutant (nutrients in this case) that a water body can receive and still meet water quality standards.

Based on effluent monitoring during the review period (see Attachment A), phosphorus and nitrogen are present in the Chang Farm waste water, at a flow of 150,000 GPD, as follows.

<u>Nutrient</u>	<u>Average Concentration</u>	<u>Mass Load</u>	<u>Impact to Receiving Water</u>
Total Phosphorus	1 mg/l	1.3 lbs/day	insignificant**
Total Nitrogen	11 mg/l	13.8 lbs/day	insignificant**

* From monitoring July 2004 thru June 2006, highest and lowest values not included in average.

** As defined in the MA Water Quality Standards, 314 CMR 4.04(2).

Possible sources for these nutrients include cleaning agents and nutrients used in the bean sprout process operations (these are listed in Attachment A). Also, the facility’s past well water testing has indicated nitrate concentrations of up to 10 mg/l.

Based on the above EPA Region 1 policy and Section 308 of the Clean Water Act, the draft permit includes quarterly sampling requirements for total phosphorus and nitrogen as Total Kjeldahl Nitrogen (organic nitrogen plus ammonia) and nitrate-nitrite nitrogen (inorganic nitrogen). The information submitted by the permittee will help to establish a database of nitrogen loadings, which can be used quantitatively to assess the impact of loading and transport to Long Island Sound via the Connecticut River. The monitoring data will provide a more sound decision making basis in any future decisions relating to nitrogen loadings to the Sound. This monitoring requirement may be removed by the agencies after sufficient data collection.

Specific nitrogen and phosphorus limits have not been required in the draft permit at this time. This decision was based on the physical characteristics of the receiving water at the discharge, the receiving water's assimilative capacity, the very minor level of additional nutrients entering the Connecticut River (compared to all other existing contributive inputs such as POTW dischargers and non point sources) and the requirement in the draft permit that the permittee prepare and implement a Best Management Practices plan to minimize nutrients in the discharge.

If a Total Maximum Daily Load (TMDL) or other data show that the facility is contributing to eutrophication of the river, EPA and MassDEP may exercise the reopener clause in Part II.A.4 of the permit and modify the permit accordingly.

6.7 Fecal Coliform

According to the Massachusetts Year 2002 Integrated List of Waters (MassDEP, September 2003) the reach of the Connecticut River at the location of this proposed discharge (MA34-04_2002) is listed as impaired due to the presence of excessive priority organics and pathogens.

The permittee has provided results of effluent monitoring and analysis for specific bacteria which are summarized in Attachment B. The EPA and the MassDEP have reviewed these results and other information relative to bean sprout production.

Due to the presence of significant concentrations of coliform bacteria in the current discharge, the draft permit includes limits for fecal coliform bacteria, specified as a geometric mean of no more than 200 colony forming units (cfu) per 100 ml, with a daily maximum limit of 400 cfu per 100 ml. This limit is consistent with other permitted discharges to the Connecticut River and is designed to maintain Connecticut River water quality and Massachusetts Class B water quality standards (314 CMR 4.05(3)(b)). Fecal coliform monitoring shall be required weekly on a seasonal basis, April 1st through October 31st, consistent with other discharges to the Connecticut River. Note that the draft permit includes a requirement that the fecal coliform samples should be taken at the same time that the total residual chlorine sample is collected.

The installation of the planned UV disinfection system, designed to decrease the discharge of bacteria to the Connecticut River, will help to ensure the discharge meets the draft permit limits.

6.8 Whole Effluent Toxicity (WET) Testing

Whole effluent toxicity testing is conducted to assess whether certain effluents, often containing potentially toxic pollutants, are discharged in a combination which produces a toxic amount of pollutants in the receiving water. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants.

There are two specific sources of legal authority which explain how regulatory authorities have the legal basis for establishing toxicity testing requirements and toxicity-based permit limits in NPDES permits. Sections 402(a)(2) and 308(a) of the Clean Water Act provide EPA and States with the authority to require toxicity testing data. Section 308 specifically describes biological monitoring methods as techniques which may be used to carry out objectives of the Act. Under certain State narrative water quality standards, and Sections 301, 303 and 402 of the Clean Water Act, EPA and the States may establish toxicity-based limits to implement the narrative "no toxics in toxic amounts".

The regulations at 40 CFR Part 122.44(d)(ii) state, " When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution ... (including) the sensitivity of the species to toxicity testing ...". The EPA and MassDEP believe that the complexity of this effluent is such that toxicity testing and limitations are required to evaluate and address any water quality impacts. The MassDEP, in its "Implementation Policy for the Control of Toxic Pollutants in Surface Waters" (February 23, 1990) sets forth toxicity limits which have been adopted by EPA Region I. This document assigns effluent toxicity limits according to dilution factors based on perceived risk. Results of these toxicity tests will demonstrate compliance with the Massachusetts Water Quality Standards.

To be consistent with toxicity policy for dilution in the low risk category (>100:1) (6,000:1 for the Chang Farms discharge) a WET acute LC₅₀ limit of ≥50% is specified in the draft permit. A LC₅₀ limit of ≥50% means that a sample of 50 % effluent shall cause no greater than or equal to a 50 % mortality rate to the test organisms in that effluent sample during an exposure of 48 hours. The draft permit specifies LC₅₀ testing two times a year for one species. The species required for testing is the daphnid, *Ceriodaphnia dubia*. Toxicity tests are to be conducted in June and September. Toxicity testing requirements are described in Attachment A to the draft permit.

The draft permit allows for the possibility of decreasing the frequency of WET testing to no less than one time per year, if no toxicity is found after two tests.

7. ANTI-DEGRADATION

Massachusetts Surface Water Quality Standards include Anti-Degradation Provisions (in 314 CMR 4.04) that state "...*These waters (applicable to Class B) shall be protected and maintained for their existing level of quality unless limited degradation by a new or increased discharge is authorized by the Department. Limited degradation may be allowed by the Department where it determines that a new or increased discharge is insignificant because it does not have the potential to impair any existing or designated water use and cause any significant lowering of water quality; also limited degradation may be allowed as provided in 314 CMR 4.04(4).*"

Federal regulations require each state to establish a program to monitor and assess the quality of its surface and groundwater and report on its findings. An "integrated list" report includes the reporting requirements of both Sections 305(b) ("Water Quality Inventory") and 303(d) ("List of Impaired Waters") of the Clean Water Act (CWA). Category 5 of the Integrated List constitutes the "Section 303(d) List" of waters that are impaired for one or more designated uses and require the development of total maximum daily loads (TMDL). The Massachusetts integrated list of waters is published by the State every two years and provides the status of all assessed waters and outlines which water bodies are not in compliance with particular State Water Quality Standards. The most recently finalized integrated list is the *Massachusetts Year 2002 Integrated List of Waters*, published in September of 2003. This report indicates that certain reaches of the Connecticut River suffer from impairments.

The Massachusetts Anti-degradation Policy is found at Title 314 CMR 4.04. All existing uses of the Connecticut River must be protected. The public is invited to participate in the anti-degradation finding through the permit public notice procedure.

This is a new discharge (as described in Section 1) to the Connecticut River and the Commonwealth of Massachusetts has determined that it will result in an insignificant lowering of water quality. Pursuant to the Massachusetts anti-degradation review policy, the State has found that there is no alternative to the new discharge reasonably available or feasible. Further, the State has determined that all existing water uses will be fully protected. A letter and determination dated September 29, 2005 from the MassDEP (see Attachment D), provides supporting evidence for the State position. The State's conclusion is subject to public notice and review before becoming final. The Public Notice is written to serve both as the permit public notice and the notice for the Massachusetts anti-degradation review. Public comments received on the Massachusetts anti-degradation finding will be responded to by the Commonwealth of Massachusetts and EPA.

This existing discharge was previously permitted by the EPA to discharge to the Sugarloaf Brook, a tributary to the Connecticut River. Based on a dilution factor of approximately 6,000:1, the characterization of the proposed discharge and the aforementioned planned UV disinfection system, EPA and the MassDEP believe this discharge will not exceed the threshold criteria in the above referenced Anti-Degradation Provisions and therefore is defined by these regulations as "insignificant". The threshold criteria for the Connecticut River, a Class B water, are specified in 314 CMR 4.05(3)(b), and include water quality parameters for dissolved oxygen, temperature, pH, fecal coliform bacteria, solids, turbidity, oil & grease and taste & color.

After review of the above requirements, EPA and the MassDEP have authorized this discharge subject to the provisions of the draft permit including the requirement that the permittee prepare and implement a Best Management Practices plan (BMPs)(see Permit, Part 1.B). The BMP plan addressing day to day facility activities will help to minimize the presence of coliform bacteria and cleaning solution chemicals in the discharge. For periodic activities, such as major cleaning of holding tanks or rooms, the BMP plan must either ensure that these discharges are not directed to the NPDES outfall, or provide treatment or other controls to ensure that the discharge does not violate the permit's effluent limitations or water quality standards.

8. ESSENTIAL FISH HABITAT (EFH)

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C § 1801 et seq.(1998)), EPA is required to consult with the National Marine Fisheries Service (NMFS) if EPA's actions or proposed actions that it funds, permits, or undertakes, "may be adversely impact any essential fish habitat," 16 U.S.C. § 1855(b). The Amendments broadly define "essential fish habitats" (EFH) as: "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity," 16 U.S.C. § 1802(10). "Adverse impact" means any impact which reduces the quality and/or quantity of EFH, 50 C.F.R. §600.910(a). "Adverse effects" may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. Id.

Essential fish habitat is only designated for fish species for which federal Fisheries Management Plans exist. 16 U.S.C. § 1855(b)(1)(A). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

Andadromous Atlantic Salmon (*Salmo salar*) is the only managed species with designated EFH within this section of the Connecticut River, which is classified by the State as a warm water fishery. While

river conditions in this river may not be suitable as spawning or juvenile rearing habitat for salmonids, the area does serve as the only corridor for Atlantic salmon migrating to and from juvenile rearing habitats located in upstream tributaries.

EPA has concluded that the limits and conditions contained in this draft permit minimize adverse effects to Atlantic salmon EFH for the following reasons:

- The design flow of the facility is 180,000 gpd and the dilution factor is over 6,000;
- The technology based limits for chlorine, which are used in this permit, are more stringent and protective of aquatic organisms than those based on EPA water quality criteria;
- Acute whole effluent toxicity tests will be conducted two times per year on fathead minnow (*Pimephales promelas*) to monitor for adverse reactions to the discharge; and
- The permit will prohibit violations of the state water quality standards.

EPA believes the draft permit adequately protects Atlantic Salmon EFH, and therefore additional mitigation is not warranted. NMFS will be notified and an EFH consultation will be reinitiated if adverse impacts to EFH are detected as a result of this permit action, or if new information is received that changes the basis for EPA's conclusions.

9. ENDANGERED SPECIES ACT (ESA)

Section 7 of the Endangered Species Act of 1973, as amended ("Act") grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical ("A critical habitat"). The Act requires every Federal agency, in consultation with and with the assistance of the Secretary of the Interior, to ensure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat. The National Marine Fisheries Service (NMFS) administers Section 7 consultations for marine species and anadromous fish. The United States Fish and Wildlife Service (USFWS) administers Section 7 consultations for freshwater species.

Listed endangered species that may be found in this area include shortnose sturgeon (*Acipenser brevirostrum*), dwarf wedgemussel (*Alasamidonta neterodon*) and bald eagle (*Haliaeetus leucocephalus*). EPA believes the authorized discharge from this facility is not likely to adversely affect any federally-listed species, or their habitats. This preliminary determination is based on the location of the outfall, and the reasons provided in the EFH discussion (Section 7 of this Fact Sheet). EPA is seeking concurrence with this opinion from NMFS and USFWS through the informal ESA consultation process.

10. STATE PERMIT CONDITIONS

The NPDES Permit is issued jointly by the U. S. Environmental Protection Agency and the MassDEP under federal and state law, respectively. As such, all the terms and conditions of the permit are, therefore, incorporated into and constitute a discharge permit issued by the MassDEP Commissioner.

11. STATE CERTIFICATION REQUIREMENTS

The staff of the MassDEP has reviewed the draft permit. EPA has requested permit certification by the State pursuant to 40 CFR § 124.53 and expects that the draft permit will be certified.

12. PUBLIC COMMENT PERIOD AND PROCEDURES FOR FINAL DECISION

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection, MA Unit, One Congress Street, Suite-1100, Boston, Massachusetts 02114. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. Public hearings may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates a significant public interest. In reaching a final decision on the draft permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period and after a public hearing, if such a hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice.

13. EPA CONTACT

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

Ellen Weitzler
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1 Congress Street
Suite 1100 (CIP)
Boston, MA 02114-2023
Telephone: 617-918-1582
FAX: 617-918-1505
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Dana Hill
Massachusetts Department of Environmental Protection
Watershed Permitting
Surface Water Discharge Permit Program
One Winter Street, 6th Floor
Boston, Massachusetts 02108
Telephone: (617) 292-5867
Email: dana.hill@state.ma.us

Date:

Linda M. Murphy, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

THE DENNIS GROUP, LLC 1390 MAIN STREET, SUITE 100, SPRINGFIELD, MA 01103. PHONE: 413-787-1785. FAX: 413-787-1786. BY: LANCE

CHANG FARMS



SITE LOCATION

REL.	DATE	BY	APP.	DESCRIPTION
A	11/17/10			

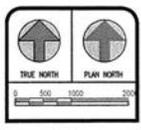
CHANG FARMS, INC.
 Project Expansion
 300 Rt. 116
 South Deerfield, MA 01373

SITE MAP

THE DENNIS GROUP, LLC
 PLANNING • ENGINEERING • CONSTRUCTION MANAGEMENT

1390 MAIN STREET
 SPRINGFIELD, MA 01103
 413-787-1785 • FAX 413-787-1786

126 SOUTH MAIN STREET, SUITE 100
 SPRINGFIELD, MA 01103
 413-787-1785 • FAX 413-787-1786

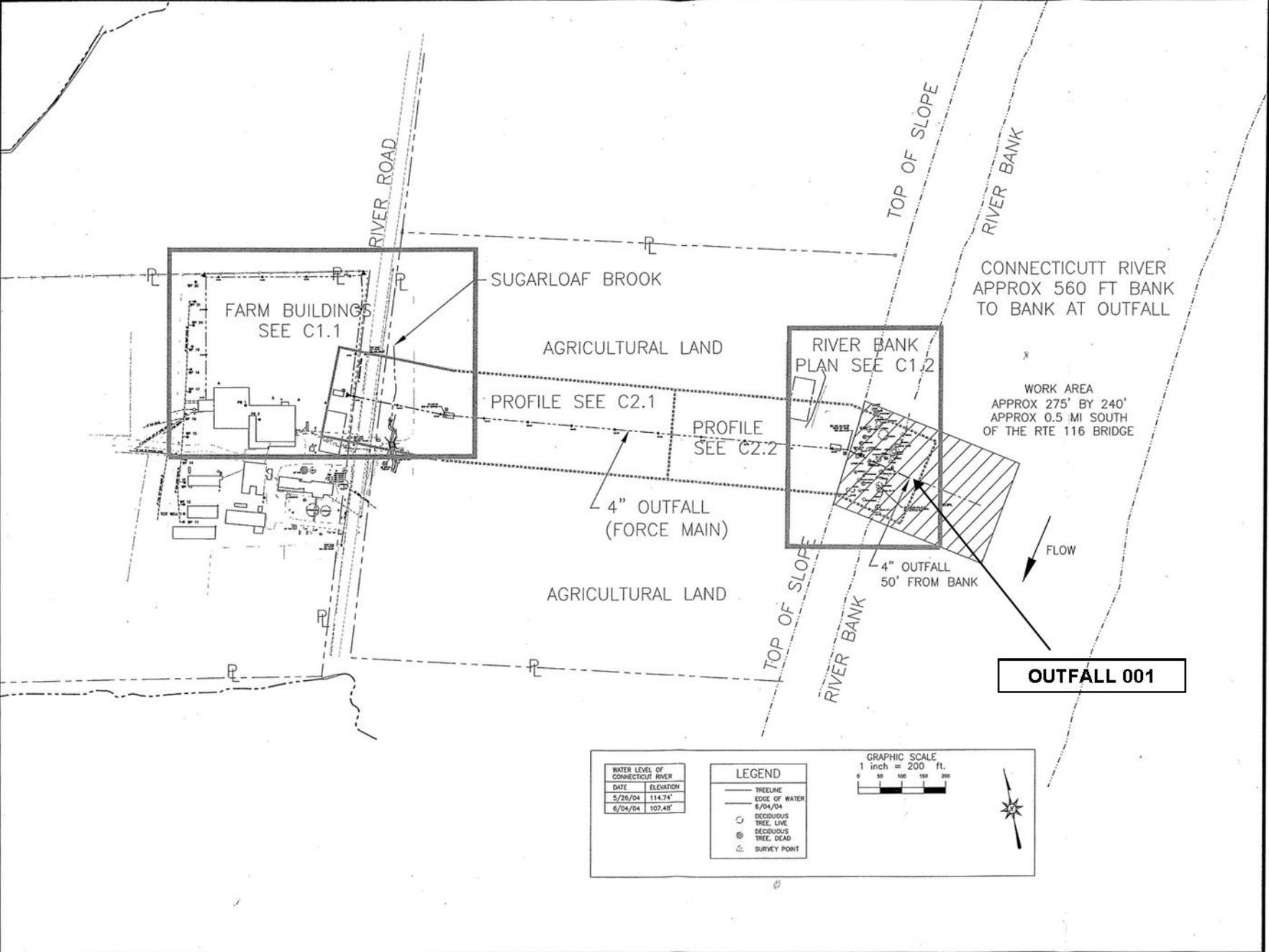


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DRAWING NO.
C-00
 F2049

FIGURE 1
SITE LOCUS MAP
 Chang Farms, Inc.
 NPDES Permit MA 004207

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WATER LEVEL OF CONNECTICUT RIVER	
DATE	ELEVATION
5/25/04	114.74'
6/04/04	107.48'

LEGEND	
—	TREELINE
—	EDGE OF WATER
5/04/04	DECIDUOUS TREE, LIVE
⊙	DECIDUOUS TREE, DEAD
⊙	SURVEY POINT

GRAPHIC SCALE
1 inch = 200 ft.

0 50 100 150 200

REL.	DATE	BY	DESCRIPTION
C	11 APR 05	AMC	RELEASE FOR MASS PERMIT
B	1 MAR 05	AMC	RELEASE FOR WOOD POINT
A	11 AUG 05	AMC	RELEASE FOR PERMITS

CHANG FARMS, INC.
 Proposed Expansion
 301 River Road
 South Deerfield, MA 01373
 WASTEWATER OUTFALL PROJECT
 OVERALL SITE PLAN

THE DENNIS GROUP, LLC
 PLANNING • ENGINEERING • CONSTRUCTION MANAGEMENT
 1291 Main Street
 South Deerfield, MA 01373
 413-937-7262, FAX 413-937-7266

SCALE: 1" = 200'
 CIO FILE
 DRAWING NO.
C1.0
 F-2049

FIGURE 2
SITE PLAN
 Chang Farms, Inc.
 NPDES Permit MA 0040207

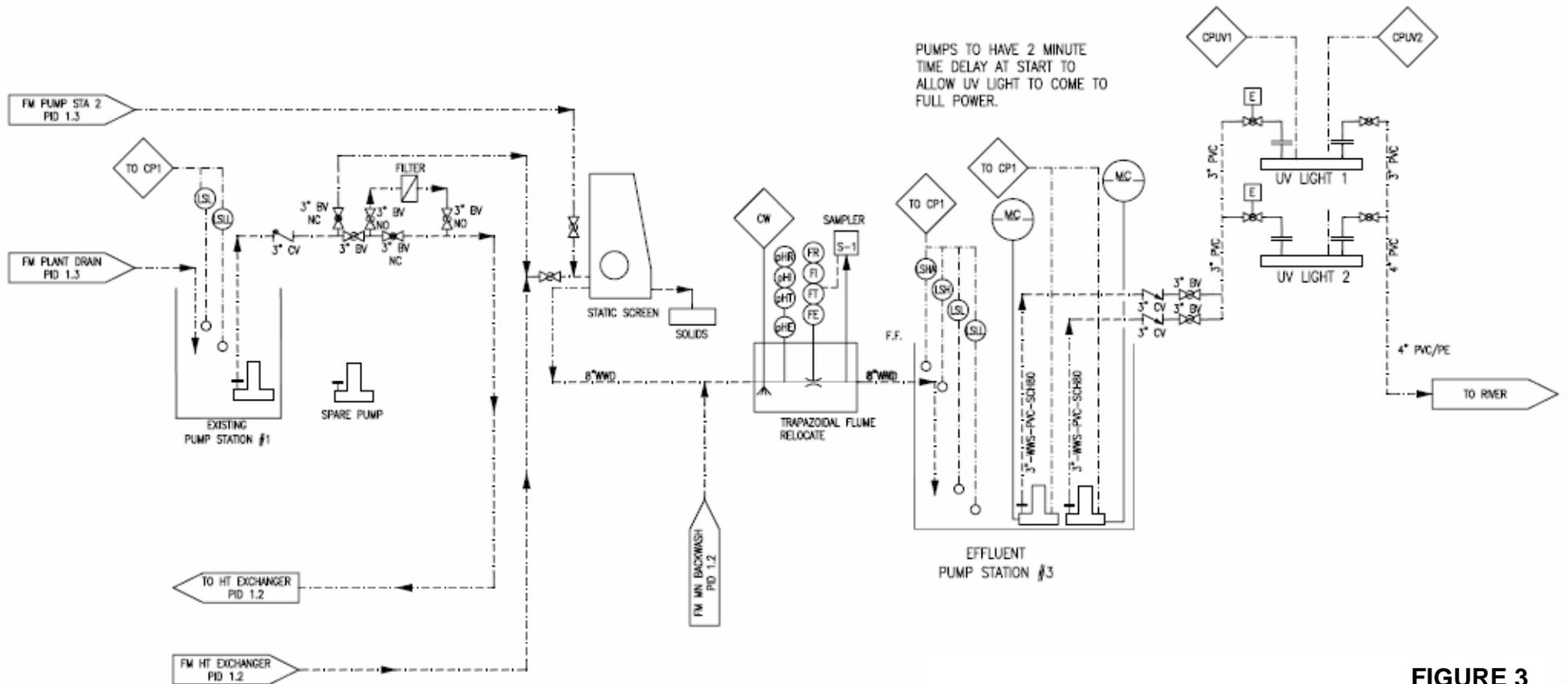


FIGURE 3
TREATMENT SYSTEM PROCESS SCHEMATIC
 Chang Farms, Inc.
 NPDES Permit MA0040207

ATTACHMENT A
CHEMICALS USED AT CHANG FARMS

ATTACHMENT A

CHEMICALS USED AT CHANG FARMS

Usage	Product Name	Chemical Composition	Estimated Usage
Nutrients	P1	Phosphoric Acid (2.0%) Soluble Potash (1.0%) Calcium Carbonate (2.0%)	0.5 gallons per day
	B88	No Longer Used	
Cleaning	F-182A Liquid Chlorinated Alkaline Foam Cleaner	Sodium Hydroxide (5%) Sodium Hypochlorite (1.5%)	1.0 gallon per day
Cleaning	F-48 Liquid Acid Cleaner and Sanitizer	Quaternary Ammonium (7%) Phosphoric Acid (30%) Ethyl Alcohol (2%)	8 oz per day (0.0625GPD)
Cleaning	Super Lime-Sol	No Longer Used	
Cleaning	Powder Bleach	Calcium Hypochlorite	2 lbs/day

ATTACHMENT B
MONTHLY DATA SUMMARY

ATTACHMENT B - MONTHLY DATA SUMMARY JULY 2004 to JUNE 2006

	Flow (GPD)		Chlorine Residual ² (mg/l)		TSS ³ (mg/l)		BOD ⁴ (mg/l)		Total P (mg/l)		Total N (mg/L)		Fecal Coliform (cfu/100 ml)		pH (S.U.)	
	Monthly Average	Daily Max	Monthly Average	Daily Max	Monthly Average	Daily Max	Monthly Average	Daily Max	Monthly Average	Daily Max	Monthly Average	Daily Max	Monthly Average	Daily Max	Monthly Average	Daily Max
July-04	95,333	100,000	0	ND ⁵	7.7	9.0	171	360	9.7	20	10	11	<10 - TNTC ⁶	TNTC	No data	
August-04	99,667	107,000	0.1	0.16	9.6	10.0	13	15	3.8	6.1	11	12	169,000	263,000	No data	
September-04	91,800	105,000	0.025	0.1	10.5	13.0	17	19	3.9	10.0	11	12	123,000	310,000	No data	
October-04	99,250	107,000	0.23	0.72	11.8	16.0	17	24	2.9	4.4	12	13	13,005	34,000	No data	
November-04	156,946	216,864	0.53	0.81	9.3	11.0	16	19	1.8	2.9	12	13	11,667	15,000	7.0	7.0
December-04	117,428	128,491	0.41	0.86	12.7	15.0	20	22	1.2	1.7	13	14	4,743	18,000	6.9	7.0
January-05	140,731	162,994	0.1	0.22	15.8	23.0	24	29	0.5	0.6	10	14	46,250	120,000	7.2	7.3
February-05	159,523	159,523	0		18.0	18.0	28	28	0.4	0.4	13	13	700	700	7.2	7.2
March-05	143,217	159,523	0.018	0.09	14.4	22.0	24	32	1.0	1.9	12	13	<100 - TNTC	TNTC	7.2	7.3
April-05	157,637	193,277	0.03	0.12	15.0	20.0	24	29	1.1	1.7	12	13	162,000	430,000	7.1	7.3
May-05	164,038	176,789	0	ND	12.8	16.0	19	24	1.1	1.5	10	11	202,775	780,000	7.0	7.2
June-05	143,983	151,920	0	ND	10.2	14.0	25	61	1.0	1.6	10	11	60,830	300,000	7.2	7.2
July-05	147,352	156,658	0.038	0.05	8.5	14.0	14	16	0.5	0.6	10	10	900	3,000	7.3	7.5
August-05	166,702	186,811	0.025	0.05	13.5	16.0	27	27	1.3	1.4	12	14	200	400	7.3	7.3
September-05	167,803	177,437	0	ND	11.8	16.0	20	27	1.4	2.3	12	12	10,250	19,000	7.4	7.5
October-05	166,896	172,512	0.025	0.05	9.5	11.0	15	21	1.8	2.2	12	12	6,000	10,000	7.3	7.4
November-05	147,974	153,605	0	ND	6.5	13.0	18	29	1.4	2.2	14	16	TNTC	TNTC	7.1	7.1
December-05	184,884	203,677	0	ND	8.0	17.0	19	30	0.7	1.4	12	15	686,333	1,800,000	7.1	7.2
January-06	157,455	318,904	ND	ND	9.5	10.0	15	14	1.1	1.6	11	12	3,000	3,000	No data	
February-06	159,600	211,797	ND	ND	8.3	9.0	14	15	0.7	0.9	10	11	no data		No data	
March-06	121,000	300,259	ND	ND	3.0	6.0	26	33	0.8	0.8	11	12	no data		No data	
April-06	128,971	154,849	ND	ND	10.3	11.0	29	47	1.2	1.5	9	9	no data		No data	
May-06	137,423	205,950	ND	ND	6.0	6.0	14	14	ND	ND	10	10	1	1	No data	
June-06	142,049	176,002	ND	ND	ND	ND	ND	ND	1.5	1.5	9	9	>200	>200	No data	
Minimum	91,800	100,000	0	ND	3	6	13	14	0	0	9	9	1	1	6.9	7.0
Maximum	184,884	318,904	0.53	0.86	18	23	29	61	4	10	14	16	TNTC	TNTC	7.4	7.5
Average	141,569	174,452	0.064	0.14	11	14	20	26	1	2	11	12			7.2	7.3

NOTES:

1. Flow measurements recorded in late 2005 and early 2006 are suspect due to foaming problems in the measurement flume.
2. Residual Chlorine detection limit is 0.05 (source: 2/23/06 telephone call to M. Krcmarik)
3. Total Suspended Solids (TSS) detection limit is 5 mg/l (source: 3/1/06 email from M. Krcmarik)
4. Biochemical Oxygen Deman (BOD) detection limit is 3 mg/l (source: 3/1/06 email from M. Krcmarik)
5. ND = not detected
6. TNTC = too numerous to count
7. Anomalous data from July 2004 not included in statistical analysis

ATTACHMENT C
TSS AND BOD STATISTICAL ANALYSIS

**CHANG FARMS
PERMIT LIMIT DERIVATIONS**

BOD Concentration Loading

Daily Maximum Limit Derivation

$u_y = \text{Avg of Nat. Log of daily discharge (mg/l)} =$	2.89207
$\sigma_y = \text{Std Dev. of Nat Log of daily discharge} =$	0.35788
$\Sigma (y_i - u_y)^2 =$	8.32508
$k = \text{number of daily samples} =$	66
$\sigma_y^2 = \text{estimated variance} = (\Sigma[(y_i - u_y)^2]) / (k-1) =$	0.12808

Daily Max Limit = $\exp(u_y + 2.326 * \sigma_y)$

Daily Max Limit = 41.45 mg/l
(Log normal distribution, 99th percentile)

Average Monthly Limit Derivation

Number of samples per month, $n =$	3.00
$E(x) = \text{Daily Avg} = \exp(u_y + 0.5 \sigma_y^2) =$	19.22309
$V(x) = \text{Daily Variance} = \exp(2u_y + \sigma_y^2) * [\exp(\sigma_y^2) - 1] =$	50.49285
$\sigma_n^2 = \text{Monthly Average variance} = \ln\{ V(x) / (n[E(x)]^2) + 1\} =$	0.04454
$\sigma_n = \text{Monthly Average standard deviation} = \sigma_n^2^{(0.5)} =$	0.21105
$u_n = \text{n-day monthly average} = \ln(E(x)) - 0.5\sigma_n^2 =$	2.93384

Monthly Average Limit = $\exp(u_n + 1.645 * \sigma_n)$

Monthly Avg Limit = 26.60 mg/l
(Log normal distribution, 95th percentile of average monthly values)

Source: EPA 1991, *Technical Support Document for Water Quality-base Toxics Control*,
Appendix E - Lognormal Distribution and Permit Limit Derivations, EPA/505/2-90-001

CHANG FARMS
PERMIT LIMIT DERIVATIONS

Total Suspended Solids (TSS) Concentration

Daily Maximum Limit Derivation (some measurements < detection limit)	
D = detection limit =	5 mg/l
u_y = Avg of Nat. Log of daily Discharge (lbs/day) =	2.43313
$\Sigma (y_i - u)^2 =$	6.04780
k = number of daily samples =	70
r = number of non-detects =	6
σ_y^2 = estimated variance = $(\Sigma[(y_i - u_y)^2]) / (k-r-1) =$	0.09600
σ_y = standard deviation = square root $\sigma_y^2 =$	0.30983
δ = number of nondetect values/number of samples =	0.08571
$z = z\text{-score}[(0.99-\delta)/(1-\delta)] =$	z-score of 0.98906
	= 2.299792
(from z-score calculator at http://www.fourmilab.ch/rpkp/experiments/analysis/zCalc.html)	
Daily Max Limit = exp ($u_y + z\text{-score} * \sigma_y$)	
Daily Max Limit =	23.24 mg/l
(Log normal distribution, 99th percentile)	
Average Monthly Limit Derivation (some measurements < detection limit)	
Number of samples per month, n =	3.04
$E(x) = \text{Daily Avg} = \delta D + (1-\delta) \exp(u_y + 0.5 \sigma_y^2) =$	11.35863
$V(x) = \text{Daily Variance} = (1-\delta)\exp(2u_y + \sigma_y^2)[\exp(\sigma_y^2)-(1-\delta)] + \delta(1-\delta)D[D-2\exp(u_y + 0.5\sigma_y^2)] =$	16.95584
$A = V(x)/[n(E(x)-\delta^n D)^2] =$	0.043228831
$B = -[\delta^n D^2(1-\delta^n)]/(E(x)-\delta^n D)^2 =$	-0.000110144
$C = (2\delta^n D)/(E(x)-\delta^n D)$	0.000500595
$\sigma_n^2 = \text{Monthly Average variance} = \ln\{(1-\delta^n)[1+A+B+C]\}$	0.04213
$\sigma_n = \text{Monthly Average standard deviation} = \sigma_n^2^{(0.5)} =$	0.20525
$u_n = n\text{-day monthly average} = \ln[(E(x)-\delta^n D)/(1-\delta^n)] - 0.5\sigma_n^2 =$	2.40866
$z = z\text{-score}[(0.95-\delta)/(1-\delta)] =$	z-score of 0.94531
	= 1.61054
Monthly Average Limit = exp ($u_n + z\text{-score} * \sigma_n$)	
Monthly Avg Limit =	15.47 mg/l
(Log normal distribution, 95th percentile of average monthly values)	

Source: EPA 1991, *Technical Support Document for Water Quality-based Toxics Control*, Appendix E - Lognormal Distribution and Permit Limit Derivations, EPA/505/2-90-001

ATTACHMENT D

ANTI-DEGRADATION REVIEW AND DETERMINATION

NPDES Permit: MA0040207

ANTI- DEGRADATION REVIEW AND DETERMINATION

Proponent: Chang Farms, Inc.

Project: Proposed NPDES Permit MA0040207
Bean Sprout Cultivation Wastewater

Receiving Water: Connecticut River
Connecticut Watershed - MA34-04

Classification: Class B - Warm Water Fishery

Introduction

Chang Farms, located in Whately, MA, has submitted an application for a NPDES permit to the MADEP (the 'Department') and USEPA for the discharge of wastewater. The facility is an agricultural enterprise that produces bean sprouts in different varieties for the retail market. The proposed discharge is to the Connecticut River, adjacent to the facility. The following review and determination is based upon information submitted as part of NPDES application MA0040207, the USEPA permit draft fact sheet, effluent monitoring data from 2004 and a site visit conducted by the Department on March 29, 2005. This information is paraphrased in the following discussion without further reference.

Applicability

This discharge constitutes a "new discharge" (see 314 CMR 4.02) to a surface water of the Commonwealth. In accordance with 314 CMR 3.03, this discharge requires a NPDES/Surface Water Discharge Permit and is subject to a review and determination by the Department under the Antidegradation Provisions [314 CMR 4.04 (2)] of the Massachusetts Surface Water Quality Standards.

NPDES Permit History

The US EPA and the MA DEP jointly issued Chang Farms a NPDES permit to discharge process wastewater to the Sugarloaf Brook (which flows to the Connecticut River) from a bean sprout farming operation in the town of Whately, Massachusetts. This permit, MA0028851, was issued and effective on September 30, 1985. Chang Farms notified EPA on February 10, 1995 that it had ended discharge to Sugarloaf Brook and was discharging to the ground, on-site. EPA responded in a letter dated March 10, 1995, that because Chang Farms was no longer discharging to waters of the U.S. it was closing their NPDES permit. The facility currently discharges to the ground.

Proposed NPDES Discharge

Chang Farms submitted a NPDES permit application to the MADEP and the EPA, dated June 30, 2004, requesting to discharge to the Connecticut (CT) River. The NPDES permit application was approved as administratively complete by the EPA on April 27, 2005. Chang Farms application details the proposed discharge to the CT River of up to 180,000 gallons per day (GPD) of wastewater generated during sprout cultivation and harvesting, including wastewater from washing of the mature sprouts and associated handling equipment. The wastewater

contains E. coliform, Fecal coliform bacteria and low levels of suspended solids and BOD. Remaining wastewater constituents include applied nutrients, liquid acid equipment cleaners and sanitizers, liquid chlorinated alkaline foam cleaners and liquid phosphoric acid foam cleaners. A table of effluent characteristics is attached to this determination.

Chang Farms' consultant, The Dennis Group, has provided a report with specific bacterial effluent monitoring data. The EPA and the MA DEP have reviewed this report and other information relative to bean sprout production. A copy of the the report is provided as an attachment to the draft permit's fact sheet.

The applicant has agreed to install a UV disinfection system to ensure the discharge to the Connecticut River complies with Massachusetts water quality standards. Monitoring the discharge for chlorine residual will be required in the permit due to the occasional use of chlorine containing cleaning products at the facility. Any residual chlorine concentration present in the discharge will be minimized by the available detention time in the force main.

Technology-based Review

EPA has not promulgated effluent guidelines for bean sprout cultivation facilities. The draft NPDES permit for the Chang Farms facility in Whately, MA (MA0040207) was prepared based on Best Professional Judgement (BPJ).

Review of Antidegradation Qualification Provisions

Protection of Existing Uses - [314 CMR 4.04 (1)]

In all cases existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

The Connecticut River at the point of discharge is classified as a Class B water body by the Massachusetts Surface Water Quality Standards 314 CMR 4.05(3)(b). The discharge will be within the limits for Class B waters and not impair existing water uses nor result in a level of water quality less than that specified for Class B water. To the maximum extent feasible, this discharge and activity are designed and conducted to minimize adverse impacts on water quality, including implementation of source reduction practices.

Protection of High Quality and Other Significant Resource Waters - [314 CMR 4.04 (2)]

Limited degradation may be allowed by the Department where it determines that a new or increased discharge is insignificant because it does not have the potential to impair any existing or designated water use and cause any significant lowering of water quality; also limited degradation may be allowed as provided in 314 CMR 4.04(4).

Based on a dilution factor of over 6,000:1, the proposed discharge to the Connecticut River provides significant dilution and does not have the potential to impair any existing or designated water use or cause any significant lowering of water quality. An analysis of the proposed discharge's mass loadings of BOD, TSS, phosphorus, nitrogen and bacteria, predict extremely low increases in the river concentrations of these parameters.

The discharge will maintain the resource, the receiving water, for its designated use, and the discharge will meet the conditions of 314 CMR 4.04(4).

Protection of Outstanding Resource Waters - [314 CMR 4.04(3)]

Not Applicable

Authorizations - [314 CMR 4.04 (4)]

(a) *An authorization to discharge to waters designated for protection under 314 CMR 4.04(2) may be allowed by the Department where the applicant demonstrates that:*

- 1. The discharge is necessary to accommodate important economic or social development in the area in which the waters are located;*

The applicant, Chang Farms, Inc., maintains open farming space at this facility.

- 2. No less environmentally damaging alternative site for the activity, source for the disposal, or method of elimination of the discharge is reasonably available or feasible;*

The Department recognizes four alternatives for management of the proposed permitted discharge flow ; 1. reuse of discharge for irrigation of crops., 2. discharge to ground with a groundwater discharge permit, 3. convey discharge to an existing publicly owned treatment facility (POTW) for treatment and discharge to the CT River and 4. provide treatment and discharge directly to the CT River. Option 1 and 2 are not possible, discharge to irrigation was used in the past and caused ponding due to restrictive soils and is potentially harmful to crops. Option 3, conveying the discharge to the South Deerfield POTW, is not possible at this time due to the current lack of hydraulic flow capacity at the POTW. Option 4, treatment and discharge to the CT River has been determined to be the most reasonable and sufficiently environmentally protective at this time. No less environmentally damaging alternative site for the activity, source for the disposal, or method of elimination of the discharge is reasonably available or feasible.

- 3. To the maximum extent feasible, the discharge and activity are designed and conducted to minimize adverse impacts on water quality, including implementation of source reduction practices; and*

The applicant proposes to install a UV disinfection system in order for the discharge to meet Class B waters standards. The draft NPDES permit also includes the requirement that the permittee prepare and implement a “Best Management Practices (BMPs) Plan” to be followed in operating the facility to identify and describe operational practices which specifically target the minimization of the discharge of nitrogen compounds and which minimize, in general, the amounts of pollutants (biological and chemical) discharged to receiving surface waters.

- 4. The discharge will not impair existing water uses nor result in a level of water quality less than that specified for the Class.*

The effluent characteristics of the proposed discharge, described in the attachment to this

Anti-Degradation Review and Determination

determination, will not impair the Connecticut River's use as a Class B water, cause aesthetically objectionable conditions nor impair the benthic biota. To the maximum extent feasible, this discharge and activity are designed and conducted to minimize adverse impacts on water quality.

Determination

The Department has determined that the proposed discharge meets the requirements of the Anti-degradation provisions of the Massachusetts Surface Water Quality Standards and complies with the policy document (Anti-degradation Review Procedure for Discharge Requiring a Permit under 314 CMR 3.03: 1993 revised), which guides the review and implementation of these provisions. The Department has determined that this new discharge does not have the potential to impair existing or designated uses or cause any significant lowering of water quality and is therefore 'insignificant' [as provided in 314 CMR 4.04(2)]. The Department hereby approves the NPDES discharge permit and has determined that the discharge will be in compliance with the Massachusetts Surface Water Quality Standards and complies with the Anti-degradation requirements contained in 314 CMR 4.04.

Signed: _____

Glenn Haas, Director

Division of Watershed Management

Massachusetts Department of Environmental Protection

Date: _____

8/18/06

Chang Farms Wastewater Discharge - Effluent Data July 2004 - November 2004

SAMPLE DATE	Daily Flow	Coliform Bacteria		pH	BOD	Total Suspended Solids	Total Phosphorus	Total Nitrogen	Total Residual Chlorine	
		Fecal Coli	E. Coli							
	GPD	col/100 ml	col/100ml	s.u.	Mg/l	mg/l	mg/l	mg/l	mg/l	
7/8/04	100,000	5,800	---	Range 6.6 to 7.1	140	6	3	9.9	ND	
7/15/04	100,000	TNTC	---		360	9	20	11	ND	
7/22/04	86,000	<10	---		13	8	6	10	ND	
8/12/04	107,000	180,000	<2,000		15	10	3	11	0.16	
8/19/04	102,000	64,000	9,000		12	9	6	11	ND	
8/26/04	90,000	20,000	9,000		12	9	5.8	10	ND	
9/2/04	95,000	90,000	50,000		14	7	10	11	ND	
9/9/04	79,000	35,000	<1000		18	8	1	11	ND	
9/16/04	90,000	310,000	290,000		17	13	2	11	ND	
9/23/04	90,000	17,000	<1000		19.0	13	4.8	11	0.10	
10/7/04	105,000	18,000	<1000		14	10	2.9	12	ND	
10/14/04	100,000	<1000	<1000		15	10	4	11.0	ND	
10/21/04	100,000	34,000	0		24	16	3	11	0.20	
10/28/04	90,000	<1000	19		15	11	1.6	13	0.72	
11/4/04	107,000	14,000	0		19	8	2.9	13	0.51	
11/11/04	151,000	6,000	0		12.0	9.0	0.9	12	0.27	
11/18/04	69,000	15,000	19		17	11	1.7	12	0.81	
AVERAGES	97,706	55,011	26,003			43	10	5	11	0.15

Notes: Data from monitoring as required by MA DEP Consent Order.

Peak flows during the review period were 200,000 GPD on 10/17/2004 and 11/14/2004.

ND = not detectable