



September 7, 2012

THOMAS M GRISA, PE – DIRECTOR
DEPARTMENT OF PUBLIC WORKS
CITY OF BROOKFIELD
200 N CALHOUN RD
BROOKFIELD WI 53005

Subject: POTABLE AND TRACER DYE WATER INJECTION APPROVAL

Dear Mr. Grisa:

The Wisconsin Department of Natural Resources (DNR), Division of Water, Bureau of Drinking Water and Groundwater, is conditionally approving the request by the City of Brookfield Department of Public Works to inject the Xanthene dye known as Uranine/Disodium Fluorescein [Color Index (C.I.) Generic Name: C.I. Acid Yellow 73, C.I. Number 45350, chemical formula $C_{20}H_{12}O_5 \cdot 2Na$ and Chemical Abstract Service (CAS) Registry Number 518-47-8] during televised inspection of sewer laterals in select areas within the City limits. The request for approval was submitted to the Department on behalf of the City of Brookfield by Julie McMullin, P.E. of Brown and Caldwell Inc.

Project Description: The City of Brookfield is conducting a Private Property Inflow/Infiltration Reduction Program (PPIIR), which is part of an ongoing effort by the City to reduce sewer overflows and comply with federal requirements to study and eliminate sources of inflow in the sanitary sewer system. The City has mapped six (6) selected areas that have experienced a higher incidence of basement backups and sanitary sewer overflows following large storm events. Two (2) of these areas have been assessed in a pilot program conducted in conjunction with the Milwaukee Metropolitan Sewerage District (MMSD). On April 1, 2011, the Department had issued a two year conditional approval to MMSD for the injection of a dilute solution of fluorescein dye into the soil column to facilitate detection of inflow and infiltration in private sanitary laterals.

This approval applies to potable water and tracer dye water injection for the purpose of investigatory sanitary sewer lateral inspection work in the remaining four (4) targeted areas. This work will be conducted by the City of Brookfield under a separate contract with Visu-Sewer Co. of Pewaukee, WI. The work will consist of inspection and assessment of approximately 920 sanitary sewer laterals with a cumulative length of approximately 73,600 feet. On properties which are also served by a municipal water system, a dyed water solution will be injected, at up to three locations per sanitary sewer lateral, in the soil above or adjacent to the sewer lateral by means of a one (1) inch diameter steel probe at a depth ranging from a minimum of three (3) feet to a maximum of eight (8) feet. In areas not served by a municipal water system, only clear potable water will be injected. The flow rate at each injection point will range from a minimum of 20 gallons per minute (gpm) to a maximum of 60 gpm. The time specified per injection is five minutes. The total volume of dyed water or clear water injected per injection point will be between 100 to 300 gallons.

The dye product proposed to be used for this project is a Yellow/Green powdered fluorescein-based product manufactured by Kingscote Chemicals, 3334 S. Tech Blvd., Miamisburg, Ohio 45342. The manufacturer has received a product-specific certification by NSF International to ANSI/NSF Standard 60: *Drink Water Treatment Chemicals – Health Effects* for use in drinking water systems.

For areas where dyed potable water will be injected, the initial dye solution will be mixed according to the manufacturer's instructions and will not exceed the recommended concentration of dye product required for "strong visual detectability". For the proposed powdered fluorescein product, this corresponds to a product mixing rate of one pound of dye per 120,000 gallons of water (equivalent to 1 mg of powdered dye product per liter of water or 1 ppm). To facilitate field operations, a practical mixing method and schedule will be established such that an initial concentration not to exceed 1 ppm of dye product is ensured (e.g. x leveled teaspoons of powdered dye product per 1000 gallons of potable water).

The described PPIIR activities are expected to be completed in calendar year 2013.

Approval Conditions:

1. For preparation of dyed water solutions, only disodium fluorescein dye, CAS Number 518-47-8, from a manufacturer that has received a product specific certification from NSF International to ANSI/NSF Standard 60 for use in drinking water shall be injected. Alternative dye products must be separately approved.
2. Clear water injected and water used to mix dye solutions shall come from a source that complies with the water quality standards for safe drinking water established in Chapter NR 809, Wis. Admin. Code.
3. At no time during injection activities shall the concentration of fluorescein dye in any waters of the state be allowed to exceed one (1) milligram per liter.
4. Tracer dye water shall not be injected within 400 feet of a municipal water supply well.
5. No dye water tracer injection shall be injected on properties, or where properties immediately adjacent, are not served by a municipal water distribution system.
6. No injection shall occur without the prior notice to, and consent of, the owner of the property on which the injection is to take place.
7. Pressure of injection shall be regulated to prevent hydraulic fracturing of subsurface geologic materials or any damage to sewer laterals or building foundations.
8. This approval is limited to the injection of clear water and dye water into the soil column extraneous to sewer laterals. Any approval required for contract activities that are related to storm sewer dye water tracer flooding shall be obtained prior to conducting storm sewer flooding activities from the DNR's Division of Water in Milwaukee, WI. Contact Theera Ratarasarn, wastewater engineer, at 414-263-8650 regarding any approvals needed for storm sewer dye water tracer flooding activities.
9. Any complaints or reports of potential water supply contamination that are received by the City of Brookfield or its contractor as a result of dye water tracer injection activities shall be immediately reported to the Department. Contact Brian Austin, of the DNR's Bureau of Drinking Water and Groundwater program, at 608-266-3415 and by e-mail at Brian.Austin@wisconsin.gov should any such report need to be made.

10. Should the Department determine that a potable water supply has become contaminated as a result of dye water tracer injection activities, the City of Brookfield will be responsible for remediating the contamination and for providing an alternative supply of potable water to the users of the water system until such time as use of the water system is restored or until a permanent alternative potable water supply is installed.

Approval Constraints: This request was reviewed in accordance with s. NR 812.05 (4), Wis. Admin. Code, and is approved subject to the conditions listed above. The Department reserves the right to order changes to the approval or make additions to the conditions of approval should conditions arise making such action necessary. The Department may also void this approval if it determines that approval conditions are not being observed.

This approval is valid for two years from the date of the approval. If injection activities have not commenced within two years, the approval shall become void and a new application must be made and approved prior to initiating dye injection activities.

Department approval is based upon the representation that the project description submitted to the DNR was complete and accurately represented the activities being approved. Any approval of activities that do not fairly represent the project because the submittal was incomplete, inaccurate or of insufficient scope and detail is voidable at the option of the Department.

Appeal Rights: If you believe that you have a right to challenge this decision, you should know that the Wisconsin Statutes and administrative rules establish time periods within which requests to review Department decisions must be filed. To request a contested case hearing pursuant to s. 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. Requests for contested case hearings must be made in accordance with ch. NR 2, Wis. Admin. Code. Filing a request for a contested case hearing does not extend the 30 day period for filing a petition for judicial review. For judicial review of a decision pursuant to ss. 227.52 and 227.53, Wis. Stats., you must file your petition with the appropriate circuit court and serve the petition on the Department within 30 days after the decision is mailed. A petition for judicial review must name the Department of Natural Resources as the respondent.

Recommendations: The following recommendations are based on staff review of the project; however, neither MMSD nor the contractor is required to implement these recommendations in order to comply with the approval.

1. According to various Uranine dye manufacturers, dye fluorescence drops very sharply at pH values below 5.5. For optimum results, pH should be maintained between 6 and 10.
2. Fluorescent dye molecules react with chlorine and may result in the formation of chlorophenols. In order to minimize degradation of the dye, the chlorine residual in the water used to prepare the dye water tracer should not exceed 2.3 mg/l.

Any questions regarding the conditions or recommendations contained in this action should be directed to Brian Austin, DNR Groundwater program, at 608-266-3415.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

For the Secretary



Brian P. Austin, P.E.
Bureau of Drinking Water and Groundwater
(608) 266-3415

cc: Julie McMullin – Brown and Caldwell
David Bennet – Brown and Caldwell
Randy Belanger – Visu-Sewer
Theera Ratarasarn – SER
Mary E Vollbrecht – DG/5