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TITLE 5 PROGRAM'S GUIDANCE ON SYSTEM UPGRADES IN AREAS SUBJECT TO  
NITROGEN LOADING LIMITATIONS

Effective date: December 23, 1999

Policy #: BRP/DWM/PeP-P99-5

Program Applicability: BRP/DWM/Watershed Permitting/Title 5 (Boston and Regional Offices)

Supersedes SOP #: None

Approved by: [signed] Arleen O'Donnell, Assistant Commissioner, BRP

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**Purpose:** This policy provides guidance to Department staff and Boards of Health who act on applications for Title 5 system upgrades in areas subject to the nitrogen loading limitations of Title 5, 310 CMR 15.214. This policy addresses the issue of whether an innovative/alternative treatment technology approved by DEP to reduce nitrogen should be required for system upgrades in such areas.

**Applicability:** This policy applies to Department staff and Boards of Health who act on Title 5 applications for system upgrades in areas subject to Title 5's nitrogen loading limitations. Those areas are set forth in 310 CMR 15.214.

**Text:** In 1995, the Department revised the Title 5 regulations. The resulting set of regulations provide for increased environmental protection in certain sensitive resource areas, such as areas that contribute to drinking water supplies. Title 5 systems serving new construction in Nitrogen Sensitive Areas and serving new residential construction in areas with on-site wells are subject to a 440 gallon per day (gpd) per acre design flow limitation. Questions have arisen as to how the nitrogen loading limitation provisions of the Code affect upgrades of existing Title 5 systems. This document is intended to provide guidance to Department staff and Boards of Health on that issue.

Areas subject to 440 gpd per acre/Nitrogen Loading Limitations

Under the 1995 Code, the areas that are afforded increased environmental protection and subject to a 440 gpd per acre design flow limitation for new construction include the following:

- residential lots with on-site wells
- interim wellhead protection areas (generally, ½ mile radius of a public water supply well)
- DEP approved Zone IIs of public water supply wells
- nitrogen sensitive embayments (to date, none have been designated by DEP).

In order to control the amount of nitrates entering the groundwater from on-site systems in the above sensitive areas, Title 5 set a 440 gpd per acre design flow limit on systems serving new construction in these areas. Title 5 generally defines “new construction” to mean any increase in design flow. Title 5 uses a 110 gallon per day, per bedroom, design flow for most residential uses. Accordingly, for new construction, in the sensitive resource areas described above, which are subject to the 440 gpd per acre limit, with a conventional Title 5 system, a four bedroom house may be built on an acre of land, a three bedroom house on ¾ acre, a two bedroom house on ½ acre, etc.

The Department has approved certain innovative/alternative (I/A) treatment technologies for enhanced nitrogen removal. With the use of one of these technologies in an area that is subject to the 440 gpd nitrogen loading limitation, an increase in the nitrogen loading limitation is allowed. With the use of a recirculating sand filter, for example, a 550 gpd per acre limit applies and a five bedroom house may be built on an acre; with the use of other technologies, a 660 gpd per acre limit applies and a six bedroom house may be built on an acre, or a three bedroom house on ½ an acre.

#### System upgrades in areas subject to nitrogen loading limitations

If the owner of a system that is located in an area subject to the 440 nitrogen loading limitations wishes to, or is being required to, upgrade, not repair, his/her system, the approving authority must determine whether enhanced nitrogen removal should be required. Because the nitrogen loading limitations apply to systems serving “new construction,” if the upgrade does not also include an increase in design flow, i.e. the addition of a bedroom in the case of a house, then enhanced nitrogen removal is not required automatically. Instead, under its authority in 310 CMR 15.303(2), 310 CMR 15.304(4) and 310 CMR 15.003(1), and the goal of full or maximum feasible compliance, as stated in 310 CMR 15.404, and based on the circumstances of the particular site, the approving authority may require enhanced nitrogen removal.

Sections 310 CMR 15.303(2) and 310 CMR 15.304(4) of the Code afford the approving authority the discretion, where “necessary to protect public health and safety and the environment,” to require a system owner to install a recirculating sand filter or equivalent alternative technology or to obtain a groundwater discharge permit in accordance with 314 CMR 5.00 and 6.00. Additionally, 310 CMR 15.003(1) of the Code states that in general, “full compliance with the provisions of 310 CMR 15.000 is presumed by the Department to be protective of the public health, safety, welfare and the environment. Specific site or design conditions, however, may require that additional criteria be met in order to achieve the purpose and/or intent of 310 CMR 15.000.”

When an existing system is located in a nitrogen sensitive area, as defined in 310 CMR 15.215 of the Code, or on a residential lot with an on-site well, and no increase in flow is proposed,

Department staff and Boards of Health must use their professional judgement to assess the circumstances of the proposed upgrade so as to determine whether enhanced nitrogen removal should be required.

Circumstances that may warrant requiring enhanced nitrogen removal to meet 440 gpd per acre to the maximum extent feasible in connection with a system upgrade would include, for example, a system serving a lot with an on-site well that is located hydraulically downgradient of the system where well water analysis demonstrates increased nitrogen concentrations in the well. Another example where enhanced nitrogen removal to meet a design flow of 440 gpd per acre to the maximum extent feasible would be appropriate for an upgrade would be where a system is located within a Zone II of a well that exhibits elevated nitrogen concentrations. System upgrades requiring either a variance or local upgrade approval under Title 5, located in areas subject to the nitrogen loading limitations, also might warrant the requirement for enhanced nitrogen removal.

The Department recognizes that decisions regarding these issues are not always clear cut and encourages approving authorities to work with system owners to arrive at the best solution for any given upgrade.

#### New construction in areas subject to nitrogen loading limitations

When construction of a new house is proposed in an area that is subject to the nitrogen loading limitations, then the 440 gpd per acre limit applies. When a system owner proposes to add a bedroom to an existing house located in an area that is subject to the nitrogen loading limitations, then the provisions of the Code applicable to new construction come into play. A homeowner may add a bedroom to a house without providing enhanced nitrogen removal in such areas where 440 gpd per acre can be met. A bedroom may be added to a three bedroom house on an acre of land, for example, without enhanced nitrogen removal. Likewise, a third bedroom may be added to a two bedroom house on  $\frac{3}{4}$  of an acre without enhanced nitrogen removal. In both of these cases, the 440 gpd per acre limitation would be met. Of course, in these cases, the existing Title 5 systems would have to be upgraded first, under the standards applicable to new construction, to serve the increase in design flow. On the other hand, the owner of a three bedroom house on only  $\frac{3}{4}$  of an acre who seeks to add a fourth bedroom also may do so, provided that an appropriate I/A technology is used. The homeowner would have to install an I/A technology approved for 660 gpd per acre as part of the system upgrade. Similarly, someone may expand a house from four to five bedrooms or to six bedrooms on an acre with the use of an I/A technology approved for 550 gpd or 660 gpd, respectively. (For new construction on lots subject to the Transition Rules, please refer to the Department's Guidance On the Title 5 Transition Rules for Isolated Lots, dated June 29, 1999.)

The nitrogen loading limitations of the 1995 Code result in increased protection where it is needed the most – in sensitive drinking water resource areas. And, the Innovative/Alternative Technologies Program allows for increased flows, beyond the 440 gpd per acre limit, when enhanced nitrogen removal is provided in these sensitive areas.