MEMORANDUM

DATE: January 27, 1993

TO: Division of Shellfish Sanitation Staff

THROUGH: Eric H. Bartsch, P.E., Director
Office of Water Programs

FROM: Robert E. Croonenberghs, Ph.D., Director
Division of Shellfish Sanitation

SUBJECT: Classification of Shellfish Growing Areas - Procedure - Sewage Discharge Buffer
Calculations for Single Family Facilities and Gray Water Discharges

The purpose of this working memo is to set forth the concentration of fecal coliforms to be used in the Hamrick-Neilson equation when establishing buffer zones around small sewage treatment facilities and laundromats or other gray water discharges (if required for area classification).

A) Single family home or small multifamily home sewage treatment facilities (STF) have a record in the Commonwealth for having had numerous problems. Homeowners typically do not want to invest much time or money in their maintenance. Since we do not know if the plant will be operated correctly, and there is a strong likelihood that problems will occur, the Office of Water Programs has developed likely worst case scenarios for such systems as follows:

1) Home sewage treatment facility
- Anaerobic digestion with no chlorination

- Effluent concentration of 10^6 fecal coliforms per 100 ml

2) Septic tank effluent treated by a constructed wetland
- Channelization of septic tank effluent through the constructed wetland with no chlorination

- Effluent concentration of 10^6 fecal coliforms per 100 ml

If a sand filter is used after either the STF in case #1 or after the septic tank in case #2 above, then the worst case condition can be reduced to be 10^4 fecal coliforms per 100 ml.

The volume of discharge can be set either of two ways:
Either as the maximum volume allowed on the VPDES permit or via a calculation. The calculation is based on the multiplication of 75 gallons per day per person at two people per room times the maximum number of bedrooms in the house (or houses). If a house currently has what one could call two bedrooms, but only one room is used by one person now, and the other room is used as a

den, the volume calculation would be:

(75 gal/person/day)*(2 persons/room)*(2 rooms/house)*(1 house)   = 300 gal/day

The reason the worst case calculation is required is that after the discharge is permitted, the room use may change or the house may be sold to a larger family.

B)   Based on work done in the 1970's by the VDH, the fecal coliform concentration to be used in the Hamrick-Neilson equation for laundromats and gray water discharges shall be 10^3 fecal coliforms per 100 ml. These fecals come from diapers, clothing and bath water.

If a sand filter is used to treat the discharge, then the fecal coliform concentration to be used in the Hamrick-Neilson equation can be reduced to 10^2 fecal coliforms per 100 ml. Since sand filters are less effective in reducing fecal coliforms at low initial concentrations, a two log reduction cannot be used as is used for sand filter treated septic tank discharges.

The volume of discharge is determined as follows:
For laundromat - use volume permitted in VPDES permit
For homes - many studies indicate that blackwater makes up 25% of water use. Since the
      on-site regulations say 75 gal/person/day
      Use 2 people per room that can be used as a bedroom.
      75 gal less 25% = 75 - 18.75 = 56.25 gal/person
      or 112.5 gal per day per room