B&V WASTE SCIENCE AND TECHNOLOGY CORP.
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From 3-4-94

County of San Luis Obispo
Baywood - Los Osos Soil and
Groundwater Nitrogen Study

BVWST Projects 040282/300
BVWST File E.1
September 20, 1993

Mr. Percy M. Garcia
Water Quality Manager
San Luis Obispo County
County Government Center
Room 207
San Luis Obispo, CA 93408

Subject: Baywood - Los Osos Soil and
Groundwater Nitrogen Study

Dear Mr. Garcia:

Enclosed is the Baywood - Los Osos Soil and Groundwater Nitrogen Study Report prepared by Dr. Rajeev Dwivedi, in association with other members of the County of San Luis Obispo Technical Advisory Committee (TAC). The TAC consists of the following members:

Laurence Laurent - County of San Luis Obispo Supervisor
Ray Bracken - County Service Area 9 Advisory Board
Jay Cano - California Regional Water Quality Control Board
Dr. Rajeev Dwivedi - formerly of B&V Waste Science & Tech. Corp. (BVWST)
Percy Garcia - County of San Luis Obispo Water Quality Manager
Glenn Ross - Advanced Septic (Used for site selection)
Dr. Tom Ruehr - Soil Science Department, Cal Poly State University
Gus Yates - Jones and Stokes
Wade Brim - Civil Engineer (Substitute member of committee)

The report was reviewed by the TAC, and their comments were addressed in the final report. Results of the study indicate the following:

1) Approximately 98 percent of the nitrogen detected in the soil is immobile organic-nitrogen. Less than 1 percent was detected as nitrate-nitrogen, except in a few zones where approximately 2 to 3 percent of the nitrogen was detected as nitrate-nitrogen. Organic nitrogen concentrations are higher at a depth between 1 foot and 5 feet beneath sites covered with native and landscaped vegetation than the same depth beneath septic system sites. This may be from

the vegetation which contribute more nitrogen due to mineralization.

2) Low permeability zones are present beneath the seepage beds, including a crusted zone, and that infiltration rates range from 1.8 to 8 feet per day.

3) The nitrogen in the wastewater effluent is approximately 75 to 80 percent ammonium-nitrogen when it is discharged through the seepage beds. But the ammonium-nitrogen is nitrified over a short distance to produce a nitrogen flux of 40 to 112 milligrams nitrogen per liter (mg N/l) at the septic tank sites, and 1 to 220 mg N/l at the leach-field site.

4) Nitrate concentrations are higher in the groundwater than in the unsaturated zones beneath the sites which suggests that additional nitrate-nitrogen is migrating laterally from off-site sources.

5) Nitrification and denitrification at the Bayridge leach-field site appeared to be directly related to the frequency and duration of the infiltration cycles. High nitrate-nitrogen concentrations were associated with the wet cycles immediately following long dry cycles. Subsequently, 80 to 90 percent of the nitrogen was removed by denitrification.

6) Groundwater nitrate concentrations are greater beneath the Bayridge leach-field site (37 mg N/l) than the 13th Street and 14th Street sites (21 mg N/l). The difference may be attributed to higher recharge rates at the Bayridge leach-field site (about 3,000 gallons per day [gpd]) that the 13th Street and 14th Street sites (about 350 gpd), and possibly from elevated nitrate concentrations in groundwater migrating from off-site sources. Off-site sources are unknown.

The TAC recommendations include improving the water quality in the community with respect to nitrate-nitrogen concentrations. Sources of laterally moving nitrate, and the depth at which elevated nitrate concentrations in surface groundwater mix should be examined. Elevated nitrate concentrations in the shallow groundwater can be removed through pumping and treating. However, elevated nitrate concentrations in the deeper groundwater is a greater risk to public health, and removing the nitrate concentrations would be more costly.

B&V Waste Science and Technology Corp. facilitated the preparation of this report for the County of San Luis Obispo Technical Advisory Committee. Technical questions regarding this report should be addressed to the TAC.

Very truly yours,

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

Michael R. Ploessel, C.E.G.
Regional Manager

Enclosure

* Dr. Dwivedi was employed by BVWST during most of the period of this study. Dr. Dwivedi resigned his position with BVWST on July 16, 1993.