# AFFIDAVIT OF R. GLENN STILLMAN

I, R. Glenn Stillman, herein declare that:

1. I am Vice-President and Principal Engineer with Alaska Petroleum Environmental Engineering, Inc. that has an office in Garden Grove, California.

2. I have a Bachelor of Science in Chemical Engineering from the University of Illinois - Chicago, a Masters of Science in Petroleum Engineering from the University of Alaska – Fairbanks, and have completed all course work at the University of Alaska - Fairbanks for a Masters of Science in Environmental Engineering. I have worked in the environmental, construction and petroleum industries for over 20 years. Since March 1991, I have held California Contractor's License 615579. The classifications under this license are General Engineering "A", Hazardous Substance Removal and Remedial Actions Certificate ("HAZ"), Asbestos Certification, and C-57 (Well Drilling).

3. During my career, I have designed and drilled hundreds of wells including oil production wells, injection wells, potable water wells, water and waste disposal wells, groundwater remediation wells, and groundwater monitoring wells. I have also inspected and sampled hundreds of wells. Finally, I have been involved in the plugging and abandonment of scores of these wells. I am familiar with United States Environmental Protection Agency (USEPA) and State of California requirements for the proper installation of various wells, and the requirements for their closure. I have worked in the past with various California Regional Water Quality Control Boards, including those at Los Angeles, Santa Ana, San Diego, San Francisco Bay Area, Lahontan, and North Coast Regions.

4. I was retained by the Law Office of Matthew J. Nasuti to investigate and potentially provide expert testimony in a federal lawsuit regarding the proposed Los Osos sewer project (hereafter referred to as the "Sewer Project"). My investigation has resulted in the following conclusions:

5. There is nitrate contamination at various locations in the upper aquifer under Los Osos in concentrations that exceed the Maximum Contaminant Level (MCL) as promulgated by the USEPA. The MCL for nitrate reported as nitrogen is 10 milligrams per liter (or 45

are experts who have provided contrary information. Specifically, John Timothy Winneberger, Ph.D. was retained by the South Central Coast Regional Commission under Resolution 76-4. Dr. Winneberger's evaluation is entitled "Recommendations to the South Central Coast Regional Commission for Management of On-Site Wastewater Disposal at Baywood, San Luis Obispo County, California", dated November 26, 1976. Therein Dr. Winneberger states: "Experts in the technology of subsurface wastewater disposal know that disposal fields exist and function quite acceptably under groundwater." A true and copy of a portion of Dr. Winneberger's report is contained in Exhibit D. If needed, a way to "correct" the suspect septic systems is to increase the separation zone to groundwater. It is feasible, on an economic and engineering basis, to extract "clean" water from the upper aquifer and pump it into the lower aquifer. That would both directly recharge the lower aquifer (i.e., used for drinking water purposes) and deal with any potential saltwater intrusion; another issue of concern to the Agencies, that they allege will be corrected by the Sewer Project. The upper aquifer extraction/lower aquifer injection option would lower the upper aquifer thereby improving the efficiencies of all septic systems, reduce the potential for saltwater intrusion into the lower Aquifer while at the same time recharge the drinking water supply. Compared to a Sewer Project with an estimated cost of $100,000,000 which will not correct all of these problems, the extraction/ injection option is a low cost, effective solution. Another simple solution is to extract nitrate contaminated groundwater for agricultural use, etc.. This will remediate the upper aquifer, as well as increase the separation distance where it is needed the most (i.e., where there is shallow water and high nitrate concentrations).

12. A major source of the nitrate contamination is the groundwater monitoring wells that were installed in 1982 as part of Agencies environmental assessments to determine the source of the nitrate contamination. Earlier this month, I personally inspected almost 20 of these well sites; true and correct photographs of accessible groundwater monitoring wells are included as Exhibit E.

13. The vast majority of these wells have elevated nitrate analytical results, which were used by

the Agencies to justify the necessity for the construction of the Sewer Project. All of the groundwater monitoring wells are "illegal" as they were improperly installed and do not meet the requirements as set forth in "California Well Standards, Bulletin 74-90, supplement to Bulletin 74-81", California Department of Water Resources, June 1991. True and correct pertinent sections of 74-81 and 74-90 and have been "highlighted" and are attached as Exhibits F and G, respectively. As stated above, the groundwater monitoring wells were either installed by the County and/or the Agencies' consultant Brown & Caldwell in 1982; therefore, the well installation was required to meet the minimum standards as set forth in 74-81.

14. A true and correct copy of the May 25, 1982 "Water Well Driller"s Report" for State well # 30S/10E-13Q01 ("13Q01" located at 333 Woodland Drive of which there is a photograph in Exhibit D) is attached as Exhibit H. The methodology used to complete this well is similar to all of the groundwater monitoring wells that were installed. In this driller's report it is stated that:

(1) a sanitary seal was placed from the surface to a depth of one foot, and

(2) that surface strata was "sealed against pollution" from eight to 12 feet below ground surface.

All of the groundwater monitoring wells are "illegal" for the following reasons:

1. Monitoring wells are required to have a minimum surface seal of 20 feet [74-81, page 29, Section 9.A.]; 13Q01 only has a seal from the surface to one foot and from 8 to 12 feet. All wells were similarly constructed.

2. The top of these wells are below ground (pictures in Exhibit D). In addition, the PVC caps on the wells have holes drilled in them, and the caps were loose during my site inspection. I could literally unscrew a cap just by using my thumb and forefinger without any effort. "Openings into the top of the well...shall be protected against entrance of surface water or foreign matter by installation of watertight caps or plugs" [74-81, page 36, Section 10.A].

3. The wells are "abandoned" and should be "destroyed" (i.e., legally removed

by drilling out and cementing the hole) as they have not been sampled in over one year and do not meet the criteria to be considered "inactive". An "inactive" well is one that "the owner demonstrates his intention to use the well again...As evidence of his intentions for continued use, the owner shall properly maintain the well in a way such that:

i. The well has no defects which will allow the impairment of quality of water in the well or in the water-bearing formations penetrated.

ii. The well is covered such that the cover is watertight and cannot be removed except with the aid of equipment or the use of tools.

iii. The well is marked so that it can clearly been seen.

iv. The area surrounding the well is kept clear of brush or debris."

15. Review of the photographs contained in Exhibit D clearly show that none of the groundwater monitoring wells used by the Agencies for nitrate sampling meet the definition of "inactive". It should also be stressed that these were the well construction standards that were in place in 1981; they are subsequently more stringent (i.e., 74-90). Under the 1981 and the 1990 standards, these wells would be considered no more than simply "funnels" that allow surface contamination to enter a well and contaminate the groundwater; they are illegal wells and provide false and misleading analytical results.

16. The analytical results obtained from the groundwater monitoring wells are false and misleading and this is clearly shown by comparing results just after the wells were installed in 1982, and again after the winter rains in 1983. The annual rainfall from 1982 to 1983 increased almost by a factor of two (17.9 to 35.1 inches), correspondingly the nitrate concentrations increased by a factor of 1.6 (about 36 to 56 ppm nitrates reported as nitrates). This is shown on the nitrate graph, a true and correct copy is contained in Exhibit I. This shows that the groundwater monitoring wells are direct conduits for nitrates into the upper aquifer, and have been since their installation in 1982.

17. All of the data used by the Agencies to support their position requiring the Sewer Project is based on inaccurate data. The Agencies even acknowledged this fact about two years after

the groundwater monitoring wells were installed; in a December 14, 1983 "internal memo" from the Regional Water Quality Control Board it is stated that contamination is due to "poorly constructed monitoring wells...and agrees there is a potential for contamination from surface runoff". While the discussion refers to human bacteria, where there is human or other animal wastes there is nitrates. A true and correct copy of this memo is attached as Exhibit J. Some of the wells were eliminated from the Agencies sampling program due to their acknowledgment that these were "poorly constructed monitoring wells"; a true and correct correspondence documenting this is contained in Exhibit K.

18. After my inspection of the wells, in order to more definitively prove that the groundwater monitoring wells are nitrate conduits, I collected surficial soil samples immediately adjacent to six of the wells. In addition, I collected one "background" soil sample to determine what the nitrate concentration is in an undeveloped area outside of the Prohibition Zone, and one in an area that is subject to run-off from a large horse stable. A true and correct copy of the analytical report and a table detailing the nitrate results are contained in Exhibit L. The MCL for nitrate as nitrogen is 10 ppm. The average nitrate concentration of the soil samples collected by the groundwater monitoring wells is 10.2 ppm; this concentration exceeds the MCL. It has already been shown that these wells are illegal, which the Agencies have already admitted to, and are conduits for the nitrates to enter the upper aquifer. The background soil nitrate concentration is more than ½ of the MCL, and the horse stable effluent is a major source of nitrate that is directly deposited into Morro Bay via the storm drain system.

19. The water sampling methodology used by the Agencies is also questionable. The available information that I could find is that three to four casing volumes of water were removed from a well prior to collecting a sample for analysis. Standard sampling methodology specifies this volume, however, field screening for certain parameters is also required (e.g., water temperature, pH, conductivity at a minimum); this screening data was not found. These field parameters are measured until they stabilize; upon stabilization it is assumed that "fresh" formation water has entered the well (i.e, water representative of the upper aquifer).

It is at this time that a water sample is collected.

20. Based upon evaluation of the information contained in the previously mentioned driller's report, the Agencies were probably not sampling "fresh" formation water. They were sampling runoff into these illegal wells from the surficial nitrates that were shown to be present from my soil sampling. An eight inch diameter auger was used to bore a hole to a depth of 100 feet; groundwater was encountered at 90 feet. A 1.5 inch diameter PVC pipe was used for the casing; the casing was perforated/slotted (i.e., to let water into the PVC pipe from 97 to 100 feet). Using simple mathematics, and some assumptions (e.g., no water is coming in from the surface or from the annular space above the sand pack, and four well volumes are purged by the Agencies prior to sampling, etc.), the volume of water inside the borehole and the casing can be calculated. Based upon this evaluation, the maximum theoretical volume of water removed from the formation is only about one quart. The Agencies indicated that only three to four well volumes were purged, and the wells are illegal and there is surface water entry. Therefore, the sample results are representative of the nitrate laden surface water that has entered the well for almost the last 20 years, not from the upper aquifer that was supposed to be sampled.

21. A two-step approach to mitigation is normally recommended:

(i) Locate the source(s) for the contaminant and prevent new releases; and

(ii) If needed, pump out and either treat or dispose/recycle the contaminated water.

22. In conclusion, I have multiple concerns about the data used by the Agencies to support their contention that the Sewer Project is necessary to protect the upper aquifer. Their data was derived from illegal wells that clearly have nitrate contaminated soil entering them. These wells may not have been adequately purged prior to sampling and the water that was being sampled is nitrate contaminated surface water that entered the well, or formation water that has been contaminated by surface effluent.

23. The proposed Sewer Project will not solve the problem as only part of the community is being required to be connected to sewers, and it will not remediate areas outside of the Prohibition Zone, such as Bayview Estates where there is definitive analytical documentation

that its treatment system has impacted the upper aquifer with nitrates. The Sewer Project does not call for the abandonment of the illegal wells (the nitrate "funnels"), or for conducting remedial work on the upper aquifer as was previously discussed above (i.e., extraction of clean water and injection into the lower aquifer, extraction of nitrate contaminated groundwater for agricultural use, etc. which will increase the separation and remove contaminated water). My fear is that the community will spend $100,000,000 + and see no appreciable improvement in groundwater quality. The Agencies have made no guarantee that the Sewer Project will correct the problem. If funds have to be expended, a number of more cost-effective solutions based upon sound engineering have been "on the table" for years and they should not have been disregarded.

24. Based upon my evaluation of the nitrate data and prior to expending in excess of $100,000,000 on a Sewer Project that will not correct the problem, a two step remedial project should be implemented. If implemented, it will remove the contaminated water from the illegal wells and/or provide valid data that can be assessed to determine if there even is a nitrate problem in Los Osos. If successful, the savings to the community would be about $99,855,000. The proposed scope of work is:

1. Pump the Brown & Caldwell illegal wells: $ 45,000

The cost includes all equipment and personnel to purge the wells to collect and analyze a representative water sample of the upper aquifer. If nitrates are detected above the MCL, that well will be pumped for a duration of one week. The purged water will be used for irrigation purposes at a local farm. For cost estimating purposes, I assumed that all 10 wells will require one week of pumping.

2. Abandonment of the ten Brown & Caldwell illegal wells and drilling of replacement wells: $100,000

The cost includes all equipment and personnel to abandon the wells pursuant to the requirements in 74-90. Ten wells will be drilled about 50 feet from the illegal wells to obtain valid data. The cost includes disposal of all the drill cuttings at a local landfill, although a local farm would probably accept the soil as it is non-hazardous. For cost estimating

purposes, I assumed that all wells will be drilled to a depth of 100 feet, and that four calendar quarters of groundwater monitoring are conducted.

25. There is insufficient scientific data to support the drawing of the Prohibition Zone boundaries. I have heard and read conflicting rationales for the boundaries. Sorrell Marks - RWQCB claims that all properties outside of the Prohibition Zone are all ½ acre lots, this is not true. In addition, lot size apparently does not matter to the RWQCB which claims that vertical separation between septic system and groundwater is all that matters. Ms. Marks then claims that homes high up on the hill would be too expensive to hook up with sewers (but this does not address all the expensive homes on the valley floor that are not in the Prohibition Zone). It has been claimed that systems outside the Prohibition Zone all have more than 30 feet separation between their septic systems and groundwater, but that is not true for many of the homes. In short, I have found no scientific basis for the specific boundaries that the Agencies used to establish the Prohibition Zone.

I have personal knowledge as to the above matters and if called upon, I could and would competently testify thereto. I swear under penalty of perjury, that the foregoing is true and correct and that this affidavit was sworn to and executed on August 21, 2001 in Garden Grove, California.

R. GLENN STIELMAN