ENVIRONMENTAL ENGINEERING SURVEY
MARINE CORPS BASE, CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

FY-80 UPDATE

UTILITIES, ENERGY AND ENVIRONMENTAL DIVISION
ATLANTIC DIVISION, NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA

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ENVIRONMENTAL ENGINEERING SURVEY
MARINE CORPS BASE, CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

I. EXECUTIVE SUMMARY

A. Authority. In compliance with OPNAVINST 6240.3E and NAVFACINST 5450.19B, the FY-80 update of the Marine Corps Base, Camp Lejeune Environmental Engineering Survey Report was conducted on 14-24 August 1979.

B. Objectives and Scope. The objectives of this year's update are:

1. Identification of current environmental facility deficiencies and status of corrective projects previously identified.

2. Identification of environmental operation and maintenance deficiencies and recommended corrective actions.

C. Compliance Status with Environmental Regulations

Media	Deficiencies Noted	Remarks
Air	Yes	See Pages 4-5
Water	Yes	MCON P-996 to correct. See Pages 5-7, 11-12
Wastewater	Yes	MCON P-996 to correct. See Pages 7-10, 11-12
Oil	Yes	MCON P-996 to correct. See Pages 12-13
Solid Waste	Yes	See Pages 13-14
Hazardous Waste/ Toxic Substance	Yes	See Pages 15-17

D. Any environmental problem(s) that should arise between surveys or problem(s) inadvertently omitted during the current survey, should be directed to the program manager concerned as indicated in LANTNAVFACENGCOM environmental organization chart on the next page.

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ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND

ENVIRONMENTAL PROTECTION COORDINATION OFFICE
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1141
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Mr. C. Thompson
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Mr. P. Cunanan
(Solid Wastes)

Mr. M. White
(Water Conservation; Hazardous Waste)

Ms. D. Cantor
(Potable Water)

1142
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Mr. P. Rakowski
(Industrial Wastes; Dredging)

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(Wastewater Discharge Permits)

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II. INTRODUCTION

A. Description of Activity. Marine Corps Base, Camp Lejeune, located in the coastal region of North Carolina, is the nation's most complete Amphibious Training Base. It encompasses approximately one hundred and seventy square miles of land and water, and twelve miles of ocean frontage. The principal watershed drainage areas are Bear Creek, Freeman Creek, French Creek, Northeast Creek, Southwest Creek, Wallace Creek and New River.

Established in 1941 and named in honor of Lieutenant General John A. Lejeune, the base houses four Marine Corps commands and two Navy commands: Marine Corps Base; Marine Corps Air Station (Helicopter); Force Troops, FMFLANT; 2nd Marine Division, FMF; Naval Regional Medical Center; and Naval Regional Dental Center.

The Base is divided into nine major subdivisions: Hadnot Point; Tarawa Terrace (I & II); Midway Park (Housing Area); Montford Point (Camp Johnson); Camp Geiger; Marine Corps Air Station (H), New River; Rifle Range; Courthouse Bay; and Onslow Beach. The current military population is approximately 40,000 military personnel, 4,000 civilian employees, and 32,000 military dependents on and off base.

The mission of Marine Corps Base, Camp Lejeune is as follows:

1. To provide housing, training facilities, logistic support, and certain administrative support for Fleet Marine Force units and other units as assigned.

2. To receive and process personnel as assigned and conduct individual combat training as directed.

3. To conduct specialized schools and other training as directed.

B. List of Station Personnel Contacted

Mr. W. Elston	Ass't. Base Maintenance Officer
Mr. B. Lanier	Acting Utilities Director
Mr. J. Wooten	Environmental Coordinator
Mr. M. King	Defense Property Disposal Officer
LT B. Salamanca	OIC Base EOD
CWO C. Rolle	Fuel Officer
MGSGT H. Manhein	MCAS (H) S-4 Chief
GSGT Redman	NCOIC Base EOD
SSGT D. Farmer	Fuel Distribution System Inspector
Mr. W. Mayo	Ground Structures General Foreman
Mr. M. Gray	General Foreman Pest Control
Mr. Wetherington	Central Heating Plant Foreman
Mr. P. Huffman	General Foreman, Sewage Treatment Plants
Mr. W. Price	General Foreman, Water Treatment Plants

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Mr. L. Holland	Water Treatment Plant Operator
Mr. R. Vick	Water Treatment Plant Operator
Mr. J. Shackleford	Water Treatment Plant Operator
Mr. M. Rich	Water Treatment Plant Operator
Mr. C. Kelly	Water Treatment Plant Operator
Mr. T. Stone	Water Treatment Plant Operator
Mr. J. Lucas	Water Treatment Plant Operator
Mr. B. Morton	Water Treatment Plant Operator
Mr. N. Fisher	Sewage Treatment Plant Operator
Mr. N. Futrell	Sewage Treatment Plant Operator
Mr. C. Schmidt	Sewage Treatment Plant Operator
Mr. W. Burnette	Sewage Treatment Plant Operator
Mr. V. Williams	Sewage Treatment Plant Operator
Mr. C. Huffman	Sewage Treatment Plant Operator
Mr. H. Burns	Laboratory Technician
Mr. R. Sutton	Liquid Fuel Mechanic

C. The Environmental Engineering Survey Preliminary Report and Recommendations, (Attachment 9), was provided to base personnel at the end of the survey.

III. DISCUSSION OF DEFICIENCIES AND RECOMMENDATIONS

A. Air Pollution

1. Camp Lejeune has over 200 air pollution sources registered with the North Carolina Division of Environmental Management. This registration was accomplished over two years ago using the Navy Air Pollution Source Inventory System Report. This report currently contains out-dated data. The report needs to be reverified and updated for resubmittal to the North Carolina Division of Environmental Management.

RECOMMENDATION NO. 1 - The above review and update should be accomplished by 1 March 1980 using 1979 calendar data.

2. Camp Lejeune has obtained permits from the North Carolina Division of Environmental Management to operate one oil-fired and four coal-fired boilers in Building 1700. The North Carolina air pollution regulations require most of the Camp Lejeune air pollution sources to have permits to operate. During a discussion with the North Carolina Division of Environmental Management personnel, in August, it was agreed that only coal-fired boilers, Numbers 5 and 6 oil-fired boilers and incinerators currently operating will require permits at this time. LANTNAVFACENGCOM records show that there are one classified waste incinerator, one pathological incinerator and sixteen No. 6 oil-fired boilers requiring permits.

RECOMMENDATION NO. 2 - It is recommended that permit applications for these sources be submitted to the North Carolina Division of Environmental Management no later than the end of December 1979.

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3. The classified waste incinerator located in Building S-355 does not meet North Carolina air pollution regulations .0505 and .0521 covering particulates and visible emissions respectively.

RECOMMENDATION NO. 3 - This incinerator should be closed down immediately and replaced by either a document destructor or a controlled air incinerator. If the controlled air incinerator option is chosen, then a permit to construct will be required to be submitted to the North Carolina Division of Environmental Management and manufacturers stack emission data must be obtained to demonstrate compliance of the incinerator. Pollution abatement funding is available from the Commandant, Marine Corps, Washington, to procure either of the above replacements.

B. Potable Water

MCAS Water Treatment Plant

1. When the lime hopper at the MCAS potable water treatment plant is refilled, excessive amounts of dust are generated causing much accumulation within the enclosed room. The current dust collector and fan provided are inadequate to alleviate the problem. This condition as is appears hazardous. Origin of dust generation is around hopper door seal and auger shaft located under the hopper. Even though measures have been taken to eliminate the problem, little success has been achieved.

RECOMMENDATION NO. 1 - The current hopper should be replaced with a larger externally fed lime hopper.

2. Unlike the other treatment facilities, the above plant is not fenced in. It is located on the corner of Curtis and Bandcross Road, making it very accessible to trespassers. The chlorine drums are located outside of building. This situation is potentially dangerous since these drums are accessible to the public and can be easily tampered with.

RECOMMENDATION NO. 2 - Fence in the entire treatment facility.

3. This facility is, also, not provided with auxiliary power for in-plant operation in the case of power outage.

RECOMMENDATION NO. 3 - Provide auxiliary power for in-plant operation for such an emergency situation.

Courthouse Bay and Montford Point Water Treatment Plants

4. The zeolite softeners at these two treatment facilities will eventually need replacing. At Montford Point Plant, the softeners are very old and antiquated. One of the Courthouse Bay Plant softeners has begun to corrode. Hence, the latter was tested by Base personnel this past summer and was still found to be structurally sound.

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RECOMMENDATION NO. 4 - Efforts should be initiated to provide for the future replacement of these tanks.

Hadnot Point Water Treatment Plant

5. The chlorine tanks are located in the chlorine storage room where there is inadequate ventillation. There was a window open, however, during cold weather, this window will be shut. Further, it is located too high off the floor to be of any benefit to plant personnel entering the room in the event of a chlorine gas leakage.

RECOMMENDATION NO. 5 - Chlorine gas is approximately 2.5 times as heavy as air. In case of a leak, it would therefore seek the lowest level. Install a vent with an exhaust fan at floor level to be switched on prior to entering the room. This will prevent the inhalation of toxic and hazardous fumes, which can be fatal. Personnel using gas masks should practice regularly with them in order to become proficient in their use and accustomed to breathing through them. The acceptable safety practice for the chlorine gas mask is to properly store it, available for instant use at a convenient location outside of the chlorination facility.

6. At the present time, the Quality Control Laboratory Chemist position is vacant. The vacancy announcement to fill this position has been advertised since March 1979, however, no one has been hired. The incumbent will be in charge of this laboratory, which performs a variety of chemical, physical and bacteriological analyses of boiler, domestic waste, river, storm drain and potable water samples.

7. The Quality Control Laboratory is not certified. In accordance with EPA's requirement, this lab should apply for interim certification.

RECOMMENDATION NO. 6 - In filing an application for certification, the EPA Region IV office, Athens, Georgia, is to be contacted. The point of contact is:

Mr. Bob J. Carroll
Chief, Lab Services Branch
EPA Surveillance and Analysis Division
College Station Road
Athens, GA 30605

8. The inorganic chemical analysis for potable water is to be performed every three years. It had not been done. Accordingly, potable water samples were collected from various points on Base by LANTNAVFAC-ENGCOM's Code 114 personnel. They were then sent to the LANTNAVFACENGCOM contracted laboratory for the required inorganic chemicals analysis. The results are shown in Attachment 1. As noted, the suggested limit of 20 mg/l for sodium in many cases exceeds concentration for people on severe salt restricted diets.

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RECOMMENDATION NO. 7 - The Base Medical Center should be notified concerning the levels of sodium concentration in the potable water supply in order that alternative measures may be implemented for those individuals whose salt intake should not exceed the allowable limit. Further questions concerning this matter should be directed to Ms. D. Cantor, Code 114 of this command, telephone AUTOVON 690-7313.

C. Wastewater

1. LANTNAVFACENGCOM letter 114:DPG ser 6280 of 13 Oct 1978, Attachment 2, noted the rapid increase in water and sewage flows. If this recent growth trend continues, the MARCORB CAMP LEJEUNE water and sewage treatment facilities capacity may be exceeded in the early 1980's.

RECOMMENDATION NO. 1 - The above reference recommended a base-wide A/E study of water/wastewater systems in order to program an approximated $20-80 million MCON(s) (non-pollution abatement funds) to relieve possible outyear overloads. Please advise LANTNAVFACENGCOM Code 114 as to the Base evaluation of this situation.

2. The EPA nation-wide enforced secondary National Pollutant Discharge Elimination System (NPDES) limit for fecal coliform is 200 MPN per 100 ml. There is no maximum chlorine limit, however, in the current NPDES permit for MARCORB CAMP LEJEUNE.

3. It was discussed in LANTNAVFACENGCOM letter of 8 Feb 1979 (Attachment 3) that toxic amounts of excess chlorine were being used (e.g. historical weighted average effluent chlorine of 4.0 mg/l). As a result, LANTNAVFACENGCOM recommended that the chlorine residual be reduced to approximately 2.0 mg/l, based on (a) toxicity literature forwarded with the 8 February 1979 letter, (b) the Virginia limit of 2.5 mg/l maximum, and (c) the Maryland limit of 0.5 mg/l maximum. MARCORB CAMP LEJEUNE has since reduced the residual levels to 2.0-3.0 mg/l.

RECOMMENDATION NO. 2 - Continuing efforts should be made to maintain chlorine residual at approximately 2.0 mg/l. Although chlorine effluent limits vary, effluent chlorine greater than 1.0-2.0 mg/l is generally not required for adequate disinfection. It can cause the sewage effluent to become toxic, thereby negating beneficial effects of the sewage treatment plant.

4. Metal steps leading into the Tarawa Terrace sewage treatment plant wet well are badly corroded. Some of the steps are missing entirely. This condition makes access into and out of the facility very dangerous.

RECOMMENDATION NO. 3 - It is recommended that the metal steps be replaced immediately.

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5. The Hadnot Point sewage treatment plant two 25-inch comminutors are old and worn. They are no longer cutting/functioning properly. Utilization of these devices tends to reduce odors, flies and unsightliness often found around screenings when comminutors are not used.

RECOMMENDATION NO. 4 - It is recommended that the Hadnot Point sewage treatment plant two 25-inch comminutors be replaced.

6. Exhaust fans for the chlorination room at the Montford Point and Onslow Beach sewage treatment plants are absent. Moreover, the chlorine gas mask at the Montford Point plant is located in the operator office, away from the chlorination facility.

Chlorine gas is extremely toxic and corrosive in moist atmospheres. It is very irritating to mucous membranes and small amounts in the air will cause severe coughing when inhaled. Heavy exposure to this gas can be fatal.

RECOMMENDATION NO. 5 - For the above treatment facilities, install exhaust fans at floor level to be switched on prior to entering the chlorine rooms. Further, the acceptable safety practice for the chlorine gas mask is to properly store it, available for instant use, at a convenient location outside of the chlorination facility.

7. Bathroom fixtures for plant personnel at the Onslow Beach sewage treatment plant are present, but have not been installed.

The importance of preventing infections cannot be overemphasized. Wastewater, sludge, screenings, etc. are potentially infectious to plant personnel. Plant personnel should therefore exercise great care since they are not only confronted with danger from infected wounds, but are also subject to water-borne diseases from contamination introduced through the mouth. Good personnel hygiene and prompt medical attention are the best defense against infections.

RECOMMENDATION NO. 6 - It is recommended that the sanitary fixtures at the Onslow Beach sewage treatment facility be installed to immediately increase opportunities for plant personnel to exercise better personal hygiene, thereby reducing the chances of getting infection from contamination while treating the sewage.

8. The Camp Geiger sewage treatment plant is meeting current NPDES limitation requirements, even though the advanced wastewater treatment portion of the plant is inoperative. The tertiary unit pumps and Quality Automatic Control System won't function. In addition, the SILS No. 6 high level panel light indicator on the lift station console won't go off, indicating a possible shortage in wiring.

RECOMMENDATION NO. 7 - The decision has been made by base personnel to continue operating the Camp Geiger advanced wastewater portion of the

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sewage treatment plant. Accordingly, it is recommended that personnel from the Base Maintenance Department be brought in to work on/put the facility back into operation.

9. The MARCORB CAMP LEJEUNE boilers are contract-serviced by the Dearborn Aqua Service of Wilson, North Carolina. It was indicated that services were provided approximately every two months. At this time, samples are taken, tests are run and personnel are trained to properly operate the equipment. Hence, there does exist a need for a technically trained individual to administer the boilers feedwater treatment program to adequately interpret test data and to provide optimum boiler operation. Finally, no boiler samples are currently being submitted to BUMINES for check analysis, as required.

RECOMMENDATION NO. 8 - An experienced chemist with technical knowledge of boiler water treatment should be hired to supervise the boiler feedwater treatment program at all the MARCORB CAMP LEJEUNE steam plants.

RECOMMENDATION NO. 9 - In accordance with the requirements set forth through NAVFACINST 5450.19B and LANTDIVINST 11300.4A, it is recommended that a boiler water sample for each applicable boiler be collected/ submitted to the Bureau of Mines Water Service Laboratory, 4900 LaSalle Road, Avondale, Maryland 20782 for check analysis. NOTE: This is their new address.

10. The MARCORB CAMP LEJEUNE water and sewage treatment plants are excellently run operations. Nevertheless, there was evidence of sporadic maintenance problems which indicated the periodic shortages of plant personnel. Likewise, a severe personnel shortage was reported in the Natural Resources and Environmental Affairs Division.

RECOMMENDATION NO. 10 - It is recommended that additional personne 1 be hired at both the water and sewage treatment facilities to provide adequate staffing.

RECOMMENDATION NO. 11 - It is further recommended that the Natural Resources and Environmental Affairs Division be adequately staffed to perform/meet the necessary demands for the environmental program.

Field Head Facilities

1. During a recent conversation with Mr. Jack Knight at the North Carolina State Board of Health, existing state statutes governing the installation and use of ground absorption sewage disposal systems were discussed. It was stated that primary regulatory responsibility for these systems lies with the local health departments. For sanitary sewage disposal systems with 3,000 gallons or less which do not discharge to surface waters, permits are issued by the North Carolina Health Department. For all other such facilities of greater than 3,000 gallons capacity, the North Carolina Department of Natural Resources and Community Development issues permits. These permit requirements are primarily applicable to the

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private sector, unless it is established that the sewage disposal (from military installations) result in the discharge or runoff of pollutants affecting public waters.

RECOMMENDATION NO. 1 - Attachment 4 provides a copy of North Carolina's statute for Ground Absorption Sewage Disposal Systems of 3,000 gallons or less design capacity for review. Accordingly, it is recommended that these requirements to construct/operate an "approved privy" as outlined in the legislation be strictly adhered to.

2. Field head facilities at the MARCORB CAMP LEJEUNE Veronah Loop K Range are wooden structures consisting of a pit, floor and seat assembly. Drums are placed at the bottom of these pits to collect humanwastes. It was learned that, in certain instances, these drums had been found sitting in pools of water, due to the high groundwater table.

RECOMMENDATION NO. 2 - In no case should the depth of the pit be excavated such that contamination of groundwater will occur. The recommended depth should be no less than 12" above the groundwater table. It is also recommended that any existing field head facilities located in or found contaminating the groundwater be abolished, the pit completely covered with earth and the privy building moved to a suitable site.

Erosion/Sediment Control

1. Accelerated erosion from unprotected construction sites and other land disturbing activities constitute a major pollution problem. Sediment suspended in water runoff settles out depositing soil and other materials into rivers, lakes and streams. As a result, stream channels, lakes and reservoirs become filled, thereby having detrimental impact upon the environment. Accordingly, Federal and State regulations have been created and are being enforced to effectively control erosion/sedimentation during active construction or after stabilization. Preventive measures, however, are generally considered from both a technical and economic view point.

2. It was observed during the recent visit that MARCORB CAMP LEJEUNE does have significant erosion/sediment control problems associated with the sanitary landfill site, and the Engineering Equipment/Rifle Range training areas. Comments on construction site erosion problems have been addressed to the ROICC.

RECOMMENDATION NO. 1 - Compliance with Soil Conservation Service erosion control requirements, and other Federal or North Carolina State regulations (Attachment 5) are legally mandated. It is therefore recommended that a separate FY-82 pollution abatement MCON project be submitted as soon as possible. An A/E preliminary study may be required to outline the scope of this project and the scope of work for this project should be coordinated with North Carolina State Coastal Zone Management Office.

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D. Operator's Training and Certification

1. Operators of Navy treatment facilities (potable water, sewage and industrial waste treatment plants) are now required by law to meet certification requirements of the state in which the facility is located. Compliance with the aforementioned requirement is mandated by the following legislation:

a. Safe Drinking Water Act (SDWA), PL95-523 - established specific legal requirements for the provision of adequate treatment and monitoring of public water supplies.

b. Clean Water Act (CWA), PL95-217 - established requirements for pollution control facilities to comply with state and local administrative and procedural requirements, including operator training and certification, as well as all discharge standards.

2. There is one operator in responsible charge for all potable water plants on the base and another for all the sewage treatment plants.

3. The highest state certification requirement for water treatment plant operators is Class A and lowest is Class C-well. The highest certification level for wastewater plant operators is Class IV and the lowest is Class I.

4. The potable water treatment plant operator in responsible charge has a Class B license. However, a recent conversation with Mr. C. Rundgren of the North Carolina State Health Department stated that in order for the MARCORB CAMP LEJEUNE water treatment plants to be in compliance with the state certification requirement, the operator in responsible charge must pass the Class A licensing examination. This certification requirement was not only based on types of potable water treatment performed, but also considered that one man is in responsible charge of eight separate treatment systems.

RECOMMENDATION NO. 1 - In order to meet state requirements for the Potable Water Works, it is recommended that the Class B operator in responsible charge be recertified at the Class A level.

5. The operator in responsible charge of the seven wastewater plants has a Class IV license. These facilities are, therefore, in compliance with the state certification requirements.

6. The Environmental Quality Control Laboratory physical science technicians perform the following tests: turbidity, bacteriological, fluoride and chlorides on potable water samples, and BOD, SS and fecal coliform on the wastewater samples. Moreover, analyses are performed once a month for BOD, DO, fecal coliform, pH and temperature on upstream and downstream receiving waters, including 71 storm drain outfalls monitoring for oil, grease, SS and pH.

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RECOMMENDATION NO. 2 - The Environmental Protection Agency conducts excellent training courses in the areas of water quality management, chemical and bacteriological analyses, and others. Such courses, designed to develop expertise and sharpen required skills necessary to achieve an effective water pollution control and abatement program, would prove beneficial to the laboratory technicians. For additional information and details concerning these courses, refer to LANTDIVNOTE 6280, 114 of 20 September 1979, entitled "Availability of EPA's water quality control training courses for FY-80; announcement of."

E. Oil

1. As a result of two previous comprehensive studies, one performed by Stearns, Conrad and Schmidt (SCS) Engineers (Contract N62470-76-C-1863) and the other by Austin Brockenbrough and Associates (Contract No. N62470-78-B-8268), all known areas of existing and potential oil spills and oily wastewater discharges on Base were identified. MILCON Project P-996, entitled "Industrial Waste Collection and Treatment Facilities", to correct those deficiencies is approximately ninety percent design complete and is scheduled to begin construction in FY-80. However, Spill Prevention Control and Countermeasures (SPCC) to eliminate/control spills from 55-gallon oil drums for an estimated 1,561 space heaters have been deleted due to cost limitations.

RECOMMENDATION NO. 1 - A separate FY-81/82 oil SPCC pollution abatement MCON project should be resubmitted to include provisions for the estimated 1,561 space heaters.

MCAS (H), NEW RIVER

2. A berm at the motor pool, Building 119 utilized to retain the wash water until it enters the sewer collection system is inadequate. It does not extend far enough to enclose the entire wash area to prevent wastewater runoff from entering the adjacent storm drain.

RECOMMENDATION NO. 2 - The MCAS motor pool, Building 119 washrack berm should be extended to enclose the entire area to prevent wastewater runoff from entering the adjacent storm drain.

3. Many problems identified during the recent survey were related to personnel carelessness and negligence rather than the lack of proper oil spill/collection equipment. The following were noted:

a. Cigarette butts and other garbage placed in waste oils, eventually clogging up funnel discharging into the waste oil tanks.

b. Oil needlessly being spilled around waste oil collection tanks.

c. Old paint, rags, paper and similar refuse discarded on ground around waste oil collection tanks.

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d. Helicopter washing and evidence of solvents, and fluids/oil discharges on helicopter pad area at MCAS (H), NEW RIVER which drains into the storm drainage system. These storm drains are not equipped with oil/water separators.

RECOMMENDATION NO. 3 - Pollution control equipment will prevent/abate environmental impact if properly utilized. The above practices must therefore be discontinued. All waste streams should be segregated and disposed of in an environmentally acceptable manner. Helicopter washings should not be done on the helicopter pads, but on wash racks intended for that purpose.

4. The catch basin at HTMS-29 for the oil/water separator is not functioning properly. The seal appears clogged up and the storm drain needs cleaning out, evidenced by much sand buildup. A work order request had been submitted, but no action has currently been initiated to correct the situation.

RECOMMENDATION NO. 4 - Expedite the work order request to put this oil/water separator back into proper operation.

5. After maintenance is completed on the helicopter internal fuel storage tanks at Hangar 518, they are placed outside on a concrete pad and allowed to drain. An oil path can be observed heading toward a storm drainage ditch located at the base of the down hill grade.

RECOMMENDATION NO. 5 - These fuel tanks should not be allowed to drain their oily residues onto the concrete pad(s). The tanks should be rinsed clean to collect and dispose of the oily residuals in an acceptable manner prior to draining, or ports permitting tanks to drain should be closed.

6. It is understood by LANTNAVFACENGCOM that remaining known wastewater/oil environmental deficiencies which concern the treatment of coal piles runoff will be accomplished as part of the MARCORB CAMP LEJEUNE boilers coal conversion program.

F. Solid Waste

1. P.L. 94-580, Resource Conservation and Recovery Act of 1976 and Executive Order 12088 of 13 October 1978 mandate that federal agencies involved in solid waste management shall comply with both substantive and procedural requirements of Federal, State and local regulatory agencies. Consequently, the State of North Carolina does require permit(s) to operate solid waste landfills.

At the time of this survey, MARCORB CAMP LEJEUNE did not have a permit to operate the sanitary landfill. However, a sanitary landfill operating plan had been submitted to the State for approval to acquire a permit for the disposal site.

RECOMMENDATION NO. 1 - It is requested that this Command be kept advised of the Base landfill permit compliance status. Upon receipt of the permit, it is further requested that a file copy be forwarded to this Command.

2. 40 CFR 241, "Guidelines for Land Disposal of Solid Waste" and 40 CFR 257, "Criteria for the Classification of Solid Waste Disposal Facilities" require that land disposal facilities be designed, constructed and operated in a manner to protect groundwater from leachate contamination.

Since the Camp Lejeune area depends extensively on groundwater as a potable source, MARCORB CAMP LEJEUNE was requested on 7 September 1978 to forward 15 water samples to this Command from landfill test wells for chemical analysis. Results of the chemical analysis dated 18 July 1978 did not indicate any severe contamination of the ground-water under the landfill.

RECOMMENDATION NO. 2 - Once a year, monitoring of the landfill test wells is recommended. Monitoring is necessary to evaluate either the potential danger to or the impact on groundwater quality by providing early indications of contaminants movement from disposal facility into the groundwater.

3. Large quantities of aluminum cans, cardboard, wood and various types of metal are still being disposed of in the landfill, inspite of the Base recycling program to recover such materials. Moreover, it is DOD policy to reduce the amount of materials wasted and to recover/recycle materials from solid and other waste products as an alternative to landfilling, incineration or other disposal manner which is environmentally harmful/economically wasteful.

Recent solid waste management study performed by SCS Engineers has found it feasible, and recommended increased material recovery and energy recovery. Energy recovery is to be generated in the form of steam recovered from the wastes after material recovery.

RECOMMENDATION NO. 3 - More stringent control should be initiated on types of material being disposed of in the landfill. This control may be implemented through stricter enforcement of current Base regulation(s) to source separate/recycle materials or by establishing a staging area at the landfill site, in addition to Base regulation(s) for materials recovery.

RECOMMENDATION NO. 4 - Based upon the SCS Engineers report, plans should be finalized soon concerning future solid waste management. Further questions or guidance concerning this matter should be directed to Mr. P. Cunanan, Code 114 of this Command, telephone AUTOVON 690-7313.

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G. Hazardous Waste/Toxic Substances

Background

1. Hazardous wastes are those wastes which may cause or contribute to adverse acute or chronic effects on human health or the environment when such wastes are not properly controlled. These wastes primarily consist of by-products of industrial production, surplus chemicals, salvage materials and sludges and may be in the form of solids, slurries, liquids, gases and powders. Hazardous wastes may include residues from pollution control devices (e.g. electrostatic precipitator dusts, industrial waste treatment plant sludges) as well as chemicals and pesticide substances (DDT, etc.)

2. Identification, handling and disposal of hazardous and toxic materials has in the past been an area of relatively minor concern. New stringent legislaion, increased information concerning toxicity to humans and the environment, along with the increasing frequency of accidents involving hazardous materials have rendered past handling and disposal methods unacceptable and re-emphasized the importance of acceptable handling and disposal methods.

A legal compedium regarding hazardous and toxic materials and solid waste is included as Attachment 6.

Pesticide

1. At the present time, MARCORB CAMP LEJEUNE's pest control shop has 132 gallons of silvex stored. This chemical along with the herbicide 2,4,5-T was published on an EPA Stop sale list for their manufacture and use.

RECOMMENDATION NO. 1 - It is strongly recommended that remaining containers of silvex NOT be used. The herbicide should continue to be stored until further notification from the Applied Biology Branch, LANTNAVFAC-ENGCOM Code 10A. In the case of significant container(s) deterioration, Code 10A should be contacted immediately for instructions.

Asbestos

2. Asbestos presents serious occupational, health and environmental problems. Prolonged inhalation of asbestos fibers can cause impaired breathing or asbestosis. Asbestosis is a progressive, diffuse, non-nodular fibrosis of the lungs. Asbestos has also been linked as a contributing agent to cancer of the chest and abdominal membranes.

3. Section 112 of the Federal Clean Air Act as amended (40 CFR 61) prohibits visible air emissions and provides proper handling and disposal procedures for asbestos. See Attachment 7.

CLW

4. Under the Resource Conservation and Recovery Act (P.L. 94-580), hazardous wastes legislation addressing handling, transport, storage and disposal requirements are in proposed form. However, they should be finalized and promulgated in final form sometime during the early 1980's. These proposed regulations will also address state requirements for Hazardous Waste Management.

5. It was stated that asbestos shingles have been disposed of at the Base landfill. The current practice includes wetting the material and burying it along with the rest of the refuse.

RECOMMENDATION NO. 2 - There should be a specific location within the landfill to dispose of asbestos materials. This location must then be recorded for future reference, because once asbestos has been buried in a landfill, future excavation of that site is prohibited.

RECOMMENDATION NO. 3 - It is recommended that MARCORB CAMP LEJEUNE landfill be operated in accordance with 40 CFR 241 guidelines. Asbestos materials properly handled and disposed of will not pose a health hazard or environmental problem.

RECOMMENDATION NO. 4 - It is recommended that the Camp Lejeune Regional Medical Center and LANTNAVFACENGCOM, Code 114 be contacted concerning specific health or environmental disposal problems, respectively.

6. On 5 July 1979, a letter was forwarded from the Natural Resources and Environmental Affairs Division to Base tenants requesting identification of hazardous materials requiring acceptable environmental disposal. Accordingly, hazardous waste materials identification lists (Attachment 8) from MCAS (H) NEW RIVER and 2nd Marine Division, FMF, Tarawa Terrace were provided. In addition, laboratory chemicals from MARCORB CAMP LEJEUNE High School have also been stored awaiting acceptable disposal.

RECOMMENDATION NO. 5 - All questions concerning environmentally acceptable disposal methods for hazardous materials should be directed to Mr. Sonny White, Code 114 of this Command, telephone 804-444-7313 or AUTOVON 690-7313.

7. Base Maintenance conducted a Base survey of all transformers containing Polychlorinated Bi-phenyls (PCB's). An Engineering Service Request has also been submitted to LANTNAVFACENGCOM Code 114 to provide technical assistance in the development of a plan to prevent PCB's from spilling into the waterways.

8. MARCORB CAMP LEJEUNE's Defense Property Disposal Office (DPDO) is currently holding 304 transformers received from Base Maintenance for disposal. However, DPDO decided not to get rid of these transformers until it has been determined whether or not they contain cooling oil or PCB's. Approximately 5,094 4-ounze cans of DDT are also being stored in a trailer awaiting disposal by DPDO.

CLW

RECOMMENDATION NO. 6 - Disposal for the above materials should be undertaken in accordance with Defense Logistics Agency (DLA) guidelines. It is further recommended that the transformers be tested to ascertain their content.

CLW

IV. MARCORB CAMP LEJEUNE, POLLUTION CONTROL PROJECTS REVIEW

Project Number	Program Year	Project Description	Remarks
P-996	FY-80	Provide wastewater treatment for 8 water plants, 1 cooling tower, 14 boilers, 6 pools, 1 septic tank, 7 battery shops, 1 pest shop, 2 paint shops, 1 PPP shop, 3 photo shops, 20 washracks, 69 waste oil systems, 53 maintenance shops, 46 grease racks, 50 POL storage areas, 146 fill pipes, 144 fuel tanks, 20 unloading areas, 9 fueling areas, 9 pumphouses, 3 condensates, 1 wash basin, 2 coil pits, 1 crash crew facility, 4 maintenance lots, 3 streams and phaseout 64 washracks.	$10,000,000

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. #1381

FROM: (Station or unit) MCB CAMP LEJEUNE

DATE August 31, 1979

TO: (Name and location of laboratory) JENNINGS LABORATORIES, INC. 1118 Cypress AVenue, Virginia Beach, Virginia

SAMPLE FROM (Location of sampling point) BUILDING 1006 EM Club - Hadnot Point

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
	8/24/79		

REASON FOR EXAMINATION: SDWA ANALYSIS

EXAMINATION REQUESTED BY:

NOTE: *All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.*

I. FIELD ANALYSIS

1. pH

TEMPERATURE	
°F	°C

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY

DATE OF ANALYSIS

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	<0.01
	2. Se	<0.005
	3. Pb	<0.005
	4. B	
	5. Cu	0.083
	6. Zn	0.006
	7. Cr (Hexavalent)	<0.002
	8. PO	
	9. Cd	<0.005
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
	13. Barium	<0.02
	14. Mercury	<0.002
	15. Silver	<0.01
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

REQUESTED		NOT REQUESTED

ITEM	PPM
1. COLOR	<1
2. TURBIDITY	
3. ALKALINITY ($CaCO_3$) P	MO
4. TOTAL HARDNESS ($CaCO_3$)	
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
7. TOTAL DISSOLVED SOLIDS	224.0
8. SPECIFIC CONDUCTANCE (Micromhos)	

ITEM		PPM
9. CALCIUM (Ca)		
10. MAGNESIUM (Mg)		
11. SODIUM (Na) AND POTASSIUM (K)		20.4
12. HYDROXIDE (OH)*		
13. BICARBONATE (HCO_3)*		
14. CARBONATE (CO_3)*		
15. SULFATE (SO_4)		<0.1
16. CHLORIDE (Cl)	mg/l	12.74
17. NITRATE (NO_3)		(*)
18. IRON (Fe) TOTAL	mg/l	0.07
19. MAGANESE (Mn)		<0.01
20. SILICA (SiO_2)		
21. FLUORIDE (F)		1.01

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

(*) Sample preserved with Nitric Acid

CLW

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LABORATORY ANALYSIS BY: [signature]

DATE OF ANALYSIS: 8/31/79

DD FORM 1 APR 53 710

S/N 0102-LF-007-2100

$168.00

ATTACHMENT (1)

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. #1380

FROM: (Station or unit) MCB CAMP LEJEUNE

DATE August 31,1979

TO: (Name and location of laboratory) JENNINGS LABORATORIES,INC. 1118Cypress Avenue,Virginia Beach,Virginia

SAMPLE FROM: (Location of sampling point) TERAWA TERRACE

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
	8/24/79		

REASON FOR EXAMINATION: SDWA ANALYSIS

EXAMINATION REQUESTED BY:

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH	TEMPERATURE °F	TEMPERATURE °C

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY:

DATE OF ANALYSIS:

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	<0.01
	2. Se	<0.005
	3. Pb	<0.005
	4. B	
	5. Cu	0.087
	6. Zn	<0.005
	7. Cr (Hexavalent)	<0.002
	8. PO	
	9. Cd	<0.005
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
	13. Barium	<0.02
	14. Mercury	<0.002
	15. Silver	<0.01
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

REQUESTED		NOT REQUESTED

ITEM		PPM
1. COLOR		<1
2. TURBIDITY		
3. ALKALINITY ($CaCO_3$) P	MO	
4. TOTAL HARDNESS ($CaCO_3$)		
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
7. TOTAL DISSOLVED SOLIDS		134.0
8. SPECIFIC CONDUCTANCE (Micromhos)		
9. CALCIUM (Ca)		
10. MAGNESIUM (Mg)		
11. SODIUM (Na) ~~AND POTASSIUM (K)~~		7.2
12. HYDROXIDE (OH)*		
13. BICARBONATE (HCO_3)*		
14. CARBONATE (CO_3)*		
15. SULFATE (SO_4)		32.0 -
16. CHLORIDE (Cl)	mg/l	16.24
17. NITRATE (NO_3)		(*)
18. IRON (Fe) TOTAL	mg/l	0.18
19. MAGANESE (Mn)		<0.01
20. SILICA (SiO_2)		
21. FLUORIDE (F)		0.71

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

(*) Sample preserved with Nitric Acid

CLW

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LABORATORY ANALYSIS BY: [signature]

DATE OF ANALYSIS: 8/31/79

DD FORM 1 APR 53 710

SAMPLE LF-007-2100

$168.00

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. #1379

FROM: (Station or unit) MCB CAMP LEJEUNE

DATE August 31.1979

TO: (Name and location of laboratory) JENNINGS LABORATORIES,INC.1118 Cypress Avenue,Virginia Beach,Virginia

SAMPLE FROM (Location of sampling point) COURTHOUSE BAY CO-MESS

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, rer, treated)
	8/24/79		

REASON FOR EXAMINATION	EXAMINATION REQUESTED BY

NOTE: All results reported in parts per billion unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH

TEMPERATURE	
°F	°C

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY

DATE OF ANALYSIS

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	<0.01
	2. Se	<0.005
	3. Pb	<0.005
	4. B	
	5. Cu	0.037
	6. Zn	0.005
	7. Cr (Hexavalent)	<0.002
	8. PO	
	9. Cd	<0.005
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
	13. Barium	<0.02
	14. Mercury	<0.002
	15. Silver	<0.01
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

REQUESTED		NOT REQUESTED

ITEM	PPM
1. COLOR	<1
2. TURBIDITY	
3. ALKALINITY ($CaCO_3$) P	MO
4. TOTAL HARDNESS ($CaCO_3$)	
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
7. TOTAL DISSOLVED SOLIDS	160.0
8. SPECIFIC CONDUCTANCE (Micromhos)	

ITEM	PPM
9. CALCIUM (Ca)	
10. MAGNESIUM (Mg)	
11. SODIUM (Na)	50.4
12. HYDROXIDE (OH)*	
13. BICARBONATE (HCO_3)*	
14. CARBONATE (CO_3)*	
15. SULFATE (SO_4)	<0.1
16. CHLORIDE (Cl)	17.49
17. NITRATE (NO_3)	(*)
18. IRON (Fe) TOTAL	0.02
19. MAGANESE (Mn)	<0.01
20. SILICA (SiO_2)	
21. FLUORIDE (F)	0.34

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

(*) Sample preserved with Nitric Acid

CLW

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LABORATORY ANALYSIS BY

DATE OF ANALYSIS 8/31/79

DD FORM 1 APR 53 710

S/N 0102-LF-007-2100

$168.00

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. #1378

FROM: (Station or unit)
MCB CAMP LEJEUNE

DATE
August 31,1979

TO: (Name and location of laboratory)
JENNINGS LABORATORIES,INC.1118 Cypress Avenue,Virginia Beach,Virginia

SAMPLE FROM (Location of sampling point)
MIDWAY PARK (HOLCOMB BLVD.) 1711 B Butter Drive

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
	8/24/79		

REASON FOR EXAMINATION	EXAMINATION REQUESTED BY

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH	TEMPERATURE °F	TEMPERATURE °C

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY

DATE OF ANALYSIS

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	<0.01
	2. Se	<0.005
	3. Pb	<0.005
	4. B	
	5. Cu	0.012
	6. Zn	0.011
	7. Cr (Hexavalent)	0.002
	8. PO	
	9. Cd	<0.005
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
	13. Barium	<0.02
	14. Mercury	<0.002
	15. Silver	<0.01
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

REQUESTED		NOT REQUESTED

ITEM		PPM
1. COLOR		<1
2. TURBIDITY		
3. ALKALINITY ($CaCO_3$) P		
3. ALKALINITY ($CaCO_3$) MO		
4. TOTAL HARDNESS ($CaCO_3$)		
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
7. TOTAL DISSOLVED SOLIDS		260.0
8. SPECIFIC CONDUCTANCE (Micromhos)		
9. CALCIUM (Ca)		
10. MAGNESIUM (Mg)		
11. SODIUM (Na)		11.4
12. HYDROXIDE (OH)*		
13. BICARBONATE (HCO_3)*		
14. CARBONATE (CO_3)*		
15. SULFATE (SO_4)		<0.1
16. CHLORIDE (Cl)	mg/l	19.99
17. NITRATE (NO_3)		(*)
18. IRON (Fe) TOTAL	mg/l	0.02
19. MAGANESE (Mn)		<0.01
20. SILICA (SiO_2)		
21. FLUORIDE (F)		1.05

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

(*) Sample preserved with Nitric Acid

CLW

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LABORATORY ANALYSIS BY

DATE OF ANALYSIS
8/31/79

DD FORM 1 APR 53 770

S/N 0102-LF-007-2100

$168.00

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. #1377

FROM: (Station or unit) MCB CAMP LEJEUNE

DATE August 31, 1979

TO: (Name and location of laboratory) JENNINGS LABORATORIES, INC.1118 Cypress Avenue,Virginia Beach,Virginia

SAMPLE FROM (Location of sampling point) MONTFORD POINT "O" CLUB

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
	8/24/79		

REASON FOR EXAMINATION

EXAMINATION REQUESTED BY

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH

TEMPERATURE	
°F	°C

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY

DATE OF ANALYSIS

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM		PPM
	1. As		<0.01
	2. Se		<0.005
	3. Pb		<0.005
	4. B		
	5. Cu	mg/l	0.021
	6. Zn		0.011
	7. Cr (Hexavalent)		<0.002
	8. PO		
	9. Cd		<0.005
	10. CN		
	11. Phenolic Compounds (PPB)		
	12. Others (Specify)		
	13. Barium		<0.02
	14. Mercury		<0.002
	15. Silver		<0.01
	16.		

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

REQUESTED		NOT REQUESTED

ITEM		PPM
1. COLOR		<1
2. TURBIDITY		
3. ALKALINITY ($CaCO_3$) P		MO
4. TOTAL HARDNESS ($CaCO_3$)		
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
7. TOTAL DISSOLVED SOLIDS		344.0
8. SPECIFIC CONDUCTANCE (Micromhos)		

ITEM		PPM
9. CALCIUM (Ca)		
10. MAGNESIUM (Mg)		
11. SODIUM (Na) ~~AUTOMATIC~~ (*)		82.5
12. HYDROXIDE (OH)*		
13. BICARBONATE (HCO_3)*		
14. CARBONATE (CO_3)*		
15. SULFATE (SO_4)	mg/l	2.50
16. CHLORIDE (Cl)	mg/l	35.99
17. NITRATE (NO_3)		(*)
18. IRON (Fe) TOTAL	mg/l	1.35
19. MAGANESE (Mn)		~~<0.01~~
20. SILICA (SiO_2)		
21. FLUORIDE (F)		0.47

*State whether determined or computed from P and MO alkalinities.

REMARKS (Such as unusual appearance, taste, odor, etc.)

(*) Sample preserved with Nitric Acid

CLW

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LABORATORY ANALYSIS BY W. W. Jennings Jr.

DATE OF ANALYSIS 8/31/79

DD FORM 1 APR 53 710

S/N 0102-LF-007-2100

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. #1376

FROM: (Station or unit) MCB CAMP LEJEUNE

DATE August 31, 197

TO: (Name and location of laboratory) JENNINGS LABORATORIES, INC. 1118 Cypress Avenue, Virginia Beach, Virginia

SAMPLE FROM (Location of sampling point) ONSLOW "O" CLUB

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
	8/24/79		

REASON FOR EXAMINATION: SDWA ANALYSIS

EXAMINATION REQUESTED BY:

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH

TEMPERATURE	
°F	°C

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY:

DATE OF ANALYSIS:

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	<0.01
	2. Se	<0.005
	3. Pb	<0.005
	4. B	
	5. Cu mg/l	0.058
	6. Zn	0.012
	7. Cr (Hexavalent)	<0.002
	8. PO	
	9. Cd	<0.005
	10. Cl	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
	13. Barium	<0.02
	14. Mercury	<0.002
	15. Silver	<0.01
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

REQUESTED		NOT REQUESTED

ITEM		PPM
1. COLOR		0 <1
2. TURBIDITY		
3. ALKALINITY ($CaCO_3$) P		MO
4. TOTAL HARDNESS ($CaCO_3$)		
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
7. TOTAL DISSOLVED SOLIDS		284.0 mg/l
8. SPECIFIC CONDUCTANCE (Micromhos)		
9. CALCIUM (Ca)		
10. MAGNESIUM (Mg)		
11. SODIUM (Na)		413.2
12. HYDROXIDE (OH)*		
13. BICARBONATE (HCO_3)*		
14. CARBONATE (CO_3)*		
15. SULFATE (SO_4)	mg/l	1.0
16. CHLORIDE (Cl)	mg/l	21.24
17. NITRATE (NO_3)		(*)
18. IRON (Fe) TOTAL	mg/l	0.41
19. MAGANESE (Mn)		< 0.01
20. SILICA (SiO_2)		
21. FLUORIDE (F)		0.42

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

(*) SAMPLE PRESERVED WITH NITRIC ACID

CLW

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LABORATORY ANALYSIS BY:

DATE OF ANALYSIS: August 31, 1979

DD FORM 1 APR 53 710

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. #1375

FROM: (Station or unit) MCB CAMP LEJEUNE

DATE August 31,1979

TO: (Name and location of laboratory) JENNINGS LABORATORIES,INC.,1118 Cypress Avenue,Virginia Beach,Virginia

SAMPLE FROM (Location of sampling point) RIFLE RANGE EXCHANGE SNACK SHOP

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
	8/24/79		

REASON FOR EXAMINATION: SDWA ANALYSIS

EXAMINATION REQUESTED BY:

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH	TEMPERATURE °F	TEMPERATURE °C

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY:

DATE OF ANALYSIS:

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	<0.01
	2. Se	<0.005
	3. Pb	<0.005
	4. B	
	5. Cu mg/l	0.033
	6. Zn	0.034
	7. Cr (Hexavalent)	<0.002
	8. PO	
	9. Cd	<0.005
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
	13. Barium	<0.02
	14. Mercury	<0.002
	15. Silver	<0.01
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

REQUESTED		NOT REQUESTED

ITEM	PPM
1. COLOR	<1
2. TURBIDITY	
3. ALKALINITY ($CaCO_3$) P	
3. ALKALINITY ($CaCO_3$) MO	
4. TOTAL HARDNESS ($CaCO_3$)	
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
7. TOTAL DISSOLVED SOLIDS	424.0
8. SPECIFIC CONDUCTANCE (Micromhos)	
9. CALCIUM (Ca)	
10. MAGNESIUM (Mg)	
11. SODIUM (Na) ~~AND POTASSIUM (K)~~	77.5
12. HYDROXIDE (OH)*	
13. BICARBONATE (HCO_3)*	
14. CARBONATE (CO_3)*	
15. SULFATE (SO_4)	<0.1
16. CHLORIDE (Cl) mg/l	44.99
17. NITRATE (NO_3)	(*)
18. IRON (Fe) TOTAL mg/l	0.02
19. MAGANESE (Mn)	<0.01
20. SILICA (SiO_2)	
21. FLUORIDE (F)	0.34

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

(*) Sample preserved with Nitric Acid

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LABORATORY ANALYSIS BY: W. H. Jennings Jr.

DATE OF ANALYSIS 8/31/79

DD FORM 1 APR 53 710

S/N 0102-LF-007-2100

$168.00

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. #1374

FROM: (Station or unit) MCB CAMP LEJEUNE

DATE: August 31,1979

TO: (Name and location of laboratory) JENNINGS LABORATORIES, INC.,1118 Cypress Avenue,Virginia Beach,Virginia

SAMPLE FROM (Location of sampling point) CAMPGEIGER (MCAS)MESS HALL g-640

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
	8/24/79		

REASON FOR EXAMINATION: SDWA ANALYSIS

EXAMINATION REQUESTED BY:

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH	TEMPERATURE °F	TEMPERATURE °C

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY:

DATE OF ANALYSIS:

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	<0.01
	2. Se	<0.005
	3. Pb	<0.005
	4. B	
	5. Cu mg/l	0.025
	6. Zn	0.005
	7. Cr (Hexavalent)	<0.002
	8. PO	
	9. Cd	<0.005
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
	13. Barium	<0.02
	14. Mercury	<0.002
	15. Silver	<0.01
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

REQUESTED		NOT REQUESTED

ITEM	RESULT
1. COLOR	<1
2. TURBIDITY	
3. ALKALINITY ($CaCO_3$) P	
3. ALKALINITY ($CaCO_3$) MO	
4. TOTAL HARDNESS ($CaCO_3$)	
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
7. TOTAL DISSOLVED SOLIDS	624.0
8. SPECIFIC CONDUCTANCE (Micromhos)	

ITEM	PPM
9. CALCIUM (Ca)	
10. MAGNESIUM (Mg)	
11. SODIUM (Na)	142.5
12. HYDROXIDE (OH)*	
13. BICARBONATE (HCO_3)*	
14. CARBONATE (CO_3)*	
15. SULFATE (SO_4)	26.50
16. CHLORIDE (Cl)	102.47
17. NITRATE (NO_3)	(*)
18. IRON (Fe) TOTAL mg/l	0.04
19. MAGANESE (Mn)	<0.01
20. SILICA (SiO_2)	
21. FLUORIDE (F)	1.07

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

(*) Sample preserved with Nitric Acid

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LABORATORY ANALYSIS BY: W. H. Jennings, Jr.

DATE OF ANALYSIS: 8/31/79

DD FORM 1 APR 53 710

S/N 0102-LF-007-2100

444-7313
AUTOVON 690-7313

114:DPC
6280
13 OCT 1978

From: Commander, Atlantic Division, Naval Facilities Engineering Command
To: Commanding General, Marine Corps Base, Camp Lejeune

Subj: Marine Corps Base, Camp Lejeune; proposal for Base-wide Water/ Wastewater System Study

Encl: (1) Summary of the Review for Sewage Treatment Requirements for a New Barracks in the Courthouse Bay Area and the New Hospital in the Hadnot Point Area of Marine Corps Base, Camp Lejeune

1. Review of sewage treatment requirements for a new barracks in the Courthouse Bay area and the new hospital in the Hadnot Point area of Marine Corps Base, Camp Lejeune (MARCORB CAMP LEJEUNE), is summarized in enclosure (1). Water treatment demand records have shown similar increases.

2. If these recent trends continue, the water and sewage treatment facilities will exceed their design capacity in the early 1980's. Continued growth may require major facility expansions costing $20 million to $30 million. Therefore, the Atlantic Division, Naval Facilities Engineering Command (LANTNAVFACENGCOM) recommends MARCORB CAMP LEJEUNE review the recent growth trends and provide current projected growth figures for each area of MARCORB CAMP LEJEUNE. It is recommended that these projections include population estimates, proposed industrial operations, and usage rates per person and/or industrial operation.

3. Design of such a major facility expansion will require extensive preliminary studies including: potential for upgrading/consolidating treatment units/pump stations, study of infiltration/inflow, effects of consolidated discharges in receiving waters, potential for elimination of discharges through land application, applicability and potential savings from water conservation techniques. It is therefore recommended that these projections be completed in time to allow for project programming and preliminary studies to accommodate FY-82/83 projects.

J. G. Leech
By direction

Copy to:
CMC (LFF-2)
MCAS CHERRY POINT
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Richar
10/11/
NRS

ATTACHMENT (2)

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SUMMARY OF THE REVIEW FOR THE
SEWAGE TREATMENT REQUIREMENTS FOR A NEW BARRACKS IN THE COURTHOUSE BAY AREA
AND THE NEW HOSPITAL IN THE HADNOT POINT AREA OF MARINE CORPS BASE, CAMP LEJEUNE

TIMEFRAME	BASEWIDE TOTAL AVERAGE SEWAGE FLOW (000 GPD*)	REMARKS	COURTHOUSE BAY SEWAGE TREATMENT PLANT AVERAGE FLOW (000 GPD*)	REMARKS	HADNOT POINT SEWAGE TREATMENT PLANT AVERAGE FLOW (000 GPD)	REMARKS
MAR-DEC 76	6687	Total Capacity:** 13,100,000 GPD	276	Design Capacity: 525,000 GPD	4177	Design Capacity: 8,000,000 GPD
JAN-DEC 77	7402	11% Increase	328	20% Increase	4716	9-13% Increase***
JAN-JUL 78	8316	12% Increase	412	20% Increase	5476	16% Increase
1 OCT 79 Est.	9000+	10%+ Increase Assumed	450+	10%+ Increase Assumed	6000+	10%+ Increase Assumed
1 OCT 80 Est.	10,000+	10%+ Increase Assumed	500+	10%+ Increase Assumed	6500+	10%+ Increase Assumed
1 OCT 81 Est.	11,000+	10%+ Increase Assumed	550+	10%+ Increase Assumed	7000+	10%+ Increase Assumed
1 OCT 82 Est.	12,000+	10%+ Increase Assumed	600+	10%+ Increase Assumed	7700+	10%+ Increase Assumed
1 OCT 83 Est.	13,000+	10%+ Increase Assumed	650+	10%+ Increase Assumed	8500+	10%+ Increase Assumed

NOTE: (1) Possible FY-84 base-wide overload even without FY-80 P-996 (500,000 GPD; not included in above).
(2) Possible FY-81 Courthouse Bay overload even without FY-80 P-996 (50-100,000 GPD; not included in above).
(3) Possible FY-83 Hadnot Point overload even without FY-80 P-996 (300,000 GPD; not included in above) and the new hospital (300,000 GPD; not included in above).

(4) Possible causes of flow increases:

(a) Flow meter errors (unlikely that all 7 meters would increase)
(b) Infiltration/inflow increasing
(c) More persons and/or industrial operations
(d) Higher generation rate per person and/or industrial operation

*GPD = Gallons per Day
**Excludes New River Sewage Treatment Plant (abandoned)
***% increase variability due to whether include SEP 76 average flow of 2,930,000 GPD (appears too low).

ENCLOSURE (1)

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

TELEPHONE NO.
AUTOVON 690-7313
IN REPLY REFER TO:

114:DPG
6280
8 FEB 1979

From: Commander, Atlantic Division, Naval Facilities Engineering Command
To: Commanding General, Marine Corps Base, Camp Lejeune, NC

Subj: Recommended corrective actions for remaining known wastewater/ oil environmental deficiencies

Ref: (a) National Pollutant Discharge Elimination System (NPDES) Wastewater Discharge Permit NC0003239
(b) FY80 Pollution Control MCON Project P-996 ($9,000 + K)
(c) Clean Water Act of 1977

Encl: (1) Sewage Treatment Plant Excessive Chlorination estimates
(2) LANTNAVFACENGCOM ltr 6280 114:DPG of 13 Oct 78

1. On 22 September 1977, the U. S. Environmental Protection Agency (EPA) cited Marine Corps Base, Camp Lejeune, as a "major polluter" for noncompliance with the legal requirements of reference (a), which covers the seven Marine Corps Base, Camp Lejeune, sewage treatment plants and the industrial wastewater/oil discharges to the 71 storm drains.

2. Reference (b) will provide by 1 July 1981, the several hundred corrective action items which will bring Marine Corps Base, Camp Lejeune, into compliance with reference (a).

3. In accordance with reference (c), state environmental requirements will become part of the next National Pollutant Discharge Elimination System (NPDES) wastewater discharge permit. The present permit expires 31 December 1979, and reapplication is due 30 June 1979 (LANTNAVFACENGCOM technical assistance will be available).

4. The next (FY80) NPDES Permit may require:

a. More monitoring of the sewage treatment plants and receiving waters (e.g. monitoring for chemical oxygen demand, phosphorus, and oil in accordance with the new definition of secondary treatment).

b. Operation of the advanced wastewater treatment portion of the Camp Geiger sewage treatment plant. A "Waste Load Allocation Report" should be requested of North Carolina to justify whether there is even an environmental need to operate this system.

c. Sewage treatment plant effluent chlorine limits. As discussed in enclosure (1), excessive, toxic amounts of chlorine are being used at a cost of $50 - 100,000 per year.

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Subj: Recommended corrective actions for remaining known wastewater/ oil environmental deficiencies

5. Although the EPA considers the operation/maintenance of the seven sewage treatment plants to be excellent, the capacity of the plants may be exceeded in the early 1980's as discussed in enclosure (2). Please advise LANTNAVFACENGCOM Code 114 as to your evaluation of this situation.

6. Due to cost limitations of reference (b), the $375K to provide oil Spill Prevention Control Counter Measures (SPCC) for an estimated 1,561 space heaters was deleted. These items should be resubmitted as a separate FY81/82 oil SPCC pollution abatement MCON.

7. Reference (b) is to attain compliance with reference (a) which does not require erosion control. Compliance with Soil Conservation Service erosion control requirements is, however, also legally required and a separate FY82 pollution abatement MCON should be submitted as soon as possible. An A/E preliminary study will probably be required to delineate the scope of this project.

8. Remaining known wastewater/oil environmental deficiencies concern the treatment of the coal pile runoff, which is understood by LANTNAVFACENGCOM to be accomplished as part of the coal conversion of the Marine Corps Base, Camp Lejeune, boilers.

J. G. Leech
By direction

Copy to:
COMNAVFACENGCOM
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09A
09P
114S
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114/JRL

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MARINE CORPS BASE, CAMP LEJEUNE
SEWAGE TREATMENT PLANT EXCESSIVE CHLORINATION ESTIMATES

Note: Although chlorine effluent limits vary, effluent chlorine greater than 1.0-2.0 MG/L is generally not required for adequate disinfection and can cause the sewage treatment plant effluent to become toxic, thereby negating the entire purpose of the sewage treatment plant. (See attached discussion of chlorine toxicity).

Month	Total Flow (MGD)	Weighted Average Chlorine (MG/L)	Excess Chlorine (100 lbs./month)	Estimated Cost per month ($000)*
OCT 76	6.7	3.1	19-36	2-7
NOV 76	6.5	5.0	49-65	5-13
DEC 76	6.9	4.4	43-61	4-12
JAN 77	6.7	5.1	54-71	5-14
FEB 77	6.6	4.9	45-60	5-12
MAR 77	7.1	4.6	48-66	5-13
APR 77	6.4	4.3	37-53	4-11
MAY 77	7.7	3.3	26-46	3-9
JUN 77	7.6	3.4	27-46	3-9
JUL 77	7.6	3.5	30-49	3-10
AUG 77	8.1	3.7	36-57	4-11
SEP 77	7.5	3.8	34-53	3-11
OCT 77*	7.6	3.8	35-55	4-11
NOV 77	8.1	4.1	43-63	4-13
DEC 77	7.9	3.9	39-59	4-12
JAN 78	8.7	3.5	34-56	3-11
FEB 78	7.9	3.7	31-50	3-10
MAR 78	8.3	3.9	41-62	4-12
APR 78	8.0	4.0	40-60	4-12
MAY 78	8.8	3.9	43-66	4-13
JUN 78	8.3	3.9	40-60	4-12
JUL 78	8.3	3.5	32-54	3-11
AUG 78	7.9	4.1	43-63	4-13
SEP 78	8.1	3.6	32-53	3-11
OCT 78	8.1	3.9	40-61	4-12
NOV 78	8.3	4.0	42-62	4-12
DEC 78	9.3	3.9	46-70	5-14
27 Months (822 days)	7.7	4.0	40-58	4-12
				Say: $50-$100,000 per year

*Chlorine cost: $1-2 per pound depending on locale and amount of purchase.
** LANTNAVFACENGCOM initiated monthly recommendations that the effluent chlorine be lowered (i.e. to less than 2.0 MG/L).

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Enclosure (1)

QUALITY CRITERIA FOR WATER

U.S. ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

PORTIONS OF THIS REPORT ARE NOT LEGIBLE.

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TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA-440/9-76-023		

4. TITLE AND SUBTITLE	5. REPORT DATE
Quality Criteria for Water	Jul 1976
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPOR
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Water Planning and Standards Washington DC 20460	13. TYPE OF REPORT AND PERIOD COV
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Federal Water Pollution Control Act Amendments of 1972 require the Administrator of the Environmental Protection Agency to publish criteria for water quality accurately reflecting the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare which may be expected from the presence of pollutants in any body of water, including ground water. Proposed Water Quality Criteria were developed and a notice of their availability was published on Oct 26, 1973 (38 FR 29646). This present volume represents a revision of the proposed water quality criteria based upon a consideration of comments received from other Federal agencies, State agencies, special interest groups and individual scientists.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Grou

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
	20. SECURITY CLASS *(This page)*	22. PRICE

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EPA Form 2220-1 (9-73)

CHLORINE

CRITERIA:

Total residual chlorine:

2.0 ug/l for salmonid fish ;
10.0 ug/l for other freshwater and marine organisms.

INTRODUCTION:

Elemental chlorine is a greenish-yellow gas that is highly soluble in water. It reacts readily with many inorganic substances and all animal and plant tissues. The denaturing effect of chlorine on animal and plant tissues forms the basis for its use as an effective water or wastewater disinfectant. When chlorine dissolves in water, it hydrolyzes according to the reaction: $Cl_2 + H_2O \longrightarrow HOCl + H^+ + CL^-$. Unless the concentration of the chlorine solution is above 1000 mg/l, all chlorine will be in the form of HOCl or its dissociated ions H^+ and OCl^-. The HOCl is a weak acid and is dissociated according to the equation, $HOCl \rightleftharpoons H^+ + OCl^-$.

The ratio between HOCl and OCl^- is a function of the pH, with 96 percent HOCl remaining at pH 6, 75 percent at pH 7, 22 percent at pH 8, and 3 percent at pH 9. The relationship of HOCl to pH is significant as the undissociated form appears to be the bactericidal agent in the use of chlorine for disinfection (Moore, 1951).

Chlorine is not a natural constituent of water. Free available chlorine (HOCl and OCl^-) and combined available chlorine (mono- and

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di-chloramines) appear transiently in surface or ground waters as a result of disinfection of domestic sewage or from industrial processes that use chlorine for bleaching operations or to control organisms that grow in cooling water systems.

RATIONALE:

Chlorine, in the free available form reacts readily with nitrogenous organic materials to form chloramines. These compounds are toxic to fish. Chloramines have been shown to be slightly less toxic to fish than free chlorine, but their toxicity is considered to be close enough to free chlorine that differentiation is not warranted (Merkens, 1958). Since the addition of chlorine or hypochlorite to water containing nitrogenous materials rapidly forms chloramines, toxicity in most waters is related to the chloramine concentration. The toxicity to aquatic life of chlorine will depend upon the concentration of total residual chlorine, which is the amount of free chlorine plus chloramines. The persistence of chloramines is dependent on the availability of material with a lower oxidation-reduction potential.

In field studies in Maryland and Virginia, Tsai (1973) observed that downstream from plants discharging chlorinated sewage effluents, the total numbers of fish species were drastically reduced with the stream bottom clear of aquatic organisms characteristically present in unchlorinated wastewater discharges. No fish were found in water with a chlorine residual above 0.37 mg/l and the species diversity

index reached zero at 0.25 mg/l. A 50 percent reduction in the species diversity index occurred at 0.10 mg/l. Of the 45 species of fish observed in the study areas, the brook trout and brown trout were the most sensitive and were not found at residual chlorine levels above about 0.02 mg/l. In studies of caged fish placed in waters downstream from chlorinated wastewater discharges, the Michigan Department of Natural Resources (1971) reported that 50 percent of the rainbow trout died within 96 hours at residual chlorine concentrations of 0.014 to 0.029 mg/l. Some fish died as far as 0.8 miles (1.3 km) downstream from the outfall.

Studies described by Brungs (1973) indicate that salmonids are the most sensitive fish to chlorine. A residual chlorine concentration of 0.006 mg/l was lethal to trout fry in two days (Coventry, et al., 1935). The 7-day LC_{50} for rainbow trout was 0.08 mg/l with an estimated median period of survival of one year at 0.004 mg/l (Merkens, 1958). Rainbow trout were shown to avoid a concentration of 0.001 mg/l (Sprague and Drury, 1969). Dandy (1972) demonstrated that brook trout had a mean survival time of 9 hours at 0.35 mg/l, 18 hours at 0.08 mg/l and 48 hours at 0.04 mg/l, with mortality of 67 percent after 4 days at 0.01 mg/l. Pike (1971) observed a 50 percent brown trout mortality at 0.02 mg/l within 10.5 hours and 0.01 mg/l with 43.5 hours.

The range of acutely lethal residual chlorine concentrations is narrow for various species of warm water fish. Arthur (1972) determined

96-hour LC_{50} values for the walleye, black bullhead, white sucker, yellow perch, largemouth bass, and the fathead minnow. The observed concentration range was 0.09 to 0.30 mg/l.

Using fathead minnows in a continuous bioassay technique at Michigan treatment plants, Zillich (1972) found that an average concentration of 0.16 to 0.21 mg/l killed all of the test fish and that concentrations as low as 0.07 mg/l caused some mortalities. Pyle (1960) demonstrated a 50 percent mortality of smallmouth bass exposed to 0.5 mg/l within 15 hours. The mean 96-hour LC_{50} value for golden shiners was 0.19 mg/l (Esvelt, et al., 1971). Arthur and Eaton (1971), working with fathead minnows and the freshwater crustacean, Gammarus pseudolimnaeus, in dilute wastewater, found that the 96-hour LC_{50} of total residual chlorine for Gammarus was 0.22 mg/l and that all fathead minnows were dead after 72 hours at 0.15 mg/l. At concentrations of .09 mg/l, all fish survived until the seventh day when the first death occurred. In exposure to 0.05 mg/l residual chlorine, these investigators found reduced survival of Gammarus and at 0.0034 mg/l there was reduced reproduction. Growth and survival of fathead minnows after 21 weeks were not affected by continuous exposure to 0.043 mg/l residual chlorine. The highest level showing no significant effect was 0.016 mg/l. Working with secondary wastewater effluent, Arthur (1972) found that reproduction by Gammarus was reduced by residual concentrations above 0.012 mg/l residual chlorine.

In marine water, 0.05 mg/l was the critical chlorine level for young Pacific salmon exposed for 23 days (Holland, et al., 1960). The

lethal threshold for chinook salmon and coho salmon for a 72-hour exposure was noted by these investigators to be less than 0.01 mg/l chlorine. Studies on the effect of residual chlorine to marine phytoplankton indicate that continuous exposure to 0.10 mg/l reduced primary production by 70 percent while 0.2 mg/l for 1.5 hours reduced primary production by 25 percent (Carpenter, et al., 1972). Laboratory studies on ten species of marine phytoplankton indicate that a 50 percent reduction in growth rate occurred at chlorine concentrations of 0.075 to 0.250 mg/l during a 24-hour exposure period (Gentile, et al., 1973). Oysters are sensitive to chlorine concentrations of 0.01 to 0.05 mg/l and react by reducing pumping activity. At chlorine concentrations of 1.0 mg/l, effective pumping could not be maintained (Galtsoff, 1945).

Chlorine residuals of 10 ug/l have been shown to kill adult salmonid fish in a period of several days in fresh water and the fry of these species have been killed in chlorine residuals of 6 ug/l. The criterion of 2 ug/l chlorine should afford protection to this group of fish when exposed on a continuing basis. Considering the data presented above, a criterion of 10 ug/l should afford protection to other freshwater fish and marine aquatic life (Brungs, In Press). Brungs (1973) reported that aquatic organisms may tolerate short-term exposure to higher levels of residual chlorine than the concentrations which have adverse chronic effects. Basch and Tmuchan (In Press) have shown that repeated daily exposure at these levels will have toxic effects on aquatic life.

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REFERENCES CITED:

Arthur, J.W., 1972. Progress Report, Natl. Water Quality Lab., Environmental Protection Agency, Duluth, Minn.

Arthur, J.W., and L.G. Eaton, 1971. Chloramine toxicity to the amphipod, Gammarus pseudolimnaeus, and the fathead minnow, Pimephales promelas. Jour. Fish. Res. Bd. Can., 28:1841.

Basch, R.E. and J.G. Truchan, In Press. Toxicity of chlorinated power plant condenser cooling waters to fish. U.S. Environmental Protection Agency, Ecological Research Series. Grant R800700 Michigan Water Resources.

Brungs, W.A., 1973. Effects of residual chlorine on aquatic life. Jour. Water-Poll. Cont. Fed., 45:2180.

Brungs, W.A., In Press. Effects of wastewater and cooling water chlorination on aquatic life. U.S. Environmental Protection Agency, Ecological Research Series.

Carpenter, E.J., et al., 1972. Cooling water chlorination and productivity of entrained phytoplankton. Marine Biology, 16:37.

Coventry, F.L., et al., 1935. The conditioning of a chloramine treated water supply for biological purposes. Ecology, 16: 60.

Dandy, J.W.T., 1972. Activity response to chlorine in brook trout, Salvelinus fontinalis. Can. Jour. Zool., 50:405.

Esvelt, L.A., et al., 1971. Toxicity removal from municipal wastewaters. Vol. IV, A study of toxicity and biostimulation in San Francisco Bay-Delta Water. SERL Rept. No. 71-7, San Eng. Res. Lab., Univ. of California, Berkeley.

Galtsoff, P.S., 1946. Reactions of oysters to chlorination. Fish and Wildlife Service, USDI Research Report 11.

Gentile, J.H., et al., 1973. The effects of chlorine on the growth and survival of selected species of estuarine phytoplankton and zooplankton. 36th Ann. Meeting Amer. Soc. Limnol. and Oceanog.

Holland, G.A., et al., 1960. Toxic effects of organic and inorganic pollutants on young salmon and trout. State of Wash., Dept. of Fisheries, Res. Bull. No. 5:198.

Merkens, J.C., 1958. Studies on the toxicity of chlorine and chloramines to the rainbow trout. Water Waste Trt. Jour., (C.B.), 7:150.

Michigan Department of Natural Resources, 1971. Chlorinated municipal waste toxicities to rainbow trout and fathead minnows. Water Poll. Cont. Res. Ser., 18050 GZZ, EPA, Washington, D. C.

Moore, E.W., 1951. Fundamentals of chlorination of sewage and waste. Water and Sewage Works, 98:130.

Pike, D.J., 1971. Toxicity of chlorine to brown trout. New Zealand Wildlife, No. 33.

Pyle, E.A., 1960. Neutralizing chlorine in city water for use in fish distribution tanks. Progressive Fish Cult., 22:30.

Sprague, J.B. and D.E. Drury, 1969. Avoidance reactions of salmonid fish to representative pollutants. In: Advances in water pollution research. Proc. 4th Intl. Conf. Water Poll. Res., Pergamon Press, London, England.

Tsai, C., 1973. Water quality and fish life below sewage outfalls. Trans. Amer. Fish. Soc., 102:281.

Zillich, V.A., 1972. Toxicity of combined chlorine residuals to freshwater fish. Jour. Water Poll. Cont. Fed., 44:212.

LAWS AND RULES
FOR
GROUND ABSORPTION SEWAGE DISPOSAL SYSTEMS
OF 3000 GALLONS OR LESS DESIGN CAPACITY

SECTION .1900
OF THE
NORTH CAROLINA ADMINISTRATIVE CODE
TITLE 10
DEPARTMENT OF HUMAN RESOURCES
CHAPTER 10
HEALTH SERVICES; SANITARY ENGINEERING
SUBCHAPTER 10A
SANITATION

NORTH CAROLINA
DEPARTMENT OF HUMAN RESOURCES
DIVISION OF HEALTH SERVICES
SANITARY ENGINEERING SECTION
EFFECTIVE
JULY 1, 1977

10 NCAC 10A .1900; SEWAGE DISPOSAL SYSTEMS;

CONTENTS

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SECTION 130-160 OF CHAPTER 130
OF THE GENERAL STATUTES OF NORTH CAROLINA
AS AMENDED BY 1977 GENERAL ASSEMBLY

§130-160. Sanitary Sewage Disposal; Rules.

(a) Any person owning or controlling any single or multiple family residence, place of business or place of public assembly shall provide a sanitary system of sewage disposal consisting of an approved privy, an approved septic tank system, or a connection to a public or community sewerage system. Any such sanitary sewage disposal system with 3,000 gallons or less design capacity serving a single or multiple family residence, place of business, or place of public assembly, the effluent from which is not discharged to the surface waters, shall be approved under rules and regulations promulgated by the Commission for Health Services. All other such sanitary sewage disposal systems with more than 3,000 gallons design capacity shall be approved under rules and regulations promulgated by the Environmental Management Commission pursuant to the applicable provisions of Article 21 of Chapter 143.

(b) Notwithstanding the provisions of subsection (a) of this section and the provisions of G.S. 130-17(b), any sanitary sewage disposal system subject to approval under rules and regulations of the Commission for Health Services shall be reviewed and approved under rules and regulations of a local board of health in the following circumstances:

(1) The local board of health, on its own motion, has requested the Commission for Health Services to review its proposed regulations concerning sanitary sewage disposal systems.

(2) The Commission for Health Services has found that the regulations of the local board of health concerning sanitary sewage disposal systems are substantially equivalent to the commission's regulations, and are sufficient to safeguard the public health.

(c) The Commission for Health Services from time to time, upon its own motion or upon the request of a local board of health or upon the request of a citizen of an affected county, may review its findings under subsection (b) of this section. Subject to such review, the commission's finding that local regulations meet the requirements of subsection (b) of this section shall be binding and conclusive.

(d) The relationship between State and local regulations concerning sanitary sewage disposal systems shall continue to be governed by G.S. 130-17(b) except in those cases where local regulations have been reviewed and approved pursuant to subsection (b) of this section. (1957, c. 1357, s. 1; 1973, c. 471, s. 1; c. 476, s. 128; c. 860; 1977, c. 857, s. 1.)

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G.S. 130-17 is amended to read as follows:

(b) The local boards of health shall make such rules and regulations, not inconsistent with law, as are necessary to protect and advance the public health. Subject to the provisions of G.S. 130-160, where such rules and regulations deal with subject matter also covered by rules and regulations of the Commission for Health Services, and there is an emergency, or peculiar local condition or circumstances, requiring such action in the interest of public health, the rules and regulations of the local boards may be more stringent, but not less stringent, than those of the commission. In other instances where there is a conflict between the rules and regulations of the Commission and the local boards, the rules and regulations of the Commission shall prevail. All rules and regulations heretofore adopted by a local board of health shall remain in full force and effect until repealed by said local board of health or superseded by rules and regulations duly adopted by said local board of health. (1977, c. 857, s. 2.)

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ARTICLE 13C OF CHAPTER 130
OF THE GENERAL STATUTES OF NORTH CAROLINA

GROUND ABSORPTION SEWAGE DISPOSAL SYSTEM ACT OF 1973

§130-166.22. Short title. -- This Article shall be known and may be cited as the "Ground Absorption Sewage Disposal System Act of 1973." (1973, c. 452, s. 2.)

§130-166.23. Preamble. -- The General Assembly finds and declares that continued installation, at a rapidly and constantly accelerating rate, of septic tanks and other types of ground absorption sewage disposal systems in a faulty or improper manner and in areas where unsuitable soil and population density adversely affect the efficiency and functioning of these systems has a detrimental effect on the public health through contamination of the ground water supply. Recognizing, however, that ground absorption sewage disposal can be rendered ecologically safe and the public health protected if such methods of sewage disposal are properly regulated and recognizing that ground absorption sewage disposal will continue to be necessary for the adequate and economical housing of an expanding population, the General Assembly intends hereby to insure the regulation of ground absorption sewage disposal systems so that such systems may continue to be used, where appropriate, without jeopardizing the public health. (1973, c. 452, s. 3.)

§130-166.24. Definitions. -- As used herein, unless the context otherwise requires:

(1) "Construction" means any work at the site of placement done for the purpose of preparing a dwelling or mobile home for initial occupancy;
(2) "Ground absorption sewage disposal system" means a sewage disposal method relying primarily on the soil for leaching and removal of dissolved and suspended organic or mineral materials from human waste, including a privy;
(3) "Health department" means any county, city, district, consolidated city-county or other health department authorized to be organized under Chapter 130 of the General Statutes;
(4) "Location" means the initial placement of a mobile home;
(5) "Mobile home dealer" means every person or firm offering mobile homes for sale within this State;
(6) "Mobile home sales lot" means any place where two or more mobile homes are displayed and offered for sale;
(7) "Relocation" means the displacement of a dwelling or mobile home from one site to another;
(8) "Septic tank system" means a ground absorption sewage disposal system consisting of a holding or settling tank and a ground absorption field. (1973, c. 452, s. 4.)

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§130-166.25. Improvements permit require. -- (a) No person shall commence the construction or relocation of any dwelling nor shall any person locate, relocate or cause to be located or to be relocated any mobile home intended for use as a dwelling, other than one in a mobile home park, on a site in an area not served by a public or community sewage disposal system without first obtaining an improvements permit from the local health department having jurisdiction.

(b) The local health department shall issue an improvements permit authorizing work to proceed and the use of a septic tank or other ground absorption disposal system when it has determined, after a field investigation of the area, including such factors as character and porosity of soil, percolation rate, topography, depth to water table and rock or other impervious formations and location or proposed location of any water supply wells, that such a system can be installed at the site in compliance with the rules and regulations of the local board of health governing such installations; provided, however, that no septic tank system which is attempted to be installed shall be covered with the soil until the local health department determines that the system as installed is in compliance with the rules and regulations governing such installations; provided further, that this Article does not limit or interfere with the authority of the Department of Human Resources to adopt and enforce reasonable rules and regulations under authority of G.S. 130-160. (1973, c. 452, s. 5; c. 476, s. 128.)

§130-166.26. Certificate of completion. -- Upon determining that a ground absorption sewage disposal system is properly installed, the local health department shall issue a certificate of completion authorizing a conventional dwelling to be occupied following construction or relocation activity upon that dwelling. Upon determining that a ground absorption sewage disposal system is properly installed, the local health department shall issue a certificate of completion authorizing a mobile home to be occupied following its location or relocation. No person shall occupy a dwelling or mobile home until a certificate of completion has been issued. (1973, c. 452, s. 6.)

§130-166.27. Improvements permit or certificate of completion required before other permits to issue. -- (a) Where construction or relocation activity is proposed to be done upon a conventional dwelling, no permit required for electrical, plumbing, heating, air conditioning or other construction, location or relocation activity under any provision of general or special law shall be issued until after an improvement permit has been issued.

(b) Where location or relocation is proposed for a mobile home, no permit required for electrical, plumbing, heating, air conditioning or other construction, location or relocation activity under any provision of general or special law shall be issued until after a certificate of completion has been issued. (1973, c. 452, s. 7.)

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§130-166.28. Limitation on electrical service. -- It shall be unlawful for any person, partnership, firm, or corporation to allow any electric current for use at the locating or relocating of a mobile home intended to be used as a dwelling, other than one in a mobile home park, or to a dwelling upon construction, location or relocation until the official electrical inspector with jurisdiction as provided in G.S. 143-143.2 certifies to the electrical supplier that the required improvements permit for conventional dwellings or the required certificate of completion for mobile homes has been issued. (1973, c. 452, s. 8.)

§130-166.29. Appeal to local board of health. -- Any owner or builder denied an improvements permit or a certificate of completion under this Article shall have a right of appeal to the local board of health, provided such action is taken within 15 days of denial. Notice of appeal shall be given by filing with the local health director a demand for a hearing. Upon filing of such notice the local health director shall, within five working days, transmit t the board of health the papers and materials constituting the record upon which the decision appealed from was made.

The local board of health shall hold a hearing within 15 days of the receipt of the notice of appeal. The board shall give the appellant not less than five days' notice of the date, time, and place of the hearing. Any party may appear in person or by agent or attorney. In considering appeals, the board shall have authority only to determine whether a ground absorption system can be installed in compliance with its rules and regulations or whether the work done so complies.

No person denied an improvements permit or certificate of completion shall proceed with any work or improvement activity whatsoever or shall occupy any dwelling or reside in any mobile home unless and until the department issues the necessary permit. (1973, c. 452, s. 9; 1977, c.239.)

§130-166.30. Judicial review. -- Any owner or builder denied a permit under this Article shall have a right of appeal to the district court having jurisdiction, if such appeal be made within 10 days after the date of the denial by the board. (1973, c. 452, s. 10.)

§130-166.31. Duties of mobile home dealers. -- (a) Every mobile home dealer doing business in this State shall be required to furnish each purchaser of a mobile home an easily understandable summary of the provisions of this Article. The Department of Human Resources shall prepare the summary and shall make sufficient copies available to dealers.

(b) Each mobile home dealer shall be required to post conspicuously at the office of each mobile home sales lot the following:

> "NOTICE: State law requires that the local health department determine the method and adequacy of sewage disposal before a mobile home is placed on the premises."

(1973, c. 452, s. 11; c. 476, s. 128)

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§130-166.32. Exemptions. -- No provision of this Article shall apply to persons developing land in areas not served by community sewer systems who present acceptable plans for installation of community sewer systems to the local health department and the North Carolina Environmental Management Commission and who certify that such system will be installed before permitting occupancy. (1973, c. 452, s. 12; 1974, c. 1262, s. 23.)

§130-166.33. Penalties. -- Any person who knowingly violates any provision of this Article shall be guilty of a misdemeanor and shall be punishable by a fine not to exceed two hundred dollars ($200.00). (1973, c. 452, s. 13.)

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10 NCAC 10A .1900; SEWAGE DISPOSAL SYSTEMS; has been adopted and reads as follows:

.1901 PURPOSE

To protect the health and well being of the general public, any single or multiple-family residence, place of business or place of public assembly in North Carolina, which is served by a ground absorption sewage disposal system of 3,000 gallon or less design capacity, and which does not result in a discharge to the surface waters of the state shall be governed as set out in .1902 - .1931 of this section.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1902 PROPER DISPOSAL

The Commission for Health Services:

(1) Finds and declares that continued installation, at a rapidly and constantly accelerating rate, of septic tanks and other types of ground absorption sewage disposal systems in a faulty or improper manner and in areas where unsuitable soil and population density adversely affects the efficiency and functioning of these systems, has a detrimental effect on the public health through contamination of ground and surface water and through the exposure of sewage-carried pathogens to man, animals, birds, and insects.

(2) Recognizes, that ground absorption sewage can be rendered ecologically safe and the public health protected if such methods of sewage disposal are properly regulated and recognizes that ground absorption sewage disposal will continue to be necessary for the adequate and economical housing of an expanding population.

(3) Intends to insure the regulation of ground absorption sewage disposal systems so that such systems serving residences, places of business, and places of public assembly in North Carolina may continue to be used, where appropriate, without jeopardizing the public health.

(4) Intends that, consistent with the General Statutes, the primary responsibility for regulating the installation and use of ground absorption sewage disposal systems be with local health departments.

History Note: Statutory Authority G.S. 130-160; 130-166.23;
Eff. July 1, 1977.

.1903 DEFINITIONS

The following definitions shall apply throughout this section:

(1) "Alluvial soils" shall mean stratified soils without distinct horizons, deposited by flood waters.

(2) "Approved" shall mean that which has been considered acceptable to the state or local agency.

(3) "Approved privy" shall mean a fly-tight structure consisting of a pit, floor slab, and seat riser constructed in accordance with .1905 (a) of this section.

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(4) "Approved sewerage system" shall mean a public, community or institutional sewerage system for the collection and treatment of sewage or other liquid wastes constructed and operated in compliance with applicable requirements of the state or local agency.

(5) "Areas subject to frequent flooding" shall mean those areas consisting of alluvial soils, indicating soils deposited from flooding of less than a 10-year frequency.

(6) "Horizon" shall mean a layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil forming processes.

(7) "Local health director" shall mean the local health director as defined in G.S. 130-3(g), or his authorized representative.

(8) "Nitrification field" shall mean the system of nitrification lines or field lateral lines which receive the septic tank effluent.

(9) "Nitrification lines" or "field lateral lines" shall mean the open-jointed pipe, drain lines, especially designed porous blocks, or other approved materials which receive the septic tank effluent for nitrification, distribution, and absorption into the soil beneath the ground surface.

(10) "Organic soils" shall mean those organic mucks and peats consisting of more than 20% organic matter to depths of 18 inches or greater.

(11) "Ped" shall mean a unit of soil structure such as an aggregate, crumb, prism, block, or granule, formed by natural processes.

(12) "Perch" shall mean restricting vertical movement of liquids.

(13) "Person" shall mean any individual, firm, association, organization, partnership, business trust, corporation, or company.

(14) "Place of business" shall mean and include any store, warehouse, manufacturing establishment, place of amusement or recreation, service station, office building, or other places where people work.

(15) "Place of public assembly" shall mean and include fairgrounds, auditoriums, stadiums, churches, campgrounds, theaters, and other places where people assemble.

(16) "Privy building" shall mean and include any and all buildings which are used for affording privacy in acts of urination and defecation which are not connected to a residential septic tank or community type sewerage system.

(17) "Residence" shall mean and include any private home, tenant house, hotel, motel, summer camp, labor work camp, mobile home, institution, or places where people reside for any period of time.

(18) "Septic tank" shall mean a water-tight, covered receptacle designed and constructed to:

(a) Receive the discharge of sewage from a building sewer;
(b) Separate settleable and floating solids from the liquid;
(c) Digest organic matter by anaerobic bacterial action;
(d) Store digested solids through a period of detention; and,
(e) Allow clarified liquids to discharge for additional treatment and final disposal.

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(19) "Septic tank system" shall mean a ground absorption sewage disposal system consisting of a holding or settling tank and a ground absorption field.

(20) "Sewage" shall mean the waste water and its contents from any single or multiple-family residence, place of business, or place of public assembly.

(21) "Sewer connection" shall mean a connection with an approved community or public sewerage system which provides for the collection and disposal of sewage or other liquid wastes.

(22) "Site" shall be that area in which the septic tank system is to be located, and the area required to accommodate repairs and/or replacement of field and permit proper functioning of the system.

(23) "Soil," for the purposes of subsurface sewage disposal, shall mean the unconsolidated mineral and organic material of the land surface. It consists of sand, silt, and clay minerals and variable amounts of organic materials. It exists as natural undisturbed material or as disturbed material (such as cut and fill).

(24) "Soil absorption system" shall mean a system that utilizes the soil for absorption of effluent from treated sewage.

(25) "Local agency" shall mean the local agency (or its authorized representative) having legal jurisdiction for implementation of this section.

(26) "Structure," as it relates to soil, shall mean the arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles.

(27) "Subsurface disposal" shall mean the process of sewage treatment inwhich sewage effluent is applied to land by distribution beneath the surface of the ground through open-jointed pipes; approved drains; approved, specially designed porous block; or other approved materials.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1904 SEWAGE DISPOSAL REQUIREMENTS

(a) Every residence, place of business or place of public assembly as defined in this section shall be provided with either an approved number of privies constructed in accordance with the requirements of this section, a septic tank system constructed in accordance with the provisions of this section, or connection to an approved sewer system.

(b) Where an approved privy, an approved septic tank system, or a connection to an approved sewer system is impossible, impractical, or undesirable, this section shall not prohibit the state or local agency from permitting alternate systems, approved vault type privies, or approved mechanical toilet facilities utilizing heat or other approved means for reducing the toilet contents to an inert or stabilized residue or to an otherwise harmless condition, rendering such contents non-infectious or non-contaminating. Alternative systems to septic tank systems shall be designed to

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comply with the purposes and intent of this section.

(c) Nothing in this section shall prohibit the state or local agency from permitting the use of portable toilets at construction sites or at mass gathering events of a temporary nature, provided such use shall be contingent upon the provision of adequate cleaning and disposal service in accordance with the directions of the state or local agency.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1905 PRIVY AND SEPTIC TANK CONSTRUCTION

(a) An "approved privy" shall consist of a pit, floor slab, and seat assembly housed in a building which affords privacy and reasonable protection from the weather.

(1) The pit shall consist of an excavation at least 42 inches square and 5 feet deep, but in no case shall the depth be such that contamination of ground water will occur.

(2) The pit shall be properly curbed to prevent caving. In sandy or loose soil the curb should extend the full depth of the pit. In tight soils partial curbing is acceptable if it prevents caving.

(3) The privy floor slab shall be constructed of reinforced concrete. Where it is impractical to secure or construct reinforced concrete floor assemblies, wood construction will be accepted provided the floor slab is made of rough sub-flooring and covered with tight tongue-and-groove flooring or other type flooring materials to provide strength and prevent entrance of flies and mosquitoes to the privy pit. Where wood construction is used, floors shall be anchored to at least 4 inch by 4 inch sills. All wood material within 12 inches of finished grade should be treated to prevent rot or insect infestation.

(4) Wood used for riser and seat assemblies shall be tongue-and-groove or plywood (exterior or marine) material.

(b) A "septic tank" shall be of watertight construction, structurally sound and not subject to excessive corrosion or decay. Tanks of rectangular design are recommended. Septic tanks of 1,600 gallon liquid capacity or larger shall be of two-compartment design and construction. The inlet compartment of a two-compartment tank shall be between 2/3 and 3/4 of the total tank capacity. Two-compartment septic tanks are recommended for tanks of less than 1,600 gallon capacity.

(c) Minimum liquid capacities for septic tanks shall be in accordance with the following:

(1) Residential Septic Tanks (For each individual residence)

Number of Bedrooms	Minimum Liquid Capacity	Equivalent Capacity Per Bedroom
2 or less	750 gallons	375 gallons
3	900 gallons	300 gallons
4	1,000 gallons	250 gallons

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For each additional bedroom, add 250 gallons. These figures provide for use of garbage grinders, automatic clothes washers, and other household appliances.

(2) Septic Tank Other Than Residential

(A) Septic tanks for commercial or institutional installations shall be sized according to accepted engineering practice and the size of each installation shall be determined on the basis of specific needs.

(B) For determining required minimum capacities for installations serving other than residences, use the daily flows in Table I, .1925 of this section.

(3) The minimum capacity of any septic tank shall be 750 gallons.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1906 PREFABRICATED TANKS

If prefabricated tanks, or tanks of other design are used, they shall be constructed in accordance with plans which have been approved by the state agency, and shall comply with all requirements of .1907 of this section. For tanks of 3,000 gallons or less capacity, three (3) complete sets of plans and specifications for the design of the prefabricated septic tank shall be submitted to the Engineering Planning Branch, Sanitary Engineering Section, Division of Health Services, Post Office Box 2091, Raleigh, North Carolina 27602. These plans and specifications shall show the design of the septic tank in detail, including:

(1) All pertinent dimensions,
(2) Reinforcement material,
(3) Concrete strength,
(4) Liquid depth,
(5) Cleanout provisions, and
(6) Other design features.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1907 MINIMUM STANDARDS FOR PREFABRICATED SEPTIC TANKS

(a) The Department of Human Resources shall use the following minimum standards as guides in the review and approval of design plans for precast reinforced concrete septic tanks:

(1) The minimum requirement for the liquid depth level is 36 inches; however, 48 inches is strongly recommended.

(2) A minimum of 9 inches freeboard is required, the freeboard being the air space between the top of the liquid and the bottom side of the lid or cap of the tank.

(3) The length of the septic tank shall be at least twice as long as the width, but in no case shall the length exceed three (3) times the width.

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(4) The inlet shall be a straight pipe.
(5) The outlet shall be a sanitary tee that extends down 2/5's of the liquid depth. There shall be at least 2 inches difference in elevation between the invert off the inlet and the invert of the outlet.
(6) Cleanouts shall be provided over the inlet and outlet of the tank. In the event that adequate manholes are installed or the top is cased in multiple slabs, cleanouts may be omitted.
(7) At least one manhole or access opening approximately 21 inches by 21 inches shall be provided. In case thee top is to be cast as multiple slabs, no single slab directly over the inlet or outlet shall weigh in excess of 150 pounds.
(8) A minimum reinforcing of 6 inches by 6 inches by No. 10 gauge mesh must be used in all faces of the tank, and consideration should be given to increasing the reinforcing in the top of the tank as needed.
(9) A minimum concrete strength of 3,000 pounds per squaree inch.
(10) The wall thickness of septic tanks shall be not less than 2 1/2 inches. It is the direct responsibility of the manufacturer to design a septic tank in such a manner that the structure will withstand any and all stresses generally attributed to this type of installation.
(11) If a partition is to be used, it is recommended that it be placed near the outlet end of the tank at approximately 2/3's the length of the tank.

(b) Plans for prefabricated tanks, other than those for precast reinforced concrete tanks, shall be approved on an individual basis as determined by the information furnished by the designer which indicates the tank will provide equivalent effectiveness as those designed in accordance with the provisions of .1907 (a).

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1908 SITE EVALUATION

(a) The local agency shall investigate each proposed site. The investigation shall include the evaluation of the following factors:
(1) Topography.
(2) Soil character, which includes texture, structure, depth, restrictive horizons, and drainage.
(3) Ground water elevation.
(4) Depth to impervious strata.
(5) Soil percolation rate and porosity.

(b) Evaluations shall be made in accordance with .1917 - .1927 of this section and other accepted public health principles. Based on this evaluation, each of the factors listed in .1908 (a) (1-5) shall be classified as SUITABLE, PROVISIONALLY SUITABLE

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or UNSUITABLE. Lowest of the uncorrectable characteristics will determine site classification.

History Note: Statutory Authority G.S. 130-160; 130-166.23 through -166.27;
Eff. July 1, 1977.

.1909 APPLICATION RATES

(a) In determining the volume of sewage from residences, the flow rate shall be 75 gallons per person per day; and each bedroom shall be considered the equivalent of 2 persons. For establishments other than residences, the flow rate shall be determined from Table I, .1925 of this section.

(b) In calculating the number of square feet of area needed for the nitrification field in trench system, the maximum trench width used in the calculations shall be 36 inches, even though the actual trench width may be constructed larger. Trenches shall be not less than 8 feet on centers.

(c) The local agency may permit the use of a bed system in lieu of a trench system for the nitrification field when it has been determined that the trench system is impractical or impossible because of topography, space limitations, or other site planning considerations. In such cases, the number of square feet of area needed shall be increased by 50% over what would be required for a trench system; or in lieu of the added area, the amount of gravel or stone under the drain lines shall be increased to a depth of not less than 12 inches. The extra area is needed to compensate for the loss of trench sidewall area in the bed systems. Drain lines shall be at least 18 inches from the side of the bed and shall be not less than three feet on centers.

History Note: Statutory Authority G.S. 130-160; 130-166.23 through -166.27;
Eff. July 1, 1977.

.1910 SITE CLASSIFICATION

(a) Sites classified as SUITABLE may receive application of septic tank effluents up to 1.5 gallons per square foot per day.

(b) Sites classified as PROVISIONALLY SUITABLE may receive septic tank effluents up to 0.75 gallons per square foot per day; except that where percolation rates exceed 60 minutes per inch, the application rate shall not exceed 0.5 gallons per square foot per day.

(c) Sites originally classified as UNSUITABLE may be used for soil absorption disposal systems, provided engineering, hydrogeologic, and soil studies indicate to the local agency that a suitable septic tank system or a suitable alternate system can reasonably be expected to function satisfactorily. Such sites may be reclassified as PROVISIONALLY SUITABLE, upon submission to the

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local agency of:

(1) Adequate substantiating data to indicate that a ground absorption system can be installed so that the septic tank effluent will receive adequate treatment;
(2) The effluent will not contaminate any drinking water supply or any surface water;
(3) The effluent will not be accessible to insects, rodents, or other possible carriers which may come in contact with food or drinking water; and,
(4) The effluent will not be readily accessible to people.

History Note: Statutory Authority G.S. 130-160; 130-166.23 through -166.27;
Eff. July 1, 1977.

.1911 SPACE REQUIREMENTS

Sites shall have sufficient available space to permit the installation and proper functioning of ground absorption sewage disposal systems, based upon the square footage of nitrification field required for the application rate previously determined. Sites classified as PROVISIONALLY SUITABLE should have sufficient available space to accommodate a replacement nitrification field.

History Note: Statutory Authority G.S. 130-160; 130-166.23 through -166.27;
Eff. July 1, 1977.

.1912 LOCATION OF SEPTIC TANK SYSTEMS AND PRIVIES

(a) Every septic tank system and privy shall be located at least the minimum horizontal distance from the following:

(1) Any private water supply source-----100 feet, or maximum feasible distance, but in no case less than 50 feet.
(2) Any community water supply source-----100 feet.
(3) Streams classified as A-II-----50 feet.
(4) Waters classified as S. A.-----100 feet from normal high tide mark.
(5) Any other stream, canal, marsh, or coastal waters-----50 feet.
(6) Any Class I or Class II impounded reservoir used as a source of drinking water-----100 feet from normal high water line.
(7) Any other lake or impoundment-----50 feet from normal high water line.
(8) Any building foundation-----10 feet.
(9) Any basement-----15 feet.
(10) Any property line-----10 feet.
(11) Top of slope of embankments or cuts of 2 feet or more vertical height-----15 feet.
(12) Any water line-----10 feet.

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(b) Septic tank systems and privies may be installed in fill ground when the site complies essentially with the requirements of this section and is specifically approved by the state or local agency. In such fill areas, the soil used for fill shall have such soil characteristics so as to be classified as SUITABLE or PROVISIONALLY SUITABLE soil. There should be a mix of the fill soil and the original soil at the interface of the two soils. The fill area shall be compacted so as to prevent settling of the nitrification lines.

(c) Septic tank systems and privies:

(1) Shall not be installed in areas where the seasonal high water is at or near the ground surface at any time of the year, unless the site is modified.

(2) Should be located downhill from sources of drinking water.

(3) Shall not be located in areas subject to frequent flooding.

(d) Septic tank systems shall not be located under paved areas or driveways, except that a solid cast iron or other suitable pipe may be permitted to convey the effluent under a driveway or other paved areas.

History Note: Statutory Authority G.S. 130-160 ; 130-166.23 through -166.27;
Eff. July 1, 1977.

.1913 MAINTENANCE OF PRIVIES

(a) Any person owning or controlling the property upon which a privy is located shall be responsible for these requirements:

(1) The privy building shall afford a reasonable degree of protection from bad weather conditions.

(2) When the pit becomes filled to within 18 inches of the top of the ground, the privy building must be moved to a new pit and the old pit completely covered with earth.

(3) If the pit should cave in, a new pit shall be provided.

(b) The tenant or person occupying the property shall be responsible for these requirements:

(1) The walls, floors, and seat of the privy and grounds immediately adjacent to the building must be kept in a clean and decent condition.

(2) Chickens and other animals shall not be harbored in the privy building.

(3) Seat cover shall be hinged and closed at all times when the privy is not in use.

(4) Flies shall be excluded from the pit at all times. The application of a cup full of kerosene or used oil once each week will assist in controlling mosquito breeding and keep down odors.

(5) Ashes, garbage, and trash shall be kept out of the pit.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

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.1914 MAINTENANCE OF SEPTIC TANK SYSTEMS

Any person owning or controlling the property upon which a septic tank system is installed shall be responsible for the following items regarding the maintenance of the system.

(1) Septic tank system shall be maintained at all times to prevent seepage of sewage or effluents to the surface of the ground.

(2) Septic tanks need occasional cleaning and should be checked at least each three years to determine if sludge needs removing (once a year if garbage grinders are discharging to the tank).

(3) Contents removed from septic tanks shall be discharged into an approved sewer system, buried or plowed under at an approved location within 24 hours, or otherwise disposed of at a location and in a manner approved by the state or local agency.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1915 PERMITS

(a) No person shall install, repair or renovate, or cause to be installed, repaired, or renovated any sewage disposal system or privy without first having obtained a written permit from the local agency. The local agency shall issue such permits only after the agency has determined that the system is designed and can be installed so as to meet the provisions of this section. Permits shall become invalid after 36 months from the date of issue, if the installation has not been completed during that time period, unless otherwise specified in writing. When a permit has become invalid, the installation shall not be commenced or completed until a new permit has been obtained.

(b) Any person other than the owner, tenant, or manager of a residence, place of business, or place of public assembly, who engages in the business of constructing or installing septic tank systems, or the cleaning of septic tanks, shall register with the local health director in each county where he operates before constructing or installing septic tank systems, or collecting and disposing of septic tank contents.

History Note: Statutory Authority G.S. 130-160; 130-166.25 through -166.28;
Eff. July 1, 1977.

.1916 RESPONSIBILITIES

(a) The design, construction, and maintenance of ground absorption sewage systems, whether septic tank systems or alternative systems, shall be the responsibility of the owner, developer, installer, and user of the system as applicable in the circumstances.

(b) Actions of representatives of state or local agencies engaged in the evaluation and determination of measures required to effect compliance with the provisions of this section shall in no way be taken as a guarantee that sewage disposal systems approved

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and permitted will function in a satisfactory manner for any given period of time, or that such employees assume any liability for damages, consequential or direct, which are caused, or which may be caused, by a malfunction of such systems.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1917 TECHNICAL GUIDE

Rules .1918 - .1927 of this section shall be used in the evaluation of proposed sites for soil absorption systems except where the local agency determines that peculiar or unusual circumstances justify the use of other criteria which shall be consistent with good public health practice.

History Note: Statutory Authority G.S. 130-160; 130-166.25;
Eff. July 1, 1977.

.1918 SITE FACTORS

In order to determine whether a site can be used for disposing of a septic tank effluent, the factors in .1919 - .1921 of this section shall be taken into consideration.

History Note: Statutory Authority G.S. 130-160; 130-166.25;
Eff. July 1, 1977.

.1919 TOPOGRAPHY

(a) Uniform slopes under 15% shall be considered SUITABLE with respect to topography. When slopes are less than 2%, provisions shall be made to insure good surface drainage of rainfall or run-off from buildings or paved areas. When slopes are greater than 4%, the nitrification lines shall follow the contour of the ground. Complex slope patterns and slopes dissected by gullies and ravines are not suitable. The surface area on or around a soil absorption system shall be graded to provide adequate drainage; and such a system shall not be located in a depressed area. Good surface drainage is essential and shall be provided to prevent soil saturation around the system during rainy periods.

(b) Uniform slopes between 15% and 30% shall be considered PROVISIONALLY SUITABLE with respect to topography, if the soils are deep (36 inches or more). Complex slope patterns and slopes dissected by gullies and ravines are not suitable. Slopes within this range may require installation of drainage lines up-slope from the soil absorption system to remove all excess water that might be moving laterally through the soil during wet periods of the year. The interception of lateral ground water movement shall be provided where necessary to prevent soil saturation around the soil absorption system. Usable areas larger than minimum are ordinarily required in this slope range.

(c) Slopes greater than 30% may be considered PROVISIONALLY SUITABLE, provided a thorough study of the soil characteristics indicates that a soil absorption system will function satisfactorily and sufficient ground area is available to properly install

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such a system. Slopes greater than 30% may be classified as PROVISIONALLY SUITABLE when:

(1) The slope can be terraced or otherwise graded or the nitrification lines located so as to maintain a minimum 5 foot horizontal distance from the bottom of the nitrification lines and the ground surface;
(2) The soil characteristics can be classified as SUITABLE or PROVISIONALLY SUITABLE;
(3) Surface water runoff is diverted around the nitrification field so that there will be no scouring or erosion of the soil over the field;
(4) If necessary, ground water flow is intercepted and diverted to prevent such water from running into or saturating the soil absorption system; and
(5) There is sufficient ground area available to install the septic tank system with these modifications.

History Note: Statutory Authority G.S. 130-160; 130-166.25; Eff. July 1, 1977.

.1920 SOIL CHARACTERISTICS

Unless soil characteristics have been previously established, soil borings shall be taken in the area to be used for soil absorption systems. Such borings shall be taken to depths of at least 48 inches. From these soil borings and observation of core samples, most of the significant soil characteristics can be evaluated and a determination can be made as to the suitability of the soil to absorb septic tank effluent. The important soil characteristics which shall be determined by the approving agency are as follows:

(1) Texture - The relative amounts of the different sizes of mineral particles in a soil are referred to as soil texture. All soils are composed of sand, (2.0 - 0.05 mm in size); silt, which includes intermediate-sized particles that cannot be seen with the naked eye, but feels like flour when pressed between the fingers, (0.05 - 0.002 mm in size); and clay, which is extremely small in size and is the mineral particle that gives cohesion to a soil (less than 0.002 mm in size). The texture of the different horizons of soils may be classified into three general classes.
(a) Sandy texture soils are soils that exhibit a gritty feel when rubbed between the fingers, that crumble when moist or wet, and that will not leaf out when pressed between the thumb and index finger, should be classified as sandy textures. Sandy soils contain more than 70% sand sized particles in the soil mass. These soils do not have enough clay to be cohesive. Sandy soils have favorable percolation rates, but may have a low filtering capacity leading to malfunction due to contamination of ground water. Sandy soils shall be considered SUITABLE with respect to texture.

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(b) Loamy texture soils are soils that when moist or wet may be rolled into a ball that will stick together but is easily crushed. When pressed between the fingers, loamy soils will leaf from between the fingers to ¾ to ½ inch before breaking. Loamy soils contain less than 70% sand sized particles and more than 18% clay sized particles in the soil mass. They exhibit little or no stickiness. Loamy soils generally have favorable percolation rates and are excellent filters. Loamy soils are the most desirable for effluent treatment and shall be considered SUITABLE with respect to texture.

(c) Clayey texture soils are soils with more than 40% of the soil mass made up of clay particles. Clayey soils, when moist or wet, may be rolled into a compact, smooth ball and resist pressure when crushed between the fingers. When wet and pressed between the fingers, clayey soils will leaf out to ½ inch or more in length before breaking. The type or kind of clay in soils is very significant. There are two major types of clays: the 1:1 clays (Kaolinite) which do not shrink when dry or swell when wet; and the 2:1 (Montmorillonite) that will shrink when dry and swells when wet. The 2:1 clays crack when dry and allow water or septic tank effluent to move freely through the soil for 48 to 72 hours. They then become saturated and swell, resulting in no movement of liquids through the soil. 2:1 clays may sometimes be identified by the presence of cracks in the soil when dry, and are plastic and sticky when wet. These clays will have an olive and greyish mottled appearance, or splotches intermingled with the yellow and red clay colors. 1:1 clay soils shall be considered PROVISIONALLY SUITABLE as to texture; 2:1 clays shall be considered UNSUITABLE as to texture.

(d) Organic soils shall be considered UNSUITABLE as to texture.

(2) Soil Structure - In many soils, the sand, silt, and clay particles tend to cling or stick to one another to form a ped or a clump of soil. This is known as soil structure. Soil structure may have a significant effect on the movement of effluent through a soil. The structure may determine the rate of movement of liquids through clayey soils. Structure is not important in sandy-textured soils or in loamy-textured soils, and these types of soils shall be considered SUITABLE as to structure. The three kinds of soil structure that are most significant in movement of sewage effluent through clayey soils are blocky, platty, and the absence of soil structure or massive conditions are described as follows:

(a) Blocky soil structure

(i) In clayey soils, if the soil exhibits many peds of angular and subrounded peds, then the soil is have blocky structure. The sewage effluent may move between the cracks of these blocky types of peds.

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Blocky soil structure in clayey soils is frequently destroyed by mechanical equipment manipulating the soil when it is too wet. Trenches for nitrification lines being placed in clayey soils with blocky structure should only be dug when soils are moist or dry. Blocky soil structure in clayey soils shall be considered PROVISIONALLY SUITABLE as to structure.

(ii) Some rocks, even though weathered, such as slates or creviced or fractured rocks, exhibit blocky structure, which is not changed by moving water, thereby allowing fluids to move downward without filtration. Such soils shall be considered UNSUITABLE as to structure.

(b) Platy soil structure - If clayey soils fall out into platelike sheets, then the soil would have platy structure. Water or effluent movement through these horizons would be extremely slow, and the structure shall be considered UNSUITABLE.

(c) Absence of soil structure - Some clayey soils exhibit no structure aggregates. In these kinds of soils, percolation would be zero or extremely slow. Such structure shall be considered UNSUITABLE.

(3) Soil Depth - The depth of soils classified as SUITABLE OR PROVISIONALLY SUITABLE as to texture and structure shall be at least 48 inches when conventional ground absorption systems are to be utilized.

(4) Restrictive Horizons - Restrictive layers or horizons in soils may generally be recognized by the resistance offered in digging a hole or in using a soil auger. Restrictive horizons are variable in their characteristics. Massive or solid bedrock may be classed as a restrictive horizon. Where this bedrock lies shallower than 48 inches to the surface, it will perch sewage effluent and in many instances will allow sewage effluent to move laterally and seep to the surface on a lower part of the landscape. Another restrictive horizon may be caused by iron pans or plinthite. These horizons may generally be recognized by their brittleness and by the presence of red and grey colored soil materials. The red materials quite frequently will be in the form of nodules of very brittle fragments. These kinds of horizons will also perch sewage effluent and limit the storage capacity of a soil being used for disposition of effluent. The third common restrictive horizon is a cemented iron-aluminum-organic hardpan. This is very brittle when dry and will perch sewage effluent. Soils in which restrictive horizons are less than 48 inches below the ground surface or less than 12 inches below the trench bottom of subsurface nitrification lines shall be considered UNSUITABLE, except in cases where restrictive horizons occurring close to the ground surface have underlying soil stratas suitable for subsurface disposal, and the ground water table complies with (5) of this rule. In these cases, the soil shall be considered SUITABLE with respect to restrictive horizons, provided the restrictive

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horizon is penetrated.

(5) Soil Drainage - Soils with seasonally high water tables are of major concern in evaluating sites for sewage effluent disposal. These are the soil areas that give good percolation rates during dry seasons of the year but force sewage effluent to the surface during the wetter seasons. The depth of the seasonal high water table can commonly be recognized by those examining soil profiles. The criterion for recognition of high water tables is that of soil color. Subsurface horizons that are in colors of reds, yellows, and browns indicate good soil aeration and drainage throughout the year. Subsurface horizons that are in colors of grey, olive or bluish colors indicate poor aeration and poor soil drainage. These dull or greyish colors may occur as a solid mass of soil or may be in mottles of localized spots. The volume of greyish colors is indicative of the length of time that free water stands in that soil profile. There are soils that have light-colored mottles which are relic from the light-colored rock from which the soils have weathered. These soils would not have high water tables, so one must distinguish between a true soil composed of sand, silts and clays, or the rock material that may still exist in the soil profile. Any soil profile that has the greyish colors, indicative of high water tables, or is subject to tidal or periodic high water, within 36 inches of the surface shall generally be considered UNSUITABLE as to drainage. Where the soil is considered suitable as to structure and texture, and modifications can be made to keep the ground water table at least 12 inches below the bottom of the trench, such soils shall be considered PROVISIONALLY SUITABLE as to drainage.

History Note: Statutory Authority G.S. 130-160; 130-166.25; Eff. July 1, 1977.

.1921 PERCOLATION TESTS

Unless soil characteristics have been previously established by the state or local agency which indicates adequate permeability, percolation tests shall be made in the exact area where the nitrification lines are to be installed. Such percolation tests shall be conducted in accordance with the following procedures:

(1) Number and location of tests: Three or more tests should be made in separate test holes spaced uniformly over the proposed absorption field site.

(2) Type of test hole: Dig or bore a hole with horizontal dimensions of from 4 to 12 inches and vertical sides to the depth of the proposed absorption trench. Post hole diggers are satisfactory for digging holes.

(3) Preparation of test hole: Carefully scratch the bottom and sides of the hole with knife blade or sharp pointed instrument in order to remove any smeared soil surfaces and to provide a natural soil interface into which water may percolate. Remove all loose material from the hole.

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(4) Saturation and swelling of the soil: Carefully fill the hole with clear water to a minimum depth of 12 inches from the bottom. By refilling if necessary, keep water in the hole for at least 4 hours or until the soil is saturated. This saturation procedure insures that the soil is given the opportunity to swell and approach the condition that it will be in during the wettest season of the year. Thus the test will give comparable results in the same soil whether made in a dry or wet season. In sandy soils containing little or no clay, the swelling procedure is not essential and the test may be made as described in (5) (c) of this rule, after the water from one filling of the hole has completely seeped away.

(5) Percolation rate measurement: With the exception of sandy soils, percolation rate measurements shall be made on the day following the procedure described in (4) of this rule:

(a) If water remains in the test hole after the overnight swelling period, adjust the depth to approximately 6 inches from the bottom. From a fixed reference point, measure the drop in water level over a 30-minute period. This drop is used to calculate the percolation rate.

(b) If no water remains in the hole after the overnight swelling period, add clear water to bring the depth of water in the hole to approximately 6 inches from the bottom. From a fixed reference point measure the drop in water level at approximately 30-minute intervals for 4 hours, refilling 6 inches from the bottom as necessary. The drop that occurs during the final 30-minute period is used to calculate the percolation rate. The drops during prior periods provide information for possible modification of the procedure to suit local circumstances.

(c) In sandy soils (or other soils in which the first 6 inches of water seeps away in less than 30 minutes, after the overnight swelling period) the time interval between measurements shall be taken as 10 minutes and the test run for one hour. The drop that occurs during the final 10 minutes is used to calculate the percolation rate.

(6) If the average time for the water to fall 1 inch in the test hole is 30 minutes or less, the percolation test shall be considered SUITABLE; between 30 minutes and 60 minutes, PROVISIONALLY SUITABLE; between 60 minutes and 120 minutes PROVISIONALLY SUITABLE only when the soil texture and structure are classified as suitable or provisionally suitable. Rates between 60 minutes and 120 minutes are UNSUITABLE when soil texture and structure are unsuitable; rates above 120 minutes are UNSUITABLE.

History Note: Statutory Authority G.S. 130-160; 130-166.25; Eff. July 1, 1977.

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.1922 DETERMINATION OF SOIL SUITABILITY

All of the criteria in .1919 - .1921 of this section shall be determined to be SUITABLE, PROVISIONALLY SUITABLE or UNSUITABLE as indicated. If all criteria are classified the same, that classification will prevail. However, it is unlikely that all criteria will be classified the same in all situations. Where there is a variation in classification of the several criteria, the following shall be used in making the overall determination, and is summarized in Table II, .1926 of this section. The lowest of the uncorrectable characteristics will determine the site classification.

(1) If the soil structure is classified as unsuitable, the overall classification will be UNSUITABLE, regardless of the classification of the other criteria unless provisions of .1908 through .1911 of this section are met.

(2) If the soil texture is classified as unsuitable, and the soil structure is provisionally suitable, the soil texture may be reclassified as PROVISIONALLY SUITABLE.

(3) When soil depth is classified as unsuitable, it may be reclassified as PROVISIONALLY SUITABLE if shallower trenches, a mound system, or other modifications to obtain adequate soil depth can be provided.

(4) When the restrictive horizon is classified unsuitable, it may be reclassified as PROVISIONALLY SUITABLE under the conditions outlined in .1920 (4) of this section.

(5) When drainage (ground water level) is unsuitable, it may be reclassified as PROVISIONALLY SUITABLE under the conditions outlined in .1920 (5) of this section.

(6) Percolation rates in excess of 60 minutes, but not exceeding 120 minutes may be classified as PROVISIONALLY SUITABLE under conditions outlined in .1921 (6) of this section.

History Note: Statutory Authority G.S. 130-160; 130-166.25; Eff. July 1, 1977.

.1923 AVAILABLE SPACE

Sites shall have sufficient available space to permit the installation and proper functioning of ground absorption sewage disposal systems, based upon the square footage of nitrification field required for the application rate previously determined. It is desirable that sites classified as PROVISIONALLY SUITABLE have sufficient available space to accommodate a replacement nitrification field.

History Note: Statutory Authority G.S. 130-160; 130-166.25; Eff. July 1, 1977.

.1924 OTHER APPLICABLE FACTORS

The site evaluation should include consideration of any other applicable factors involving accepted public health principles, such as:

(1) The proximity of a large-capacity water-supply well, the cone of influence of which would dictate a l[illegible] separation.

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distance than the minimum distance specified in .1912 of this section.

(2) The potential public health hazard of possible failures of soil absorption systems involving large quantities of sewage, which would dictate larger separation distances than the minimums specified in .1912 of this section.

(3) The potential public health hazard of possible massive failures of soil absorption systems proposed to serve large numbers of residences, as in residential subdivisions or mobile home parks.

(4) Other circumstances peculiar to individual situations.

History Note: Statutory Authority G.S. 130-160; 130-166.25; Eff. July 1, 1977.

.1925 ESTIMATES OF SEWAGE QUANTITIES

Table No. I gives estimates of sewage quantities that are the minimums required for use in determining the volume of septic tanks being designed to serve selected types of establishments. The figures include volume necessary to handle the sewage flow and provide sludge storage, and may differ from estimated sewage flows used in the design of municipal or community sewerage systems.

TABLE NO. I

TYPE OF ESTABLISHMENT	DAILY FLOW FOR DESIGN
Airports	5 gal/passenger
(also R.R. stations, bus terminals)	
(not including food service facilities)	
Barber Shops	100 gal/chair
Beauty Shops	125 gal/booth or bowl
Bowling Alleys	50 gal/lane
Camps	
Construction or work camps	50 gal/person
Summer Camps	50 gal/person
Campgrounds	150 gal/campsite
Churches	5 gal/member
Country Clubs -Resident Members	75 gal/person
Non-resident Members	20 gal/person
Day Care Facilities	15 gal/person
Factories (exclusive of industrial wastes) - per shift	25 gal/person
Hospitals	300 gal/bed
Laundries (self-service)	500 gal/machine
Motels/Hotels	75 gal/room
with cooking facilities in room	125 gal/room
Resort	200 gal/room
Offices - per shift	25 gal/person
Nursing/Rest Homes - with laundry	150 gal/bed
- without laundry	75 gal/bed
Residential Care Facilities	75 gal/person
Restaurants	40 gal/sea

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Schools: Day schools	15	gal/person
NOTE: Use 20 gal/person if aerobic treatment is proposed.		
Boarding schools	75	gal/person
Day workers	25	gal/person
Service Stations	250	gal/water closet or urinal
Stores	250	gal/water closet or urinal
NOTE: If food service is included, add 40 gal/seat.		
Swimming Pools and Bathhouses	10	gal/person
Theaters - Auditoriums	3	gal/seat
Drive-In	5	gal/car space
Travel Trailer Parks	150	gal/space

History Note: Statutory Authority G.S. 130-160; 130-166.25; Eff. July 1, 1977.

.1926 POSSIBLE MODIFICATIONS OF INITIAL CLASSIFICATIONS

Table No. II does not include all possible combinations, but includes those which could result in upgrading the initial classification.

TABLE NO. II

Criteria	Initial Classification	Modifying Factors	Final Classification
1. TOPOGRAPHY	UNSUITABLE	Soil Characteristics Suitable or Provisionally Suitable, and sufficient area available and factors included in reference can be applied. Ref: .1919 (c)	PROVISIONALLY SUITABLE
2. SOIL CHARACTERISTICS			
(a) Texture	UNSUITABLE	Soil Structure Provisionally Suitable, Soil Depth, Restrictive Horizon and Drainage Suitable or Provisionally Suitable. Ref: .1920 (2), (3), (4), and (5)	PROVISIONALLY SUITABLE

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(b)	Structure	UNSUITABLE	Provisions of .1910 and .1911 are met. Ref: .1910 (c)	PROVISIONALLY SUITABLE
(c)	Depth	UNSUITABLE	Use of Shallow Trench, Use of Mound System. Ref: .1910 and .1911	PROVISIONALLY SUITABLE
(d)	Restrictive Horizon	UNSUITABLE	Restrictive Horizon Close to Surface; Underlying Soil Strata Suitable or Provisionally Suitable; Water Table 1 Foot or More Below Bottom of Trench. Ref: .1920 (4)	PROVISIONALLY SUITABLE
(e)	Drainage	UNSUITABLE	Lower Ground Water Table to at Least 1 Foot Below Bottom of Trench. Ref: .1920 (5)	PROVISIONALLY SUITABLE
3.	GROUND WATER ELEVATION	UNSUITABLE	Lower Ground Water Table to at Least 1 Foot Below Bottom of Trench. Ref: .1920 (5)	PROVISIONALLY SUITABLE
4.	DEPTH TO IMPERVIOUS STRATA	UNSUITABLE	Restrictive Horizon Close to Surface; Underlying Soil Strata Suitable; Water Table 1 Foot or More Below Bottom of Trench. Ref: .1920 (4) and (5)	PROVISIONALLY SUITABLE
5.	PERCOLATION TEST	UNSUITABLE (60-120 min/inch)	Soil Structure and Texture Suitable or Provisionally Suitable. Ref: .1921	PROVISIONALLY SUITABLE

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History Note: Statutory Authority G.S. 130-160; 130-166.25;
Eff. July 1, 1977.

.1927 INTERPRETATION AND TECHNICIAL ASSISTANCE

(a) The provisions of .1917 through .1926 of this section shall be interpreted, as applicable, in accordance with the recognized principles and practices of soil science.

(b) State agencies will provide technical assistance. Local agencies shall obtain technical assistance from soil scientist personnel, and local soil survey information as may be needed for interpretation of this section.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1928 APPLICABILITY OF RULES

(a) Except as required in subsections (b) and (c) of this rule, the minimum horizontal distance requirements in .1912 (a) (4), (8), (9), (10) or (11) shall not apply to the installation of a single septic tank system serving a single family residence not to exceed four (4) bedrooms, on a lot or tract of land:

(1) Which on the effective date of this section is specifically described in a deed, contract, or other instrument conveying fee title or which is specifically described in a recorded plat and the lot or lots contiguous thereto have been conveyed by the subdivider so as to prevent enlargement of said lot or tract of land retained by the subdivider in order to satisfy the provisions of .1912 (a) (4), (8), (9), (10) or (11) of this section; and

(2) Which on the effective date of this section is of insufficient size to satisfy the minimum horizontal distance requirements in .1912 (a) (4), (8), (9), (10) or (11) of this section; and

(3) Which on the date system construction is proposed to begin, is not capable of being served by a community or public sewerage system.

(b) However, if any two or more contiguous lots or tracts of land, such as are described in .1928 (a) (1), are under single ownership on the effective date of this section, they shall not be exempted from any of the minimum horizontal distance requirements of .1912 (a) (4), (8), (9), (10) or (11) of this section, if such lots or tracts of land under single ownership can be combined to meet said minimum horizontal distance requirements.

(c) For those lots or tracts of land described in .1928 (a) and (b) of this section, where any of the minimum horizontal distance requirements prescribed in .1912 (a), (4), (8), (9), (10) or (11) of this section, can be met, such minimum horizontal distances shall be required.

(d) For those lots or tracts of land described in .1928 (a) and (b) of this section, where a specific minimum horizontal distance requirement prescribed in .1912 (a) (4), (8), (9), (10) or (11) of this section, cannot be met, the maximum feasible horizontal distance, as determined by the local agency, shall be required. Provided, however, that at least the following

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minimum horizontal distances shall be required in all cases:

(1) .1912 (a) (4) of this section, the minimum horizontal distance shall be not less than 50 feet.

(2) .1912 (a) (8), (10) and (11) of this section, the minimum horizontal distance shall be not less than 5 feet.

(3) .1912 (a) (9) of this section, the minimum horizontal distance shall be not less than 8 feet.

(e) All other provisions of this section except as exempted by this rule shall apply to the lots or tracts of land described in .1928 (a) of this section. Any rules and regulations of the Commission for Health Services, or any local board of health in effect on the day before the effective date of this section, which establish greater minimum distance requirements than those provided for in this section, shall remain in effect and shall apply to a lot or tract of land to which .1912 (a) (4), (8), (9), (10) or (11) of this section do not apply.

(f) The provisions of .1928 (a) of this section shall be inapplicable to a conveyance, as described in this rule, which is effected primarily for the purpose of exempting a tract of land from the provisions of .1912 (a) (4), (8), (9), (10) or (11) of this section and in which the party or parties conveying the tract of land are united in interest with the party or parties receiving the conveyance, or the entity receiving the conveyance is controlled by the same party or parties making the conveyance, or the parties to the conveyance have colluded for the purpose of exempting the tract of land from the provisions of .1912 (a) (4), (8), (9), (10) or (11) of this section.

(g) The provisions of .1928 (a) of this section shall be inapplicable to a tract of land when the conveyance of the tract or tracts of land adjacent thereto is effected primarily for the purpose of exempting the tract of land from the provisions of .1912 (a) (4), (8), (9), (10) or (11) of this section and in which the party or parties conveying the tract or tracts of land are united in interest with the party or parties receiving the conveyance, or the entity receiving the conveyance is controlled by the same party or parties making the conveyance, or the parties to the conveyance have colluded for the purpose of exempting the tract of land from the provisions of .1912 (a), (4), (8), (9), (10) or (11) of this section.

(h) It shall be the responsibility of any owner of a lot or tract of land, who applies for a permit required by .1915 (a) of this section and who seeks, under the provisions of .1928 (a) of this section, to exempt his lot or tract of land from any of the minimum horizontal distance requirements of .1912 (a) (4), (8), (9), (10) or (11) of this section to provide to the local agency necessary records of title to both the lot or tract of land, for which the exemption is sought, and to all contiguous lots or tracts of land, in order that the local agency may determine whether the applicant is entitled to any such exemption.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

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.1929 EXEMPTION

If the application of this section would prohibit the use of such systems, the provisions of this section shall not apply to septic tank systems and other types of ground absorption sewage disposal systems in use or for which a valid permit has been issued prior to the effective date of these rules and regulations.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1930 DISUSE OF SEWAGE SYSTEM

Notwithstanding the foregoing provisions of .1928 (a) and .1929 of this section, if, for any reason (except for destruction by fire), a ground absorption sewage disposal system falls into disrepair or has been disconnected, or the use of which has been abandoned, such system shall not be used again unless it meets all of the provisions of this section except those included in .1912 (a) (4), (8), (9), (10) and (11) of this section, provided such reuse will not create a public health hazard.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1931 VIOLATIONS

If any person shall willfully violate any of these rules or shall willfully fail to perform any acts required by these rules, he shall be guilty of a misdeameanor and shall be punished as provided in G.S. 130-203 through 205.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1932 CONFLICTING RULES REPEALED

All rules heretofore adopted by the Commission for Health Services which are in conflict with the provisions of this section, except as provided in .1928 of this section, are hereby repealed.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

.1933 SEVERABILITY

If any provision of these rules or the application thereof to any person or circumstance is held invalid, the remainder of the rules or the application of such provisions to other persons or circumstances shall not be affected thereby.

History Note: Statutory Authority G.S. 130-160;
Eff. July 1, 1977.

NOTE: "THE FORM OF THIS RULE MAY BE REVISED BY THE ATTORNEY GENERAL PURSUANT TO THE PROVISIONS OF G.S. 150A-61."

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top of riser, or by a T vent through sides of building as shown in U. S. P. H. S. Bulletin, known as revised Type 4, Supplement No. 108 of Public Health Reports.

The pit for the privy shall be dug at least 3' 6" square by at least 5' deep. A templet shall be used to secure a true square pit. Immediately upon completion the pit shall be lined with a wood curbing 3' 6" square, outside measurements and made from 1" or heavier material securely nailed to 2" by 4" corner posts, set the full depth of the pit, or at least as far as may be necessary to prevent caving of the ground around the pit. The top of the wood curbing shall extend not less than 1" nor more than 3" above the original ground surface. The privy floor slab shall be of reinforced concrete, or reinforced cement mortar may be used where coarse aggregate is not available. The reinforcing shall be 6" mesh, 10 gauge, welded wire fabric, or 2" mesh, 14 gauge welded wire fabric, or ¼" pencil steel rods or equivalent. In the finished slab, at least 90% of the reinforcing shall be completely covered with concrete. The top surface of the concrete slab shall be neatly finished and be not less than 50" square. The top outer edges of the concrete slab should be rounded with an edging tool. The top of the floor slab shall be not less than 7¾" above the bottom surface of the concrete sill. No part of the slab or concrete sill shall have serious honeycomb or be less than 1½" thick. ½" bolt holes shall be cast in the slab at suitable locations as shown on plan for securely anchoring the privy house to the floor slab by means of bolts with suitable washers.

All reinforced concrete or reinforced cement mortar, privy floor slabs, when placed on concrete sills shall be capable of supporting a uniformly distributed load of at least 2,000 pounds, 7 days after casting. No privy floor slab shall be placed within 7 days after casting. The concrete or cement mortar floor slab shall be set level on an evenly compacted bearing over and around the pit curbing and the excavated material from the pit shall be back-filled and tamped around the foundation and slab to a point ½" below the top surface of the privy slab and extend level from this point at least 18" from the privy building and then slope off gradually to the original ground level so that the surface drainage shall be away from the pit in all directions. Where privy is built on the side of a hill it will be necessary to ditch on upper side of hill to prevent washing of the mound.

The U. S. P. H. S. type concrete slab privy as shown in Service Bulletin No. 103, revised Type 4, shall be considered as an approved type of privy when seat assembly is properly secured to the concrete riser.

Specifications
For A Pit Privy

PREPARED BY THE
NORTH CAROLINA STATE BOARD OF HEALTH
RALEIGH, N. C.

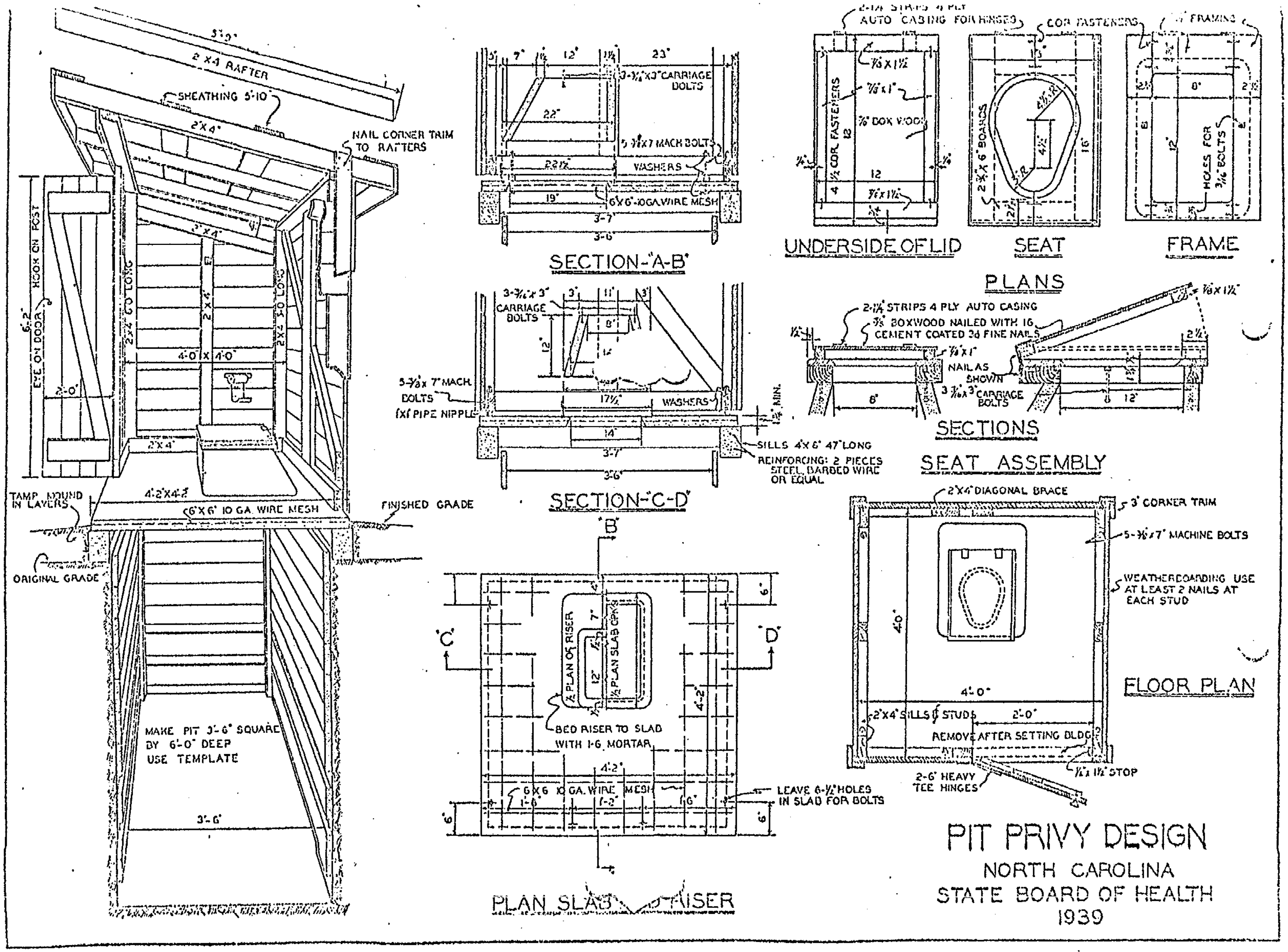
The privy building shall be framed of No. 2 common lumber, preferably D4S material, cut and securely spiked together with 20d spikes, so that the outside of the framework will be 4' square, and with the front studding 6' long and the rear studding 5' long.

The siding shall be German siding, T & G roofers free from loose knots or weather boarding securely nailed with at least 2 nails at each bearing, painted with two coats of outside oil paint. In lieu of outside oil paint the privy may be painted with two coats of creosote or other wood preservative which is approved by a representative of the State Board of Health. The roofing shall be of shingles, composition roofing, or galvanized metal roofing which shall be not less than #28 gauge. Roof rafters shall be 5'-8" long and extend 5" from the plate at front of building. The door shall be hung with two 6" T hinges secured with 1½" No. 9 screws. The door shall be secured on the inside with a hook and eye and on the outside the door shall be secured with a wooden button or other approved fastener.

The seat shall be smooth, washable material and constructed of such material as to make it fly tight, preferably T & G flooring. The lid shall be provided with hinges made from 4 ply automobile casings, metal, or other rust resisting hinges securely fastened in place. The seat assembly shall be fastened to the concrete riser by means of 3¼" by 3" bolts cast in the top of riser as shown on plan. Wood shall be carefully fitted to top of concrete riser to prevent cracks.

Sills shall be cast with a cross section of not less than 4" x 6" and may be cast in 4 pieces 47" long or in one piece with an inside dimension of 47". Sills should be reinforced with 2 pieces of ¼" steel, barbed wire or equivalent. The sills of the privy building shall be securely bolted to the concrete slab by means of at least five ⅝" by 7" bolts with suitable washers. The sills of the privy building shall be raised one inch from the concrete slab by means of [illegible] nipples 1" long or small blocks 1" thick.

Ventilation of the pit shall not be mandatory but may be accomplished if desired by a screen opening through the seat lid, vent pipe from floor or



RULES AND REGULATIONS FOR EROSION AND SEDIMENT CONTROL

STATE OF NORTH CAROLINA

DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES

NORTH CAROLINA SEDIMENTATION CONTROL COMMISSION

PROMULGATED PURSUANT TO THE PROVISIONS CONTAINED IN THE SEDIMENTATION POLLUTION CONTROL ACT OF 1973.

(GENERAL STATUTES, CHAPTER 113A, ARTICLE 4)

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ATTACHMENT (5)

DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES

SEDIMENTATION CONTROL COMMISSION

RULES AND REGULATIONS

PREFACE

Accelerated erosion from unprotected construction sites, road maintenance, and other land-disturbing activities is a major source of sediment. Sediment suspended in streams, lakes, and other waters of this State constitutes a major pollution problem. As the sediment settles out, it fills stream channels, lakes, and reservoirs.

Erosion and sedimentation can be effectively controlled, but cannot be completely eliminated, either during active construction or after stabilization, from both a technical and an economic standpoint.

Natural erosion during storm water runoff has always occurred and will continue at low rates from well stabilized areas. It will cause stream turbidity regardless of the control measures applied. During construction accelerated erosion will occur during storm water runoff with a proportionate increase in visible turbidity in stream flow.

The economically acceptable control measure requires optimum control of accelerated erosion and resulting sedimentation, and the acceptance of some turbidity and fine suspended particulate matter in construction site effluents during storm water runoff. This approach conforms to the stated purpose of the law, i.e., "to provide for the creation, administration, and enforcement of a program and for the adoption of minimal mandatory standards which will permit development of this State to continue with the least detrimental effects from pollution by sedimentation." (GS113A-51 Preamble).

These Rules and Regulations are promulgated pursuant to the authority contained in the North Carolina Sedimentation Pollution Control Act of 1973, and together with the law establishes a State erosion and sedimentation control program. This program is oriented towards prevention of pollution from sediment by requiring preparation and implementation of an erosion and sedimentation control plan adapted to site conditions and meeting specified performance criteria.

NORTH CAROLINA SEDIMENTATION CONTROL COMMISSION

RULES AND REGULATIONS

AUTHORITY

These Rules and Regulations are issued pursuant to the authority contained in GS113A-54.

Section 1 PURPOSE

The purpose of these Rules and Regulations is to control accelerated erosion and sedimentation resulting from land-disturbing activities by establishing a prevention-oriented sediment control program.

Section 2 SCOPE

The provisions of these Rules and Regulations impose requirements on persons engaged in land-disturbing activities which require planning and implementation of effective temporary and permanent control measures to prevent accelerated erosion and sedimentation.

Section 3 DEFINITIONS

As used in these Rules and Regulations, unless the context clearly indicates otherwise, the following definitions apply:

a. Accelerated Erosion - means any increase over the rate of natural erosion as a result of land-disturbing activities.

b. Active Construction - means activities which contribute directly to the completion of facilities contemplated or shown on the construction plans.

c. Adequate Erosion Control Measure, Structure, or Device - means one which controls the soil material within the land area under responsible control of the person conducting the land-disturbing activity.

d. Borrow - means fill material which is required for on-site construction and is obtained from other locations.

e. Buffer Zone - means the strip of land adjacent to a lake or natural watercourse, the width of which is measured from the edge of the water to the nearest edge of the disturbed area, with the twenty-five percent (25%) of the strip nearer the land-disturbing activity containing natural or artificial means of confining visible siltation.

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f. Commission - means the North Carolina Sedimentation Control Commission. (GS113A-52)

g. Department - means the North Carolina Department of Natural and Economic Resources. (GS113A-52)

h. Erosion - means the wearing away of land surface by the action of wind, water, gravity, or any combination thereof. (GS113A-52)

i. Ground Cover - means any natural vegetative growth or other material which renders the soil surface stable against accelerated erosion.

j. Lake or Natural Watercourse - means any stream, river, brook, swamp, sound, bay, creek, run, branch, canal, waterway, estuary, and any reservoir, lake or pond, natural or impounded, in which sediment may be moved or carried in suspension, and which could be damaged by accumulation of sediment.

k. Land-disturbing Activity - means any use of the land by any person in residential, industrial, educational, institutional, or commercial development, highway and road construction and maintenance that results in a change in the natural cover or topography and that may cause or contribute to sedimentation. (GS113A-52) (1973-74, c.1417,s.1)

l. Local Government - means any county, incorporated village, town, or city, or any combination of counties, incorporated villages, towns, and cities, acting through a joint program pursuant to the provisions of this Article. (GS113A-52)

m. Natural Erosion - means the wearing away of the earths surface by water, wind, or other natural agents under natural environmental conditions undisturbed by man.

n. Person - means any individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, interstate body, or other legal entity. (GS113AA-52)

o. Person Engaged in or Conducting Land-disturbing Activity - means the individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, interstate body, or other legal entity, financially responsible for the land-disturbing activity.

p. Phase of Grading - means one of two types of grading, rough or fine.

q. Plan - means erosion and sedimentation control plan.

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r. Secretary - means the Secretary of the Department of Natural and Economic Resources. (GS113A-52)

s. Sediment - means solid particulate matter, both mineral and organic, that has been or is being transported by water, air, gravity, or ice from its site of origin. (GS113A-52) (1973-74, c.1417, s.1)

t. Siltation - means sediment resulting from accelerated erosion which is settleable or removable by properly designed, constructed, and maintained control measures; and which has been transported from its point of origin within the site of a land-disturbing activity; and which has been deposited, or is in suspension in water.

u. Storm Water Runoff - means the direct runoff of water resulting from precipitation in any form.

v. Tract - means all contiguous land and bodies of water in one ownership, or contiguous land and bodies of water in diverse ownership being developed as a unit, although not necessarily all at one time.

w. Uncovered - means the removal of ground cover from, on, or above the soil surface.

x. Undertaken - means the initiating of any activity, or phase of activity, which results or will result in a change in the ground cover or topography of a tract of land.

y. Waste - means surplus materials resulting from on-site construction and disposed of at other locations.

z. Working Days - means days exclusive of Saturday and Sunday during which weather conditions permit land-disturbing activity to be undertaken. (GS113A-52)

Section 4 GENERAL REQUIREMENTS

a. Plan Required
An erosion and sedimentation control plan shall be prepared and filed with the Commission, or local government having jurisdiction, prior to the commencement of any land-disturbing activity whenever the proposed activity is to be undertaken on a tract comprising more than one acre, if more than one contiguous acre is to be uncovered.

b. Protection of Property
Persons engaged in land-disturbing activities shall take all reasonable measures to protect all public and private property from damage by such activities.

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c. More Restrictive Rules Shall Apply
Whenever there is a conflict between Federal, State, or Local Laws Ordinances, Rules and Regulations, Orders, and Decrees the more restrictive provision shall apply.

Section 5 BASIC CONTROL OBJECTIVES

The basic control objectives which are to be considered in developing and implementing an erosion and sedimentation control plan are to:

a. Identify Critical Areas
On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attentic

b. Limit Exposed Areas
All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time.

c. Limit Time of Exposure
All land-disturbing activities are to be planned and conducted to limit exposure to the shortest feasible time.

d. Control Surface Water
Surface water runoff originating upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.

e. Control Sedimentation
All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.

f. Manage Storm Water Runoff
When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream, plans are to include measures to control both the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream.

Section 6 MANDATORY STANDARDS

GS113A-57. Mandatory Standards for Land-disturbing Activity.
No land-disturbing activity subject to this Article shall be undertaken except in accordance with the following mandatory requirements.

a. No land-disturbing activity shall be permitted in proximity to a lake or natural watercourse unless a buffer zone is provided along the margin of the watercourse of sufficient width to confine visible siltation within the twenty-five percent (25%) of

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the buffer zone nearer the land-disturbing activity, provided, that this subdivision (a) shall not apply to a land-disturbing activity in connection with the construction of facilities to be located on, over, or under a lake or natural watercourse.

b. The angle for graded slopes and fills shall be no greater than the angle which can be retained by vegetative cover or other adequate erosion control devices or structures. In any event, slopes left exposed will, within 30 working days of completion of any phase of grading, be planted or otherwise provided with ground cover, devices, or structures sufficient to restrain erosion. (1973-74, c.1417, s.5)

c. Whenever land-disturbing activity is undertaken on a tract comprising more than one acre, if more than one contiguous acre is uncovered, a ground cover sufficient to restrain erosion must be planted or otherwise provided within 30 working days on that portion of the tract upon which further active construction is not being undertaken, provided, that this subdivision (c) shall not apply to cleared land forming the basin of a reservoir later to be inundated. (1973,c.392,s.8)

Section 7 DESIGN AND PERFORMANCE STANDARD

Erosion and sedimentation control measures, structures, and devices shall be so planned, designed, and constructed as to provide control from the calculated peak rates of runoff from a ten-year frequency storm. Runoff rates shall be calculated using the procedures in the USDA, Soil Conservation Service's "National Engineering Field Manual for Conservation Practices", or other acceptable calculation procedures. Runoff computations shall be based on rainfall data published by the National Weather Service for the area.

Section 8 PERMANENT DOWNSTREAM PROTECTION OF STREAM BANKS AND CHANNELS

Provision shall be made for the permanent protection of off-site stream banks and channels from the erosive effects of increased velocity and volume of storm water runoff resulting from certain land-disturbing activities.

a. A combination of storage and controlled release of storm water runoff shall be required for highway construction; commercial, industrial, educational, and institutional developments of one acre or more; for multi-family residential developments of 5 acres or more; and, for single family developments of 10 acres or more. After development of the site, the calculated peak rate of storm water runoff resulting from a ten-year frequency storm shall be no greater than that which would result from a ten-year frequency storm on the same site prior to development.

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b. Detention storage and controlled release will not be required in those instances where the person planning to conduct the activity can demonstrate that the storm water release will not cause an increase in accelerated erosion or sedimentation of the receiving stream or other body of water, taking into consideration any anticipated development of the watershed in question.

Section 9 BORROW AND WASTE AREAS

When the person conducting the land-disturbing activity is also the person conducting the borrow or waste disposal activity, areas from which borrow is obtained and which are not regulated by the provisior of the Mining Act of 1971, and waste areas for surplus materials othe than landfills regulated by the Department of Human Resources, Divisi of Health Services, shall be considered as part of the land-disturbir activity where the borrow material is being used or from which the waste material originated. When the person conducting the land-disturbing activity is not the person obtaining the borrow and/or disposing of the waste these areas shall be considered a separate land-disturbing activity.

Section 10 ACCESS AND HAUL ROADS

Temporary access and haul roads, other than public roads, constructe or used in connection with any land-disturbing activity shall be co sidered a part of such activity.

Section 11 OPERATIONS IN LAKES OR NATURAL WATERCOURSES

Land-disturbing activity in connection with construction in, on, ove or under a lake or natural watercourse shall be planned and conducte in such a manner as to minimize the extent and duration of disturbar of the stream channel. The relocation of a stream, where relocation is an essential part of the proposed activity, shall be planned and executed so as to minimize changes in the stream flow characteristi except when justification for significant alteration to flow charact istic is provided.

Section 12 RESPONSIBILITY FOR MAINTENANCE

The person engaged in or conducting the land-disturbing activity sh be responsible for maintaining all temporary and permanent erosion sedimentation measures and facilities during the development of a s The responsibility for maintaining all permanent erosion and sedime tion control measures and facilities, after site development is comp shall lie with the landowner.

Section 13 GUIDELINES FOR EROSION AND SEDIMENT CONTROL PRACTICES

Until such time as the Commission can prepare and distribute refere materials dealing with sedimentation control techniques, persons e

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in planning, designing, installing, and maintaining sedimentation control measures may use generally accepted references on the subject from other sources, as well as generally accepted references for standard engineering and agricultural practices.

The Commission will publish and furnish upon request a list of acceptable references.

Section 14 ADDITIONAL MEASURES

Whenever the Commission, or a local government having jurisdiction, determines that significant sedimentation is occurring as a result of a land-disturbing activity, despite application and maintenance of protective practices, the person conducting the land-disturbing activity or the person responsible for maintenance will be required to take additional protective action.

Section 15 EXISTING UNCOVERED AREAS

a. All uncovered areas existing on the effective date of these Rules and Regulations which resulted from land-disturbing activities and exceed one contiguous acre, and are subject to continued accelerated erosion, and are causing off-site damage from sedimentation, shall be provided with a ground cover or other protective measures, structures, or devices sufficient to restrain accelerated erosion and control off-site sedimentation.

b. The Commission, or the local government having jurisdiction, shall serve upon the landowner, by certified mail, notice to comply. The notice shall set forth the measures needed to comply and shall state the time within which such measures must be completed. In determining the measures required and the time allowed for compliance, the authority serving the notice shall take into consideration the economic feasibility, technology, and quantity of work required, and shall set reasonable and attainable time limits for compliance.

c. State agency erosion and sedimentation control programs, submitted to the Commission for approval and delegation of authority for administration of such programs in their jurisdiction, shall contain provisions for the treatment of existing exposed areas. Such provisions shall be consistent with existing technology and shall consider the quantity of work required and the economic feasibility.

d. This section shall not require ground cover be provided on cleared land forming the basin of a reservoir later to be inundated.

Section 16 PLAN REQUIREMENT

a. Whenever the area to be disturbed comprises more than one acre, a copy of the plan shall be filed with the local government having

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jurisdiction, or the Commission if no local government haas jurisdiction, 30-days prior to beginning any land-disturbing aactivity. A copy of the plans shall also be on file at the job sitee. If the Commission or local government determines, either upcon review of such plan or on inspection of the job site, that a siggnificant risk of off-site sedimentation exists, it will require a revised plan be prepared. Pending the preparation of the revisedH plan, the work shall be either suspended or continued under conditions outlined by the appropriate authority.

b. Erosion and sediment control plans, as required under Section 4.a, shall contain architectural and engineering drawings, maps, assumptions, calculations, and narrative statements as needed to describe adequately the proposed development of the site; the measures planned to meet the Basic Control Objectives of Section 5; and the requirements of Section 6, 7, and 8. Plan content may vary to meet the needs of specific site conditions. Detailed guidelines for plan preparation may be obtained from the Commission on request.

c. An amendment to a plan may be made at any time under the same procedure as followed for the original plan.

Section 17 APPROVAL OF PLANS

a. Commission Approval

(1) Plans are to be approved by the Commission for all land-disturbing activities over which the Commission, by statutes, has exclusive jurisdiction, including those

(a) conducted by the State,
(b) conducted by the United States,
(c) conducted by persons having the power of eminent domain,
(d) conducted by local governments,
(e) licensed by the State or the United States, or
(f) funded in whole or in part by the State or United States.

(2) The Commission may delegate jurisdiction, in whole or in part, to any other state agency that has submitted an erosion control program to be administered by it, if such program has been approved by the Commission as being in conformity with the general State program for land-disturbing activities.

(3) The Commission will, within 30 days of receipt of a plan, complete its review of such plan, and notify the person submitting the plan that it has been

(a) approved,
(b) approved with modifications,
(c) approved with performance reservations, or
(d) disapproved.

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(4) The disapproval, modification, or performance reservations of any proposed plan, by the Commission, shall entitle the person submitting the plan to a public hearing before the Commission, if such person submits written demand for a hearing within 15 days after receipt of notification of disapproval, modification, or performance reservation. The hearing will be scheduled within 30-days of demand and will be conducted in Raleigh, Wake County, or in the City or County where the land-disturbing activity is located, as may be designated by the Commission. Judicial review of the final Commission action may be had in the Superior Court of the County in which the hearing is held.

b. Local Government Approval

(1) The governing body of each local government administering an approved erosion and sedimentation control program shall develop and publish procedures for review of plans. Such procedures shall not be inconsistent with the applicable laws, ordinances, rules and regulations, and shall contain procedures for appeals consistent with the local government organization and operating procedures.

Section 18 COMPLIANCE WITH PLAN REQUIREMENTS

Any person engaged in land-disturbing activities who fails to file a plan in accordance with these rules and regulations, or who conducts a land-disturbing activity except in accordance with provisions of a plan shall be deemed in violation of these rules and regulations.

Section 19 INSPECTIONS AND INVESTIGATIONS

a. The Commission shall have the power to conduct such investigations as it may reasonably deem necessary to carry out its duties as prescribed in the Sedimentation Pollution Control Act of 1973, and for this purpose to enter at reasonable times upon any property, public or private, for the purpose of investigating and inspecting the sites of land-disturbing activities. No person shall refuse entry or access to any authorized representative or agent of the Commission who requests entry for purposes of inspection, and who presents appropriate credentials, nor shall any person obstruct, hamper, or interfere with any such representatives while in the process of carrying out his official duties.

b. The Commission shall also have the power to require written statements, or the filing of reports under oath, with respect to pertinent questions relating to land-disturbing activities.

Section 20 PENALTIES

Civil and criminal penalties for violation of the Sedimentation Pollution Control Act of 1973 and these regulations as authorized by that Act are contained in GS113A-64.

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Section 21 SEVERABILITY CLAUSE

If any of these rules and regulations are held to be invalid or unenforceable, all of the other rules and regulations shall nevertheless continue in full force and effect.

Section 22 EFFECTIVE DATE

These rules and regulations shall become effective on July 1, 1974 with the exception that specific provisions shall become effective in accordance with the following schedule:

a. The Mandatory Standards contained in GS113A-57 and reprinted in Section 6 became effective on July 1, 1973.

b. Section 15 pertaining to land-disturbing activities in progress or disturbed areas existing on July 1, 1974 which are causing off-site damage shall become effective on January 1, 1975.

c. Sections 4 a., 7, 16, and 17, pertaining to plan requirements and design criteria for control measures shall become effective March 1, 1975 for all proposed activities advertised for bid, let to contract, or on which work is undertaken on or after March 1, 1975.

d. Section 8 pertaining to permanent downstream protection of stream banks and channels shall become effective by order of the Commiss after completion and evaluation of additional engineering studies Any such order will be issued six months prior to the effective date, but not later than January 1, 1977.

e. Local governments adopting a local ordinance for approval by the Commission shall include therein a proposed schedule for implementing the ordinance.

This is to certify that this is a true copy of the Rules and Regula which were duly adopted by the North Carolina Sedimentation Control Commission pursuant to the provisions of the Sedimentation Pollutio Control Act of 1973 on the 10th day of April, 1974.

James E. Harrington, Chairman
Sedimentation Control Commission

Sworn to and subscribed before me this 17 day of April, 19

Dorothy M. Rogers
Notary Public

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My Commission expires April 9, 1979.

LEGAL COMPENDIUM
HAZARDOUS AND TOXIC MATERIALS AND SOLID WASTES

1. Federal Water Pollution Control Act Amendments of 1972. 33 U.S.C. 1151, et seq., P.L. 92-500.

2. E.O. 11752, Prevention, Control and Abatement of Environmental Pollution at Federal Facilities.

3. Rivers and Harbors Act of 1899, 33 U.S.C. 401-413 (Section 407 is the "Refuse Act of 1899").

4. E.O. 11574, Administration of the Refuse Act Permit Program.

5. Marine Protection, Research and Sanctuaries Act of 1972, P. O. 92-532.

6. EPA Regulations on Transportation for Dumping and Dumping of Material into Ocean Waters. 40 C.F.R. 220-226.

7. Ports and Waterways Safety Act of 1972, P.L. 92-340.

8. Coastal Zone Management Act of 1972, P.L. 92-583.

9. CEQ National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. 1510 (Under Authority of Subsection (c)(2) of Section 311 of the Water Pollution Control Act).

10. EPA Regulations on Policies and Procedures for the National Pollutant Discharge Elimination System, 40 C.F.R. 125.

11. EPA Pretreatment Standards, 40 C.F.R. 128.

12. Toxic Substances Control Act of 1976, P.L. 94-469.

13. Resource Conservation and Recovery Act of 1976, P.L. 94-580.

14. Clean Water Act of 1977.

15. Federal Insecticide, Fungicide and Rodenticide Act of 1972, P.L. 92-516.

16. Environmental Protection Agency Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticides Containers. 40 C.F.R 165.

ATTACHMENT CLW

Subpart B—National Emission Standard for Asbestos

§ 61.20 **Applicability.**

The provisions of this subpart are applicable to those sources specified in § 61.22.

§ 61.21 **Definitions.**

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Asbestos" means actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite.

(b) "Asbestos material" means asbestos or any material containing asbestos.

(c) "Particulate asbestos material" means finely divided particles of asbestos material.

(d) "Asbestos tailings" means any solid waste product of asbestos mining or milling operations which contains asbestos.

(e) "Outside air" means the air outside buildings and structures.

(f) "Visible emissions" means any emissions which are visually detectable without the aid of instruments and which contain particulate asbestos material.

(g) "Asbestos mill" means any facility engaged in the conversion or any intermediate step in the conversion of asbestos ore into commercial asbestos. Outside storage of asbestos materials is not considered a part of such facility.

(h) "Commercial asbestos" means any variety of asbestos which is produced by extracting asbestos from asbestos ore.

(i) "Manufacturing" means the combining of commercial asbestos, or in the case of woven friction products the combining of textiles containing commercial asbestos, with any other material(s), including commercial asbestos, and the processing of this combination into a product as specified in § 61.22(c).

(j) "Demolition" means the wrecking or taking out of any load-supporting structural member and any related removing or stripping of friable asbestos materials.

(k) "Friable asbestos material" means any material that contains more than 1 percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure.

(l) "Control device asbestos waste" means any asbestos-containing waste material that is collected in a pollution control device.

(m) "Renovation" means the removing or stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. Operations in which load-supporting structural members are wrecked or taken out are excluded.

[Paragraph (m) revised by 43 FR 26373, June 19, 1978]

(n) "Planned renovation" means a renovation operation, or a number of such operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Operations that are individually non-scheduled are included, provided a number of such operations can be predicted to occur during a given period of time based on operating experience.

(o) "Emergency renovation" means a renovation operation that results from a sudden, unexpected event, and is not a planned renovation. Operations necessitated by non-routine failures of equipment are included.

(p) "Adequately wetted" means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions.

(q) "Removing" means taking out friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member from any building, structure, facility, or installation.

(r) "Stripping" means taking off friable asbestos materials from any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member.

[Paragraph (q) and (r) revised by 43 FR 26373, June 19, 1978]

(s) "Fabricating" means any processing of a manufactured product containing commercial asbestos, with the exception of processing at temporary sites for the construction or restoration of buildings, structures, facilities or installations.

(t) "Inactive waste disposal site" means any disposal site or portion thereof where additional asbestos-containing waste material will not be deposited and where the surface is not disturbed by vehicular traffic.

(u) "Active waste disposal site" means any disposal site other than an inactive site.

(v) "Roadways" means surfaces on which motor vehicles travel including, but not limited to, highways, roads, streets, parking areas, and driveways.

(w) "Asbestos-containing waste material" means any waste which contains commercial asbestos and is generated by a source subject to the provisions of this subpart, including asbestos mill tailings, control device asbestos waste, friable asbestos waste material, and bags or containers that previously contained commercial asbestos.

[40 FR 48292, October 14, 1975]

(x) "Structural member" means any load-supporting member, such as beams and load-supporting walls; or any non-load-supporting member, such as ceilings and non-load-supporting walls.

[42 FR 12127, March 2, 1977]

61.22 **Emission standard.**

(a) Asbestos mills: There shall be no visible emissions to the outside air from any asbestos mill except as provided in paragraph (f) of this section.

[39 FR 15936, May 3, 1974]

(b) Roadways: The surfacing of roadways with asbestos tailings or with asbestos-containing waste that is generated by any source subject to paragraphs (c), (d), (e) or (h), of this section is prohibited, except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings or asbestos-containing waste on roadways covered with snow or ice is considered "surfacing."

(c) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

[40 FR 48292, October 14, 1975]

(1) The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap, or other textile materials.

(2) The manufacture of cement products.

(3) The manufacture of fireproofing and insulating materials.

(4) The manufacture of friction products.

(5) The manufacture of paper, millboard, and felt.

(6) The manufacture of floor tile.

(7) The manufacture of paints, coatings, caulks, adhesives, sealants.

(8) The manufacture of plastics and rubber materials.

(9) The manufacture of chlorine.

(10) The manufacture of shotgun shells.

(11) The manufacture of asphalt concrete.

(d) *Demolition and renovation.* The requirements of this paragraph shall apply to any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that is covered or coated with friable asbestos materials, except as provided in paragraph (d)(1) of this section; or who intends to renovate any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof where more than 80 meters (ca. 260 feet) of pipe covered or coated with friable asbestos materials are stripped or removed, or more than 15 square meters, (ca. 160 square feet) of friable asbestos materials used to cover or coat any duct, boiler, tank, reactor, turbine, furnace, or structural member are stripped or removed.

(1) (i) The owner or operator of a demolition operation is exempted from the requirements of this paragraph: *Provided,* (A) The amount of friable asbestos materials in the building or portion thereof to be demolished is less than 80 meters (ca. 260 feet) used on pipes, and less than 15 square meters (ca. 160 square feet) used on any duct, boiler, tank, reactor, turbine, furnace, or structural member, and (B) the notification requirements of paragraph (d)(1)(ii) are met.

(ii) Written notification will be postmarked or delivered to the Administrator at least 20 days prior to com-

mencement of demolition and shall include the information required by paragraph (d)(2) of this section, with the exception of the information required by paragraphs (d)(2) (iii), (vi), (vii), (viii), and (ix) of this section, and shall state the measured or estimated amount of friable asbestos materials which is present. Techniques of estimation shall be explained.

[Paragraph (d) revised by 43 FR 26374, June 19, 1978]

(2) Written notice of intention to demolish or renovate shall be provided to the Administrator by the owner or operator of the demolition or renovation operation. Such notice shall be postmarked or delivered to the Administrator at least 10 days prior to commencement of demolition, or as early as possible prior to commencement of emergency demolition subject to paragraph (d)(6) of this section, and as early as possible prior to commencement of renovation. Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished or renovated, including the size, age, and prior use of the structure, and the approximate amount of friable asbestos materials present.

[Paragraph (iii) revised by 43 FR 26374, June 19, 1978]

(iv) Address or location of the building, structure, facility, or installation.

(v) Scheduled starting and completion dates of demolition or renovation.

(vi) Nature of planned demolition or renovation and method(s) to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph and paragraph (j) of this section.

(viii) The name and address or location of the waste disposal site where the friable asbestos waste will be deposited.

(ix) Name, title, and authority of the State or local governmental representative who has ordered a demolition which is subject to paragraph (d)(6) of this section.

(3)(i) For purposes of determining whether a planned renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be:

(A) For planned renovating operations involving individually non-scheduled operations, the additive amount of friable asbestos material that can be predicted will be removed or stripped at a source over the maximum period of time for which a prediction can be made. The period shall be not less than 30 days and not longer than one year.

(B) For each planned renovating operation not covered by paragraph (d)(3)(i)(A), the total amount of friable asbestos material that can be predicted will be removed or stripped at a source.

(ii) For purposes of determining whether an emergency renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be the total amount of friable asbestos material that will be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(4) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member, shall be removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility, or installation that would break up the friable asbestos materials and before wrecking or dismantling of any other portion of such building, structure, facility, or installation, that would preclude access to such materials for subsequent removal. Removal of friable asbestos materials used on any pipe, duct, or structural member which are encased in concrete or other similar structural material is not required prior to demolition, but such materials shall be adequately wetted whenever exposed during demolition.

(ii) Friable asbestos materials used on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall be adequately wetted during stripping, except as provided in paragraphs (d)(4)(iv), (d)(4)(vi), or (d)(vii) of this section.

(iii) Pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members that are covered or coated with friable asbestos materials may be taken out of any building, structure, facility, or installation subject to this paragraph as units or in sections provided the friable asbestos materials exposed during cutting or disjoining are adequately wetted during the cutting or disjoining operation. Such units shall not be dropped or thrown to the ground, but shall be carefully lowered to ground level.

(iv) The stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that has been removed as a unit or in sections as provided in paragraph (d)(4)(iii) of this section shall be performed in accordance with paragraph (d)(4)(ii) of this section. Rather than comply with the wetting requirement, a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos materials. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems except as provided in paragraph (f) of this section.

[4(i)–(iv) revised by 43 FR 26374, June 19, 1978]

(v) All friable asbestos materials that have been removed or stripped shall be adequately wetted to ensure that such materials remain wet during all remaining stages of demolition or renovation and related handling operations. Such materials shall not be dropped or thrown to the ground or a lower floor. Such materials that have been removed or stripped more than 50 feet above ground level, except those materials removed as units or in sections, shall be transported to the ground via dust-tight chutes or containers.

(vi) Except as specified below, the wetting requirements of this paragraph are suspended when the temperature at the point of wetting is below 0°C (32°F). When friable asbestos materials are not wetted due to freezing temperatures, such materials on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall, to the maximum extent possible, be removed as units or in sections prior to wrecking. In no case shall the requirements of paragraphs (d)(4)(iv) or (d)(4)(v) be suspended due to freezing temperatures.

(vii) For renovation operations, local exhaust ventilation and collection systems may be used, instead of wetting as specified in paragraph (d)(4)(ii), to prevent emissions of particulate asbestos material to outside air when damage to equipment resulting from the wetting would be unavoidable. Upon request and supply of adequate information, the Administrator will determine whether damage to equipment resulting from wetting to comply with the provisions of this paragraph would be unavoidable. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping and removal of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems, except as provided in paragraph (f) of this section.

(5) Sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(6) The demolition of a building, structure, facility, or installation, pursuant to an order of an authorized representative of a State or local governmental agency, issued because that building is structurally unsound and in danger of imminent collapse is exempt from all but the following requirements of paragraph (d) of this section:

(i) The notification requirements specified by paragraph (d)(2) of this section;

(ii) The requirements on stripping of friable asbestos materials from previously removed units or sections as specified in paragraph (d)(4)(iv) of this section;

(iii) The wetting, as specified by paragraph (d)(4)(v) of this section, of friable asbestos materials that have been removed or stripped;

(iv) The portion of the structure being demolished that contains friable asbestos materials shall be adequately wetted during the wrecking operation.

[39 FR 15936, May 3, 1974; 40 FR 48292, October 14, 1975]

(e) *Spraying.* There shall be no visible emissions to the outside air from the spray-on application of materials containing more than 1 percent asbes-

8-18-78

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tos, on a dry weight basis, used on equipment and machinery, except as provided in paragraph (f) of this section. Materials sprayed on buildings, structures, structural members, pipes, and conduits shall contain less than 1 percent asbestos on a dry weight basis.

[Paragraph (e) revised by 43 FR 26374, June 19, 1978]

(1) Sources subject to this paragraph are exempt from the requirements of § 61.05(a), § 61.07, and § 61.09.

(2) Any owner or operator who intends to spray asbestos materials which contain more than 1 percent asbestos on a dry weight basis on equipment and machinery shall report such intention to the Administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Location of spraying operation.

(iv) Procedures to be followed to meet the requirements of this paragraph.

(3) The spray-on application of materials in which the asbestos fibers are encapsulated with a bituminous or resinous binder during spraying and which are not friable after drying is exempted from the requirements of paragraphs (e) and (e)(2) of this section.

[Paragraphs (2) and (3) revised by 43 FR 26374, June 19, 1978]

(f) Rather than meet the no-visible-emission requirements as specified by paragraphs (a), (c), (d), (e), (h), (j), and (k) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

(g) Where the presence of uncombined water is the sole reason for failure to meet the no-visible-emission requirement of paragraphs (a), (c), (d), (e), (h), (j), or (k) of this section, such failure shall not be a violation of such emission requirements.

(h) Fabricating: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

(1) The fabrication of cement building products.

(2) The fabrication of friction products, except those operations that primarily install asbestos friction materials on motor vehicles.

(3) The fabrication of cement or silicate board for ventilation hoods; ovens; electrical panels; laboratory furniture; bulkheads, partitions and ceilings for marine construction; and flow control devices for the molten metal industry.

(i) Insulating: Molded insulating materials which are friable and wet-applied insulating materials which are friable after drying, installed after the effective date of these regulations, shall contain no commercial asbestos. The provisions of this paragraph do not apply to insulating materials which are spray applied; such materials are regulated under § 61.22(e).

(j) Waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations: The owner or operator of any source covered under the provisions of paragraphs (c), (d), (e), or (h) of this section shall meet the following standards:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (j)(3) of this section, during the collection; processing, including incineration; packaging; transporting; or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (j)(1) of this section, an owner or operator may elect to use either of the disposal methods specified under (j)(3)(i) and (ii) of this section, or an alternative disposal method which has received prior approval by the Administrator:

(i) Treatment of asbestos-containing waste material with water:

(A) Control device asbestos waste shall be thoroughly mixed with water into a slurry and other asbestos-containing waste material shall be adequately wetted. There shall be no visible emissions to the outside air from the collection, mixing and wetting operations, except as provided in paragraph (f) of this section.

(B) After wetting, all asbestos-containing waste material shall be sealed into leak-tight containers while wet, and such containers shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(C) The containers specified under paragraph (j)(3)(i)(B) of this section shall be labeled with a warning label that states:

CAUTION
Contains Asbestos
Avoid Opening or Breaking Container
Breathing Asbestos is Hazardous
to Your Health

Alternatively, warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.-93a(g)(2)(ii) may be used.

(ii) Processing of asbestos-containing waste material into non-friable forms:

(A) All asbestos-containing waste material shall be formed into non-friable pellets or other shapes and deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(B) There shall be no visible emissions to the outside air from the collection and processing of asbestos-containing waste material, except as specified in paragraph (f) of this section.

(4) For the purposes of this paragraph (j), the term all asbestos-containing waste material as applied to demolition and renovation operations covered by paragraph (d) of this section includes only friable asbestos waste and control device asbestos waste.

(k) Waste disposal for asbestos mills: The owner or operator of any source covered under the provisions of paragraph (a) of this section shall meet the following standard:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (k)(3) of this section, during the collection, processing, packaging, transporting or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (k)(1) of this section, an owner or operator may elect to meet the following requirements in paragraphs (k)(3)(i) and (ii), or use an alternative disposal method which has received prior approval by the Administrator:

(i) There shall be no visible emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, except as provided in paragraph (f) of this section. Such waste shall be subsequently processed either as specified in paragraph (k)(3)(ii) of this section or as specified in paragraph (j)(3) of this section.

(ii) All asbestos-containing waste material shall be adequately mixed, with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, prior to deposition at a waste disposal site. Such agent shall be used as recommended for the particular dust by the manufacturer of the agent. There shall be no discharge of visible emissions to the outside air from the wetting operation except as specified in paragraph (f) of this section. Wetting may be suspended when the ambient temperature at the waste disposal site is less than −9.5°C (ca. 15°F). The ambient air temperature shall be determined by an appropriate measurement method with an accuracy of ±1°C (±2°F) and recorded at least at hourly intervals during the period that the operation of the wetting system is suspended. Records of

such temperature measurements shall be retained at the source for a minimum of two years and made available for inspection by the Administrator.

(l) The owner of any inactive waste disposal site, which was operated by sources covered under § 61.22 (a), (c) or (b) and where asbestos-containing waste material produced by such sources was deposited, shall meet the following standards:

(1) There shall be no visible emissions to the outside air from an inactive waste disposal site subject to this paragraph, except as provided in paragraph (l)(5) of this section.

(2) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited, at intervals of 100 m (ca. 330 ft) or less, except as specified in paragraph (l)(4) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20" x 14" upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

Do Not Create Dust

Breathing Asbestos is Hazardous to Your Health

Notation

1" Sans Serif, Gothic or Block

¾" Sans Serif, Gothic or Block

14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(3) The perimeter of the site shall be fenced in a manner adequate to deter access by the general public, except as specified in paragraph (l)(4) of this section.

(4) Warning signs and fencing are not required where the requirements of paragraphs (1)(5) (i) or (ii) of this section are met, or where a natural barrier adequately deters access by the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(5) Rather than meet the requirement of paragraph (1)(1) of this section, an owner may elect to meet the requirements of this paragraph or may use an alternative control method for emissions from inactive waste disposal sites which has received prior approval by the Administrator.

(i) The asbestos-containing waste material shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material, and a cover of vegetation shall be grown and maintained on the area adequate to prevent exposure of the asbestos-containing waste material; or

(ii) The asbestos-containing waste material shall be covered with at least 60 centimeters (ca. 2 feet) of compacted non-asbestos-containing material and maintained to prevent exposure of the asbestos-containing waste; or

(iii) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion shall be applied. Such agent shall be used as recommended for the particular asbestos tailings by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

[40 FR 48292, October 14, 1975]

§ 61.23 Air-cleaning.

If air-cleaning is elected, as permitted by §§ 61.22(f) and 61.22(d)(4)(iv), the requirements of this section must be met.

[40 FR 48292, October 14, 1975]

(a) Fabric filter collection devices must be used, except as noted in paragraphs (b) and (c) of this section. Such devices must be operated at a pressure drop of no more than 4 inches water gage, as measured across the filter fabric. The airflow permeability, as determined by ASTM method D737-69, must not exceed 30 $ft^3/min/ft^2$ for woven fabrics or 35 $ft^3/min/ft^2$ for felted fabrics, except that 40 $ft^3/min/ft^2$ for woven and 45 $ft^3/min/ft^2$ for felted fabrics is allowed for filtering air from asbestos ore dryers. Each square yard of felted fabric must weigh at least 14 ounces and be at least one-sixteenth inch thick throughout. Synthetic fabrics must not contain fill yarn other than that which is spun.

(b) If the use of fabric filters creates a fire or explosion hazard, the administrator may authorize the use of wet collectors designed to operate with a unit contacting energy of at least 40 inches water gage pressure.

(c) The administrator may authorize the use of filtering equipment other than that described in paragraphs (a) and (b) of this section if the owner or operator demonstrates to the satisfaction of the administrator that the filtering of particulate asbestos material is equivalent to that of the described equipment.

(d) All air-cleaning equipment authorized by this section must be properly installed, used, operated, and maintained. Bypass devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos material.

§ 61.24 Reporting.

The owner or operator of any existing source to which this subpart is applicable shall, within 90 days after the effective date, provide the following information to the administrator:

(a) A description of the emission control equipment used for each process;

(b) If a fabric filter device is used to control emissions, the pressure drop across the fabric filter in inches water gage.

(1) If the fabric filter device utilizes a woven fabric, the airflow permeability in $ft^3/min/ft^2$; and, if the fabric is synthetic, indicate whether the fill yarn is spun or not spun.

(2) If the fabric filter device utilizes a felted fabric, the density in oz/yd^2, the minimum thickness in inches, and the airflow permeability in $ft^3/min/ft^2$.

(c) For sources subject to §§ 61.22(j) and 61.22(k):

(1) A brief description of each process that generates asbestos-containing waste material.

(2) The average weight of asbestos-containing waste material disposed of, measured in kg/day.

(3) The emission control methods used in all stages of waste disposal.

(4) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site.

(d) For sources subject to § 61.22(l):

(1) A brief description of the site.

(2) The method or methods used to comply with the standard, or alternative procedures to be used.

(e) Such information shall accompany the information required by § 61.10. The information described in this section shall be reported using the format of Appendix A of this part.

[40 FR 48292, October 14, 1975]

§ 61.25 Waste disposal sites.

In order to be an acceptable site for disposal of asbestos-containing waste material under § 61.22 (j) and (k), an active waste disposal site shall meet the requirements of this section.

(a) There shall be no visible emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, except as provided in paragraph (e) of this section.

(b) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited, at intervals of 100 m (ca. 330 ft) or less except as specified in paragraph (d) of this section. Signs shall be posted in such

[Sec. 61.25(

a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20" x 14" upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

Do Not Create Dust

Breathing Asbestos
is Hazardous to Your Health

Notation

1" Sans Serif, Gothic or Block

¾" Sans Serif, Gothic or Block

14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(c) The perimeter of the disposal site shall be fenced in order to adequately deter access to the general public except as specified in paragraph (d) of this section.

(d) Warning signs and fencing are not required where the requirements of paragraph (e)(1) of this section are met, or where a natural barrier adequately deters access to the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(e) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may elect to meet the requirements of paragraph (e)(1) or (e)(2) of this section, or may use an alternative control method for emissions from active waste disposal sites which has received prior approval by the Administrator.

(1) At the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material.

(2) At the end of each operating day, or at least once every 24-hour period while the disposal site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion. Such agent shall be used as recommended for the particular dust by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

[40 FR 48292, October 14, 1975]

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

Subpart C—National Emission Standard for Beryllium

§ 61.30 Applicability.

The provisions of this subpart are applicable to the following stationary sources:

(a) Extraction plans, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

(b) Machine shops which process beryllium, beryllium oxides, or any alloy when such alloy contains more than 5 percent beryllium by weight.

§ 61.31 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Beryllium" means the element beryllium. Where weights or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any associated elements.

(b) "Extraction plant" means a facility chemically processing beryllium ore to beryllium metal, alloy, or oxide, or performing any of the intermediate steps in these processes.

(c) "Beryllium ore" means any naturally occurring material mined or gathered for its beryllium content.

(d) "Machine shop" means a facility performing cutting, grinding, turning, honing, milling, deburring, lapping, electrochemical machining, etching, or other similar operations.

(e) "Ceramic plant" means a manufacturing plant producing ceramic items.

(f) "Foundry" means a facility engaged in the melting or casting of beryllium metal or alloy.

(g) "Beryllium-containing waste" means material contaminated with beryllium and/or beryllium compounds used or generated during any process or operation performed by a source subject to this subpart.

(h) "Incinerator" means any furnace used in the process of burning waste for the primary purpose of reducing the volume of the waste by removing combustible matter.

(i) "Propellant" means a fuel and oxidizer physically or chemically combined which undergoes combustion to provide rocket propulsion.

(j) "Beryllium alloy" means any metal to which beryllium has been added in order to increase its beryllium content and which contains more than 0.1 percent beryllium by weight.

(k) "Propellant plant" means any facility engaged in the mixing, casting, or machining of propellant.

§ 61.32 Emission standard.

(a) Emissions to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 10 grams of beryllium over a 24-hour period, except as provided in paragraph (b) of this section.

(b) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may request approval from the Administrator to meet an ambient concentration limit on beryllium in the vicinity of the stationary source of 0.01 $\mu g/m^3$, averaged over a 30-day period.

(1) Approval of such requests may be granted by the Administrator provided that:

(i) At least 3 years of data is available which in the judgment of the Administrator demonstrates that the future ambient concentrations of beryllium in the vicinity of the stationary source will not exceed 0.01 $\mu g/m^3$, averaged over a 30-day period. Such 3-year period shall be the 3 years ending 30 days before the effective date of this standard.

(ii) The owner or operator requests such approval in writing within 30 days after the effective date of this standard.

(iii) The owner or operator submits a report to the Administrator within 45 days after the effective date of this standard which report includes the following information:

(a) Description of sampling method including the method and frequency of calibration.

(b) Method of sample analysis.

(c) Averaging technique for determining 30-day average concentrations.

(d) Number, identity, and location (address, coordinates, or distance and heading from plant) of sampling sites.

(e) Ground elevations and height above ground of sampling inlets.

(f) Plant and sampling area plots showing emission points and sampling sites. Topographic features significantly affecting dispersion including plant building heights and locations shall be included.

(g) Information necessary for estimating dispersion including stack height, inside diameter, exit gas temperature, exit velocity or flow rate, and beryllium concentration.

(h) A description of data and procedures (methods or models) used to de-

UNITED STATES MARINE CORPS
2d Marine Division, FMF
Camp Lejeune, North Carolina 28542

4/JAT/pat
6200
14 Aug 79

From: Commanding General
To: Commanding General, Marine Corps Base, Camp Lejeune, North Carolina 28542 (Attn: EMaintO)

Subj: Hazardous Waste Material; report of

Ref: (a) CG, MCB CLNC ltr MAIN/JIW/th 6240 of 5 Jul 79
(b) Telecon MGYSGT TARWATER, 2d MarDiv, G-4 and Mr. WOOTEN, NR & EA Div, MCB on 3 Aug 79

1. As requested by reference (a) and discussed in reference (b), the following estimates are submitted for hazardous waste materials generated on a monthly basis:

ELECTROLYTE	180	GAL
CLEANING SOLVENT	315	GAL
ANTIFREEZE	275	GAL
OTHER POL	315	GAL

W. W. OGLE
By direction

CLW

0000000342

ATTACHMENT (8)

UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
(HELICOPTER)
NEW RIVER, JACKSONVILLE
NORTH CAROLINA 28545

204:PFA:cbm
11000
30 May 1979

From: Commanding Officer
To: Commanding General, Marine Corps Base, Camp Lejeune, N. C. 28542
(Base Maintenance Officer)

Subj: Identification of Hazardous Material for Disposal

Ref: (a) CG, MCB, CLNC ltr MAIN/JIW/th 6240/25 dtd 15 Jan 1979

Encl: (1) List of Hazardous Materials to be Disposed of at MAG-26
(2) List of Hazardous Materials to be Disposed of at MAG-29
(3) List of Hazardous Materials used at MCAS(H), New River

1. Per reference (a), enclosures (1) and (2) identify hazardous materials to be disposed of at tenant units at MCAS(H), New River.

2. Currently, materials are being stored in open storage areas in accordance with the local Fire Marshall's instructions.

3. Enclosure (3) lists all the hazardous materials used at MCAS(H), New River and their approximate annual requirements. Residual quantities of these materials are difficult to predict and should a contract be required for economical disposal of them, it is requested that bidders be invited to talk to the Maintenance Officers of these tenant units prior to submitting their bids to determine the total requirement.

P. F. ANGEL
By direction

Copy to:
CO, MAG-26
CO, MAG-29

CLW

0000000343

LIST OF HAZARDOUS MATERIALS TO BE DISPOSED OF AT MAG-26

The following list of material is comprised of those items to be disposed of properly in accordance with existing environmental regulations. Currently, these items are accounted for on records held by the MAG-26 Group Supply Officer, MCAS(H), New River, Jacksonville, NC.

NOMENCLATURE	QTY	TYPE CONTAINER	NIIN
Cleaning Compound	220 gal.	(2) 55 gal drums (opened) (2) 55 gal drums (sealed)	00-753-4998
Dry Cleaning Solvent (Petroleum Naphtha)	25 gal.	(5) 5 gal cans (sealed)	00-274-5421
Cleaning Compound Aircraft Surface	16 gal.	(1) 16 gal drum (sealed)	00-180-5946
Engine Lube Oil	55 gal.	(1) 55 gal drum (sealed)	00-189-6729
Engine Lube Oil	220 gal.	(1) 55 gal drum (opened) (3) 55 gal drums (sealed)	00-181-8097
Engine Lube Oil	55 gal.	(1) 55 gal drum (opened)	00-191-2772
Toulene Technical	110 gal.	(2) 55 gal drums (sealed)	00-290-0046
Methyl Ketone	55 gal.	(1) 55 gal drum (opened)	NOT AVAIL.
Paint Remover	55 gal.	(1) 55 gal drum (sealed)	00-926-1489
Cleaning Compound Solvent	55 gal.	(1) 55 gal drum (sealed)	00-224-6666
Ammonium Hydroxide Technical (5% Acetic Acid, 27% Ammonia)	58 gal.	(26) 1 gal plastic containers (sealed) (32) 2 gal drums (sealed)	00-817-9929
Corrosion Preventative Compound (Petroleum Base)	80 gal.	(16) 5 gal drums (sealed)	00-526-1605
Sulfuric Acid Electrolyte	65 gal.	(13) 5 gal drums (sealed)	00-823-8007
Trichlorethane	10 gal.	(2) 5 gal drums (sealed)	00-664-0388
Corrosion Preventative (Aircraft Engine)	5 gal.	(1) 5 gal drum (sealed)	00-281-2031

In addition to the items cited above, there are approximately 80 gallons of unknown substance in two containers. One 55 gallon drum (sealed), and one 55 gallon drum (opened).

These items are to be disposed for the following reasons: either the container is badly corroded and deemed hazardous; the container has been partially opened and the material has been contaminated; or the shelf life of the material has expired.

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ENCLOSURE (1)

LIST OF HAZARDOUS MATERIALS TO BE DISPOSED OF AT MAG-29

The following amounts of hazardous material is on hand awaiting disposition.

100 gallons of toxic material-ammonia based paint stripper

320 gallons of flammable liquids/toxic material. This material is mixed ammonia based stripper, lacquer paint, lacquer thinner, enamel paint and enamel thinner.

In addition to this material that is on hand, there is approximately 100 gallons of flammable petroleum based liquids collected each month. This material is being disposed of through a civilian company that has a contract with Marine Corps Base.

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ENCLOSURE (2)

LIST OF HAZARDOUS MATERIALS USED AT MCAS(H), NEW RIVER

A. FLAMMABLE LIQUIDS

MOGAS	10,000 gal
Diesel Fuel	10,000 gal
Freon, liquid	106 gal
Aliphatic Polyurethane	200 gal
Acetone	104 gal
Trichloroethylene	10 gal
Trichlorotrifluoroethane	40 gal
Methyl Ethyl Ketone (MEK)	2 gal
Toluene	2 gal
Isopropyl Alcohol	2 gal
RTV Catalyst 5	32 gal
Adhesive A-40 Part A	32 oz
Dry Cleaning Solvent	444 gal
Aircraft Surface Cleaning Compound	10 gal
Avionics Component Cleaning Compound	10 gal
Corrosion Preventative	10 gal
Paint Thinner	404 gal
Paint	450 gal
Spray Paint	24 cases
Hydraulic Fluid	1,500 gal
Transmission Fluid	60 gal
Lubricating Oil	1,600 gal
Engine Oil	30 gal
Contaminated Fluid Tank	1,100 gal
Xylene	2 gal

B. FLAMMABLE SOLIDS

Automotive Grease - 6 each, 100 lb drum

C. OXIDIZING MATERIAL

MEK Peroxide	102 lbs

D. CORROSIVE MATERIAL

Ethylene Glycol	400 gal
Epoxy Paint Remover	120 gal
Sulfuric Acid, Electrolyte	40 gal
Diethylenetriamine	2 gal
Potassium Hydroxide	2 qt

E. RADIOACTIVE MATERIAL

Electron Tubes		
P/N 0A2WA	5960-00-503-4880	8 ea
P/N 6700	5960-00-543-1272	6 ea
Probe Ice Detector		
P/N 1278-1N	1660-00-077-8473	2 ea

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ENCLOSURE (3)

F. COMPRESSED GAS

Argon - 8 each - 50 lb cylinder
Acetylene - 6 each - 50 lb cylinder
Oxygen - 25 each - 50 lb cylinder
Freon - 2 each - 50 lb cylinder
Nitrogen, gaseous - 232 each - 30 lb cylinder
50 each - 50 lb cylinder
Nitrogen, liquid - 4 each - 500 gal tank
Starting Fluid - 2 each - 20 gal tank

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ENCLOSURE (3)

From: Mr. W. L. Carter, Environmental Engineer, Atlantic Division, Naval Facilities Engineering Command

To: LT COL T. R. Baisley, Base Maintenance Officer, Marine Corps Base, Camp Lejeune

Subj: Environmental Engineering Survey Preliminary Report and Recommendations

A. Deficiencies noted during the survey are as follows:

1. EPA has issued a stop sale list for the manufacture and use of the herbicide silvex. At the present time, 132 gallons of silvex are on hand and have been stored at MARCORB CAMP LEJEUNE Pest Control Shop.

2. There is no Spill Prevention Control and Countermeasure (SPCC) to eliminate/control spills from 55-gallon oil drums for an estimated 1,561 space heaters. These items initially included in the FY-80 Pollution Control MCON Project P-996 were deleted due to cost limitations.

3. There exists a need for a technically trained person to administer the boiler feedwater treatment program to adequately interpret test data and provide optimum boiler operation.

4. There is no collection/treatment of coal pile runoff at the steam plant(s).

5. In view of new construction of barracks at the Courthouse Bay area and a hospital at the Hadnot Point area, the MARCORB CAMP LEJEUNE water/sewage treatment facilities will exceed their design capacity in the early 1980's if this recent trend continues. As outlined in LANTNAVFACENGCOM letter 114:DPG ser 6280 of 13 Oct 1978, design of such major facility expansion will require extensive preliminary studies.

6. Large quantities of aluminum cans, cardboard, wood, and various type metals are currently being disposed of in the landfill.

7. There is presently no operating permit for the Camp Lejeune Sanitary Landfill. An operating plan, however, has been submitted to the State of North Carolina for approval to acquire a permit for the disposal site.

8. Significant soil erosion/sediment control problems are associated with the new Marine Barracks, 1st area, Naval Hospital construction site, sanitary landfill site, and the Engineering Equipment and Rifle Range training areas.

9. The zeolite softener tanks at the Courthouse Bay water treatment plant are corroded.

10. The metal steps leading into the Tarawa Terrace sewage treatment plant wet well are badly corroded, and some are missing entirely. CLW

11. There is a lack of adequate sanitary facilities (i.e. flushing toilet and bowl) at the Onslow Beach sewage treatment plant.

12. The two 25-inch comminutors at the Hadnot Point sewage treatment plant are old and worn. They are no longer cutting/functioning properly.

13. No auxilliary power is provided for in-plant operation at the MCAS NEW RIVER water treatment facility. Chlorine drum(s) located in the rear of the plant is not confined by a fence or structure. The lime hopper is enclosed in the upper room of the water treatment plant with an undersized dust collector and poor ventilation. A tremendous amount of dust is generated during hopper reloading.

14. Camp Geiger's advanced wastewater treatment portion of the sewage treatment plant is inoperative.

15. Chlorine rooms at the Onslow Beach and Montford Point sewage treatment plants and Hadnot Point water treatment plant lack proper ventilation.

16. The Montford Point water treatment plant zeolite softeners are old and antiquated.

17. MARCORB CAMP LEJEUNE's water and sewage treatment plants are excellently run operations. However, there was evidence of sporadic maintenance problems associated with periodic personnel shortages.

18. Field head facilities at the Verona Loop K range are dug pits located just above the area's high water table. Some of the drums in the pits were reported sitting in the groundwater.

19. No boiler water samples are being submitted monthly to BUMINES for referee check analysis.

20. MARCORB CAMP LEJEUNE Defense Property Disposal Office is presently storing 304 Base Maintenance Transformers and 5,094 4-ounze cans of powdered DDT.

21. Laboratory chemicals from MARCORB CAMP LEJEUNE High School are currently being stored for acceptable disposal.

22. Hazardous waste materials identification lists for MCAS NEW RIVER and 2nd Marine Division, FMF, Tarawa Terrace have been provided, seeking proper environmental disposal methods.

23. The berm for the vehicle washrack at MCAS CAMP LEJEUNE Motor Pool, Building 119, is inadequate to prevent wastewater from entering the adjacent storm drain.

24. There is no chemist at the Environmental Quality Control Laboratory. In addition, this laboratory is not certified.

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25. The inorganic chemical analysis for potable water, due every three years, has not been performed.

26. Severe personnel shortages in the Natural Resources and Environmental Affairs Division limit current capability to perform/meet the necessary environmental program requirements.

B. Preliminary recommendations are as follows:

1. It is strongly recommended that remaining containers of silvex not be used. The herbicide should continue to be stored until further notification from the Applied Biology Office. However, when significant container deterioration is detected, LANTNAVFACENGCOM Code 10A is to be contacted immediately for further instruction.

2. It is recommended that separate FY-81/82 oil SPCC pollution abatement MCON project be resubmitted to include provisions for the estimated 1,561 space heaters.

3. It is recommended that an experienced chemist with technical knowledge of boiler water treatment be hired to supervise the boiler water treatment program at all the Camp Lejeune steam plants.

4. As understood by LANTNAVFACENGCOM, remaining known wastewater/oil environmental deficiencies which concern the treatment of coal pile runoff will be accomplished as part of the MARCORB CAMP LEJEUNE boilers coal conversion program.

5. It is recommended that MARCORB CAMP LEJEUNE review recent growth trends and provide current projected growth figures for each Base area to LANTNAVFACENGCOM. These projections are to include population estimates, proposed industrial operations, and usage rates per person and/or industrial operations. It is further recommended that these projections be completed in time to allow for project programming and preliminary studies to accommodate FY-82/83 projects.

6. It is recommended that a staging area be established for recovery of recycleable materials currently being disposed of at the landfill.

7. The Stearns, Conrad, and Schmidt Consulting Engineers, Inc. Solid Waste Management Study for MARCORB CAMP LEJEUNE has determined it is feasible to recover energy from the generated waste streams. It is therefore recommended that Mr. Peter Cunanan, LANTNAVFACENGCOM Code 114 be requested to review and provide guidance for implementing the present solid waste program.

8. Compliance with the Soil Conservation Service Erosion Control requirements is legally mandated. It is recommended that a separate FY-82 pollution abatement MCON project be submitted as soon as possible. An A/E preliminary study may be required to outline the scope of this project.

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9. It is recommended that the new Marine Barracks, 1st area, and the Naval Hospital construction contracts be reviewed for sediment control provisions. It is further recommended that receiving streams be monitored for sediment compliance with NPDES limitations. LANTNAVFACENGCOM should be advised of these conditions prior to further recommendations.

10. Zeolite softener tanks at the Courthouse Bay water treatment plant were tested this summer and proved to be sound for continuous use. It is recommended that new tanks be purchased for replacement.

11. It is recommended that the metal steps for the Tarawa Terrace sewage treatment plant wet well be replaced immediately.

12. It is recommended that sanitary facilities be installed at the Onslow Beach sewage treatment plant.

13. It is recommended that the two 25-inch comminutors at the Hadnot Point sewage treatment plant be replaced.

14. The following corrective measures are recommended for the MCAS water treatment plant: (1) fence in the entire treatment facility; (2) provide auxillary power for in-plant operation; and (3) replace current hopper with a larger externally-fed lime hopper

15. It is recommended that a "Waste Load Allocation Report" be requested of North Carolina to justify an environmental need to operate the advanced wastewater treatment portion of the Camp Geiger sewage treatment plant.

16. It is recommended that Montford Point water treatment plant zeolite softener(s) be replaced.

17. It is recommended that three additional personnel be hired at both the water and sewage treatment facilities.

18. The Verona Loop K range field head facilities will be addressed in the final survey report pending review of North Carolina specifications for pit privies.

19. In accordance with NAVFACINST 5450.19B and LANTDIVINST 11300.4A, it is recommended that a boiler water sample be collected monthly from each steam boiler and be submitted to the Bureau of Mines Water Service Laboratory, College Park, Maryland 20740.

20. It is recommended that effort be initiated by DLA to verify the absence or presence of PCB's in the 304 Base Maintenance transformers.

21. It is recommended that Mr. Sonny White, LANTNAVFACENGCOM Code 114 be requested to visit MARCORB CAMP LEJEUNE to evaluate/provide acceptable storage and disposal options for the hazardous waste program.

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22. It is recommended that MCAS motor pool, Building 119 washrack berm be extended to enclose the entire area to prevent wastewater runoff from entering the adjacent storm drain.

23. The chemist position for the Environmental Quality Control Laboratory is currently being advertised. It is recommended that the necessary forms be completed and forwarded to North Carolina for interim approval of the testing laboratory. It is requested that copies be sent to LANTNAVFACENGCOM.

24. Potable water samples for chemical testing have been collected and will be analyzed by LANTNAVFACENGCOM's contracted laboratory. As required, all new wells should be tested for inorganic chemicals prior to being put into service.

25. It is recommended that additional personnel be hired to staff the Natural Resources and Environmental Affairs Division in order to perform/ meet the necessary demands for the environmental program.