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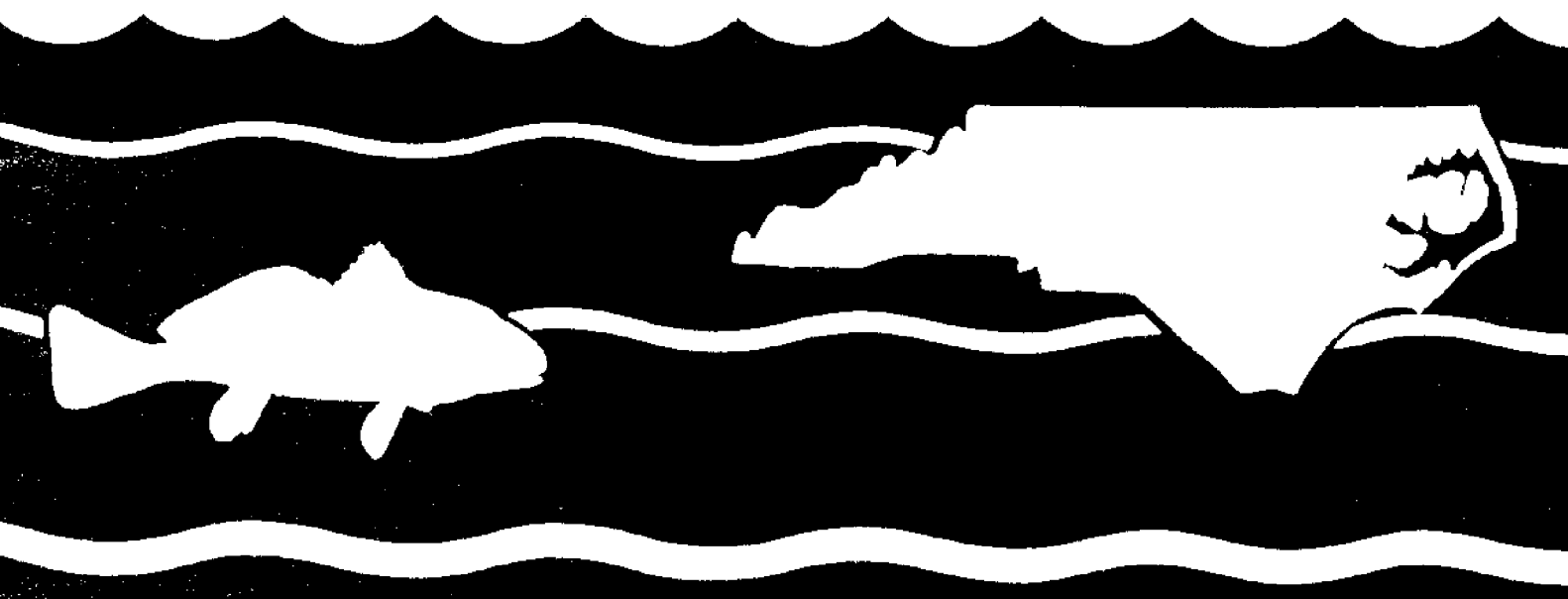
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**LEGAL ASPECTS OF PHOSPHATE MINING  
IN NORTH CAROLINA**

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LEGAL ASPECTS OF PHOSPHATE MINING IN NORTH CAROLINA

by

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Independent Study Under  
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## INTRODUCTION

The subject matter of this article, "Legal Aspects of Phosphate Mining in North Carolina," presents the ecological dilemma in an unusually complex setting. The removal of phosphate from beneath navigable waters of North Carolina may produce adverse effects upon marine life adjacent to the operation. On the other hand, the phosphate is critically needed to provide fertilizer to increase crop yields in a hungry world. The ecological resolution of this scientific, economic, legal, political, and humanistic problem is not simple.

Michael A. Almond, a third year law student at the University of North Carolina, as a result of his research, capably sets forth the pertinent North Carolina statutes and legal thinking likely to be used in the administrative or legal solution of this problem. He points out that wide discretion is vested in State officials and that where several worthy interests are to be reconciled and where delicate policy decisions must be made, flexible regulation may well provide the only viable answers.

Credit is due to both industry and to nutritionists for their helpful interest in exploring this question. Officials of the Texasgulf Corporation and Dr. Howard A. Schneider, Director of the U.N.C. Institute of Nutrition, and his staff have given wholehearted cooperation to the author in the preparation of this paper.

The interest in and support of this research by Dean Robert G. Byrd, Dean of the U.N.C. Law School, and of Doctors B. J. Copeland and William Rickards, respectively, Director and Assistant Director of the U.N.C. Sea Grant program, is acknowledged with thanks.

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Rumor has it that the infamous pirate Edward Teach, remembered by history as Blackbeard, hid and buried his ill-gotten booty somewhere along the North Carolina coast during the "Golden Age of Piracy"<sup>1</sup> of the early 1700s. Ever since Lieutenant Maynard of the Royal Navy terminated Teach's career abruptly and permanently near Ocracoke Inlet on November 22, 1718, there have been those who dream of a fabulous treasure hidden somewhere under the clays and sands of the coastal plain. Fittingly enough, there is a treasure buried in eastern North Carolina, and the value of it would stagger even the imagination of Blackbeard. However, the fortune does not consist of wrought gold and precious jewels, but rather of smooth, spherical grains of grayish-black phosphate.

Fifteen million years ago, a vast Miocene Sea covered what is now Beaufort County, North Carolina.<sup>2</sup> For reasons which geologists still cannot explain, these waters were incredibly rich in phosphates, which settled out and were deposited on the floor of the sea.<sup>3</sup> Thus, today, underlying much of Beaufort County and the Pamlico River, there exists one of the world's largest deposits of phosphate. This formation underlies more than seven-hundred square miles, and its thickness ranges from a featheredge just east of Washington, North Carolina, to more than one-hundred-twenty feet near the south shore of the Pamlico in eastern Beaufort County.<sup>4</sup> This "treasure" is truly a buried one, for it lies nearly forty feet below sea level at its highest point, covered by thick layers of sedimentation, and gradually declines to more than two-hundred-thirty feet below the northeastern part of the county.<sup>5</sup> Estimates of the total reserves in this vast ore body range from 1.5 to ten billion tons.

North Carolina's phosphate treasures lay undisturbed and undiscovered until 1883, when C. W. Dabney examined a phosphate deposit at Castle Hayne in New Hanover County.<sup>7</sup> However, there are no records of commercial production of phosphate from these early-found deposits.<sup>8</sup> Although a number of mining companies had gone so far as to drill exploratory test holes in

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<sup>1</sup>H. LEFLER & A. NEWSOME, NORTH CAROLINA: THE HISTORY OF A SOUTHERN STATE 64 (rev. ed. 1963).

<sup>2</sup>Texasgulf Phosphate (undated, non-paginated pamphlet published and distributed by Texasgulf, Inc., 200 Park Avenue, New York, New York 10017).

<sup>3</sup>Id.

<sup>4</sup>J. KIMREY, DESCRIPTION OF THE PUNGO RIVER FORMATION IN BEAUFORT COUNTY, NORTH CAROLINA, at 1 (Bull. No. 79, N.C. Dep't. of Conservation & Development 1965).

<sup>5</sup>Id.

<sup>6</sup>Caldwell, Lee Creek Open-Pit Mine and Fertilizer Plants, ENGINEERING AND MINING JOURNAL 59, at 67 (January 1968) [hereinafter cited as Caldwell].

<sup>7</sup>J. STUCKEY, MINERAL INDUSTRY OF NORTH CAROLINA FROM 1960 THROUGH 1967, at 15 (Economic Paper 68, N.C. Dept. of Conservation & Development 1970) [hereinafter cited as STUCKEY].

<sup>8</sup>Id. at 16.

the area, as late as 1953 a major company could report that it had "failed to make any discovery of a commercial body of phosphate-bearing minerals or other minerals."<sup>9</sup> Interest in the area was revived, however, when in 1958 United States geologist P. M. Brown reported the discovery of a phosphate field of major economic importance in Beaufort County.<sup>10</sup> This initial enthusiasm again waned, however, and only one firm, Texas Gulf Sulphur, Inc. (now renamed Texasgulf, Inc.) actually began phosphate production.<sup>11</sup> Texasgulf now holds mining leases on more than 30,000 acres,<sup>12</sup> including over 9,000 acres under the Pamlico River held under lease from the State.<sup>13</sup> Texasgulf's gamble has proved spectacularly successful.<sup>14</sup> From its original expenditure of eighty-million dollars in 1963, Texasgulf's total investment in North Carolina by the end of 1975 will be more than one-hundred-seventy-five million dollars.<sup>15</sup> Plans for the future envision new capital investment estimated at one-hundred million dollars,<sup>16</sup> and expansion of the Lee Creek complex will soon make this location the largest phosphate production facility in the world.<sup>17</sup> The lesson has not been lost upon other giants in the mineral industry. In August of 1974, North Carolina Phosphate Corp. announced plans to begin mining and construction of a two-hundred-twenty million dollar processing plant near Aurora, North Carolina.<sup>18</sup> FMC, Corp., which originally concluded that Beaufort County phosphate could not be mined economically, is now said to be reevaluating its position and seriously considering mining the acres on which it holds mineral leases.<sup>19</sup>

Naturally, the "phosphate boom" of the 1970s has contributed much to North Carolina's economy,<sup>20</sup> and the rich infusion of mining industry dollars may signal the rejuvenation of eastern North Carolina, perennially one of

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<sup>9</sup>Id. (explanation of Amco Exploration, Inc. for cancellation of mineral lease, May 11, 1953).

<sup>10</sup>Id.

<sup>11</sup>Texasgulf made its first shipment of phosphate material mined and processed in Beaufort County on April 1, 1966. Id. at 20.

<sup>12</sup>Texasgulf Phosphate, supra note 2.

<sup>13</sup>See text accompanying notes 162, 163, infra.

<sup>14</sup>Precise figures as to the quantity and value of phosphate mined and processed by Texasgulf, Inc. are confidential. See Merwin & Conrad, The Mineral Industry of North Carolina, BUREAU OF MINES MINERALS YEARBOOK 1,2 (preprint published by U.S. Dep't. of the Interior 1972). However, the initial operation was designed to process a maximum of three million tons of phosphate concentrate annually. E.g., STUCKEY, supra note 7, at 20; Caldwell, supra note 6, at 60. For recent production statistics, see TEXASGULF ANNUAL REPORT 1973, at 9.

<sup>15</sup>Update on Tg Construction, TEXASGULF TRIANGLE 3 (July 1974).

<sup>16</sup>See Appendix (answer to question number 6).

<sup>17</sup>Id.

<sup>18</sup>See, e.g., Berg, Aurora Phosphate: Mixed Blessing, Raleigh News & Observer, September 22, 1974, at 1, col. 2.

<sup>19</sup>Id.

<sup>20</sup>See Appendix (answer to question number 3).

the poorest, economically-depressed areas in the Southeast.<sup>21</sup>

The significance of this enormous phosphate deposit, estimated to contain reserves adequate to meet world demand for over one-hundred years,<sup>22</sup> is felt far beyond the Beaufort County line. The discovery of phosphate in North Carolina marks an event of truly worldwide importance, and for millions of the world's people, this "buried treasure" promises to be far more valuable than a pirate's chest of gold, silver, and precious jewels.

At the same time, there are those who view the State's phosphate mining industry as a mixed blessing.<sup>23</sup> While the economic benefits to the state promise to be enormous, clearly there are potential hazards in the development of a mineral resource lying at least forty feet below the surface, and these problems are primarily environmental. Accordingly, the remainder of this paper will pursue two themes. First, an effort will be made to evaluate the great human suffering which can be relieved by increasing phosphate-based fertilizer supplies to meet world demand. Secondly, an examination will be made of the legal machinery established in North Carolina to protect its valuable coastal resources and the quality of life of the people who make their homes in that part of the state. The purpose, of course, is to reconcile these two themes, to make the needs of the world's hungry compatible with the interests of the people of North Carolina in preserving and protecting their irreplaceable marine resources. Whether this is possible or not remains an unsettled question. Discussion of the point, however, must be dominated by the presence and spirit of one corporation, Texasgulf, Inc.; not merely because Texasgulf is at present the only company mining phosphate in the state, but because Texasgulf is also one of the most environmentally conscious and committed companies in the industry.<sup>24</sup>

<sup>21</sup>"The extent of the economic development lag in eastern North Carolina is indicated by a per capita income in 1970 in the Coastal Plains Region which was \$1,042 less than in the nation as a whole.... In 1962 the gap was \$848. Eastern North Carolina, which includes nearly 2 million people, had an unemployment rate of 4.7 percent in 1969. More serious than unemployment is the quality of employment and the tremendous amount of underemployment in the region." NORTH CAROLINA MARINE SCIENCE COUNCIL, NORTH CAROLINA'S COASTAL RESOURCES 1-2 to 1-3 (1972) [hereinafter cited as NORTH CAROLINA'S COASTAL RESOURCES].

<sup>22</sup>E.g., Caldwell, supra note 6, at 60.

<sup>23</sup>See, e.g., Berg, supra note 18.

<sup>24</sup>At this point the author wishes to thank David Edmiston and E. C. Burks of the Raleigh Office of Texasgulf, Inc. for their cooperation and assistance. It was my intention to have Texasgulf represent the mining industry's point of view throughout this paper. Accordingly I prepared a list of thirteen written questions on various aspects of the industry and submitted them to Mr. Edmiston. Texasgulf's response was a nine-page letter containing written answers to all thirteen questions. These answers are thoughtful, complete and were obviously prepared with care. Moreover, they are extremely enlightening and merit the attention of anyone who has persevered this far into this paper. Accordingly, the questions and Texasgulf's answers are included unedited as an appendix to the main text.

## I. North Carolina Phosphate and the World Food Crisis

At present, in the fall of 1974, there are millions of people in the world on the brink of starvation. As this is written, thousands in Asia and Africa will actually die for lack of food. The stark reality of a possible worldwide famine has been dramatically and sharply brought into focus by the recently concluded World Food Conference in Rome. In the midst of this crisis, phosphates may literally hold the key to the survival of many thousands.

Phosphate, along with nitrates and potash, is an essential ingredient in fertilizer.<sup>25</sup> Fertilizer in turn is indispensable to greater worldwide food production and to the ultimate success of the Green Revolution in those poorer nations presently unable to grow food enough to feed burgeoning populations. The Green Revolution, according to nutritionalists, began in 1943 when, with United States' aid, harvests of Mexican wheats were doubled by the proper use of water and fertilizer and through the application of the latest crop technology and equipment.<sup>26</sup> Essentially, the Green Revolution is a global effort to help underdeveloped nations increase food production through the use of high-yield seeds and crop strains, modern equipment, chemical fertilizers and pesticides. As Allan S. Nanes has written:

Chemical fertilizers are another key element in the Green Revolution. The new cereal varieties require large applications of fertilizers to produce their enormously increased yields. Increased use of fertilizer is needed to obtain high yields in areas of high population pressure, where opportunities for the expansion of arable land are limited. The larger the investment in the irrigation or mechanization of agriculture, the greater the need for fertilizer use. Fertilizers widen the opportunities for crop diversification. They can help bring soils of very low natural fertility into production. Indeed, the expanded use of fertilizers is foreseen not only for food crops, but for industrial crops, and for the modernized cultivation of grasslands under high tropical rainfall.<sup>27</sup>

James P. Grant, President of the Overseas Development Council, reports that while farmers in developed, industrial nations can achieve less than five pounds of production gain from the application of one additional pound of fertilizer, farmers in poor countries can easily yield ten to twelve extra pounds of grain from that same pound of fertilizer.<sup>28</sup> Among other things,

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<sup>25</sup> Phosphate-based fertilizers are produced by combining phosphate rock with sulphuric acid. Texasgulf reports that the fertilizer industry consumes 70% of all phosphate production. Texasgulf Phosphate, supra note 2.

<sup>26</sup>A. NANES, BEYOND MALTHUS: THE FOOD/PEOPLE EQUATION, SUBCOMM. ON NATIONAL SECURITY POLICY AND SCIENTIFIC DEVELOPMENTS OF THE HOUSE COMM. ON FOREIGN AFFAIRS, 92d CONG., 2d SESS. 16 (Comm. Print 1971) [hereinafter cited as NANES].

<sup>27</sup>Id. at 19.

<sup>28</sup> Grant, While We Fertilize Golf Courses, N.Y. Times, August 28, 1974, at 31, col. 1.

a shortage of fertilizer,<sup>29</sup> which has driven prices to a level beyond the reach of many poor countries,<sup>30</sup> has contributed to the overall lack of success of the Green Revolution. As Dr. Folke Doyring has pointed out, "the net result of the 'green revolution,' so far, has been to avoid an outright decline in per capita food production, not to bring any lasting improvement."<sup>31</sup> Indeed the situation has deteriorated. As Dr. Howard A. Schneider, Director of the Institute of Nutrition at the University of North Carolina at Chapel Hill, has observed, "unfortunately bad weather in 1973-74, shortages of fuel, fertilizers and pesticides have combined to perpetuate the precarious situation, and famines are now proceeding in the sub-Saharan, India and Bangladesh. ... By 1973 serious shortages of nitrogen and phosphate had occurred, and 1974 has not seen any substantial improvement."<sup>32</sup>

Lester R. Brown, a senior fellow of the Overseas Development Council, discussed in a recent interview the increasing world demand for fertilizers.<sup>33</sup> After noting that current world fertilizer use is about seventy million metric tons annually, Brown estimated that by the year 2000, two-hundred-fifty million tons would be required to produce the world's food.<sup>34</sup> Brown added that eight to nine billion dollars in capital investment would be required to raise plant capacity to this level.<sup>35</sup> Texasgulf, Inc. estimates that between 1.5 and two billion dollars will be required to develop fully known phosphate reserves in North Carolina alone.<sup>36</sup>

The United States is in a position to play a key role in increasing fertilizer production, particularly of phosphate-based fertilizers. Dr. Schneider<sup>37</sup> cites statistics which show that although Morocco controls forty-one percent of the world's phosphate reserves (compared to the United States' twenty-three percent), the U.S. is the world's leading producer of phosphate rock, providing thirty-nine percent of world production in 1973.<sup>38</sup> Increases in the price of phosphate and phosphate-based fertilizers have also made feasible the commercial development of deeply-buried deposits, such as those in some parts of Beaufort County.<sup>39</sup> As a result, the future of the phosphate industry in North Carolina, measured by worldwide demand, appears bright indeed. As Bartlett Crawford, Chairman of the Williams Cos., the fertilizer industry's largest factor, has noted, "It's hard to foresee a time when there could ever be an oversupply of phosphate."<sup>40</sup> The motivation for the growth of North Carolina's phosphate mining and processing industry will, of course, be the substantial profits anticipated by the companies involved. There is nothing evil about this, particularly when in the process the world is provided with a fundamental

<sup>29</sup>See, e.g., Why Farmers Can't Get Enough Fertilizers: The Facts Behind the Fertilizer Shortage (1973) (non-paginated pamphlet published and distributed by the Fertilizer Institute, 1015 18th St., N.W., Washington, D.C. 20036).

<sup>30</sup>In the past year, export prices for phosphate increased from \$90 to \$400 per ton. Domestic prices rose from \$75 to \$175 per ton in the same period.

<sup>31</sup>F. Doyring, The World Food Crisis and the Challenge to Agriculture 3 (1974) (an occasional paper published by the Institute of Nutrition, University of North Carolina at Chapel Hill).

<sup>32</sup>Letter from Dr. Howard A. Schneider, Ph.D. to Michael A. Almond, October 23, 1974.

<sup>33</sup>Jones, Poor Lands Face Barrier of Food Cost, Expert Says, N.Y. Times, July 6, 1974, at 25 col. 7 (interview with Lester R. Brown).

<sup>34</sup>Id.

<sup>35</sup>Id.

<sup>36</sup>See Appendix (answer to question number 6).

<sup>37</sup>See text accompanying note 32, supra.

<sup>38</sup>Letter from Dr. Howard A. Schneider, Ph.D. to Michael A. Almond, October 23, 1974.

<sup>39</sup>See note 30, supra and Appendix (answer to question number 2b-3).

<sup>40</sup>Have Fertilizer Profits Turned Evergreen?, 142 FINANCIAL WORLD 20, (Sept., 25, 1974). Cf. Appendix (answer to question number 2b-2).



and desperately needed life-giving commodity. What can be hoped for, ideally is that expansion of phosphate capacity will, on the one hand, be sufficient to meet world demand and, as a corollary to this, increases in production will operate to stabilize prices at a level affordable by poorer nations, while at the same time yielding a return on investment acceptable to the mining industry.

In summary, then, the world demands more phosphate. In response, the North Carolina phosphate industry is on the verge of tremendous growth. This is good news to the hungry of the world and to the mining companies. But is it such good news for the people of North Carolina?

## II. North Carolina Phosphate and the Environment

North Carolina has been generously blessed with an abundance of basic marine resources, the value of which has not yet been fully appreciated. These resources include more than 3,375 miles of tidal shoreline, 15,000 square miles of continental shelf, and 4,650 square miles of estuarine waters,<sup>41</sup> such as bays, sounds and navigable rivers.<sup>42</sup> In the continental United States, only three states have a longer shoreline.<sup>43</sup> The value of the State's commercial and sport fisheries exceeds one-hundred million dollars annually, and North Carolina offers some of the finest beaches and recreational facilities on the Atlantic Coast, the basis of a multi-million dollar tourist industry.<sup>44</sup> Yet the environment which supports these marine resources is a fragile and delicately-balanced one. Public awareness of the need to protect the coastal environment has been growing in recent years. It has been observed,

Although experts formerly considered estuaries a "wasteland," they now recognize that because of the kinds and variety of producer organisms in the salt marsh and because of the tidal action that removes waste and transports food and nutrients, the estuary is one of the most highly productive areas on earth.... Approximately ninety percent of the total harvest taken by commercial fishermen in the United States is dependent on the estuaries.<sup>45</sup>

In 1974 the state legislature responded to this need with the Coastal Area Management Act of 1974.<sup>46</sup> Yet this Act is only one part of an impressive array of legal devices which can and have been used to protect the State's coastal environment. Expressed in broad categories, the State and its citizens may protect themselves from coastal pollution in four ways: administrative regulations and orders, statutory requirements and prohibitions, common law doctrines reflected in case law, and by contract. The remainder of this paper will focus upon the particular environmental hazards posed by phosphate mining in North Carolina and how these problems may be resolved to the satisfaction and benefit of both the general public and the mining industry.

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<sup>41</sup>An estuary is a "semi-enclosed coastal body of water which has a free connection with the open sea." E. ODUM, *FUNDAMENTALS OF ECOLOGY* 352 (3d ed. (1971)).

<sup>42</sup>NORTH CAROLINA'S COASTAL RESOURCES, *supra* note 21, at 1-1.

<sup>43</sup>NORTH CAROLINA MARINE SCIENCE COUNCIL, *NORTH CAROLINA AND THE SEA* (May 1971) [hereinafter cited as *NORTH CAROLINA AND THE SEA*].

<sup>44</sup>NORTH CAROLINA'S COASTAL RESOURCES, *supra* note 21, at 6-3.

<sup>45</sup>Schoenbaum, *Public Rights and Coastal Zone Management*, 51 *N.C.L. REV.* 1, 2-3 (1972).

<sup>46</sup>N.C. GEN. STAT. § 113A-100 *et seq.*

North Carolina's public policy is generally expressed in The Environmental Policy Act of 1971,<sup>47</sup> which declares, *inter alia*, "that it shall be the continuing policy of the State of North Carolina to conserve and protect its natural resources and to create and maintain conditions under which man and nature can exist in productive harmony."<sup>48</sup> Likewise, in enacting the Interstate Environmental Compact Act of 1971,<sup>49</sup> the General Assembly recognized that "concern for the purity and life-giving qualities of our environment is of primary interest to every citizen of North Carolina and to all Americans,"<sup>50</sup> and pledged to cooperate with other states and the federal government to preserve the quality of the environment. In the Coastal Area Management Act of 1974<sup>51</sup> the General Assembly found "that an immediate and pressing need exists to establish a comprehensive plan for the protection, orderly development, and management of the coastal area of North Carolina."<sup>52</sup> Thus the public policy of the State, if taken at face value, clearly supports protection of marine resources.

Similarly, the General Assembly has enacted strict laws regulating the mining industry. The Mining Registration Act of 1969<sup>53</sup> requires every mining operator to secure a registration certificate from the State Mining Engineer,<sup>54</sup> which will not be granted unless the company provides full details of its operations, future mining plans, and summaries of conservation and reclamation procedures.<sup>55</sup> This information is important in the administration of the Mining Act of 1971,<sup>56</sup> one of the strictest mining laws in the nation. In this statute the General Assembly acknowledged that "mining is a basic and essential activity making an important contribution to the economic well-being of North Carolina and the nation,"<sup>57</sup> but at the same time pointed out that "it is possible to conduct mining in such a way as to minimize its effects on the surrounding environment."<sup>58</sup> The Act expressly includes phosphate rock mining under its provisions,<sup>59</sup> and requires every mining operation to have a permit from the Department of Conservation and Development,<sup>60</sup> (now the Department of Natural and Economic Resources). In addition to posting a security bond,<sup>61</sup> the operator must also file and have approved a land reclamation plan as a condition to granting the permit.<sup>62</sup> The Act lists seven additional grounds upon which the permit may be denied,<sup>63</sup> and these standards are strongly-weighted in favor of environmental protection. Failure to comply with the provisions of the Act can result in revocation of the permit,<sup>64</sup> and criminal

<sup>47</sup>N.C. GEN. STAT. § 113A-1 *et seq.*

<sup>48</sup>N.C. GEN. STAT. § 113A-3.

<sup>49</sup>N.C. GEN. STAT. § 113A-21 *et seq.*

<sup>50</sup>N.C. GEN. STAT. § 113A-22.

<sup>51</sup>N.C. GEN. STAT. § 113A-100 *et seq.*

<sup>52</sup>N.C. GEN. STAT. § 113A-102.

<sup>53</sup>N.C. GEN. STAT. § 74-39 *et seq.*

<sup>54</sup>N.C. GEN. STAT. § 74-43.

<sup>55</sup>*Id.*

<sup>56</sup>N.C. GEN. STAT. § 74-46.

<sup>57</sup>N.C. GEN. STAT. § 74-47.

<sup>58</sup>*Id.*

<sup>59</sup>N.C. GEN. STAT. § 74-49(6).

<sup>60</sup>N.C. GEN. STAT. § 74-51.

<sup>61</sup>N.C. GEN. STAT. § 74-50.

<sup>62</sup>N.C. GEN. STAT. § 74-53.

<sup>63</sup>N.C. GEN. STAT. § 74-51.

<sup>64</sup>N.C. GEN. STAT. § 74-58.

prosecution of those responsible.<sup>65</sup>

By law<sup>66</sup> it is now the duty of the Department of Natural and Economic Resources to prepare an evaluation of the impact "on the State's natural and economic environment of any new or expanding industry or manufacturing plant locating in North Carolina," and presumably this includes both the on-going and future operations of Texasgulf as well as the new facilities planned by N.C. Phosphate Corp. and others. More specifically, state law<sup>67</sup> also requires every firm manufacturing products from mineral resources of the State to notify the Department of Natural and Economic Resources of its intentions either to begin or discontinue such operations. Failure to give the required notice is made a misdemeanor.<sup>68</sup>

The statutes outlined above, while fully applicable to the phosphate industry, are nevertheless expressed in very general terms. Beyond these policy generalities, however, remain the specific and particular environmental hazards raised by phosphate mining in North Carolina. Although the statutes discussed above may in many cases provide adequate protection, there are also remedies more particularly suited to environmental dangers of phosphate mining.

#### A. On-Land Mining of Phosphate

Texasgulf, Inc. is currently the only firm engaged in phosphate mining in North Carolina, and at the present time its operations are confined to on-land mining.<sup>69</sup> The excavation is essentially by strip-mining the overburden using enormous draglines which mine a swath approximately one-hundred-fifty feet wide and three thousand feet long.<sup>70</sup> After the overburden is removed, phosphate ore is scooped out, mixed with water to form a slurry, and ultimately transformed into phosphoric acid ( $P_2O_5$ ) by combining the phosphate rock with sulphuric acid. This phosphoric acid is then used in the production of liquid fertilizers of varying composition. This mining process can cause environmental problems in three areas: (1) air pollution, (2) land reclamation, and (3) ground water.

(1) Air Pollution--Pollution of the air incident to phosphate production has always been a matter of concern for state officials. In 1962, when it had become apparent that commercial development of the State's phosphate was inevitable, Governor Terry Sanford asked the State Stream Sanitation Committee to investigate and report on the potential adverse effects of such mining in North Carolina. Accordingly, state officials observed first-hand operations in Florida and reported that "air pollution problems associated with the discharge of fluorides and other gasses from phosphate rock processing has in recent years become of growing concern," and recommended that "effective air pollution control devices should be incorporated in the design and construction of any phosphate recovery and processing plants located within

<sup>65</sup>N.C. GEN. STAT. § 74-64.

<sup>66</sup>N.C. GEN. STAT. § 113-15.2.

<sup>67</sup>N.C. GEN. STAT. § 113-25.

<sup>68</sup>Id.

<sup>69</sup>See Appendix (answer to question number 10a).

<sup>70</sup>For a general description of Texasgulf's operations in North Carolina, see, e.g., Texasgulf Phosphate, supra note 2; Caldwell, supra note 6. A recent description of the process used by Texasgulf to produce phosphate ore into phosphate-based fertilizer is in Killough, Industry's Phosphoric Acid Supply Brightens Lee Creek Expansion, FERTILIZER SOLUTIONS (March-April 1974).

the area."<sup>71</sup>

When Texasgulf began mining in Beaufort County in 1965, 6.5 million dollars of its initial eighty million dollar investment was spent for environmental controls, and the company was issued Permit No. 1 by the State for its pollution abatement facilities.<sup>72</sup> At present, Texasgulf monitors the air at twenty-four points within a five mile radius of the plant and samples local vegetation periodically.<sup>73</sup> As a result of this effort, Texasgulf's air effluents are within government limits, and air pollution has never become the serious problem many anticipated.<sup>74</sup> Announced expansion of mining in Beaufort County and the arrival of new companies in the area will require careful regulation of air quality standards. Federal, state and local governmental agencies should insist that the same concern for air quality demonstrated by Texasgulf in the past be reflected in the future operations of Texasgulf and other industry representatives.

(2) Land Reclamation--The Mining Act of 1971<sup>75</sup> states the policy of the State in clear and unequivocal terms: "...proper reclamation of mined land is necessary to prevent undesirable land and water conditions that would be detrimental to the general welfare, health, safety, beauty, and property rights of the citizens of the State."<sup>76</sup> The Act then makes the approval of a fully detailed land reclamation plan a condition precedent to the granting of a permit necessary to begin mining.<sup>77</sup> The Act requires that land reclamation proceed on a schedule roughly simultaneous with the progress of the mining operation, and all land must be reclaimed within two years after termination of mining activities unless a longer period is specifically approved by the State.<sup>78</sup> Also required are annual reports on the progress of land reclamation,<sup>79</sup> and the mining company must permit on-site inspection to determine if the provisions of the Act are being complied with in all respects.<sup>80</sup> Moreover, with proper notice and a hearing, the State is authorized to revoke a mining permit if the reclamation plan is not carried out satisfactorily,<sup>81</sup> or, if the State concludes that the reclamation plan is for some reason no longer adequate or suitable, it may unilaterally modify the plan to achieve the purposes of the Act.<sup>82</sup> Wilful violation of the Act is made a criminal offense, and each day of continued violation after notification is considered a separate offense subject to a one thousand dollar fine.<sup>83</sup>

<sup>71</sup>E. Hubbard & W. Clarly, An Evaluation of the Effects of Proposed Phosphate Operations Upon the Waters of the Pamlico and Pungo Rivers in North Carolina 7 (July 20, 1962) (report prepared for the State Stream Sanitation Comm. of the N.C. Dep't. of Water Resources) [hereinafter cited as 1962 Report].

<sup>72</sup>Killough, supra note 70.

<sup>73</sup>Texasgulf Phosphate, supra note 2.

<sup>74</sup>Precautions taken by Texasgulf keep the plant plume from its sulphuric acid plant 99.8% pure. See, e.g., Caldwell, supra note 6, at 76.

<sup>75</sup>N.C. GEN. STAT. § 74-46 et seq.

<sup>76</sup>N.C. GEN. STAT. § 74-47. In a similar vein, § 74-48(2) provides that "no mining shall be carried on in the State unless plans for such mining include reasonable provisions for protection of the surrounding environment and for reclamation of the area of land affected by mining."

<sup>77</sup>N.C. GEN. STAT. § 74-51.

<sup>78</sup>N.C. GEN. STAT. § 74-53.

<sup>79</sup>N.C. GEN. STAT. § 74-55.

<sup>80</sup>N.C. GEN. STAT. § 74-56.

<sup>81</sup>N.C. GEN. STAT. § 74-58.

<sup>82</sup>N.C. GEN. STAT. § 74-57.

<sup>83</sup>N.C. GEN. STAT. § 74-64.

The overall thrust of the Mining Act of 1971 is that land reclamation is a matter of the greatest public concern and of the highest priority. Although the Act does not specifically require it, the whole spirit of its strict permit and enforcement provisions indicates that the land reclamation plan, which must be filed with the Department of Natural and Economic Resources,<sup>84</sup> should be a matter of public record, subject to inspection and examination by the general public. Unfortunately, Texasgulf and state officials have resisted efforts to disclose exact details of the company's reclamation plan, its reclamation schedule, and the ratio of acres mined to acres actually reclaimed. Stephen G. Conrad, the State Geologist, explains that the State so far has been willing to accommodate Texasgulf's request that its reclamation plan not be disclosed.<sup>85</sup> Conrad did acknowledge that the State's position in this matter is of questionable legality and said that the issue is now under study by the Attorney General's office. The present policy, as outlined by Conrad, is that if called upon to answer a subpoena for the material, the State would comply, but that any request not of similar legal effect would be denied.<sup>86</sup> Texasgulf, for its part, maintains that its reclamation plan is not confidential, but that its mining plan is, and that the one cannot be released without revealing the other.<sup>87</sup> This attitude is unfortunate in light of the general public interest in reclamation. So long as proper land reclamation is a prerequisite to the mining operation itself, mining company plans filed with the State should be available for public inspection and comment. One feels, if only somewhat viscerally, that were the effort genuinely made, a solution could be achieved which both serves the public interest and at the same time respects corporate confidentiality and the real need of the industry to protect valuable trade secrets.

From information available,<sup>88</sup> Texasgulf's general scheme is to reclaim the mined land in a manner permitting profitable re-use of the land by the company in future business ventures.<sup>89</sup> After replacing the mined-out overburden, the plan calls for topping off the area with a synthetic topsoil made from by-products of phosphate production. Grasses, clover and trees will then be planted, with the ultimate objective a profit-making beef cattle and forestry program.<sup>90</sup> At present, the company reports that the total mined area is in excess of five hundred acres, and that eighty acres have been completely

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<sup>84</sup>N.C. GEN. STAT. § 74-51.

<sup>85</sup>Interview with Stephen G. Conrad, N.C. State Geologist, in Raleigh, N.C., November 1, 1974, [hereinafter cited as Interview].

<sup>86</sup>Note that § 74-66 of the Mining Act of 1971 provides that "No provision of this article shall be construed to restrict or impair the right of any private or public person...to bring any legal or equitable action for redress against nuisances or hazards." Given a proper party as plaintiff as contemplated by this section with an arguably valid claim, presumably suit could be filed against the mining company and the reclamation plan obtained through discovery.

<sup>87</sup>See Appendix (answer to question number 9).

<sup>88</sup>See generally Texasgulf Phosphate, *supra* note 2.

<sup>89</sup>See, e.g., Texasgulf (July 19, 1974) (presentation by Dr. Charles F. Fogarty, Chairman and Chief Executive Officer, Texasgulf, Inc. to N.Y. Society of Security Analysts).

<sup>90</sup>Caldwell, *supra* note 6, at 65.

reclaimed.<sup>91</sup> When carried through to completion, Texasgulf's land reclamation plan will establish a valuable new industry in eastern North Carolina. Raising beef cattle on reclaimed land is also compatible with the local economy in that it does not compete with other area industries and makes productive, land which is of little value for other purposes.<sup>92</sup>

(3) Groundwater--Another early apprehension concerning development of the State's phosphate was the effect the mining would have on the underground fresh water supply in Beaufort County. Groundwater in this area occurs under artesian conditions and is confined under tremendous pressure.<sup>93</sup> The mining process now in use consists of an open-pit dug at least forty feet to reach the ore body. Ground water under natural conditions would flood a pit this deep, making mining almost impossible. Maintaining a dry pit requires pumping out the water, which in turn reduces ground water pressure and lowers the artesian head so that the mining area remains relatively dry.<sup>94</sup> This affects local groundwater supplies for miles around the mining pit, and in the early 1960s there were fears that serious difficulties would arise both from ground water pollution and groundwater diversion.

Pollution of the ground water supply, it was thought, would occur by infiltration of the salty waters of the Pamlico River into the vacant spaces left when fresh groundwater was pumped out.<sup>95</sup> The effect of this would have been to raise the chloride content of local well water to dangerous levels. Fortunately there exists a natural, watertight clay seal running along the floor and sides of the Pamlico River bed which prevents vertical and horizontal seepage.<sup>96</sup> As a result, pollution of groundwater by salt water encroachment has not been a serious problem.<sup>97</sup> Groundwater pollution proves to present a much more serious problem if and when a decision is made to mine phosphate under the river.

Diversion of groundwater, on the other hand, results in unique problems all its own. Keeping a dry pit at Texasgulf's Lee Creek facility requires pumping out sixty million gallons of groundwater daily, and when current expansion plans are completed, eighty million gallons per day will be removed.<sup>98</sup> One immediate effect of this enormous groundwater diversion was that local wells did not work as well as before.<sup>99</sup> Wells which provided plenty of water without mechanical pumps (due to the artesian nature of the aquifer) suddenly stopped producing, and some wells went dry. Texasgulf, although it is not likely that the company would have been held legally

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<sup>91</sup>See Appendix (answer to question number 9a, 9b).

<sup>92</sup>Caldwell, supra note 6, at 65.

<sup>93</sup>J. KIMREY, supra note 4, at 7.

<sup>94</sup>Id.

<sup>95</sup>1962 Report, supra note 71, at 6.

<sup>96</sup>Caldwell, supra note 6, at 80.

<sup>97</sup>See Appendix (answer to question number 7).

<sup>98</sup>Id. (answer to question number 7c).

<sup>99</sup>See, e.g., Berg, supra note 18.

liable for damages caused by groundwater diversion,<sup>100</sup> voluntarily improved approximately nine hundred local domestic and irrigation wells at a cost of about four hundred thousand dollars.<sup>101</sup> In the company's words, "the ground water situation in the Aurora area has stabilized."<sup>102</sup>

Lest the situation get out of hand, the General Assembly in 1967 passed the Water Use Act, designed to regulate the use of groundwater resources.<sup>103</sup> Under the provisions of this Act all of Beaufort County has been declared a Capacity Use Area in which required permits set maximum limits upon groundwater use and diversion.<sup>104</sup> Texasgulf, after an extensive study, was granted a twenty-year water use permit<sup>105</sup> to divert up to sixty million gallons per day.<sup>106</sup> With respect to future expansion of the phosphate industry, state officials foresee no major problems,<sup>107</sup> pointing out that groundwater supplies in Beaufort County are sufficient to meet the needs of local residents and to permit full development of phosphate reserves. Significantly, in the recent designation of proposed interim areas of environmental concern under the new Coastal Management Act,<sup>108</sup> the Secretary of Natural and Economic Resources did not include the Beaufort County Capacity Use Area, even though the Act expressly provides that these areas may be so designated if there is cause for concern.<sup>110</sup>

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<sup>100</sup>N.C. courts apply a "reasonable use" test in cases involving groundwater diversion, which has made it extremely difficult to hold a landowner liable for damages caused by use and withdrawal of groundwater on his property, even when such use in fact damages neighboring landowners. See, e.g., Bayer v. Nello L. Teer, Co., 256 N.C. 509, 124 S.E.2d 552 (1962). A complete discussion of U.S. law pertaining to both groundwater diversion and pollution can be found in David, Groundwater Pollution: Case Law Theories of Relief, 39 Missouri L.R. 117 (1974).

<sup>101</sup>See Appendix (answers to questions number 7a, 7b).

<sup>102</sup>See Appendix (answers to question 7).

<sup>103</sup>N.C. GEN. STAT. § 143-215.11 et seq.

<sup>104</sup>N.C. GEN. STAT. § 143-215.13.

<sup>105</sup>Texasgulf, Inc.: Expansion in North Carolina, WE THE PEOPLE OF NORTH CAROLINA (November 1972)(official publication of the N.C. Citizens Ass'n.).

<sup>106</sup>See Appendix (answer to question number 7c).

<sup>107</sup>See, e.g., Berg, supra note 18.

<sup>108</sup>N.C. GEN. STAT. § 113A-114(b)(2).

<sup>109</sup>N.C. Department of Natural and Economic Resources, Public Notice: Interim Areas of Environmental Concern (November, 1974) [hereinafter cited as Public Notice].

<sup>110</sup>N.C. GEN. STAT. § 113A-113(b)(3).

## B. Underwater Mining of Phosphate

The rich phosphate deposits of Beaufort County underlie not only dry land, but extend beneath the Pamlico River bed and portions of the floor of Pamlico Sound as well. It is not surprising, then, that those underwater deposits near easily-accessible on-land ore have attracted the attention of mining interests. In 1962, before the potentially disastrous environmental consequences were fully understood,<sup>111</sup> the State announced an option-to-lease plan which established a five-year option period and defined the terms and conditions whereby a mining company could convert its option into a regular mineral lease.<sup>112</sup> These options-to-lease were granted by the State on the basis of competitive bids. The bidding focused upon percentage royalties of the value of whatever marketable products were developed.<sup>113</sup> In addition, during the five-year option term, a nominal annual rental fee of twenty-five cents per acre was required, and upon exercise of the option, the rent for the lease rose to three dollars per year plus the royalty bid.<sup>114</sup> Ultimately, Magnet Cove Barium Corp., one of the Dresser Industries, FMC Corp. and Texasgulf, Inc. all were granted options-to-lease on various parcels of Pamlico River bottom.<sup>115</sup> For various reasons, Magnet Cove and FMC allowed their options to lapse,<sup>116</sup> but in 1967 Texasgulf exercised its option and obtained a regular mining lease on approximately ten thousand acres adjacent to its on-land phosphate operation.<sup>117</sup> As a result, Texasgulf is the only company presently holding a valid mining lease for underwater mining of phosphate.<sup>118</sup>

While most fears concerning on-land mining have been proved somewhat overblown, the potential for environmental damage from underwater mining is truly alarming. In order to mine the river, a procedure known as isolation or dry-bed dike mining would be employed.<sup>119</sup> In simplest terms, this would involve actually damming a portion of the river and pumping all the water out to produce a dry bed.<sup>120</sup> Mining equipment would then be moved into the dry area, and phosphate would be mined just as on dry land. Upon completion of mining in that area, the overburden would be replaced and the area flooded. The process would then be repeated in a different area until the entire leased area was mined out.

Such a procedure could cause enormous problems, the nature and scope of which are not fully understood. It will be recalled that local groundwater supplies are protected from salt water infiltration by an impervious, watertight

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<sup>111</sup>See, e.g., 1962 Report, supra note 71.

<sup>112</sup>STUCKEY, supra note 7, at 19.

<sup>113</sup>Id.

<sup>114</sup>Id.

<sup>115</sup>Id. at 19-21.

<sup>116</sup>Interview, supra note 85.

<sup>117</sup>STUCKEY, supra note 7, at 20.

<sup>118</sup>State of North Carolina, County of Beaufort, Pamlico River Lease Agreement (September 27, 1967) (lease on file in office of State Geologist, Raleigh, N.C.) [hereinafter cited as Lease].

<sup>119</sup>E.g., Letter from Texas Gulf Sulphur, Co. to F. B. Turner, July 3, 1962, in 1962 Report, supra note 71. Cf. Appendix (answer to question number 10c).

<sup>120</sup>Id.



layer of clay which seals the sides and floor of the riverbed.<sup>121</sup> Excavation in the river could break through this seal, permitting salt water to seep into the groundwater supply. There is, moreover, no guarantee that the replaced overburden will provide a watertight barrier adequate to prevent such encroachment. In addition, there are serious difficulties in backfilling the mined-out area.<sup>122</sup> Replacing the overburden could cause excessive water turbidity and siltation in the river, which in turn would threaten commercial fisheries in the area.<sup>123</sup> The State's shrimp industry in particular could suffer irreparable damage.<sup>124</sup> Eutrophication is another danger which, if unchecked, could literally kill the river. Eutrophication occurs when phosphate compounds are exposed to sunlight, resulting in overstimulation of aquatic vegetation such as algae and inevitable disruption of the ecological balance in the estuarine area.<sup>125</sup> Some are of the opinion that phosphate mining might accidentally trigger this destructive process.<sup>126</sup>

These, then, are the hazards of underwater mining of phosphate. Public and private legal remedies to forestall such damage will be examined below. Also important, however, is the determination of who actually owns land under the river. Title to this phosphate-rich riverbottom carries with it legal implications of great significance, particularly with respect to attempts by the State to regulate commercial development in this vulnerable environment.<sup>127</sup>

As between the States and the federal government, United States Supreme Court cases are uniform in holding that the States own the beds of navigable rivers within their borders.<sup>128</sup> This case law result was codified in 1953 in the Federal Submerged Lands Act.<sup>129</sup> Lamentably enough, the tale does not end here, for thousands of persons insist that at one time or another since the Revolution, the State of North Carolina conveyed title in fee to their ancestors, and consequently they now claim ownership of portions of the State's navigable riverbeds.<sup>130</sup> These land squabbles are, however, beyond

<sup>121</sup>See text accompanying notes 95-97, *supra*.

<sup>122</sup>See, e.g., Letter from Texasgulf Sulphur, Co. to F. B. Turner, July 3, 1962, in 1962 Report, *supra* note 71.

<sup>123</sup>N.C. AND THE SEA, *supra* note 43.

<sup>124</sup>See, e.g., NORTH CAROLINA'S COASTAL RESOURCES, *supra* note 21, at 6-18.

<sup>125</sup>Note, Preservation of the Estuarine Zone, 49 N.C.L. Rev. 960, 968 (1971).

<sup>126</sup>*Id.*

<sup>127</sup>The issue of who owns title to land under navigable waters has been the subject of much legal commentary in N.C. recently, and no effort will be made here to repeat these exhaustive efforts. See Morgan, On the Legal Aspects of North Carolina's Coastal Problems, 49 N.C.L. Rev. 857 (1971); Rice, Estuarine Land of North Carolina: Legal Aspects of Ownership, Use and Control, 46 N.C.L. Rev. 779 (1968); Schoenbaum, Public Rights and Coastal Zone Management, 59 N.C.L. Rev. 1 (1972).

<sup>128</sup>See, e.g., *Martin v. Waddell*, 41 U.S. (16 Pet.) 367 (1842).

<sup>129</sup>43 U.S.C. §§ 1301-15 (1970).

<sup>130</sup>See, e.g., Rice, *supra* note 127. State law, N.C. GEN. STAT. § 113-205, required persons claiming title to land underlying navigable waters to file claims with the state not later than January 1, 1970, and titles not registered by that deadline are declared void. Thousands of such claims were filed, and are currently being processed.

the scope of this effort, and suffice it to say that the State does strongly assert ownership of most all navigable river bottoms,<sup>131</sup> and only rarely is this title challenged, and even more rarely is such a challenge successful. From this point, the discussion will proceed on the assumption that the State holds good title to river bottoms in the Beaufort County area. Given this assumption, what legal remedies and safeguards are available to insure that future development is consistent with the preservation of estuarine resources?

(1) Governmental Regulations<sup>132</sup>--While most of the environmental control apparatus involves State agencies, at least one federal statute insures that plans for underwater mining will undergo the strictest scrutiny. The Rivers and Harbors Act of 1899<sup>133</sup> requires that anyone contemplating excavating or dredging in the bottom of a navigable river must first obtain a permit from the Army Corps of Engineers.<sup>134</sup> Traditionally, the standard for granting or denying such a permit has depended upon whether the operation would seriously impede navigation on the river.<sup>135</sup> In 1970, however, the Fifth Circuit Court of Appeals decided Zabel v. Tabb.<sup>136</sup> In this case the Corps denied a dredge and fill permit on purely ecological grounds, even though the project would not substantially interfere with navigation. The Court upheld the Corps, and in the process provided environmentalists with a powerful new weapon against risky dredge and fill projects. Although Zabel was not a North Carolina case, the Wilmington, North Carolina, District of the Corps of Engineers has announced that it will follow the guidelines of the Fifth Circuit opinion, suggesting greater federal intervention in protection of the estuarine zone.<sup>137</sup>

A similar State statute requires that a permit be obtained from the Department of Natural and Economic Resources before any excavation or dredging and filling is begun in rivers.<sup>138</sup> This law requires that the application for such a permit be circulated among all appropriate State and, in some cases, Federal agencies for comment.<sup>139</sup> The Department is authorized to deny the permit upon finding that the project will have significant adverse effects (a) use of the water by the public, (b) the value of the property or riparian owners, (c) public health, safety and welfare, (d) public and private water supplies, or (e) upon wildlife and marine fisheries.<sup>140</sup> If objections are raised, open public hearings on the application are to be held.<sup>141</sup> In addition, the Wetlands Protection Act<sup>142</sup> permits the Director of the Department of Natural and Economic Resources to adopt, amend or repeal, with proper notice

<sup>131</sup>See N.C. GEN. STAT. §§ 146-1, 146-8, 146-64(6), 146-64(7).

<sup>132</sup>The legal remedies discussed in this section are in addition to those more general safeguards discussed in text accompanying notes 50-68, supra.

<sup>133</sup>33 U.S.C. § 401 et seq.

<sup>134</sup>33 U.S.C. § 403.

<sup>135</sup>See, e.g., Morgan, supra note 127, at 862.

<sup>136</sup>430 F.2d 199 (5th Cir. 1970), cert. denied 401 U.S. 910 (1971).

<sup>137</sup>Morgan, supra note 127, at 862.

<sup>138</sup>N.C. GEN. STAT. § 113-229.

<sup>139</sup>Id.

<sup>140</sup>Id.

<sup>141</sup>Id.

<sup>142</sup>N.C. GEN. STAT. § 113-230.

and a hearing, orders regulating or prohibiting alteration or coastal wetlands. The Director is authorized to so act in order to promote public welfare and protect wildlife and marine fisheries.<sup>143</sup>

The Secretary of the Department of Natural and Economic Resources, pursuant to the Coastal Area Management Act,<sup>144</sup> has recently proposed that all estuarine waters in the coastal zone, including the Pamlico River, be declared interim areas of environmental concern.<sup>145</sup> Once these interim areas are established, anyone intending mining operations in estuarine waters would be required to notify the State at least sixty days in advance<sup>146</sup> in order to allow the State to take whatever action is deemed appropriate.

Finally, the State may have powers under the public trust doctrine to prevent environmental harm from underwater mining. This doctrine is a subtle one, and its limits and usefulness as an ecological protective measure have not yet been determined. The doctrine has been summarized as follows:

Generally speaking, it can be said that the State holds the lands under the navigable waters of its sounds, rivers, bays, and inlets in trust for everyone. Stated simply, this doctrine of public trust says that every member of society possesses such intrinsically important rights, privileges, and interests in these waters that it is the duty of the State to protect them.<sup>148</sup>

Illinois Central Railroad Co. v. Illinois<sup>149</sup> is often cited as the watershed case for the public trust doctrine, and the opinion in that case has been cited favorably by the North Carolina Supreme Court.<sup>150</sup> In Illinois Central the Supreme Court held that, with respect to state-owned lands, "the State can no more abdicate its trusts over property in which the whole people are interested, like navigable waters and soils under them, so as to leave them entirely under the use and control of private parties...than it can abdicate its police power in the administration of government...."<sup>151</sup> Arguably, the State could contend that, as owner of the land under the Pamlico, in granting a mining lease to Texasgulf, the State of course could pass no greater interest than it held itself. Since the State is said to hold these lands in trust for the benefit of the general public, any lease of them to a private party would remain impressed with this trust and limited by it, regardless of

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<sup>143</sup>Id.

<sup>144</sup>N.C. GEN. STAT. § 113A-114(b)(2).

<sup>145</sup>Public Notice, supra note 109.

<sup>146</sup>N.C. GEN. STAT. § 113A-114(e).

<sup>147</sup>See generally Sax, The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention, 68 Mich. L. Rev. 471 (1970).

<sup>148</sup>Note, Defining Navigable Waters and the Application of the Public Trust Doctrine in North Carolina: A History and Analysis, 49 N.C.L. Rev. 888, 891 (1971).

<sup>149</sup>146 U.S. 387 (1892).

<sup>150</sup>Sehpard's Point Land Co. v. Atlantic Hotel, 132 N.C. 517, 44 S.E. 39 (1903).

<sup>151</sup>146 U.S. at 453 (emphasis added).

the provisions in the lease.<sup>152</sup> Accordingly, the State,<sup>153</sup> or perhaps a private party, might be able to obtain equitable relief to prevent use of the leased riverbottom in a manner inconsistent with the greater public welfare. Whether or not the State courts would be willing to extend the public trust doctrine so far remains to be seen.

(2) Private Remedies--As just noted, a private party might have power to assert rights under the public trust doctrine to prevent interference with his use and enjoyment of navigable waters and the lands under them. A compelling case would be presented if proposed mining operations threatened to destroy a person's commercial or property interest in the use of public trust areas. Owners and lessees of shellfish beds and commercial fishermen have precisely such an interest, and it would be difficult to deny them standing to litigate the issue as beneficiaries of the public trust.

Private parties may also be entitled to obtain judicial review of administrative decisions should the Department of Natural and Economic Resources give the green light to underwater phosphate mining despite genuine environmental hazards.<sup>154</sup> The Administrative Procedure Act gives the right of judicial review to "any person who is aggrieved by a final administrative decision, and who has exhausted all administrative remedies...."<sup>155</sup> At least one North Carolina Supreme Court case has indicated that this statute will be construed liberally to grant standing to such "aggrieved persons."<sup>156</sup> One note-writer concludes that persons who are adversely affected economically by an administrative decision, such as commercial or sport fishermen, should certainly have standing under the Act.<sup>157</sup>

Of course private actions against the mining company are possible if underwater mining begins and actually causes damages to private citizens. The Mining Act of 1971<sup>158</sup> expressly preserves private causes of action, legal or equitable, against nuisances and hazards.<sup>159</sup> For example, should underwater mining break the clay seal underlying the Pamlico River resulting in groundwater pollution, indications are that the courts would look less kindly upon this than in cases of damage caused by mere groundwater diversion.<sup>160</sup> Negligence or nuisance law may very well support a private suit for damages under these circumstances.<sup>161</sup> Note that in Masten v. Texas Co.<sup>162</sup> gasoline from

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<sup>152</sup>"The trust devolving upon the State for the public...cannot be relinquished by a transfer of the property." Id.

<sup>153</sup>It has been suggested that the State Attorney General would be the proper party to file suit. Note, The Public Trust Doctrine: A Useful Tool in the Preservation of Sand Dunes, 49 N.C.L. Rev. 973, 974 (1971).

<sup>154</sup>See, e.g., Note, Estuarine Pollution: The Deterioration of the Oyster Industry in North Carolina, 49 N.C.L. Rev. 921, 933 (1971).

<sup>155</sup>N.C. GEN. STAT. § 143-307.

<sup>156</sup>In re Halifax Paper Co., 259 N.C. 589, 131 S.E.2d 441 (1962).

<sup>157</sup>Note, N.C.L. Rev., supra note 153, at 933.

<sup>158</sup>N.C. GEN. STAT. § 74-46 et seq.

<sup>159</sup>N.C. GEN. STAT. § 74-66.

<sup>160</sup>Davis, supra note 100, at 121.

<sup>161</sup>See, e.g., Note, N.C.L. Rev., supra note 153, at 935.

<sup>162</sup>194 N.C. 540, 140 S.E. 89 (1927).

the defendant's pumps polluted plaintiff's well water. The defendant was held liable for the damages, the North Carolina Supreme Court noting that "this is good morals as well as good law."<sup>163</sup>

(3) Contractual Remedies--Easily the most obvious and effective way to avoid pollution from underwater phosphate mining is to draft the mineral lease so as not to permit it. If the mining company may not pollute under the terms of its lease, the elaborate legal machinery discussed above becomes irrelevant. Fortunately, North Carolina wrote into Texasgulf's lease strict provisions regarding any future underwater mining operation.<sup>164</sup> Of particular ecological importance are the following terms and conditions:

All operations which may be conducted under this lease by Lessee shall be subject to all regulations which may be adopted and promulgated under authority of any existing or future act of the General Assembly of North Carolina. This lease shall be subject to any oyster or clam bed leases heretofore granted by the State Board of Conservation and Development. Lessee agrees to take all required precautions to prevent pollution of the waters of the State of North Carolina and shall comply with all of the laws of the State with respect thereto.... Nothing herein shall be deemed to restrict the power of the State or of its agencies to enforce all provisions of law and all applicable regulations....<sup>165</sup>

If the conditions of the lease, then, are strictly enforced by the State, it would appear that these contractual provisions alone afford adequate protection of the environment.

(4) Good Faith of the Mining Industry--Everything to this point leads to the inescapable conclusion that it will, quite simply, be well-nigh impossible for Texasgulf to mine phosphate under the Pamlico River under present circumstances. As the State Geologist has explained, if the State had it to do all over again, probably no underwater leases at all would be granted, and there is virtually no possibility that additional leases will be granted in the future.<sup>166</sup> Provisions in the lease plus public and private legal safeguards should insure that Texasgulf will not be permitted to mine the riverbottom until it can offer convincing guarantees that the environment will not suffer as a result.

Unfortunately, the tone of the discussion thus far, in retrospect, unavoidably insinuates that Texasgulf desperately craves to mine the river bed regardless of the ecological risk. In fact, this is not true. As its past and present conduct has demonstrated, Texasgulf is indeed concerned about the environment and is committed to preserving the natural beauty and resources of the Pamlico River area. Nothing to this point indicates that Texasgulf intends to apply for permission to mine its leasehold unless and until it can

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<sup>163</sup>Id. at 542.

<sup>164</sup>Lease, supra note 118. The mineral lease is for an initial 25-year term with an option to renew for one additional 25-year term.

<sup>165</sup>Id.

<sup>166</sup>Interview, supra note 85.

insure that the environment will be protected, and it is important that the company not be unfairly criticized on the point. Texasgulf, Inc. has spent over nine million dollars for environmental control equipment out of a total investment of one-hundred-seventy-five million dollars in North Carolina, and spends an additional two thousand dollars per day to maintain this equipment.<sup>167</sup> In so doing, the company has demonstrated a standard of corporate responsibility which is indeed admirable. As the phosphate mining industry in North Carolina continues to expand, the State and its citizens should require no less responsible behavior from those companies who come later.

### Summary and Conclusion

For the most part, the legal remedies discussed in this paper depend ultimately upon the wisdom, discretion and public accountability of the officials holding various state agency positions with decision-making powers. Enforcement of State policy toward environmental protection depends largely upon what these officials do, upon their own perception of their office and their true political constituency. Some may contend that this arrangement leaves too much power in the hands of State administrative departments, and that the statutes should be amended to clarify and state in precise terms the environmental position of the State on every conceivable issue. Such a move, in the long run, would be unwise and not in the best interests of the people, industry, or the environment. True, present State laws grant broad discretion in implementing environmental standards. Such discretion, which is after all nothing more than the power to pick and choose among various alternatives, carries with it the potential for neglect and abuse. When exercised in good faith by responsible men, however, this discretion provides the State with the flexibility to deal with present and future difficulties as they develop and unfold. Such flexibility will ultimately prove important in managing the environment, and until such time as industry and state officials conspire to betray the public trust, policing of the environment should remain flexible enough to meet the special demands of new and undreamed of problems as they appear.

The world needs phosphate. And North Carolina needs the phosphate industry. Just as importantly, however, the phosphate industry needs the support and goodwill of the people of North Carolina. So far, a positive effort has been made to cultivate this goodwill. The phosphate industry is trying to be a good neighbor, and, despite some lingering question marks, it is succeeding. So long as this spirit of cooperation and mutual assistance prevails, North Carolina and the phosphate companies may yet show the world how the mining industry and the environment can coexist and even complement one another. The State of North Carolina deserves no less than this, and its people expect it.

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<sup>167</sup> See Appendix (answer to question number 4).

Appendix

(See note 24, supra)

Question No. 1:

Sketch briefly (a) the history of Texasgulf's operations in North Carolina, (b) the nature of its current operations, and (c) its general plan for the future.

Answer No. 1:

(a) Texasgulf began its own exploration of the North Carolina phosphate deposit in 1958. Phosphate had been discovered in 1951 on the north side of the Pamlico River by American Metals Climax and all exploration between 1951 and 1958 had centered on the north side of the river where the ore is deeply buried in a relatively thin layer. In 1958 Texasgulf geologists explored and mapped the phosphate deposit beneath some 50,000 acres of land, most of which was south of the Pamlico River and some under the river. All of this area was in Beaufort County.

In the spring of 1961 the company decided that the deposit warranted further investigation. A team moved to Beaufort County and began making a reconnaissance survey of the deposit by recording data from water wells with a gamma ray logger.

In the period of 1962 through 1964, the State of North Carolina made available for leasing to the company, on a competitive bid basis, over 10,000 acres of prime phosphate lands underneath part of the Pamlico River and Durham Creek. As a result of that, and of favorable mining and processing pilot operations, Texasgulf made the decision to invest about \$45 million. Shortly thereafter the capital outlay was increased to \$80 million. The first phosphate rock shipment was made on April 1, 1966. The acid plants started production in November of that year.

Since then the investment has continued to grow with increased production facilities. By late 1975 total investment will reach \$175 million, and plans have been announced for still further expansion of mining and production facilities.

(b) Texasgulf, at its Phosphate Operations in Beaufort County, is engaged in open, dry pit mining of phosphate ore. The ore is then processed into basic phosphatic fertilizer products for sale to manufacturers of commercial fertilizers, both domestically and in the export market. The Agricultural Division office is located in Raleigh to oversee the marketing and administration of Texasgulf's agricultural endeavors. The corporate data processing center is also in Raleigh.

(c) Plans for the Lee Creek Phosphate Operations will soon make this location the largest phosphate complex in the world. The fourth acid unit, now under construction and due to come on stream about the third quarter of 1975, will increase the total  $P_2O_5$  capacity to 680,000 tons per year. The fifth and sixth units will follow in succession raising the total capacity to 1,000,000 tons  $P_2O_5$  annually by 1980.

Regarding other plans for North Carolina, the Chemicals Division is to be headquartered in Raleigh. This Division will include administration and sales of phosphate from North Carolina; potash from Utah and Saskatchewan, Canada; sulphur from Texas, Louisiana, Mexico, and Alberta, Canada; and soda ash from Texasgulf's trona mine and processing facilities in Wyoming (startup of the Wyoming facilities is scheduled for 1976).

Question No. 2:

Describe the importance, in your opinion, of North Carolina's phosphate deposits in the current world food crisis?

Answer No. 2:

The phosphate deposit found in North Carolina is one of the world's major deposits and will have a significant impact on future world food supplies.

Question 2(a):

What is Texasgulf doing to increase the supply of fertilizer to meet the world's needs?

Answer 2(a):

Texasgulf is working to help produce more food. Plants cannot grow without phosphates. Texasgulf phosphate fertilizer materials, mined and manufactured in North Carolina for only a few short years, have already helped farmers throughout the world grow more food. Fertilizers, in addition to increasing crop yield, also increase the protein content of crops and they influence maturity, improve quality, and help crops resist disease.

Texasgulf is expanding  $P_2O_5$  capacity as rapidly as possible to increase the supply of fertilizer, so the world's food needs can be met.

Question 2(b-1):

What is your assessment of world fertilizer supplies as compared to world-wide demand?

Answer 2(b-1):

The worldwide demand for fertilizer currently exceeds the supply.

Question 2(b-2):

When will fertilizer production increase sufficiently to meet that demand?

Answer 2(b-2):

Worldwide demand for phosphate and potash will probably exceed the supply for another three years, with a gradual easing of the imbalance as new production becomes available. The short supply of nitrogen will probably extend longer than that, since feed stock for nitrogen is natural gas. Another



factor effecting an imbalance in the supply and demand for fertilizer products is the world population growth. With all factors coming into play, a prediction of the exact time supply will balance demand is difficult to make. However, announcements of new facility expansion programs have slowed in recent months. This would seem to indicate that industry planners believe the imbalance is lessening.

Question 2(b-3):

Are fertilizer prices on the world market at a level which is likely to encourage increased production?

Answer 2(b-3):

Both domestic and export prices are now at a sufficient level to encourage investors to plan additional facilities. Phosphate, potash, and nitrogen prices have all advanced significantly in the last year. Not only prices but also governmental policies can contribute to the incentive to invest new capital. For example, in the case of our proposed expansions in Canada, we have had to work with the Provincial government in convincing them that social development can be financed easier by expansion of the potash industry than by higher taxation.

Question No. 3:

How has Texasgulf benefited the State and people of North Carolina by its operations at Lee Creek? What impact does Texasgulf have upon the economy of Eastern North Carolina in terms of jobs, payroll, taxes paid, etc., and how do you assess its future impact in these terms?

Answer No. 3:

Texasgulf is working to help North Carolina grow economically. Lee Creek has provided relatively high-paying jobs to a significant segment of society in one of the State's lowest per capita income areas. In doing so, the standard of living has been raised by this annual payroll of some \$12 million. Here are some other examples of what we are doing to help the economy of Eastern North Carolina.

1. Texasgulf pays about 20% of Beaufort County's ad valorem taxes and is the County's largest taxpayer.
2. We will increase our investment in North Carolina to about \$175,000,000 by 1976 and significantly more by 1980. This means more than 1,300 new jobs will be directly and indirectly created. Already, we estimate that our operations have created the need for at least 4,000 jobs in service and supporting firms.
3. The company purchases more than \$7,000,000 worth of supplies and materials annually from North Carolina vendors.

Lee Creek represents, in full measure, mining's ability to make important contributions to the economy of the area in which it operates. For instance, in 1966 before Texasgulf's mining and fertilizer operations had begun, the value added by Beaufort County manufacturing was about \$12.5 million. Lee

Creek products at the beginning contributed four to five times this amount and now, with three units producing, have caused the "value added" to increase perhaps six or seven times the original amount. In addition, the value of Lee Creek products has more than tripled the 1965 total mining revenue of about \$56 million for the State.

At Lee Creek employment, wages, and taxes derived from operating the plant contribute handsomely to the economy of Beaufort County and North Carolina. According to Rand McNally statistics, Beaufort County had a net population decline from 37,134 residents in 1950 to 34,014 in 1960. The original 670 employees and their families who derived their livelihood from Lee Creek did much to reverse this downward trend. Add \$12 million in wages to be received by the 1,000-plus Lee Creek employees in 1975 to the \$17.1 million payroll reported for all people employed in Beaufort County in 1965, and a strong re-birth of the area can be seen.

Question No. 4:

It has recently been reported that several other mining firms are expected to begin phosphate mining operations in the area in the immediate future. In your opinion, will additional mineral exploitation in the Beaufort County area be beneficial or detrimental on (a) the local economy? (b) the local environment? (c) the local ground water situation? and (d) Texasgulf's financial position vis-a-vis its competitors?

Answer No. 4:

(a) proper planning to develop the mineral deposit in Beaufort County and sensible operations should be beneficial to the local economy. New job opportunities will result, thereby giving a stimulus to business in general. (Incidentally, we prefer to use the word "development" rather than "exploitation." The latter connotes wasting of resources or an unwise use of resources. "Development" seems to us to be a positive undertaking.)

(b) The local environment should not be seriously affected by the addition of one or two new companies. Texasgulf works constantly to keep North Carolina clean. We monitor the air and water around our plantsite to make sure it is clean and pure. We have spent more than \$9 million for equipment and controls to prevent air and water pollution in Eastern North Carolina. The cost of operating this equipment is more than \$2,000 a day. Also, Texasgulf donated funds in 1965 to North Carolina State University for establishment of The Pamlico Marine Laboratory to study the basic ecology of the the estuaries of Eastern North Carolina. We support financially the continuing operation of the Lab.

(c) The local groundwater situation should not be adversely affected by doubling the present rate of mining. At some point, of course, the chances of groundwater pollution by salt water intrusion will be increased, the artesian pressure will be lowered, and water will have to be pumped from greater depths. Texasgulf is constantly monitoring groundwater conditions to assess adequately the effect of present and future mining rates on the groundwater situation.

(d) Texasgulf's financial condition is excellent. We do not wish to comment on that of other companies.

Question No. 5:

Could you estimate the current value of the known phosphate reserves in Eastern North Carolina?

Answer No. 5:

The known phosphate reserves in Eastern North Carolina are from 1.5 to more than 2.0 billion tons of ore. At a value of \$7/ton, this would amount to at least \$10.5 billion.

Question No. 6:

How great a capital investment would be required to (develop) exploit fully these resources?

Answer No. 6:

Again, we believe the choice of the word, "exploit," is not good. To "develop" all the phosphate reserves in Eastern North Carolina would require two companies like ours to work steadily for 150 to 200 years with the present technical "know-how." To put this into perspective, Texasgulf will have invested \$175 MM by the end of 1975. In "1976 dollars" this investment will be worth perhaps \$250 MM. North Carolina Phosphate has announced a \$220 MM expansion program to be complete by 1977. So by that time, in terms of "1977 dollars," the two companies will have invested a total of about \$550 MM. Between that time and 1980 Texasgulf will probably spend \$100 MM more. Our point is that the total investment to develop all known reserves is gigantic--perhaps \$1.5 to \$2.0 billion.

Question No. 7:

What is the current status of the groundwater problem caused by Texasgulf's operations in the Aurora area?

Answer No. 7:

The groundwater situation in the Aurora area has stabilized. All groundwater users continue to have an adequate supply of groundwater available of the same quality that existed prior to phosphate mining.

Question 7(a):

How many private wells have been improved by Texasgulf?

Answer 7(a):

About 900 domestic and irrigation wells owned by Private users have been improved by Texasgulf at the company's expense.

Question 7(b):

At what cost to Texasgulf?

Answer 7(b):

The cost of improvements was about \$400,000.

Question 7(c):

How many gallons of groundwater per day are pumped out in Texasgulf's mining operations?

Answer 7(c):

The State of North Carolina has granted Texasgulf a permit to pump 60 million gallons per day for dewatering. The company will be required to pump about 80 million gallons per day if current expansions are completed in 1979. The water from depressurizing pumps is used and reused to process the ore into fertilizer materials.

Question No. 8:

It is my understanding that Texasgulf is of the opinion that the reclamation plan required to be filed under the North Carolina Mining Act of 1971 is in the nature of a trade secret, and that the company wishes to keep the plan confidential. Is this true? If so, briefly state your position on this matter, particularly with regard to the view expressed by some that all such plans should be matters of public record and open for public inspection.

Answer No. 8:

We do not regard the reclamation plan as a trade secret. The conflict results from the fact that the reclamation plan is closely related to the mining plan, and we do regard the latter as confidential. We could not make the reclamation map a matter of public knowledge without revealing our mining plan. Therefore, our position on this matter is that our reclamation plan is available for inspection by State officials and mining plans should not be made public. Texasgulf, as a matter of company policy, plans to reclaim all lands it mines. A Land Management Department has been established at Lee Creek to see the mined-out lands are put back into productive use after reclamation, through planting of trees or crops, or perhaps to be used in cattle raising.

Question No. 9:

In general terms, could you describe the Texasgulf reclamation plan for the Beaufort County area?

Answer No. 9:

In general, Texasgulf plans to reclaim essentially all of the land mined. Because we live and work in North Carolina, we are particularly interested in protecting and preserving its environment. That is why we have a land reclamation plan to return mining areas to productive use in at least three ways: (1) pasture land for beef cattle, (2) growing more trees, and (3) crop raising. At the present time, the reclaimed areas are seeded with

wheat, millet, tall fescue, or are sprigged with Coastal Bermuda. Research is currently underway to determine the best usage for this land. We are also researching topsoil depths and mixtures.

Question 9(a):

How many acres have been mined?

Answer 9(a):

The number of acres mined is confidential information we would like to keep from our competitors. The total is in excess of 500 acres.

Question 9(b):

How many of these acres have to date been reclaimed under the plan?

Answer 9(b):

More than 80 acres have been completely reclaimed. Many more acres are in intermediate stages of reclamation.

Question 9(c):

What is your schedule for future reclamation?

Answer 9(c):

In general, one acre reclaimed for each acre mined.

Question No. 10:

Texasgulf currently is the only mining company to hold valid leases for phosphate mining in lands under navigable waters. With respect to these leases, do you (a) currently plan to mine these underwater lands at any time in the foreseeable future?

Answer 10(a):

Mining of underwater lands would be very expensive compared with the normal mining method we use. Therefore, we have no immediate plans to develop our leases under the Pamlico and will continue mining in other areas.

Question 10(b):

Do you intend to apply for additional leases for underwater lands?

Answer 10(b):

Perhaps, but such would not have high priority.

Question 10(c):

If you do begin underwater mining, how will this be done?

Briefly, by building a caisson--similar to those used for bridge supports, but much larger--and pumping the enclosed area dry. Mining equipment would then be moved in and the normal method of mining would be applied. After all ore was removed, the land would be reclaimed, flooded, and the caisson moved to the next location. One wall of the caisson would probably become a wall for the next.

Question 10(d):

If underwater mining is carried out through dry bed dike mining, what steps will be taken to insure that there will be no ultimate salt water pollution of fresh groundwater reserves?

Answer 10(d):

Mining experience indicates the dense clays would provide an adequate seal against salt water intrusion. All available technical knowledge and managerial concern would be utilized.

Question No. 11:

What general effect would mining of underwater lands have upon the marine environment, including commercial fisheries?

Answer No. 11:

With proper care and concern, and the utilization of modern mining techniques, no deleterious effects would result.

Question No. 12:

What changes in policy and legislation should the State make from the view of the phosphate mining industry?

Answer No. 12:

Texasgulf has no recommendation at this time.

Question No. 13:

What do you see as the greatest obstacle in the way of maximum exploitation of Eastern North Carolina's mineral resources?

Answer No. 13:

Combining land plots into large minable areas is the greatest obstacle as we see it. This would require landowners' cooperation.

