

THE KEMENY REPORT ON THE ACCIDENT AT THREE MILE ISLAND

On March 28, 1979, several water pumps failed at Unit 2 of the Three Mile Island (TMI) nuclear power station in Pennsylvania. The mechanical and human errors that followed have totally recast the contemporary debate over the wisdom and safety of nuclear power. Two weeks after the TMI incident began, President Carter created the President's Commission on the Accident at Three Mile Island,¹ headed by Dartmouth College President John Kemeny.² The Commission was ordered to study the technical causes of the accident, the role of the managing utility, the general procedures and emergency preparedness of the Nuclear Regulatory Commission (NRC), and the dissemination to the public of information during and after the accident.³ The President also charged the Commission with making "appropriate recommendations" based upon its findings.⁴ The findings and recommendations made by the Commission in the *Kemeny Report* are guiding the latest round of regulatory reform in the nuclear power industry. This Development summarizes the findings and recommendations of the *Kemeny Report* and describes the Report's major conceptual and analytical shortcomings.

Although the *Kemeny Report* identifies the most substantial effects of the TMI accident as financial,⁵ the Commission considers safety to be the highest priority for nuclear regulators.⁶ The Commission's anal-

1. Exec. Order No. 12,130, 44 Fed. Reg. 22,027, reprinted in [1979] U.S. CODE CONG. & AD. NEWS 847.

2. The 12 Commissioners' technical and professional backgrounds covered a variety of disciplines. THE PRESIDENT'S COMM'N ON THE ACCIDENT AT THREE MILE ISLAND, THE NEED FOR CHANGE: THE LEGACY OF TMI 157-63 (1979) [hereinafter cited as the KEMENY REPORT]. They also had a full range of predispositions about the efficacy of nuclear power, from Thomas Pigford, Chairman of the Department of Nuclear Engineering at the University of California and a proponent of nuclear power, to Ted Taylor, Lecturer at Princeton University and a well-known critic of nuclear energy on both reactor safety and material security grounds. *Id.*

3. Exec. Order No. 12,130, 44 Fed. Reg. 22,027, reprinted in [1979] U.S. CODE CONG. & AD. NEWS 847.

4. *Id.* As will be discussed later in this Development, the Commission defined its mission narrowly, looking only to problems that were specific to TMI, and not to other possible flaws in the nuclear power system. See KEMENY REPORT, *supra* note 2, at 3-4, 7.

5. See KEMENY REPORT, *supra* note 2, at 32-35. Because the radiation releases were too small to produce any detectable additional cases of developmental abnormalities, or genetic ill-health, the "major health effect of the accident appears to have been on the mental health of the people living in the region of Three Mile Island and of the workers at TMI." *Id.* at 35. The costs to the utility of cleanup and interim power, on the other hand, were found to be \$1 billion to \$1.86 billion, if the plant can be refurbished by 1983-85. *Id.* at 32.

6. The Report states that a reorganized NRC's "primary statutory mission and first operating priority must be the assurance of safety in the generation of nuclear power, includ-

ysis of the nuclear safety issue is narrowed by its determination "that the fundamental problems are people-related problems and not equipment problems." The *Kemeny Report* does not stress issues of mechanical safety.⁷ Rather the Commission concludes that "the equipment was sufficiently good that, except for human failures, the major accident at Three Mile Island would have been a minor incident."⁸

The Report's strongest attack is on the NRC. The Commission recommends "total restructuring" of the agency to correct a plethora of institutional failures.⁹ The Commission found at the time of the accident a "serious lack of communication" between NRC commissioners and their staff.¹⁰ Moreover, according to the Report, there are serious managerial problems within the NRC, starting at the top. "[The] commissioners . . . themselves," the Report states, "are not clear on what their role should be."¹¹ In general, the Commission is "skeptical whether the collegial mode of the five commissioners make them a suitable body for the management of an emergency, and of the agency itself."¹² The *Kemeny Report* recommends that the present five-member commission be replaced by a single administrator, who would have substantial control over the internal organization and management of the agency.¹³

The *Kemeny Report* also recommends changes in NRC procedures—licensing hearings, rulemaking, inspection and enforcement—to increase public participation and ensure that safety issues are adequately and promptly addressed and resolved.¹⁴ In particular, the Report notes that under its present procedures the NRC allows those safety issues labeled "generic"¹⁵ to remain unresolved during licensing proceedings by placing them on a separate agenda.¹⁶ This policy was

ing safeguards of nuclear materials from theft, diversion or loss." *Id.* at 62. This attitude comports with a long history of express recognition of nuclear safety as a priority in nuclear regulation. *See, e.g.*, Atomic Energy Act of 1954, 42 U.S.C. §§ 2201-2210, 2231-2241 (1976); U.S. NUCLEAR REGULATORY COMMISSION, ANNUAL REPORT—1975, at 13 (1975).

7. KEMENY REPORT, *supra* note 2, at 8.

8. *Id.*

9. *Id.* at 22.

10. *Id.* at 21.

11. *Id.*

12. *Id.*

13. *Id.* at 61 (Commission Recommendation A(1)). This has been compared with the organization of the Environmental Protection Agency. *Three Mile Island Commission Report Faults NRC, Plant for Nuclear Accident*, [1979] ENVIR. REP. (BNA) 1476.

14. KEMENY REPORT, *supra* note 2, at 65-66 (Commission Recommendations A(9), (10)).

15. Safety issues are labelled "generic" if they apply to a number of plants. *Id.* at 51. The delay in resolution is supposedly limited to those issues that are small enough not to endanger plant safety seriously. OFFICE OF THE CHIEF COUNSEL ON THE NRC, REPORT TO THE PRESIDENT'S COMM'N ON THE ACCIDENT AT THREE MILE ISLAND 67 (1979) [hereinafter cited as CHIEF COUNSEL REPORT].

16. KEMENY REPORT, *supra* note 2, at 51 (Commission Finding G(2)).

developed to expedite the licensing process,¹⁷ but has resulted in the licensing and operation of power plants without resolution of major safety issues.¹⁸ The Report recommends that recurring issues, including "generic safety issues," be promptly resolved by rulemaking.¹⁹

Present NRC licensing is a two-step process.²⁰ A construction permit is granted after approval of general design specifications. After construction has been completed, the utility submits detailed design and operations data to the NRC as part of its application for an operating license.²¹ Although this bifurcated procedure was adopted to expedite review, the hundreds of millions of dollars spent between the two phases creates economic pressures that may compromise safety review in the second stage.²² The Report recommends adoption of licensing procedures requiring resolution of safety issues before major financial commitments in construction are made.²³

The Report also examines the nuclear power industry—utilities, manufacturers of equipment, and developers of safety systems. The Commission found that the utility managing the TMI plant, General Public Utilities Corporation, and its operating subsidiary, Metropolitan Edison Company, failed to acquire sufficient information about nuclear safety problems and to analyze adequately and act on the information they did acquire.²⁴ Although some of Metropolitan Edison's safety and planning procedures met existing NRC requirements, many of these procedures nevertheless were "inadequate" to ensure safety.²⁵ Among the most notable procedures found to be deficient despite compliance with NRC requirements were the programs and procedures for operator training and certification.²⁶ The *Kemeny Report* recommends that stricter standards be imposed and enforced by the NRC, state Public Utilities Commissions, and the utilities themselves to ensure that personnel and procedures will be adequate for safe operation.²⁷

17. CHIEF COUNSEL REPORT, *supra* note 15, at 52.

18. The total number of these "generic" problems is unclear, but there may be as many as 200. *See id.* at 66.

19. KEMENY REPORT, *supra* note 2, at 65 (Commission Recommendations A(9)(b), (10)).

20. CHIEF COUNSEL REPORT, *supra* note 15, at 49.

21. KEMENY REPORT, *supra* note 2, at 52 (Commission Finding G(6)).

22. CHIEF COUNSEL REPORT, *supra* note 15, at 63; KEMENY REPORT, *supra* note 2, at 52 (Commission Finding G(6)).

23. KEMENY REPORT, *supra* note 2, at 65 (Commission Recommendation A(10)).

24. *Id.* at 43 (Commission Finding E(1)).

25. *Id.* at 43-50 (Commission Findings E & F).

26. The Commission found, for example, that "[a]n individual could fail parts of either the NRC licensing examination or the utility requalification examination, including sections on emergency procedures and equipment, and still pass the overall examination by getting a passing average score, and qualify to operate the reactor." *Id.* at 49 (Commission Finding F(3)(c)).

27. *Id.* at 68-71 (Commission Recommendations B & C).

As presented by the President's Commission, the lesson of the TMI accident is that the risks of the technology must be fully appreciated to ensure safety. The President's Commission emphasizes

that fundamental changes must occur in organizations, procedures, and, above all, in the attitudes of people. No amount of technical "fixes" will cure this underlying problem. There have been many previous recommendations for greater safety for nuclear power plants, which have had limited impact. . . . As long as proposed improvements are carried out in a "business as usual" atmosphere, the fundamental changes necessitated by the accident at Three Mile Island cannot be realized.²⁸

Thus it appears that the Commission does not believe its proposed reforms can be effective unless attitudes change as a result of the TMI accident or as a result of consequent reforms. This change in attitude, while a necessary condition, is not by itself sufficient. If nuclear power has not been safe for technological reasons, it will become safe only if the unsafe features of the system are identified and corrected. If critical dangers to nuclear safety are overlooked, or if safeguards against identified dangers are inadequate, the new zeal for nuclear safety will not produce a safe system.

In response to the conceptual and time limitations of its mandate, the Commission accepted a narrow definition of the risks of nuclear energy.²⁹ Broad policy questions about the relative merits of nuclear power are deliberately left to the political process.³⁰ Because of these limitations, the Report seems to consider only those safety issues that threaten sudden, environmentally disastrous releases of radioactive materials. Environmental and health risks from chronic releases of radioactivity are for the most part ignored.³¹

The *Kemeny Report* also glosses over technological issues,³² while

28. *Id.* at 24.

29. For instance, the Report does not address the issues of long-term waste disposal, decommissioning of power plants, or military applications of nuclear energy. *Id.* at 3-4.

30. *Id.* at 7.

31. The Report devotes substantial space to the issue of worker exposure to radiation from both chronic and accidental releases. *See id.* at 2, 17-18, 74. It does not directly address, however, the health effects on the general public of releases occurring during normal operating conditions:

We analyzed the various radiation releases and came up with the best possible estimates of the health effects of the accident. In addition, we looked more broadly into how well the health and safety of the workers was protected during normal operating conditions, and how well their health and safety and that of the general public would have been protected in the case of a more serious accident.

Id. at 2.

32. See text accompanying note 30 *supra*. A few technical corrections are suggested, based on flaws that caused problems during the TMI accident. KEMENY REPORT, *supra* note 2, at 72-73 (Commission Recommendation D). Many are directed toward improved

acknowledging the riskiness of the technology.³³ Past studies of possible equipment failures have produced varying estimates of the probability of such failures. For instance, the NRC's 1975 *Rasmussen Report*³⁴ was long cited by governmental and private proponents of nuclear power to support claims of relatively low risks.³⁵ The report was withdrawn by the NRC in 1979, prior to the TMI accident, as methodologically "unreliable,"³⁶ amid continuing criticisms that the assigned probabilities were too low. The *Kemeny Report* does not suggest that the probability of equipment failure is low. Rather, the Commission found that, even using the relatively low probabilities assigned by the discredited *Rasmussen Report*, an equipment failure like the one that began the TMI crisis "should have been expected" during the more than 400 reactor-years of U.S. nuclear power plant operating experience accumulated through the time of the accident.³⁷ Nonetheless, the Commission is confident that human failure, not technological failure, turned what otherwise would have been a minor incident into the major accident at Three Mile Island.³⁸ While human failures may have been the major cause of the accident at TMI, the Commission's satisfaction with the adequacy of nuclear technology is only justified if all technological failures can be neutralized by safety measures designed to perfect the human responses to such failures. Failure to detail major technological problems is a serious deficiency of the Report.

monitoring and redesign of displays and warning signals to facilitate better operator understanding and response. *Id.* (Commission Recommendations D(1), (3)).

The Commission discounts the efficacy of many proposed technical "fixes" because they ignore the basic problem of the "business as usual" attitude that prevails among the people who manage, operate, and regulate the nuclear energy industry. *Id.* at 24.

33. For example, "[e]quipment can and should be improved to add further safety to nuclear power plants. . . ." *Id.* at 8. The Commission made a number of findings and recommendations about equipment failures. *Id.* at 43-48, 72-73. Even within those findings, however, the Commission continually stressed the human errors in responding to mechanical failures, rather than the technological failures in designing, manufacturing, and installing the faulty equipment in the first place. *See, e.g., id.* at 43, 48 (Commission Findings E(1)(b), (d) & E(5)(k)). *But cf. id.* at 44, 48 (Commission Findings E(1)(f) & E(5)(m)) (simple findings of faulty equipment without reference to failure in human response).

34. NUCLEAR REGULATORY COMMISSION, WASH-1400 REACTOR SAFETY STUDY NUREG-014 (1975).

35. When issuing the *Rasmussen Report*, the NRC chairman declared "[i]ts overall conclusion is that the risk attached to the operation of nuclear power plants is very low compared with other natural and man-made risks." *Reactor Safety Study Review: Oversight Hearings Before the Subcomm. on Energy and the Environment of the House Comm. on Interior and Insular Affairs*, 96th Cong., 1st Sess. 117 (1979) (NRC Statement on Risk Assessment and the Reactor Safety Study Report (WASH-1400) in Light of the Risk Assessment Review Group Report).

36. The NRC officially repudiated only the Executive Summary of the *Rasmussen Report*, but it also recommended that "absolute value of the risks presented by WASH-1400 should not be used uncritically. . . . In particular, the [NRC] does not regard as reliable the Reactor Safety Study's numerical estimate of the overall risk of reactor accident." *Id.*

37. KEMENY REPORT, *supra* note 2, at 32 (Commission Finding A(16)).

38. *Id.* at 8.

Even absent details of the major technological problems, the *Kemeny Report's* proposals for improving human attitudes and responses are inadequate. The *Kemeny Report* expressly recognizes that "fundamental changes will be necessary in the organization, procedures, and practices—and above all—in the attitudes of the Nuclear Regulatory Commission and, to the extent that the institutions we investigated are typical, of the nuclear industry."³⁹

Some of the Commission's recommendations involved changes in NRC personnel, such as replacement of the five-member commission with a new single administrator from outside the agency,⁴⁰ and creation of an oversight committee on nuclear reactor safety.⁴¹ Other recommendations suggested strengthening the role of an existing committee within the agency, the Advisory Committee on Reactor Safeguards, whose primary responsibilities are safety related.⁴² These recommendations are designed to effectuate direct changes in the composite attitude of the NRC. Most of the proposed reforms, however, deal only with institutions and procedures.⁴³ To the extent that these reforms will be implemented by the same personnel who have created and perpetuated the old attitudes, it is doubtful that they will significantly improve the performance of the agency.

When considering the efficacy of reforms that change organizational structures but retain many of the same personnel, it is important to keep in mind the history of nuclear regulation in the United States. The Atomic Energy Commission was originally assigned the dual role of encouraging the development of nuclear power and of regulating that development.⁴⁴ Because of the tendency of regulation to inhibit development, the conflicts of this double mandate became increasingly problematic as the nuclear power industry grew.⁴⁵ The present NRC is the product of the latest of a long series of attempts to improve nuclear safety by separating promotional and regulatory functions through reorganization of the agencies with jurisdiction over nuclear development.⁴⁶ Despite such attempts, the *Kemeny Commission* reports "we

39. *Id.* at 27.

40. *Id.* at 61 (Commission Recommendations A(1)(a), (b)).

41. *Id.* at 62 (Commission Recommendation A(2)).

42. *Id.* (Commission Recommendations A(3)(a)-(c)).

43. *See, e.g., id.* at 62-65 (Commission Recommendations A(3)-(9)).

44. Atomic Energy Act of 1946, Pub. L. No. 79-585, 60 Stat. 755 (1947). In 1954, Congress authorized private ownership of nuclear power plants, creating the basis for the contemporary regulator/industry relationship. Atomic Energy Act of 1954, Pub. L. No. 83-703, 68 Stat. 919 (1955) (codified at 42 U.S.C. §§ 2201-2210, 2231-2241 (1976)).

45. *See generally* E. ROLPH, NUCLEAR POWER AND THE PUBLIC SAFETY (1979).

46. The Energy Reorganization Act of 1974, Pub. L. No. 93-438, 88 Stat. 1233 (1974), dissolved the AEC and created the NRC to assume its regulatory functions, and the Energy Research and Development Administration (ERDA)—to assume its development functions. ERDA's functions were subsequently transferred to the Department of Energy. There are

have seen evidence that some of the old promotional philosophy still influences the regulatory practices of the NRC. . . . [T]he evidence suggests that the NRC has sometimes erred on the side of the industry's convenience rather than carrying out its primary mission of assuring safety."⁴⁷ In light of the ineffectiveness of past attempts to eliminate the promotional bias of nuclear regulatory agencies and to ensure that greater attention be devoted to safety issues, it seems unlikely that another massive reorganization scheme will be any more successful than its many predecessors in achieving these goals.

CONCLUSION

The *Kemeny Report* does not question whether nuclear power is a reasonable, responsible source of electricity.⁴⁸ While its description of the problems at Three Mile Island as human-based is plausible, its recommendations for improvement are less credible. The Commission found evidence of the failure of past attempts to remove alleged pro-development biases from nuclear regulatory agencies and to ensure responsible plant operations by utilities.⁴⁹ Nevertheless, the Commission's proposed reforms, like past congressional attempts, rely primarily on reorganizations that leave most personnel and incentives unchanged. These cosmetic measures are unlikely to produce changes that can ensure the safety of nuclear power.

There can be little question that the TMI accident will enhance nuclear safety by focusing scrutiny on the failure of the NRC and the nuclear industry both in preventing and responding to the accident. A number of these failures are already being addressed, independent of the *Kemeny Report*.⁵⁰ The highly touted *Kemeny Report*, unfortunately, contributes little new in the area of recommendations for change. Although the Commission does not claim that its recom-

many general discussions of the history of nuclear regulation and its reforms. See, e.g., U.S. ATOMIC ENERGY COMMISSION, [1974] ANNUAL REPORT TO CONGRESS 11-33; CHIEF COUNSEL REPORT, *supra* note 15, at 6-23; E. ROLPH, *supra* note 45. Rolph is frequently cited in the CHIEF COUNSEL REPORT, *supra*, which was relied upon by the President's Commission in its critique of the NRC. Commissioner Thomas Pigford of the President's Commission objected to the CHIEF COUNSEL REPORT, *supra*, as deficient in several respects, and attacked the Rolph book as not presenting "comprehensive, accurate, and balanced knowledge of the NRC and of the nuclear industry." KEMENY REPORT, *supra* note 2, at 199 (supplemental view by Thomas H. Pigford, comments 18-18.2).

47. KEMENY REPORT, *supra* note 2, at 19.

48. *Id.* at 4.

49. See text accompanying note 37 *supra*.

50. For example, since the TMI incident, the NRC has proposed a rule to require state and local plans for all atomic reactors. *NRC Wants State, Local Crisis Plans*, San Francisco Chronicle, Dec. 6, 1979, at 8, col. 1. Another response to the accident was President Carter's removal of the NRC chairman to prepare the way for a new chairman to whom greater powers will be assigned. *Carter Ousts Chairman of Besieged NRC*, San Francisco Chronicle, Dec. 8, 1979, at 1, col. 1.

mended changes are sufficient to assure the safety of nuclear power,⁵¹ insofar as the Report focuses attention on proposals that will be ineffectual and deflects reform efforts away from more critical areas, it may result in a net detriment to environmental safety and human health.

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51. KEMENY REPORT, *supra* note 2, at 7.