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THE NEW SYNTHETIC FUELS PROGRAM: BOOMLET OR BUST

James M. Fischer*

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I. INTRODUCTION

The United States has traditionally relied upon a limited mix of mineral fuels, primarily consisting of coal, oil, and natural gas, to provide energy to power its industries, heat its homes and factories, and fuel its means of transportation. For many years these sources of energy were abundant, relatively accessible at low cost, and, whether located in the United States or abroad, effectively under the control of domestic corporations. In 1970, the era of easily accessible mineral fuels passed, as increases in domestic reserves were outpaced by increased domestic consumption.\(^1\) In 1973, effective control over liquid fossil

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\(^1\) See H. Williams, R. Maxwell & G. Myers, Oil and Gas 85 (4th ed. 1979); Energy Future 3-4, 18 (R. Stobaugh & D. Yergin eds. 1979).
mineral fuel resources passed from the hands of domestic corporations to a cartel made up of oil producing nations.\textsuperscript{2} Increasing societal concern over the damage and the risk of damage posed by mineral fuel mining and conversion into energy reduced the attractiveness of certain mineral fuel resources, particularly coal, which the United States possessed in abundance. These resources, however, presented significant environmental risks if used as alternatives to relatively "cleaner" mineral fuels, such as oil and natural gas.\textsuperscript{3}

As the United States' reliance upon foreign sources of mineral fuels increased, renewed attention\textsuperscript{4} was directed to mineral resources such as oil shale,\textsuperscript{5} tar sands,\textsuperscript{6} and coal—with emphasis upon coal largely directed to its liquefaction or gasification.\textsuperscript{7} These synthetic fuel sources are found in relative abundance in the United States. Due to environmental concerns,\textsuperscript{8} geographic and geological accessibility,\textsuperscript{9} and


\textsuperscript{4} Alternative fuels, such as oil shale and coal gasification, are often publically perceived as the fuels of the future whereas they are often the fuels of the past. Production of fuels from oil shale preceded the production of fuels from petroleum. Shale oil was produced in France as early as 1838, Scotland in 1850, Brazil and Australia before 1900 and Sweden and Germany before 1925. As early as 1920, the United States, through the Bureau of Mines, established a laboratory in Colorado to conduct studies concerning the fundamentals of oil shale retorting and yields and characteristics of shale oil products. In 1924 and 1944, Congress appropriated funds for the construction and operation of demonstration and pilot plants to produce liquid fuels from oil shale. Under both programs, retorts were constructed and operated. See generally Environmental Protection Agency, Compendium Reports on Oil Shale Technology, Interagency Energy Environment Research and Development Program 1 (1979) [hereinafter cited as Compendium Reports].

Similarly, the technology for producing gas from coal has been available for some time but whether the technology is cost competitive with liquid petroleum or natural gas is not clear. See Energy Future, supra note 1, at 68-69.

\textsuperscript{5} Oil shale is a fine-grained, laminated, sedimentary rock containing solid organic material called kerogen which upon destructive distillation will produce a substantial amount of oil. See Compendium Reports, supra note 4, at 9, 13; 1 Office of Technology Assessment, An Assessment of Oil Shale Technologies 87 (1980) [hereinafter cited as Oil Shale Technologies].

\textsuperscript{6} Tar sands are sandstones with pore spaces containing viscous-to-solid petroleum which cannot be recovered by conventional methods.

\textsuperscript{7} Energy Future, supra note 1, at 103-05.

\textsuperscript{8} See U.S. Dept of Energy, Environmental Development Plans for Energy Technology Programs: Summary Report (1979). The Report lists eight areas of concern: (1) air quality (emissions from fossil technology processes include particulate matter, oxides of nitrogen and sulphur, hydrogen sulphide, hydrocarbons, ammonia, hydrogen cyanide, polycyclic aromatic hydrocarbons, nitrogen and sulphur—containing heterocyclic compounds, and trace elements); (2) water quality (possibility of contamination of water through aquifer disruption, use of chemicals, leaching of dissolved residuals, and effluent disposal); (3) solid waste (disposal of
technological feasibility associated with the mining and transformation of these resources into usable fuels, these resources had not previously been thought economical to exploit.

It is not presently known whether it is economical to exploit synthetic fuel resources, such as oil shale and tar sands. The problems are numerous. First, as opposed to the more traditional fossil fuels, the process by which synthetic fuel mineral resources are transformed into usable fuels has not been actually demonstrated in commercial size facilities. Second, the economics of these synthetic fuel resources is spent oil shale, mining waste, and production waste; (4) ecology (problem of interaction of various processes disturbing the ecosystem, such as the effect upon ground temperature from in situ synthetic fuel technologies which rely on underground burning); (5) health (possible carcinogenic, mutagenic, teratogenic, and toxic effects resulting from products, processes, emissions and discharges of a synthetic fuel facility); (6) safety (worker protection); (7) socio-economic factors (competition for resources, boomtown problems); and (8) resource problems (land reclamation). Id. at 5-2 to 5-4. These concerns form the core of discussion in impact analyses of synthetic fuel project siting. See Compendium Reports, supra note 4, at 155-98; Oil Shale Technologies, supra note 5, ch. 8; Energy from the West, Impact Analyses Report: Introduction and Summary I (1979) [hereinafter cited as Energy from the West].

9. Mineral resources in sufficient quantities to justify the capital expenditures for synthetic fuel projects lie primarily in the western United States and include the northern Great Plains and Rocky Mountain states. Coal is found in all eight states of this region (Montana, North and South Dakota, Wyoming, Utah, Colorado, New Mexico, and Arizona) with the largest concentrations occurring in the northern Great Plains. The highest grade oil shale deposits occur in the Green River Formation in Colorado, Utah, and Wyoming. Energy from the West I, supra note 8, at 2-14. Due to the sparseness of the current population in the development area, marketing of the synthetic fuel produced requires long distance transport to the east or to the west coast of the United States. Id. at 149.

10. See note 8 supra. As opposed to conventional processes associated with the recovery of oil and natural gas, the information base with respect to unconventional processes, such as oil shale, is significantly incomplete. U.S. Dep't of Energy, Environmental Development Plan: Oil Shale 24-27 (1979) [hereinafter cited as Environmental Development Plan].

11. The Department of Energy is currently administering several true in situ and modified in situ oil shale fuel extraction programs. Id. at 13-15. Although coal gasification and liquefaction technology is in place, no commercial-size facility using the technology exists in the United States. See Great Plains Gasification Assoc., 19 Fed. Power Serv. 5-540, rev'd sub nom. Office of Consumers' Counsel v. FERC, 21 Fed. Power Serv. 6-197 (Fed. Energy Comm'n) (D.C. Cir. 1980). In Great Plains, the Federal Energy Regulatory Commission (FERC) had allowed certain tariffs designed to guarantee recoupment of project cost because of the perceived need to demonstrate the technological feasibility of the commercial-size project. The Commission found:

Although many of the individual components of the proposed plant utilize proven technology, the record in the case indicates that there is significant uncertainty related to the following:

(1) the various components of the plant will be put together in a particular sequence for the first time;

(2) the methanation process of raising coal gas Btu from 350 to 900-plus Btu has not been used in this precise way before;

(3) the sizes of some of the components are larger than have been used commercially elsewhere;

Complications or difficulties resulting from any of these factors could result in cost overruns, delay in start-up, or reduced plant efficiency with attendant implications for the long-run future of coal gasification.
largely dependent on the continued and increasing high price of oil, a factor which is subject to control by a foreign cartel. Consequently, any analysis of the economic viability of synthetic fuel resources rests upon a forecast of future oil prices, coupled with the cartel’s willingness to maintain high prices and thus protect competition.

For the above reasons, it has proven difficult, if not impossible, to secure sufficient financing to construct synthetic fuel projects. The private sector has proven itself unwilling to commit the necessary financial resources to construct these projects, given the substantial risks outlined above, dealing with the ability to build and profitably operate them. To provide the necessary financial assurance to secure private sector commitments to build and operate synthetic fuel projects, the federal government has been called upon to assume the role of financier of last resort. The justification for this call has generally been the perceived

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12. ENERGY FUTURE, supra note 1, at 26-31. This factor is, however, often overestimated. Free-world oil production is about 60 million barrels per day. Even if synthetic fuel production reached the ambitious level of 2 million barrels per day by 1992; the total impact would be less than that realized by the discovery of the North Slope fields. It is questionable whether the cartel would see synthetic fuel production as a serious threat to its pricing structure. Indeed, the high cost of oil substitutes—synthetic fuels—would probably serve to firm the cartel price. Despairies, Future Prices of OPEC and Non-OPEC Petroleum and of Rival Sources of Energy, J. OF ENERGY AND ECON. DEV. 258, 260 (Spring 1980) (the future and eventual price of oil will tend toward the price of the most expensive unconventional oil as soon as the latter becomes indispensible for completing oil supplies).

13. Synthetic fuel projects outside the United States are heavily subsidized by government. For example, the tar sands project in the Saskatchewan Province of Canada is subsidized through price guarantees provided by the Canadian government. Similarly, the Sassol coal liquefaction project in South Africa is subsidized. The Office of Technological Assessment, in an analysis of the economics of various levels of oil shale development, concluded that some types of federal assistance would be necessary. See OIL SHALE TECHNOLOGIES, supra note 5, at 17-19, 182-83. In the United States, the only commercial-size synthetic fuel project to commence construction is the Great Plains Coal Gasification Project, to be located in Mercer County, North Dakota. The plant will use a coal gasification process commonly known as the lurgi process. The plant has been designed to produce an average of 125,000 Mcf per day of pipeline quality gas from lignite coal reserves held under option for that purpose. Essential to the obtaining of financial commitments to construct and operate the plant was the granting by the Federal Energy Regulatory Commission of approved tariff provisions at the outset that would: (1) provide for full recovery of debt service (both principal and interest) in all circumstances; (2) permit collection of debt financing costs during the construction period; (3) allow the outstanding debt to be amortized over a five year period if abandonment should occur and in certain other events; (4) permit the project owners to charge customer pipeline companies rates based on a full cost-of-service formula; (5) authorize the customer pipeline companies to recover all such project costs on a current basis; and (6) permit the customer pipeline companies to market the plants’ output on a rolled-in basis. The Commission granted in all major particulars the tariffs requested, thus providing for private funding of the project, but that decision was reversed by the District of Columbia Court of Appeals. See Great Plains Gasification Assocs., 19 FED. POWER SERV. 5-540, rev’d sub. nom. Office of Consumers’ Counsel v. FERC, 21 FED. POWER SERV. 6-197 (D.C. Cir. 1980).
national security interest, which is associated with a strong domestic synthetic fuels industry. The federal government has been increasingly responsive, culminating in the passage of the Energy Security Act. This Act for the first time committed the federal government to a major role as a financial backer of synthetic fuel projects.

This article examines the relationship between the financing provisions of the Act and the costs imposed by permit and approval (regulatory) requirements of synthetic fuel project construction and operation. The costs imposed by regulatory requirements on energy projects have been well recounted. Synthetic fuel projects generally involve greater capital expenses than traditional energy projects. When this capital expense is coupled with the uncertainty surrounding the technological feasibility of synthetic fuel projects, the risk of noncompliance, and delays caused by securing compliance can become significant. This article assumes that if the risks, including the risks posed by agency action or inaction, imposed upon the synthetic fuel project cannot be quantified, the project cannot be built. This assumption is based on the abso-


ulate cap on federal financial assistance to synthetic fuels projects and the unwillingness of the private sector to commit its resources to a project in which it must maintain substantial risk capital. If the extent of those risks cannot be determined before the financial commitment is made, no such commitment will be made.

II. AN OVERVIEW OF THE SYNTHETIC FUELS PROGRAM

A. The Energy Security Act

1. Organization of the Synthetic Fuels Program

The Energy Security Act creates, as its operating entity, the Synthetic Fuels Corporation (SFC). The SFC is a unique government entity. It bears some similarities to a traditional government agency and some dissimilarities. It is in fact sui generis and best understood by examining its statutory function. The SFC is designed to serve as a federally-funded investment banker. Congress authorized approximately $20 billion to be used during the first stage of the Energy Security Act. After the submission of a report to Congress of first stage activities by the SFC and the development of a “comprehensive strategy” to exploit synthetic fuel resources, the Energy Security Act provides that an additional $68 billion may be committed toward synthetic fuel development by the SFC during the second stage of the Act.

The SFC is organized around a seven member board of direc-

18. See notes 52 and 125 infra and accompanying text.
20. Thus, the SFC is subject to: the Sunshine-in-Government Act, id. § 8712(f); and the Freedom of Information Act, id. § 8717, and is required to have an Inspector General, id. § 8718.
21. Perhaps most meaningful of the dissimilarities is the exemption of the SFC from the Administrative Procedure Act, id. § 8775, and the National Environmental Policy Act of 1969, id. § 8775(b). Of some importance is that Congress did not extend the mantle of sovereign immunity to actions by the SFC, id. § 8768. On the other hand, the SFC, by being treated as an instrumentality of the United States, is probably protected from state and local attempts to frustrate its purposes. See Fischer, Allocating Decisionmaking in the Field of Energy Resource Development: Some Questions and Suggestions, 22 ARIZ. L. REV. 1001, 1054-56 (1980). Moreover, questions relating to its financial commitments are probably governed by the federal common law. See Clearfield Trust Co. v. United States, 318 U.S. 363, 366 (1943).
23. Energy Security Act, supra note 15, 42 U.S.C.A. § 8752 (West Supp. 1980). It is against the $20 billion authorized that individual project funding limits are measured. See note 17 supra and accompanying text, even though less than $20 billion has been actually appropriated by Congress. See notes 47-50 infra and accompanying text.
tors, appointed by the President and confirmed by the Senate for seven-year staggered terms. The chairman, who must serve full time, is the chief executive officer of the SFC.

The SFC's authority includes the power to: employ no more than 300 full-time professionals; establish offices outside the District of Columbia; adopt corporate characteristics, such as bylaws and a seal; own property and make contracts; possess legal capacity; and to exercise, under limited circumstances, the power of eminent domain.

The basic purpose of the SFC is to provide financial assistance for synthetic fuels projects on the basis of solicitations published by the SFC in the Federal Register. The funding mechanisms which the SFC may employ include: loan guarantees; price guarantees; purchase agreements; direct loans; and joint ventures. The SFC is also authorized to develop up to three government-owned, contractor-constructed and operated (corporation construction projects) synthetic fuel projects. The SFC is limited to a maximum commitment of $3 billion to any single synthetic fuel project. The SFC may, however, combine various financing mechanisms, subject to certain conditions.

25. Id. § 8712(a)(2).
26. Id. § 8712(a)(2), (b)(/).
27. Id. § 8712(a)(2), (b)(/).
28. Id. § 8713(d).
29. Id. § 8711(b).
30. Id. § 8771(a)(/).
31. Id. § 8771(a)(3).
32. Id. § 8771(a)(4).
33. Id. § 8771(g).
34. Id. § 8723.
35. Id. § 8733.
36. Id. § 8734.
37. Id. § 8735.
38. Id. § 8732.
39. Id. § 8736.
40. Id. §§ 8741-8742.
41. Id. § 8731(j)(/). See note 23 supra. With respect to potentially open-ended commitments such as price guarantees and purchase commitments, the cost of financial assistance is determined by ascertaining the "probable" market price of the synthetic fuel product at the time of sale. 42 U.S.C.A. § 8734 (West Supp. 1980) (price guarantees); id. § 8735(a) (purchase agreement). The SFC's liability equals the difference between market price and price guarantee or purchase price commitment. The SFC is required to limit its absolute liability with regard to committed financial assistance by the inclusion of a clause in the financial package putting an absolute cap on the liability committed to under the package. Id. § 8731(k)(/). The agreement must be accompanied by a certification by the Secretary of the Treasury that sufficient unencumbered appropriations are available in the Energy Security Reserve to satisfy the obligation of the agreement.
42. The Energy Security Act authorizes the SFC to provide financial assistance to qualifying projects in a variety of forms. See notes 35-39 supra and accompanying text. Although the SFC has discretion to determine the form of financial assistance extended, that discretion is not unfet-
as long as the $3 billion cap per project is not exceeded.

The role of the SFC is primarily that of financial backer. The decision by the SFC to provide financial assistance is not treated as "major federal action" for purposes of the National Environmental Policy Act (NEPA) nor is the internal operation and conduct of the SFC subject to judicial challenge by private citizens. Examination of the SFC's activities by the judiciary will be extremely limited and largely constricted. For example, financial assistance in the form of direct loans or joint ventures cannot be used unless the SFC determines that price guarantees, purchase agreements, or loan guarantees will not suffice. See notes 71-80 infra and accompanying text.

43. See note 21 supra. It must be emphasized, however, that it is the "award" of financial assistance which is statutorily exempted from treatment as "major federal action" which otherwise triggers the National Environmental Policy Act of 1969, National Environmental Policy Act of 1969, § 102, 42 U.S.C. § 4322 (1970). Other federal involvement, as evidenced by the need to secure a federal lease or permit, could trigger NEPA. Similarly, where the SFC is developing corporation construction projects under § 141 of the Act, it is treated as a federal agency for purposes of NEPA. 42 U.S.C.A. § 8775(h) (West Supp. 1980). See CONFERECE REPORT, S. REP. No. 824, 96th Cong., 2d Sess. 226 (1980) [hereinafter cited as CONFERENCE REPORT]. Moreover, project applicants may find themselves subject to State Environmental Protection Acts which extend their jurisdictional umbrella to privately financed and operated projects. 42 U.S.C.A. § 8743(b) (West Supp. 1980).

44. Id. § 8767. The Act does not specifically forbid citizen suits; however, it only confers standing to the Attorney General or Inspector General to challenge conduct of the SFC which is inconsistent with the provisions of the Act. Id. § 8767(a). It was clearly the intent of the Conference that citizen suits were not to be allowed:

Section 167 authorizes the Attorney General of the United States or the Comptroller General of the United States to sue the Corporation or any other person to prevent acts of omission or commission in violation of the legislation. The section creates a public cause of action, maintainable by the Attorney General or the Comptroller General, to enforce the duties and responsibilities imposed by the legislation. The conferees do not intend that mandamus actions would lie against the Attorney General or the Comptroller General to compel action under Section 167(a). The provision was patterned after a similar statutory authorization providing for suits by the Attorney General to enforce legal obligations of the Communications Satellite Corporation under the provisions of 47 U.S.C. § 743 (1976) and the National Railroad Passenger Corporation (Amtrak) under the provisions of 45 U.S.C. § 547 (1976).

CONFERENCE REPORT, supra note 43, at 231. This provision might receive any early construction since suggestions have been raised that the SFC's initial solicitation was invalid. See SynFuels 1 (McGraw Hill, April 13, 1981).

45. The Energy Security Act limitations upon citizen suits extend only to challenges to the internal operations of the SFC. Suits against the SFC for activity cognizable under the Federal Torts Claims Act are allowed. Energy Security Act, supra note 15, 42 U.S.C.A. § 8768 (West Supp. 1980), as are suits to enforce obligations entered into by the SFC. Id. §§ 8767(c), 8771(4). The scope of judicial review of SFC activities is, however, constrained by Congress' exemption to the SFC from the need to comply with the Administrative Procedure Act (APA) and the National Environmental Policy Act of 1969. See note 21 supra. The exemption is not, however, all-encompassing. Thus, the SFC may be required to demonstrate that its decisions are not arbitrary or capricious and this demonstration may require the preparation of an administrative record, independent of the requirements of the APA. See Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402, 413 (1971). Although the APA is not directly applicable to the SFC, Congress has not altogether prohibited judicial review. Section 167 of the Energy Security Act vests the federal courts with jurisdiction to entertain cases involving the SFC. See Energy Security Act, supra note 44.
consistent with the “hands off” policy the federal courts have exhibited when the question involves exercises of the spending power or war powers.\textsuperscript{46}

As noted previously, Congress authorized approximately $20 billion for synthetic fuel project financing by the SFC. Congress has, however, only appropriated approximately $17 billion,\textsuperscript{47} of which about one third is available to the Department of Energy during the “fast start” program created by Congress to expedite synthetic fuel project development while the SFC was being organized.\textsuperscript{48} Not only has Congress kept controls on the program,\textsuperscript{49} but it seems unlikely that the Reagan administration will support additional appropriations to the SFC.\textsuperscript{50} Moreover, the SFC cannot recommit appropriated funds.\textsuperscript{51}

15, 42 U.S.C.A. § 8767(a) (West Supp. 1980). In order to discharge its judicial function, the courts will need some administrative record to determine whether SFC actions can be sustained.

\textsuperscript{46} See Fischer, supra note 21, at 1036-41.


\textsuperscript{48} The initial $19 billion appropriation under Pub. L. No. 96-126 was not specifically apportioned to any agency, except for $2.208 billion which was specifically apportioned to DOE to administer an interim synthetic fuel program under the Nonnuclear Research and Development Act of 1974. See CONFERENCE REPORT, H.R. REP. No. 604, 96th Cong., 1st Sess. 24 (1980). The reason for the lack of apportionment was that the SFC had not been created when the Interior Department appropriation was considered by Congress. It was provided that any funds unapportioned out of the $2.208 billion would be transferred to the SFC.

Under Pub. L. No. 96-304, note 47 supra, Congress further specified that $3 billion of the Energy Security Fund created by Pub. L. No. 96-126 would be apportioned to the “fast start” program established under Title I of the Energy Security Act. As with the $2.208 billion apportioned to DOE by Pub. L. No. 96-126, all unexpended portions of the $3 billion apportioned to Title I programs would be transferred to the SFC by the earlier of June 30, 1981, or the date the President declares the SFC to be fully operational. Id.

\textsuperscript{49} Both the $2.208 billion apportioned to DOE to begin an interim program under the Nonnuclear Act and the $3 billion apportioned to Title I programs were credited against the $17.522 billion apportioned to Title I programs by Pub. L. No. 96-304. Thus, of the $17.522 billion apportioned to Title I programs to be administered by the SFC, the DOE, which is administering the interim Title 1A programs pursuant to Exec. Order No. 12,242, 45 Fed. Reg. 65,175 (1980), has authority to commit $5.208 billion, leaving approximately $12.2 billion for the SFC. And even concerning the $12.2 billion clearly apportioned to the SFC, Congress provided that $6 billion shall be immediately available and $6.212 billion shall be available for obligations only after June 30, 1982. See CONFERENCE REPORT, H.R. REP. No. 1149, 96th Cong., 2d Sess. 38-39 (1980).

\textsuperscript{50} See Newsweek, December 1, 1980, at 33 ("The new U.S. Synthetic Fuels Corp. will probably be permitted to spend its first $20 billion appropriation, but private industry would have to pick up the full cost of development projects after that."). The $20 billion figure seen in the print media constituted the sum of Title I ($17.5 billion) and Title II ($1.3 billion) funding of the
Where the SFC makes a financial commitment, that amount of the existing appropriation passes from the control of the SFC unless and until Congress furnishes additional funds through an appropriation. Consequently, while the Energy Security Act promises a substantial commitment toward the development of a synthetic fuel industry, that promise is likely to be only partially fulfilled at best. In effect, after the SFC provides an initial helping hand to the private sector to explore the commercial possibilities of a synthetic fuel industry, the determination whether to proceed will be based upon private sector economics alone. The Energy Security Act will, however, provide industry with some experience to test the technological feasibility of synthetic fuel projects. It will also provide guidance whether regulatory risks, which contribute to project costs, can be brought under control. This will provide a basis to allow the private sector to assess the viability of developing synthetic fuel resources without the presence of direct government aid.

2. Methods of Government Support for Synthetic Fuels Programs

In order to qualify for federal financial assistance under the Energy Security Act, the project owner or profit participants must maintain a substantial risk of after-tax loss in the event of any default or other cancellation of a synthetic fuel project. Consequently, the types of financing available under the Energy Security Act affect the types of risks assumed by the federal government and the project owner.

Moreover, since project completion delays and additional project requirements occasioned by the regulatory process add to project costs, the type of financing provided by the federal government and the risk of additional costs imposed by the regulatory process are interrelated.


52. Id. § 8731(q), which provides:
[T]he Corporation shall impose such terms and conditions on any financial assistance (after evaluating the financing of the synthetic fuel project, the tax benefits which would be available to investors in the synthetic fuel project, and any regulatory actions associated with the synthetic fuel project) as may be necessary to assure that any investors having an ownership or profit interest in the synthetic fuel project bear a substantial risk of after tax loss in the event of any default or other cancellation of the synthetic fuel project.

53. See notes 54-86 infra and accompanying text. See also OIL SHALE TECHNOLOGIES, supra note 5, at 193-216 (estimating the economic consequences of various financing alternatives).
Adequate financing must include sufficient flexibility to account for any unforeseen costs imposed upon the project by the regulatory process, such as occasioned by regulatory delay in granting necessary permits and/or approvals and new project requirements adopted by regulatory agencies after the project's design specifications have been completed and construction has commenced.\textsuperscript{54}

\textbf{a. Purchase Agreements and Price Guarantees}

Under the Energy Security Act, the SFC is authorized, backed by the faith and credit of the United States, to agree to purchase a determined amount of product produced from the synthetic fuel project.\textsuperscript{55} The SFC may also guarantee that the project sponsors will receive a

\textsuperscript{54} See Oil Shale Technologies, supra note 5, at 186.

A 50,000-bbl/d oil shale facility would require investment of around $1.5 billion in 1979. Operating costs are estimated by industry at $8 to $13/bbl of crude shale oil processed, exclusive of capital recovery. Such an investment would be undertaken cautiously even if the estimates of capital and operating costs for oil shale plants were known to be accurate. However, during the past 10 years, capital cost estimates have increased much more rapidly than has the general rate of inflation, and still do not appear to be totally reliable. The experience of Colony Development is illustrative but not exceptional. Its direct capital cost estimates for a 43,000-bbl/d facility increased from $225 million in 1972 to $1.3 billion in early 1979, and were $1.7 billion February 1980.

Cost escalations of this magnitude are not unusual for large, capital-intensive facilities involving complex novel technologies. As demonstrated by experience with light water reactors, many coal gasification plants, Canadian tar sands, and various weapons systems, cost estimates are likely to rise rapidly as a process advances from initial to definitive engineering designs. Also, as with similar projects, oil shale development is highly vulnerable to changes in the cost of capital and labor. These costs have increased more rapidly in recent years than the composite rate of inflation.

Cost overrides are currently an integral part of doing business. A study by Walter Meade cites 12 examples, including the Trans-Alaska oil pipeline, a rapid transit system, nuclear power plants, bridges, dams, and even office buildings. \textit{W. Mead, G. Rogers & R. Smith, Transporting Natural Gas from the Arctic: The Alternative Systems} 83-89 (1977). The projects studied had an average of 121\% cost growth after adjustment for inflation and changes in scope for the project. The Rand Corporation prepared a study for the Department of Energy which shows that 10 energy process plants have experienced an average increase in cost of 141\% from the first available estimate to the actual cost of construction. \textit{RAND CORPORATION, A Review of Cost Estimation in New Technologies: Implications for Energy Process Plants, 95-108 (1979)}.

\textsuperscript{55} Energy Security Act, supra note 15, 42 U.S.C.A. § 8735 (West Supp. 1980)). The rights of the Corporation as a buyer under a purchase agreement are described in the Conference Report and include price quality assurances, the right to refuse delivery, and the right to resell, transport, refine, and/or store the synthetic fuel product. See \textit{CONFERENCE REPORT, supra note 43, at 222-23}. The Conference Report further states:

The Conference intends that the Corporation, to the maximum extent feasible, utilize purchase agreements to obtain synthetic fuel from synthetic fuels projects in a form which can be directly substituted for conventional supplies. The Conference thus intends that the authorities of subsection 135(e) to process and refine synthetic fuel obtained pursuant to purchase agreements be exercised as a last resort. Use of such authorities to directly or indirectly fund activities that would not otherwise qualify for financial assistance would be inconsistent with congressional intent.

\textit{Id.} at 223.
preset price for a determined amount of product it produces.\textsuperscript{56} The SFC, in effect, guarantees to each project a market for its product when the synthetic fuel plant is in operation. For purchase agreements, the federal government, through the SFC, becomes the purchaser; for price guarantees, the federal government agrees to make up any difference between the market price at the time the synthetic fuel is produced and the guaranteed price. The SFC must always determine \textit{at the time the financing arrangement is entered into} the market price at the time of sale. This is the price the federal government will pay for a product under a purchase agreement or will guarantee under a price guarantee. The Energy Security Act generally forbids "cost plus" pricing formulas,\textsuperscript{57} although contractual adjustments, in the case of price guarantees and purchase agreements, are permitted.\textsuperscript{58}

Under a purchase agreement or price guarantee financing mechanism, the risk of loss in the case of project default or cancellation is effectively carried by the equity owners and lending institutions. This is because no federal obligation arises unless and until the synthetic fuel plant becomes operational and produces a "product" on which a

\textsuperscript{56} Energy Security Act, \textit{supra} note 15, 42 U.S.C.A. § 8374 (West Supp. 1980). With respect to the price guarantees the Conference Report states:

The Corporation is authorized to commit to, or enter into, price guarantees for all or part of the production from a synthetic fuel project at a specific sales price. The Corporation may not enter into any "cost plus" arrangement or variation thereon in order to guarantee a profit to the concern. However, if the Corporation subsequently determines that the project would not otherwise be completed or continued and that the product is necessary to achieve the purposes of the Title, it may renegotiate the sales price.

In awarding price guarantees, the Corporation shall establish such specified sales price at the level which will provide the minimum subsidy determined by the Board of Directors to be necessary to provide an adequate incentive, in light of projected prices of competing fuels and the requirements for economic and financial viability of the synthetic fuel project.

The Conferors intend that the Board of Directors when prescribing terms and conditions for price guarantees, including establishment of the price set forth in the contract, shall assure that an appropriate risk will be borne by the recipient, that an appropriate level of price competition will be encouraged in the production and sale of synthetic fuel, that the price support will phase out if marketplace forces make such support unnecessary, or such other conditions which the Corporation determines would achieve the purposes of this section and this Title. In the event that prevailing market prices for synthetic fuels are greater than a price guaranteed by the Corporation, the Corporation should allow the marketplace to operate.

\textit{CONFERENCE REPORT, \textit{supra} note 43, at 221.}

\textsuperscript{57} Energy Security Act, \textit{supra} note 15, 42 U.S.C.A. § 8734 (West Supp. 1980)) (no price guarantee may be based upon a "cost plus" arrangement or variant thereof). \textit{But cf. id.} § 8735(a) (sales price specified in purchase agreement shall not exceed estimated prevailing market price at date of delivery unless SFC determines that higher price is necessary in order to insure the production of synthetic fuel to achieve the purposes of Title I).

\textsuperscript{58} Id. § 8742(a). Loans made or guaranteed by the SFC may also be revised if total project costs exceed initial estimates. \textit{Id.} § 8732(a)(3) (direct loans). \textit{See also id.} § 8731(b)(1)(b).
purchase agreement or price guarantee can attach. Primary reliance will therefore not be placed on purchase agreements and price guarantees to finance synthetic fuel projects.\textsuperscript{59} It is likely, however, that project sponsors will try to induce the SFC to combine purchase agreements with other forms of financial assistance available under the Energy Security Act.\textsuperscript{60} Purchase agreements are advantageous because they allow for the advancement of payments to the project sponsors during construction of the project. Although the Energy Security Act is silent on the question of advance payments, there was authority under preceding legislation, the Nonnuclear Research Development Act of 1974.\textsuperscript{61} Should the SFC indicate a willingness to provide advance payments on purchase agreements, this may prove to be a desirable means by which project sponsors can acquire, at the lowest possible cost,\textsuperscript{62} additional capital during the construction phase of the project.

b. \textit{Loan Guarantees for the Synthetic Fuel Industry}

The financing method provided by the Energy Security Act being given the most attention is the Act’s authorization to the SFC to guarantee up to seventy-five percent of the initial total estimated cost of the synthetic fuel project.\textsuperscript{63} The uncertainties surrounding commercial


\textsuperscript{62} \textit{See, e.g.,} 41 C.F.R. § 9-30.403 (1979):

Interest will be charged on the unliquidated balance of all advance payments at the rate established by the Secretary of the Treasury pursuant to Pub. L. [No.] 92-41, 85 Stat. 97, for the Renegotiation Board; however, advance payments may be made without interest:

(1) Pursuant to FRR 1-30.403;

(2) In CPFF contracts for construction or engineering services; or

(3) Where the contract provides that title to the advance funds has been retained by the government (§ 9-50.704-18).

\textit{Id.}

The activities of the Renegotiation Board were terminated effective March 31, 1979 under Title V of Pub. L. No. 94-431, 92 Stat. 1043. What effect the termination will have upon the setting of interest rates for advance payments is uncertain. One approach might be to analogize advance payments to direct loans where the SFC is authorized to establish interest rates in light of “the needs and capabilities of the recipient and the prevailing rates of interest (public and private). . . . Energy Security Act, \textit{supra} note 15, 42 U.S.C.A. § 8732(b) (West Supp. 1980)). The interest rate cannot be less than “a rate determined by the Secretary of the Treasury . . . taking into account the current average yield on outstanding marketable obligations of the United States with remaining periods of maturity comparable to the average maturities of such loans.” \textit{Id.}

utilization of synthetic fuel technology had proven largely unacceptable to private sector lending institutions. The only major synthetic fuel project to approach commercial production, the Great Plains Coal Gasification Project, had secured financing conditioned on ultimate gas consumer guarantees of the project cost. These financing guarantees, however, are only available where regulatory entities have jurisdiction over rates and can provide project sponsors with sufficient revenues to repay outstanding indebtedness. Outside of coal gasification, whose end product comes under the authority over natural gas possessed by the Federal Energy Regulatory Agency, the regulatory entities are too fragmented to be able to effectively provide this type of assistance. And even if this assistance were available, consumer guarantees of project financing through ratemaking will prove the exception, not the rule.

Any application for a loan guarantee must provide for a twenty-five percent equity contribution to the initial total estimated cost of the project. Moreover, the providing of a loan guarantee by the SFC is

The loan guarantee program set forth in the Energy Security Act is substantially similar in general configuration to an amendment to the Nonnuclear Research and Development Act of 1974 which was contained in the Department of Energy Act of 1978, Pub. L. No. 95-238, § 19, 92 Stat. 47. The amendment, 42 U.S.C. § 5919 (Supp. II 1978), was designed to provide loan guarantees for alternative fuel demonstration facilities.

64. [1980] EN. USERS REP. (BNA) No. 381 at 10. The status of this financial commitment is, however, uncertain. The Court of Appeals for the District of Columbia recently disapproved several essential tariffs, which had been authorized by the Federal Energy Regulatory Commission in Great Plains Gasification Associates, 19 FED. POWER SERV. 5-540 (1979), rev'd sub nom. Office of Consumers' Counsel v. FERC, 21 FED. POWER SERV. 6-197 (D.C. Cir. 1980). The project sponsors are reported to be unsure whether the project will be continued. See [1981] EN. USERS REP. (BNA) No. 388 at 71.

65. In Office of Consumers' Counsel the court held that the Federal Energy Regulatory Commission exceeded its jurisdiction when it attempted "to create a rate-payer-based financing package for the construction of [the Great Plains Coal Gasification Project] despite the fact that its rate-setting and certificate powers were not granted to it for that purpose." 21 FED. POWER SERV. at 6-219. If the decision stands, it would effectively remove federal agencies, with nationwide rate-setting powers, from any meaningful role in encouraging private sector financing through ratemaking financial guarantees.

66. In Office of Consumers' Counsel, the court also stated that the Federal Energy Regulatory Commission would not acquire ratemaking authority until the time of actual commingling of the synthetic gas in the pipeline system. Id. at 31. Project financing requires some assurance that rates will be sufficient to repay the capital costs of the project whether it is successful or not. The inability of the ratemaking agency to provide some form of preconstruction assurances would likely preclude reliance on ratemaking as a means of providing financial incentives for synthetic fuel projects.


69. Id. 8732(a)(2) (limiting loan guarantees issued by the corporation to 75% of the initial estimated cost of the project). The equity contribution need not, however, be a cash or cash
dependent upon the "credit elsewhere" test. The SFC may not extend financing assistance in the form of loan guarantees unless it determines that adequate financing is not otherwise available to the project. The conference report indicates that this requirement is designed to avoid competition between the SFC and private capital markets. The SFC is not required to do an exhaustive analysis of financial markets or the economy to determine if adequate financing is available. Rather, the SFC "should take into consideration whether it would constitute a prudent business judgment for the applicant to make available additional capital."

The major, if not overriding, advantage of loan guarantees for project sponsors is that they place the full faith and credit of the United States behind the project from the very beginning. Unlike purchase agreements and price guarantees, which require a product before the financing mechanism becomes effective, loan guarantees support, on a percentage basis up to seventy-five percent of initial project cost, each dollar committed to the project by lending institutions up to the amount of the guarantee. Loan guarantees possess an added benefit over other forms of financial assistance, such as purchase agreements or price guarantees. Whereas the latter allow the SFC to take a profit participation role as a condition for extending financial assistance, the extension of loan guarantees does not authorize profit participation by the SFC. In effect, should a default occur which would require the application of the guarantee, the SFC is limited to the assets of the entity whose indebtedness it guaranteed and the equity contribution of the project sponsors.

c. Other Methods of Government Support for Synthetic Fuel Projects

The Energy Security Act establishes a priority for available

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71. Id.
72. CONFERENCE REPORT, supra note 43, at 217.
73. Id.
76. Id. § 8737.
As a general principle, the SFC is directed to select the financing mechanism which is “most advantageous in meeting the national synthetic fuel production goal” with the “least commitment of financial assistance by the [SFC] and the lowest unit production cost within a given technology.” In decreasing order of priority, the SFC may consider: (1) price guarantees, purchase agreements and loan guarantees to private sector lenders; (2) direct loans by the SFC to the project; and (3) joint ventures. First priority goes to price guarantees, purchase agreements and private sector loan guarantees, with no preference expressed by Congress about these forms of financial assistance *inter se*. The other lesser orders of priority for financial assistance—direct loans and joint venture projects—require that the SFC determine that “neither price guarantees, purchase agreements, nor loan guarantees will adequately support the construction and operation of the synthetic fuel project.”

The requirement that second and third levels of financial assistance cannot be invoked unless the primary level of financial assistance proves inadequate, means that only the riskiest projects will be considered for direct loans or joint ventures. Moreover, since the financial assistance solicitation under the “fast start” program oversubscribed the amount of funding available under the first stage of the Energy Security Act, there would be little financial assistance available for projects not qualifying for primary level assistance. Even if financial

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77. *Id.* § 8731(b)(2)(B). The SFC is also authorized to undertake up to three Corporation construction projects. *Id.* § 8742. These corporation construction projects may only be undertaken prior to the approval by Congress of a “comprehensive strategy,” pursuant to § 126(c) of the Act, (codified at 42 U.S.C.A. § 8722(c) (West Supp. 1980)), and subject to the SFC's determination that the “Corporation construction project” is necessary to meet the objectives of section 8722(a)(2) and would not otherwise be constructed with financial assistance awarded under subtitle D of the Act. *Id.* § 8741(a).

78. *Id.* § 8731(b)(2).

79. *Id.* § 8731(b)(2)(A).

80. *Id.* § 8731(b)(2)(B).

81. *Id.* § 8731(p).

82. See notes 88-113 infra and accompanying text.


84. Eighteen companies sought financial assistance under either or both of the interim “fast start” programs. *Id.* A 1.5 billion loan guarantee was extended to Great Plains Gasification Associates by DOE. *See* [1981] En. Users Rep. (BNA) No. 381 at 10. The doubt thrown on the $1.5 billion guarantee by the *Office of Consumers' Counsel* decision, *see* text and notes 64-67, *supra*, and the general uncertainty over the Reagan Administration's approach to the synfuel program, put the “fast start” program into neutral. Recently, the Administration has indicated a willingness to back the “fast start” program which may put the program back on track. *See* SynFuels I (McGraw Hill, Feb. 23, 1981).
assistance is available for direct loans or joint ventures, the provisions may not prove to be attractive. The SFC's authority to commit direct loans to a project is subject to the same limitations on financial exposure as are required for loan guarantees. Concerning joint ventures, the SFC is prohibited from financing "more than [60] percentum of the total costs of the synthetic fuel project module, as estimated by the SFC as of the date of execution of the joint venture agreement." It can be expected that proposed projects, which cannot be financed with a combination of purchase agreements, price guarantees, and seventy-five percent of initial project cost loan guarantees, backed by the full faith and credit of the United States, will be anything but bridesmaids at the altar. If these non-primary means of financing achieve any usefulness, it will most likely be on an extremely limited basis to examine promising technologies which have not, as yet, been tested in demonstration level modules.

B. The "Fast Start" Program

Congress realized that it would take some time for the SFC to organize itself into a functioning entity. In order to expedite the beginnings of a domestic synthetic fuel industry, Congress authorized a "fast start" program. Under the "fast start" program, the Department of Energy (DOE) was authorized to commit approximately $5.2 billion in the interim period before the President declared the SFC "fully operational." The $5.2 billion is part of the total $17.2 billion appropriated by Congress to fund the first stage of the synthetic fuel program envisioned under the Energy Security Act. Funds not committed by DOE at the time the President declares the SFC "fully operational" are auto-

10. CONFERENCE REPORT, supra note 43, at 192.
12. The appropriations acts for each of the "fast start" programs are discussed at notes 47-49, supra.
13. Id.
matically removed from DOE jurisdiction and are transferred to the SFC.\textsuperscript{91}


The Nonnuclear Research and Development Act of 1974 (Nonnuclear Act) contains authority for the Energy Research Development Agency to provide assistance in the development and demonstration of alternative energy sources, including synthetic fuels.\textsuperscript{92} Attempts by either the Congress or the Administration to provide funding for synthetic fuel projects proved unavailing.\textsuperscript{93} It was not until 1978 that any significant funding was made available for synthetic fuel demonstration plants and research and development.\textsuperscript{94}

In 1979, concern over the availability of liquid fuels spurred renewed interest in a synthetic fuel program. This concern culminated in the enactment of the Energy Security Act. To begin the synthetic fuel program as soon as possible, Congress provided in the Interior Department Appropriation for fiscal 1981 an allocation of $2.2 billion for synthetic fuel programs under the Nonnuclear Act.\textsuperscript{95} This program is to be administered by DOE\textsuperscript{96} until the President declared the SFC “fully operational.”\textsuperscript{97} Any funds then remaining which had not been committed to financial assistance for synthetic fuel projects would be transferred to the SFC.\textsuperscript{98} The authority of DOE to provide financial assistance under this interim program is limited to purchase agreements, price guarantees, and loan guarantees.\textsuperscript{99} Solicitations for assist-

\textsuperscript{91} Id.
\textsuperscript{92} See note 60 supra. See also 42 U.S.C.A. § 5919 (West Supp. 1980).
\textsuperscript{95} See notes 47-49 supra.
\textsuperscript{97} CONFERENCE REPORT, H.R. REP. No. 1149, 96th Cong., 2d Sess., 37 (1980).
\textsuperscript{98} Id.
\textsuperscript{99} Id. at 36.
ance under the interim program were published in the *Federal Register* and closed on November 14, 1980.100

Although the interim program is designed to provide a smooth transition to a "fully operational" SFC, there are some pitfalls along the way. First, where the Energy Security Act is designed to demonstrate the feasibility of commercial size synthetic fuel plants, the Nonnuclear Act is designed to demonstrate technological feasibility through modular size plants.101 Consequently, the interim program must serve two masters. It must look to its successor entity, the SFC, and securely mesh its operations with the goals to which the SFC is directed and the procedures the SFC will adopt to meet those goals. The legal authority of the interim program, however, is not tied to the Energy Security Act but to the Nonnuclear Act which was essentially research and development oriented and not designed to function in a lending or investment capacity.102 Whether the uncertainty will prove to be sufficient to frustrate the program is unclear.103

2. Synthetic Fuel “Fast Start” Programs Under the Defense Production Act

The same reasons that led Congress to appropriate $2.2 billion for an interim program under the Nonnuclear Act also induced Congress to authorize $3 billion for an interim program for synthetic fuel project financial assistance under the Defense Production Act of 1950.104

Unlike the interim program under the Nonnuclear Act, the interim program created under the auspices of the Defense Production Act is

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102. Indeed, it took specific amendment of the Nonnuclear Act in 1978 to enable financial assistance to be provided for even demonstration-size projects. See note 62, supra. See also 1978 CQ Almanac 115-122, 154-161, 688, 747-48.

103. The legislation setting up the interim “fast start” program under the Nonnuclear Act provided for specific overrides where the Nonnuclear Act was inconsistent with the interim “fast start” program. Pub. L. No. 6-126, 93 Stat. 970 (1979); Conference Report, H.R. Rep. No. 604, 96th Cong., 1st Sess., 25 (1979) (providing that loan guarantees for oil shale facilities issued under this appropriation may be used to finance construction of full-sized commercial facilities without regard to section 19(b)(1) of the Nonnuclear Act requiring prior demonstration of a modular facility). The DOE attempted to reconcile the different approaches in the regulations promulgated to implement the loan guarantees and other financial assistance as authorized by section 207 of Title II of the Department of Energy Act of 1978. 10 C.F.R., Part 796, 45 Fed. Reg. 15,468 (to be codified in 10 C.F.R. § 796.1-99) (1980).

securely tied to the Energy Security Act. Title I(A) of the Energy Security Act specifically provides for the interim program under the Defense Production Act until the SFC is declared "fully operational" by the President.105 When the SFC is declared "fully operational," uncommitted funds will be transferred to the SFC,106 and the authority under Title I(A) will become standby authority which may be activated by the President in the event of a serious energy shortage.107 Financial commitments under this interim program are limited to purchase agreements, loans, and loan guarantees.108 By presidential directive, DOE was given administrative authority over this interim program.109 Solicitations for assistance under this interim program were published in the Federal Register and closed on November 14, 1980.110

A more studious attempt was made by Congress to mesh this interim program with the general program to be developed by the SFC. The difference is possibly explainable because unlike the interim program under the Nonnuclear Act,111 there was no existing administrative or statutory apparatus on which the Defense Production Act interim program could be fashioned. Congressional desire to begin immediate work on a synthetic fuel program caused it to begin looking for suitable vehicles on which to attach the interim programs. Defense requirements have proven to be particularly significant when justification for a synthetic fuel program is sought;112 hence, the Defense Production Act was chosen as the natural vehicle for the interim program.

105. Id. § 104; see Pub. L. No. 96-304, 94 Stat. 880 (1980).
107. Id. § 104(e).
108. Id.
111. On June 28, 1979, the DOE issued a notice of proposed rulemaking to establish regulations for the implementation of loan guarantees and other assistance for the Alternative Fuel Demonstration Facilities Program authorized by section 207 of Title II of the Department of Energy Act of 1978. 44 Fed. Reg. 37,790 (1979). These proposed rules are predicated upon the enactment of Pub. L. No. 96-126, 93 Stat. 970 (1979), which provided appropriations for DOE to guarantee or commit to guarantee indebtedness for the construction of alternative fuel demonstration facilities. See notes 47-49 supra and accompanying text and notes 92-103 supra. On March 10, 1980, the DOE published final rules which attempted to mesh the basis framework described in the proposed rulemaking of June 28, 1979, with certain required procedures and provisions contained in Pub. L. No. 96-126. 45 Fed. Reg. 15,468, 15,469 (1980).
112. See [1979] CQ ALMANAC at 652-33.
3. The Role of "Fast Start" Programs

The experience of DOE personnel and project sponsors under the "fast start" program will be influential in determining the eventual path of the SFC's synthetic fuel program. These "fast start" programs will provide guidance to the views of DOE and SFC personnel on the manner in which the programs ought to be administered. The solicitation for proposals published in the Federal Register by DOE to institute the "fast start" programs should prove to be particularly insightful, as the solicitations present DOE and SFC views on the relationship between permit and approval compliance and project financial assistance. This point is discussed in Part 4 of this article.

III. PROJECT FINANCING AND PROJECT PERMITS AND APPROVALS

A. Regulatory Risk

Regulation imposes costs on those who are regulated. In the context of energy project construction and operation, these costs are most directly imposed by regulations which require that the party subject to them does some specific act as a condition precedent to securing necessary regulatory permission to proceed. To the extent that regulatory requirements can be identified, the cost of compliance can be calculated to some reasonable degree of certainty. Thereafter, the economic viability of the project can be determined based on the estimated cost of the project, and whether adequate financing is available to cover initial estimated cost. It is on "initial total estimated cost" that

113. Contrary to earlier indications, a sizable migration of DOE personnel to the SFC occurred after the defeat of President Carter in November, 1981. See [1980] EN. USERS REP. (BNA) No. 380 at 11.

114. OIL SHALE TECHNOLOGIES, supra note 5, at 344-45:
The high cost of oil shale projects makes unexpected delay costly, with uncertain agency decision schedules or with unpredictable litigation that can delay or prevent project construction. Furthermore, some regulations and standards have not yet been set because of a lack of sufficient knowledge about the impacts of shale operations and the effectiveness of their control. Developers are particularly worried about the effects of new regulations (such as visibility maintenance as part of the PSD process) on process design and project economics. They are concerned that new regulations could necessitate costly retrofits to existing plants or even the cessation of operations. For facilities under construction, the new regulatory requirements may mean redesign or addition of environmental control equipment or strategies. These uncertainties increase the risk that a project, once started, may not be completed. Prospective developers also express their frustration over the lengthy and expensive procedures for preparing permit applications (including monitoring and modeling requirements) to meet some environmental statutes. This discontent is sometimes compounded by overlapping agency jurisdictions and by repetitive paper work.

Id.
the SFC’s percentage contribution of loan guarantees and probably the project owner’s “substantial risk” will be computed. Regulatory risk, however, envisions that the certainty of this process can never be guaranteed. The first problem is delay which invariably results in increased project costs, which may ultimately be the death knell of the project. Project delay can be caused in a variety of ways: (1) the

116. Id. § 8731(q), which provides:

[The] Corporation shall impose such terms and conditions on any financial assistance (after evaluating the financing of the synthetic fuel project, the tax benefits which would be available to investors in the synthetic fuel project, and any regulatory actions associated with the synthetic fuel project) as may be necessary to assure that any investors having an ownership or profit interest in the synthetic fuel project bear a substantial risk of after tax loss in the event of any default or other cancellation of the synthetic fuel project.

Id. The term “substantial risk” received no definition in the Energy Security Act or the legislative history of the Act. The interpretation of the term “substantial risk” is, however, influenced by limitations upon specific forms of financial assistance, such as loan guarantees (75% of initial estimated project cost), price guarantees and purchase agreements (which require a functioning facility generating a product on which the guarantee or agreement can attach). Interpretation of the term “substantial risk” is also influenced because a cash or cash equivalent contribution is not required in order for “substantial risk” to exist. Id. § 8731(m). When several forms of project financing are made available, the SFC need only “insure that the recipient of such financial assistance shall bear a reasonable degree of risk in the construction and operation of such project.” Id. § 8731(o). The reason for a lessened requirement of investment risk where two or more forms of financial assistance are made available is that the SFC is precluded from awarding more than a single form of financial assistance unless it determines that “multiple forms of financial assistance are required for the viability of the project, and further, that the project is necessary to achieve the purposes of this title and the provisions of this part.” Id. Where a single form of financial assistance is insufficiently attractive to secure necessary investment funds and/or private sector financing to construct a project deemed by the SFC to be critical to the success of the Energy Security Act, the SFC can moderate the necessary equity contributions, so that they are commensurate with the risk involved. The greater the need to reduce risk to attract some private sector investment, the closer the SFC comes to providing cost of construction financing.

117. See [1979] EN. USERS REP. (BNA) No. 309 at 14 (John McMillan, chairman and chief executive officer of the Northwest Alaskan Pipeline Company, notes that for a $12 billion project, such as the Alaskan Gas Pipeline, each year of delay will cost $1.2 billion.)
118. REPORT BY THE COMPTROLLER GENERAL—THE REVIEW PROCESS FOR PRIORITY ENERGY PROJECTS SHOULD BE EXPEDITED 5-8 (1979) (reviewing the problem of regulatory delay encountered in connection with the Sohio project). See note 54 supra.

Project delay may also result in the loss of an energy project if the ratio between project financing and project cost is so tight that there is no provision for project delay:

To understand the prospects for successful commercialization, it should be recognized that many of the technical, economic, and institutional impediments are interdependent in general, the potential for successful commercialization is limited by the margins available to accommodate a technology to these impediments without encountering barriers. Thus, if the relative economic advantage of a process is very large, then extensive adjustments to environmental standards can be made without reaching an economic barrier. When a process has relatively low technical performance requirements, it may be possible to reduce economic or institutional barriers by upgrading technical performance. However, if technical performance goals are high, production costs are close to or exceed the selling price for competitive products, and institutional barriers are restrictive, then the technology will encounter serious difficulties. Under these conditions, the usual re-
sheer size and complexity of the regulatory process; problems of the administration of new, untested regulations; and conflicts among regulatory agencies. A second problem relates to the substantive requirements that the regulatory agency seeks to impose upon the regulated party. The synthetic fuel projects envisioned under title I of the Energy Security Act are multi-billion dollar projects, requiring significant lead times. Projects proposed in 1980 are not, even if everything goes right, planned to be in commercial operation until 1985 or later. Consequently, the capital costs of a project based on compliance with current environmental technology may be seriously distorted if the project is required to comply retroactively with new environmental standards. Similarly, since even current synthetic fuel technology is, for the most part, untested and untried, project sponsors face un-

sponse of industry would be to postpone commercial commitment while waiting for technical improvements, reduced institutional barriers, or improved market prices for the product.

Oil Shale Technologies, supra note 5, at 184-85.

119. For example, the Northwest Federal Regional Council conducted a Permit Issuance Study for a hypothetical Northern Tier Interstate Crude Oil Pipeline System. The study found that such a project would require 13 separate federal permit/approval requirements, and 11 separate state permit/approval requirements distributed among the five states in which the pipeline would be located. The permit/approval process is also lengthy:

[A]dmnitrative agency proceedings [average] more than 19 months for licensing, 21 months for ratemaking, and over [3] years for enforcement actions. In licensing and rate making proceedings, it takes an average of 160 days for matters even to reach the hearing stage; for enforcement actions, it averages well over a year before a hearing is even convened.

Senate Comm. on Governmental Affairs, Study on Federal Regulation, S. Doc. No. 72, 95th Cong., 1st Sess. at ix. See also Oil Shale Technologies, supra note 5, at 343-51 (discussing various permit and approval requirements for an oil shale project).


121. See Inside DOE, October 17, 1980, at 1, discussing conflict between the DOE and the Environmental Protection Agency [EPA] over whether the pre-manufacture review requirements of the Toxic Substances Control Act, 15 U.S.C. §§ 2601-2629 (1976 and Supp. III 1979), apply at the demonstration or commercial plant stage of synthetic fuel projects. The DOE takes the position that the review requirements only apply at the commercial stage; the EPA asserts that the review requirements may apply at the demonstration stage. The issue is further discussed in notes 265-67 infra and accompanying text. See also Inside DOE, October 24, 1980, at 1, discussing DOE’s attempt to force the EPA into consolidating regulatory programs.


123. The courts have been noticeably unsympathetic to “vested” right claims. See e.g., Standard Oil Co. v. Feldstein, 105 Cal. App. 3d 390, 164 Cal. Rptr. 403 (1980) (no vested rights to operate facility without restriction after permit is issued); cf. EPA v. National Crushed Stone Ass’n, 49 U.S.L.W. 4008 (EPA not required to consider economic capability in granting variances from its “best practicable control technology currently available” regulations). Moreover, the permit/approval acquired may be open-ended and specifically contemplate additionally burdensome requirements. See e.g., Union Oil Co. v. Morton, 512 F.2d 743 (9th Cir. 1975).

124. As noted previously, several forms of synthetic fuel technologies have long histories. See note 4 supra. The technologies currently being considered, however, are significantly advanced
certainties relating to whether the environmental technology will be feasible in commercial size plants, and how the new, untested, and untried standards will be administered by regulatory agencies. Even if the standards themselves are clear, problems may arise as a result of differing views held by project sponsors and regulatory agencies about how performance under the standards is to be determined and measured.

The consequence of these uncertainties regarding the regulatory process and regulatory standards is that "initial project cost" becomes a highly fluid determination. Moreover, since project financing is dependent upon "initial project cost," the assurance that initial financing will be adequate is only as secure as the "initial project cost" estimate. Regulatory risks thus influence and even control the determination whether

from previous levels; the changes needed to improve production efficiencies, reduce costs, and limit consequential environmental degradation. See note 11 supra. And while the feasibility of these new technologies is uncertain, this uncertainty does not necessarily preclude regulatory standard-setting. See, e.g., Currie, Direct Federal Regulation of Stationary Sources under the Clean Air Act, 128 U. Pa. L. Rev. 1389, 1409-17 (1980) (discussing the "adequately demonstrated" requirement of section 111 of the Clean Air Act). Currie notes:

If we apply what we know of the legal standard [adequately demonstrated] to the sulfur-oxide situation as it stood in 1969, we find the record quite weak. FGD [Flue Gas DeSulphurization] technology had been put to substantial actual use in Britain, but the British data revealed troublesome bugs that deserved further study. Moreover, the British technology was obsolete, while the only reported test of new technology had been run on a tiny fraction of the boiler's exhaust gas. In terms of immediate application the new technology was barely beyond the "experimental" stage that the House Report said was insufficient. The prudent Administrator would probably have concluded that an installation requirement should await the results of the three promising purchases of new technology, and should probably have held that the technology was not yet "adequately demonstrated."

The 1971 record presented a closer question. Two full-scale units were now in more or less successful operation, and the EPA was optimistic that an alternative technology might be successfully transferred from oil to coal. Yet hindsight provides a sobering note: the full-scale prototypes soon proved to be lemons after all. To prevent such risky investments the National Academy of Sciences has developed a rule of thumb for determining when power-plant technology is "commercially available:" it must be in successful operation for one year on a plant of at least 100 megawatts. If "adequately demonstrated" had been equated with this standard, the EPA could not have required FGD in 1971.

Plainly it was not for the court of appeals in Essex Chemical to impose any such inflexible limit on the Agency's judgment, and the court was probably right in deferring to the EPA's determination because of the limitations on judicial review. On such a record the finding that the technology was "adequately demonstrated" could hardly be said to be "arbitrary" or "capricious." Whether the Agency's finding was correct or not, however, is quite another story.

Id. at 1413-14.

adequate financial assistance can be obtained to justify construction of
a synthetic fuel project. Unfortunately, the Energy Security Act gives
no significant attention to the regulatory permits and approvals which a
synthetic fuel project must obtain. The synthetic fuel project's viability,
as measured by the adequacy of financial assistance made available,
will be directly influenced by regulatory risk. This risk, however,
is completely ignored by the Energy Security Act. Uncertainties cre-
ated by legislation and regulatory policies will not only affect project
sponsors but also the financial commitments made by the SFC. The
wisdom of allowing the SFC to have a say in regulatory policy is per-
haps debatable. It is nonetheless unfortunate that the viability of the
project will be subject to uncontrolled variables in the form of non-
quantified regulatory risks that affect not only the solvency of the pro-
ject but also a substantial federal financial commitment. Since actual
project costs have recently proved to exceed significantly "initial pro-
ject cost" estimates, this problem of uncontrolled risk must be tamed
if the SFC is to succeed in its stated mission of assisting the private
sector to achieve a synthetic fuel production capacity.

B. Common Agency Decisions Attendant with the Construction and
Operation of a Synthetic Fuel Project

It is impossible to delineate the multitude of permits and approvals
that a synthetic fuel project would have to obtain to achieve opera-
tional status. The particular type of agency decision or action required

126. Attention to the problem of regulatory requirements is mentioned only twice in the En-
ergy Security Act, supra note 15, 42 U.S.C.A. § 8743(a) (West Supp. 1980) provides that Corpora-
tion construction projects "shall be subject to all Federal and non-discriminatory State and local
environmental, land use, and siting laws to the same extent as such laws apply to privately spon-
sored synthetic fuel projects . . . ." Section 8778 provides that nothing in title I of the Energy
Security Act affects, or is intended to affect, substantive rights or procedural requirements attend-
ant with water rights administered by the states. The reason for this lack of attention lies in the
assumption by the Act's sponsors that the companion Energy Mobilization Board proposal, which
did address the question of energy project permits and approvals, would be enacted at the same
time as the Energy Security Act. See id. § 8775(i).

127. Giving the SFC authority to impose controls upon agency action associated with a syn-
thetic fuel plant raises the prospect that the SFC would be influenced in the exercise of its regula-
tory controls by the existence of its committed or intended commitment of financial assistance to
the synthetic fuel project. But to dissociate the SFC from agency action is to place at risk substi-
 tual sums of money guaranteed by the federal government. The irony here is that the risk results
from action taken by other arms of the federal government. Some coherence and consistency in
approach by the federal government is clearly desirable. It is just as clear that it is undesirable
that the same entity should be disbursing financial assistance and controlling agency action.

128. See note 54 supra.

SYNTHETIC FUELS

involving a synthetic fuel project can include permits, licenses, approval of leases, certificates, rights-of-way, and approvals of financial assistance, rates, rulings or decisions authorized, required, or issued by any agency involved with the project. Some agency requirements depend on the particular geographic site of the synthetic fuel project. Other requirements depend on the type of technology involved. For example, oil shale projects raise some concerns different from those involving coal-based technologies. Similarly, a facility designed to produce a raw feedstock, such as kerogen from oil shale, has problems different from a facility designed as an integrated mineral chemical complex, such as is often envisioned for synthetic natural gas projects. Nevertheless, it is possible to describe these general approval requirements (agency action) that would affect most synthetic fuel projects. Indeed, any lapse is on the side of under-inclusion—a synthetic fuel project may face greater regulatory hurdles than outlined here but it is unlikely to face fewer.

Agency action falls into three generic categories: (1) project preparation; (2) project construction; and (3) project operation. Consideration of each category is not, however, serial. One cannot totally defer until the project is ready to enter the operational stage the obtaining of operational permits and approvals. The categories are not defined by the time of consideration so much as by the function which the permit or approval controls. Overlaps are always present, if for no other reason than a financial commitment to build a project cannot be undertaken unless there is some assurance that it can be operated. Yet,

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130. Although both oil shale and coal based technologies raise similar generic concerns, see note 8 supra, they involve widely different technologies and consequently give rise to problems which are unique to each process. Particular problems associated with oil shale are discussed in COMPENDIUM REPORTS, supra note 4, at 93-179. Particular problems associated with coal gasification are discussed in OFFICE OF TECH. ASSESSMENT, THE DIRECT USE OF COAL—PROSPECTS AND PROBLEMS OF PRODUCTION AND COMBUSTION 53-104 (1979). See generally Allain, Environmental Implications of a Synthetic Fuel Industry, 4 HARV. ENVIRON. L. REV. 391 (1980).

131. An integrated synthetic fuel power/chemical complex has been proposed by Ebasco Services, Inc. It would consist of a gasification plant which used lignite as a feedstock. Heat from the gasification process would be converted in an adjacent generating station into electricity. The synthetic gas produced during the gasification process would be put to a variety of uses, including pipeline sales and methanol and ammonia manufacturing. See CHEMICAL ENGINEERING PROGRESS, 47-54 (March, 1980). In addition to the need to undertake a thorough economic analysis, a complete identification of "federal permits, licenses and entitlements which must be obtained" in connection with a project is required to comply with the Council of Environmental Quality’s regulations regarding the drafting of EIS’ by federal agencies. 40 C.F.R. § 1502.25(b) (1980).

Issuance of the construction permit [for the nuclear reactor] is the crucial stage for safety
clear lines of difference in function do exist and help to define the nature and type of regulatory risk.

1. Project Preparation
   a. Environmental Impacts

   Probably the most significant preparatory requirement is the obligation to prepare an environmental impact statement (EIS). Although the SFC is not required to prepare an EIS as part of its decision to extend financial assistance, this exemption does not extend to the project itself. Consequently, when any federal agency's involvement in a synthetic fuel project, aside from the providing of financial assistance by the SFC, amounts to "major federal action," an EIS will have to be prepared. Since major synthetic fuel projects will involve significant federal agency action, there is no question but that a project EIS would be necessary.

   and environmental considerations. Issuance of the permit signifies AEC's satisfaction that the reactor can be operated at the specified location in accordance with the law and with adequate safety. It also means that a tremendous investment will be made in construction in the expectation that an operating license will be issued when construction has been completed. Moreover, it is during consideration of the construction permit that environmental issues may most effectively be raised by the public. It is useful, therefore, to consider the licensing process, at this stage, in some detail.

   The Atomic Energy Act specifically established a two-step licensing process for nuclear power plants, an uncommon requirement for synthetic fuel projects. Nonetheless, the economic considerations recounted by Green and Fridkis create the equivalent of a two-step process for synthetic fuel projects. Economic necessity requires that essential agency action be completed, where possible, during the preconstruction period.


   National Environmental Policy Act: Section 175(b) provides that no action of the Corporation, except for the construction and operation of Corporation construction projects, shall be deemed to be a "major Federal action significantly affecting the quality of the human environment" for the purposes of National Environmental Policy Act.

   With respect to Corporation construction projects, the Corporation shall be deemed to be a Federal agency for the purposes of NEPA. The Corporation itself would be required to prepare an environmental impact statement for a Corporation construction project. The Corporation also, as a Federal agency for such project, shall be subject to the Council on Environmental Quality guidelines and could request the Council on Environmental Quality to designate it or another agency as the lead agency in order to expedite the preparation of an environmental impact statement at the earliest possible time.

   CONFERENCE REPORT, supra note 43 at 234. This NEPA exemption does not apply to the "fast start" program under the Nonnuclear Act. See 10 C.F.R. § 796.10 (1980).

   134. See generally W. RODGERS, HANDBOOK ON ENVIRONMENTAL LAW § 7.6 (1977). Moreover, state EIS requirements, id. § 7.11, are not affected by the Energy Security Act.

   135. Federal agency action may be implicated because the synthetic fuel project involves the use of federal land, see Natural Resource Defense Council, Inc. v. Morton, 458 F.2d 827 (D.C. Cir. 1972); or requires necessary permits, licenses, or rights-of-way issued by a federal agency.
b. Land Use Controls

Synthetic fuel projects, wherever located, must comply with applicable land use controls. These controls will be generally more extensive where the project site is privately rather than federally owned. This is because the Mineral Leasing Act of 1920 provided that nothing in its provision was designed to preempt state authority to regulate federal lands.\textsuperscript{136} This compliment to state authority does not, however, extend to land use ordinances enacted by political subdivisions of the states.\textsuperscript{137} Nonetheless, where privately held land is subject to local land use ordinances, so are federal lands, to the extent that the local ordinance presents "no significant threat to any identifiable federal policy or interest."\textsuperscript{138} Care must also be taken to insure that this general arrangement of respective sovereign authority has not been altered by cooperative agreements between state and federal authorities\textsuperscript{139} or by

\textit{See} W. RODGERS, HANDBOOK ON ENVIRONMENTAL LAW, § 7.6, at 762 (1977). The requirement for a project EIS may be avoided where the project is adequately covered by a generic EIS. \textit{See} Environmental Defense Fund, Inc. v. Andrus, 619 F.2d 1368 (10th Cir. 1980).


\textsuperscript{138} These local ordinances may have a most significant effect upon major energy projects where local government seeks to ameliorate the socio-economic impacts (boomb town syndrome) resulting from the location of mammoth energy projects in sparsely populated, rural areas. The effect of local government upon energy project construction was recently exhibited in Garfield County, Colorado. \textit{See} SynFuels 9, (McGraw-Hill, January 23, 1981) (reporting that Garfield County Commissioners granted four special use permits for Union Oil's shale oil complex near Parachute, Colorado, after Union agreed to advance more than $2 million in grants and loans to the town, a school district and the county sheriff's office).

\textsuperscript{139} Cooperative agreements between federal and nonfederal agencies are becoming increasingly popular as means of achieving a meaningful cooperative attitude between cosovereigns. An example of state-federal cooperation is the cooperative agreement between the state of Wyoming and the Department of the Interior regarding departmental adoption and implementation of coal mining operation regulations under the Coal Leasing Amendments Act, 30 U.S.C. §§ 181-209 (1976 & Supp. III 1979) and Wyoming's desire to reclaim land within its boundaries. \textit{See} 42 Fed. Reg. 3742 (1977). Cooperative agreements have also been entered into by the Department of the Interior and the states of New Mexico, 42 Fed. Reg. 18,065 (1977); North Dakota, 42 Fed. Reg. 18,071 (1977); Utah, 42 Fed. Reg. 18,068 (1977); and Montana, 42 Fed. Reg. 18,862 (1977). The cooperative agreements set forth above are in the process of being revised, pursuant to the Surface Mining Control and Reclamation Act, 30 U.S.C. § 1273(c) (Supp. III 1979). Final rules, which became effective June 11, 1979, regarding such cooperative agreements (30 C.F.R. § 211.77 (1979)), have been jointly approved by the Department of the Interior (Office of Surface Mining Reclamation and Enforcement and the Geological Survey) and the State of Wyoming. 44 Fed. Reg. 33,655 (1979). Proposed rules following the above agreements can be found in 44 Fed. Reg. 54,493 (1979) concerning a proposed cooperative agreement between the Interior Department and the state of North Dakota. While the Energy Security Act does not specifically call for cooperator-
specific congressional legislation.  

c. Title to Lands Involved in Synthetic Fuel Production

There is presently some confusion over the ownership of substantial tracts of rich mineral fuel resource lands in the West, notably lands containing oil shale. This confusion has been generated by the Supreme Court decision in Andrus v. Shell Oil Co. In Andrus the Court held that "oil shale" was a "valuable mineral deposit" which was patentable under the savings clause of the Mineral Leasing Act of 1920. While the Mineral Leasing Act had operated to withdraw oil shale lands from private entry under the Mining Law of 1872, the savings clause of the Act preserved rights which had vested prior to its enactment. Although the Court had held elsewhere that the question whether a "valuable mineral deposit" had been discovered could be properly determined by reference to a "marketability" test, the Court

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140. See Kleppe v. New Mexico, 426 U.S. 529, 534 (1976); cf. Ventura County v. Gulf Oil Co., 601 F.2d 1080 (9th Cir. 1979), aff'd, 444 U.S. 1010 (1980).
141. 48 U.S.L.W. 4603 (1980).
143. 48 U.S.L.W. at 4604.
144. Id.
145. Id. at 4604 n.4:

In Chrisman v. Miller, 197 U.S. 313 (1950), this Court approved the Department of Interior's "prudent-man test" under which discovery of a "valuable mineral deposit" requires proof of a deposit of such character that "a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine." Castle v. Womble, 19 L.D. 455, 457 (1894). Accord, Best v. Humboldt Placer Mining Co., 371 U.S. 334, 335-63 (1962); Cameron v. United States, 252 U.S. 450, 459 (1920). In United States v. Coleman, 390 U.S. 599 (1968), the Court approved the Department's marketability test—whether a mineral can
declined to use, or allow the use of, the marketability test in *Andrus*. The Court based its decision upon a finding that the "legislative history of the Mineral Leasing Act of 1920 shows that Congress did not consider 'present marketability' a prerequisite to the patentability of oil shale." Thus, the fact that oil shale could not be marketed at a profit when entry was made, was not dispositive. Nothing in *Andrus* excuses the claimant from complying with other requirements attendant with entry, such as assessment work, for which lack of compliance may allow the government to cancel the claim.

The result is that a cloud over title exists on substantial tracts of oil shale lands in the West. Until these claims are resolved, project sponsors will be understandably hesitant to consider those lands for synthetic fuel projects. Indeed, since the SFC is on a tight schedule for disbursement of financial assistance, it is altogether probable that any tracts of land embroiled in title disputes will be ignored for purposes of synthetic fuel development through SFC financial assistance.

d. Project Site Selection

Potentially valuable tracts of land for synthetic fuel projects are not all equally accessible to development. Numerous statutes exist to be "extracted, removed and marketed at a profit"—deeming it a logical complement of the prudent-man standard.

*Id.*

146. *Id.* at 4605.
147. *Id.* at 4606.
149. *Id.* at 57-58.

150. *Cf.* Champlin Refining Co. v. Aladdin Petro Corp., 205 Okla. 524, 238 P.2d 827 (1951) (where title from sovereign fails, occupier of property is liable in trespass to rightful owner). See generally 1 H. WILLS AND C. MEYERS, OIL AND GAS LAW §§ 225-229 (1978). Under the Federal Land Policy and Management Act of 1976, 43 U.S.C.A. §§ 1701-1782 (West Supp. 1980), owners of unpatented lode or placer mining claims located prior to October 21, 1976 are required to file a notice of intention to hold the mining claim, *id.* § 1744(a), and a copy of the official record of the notice of location or certificate of location, including a description of the location of the claimed lands on the ground. *Id.* § 1744(b). The failure to file the required instruments is statutorily deemed to be conclusive evidence of abandonment of the claim. *Id.* at § 1744(c). In Topaz Beryllium Co. v. United States, 479 F. Supp. 309 (D. Utah 1979), regulations promulgated by the Secretary of Interior to carry out the filing provisions of § 1744 were upheld and the government was held to be entitled to institute contest actions, 43 C.F.R. § 4.451-1 (1978), based exclusively upon its own records in determining to whom notice must be given. 479 F. Supp. at 312-13. The right of the government to impose these additional filing requirements is established by Cameron v. United States, 252 U.S. 450, 460 (1920) and Boesche v. Udall, 373 U.S. 472, 476-78 (1963). *See also* Andrus v. Allard, 444 U.S. 51, 64-68 (1980).

151. *See* note 49 *supra.*
which place constraints upon the use of particular sites for synthetic fuel projects.

The Historic Sites, Buildings and Antiquities Act of 1935\(^{152}\) requires that federal lands destined for commercial development must be surveyed to determine the threat to historical, scientific, or archaeological materials.\(^{153}\) If any such materials are found, alternatives must be considered to avoid irreparable losses.\(^{154}\)

The Endangered Species Act of 1973\(^{155}\) provides that it must be insured that a project "authorized, funded or carried out" by a federal instrumentality, department or agency "is not likely to jeopardize the continued existence" of any endangered species or their habitats.\(^{156}\) Species may be listed as "endangered" by the Secretary of the Interior\(^{157}\) or by the state in which the project is located.\(^{158}\) Species may be exempted from the requirements of the Act by the Endangered Species Committee.\(^{159}\)

The bald and golden eagles are provided specific statutory protection\(^{160}\) as are migratory birds in general.\(^{161}\) Care must be taken to in-
sure that the synthetic fuel project does not adversely affect the birds, their nests, or migrations.

Wilderness areas\textsuperscript{162} are generally open to resource development or recovery operations, although such activities are strictly regulated and controlled.\textsuperscript{163} Wild and scenic rivers\textsuperscript{164} are largely foreclosed to resource development or recovery operations which interfere with their pristine and natural quality.\textsuperscript{165}

Where mining activities are to be carried on in connection with a specific synthetic fuel project,\textsuperscript{166} the Surface Mining Control and Reclamation Act must be considered.\textsuperscript{167} At the present time regulations under this Act apply to coal mining,\textsuperscript{168} but legislation to bring non-coal minerals under similar controls is likely to be proposed.\textsuperscript{169} The approving agency is the Office of Surface Mining of the Department of the Interior.\textsuperscript{170}

Although the Surface Mining Control and Reclamation Act is not

\textsuperscript{162} Wilderness areas are designed pursuant to the Wilderness Act, 16 U.S.C. § 1131-1136 (1976). Designated wilderness areas are set forth at 16 U.S.C. § 1132. Wilderness areas must be designated as such by Congress. Id. § 1131(a).

\textsuperscript{163} Id. § 1133.

\textsuperscript{164} Wild and scenic rivers are designated pursuant to the Wild and Scenic Rivers Act, 16 U.S.C. §§ 1271-1287 (1976). Rivers may be designed as wild and scenic: (1) by act of congress or (2) after designation by the legislature of the state or states through which the rivers flow, or, upon application by the governor of the state or governors of the states through which the rivers flow, by the Secretary of the Interior. 16 U.S.C. § 1273 (1976). The Act distinguishes between designated rivers, 16 U.S.C. § 1274 (1976), and rivers constituting potential additions to the national wild and scenic river system, 16 U.S.C. § 1276 (1976).

\textsuperscript{165} Id. § 1278.

\textsuperscript{166} This will be common since it would prove uneconomical to transport the mineral fuel resource any significant distance prior to its conversion to a synthetic fuel. Even after the mineral fuel resource has been converted to a transportable fuel, significant economic problems remain. See U.S. Envt'l Protection Agency, Energy from the West—Policy Analysis Report, Interagency Energy/Environment R & D Program Report 610-85 (1979) [hereinafter cited as Policy Analysis Report].


\textsuperscript{168} Id. §§ 1201-1202, 1251-1279. The regulations are found at 30 C.F.R., §§ 700.1-890.23 (1979).

\textsuperscript{169} Statutory authority for designating certain lands as unsuitable for non-coal mining is contained in § 601 of the Surface Mining Control and Reclamation Act, 30 U.S.C. § 1281 (Supp. III 1976). The authority is, however, limited to areas where non-coal mining would adversely affect lands used primarily for residential or related purposes. Id. § 1281(b). Senator Hart (Colorado) introduced a measure which would have extended protections similar to those found in the Surface Mining Control and Reclamation Act to oil shale development. S. 859, 96th Cong., 2d Sess. (1980). The measure, however, was not reported out of committee.

directly applicable to oil shale development, such projects on federal land remain subject to extensive reclamation controls at both the federal171 and state level.172

e. Site Evaluation

Before any decision to proceed with a synthetic fuel project can be undertaken, the site must be extensively surveyed and explored if any type of on-site or nearby mining for feedstock is anticipated. Access to federal lands, which comprise the public domain, for mineral exploration and evaluation is subject to permit issues by the United States Geological Survey Service of the Department of the Interior.173 The Geological Survey will require that detailed exploration and mining plans be prepared and submitted along with annual operations reports.174 Similar requirements are involved if the project site is on land administered by the Forest Service.175 The methods of exploration used will be subject to regulatory control where the exploratory activity occurs in the national forests176 or the public domain.177 Care must

171. Oil shale leases are obtained pursuant to 30 U.S.C. § 241 (1976) which provides, "[Oil Shale] Leases may be for indeterminate periods, upon such conditions as may be imposed by the Secretary of the Interior, including covenants relative to methods of mining, prevention of waste, and productive development." Id. Pursuant to this provision, oil shale leases are subject to the general provisions governing surface exploration, mining, and reclamation set forth in 43 C.F.R. § 23.1-.13 (1980). A permit and bond, "sufficient to satisfy the reclamation requirements of an approved exploration or mining plan," are required. Id. § 23.9. The Mineral Leasing Act also imposes reclamation controls upon any project on federal lands which requires pipeline rights-of-way where that project may have "a significant impact on the environment." 30 U.S.C. § 185(h) (1976). The project sponsor must satisfy reclamation requirements which include the "restoration, revegetation, and curtailment of erosion of the surface land," associated with the pipeline construction. Id.

Examples of the Department of Interior's attitudes toward oil shale development on federal land can be found in the lease stipulations required under the Federal Prototype Oil Shale Leasing Program. See ENERGY FROM THE WEST III, supra note 8, at 140 (leases require the lessee to "backfill and/or reclaim excavated material and processed shale and compact it thoroughly; design slope faces of waste piles to insure slope stability; revegetate slope faces and other areas in accordance with the rehabilitation plan; and comply with numerous requirements for the restoration of the disturbed land.").

172. See, e.g., Colorado Mined Land Reclamation Act, COLO. REV. STAT. §§ 34-32-101 (Cum. Supp. 1979) which specifically applies to oil shale mining. The Act is administered by the Colorado Land Reclamation Board. A permit and bond is required. Id. at §§ 34-32-103(F); 34-32-110.

173. 43 C.F.R. § 23.3 (1980).

174. Id. § 23.8.

175. The Secretary of Agriculture has authority under 16 U.S.C. §§ 478, 551 (1976) to promulgate regulations concerning the methods of prospecting and mining in national forests. Regulations implementing this statutory authority are found at 36 C.F.R. § 252.1-15 (1980).

176. 36 C.F.R. §§ 252.4(a) (1978) (requiring the submission and approval of a "plan of operation" with respect to mining activity "which might cause disturbance of surface resources").

177. 43 C.F.R. § 23.4 (1980) ("No person shall, in any manner or by any means which will
also be taken that state requirements and any cooperative agreements entered into between state and federal authorities be examined to determine all limitations upon exploratory activity.\textsuperscript{178}

2. Project Construction

The synthetic fuel project includes not only the plant facility for obtaining the synthetic fuel but also all related facilities, such as mines, disposal sites, access roads, on-site transmission facilities, refineries, and on-site end users of the synthetic fuel feedstock.\textsuperscript{179} Thus, the scope of activities considered under this generic topic ranges from actual site preparation to complete erection of the synthetic fuel project.

a. Site Preparation

Certain permits and approvals that will have to be obtained if the synthetic fuel project is to be located on federal land find their statutory basis in the Federal Land Policy and Management Act of 1976 (FLPMA).\textsuperscript{180} Under the FLPMA, permits and approvals for a variety of activities involving the use of federal lands\textsuperscript{181} must be obtained before the activity is undertaken. Such activities include: rights-of-way for tunnels, canals, and roads;\textsuperscript{182} communications;\textsuperscript{183} pipelines for the

cause the surface of lands to be disturbed, explore, test, or prospect for minerals (other than oil and gas) subject to disposition under the mineral leasing acts . . . without first filing an application for, and obtaining, a permit, lease or contract which authorizes such exploring, testing, or prospecting.\textsuperscript{177}; id. § 23.7 (requiring the submission by the operator of an exploration plan with the mining supervisor before the operator commences any surface disturbing operations to explore, test, or prospect for minerals covered by the mineral leasing act). \textit{See also} 43 C.F.R. § 3510.0-3 to 1-2 (1979) (prospecting permits).

178. \textit{See} 30 C.F.R. § 745.1-16 (1980) (setting forth guidelines for state-federal cooperative agreements under the Surface Mining Control and Reclamation Act of 1978). There is presently no statutory authority for state-federal cooperative agreements with respect to oil shale development, although Senator Hart's measure, see note 169 \textit{supra}, would correct this deficiency. To date, oil shale development has proceeded almost totally under federal control only. \textit{See} \textit{OFFICE OF TECH. ASSESSMENT, AN ASSESSMENT OF OIL SHALE TECHNOLOGIES, VOLUME II: A HISTORY AND ANALYSIS OF THE FEDERAL PROTOTYPE OIL SHALE LEASING PROGRAM} (1980) [hereinafter cited as \textit{HISTORY OF OIL SHALE LEASING PROGRAM}].

179. \textit{See} note 131 \textit{supra}.


181. The FLPMA is limited to public lands as that term is defined in the Act:

The term "public lands" means any land and interest in land owned by the United States within the several States and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except—

(1) lands located on the Outer Continental Shelf; and

(2) lands held for the benefit of Indians, Aleuts, and Eskimos.

\textit{Id.} § 1702(e).

182. \textit{Id.} § 1761(a)(6); 43 C.F.R. §§ 2821.0-3 to 1821.6-2, 2822.0-3 to 2822.2-2 (1979).
transportation of liquids and gases other than water, oil, natural gas, synthetic fuel, or gaseous fuel, or product refined therefrom;\textsuperscript{184} power transmission;\textsuperscript{185} and impoundment of water.\textsuperscript{186} Approvals for the clearance, removal and hauling of timber minerals,\textsuperscript{187} and special use permits for temporary facilities, such as sanitary facilities,\textsuperscript{188} will have to be obtained in connection with any synthetic fuel project. In addition, permits will have to be acquired from the regulatory agency with statutory authority over that portion of the project for which the right-of-way is needed.\textsuperscript{189} Generally, agencies with substantive decision-making functions over the facilities for which the right-of-way is sought will automatically issue the necessary permits, licenses, and approvals.

Any equipment used to prepare the site must meet design and operation standards set by the Department of Labor under authority provided by the Occupational Safety and Health Act.\textsuperscript{190}

Under the Antiquities Act of 1906,\textsuperscript{191} any archaeological items discovered during exploration of the project site will require a permit to allow the items to be studied and removed.\textsuperscript{192} Activities at the project site may be impeded or even halted while the discovery is inventoried and studied.\textsuperscript{193}

\textsuperscript{186} 43 U.S.C. § 1761(a)(1) (1976); 43 C.F.R. §§ 1871.0-3 to .1, 2872.0-3 to .6, 2873.0-3 to .1 (1979).
\textsuperscript{188} 43 C.F.R. §§ 2920.0-2 to .7, 2921.0-6 to .4, 2922.0-7 to .1, 2923.1 to .4-2 (1979).
\textsuperscript{189} For example, the Federal Aviation Administration requires that notice be provided to the agency prior to the construction of tall structures such as emission stacks or communication towers. 14 C.F.R. § 77.11-19 (1980). Similarly, the Federal Communication System requires that a license be obtained for a radio communication system. 47 C.F.R. § 1.511-.615 (1979).
\textsuperscript{190} 29 U.S.C. §§ 651-678 (1976).
\textsuperscript{191} 16 U.S.C. §§ 431-433 (1974); see note 154 supra.
\textsuperscript{192} 43 C.F.R. § 3.1-.17 (1980). Permits for the examination of ruins, the excavation of archaeological sites, and the gathering of objects of antiquities on Indian tribal lands are obtained under 25 C.F.R. § 132.1-9 (1980).
\textsuperscript{193} Cf. Cappaert v. United States, 426 U.S. 128 (1976) (affirming injunction which curtailed pumping of water from hydrological formation to extend pumping reduced water level of formation necessary to protect the formation's scientific value as natural habitat of pupfish); WATCH (Waterbury Action To Conserve Our Heritage, Inc.) v. Harris, 603 F.2d 310 (2d. Cir. 1979) (requiring HUD to assume a continuing responsibility of compliance with environmental objectives expressed in NEPA and articulated in congressional legislation designed to encourage historic preservation); Warm Springs Dam Task Force v. Gribble, 378 F. Supp. 240, 251 (N.D. Cal. 1974) (failure of Army Corps of Engineers to complete further procedures pursuant to § 2(b) of Executive Order 11,593, implementing National Registration of Historic Places Act, 16 U.S.C. § 470,
Under the Mine Safety and Health Act (MSHA), all mining activities associated with the project must meet MSHA standards. An approved mine safety and health plan must be in place. Opening and closing of mines require formal notification to the Mine Safety and Health Administration.

Site preparation may raise problems under the Clean Air Act through the creation of emissions generated by operations and equipment brought into the area. To the extent either event results in the

restricts Corps from disturbing known or suspected archeological sites within the particular archeological district).

194. 30 U.S.C.A. §§ 801-960 (1971). The coverage of MSHA is quite broad. Id. §§ 802(h), 803 (West Supp. 1980). In addition, many areas of concern under MSHA are also subject to standards established by OSHA. Because of the overlapping coverage, an interagency agreement was executed between OSHA and MSHA on March 29, 1979. The agreement provided that MSHA would have primary responsibility with respect to unsafe and unhealthful working conditions on minesites and in milling operations. Where MSHA did not apply or where no MSHA regulations existed for particular working conditions, OSHA would apply. A process was developed for resolving uncertainties about jurisdiction. See Oil Shale Technologies, supra note 5, at 325.


196. Approved plans are required for a variety of mining activities. See, e.g., 30 C.F.R. § 75.200-2 (roof control plans), § 75.316 (ventilation system and methane and dust control plan), § 75.517-2 (insulation of existing bare wires and cables plan) (1980). Plans are filed with the District Manager of the Coal Mine Safety District in which the mine is located. The above requirements apply specifically to underground coal mines. Mine safety and health standards have not, as yet, been specifically promulgated for oil shale mines. When such regulations are promulgated, it is likely that they will substantially follow existing mine health and safety standards applicable to surface and underground coal mines. 30 C.F.R. §§ 70.1-77.1916 (1980). At present, oil shale mining is regulated under provisions of the MSHA dealing with Metal and Nonmetallic Mine Safety. 30 C.F.R. §§ 55.1-26, 57.1-26.

An example of some of the difficulties presented by MSHA to oil shale mining is shown by the treatment of underground fires which are generally prohibited. 30 C.F.R. § 57.4 (1980). Oil shale operators using in situ retorting have therefore had to negotiate a special modification agreement before each burn. These agreements typically require: (1) twice the normal mine ventilation; (2) constant monitoring of carbon monoxide, methane, hydrogen sulfide, and oxygen; (3) that retort chambers be maintained below ambient pressure during the burn; (4) compressed air life-support refuges be located throughout the mine; (5) instant-on backup power supplies; and, (6) retort gases to be monitored. Regulations promulgated by the Geological Survey which govern general development, mining, and processing of natural resources on federal land would also be applicable to the above-ground retort and modified in-situ methods of oil shale recovery. 30 C.F.R. § 231.1(a) (1980). Under this authority the operator of an oil shale project, before conducting any operations, must submit for approval a mining plan which must show in detail, among others, measures taken to prevent hazards to public health and safety. Id. § 231.10(7). Indeed, the mining supervisor, id. § 231.2(c), is specifically directed to insure that sanitary, welfare, health, and safety arrangements are consistent with regulations under MSHA governing metal and nonmetal mines. Id. § 231.25.


199. Many areas in which synthetic fuel industries will be located have background pollution levels which at times exceed current ambient air quality standards. See Oil Shale Technologies,
violation of air quality standards, it may be necessary for the project to engage in expensive emission controls. These controls may, in turn, require additional permits as, for example, where water is diverted to reduce fugitive dust. Similarly, site preparation activities may result in discharges into water courses or groundwater aquifers which necessitate the acquisition of another permit.

b. Plant Construction

The actual construction of the synthetic fuel plant and its related facilities involves a plethora of statutory requirements administered by regulatory agencies. The Noise Control Act and the Quiet Communities Act prescribe noise standards that will be applicable to the synthetic fuel project. The Noise Control Act requires that equipment, such as air compressors and transportation devices, meets statutory and regulatory standards of quietness. Under the Quiet Communities Act, mining and mine processing facilities may be required to meet ambient noise

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This section provides that nothing in this part shall affect the jurisdiction of States or the Federal government over water, affect any interstate compact, or confer on any non-Federal entity the ability to exercise any Federal right to water. No project constructed pursuant to the authorities of the part shall be considered to be a Federal project for purposes of the application for or an assignment of water rights.

CONFERENCE REPORT, supra note 43, at 227. The language of § 178 and the Conference Report evidence that synthetic fuel projects are subject to state substantive and procedural requirements attendant with the acquisition of water rights.

201. No discharge of any pollutant from a point source is permitted without the prior obtaining of a National Pollutant Discharge Elimination Standard (NPDES) permit. In Colorado, where the major focus of synthetic fuel development is expected, the NPDES permit is administered by the State Water Quality Control Commission. COLO. REV. STAT. § 25-8-201 (1973). Use or disruption of underground waters or aquifers is covered both by federal law, see Rivers and Harbors Act of 1899, § 15, 33 U.S.C. § 407 (1976) (albeit to a limited extent, see W. RODGERS, HANDBOOK ON ENVIRONMENTAL LAW § 4.5 (1977)), and the Safe Drinking Water Act of 1974, 42 U.S.C. § 300f, and by state law, see Colorado Groundwater Management Act, COLO. REV. STAT. §§ 37-90-101 (1973). The disruption of underground aquifers is of particular importance in the field of synthetic fuel development, see SYNTHETIC FUELS DEVELOPMENT-EARTH-SCIENCE CONSIDERATIONS, U.S. DEPARTMENT OF INTERIOR/GEOLICAL SURVEY 14 (1979), because a disruption of certain types of drinking water aquifers can lead to the withdrawal of federal assistance for a project which causes the disruption. 42 U.S.C. §§ 300(h)-3(e) (1976).


standards set for site boundaries.\textsuperscript{205}

To the extent any activities duplicate those carried on during the pre-construction phase, permits and approvals obtained and regulatory standards complied with must be maintained.\textsuperscript{206} All permit and approval applications and compliances with regulatory standards should take into consideration all stages of the construction process for which the same type of permit or approval or regulatory standard may be applicable.\textsuperscript{207}

3. Project Operation

Synthetic fuel projects will face significant environmental constraints which will affect project operations. In addition, many of the statutory and accompanying regulatory programs applicable at earlier stages of the synthetic fuel project, such as OSHA, MSHA, and FLPMA, are carried over to the project operation stage.

The synthetic fuel project will engage almost all of the significant environmental legislation enacted by Congress over the last decade. This is because the environmental consequences of a synthetic fuel project are awesome, as can be shown by a review of an oil shale synthetic fuel project.\textsuperscript{208}

Oil shale project operation will cause major disruption of land where mining endeavors to exploit the shale are conducted. The quantities of the overburden, raw shale, and spent shale will vary with mining techniques. Each technique will, however, have potential monumental impacts on the physical environment. If open pit mining is used, great quantities of overburden must be removed, handled and

\textsuperscript{205} 42 U.S.C. § 4913(c) (Supp. II 1979).


\textsuperscript{207} For example, a federal license is required as a condition to dealing with explosives. This license is administered by the Bureau of Alcohol, Tobacco & Firearms of the Treasury Department. 27 C.F.R. § 181.1–200 (1980). The transport of the explosives to the mine site requires the approval of the Department of Transportation. See 49 C.F.R. §§ 171.1–177.861 (1979). Actual use of the explosives must be in accordance with the mining plan. See note 195 supra.

\textsuperscript{208} Oil shale development has received extensive scrutiny with respect to its effect on the environment. For this reason, the discussion in the text is limited to one synthetic fuel technology. The discussion relies extensively upon Oil Shale Technologies, supra note 5. Coal based synthetic fuel technologies raise similar environmental concerns, although significant differences do exist. See Energy from the West I, supra note 8, (summarizing the impact of various synthetic fuel technologies used to exploit the mineral resource.); Senate Committee on Energy and Natural Resources, 96th Cong., 1st Sess., Synthetic Fuels from Coal: Status and Outlook of Coal Gasification and Liquefaction (Committee Print 1979) (evaluating coal based synthetic fuel technologies); See generally, Allain, Environmental Implications of a Synthetic Fuel Industry, 4 Harv. Envt'l L. Rev. 391 (1980).
Problems associated with controlling large volumes of overburden are reduced with underground and in situ mining methods. One study has estimated that a one million barrel per-day industry using above-ground mining would require the processing of six hundred million tons of raw oil shale per year and the disposal of ten billion cubic feet of compacted spent shale. Oil shale mining, like coal mining, will have a significant impact upon the land surface. Numerous uncertainties still exist regarding the adequacy of land restoration and revegetation as well as the strategies to control the leaching of solid waste from spent and raw oil shale. These uncertainties will enhance the prospect of project delay.

Air quality disruption will occur at all stages of oil shale production. Oil shale mining and processing will produce atmospheric emis-

209. OIL SHALE TECHNOLOGIES, supra note 5, at 328. On a more site specific basis it has been estimated that the raw material needs for a project 40,000 bbl/d. operation amount to 73,700 tons of raw shale (averaging 30 gallons of shale oil/ton) per day. The mining and retorting processes will generate about 60,000 tons of spent shale to be disposed of each day. COMPENDIUM REPORTS, supra note 4, at 98.

210. COMPENDIUM REPORTS, supra note 4, at 103, 108; OIL SHALE TECHNOLOGIES, supra note 5, at 239; U.S. ENVTL PROTECTION AGENCY, ENERGY FROM THE WEST, IMPACT ANALYSIS REPORT 2: SITE SPECIFIC AND REGIONAL IMPACT ANALYSES 841-48 (1979) [hereinafter cited as ENERGY FROM THE WEST]. Solid wastes raise issues of particular concern as evidenced by a recent presentation by Dr. David Stephan, Director, Industrial Environmental Research Laboratory, U.S. Environmental Protection Agency:

There are a variety of synfuel-related solid waste problems as well. Both oil shale mining and coal mining produce enormous amounts of solid waste. Many of the mining problems are similar to those encountered with conventional coal mining and can be solved similarly. Surface reclamation techniques for strip mined areas are particularly successful at least where an adequate water budget exists. The solid residues of oil shale retorting and coal conversion are, however, another problem. Shale oil production, for example, produces spent shale that is greater in volume than the shale originally removed from the ground; coal conversion technologies, both gasification and direct liquefaction will produce vast quantities of ash. Each of these wastes will most likely contain a wide variety of potentially harmful components and will have to be properly managed. It has been estimated that a commercial-scale coal gasification plant would produce up to a million tons of coal ash wastes per year and these wastes may contain hazardous trace elements such as arsenic, cadmium, lead and mercury. Some special wastes from synfuel plants such as spent catalyst from coal conversion may be classified a "hazardous" under the Resource Conservation and Recovery Act.

There is also concern about the possible toxicity of liquid synthetic fuels themselves both from the handling and usage standpoints, including concern for both industrial employees and the general public. Coal-derived liquid fuels, particularly those produced by direct liquefaction, are of the most concern. These liquid fuels are not of the same composition as ordinary crude oil products. They are higher in nitrogen content, yielding higher NOx levels upon combustion and they tend to contain more substances which are potentially mutagenic or carcinogenic so that public exposure to them through normal usage might represent a significant health problem. More data are needed, however, on both conventional petroleum products and synthetic fuels in this regard.

D. Stephan, EPA's Approach To Regulating New Energy Technologies (September 28, 1980) (paper presented at the Water Pollution Control Federation Annual Conference) (copy on file with author) [hereinafter cited as New Energy Technologies].
sions, including those pollutants for which NAAQS have been established211 as well as currently unregulated pollutants.212

Emissions of particulate matter and gases will result from blasting to loosen the shale for retorting.213 Atmospheric emissions will be greater where surface mining is used because of the larger quantities of materials that must be handled. Particulates will likely increase due to road dust arising from transportation of the raw material and overburden.214 Emissions will also result from the various retorting technologies used.215 These emissions will be augmented if the waste gases are used in any cogeneration processes or if on-site power generation is contemplated as a part of synthetic fuel projects.216

The processed shale may also create air quality problems. Particu-

211. These include: sulphur dioxide, particulates, carbon monoxide, ozone, lead and nitrogen oxides. Oil Shale Technologies, supra note 5, at 260.
212. These include: silica, sulphur compounds, metals, carbon dioxide, ammonia, trace organic and trace elements. Id.
213. Potentially hazardous substances (silica, salts, mercury, lead) may be released during blasting. Methane may be released from underground gas deposits, and carbon monoxide, nitrogen oxide and hydrocarbons may be emitted by incomplete combustion of fuel oil used for blasting. Id.
214. Id.
215. Id. at 260-61. See New Energy Technologies, supra note 210, at 5.
216. Id. at 261; Compendium Reports, supra note 4, at 162-65.
late emissions from fugitive dust and spent shale handled in disposal contain certain toxic trace metals. Spent shale may release gases, ammonia, and hydrogen sulfide as it is treated after retorting and during handling processes. Particulate problems are most severe for technologies that result in very fine rather than coarse spent shale.

Development and operation of oil shale facilities risk contamination of surface and ground waters from a number of sources, including: point sources, such as cooling water discharges; nonpoint sources, such as runoff, leaching, and erosion; and accidental discharges, such as spills from carriers, pipeline leaks or failures of storage containers. The types of contaminants produced include increased salinity, oil, suspended solids, temperature alteration, and toxic substances. Water quality questions are affected by the unevenness of surface and ground water in active oil shale regions. The problem is aggravated by the presence of two bedrock aquifers in the oil shale region. The two aquifers are separated by a “confining layer of rich oil shale known as the Mahogany Zone.” In general, the upper aquifier contains higher quality water than the lower one. Although some mixing between the aquifers is normal, there is concern that any significant disruption of the confining layer or of the normal flow of subsurface waters would produce undesirable consequences.

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217. COMPENDIUM REPORTS, supra note 4, at 166-67.
218. OIL SHALE TECHNOLOGIES, supra note 5, at 261.
219. Id. at 291.
220. Id.
221. Id.
222. Id. at 295-96. The retort and condensate water produced during the operation of the facility will contain inorganic materials, such as ammonium, carbon dioxide, sodium, magnesium, calcium, bicarbonate and sulfate, see COMPENDIUM REPORTS, supra note 4, at 158-61, as well as numerous trace metals, such as lead, mercury, arsenic, zinc, magnesium, chlorium and vanadium. See also ENERGY FROM THE WEST II, supra note 210, at 836-41.
223. Id. at 297.
224. Id. at 373-74. The Mahogany Zone contains oil shale yielding up to 70 gal./ton, id. at 96, and underlies an area of more than 1,200 mi.li-2 in the Piceance Basin. Id. at 98. There are oil shale formations above and below the Mahogany Zone. Id. at 95-98.
225. Id. at 297.
226. Id. at 373-74.
227. See COMPENDIUM REPORTS, supra note 4, at 93-94. Water quality is generally best close to the source of recharge. Because recharge sites are generally in the mountains, water quality generally decreases as elevation decreases.
228. OIL SHALE TECHNOLOGIES, supra note 5, at 307-08; New Energy Technologies, supra note 210, at 4-5:

Water-related environmental problems from synfuel production may be just as complex. The oil shale industry will need copious water supplies for cooling, compaction of spent shale, and for revegetation of surface mining areas. Coal mining and coal conversion will also have substantial water requirements for process uses and revegeta-
With these various environmental concerns are numerous federal substantive statutory schemes which provide a regulatory framework to control the operation of the synthetic fuel project.

As major, new, stationary sources of pollutants, it would be expected that synthetic fuel projects would be required to comply with New Source Performance Standards (NSPS). This is not so. The lack of existing commercial synthetic fuel plants and the consequent absence of a data base has convinced the EPA not to attempt formulation of NSPS for commercial synthetic fuel projects. Rather, the EPA will join in the creation of “Pollution Control Guidance Documents” (PCGDs) for the synthetic fuel industry. These PCGDs are not le-

229. A stationary source, as defined in 40 C.F.R. § 60.2(d) (1979), is subject to New Source Performance Standards if it contains an affected facility, as defined in 40 C.F.R. § 60.2(e) (1979), the construction or modification of which is commenced after the date of publication of any standard or proposed standard applicable to that facility. 40 C.F.R. § 60.1 (1980). When construction is deemed to have “commenced” is defined at 40 C.F.R. § 60.2 (1980).

230. The EPA was directed to publish a list of categories of stationary sources and issue regulations setting NSPSs for the sources within these categories. Pub. L. No. 95-95, §§ 109(c)(2), 109(c)(3), 91 Stat. 700-701. The 1977 amendments to the Clean Air Act directed the EPA to expedite promulgation of NSPSs for all major stationary sources. 42 U.S.C.A. § 7411(b) (West Supp. 1980). NSPSs have been developed for several facilities, such as fossil fuel fired steam generators, petroleum refineries, and refinery claus sulphur recovery plants.

231. The NSPS established for fossil fuel fired steam generators, petroleum refineries, and refinery claus sulphur recovery plants will likely serve as guidelines regarding appropriate pollution standards developed in the PCGDs for oil shale projects:

Although I shall emphasize in the following discussion, as the Federation has requested, EPA's regulatory approach for new energy technologies, I should also mention the already-established technologies that are being expanded or the new technologies that are very similar to existing ones. For these technologies, we can and will use our conventional regulatory techniques: the promulgation of effluent guidelines, the definition of Best Available Treatment Economically Achievable (BATEA), the issuance of National Pollution Discharge Elimination System (NPDES) permits, etc. in water; the establishment of National Ambient Air Quality Standards (NAAQS) and National Emission Standards for Hazardous Air Pollutants (NESHAPs) and the definition of New Source Performance Standards (NSPS), etc. in air; and the definition of hazardous substances and issuance of disposal facility permits, etc. for hazardous solid wastes. The increase in coal mining, for example, is simply the expansion of an existing industry that
gally binding, although financial assistance will be conditioned on their compliance. The Office of Research and Development is currently drafting PCGDs for three synthetic fuel processes: Low BTU goal gasification, indirect coal gasification, and oil shale. They are expected to be ready in the latter part of 1981. EPA's decision to issue PCGDs in lieu of NSPS for synthetic fuel projects will likely be subject to legal challenge. Since the correctness of the EPA's position is not free from doubt, the resulting uncertainty increases regulatory risk for project sponsors.

Although the EPA will not require the synthetic fuel project to comply with legally binding NSPS, the project will be subject to the Prevention of Significant Deterioration requirements (PSD) of the Clean Air Act.

The PSDs apply to any major source with the potential to emit 100 or more tons per year of any air pollutant. Although the scope of application of the PSD provisions was significantly reduced from the EPA's first attempt to adopt final rules, the current requirements is already regulated by EPA and the Department of the Interior's Office of Surface Mining. The current increase in production of fuel-grade alcohol also utilizes conventional manufacturing processes and there is, therefore, a data base on which to formulate conventional emission standards and effluent limitations.

Regulating new, presently non-existent energy industries, of course, presents different problems from regulating long-standing segments of United States industry. The differences are of such an extent that a unique regulatory approach is demanded. The differences arise primarily from the facts that the new energy industries are, for the most part, not yet commercialized in the United States, have potentially different effluents and emissions from those from existing pollution sources and are being developed on a telescoped time frame under a governmentally-mandated response to "the energy crisis."

There is, unfortunately, little or no existing source of commercial-scale, real process data on which to base a "conventional" regulatory approach at this time. We have, for example, "borrowed" the New Source Performance Standards (NSPS) from the fuel gas portion of a refinery to apply to the similar portion of a synthetic fuels plant. Because of these circumstances, the general approach we are taking is to issue, as preregulatory multi-media guidance, a series of Pollution Control Guidance Documents (PCGDs)—one for each of the major energy technologies. The focal point of each PCGD is to be a set of available control alternatives for each environmental discharge (again, for all media) along with associated performance expectations and the basis for the alternatives presented. The intent is to present guidance for plants of typical size and for each significantly different feedstock likely to be used.

New Energy Technologies, supra note 210, at 2.

232. Id.

233. 42 U.S.C. §§ 1857-1858 (1970), as amended by Clean Air Act Amendments of 1977, Pub. L. No. 95-95, § 108, 91 Stat. 685. These requirements will only affect synthetic fuel projects which result in air quality degradation in the air quality areas in another state. See note 238 infra.


would clearly include a commercial size synthetic fuel project as envisioned under the Energy Security Act. Of critical importance in the determination whether PSD requirements apply is the assessment of the air quality status of the project site.\textsuperscript{237} It is only where the project site is located in a designated clean air area that the PSD requirements apply.\textsuperscript{238} If the project site lies in a nonattainment area,\textsuperscript{239} the nonattainment requirements would apply to project operation.\textsuperscript{240} In either case, it is important to remember that, while the focus of concern is upon project operation, the regulatory requirements insist on a preconstruction permit.\textsuperscript{241}

\textbf{236.} 40 C.F.R. §§ 51.24, 52.21 (1979), as amended, 45 Fed. Reg. 52,729 (1980). Several challenges to the revised PSD standards have been brought and are presently pending before the D.C. Circuit Court of Appeals. \textit{Envir. Rep. (BNA)} October 24, 1980 at 926. Of major importance to synthetic fuel projects are the issues of: fugitive emissions and fugitive dust in determining applicability and increment consumption; and, the coverage of non-criteria pollutants.

\textbf{237.} "Clean air areas" are those air quality control regions designated under § 107(d)(1)(D) and (E) of the Clean Air Act as having ambient air quality better than the applicable national primary or secondary ambient air quality standard, or for which there is insufficient data to make a determination of the air quality. 42 U.S.C.A. §§ 7407(d)(1)(D) and (E) (West Supp. 1980). Under the Clean Air Act and its accompanying regulations, all areas of the country attaining NAAQS are designated as either class 1 or class 2 PSD areas. Class 1 areas are permitted a lower limit of ambient quality degradation, or ambient increment, than class 2 areas. Currently these increments apply only to total suspended particulates (TSP) and sulphur dioxide pollutants.

\textbf{238.} Alabama Power Co. v. Costle, 606 F.2d 1068, 1082-85 (D.C. Cir. 1979). In \textit{Alabama Power}, the court stated that the EPA could apply PSD requirements where the source affected "clean air areas" in other states. The EPA announced that it would not apply PSD review to a pollutant emitted by a source located in an area designated nonattainment for that pollutant, even where the source would impact a "clean air area" in another state. 45 Fed. Reg. 52,712 (1980). A map of air quality designation areas in the oil shale region of Colorado and Utah can be found in \textit{Oil Shale Technologies, supra} note 5, at 268.

\textbf{239.} A nonattainment area is an air quality control region in which the ambient air quality fails to meet the applicable NAAQS. Clean Air Act, § 171(2), 42 U.S.C.A. § 7501(2) (West Supp. 1980).

\textbf{240.} The nonattainment requirements are designed to ensure "reasonable further progress" toward attaining compliance with the NAAQS in nonattainment areas. Clean Air Act § 173(l), 42 U.S.C.A. § 7501(1) (West Supp. 1980). To meet this goal the source must use "lowest achievable emission rate" (LAER) technology and demonstrate that all other sources under his control and within the same state comply with or on schedule to comply with all applicable emission limitations. \textit{Id.} §§ 173(2), (3), 42 U.S.C.A. §§ 750(2), (3) (West Supp. 1980). The nonattainment rules were revised in light of the action taken by the court in Alabama Power Co. v. Costle, 606 F.2d 1068 (D.C. Cir. 1979), and can be found at 45 Fed. Reg. 31,307 (1980).

\textbf{241.} Under the Clean Air Act, each SIP must provide for five types of preconstruction review for each new construction project. These include: (1) compliance with national ambient air quality standards and state air quality standards; (2) compliance with any applicable NSPS; (3) suitability for a nonattainment area; (4) suitability for a nondegradation (PSD) area; and (5) visibility. The two most controversial programs are the PSD and nonattainment programs. The PSD permit cannot be issued unless certain requirements are met. Clean Air Act, § 169(3), 42 U.S.C.A. § 7479(3) (West Supp. 1980). See note 237 supra. In Colorado, the PSD permit is issued and administered by the Air Pollution Control Division, Colorado Department of Health. \textit{Colo. Rev. Stat.} § 25-7-112(4) (1974). The nonattainment permit is governed by the Clean Air Act, §§ 110(a)(2)(I), 172(a)(1), 42 U.S.C.A. §§ 7410(a)(2)(I), 7502(a)(1) (West Supp. 1980). See Hecox &
The synthetic fuel project will place significant demand upon water resources in the project areas. These demands raise permit issues of two types: water availability through acquisition and water quality. Water availability is primarily a question of state law. Although the federal government has extensive rights to water in the West, it has not, as yet, attempted to do so in connection with synthetic fuel projects. State law generally extends permit and approval requirements to the actual acquisition of water rights. These requirements extend to the acquisition and use of surface waters and groundwater. Water quality standards, on the other hand, are substantially the result of federal incentive. The Clean Water Act requires a permit for the discharge of any pollutant into any public waters. This requirement, however, applies only to point source discharges.

Desautels supra note 16, at 9-20 to -23. The national ambient air quality standards pose little problem for oil shale development. See Oil Shale Technologies, supra note 5, at 266. The short term standards for particulates and hydrocarbons are occasionally exceeded due to natural background emissions. The EPA has not, however, treated these background emissions as causing air quality areas to be classified as nonattainment. Air quality problems arising from natural sources would not preclude oil shale development, providing the facilities complied with emission and PSD standards. See History of Oil Shale Leasing Program, supra note 178, at 57.

All synthetic fuel technologies are water intensive. See U.S. Environmental Protection Agency Water Requirements for Steam-Electric Power Generation and Synthetic Fuel Plants in the Western United States (1977); Energy from the West II, supra note 210, at 961-84 (discussing the effect of water requirements upon several river basins in the West.) Estimates of available water for energy development in the West differ widely. Compare Dewsnup, Assembling Water Rights for a New Use: Needed Reforms in the Law, 17 Rocky Mt. Min. L. Inst. 613 (1972) and Kneese & Brown, Water Demands for Energy Development, 8 Nat. Res. Law, 309 (1975) (stating that much of the water in the West, where the synthetic fuel industry would be located, is over-appropriated), with U.S. Dep't of the Interior, United States Geological Survey, Synthetic Fuels Development: Earth-Science Considerations 30 (1979) and General Accounting Office, Water Supply Should Not Be an Obstacle to Meeting Energy Development Goals (1980) (for purposes of synthetic fuel development existing water supplies appear to be adequate). Recently the Colorado Natural Resources Commission held that sufficient Colorado River Basin water would be available to support a proposed coal gasification project as well as an oil shale project. See Annual Review of Significant Developments—1979, 12 Nat. Res. Law, 301 (1980). See also SynFuels 10 (McGraw-Hill, February 27, 1981) (Utah State Water Resources Division finds that no major energy project need be delayed due to issue of water availability).

Water rights are issued and administered, subject to some exceptions by the state. See generally 6 R. Clarke, Waters and Waters Rights ch. 27 (19—).

See Fischer, supra note 21, at 1051-54.


See generally 6 R. Clarke, Waters and Waters Rights § 502 (19- ).

Id. § 501.

2 R. Clarke, supra § 55.6-7.

Underground water quality, although peripherally addressed in the Clean Water Act, was extensively addressed by Congress in the Safe Drinking Water Act. The Act and implementing regulations, however, address actual subsurface emplacement of fluids through well injection which affects underground water quality. Pollution of underground waters from seepage or runoff or from non point sources is addressed by specific substantive statutory schemes.

The Resource Conservation and Recovery Act (RCRA) presents significant regulatory constraints on synthetic fuel projects because they generate wastes which are covered by the Act and its implementing regulations. In connection with "solid waste" generated by the synthetic fuel project not only must a disposal site be located, but an adequate and safe means of disposal must be developed.

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251. Id. § 4.3.
255. See note 254 supra.
256. See Rosbe, RCRA and Regulation of Hazardous and Non-Hazardous Solid Wastes—Closing the Circle of Environmental Control, 35 Bus. Law. 1519 (1980) (discussing the major features of the Act and implementing regulations); see also Rodgers, Hazardous Waste Regs Increase in Complexity, Legal Times of Washington, February 9, 1981.
257. The RCRA defines "solid waste" very broadly. Rosbe, supra note 256, at 1521-22.
258. Disposal of spent shale poses significant problems not only because of its pollution potential, see notes 215-217 supra and accompanying text, but because its sheer size will tax disposal facilities. See note 208 supra. Use of federal lands for spent shale disposal will require a separate permit. See note 180 supra. Under the Mineral Leasing Act, lease tracts are limited to 5,120 acres (8m²). 30 U.S.C.A. §§ 181, 241(a) (West Supp. 1980). The FLPMA specifically prohibits disposal of overburden or waste material outside the lease tract. Id. at § 1701. Hence, at present all activities connected with oil shale mineral development must occur on the lease tract. This may make development of oil shale uneconomical unless off-site disposal is allowed. See James A. Joseph, Undersecretary, Memorandum to the Secretary, "Decisions on the Oil Shale Secretarial Issue Document," U.S. Dept of the Interior, May 27, 1980. Measures to effect changes in the law to allow off-site disposal have been introduced in the 97th Congress. See Synfuels 9 (McGraw-Hill, April 3, 1981). The constraints imposed upon oil shale development on federal land due to the problem of solid waste disposal are addressed in Oil Shale Technologies, supra note 5, at 248-52.
259. This area is receiving extensive analysis. See U.S. DEP’T OF ENERGY, ENVIRONMENTAL DEVELOPMENT PLAN—OIL SHALE 42-45 (1979). RCRA defines wastes as hazardous or nonhaz-
Under RCRA, extensive reporting requirements are imposed on generators of hazardous wastes and where the waste is transported off-site. If hazardous wastes are stored on-site for more than 90 days, the project operators will qualify as a HWMF and must comply with HWMF and HWMF permit regulations. Hazardous wastes are likely to be a substantial by-product of synthetic fuel projects. Synthetic fuels are not, as yet, listed as toxic substances under the Toxic Substances Control Act (TSCA). The Environmental Protection Agency has maintained that it will not waive pre-notification testing of synthetic fuels. Depending upon the toxicity of synthetic fuels, the TSCA may result in constraints upon use and marketing of synthetic fuels that may make the fuel uneconomical.

If the synthetic fuel project burns fuel as part of its operation at a rate greater than 100,000,000 BTU/hr., the facility must use coal as the source of energy unless an exemption is obtained. A synthetic fuel project will likely meet the statutory rate; hence, noncoal-based

ardous and applies to generators and transporters of hazardous wastes, owners and operators of hazardous waste management facilities (HWMF), and establishes criteria for nonhazardous waste facilities. See Rosbe, supra note 256, at 1521. In situ mining wastes are excluded from RCRA coverage. 45 Fed. Reg. 33,1210 (1980). This exclusion does not, however, apply to materials removed from the mine by a modified in situ method of mining.

260. Rosbe, supra note 256, at 1528.
261. Id. at 1528-29:
The full set of generator requirements applies to a generator who transports to, or treats, stores or disposes of his waste in an off-site HWMF . . . . Unless there is a change in the FLPPMA this is not likely to have significant impact because lessees are prohibited from removing wastes from the leasehold. See note 258 supra.
262. 40 C.F.R. § 262.34(b) (1980). The standards applicable to HWMFs are discussed in Rosbe, supra note 256, at 1531-35.
263. See Rosbe, supra note 256, at 1521-27 (discussing the generic requirements for classifying wastes as Hazardous or Nonhazardous).
265. Section 5 of TSCA, 15 U.S.C.A. § 2604 (West Supp. 1980), no person may manufacture a "new chemical substance" or manufacture or process any chemical substance for a "significant new use" unless a notice of intention is filed with the Administrator of the EPA at least 90 days before manufacture or processing. A history of EPA's attempt to implement Section 5 can be found in Annual Review of Significant Developments—1979, 13 NAT. RESOURCE LAW. 100 (1980).
267. Id.
269. Under §§ 201-202 of the Fuel Use Act, 42 U.S.C.A. §§ 8311, 8312 (West Supp. 1979), new electric powerplants and major fuel burning installations are prohibited from using natural gas or petroleum as a primary energy source.
SYNTHETIC FUELS

synthetic fuel projects will need an exemption to use their own synthetic fuel feedstock.\textsuperscript{271}

The transport of the synthetic fuel feedstock will also require a host of permits and approvals. The Hazardous Materials Transportation Act\textsuperscript{272} regulates the transportation of hazardous materials that may pose an unreasonable risk to health and safety.\textsuperscript{273} The Rivers and Harbors Act of 1899\textsuperscript{274} provides for the Army Corps of Engineers to approve construction affecting the navigable capacity of the waters of the United States.\textsuperscript{275} Therefore, a permit is required to construct facilities designed to divert and store water from navigable streams\textsuperscript{276} or to facilitate barge traffic to or from the project site.\textsuperscript{277} If the synthetic fuel is transported by pipeline, pipeline permits are required from the Department of Transportation with respect to design, construction, and operation standards\textsuperscript{278} as well as an accident contingency plan.\textsuperscript{279}

4. Other Requirements

The above list of requirements concerning the conception, construction, and operation of a synthetic fuel project is hardly complete.\textsuperscript{280} The major federal requirements have been noted but

\begin{footnotes}
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\footnote{The transport of the synthetic fuel feedstock will also require a host of permits and approvals. The Hazardous Materials Transportation Act\textsuperscript{272} regulates the transportation of hazardous materials that may pose an unreasonable risk to health and safety.\textsuperscript{273} The Rivers and Harbors Act of 1899\textsuperscript{274} provides for the Army Corps of Engineers to approve construction affecting the navigable capacity of the waters of the United States.\textsuperscript{275} Therefore, a permit is required to construct facilities designed to divert and store water from navigable streams\textsuperscript{276} or to facilitate barge traffic to or from the project site.\textsuperscript{277} If the synthetic fuel is transported by pipeline, pipeline permits are required from the Department of Transportation with respect to design, construction, and operation standards\textsuperscript{278} as well as an accident contingency plan.\textsuperscript{279}}
\footnote{Articles delineating common permit and approval requirements for energy projects are increasing in number. See note 16 supra.}
numerous other requirements remain unmentioned. Similarly, state and local requirements have not, for the most part, been noted. The synthetic fuel project will be constructed and operated in an environment of intense regulatory concern which will place significant demands on project sponsors and project lenders. Both private and public participants to the project will be unwilling to commit funds unless they are relatively assured that the necessary permits and approvals can be obtained so that the project can become operational. While many permits and approvals affect only one phase of the project, the application for the permit or approval must be completed, agency action predicted, and the cost of compliance factored into the cost of the project to see if it is economically viable. This raises, however, the problem of regulatory risk noted earlier. Restated, the problem of regulatory risk is that a decision to proceed with a project must be made on the basis of a necessary permit or approval which is not presently obtained or, if obtained, is subject to revision or modification. If the permit or approval is not obtained or obtained only at a higher cost than initially estimated, the initial commitment of financial assistance to the project may prove to be inadequate to complete the project as initially envisioned.

C. Critical and Non Critical Permits and Approvals

1. The Concept of Criticality

Since the decision to commit financial resources must be made in the face of regulatory risk, some means must be devised to quantify it. A basic means of quantifying risk is to distinguish between critical and non critical permits and approvals. Not all permits and approvals pres-

281. Many requirements are the result of internal agency policies that are not always expressed in administrative regulations. A complete list of agency requirements can only be developed after extensive communication with the personnel of agencies involved in the decision-making process and a review of all permit and approval forms and applications.


Extraction of oil from shale and manufacture of synthetic oil from coal appear to pose significant financing problems. The regulatory policy issues raised in such circumstances are among the most important issues of economic policy the United States will confront in this decade. The resolution of these issues could have implications far broader than just the choice of whether to develop a new source of energy.

See also note 328 infra.

283. In addition many permits and approvals, although they may involve substantive concerns associated with an advanced stage of project operation, require pre-construction completion. See, e.g., PSD requirements, discussed at notes 234-41 supra and accompanying text.
ent the same problems to the project. Ordinarily, the acquisition of a right-of-way will pose little problem, while water division permits will often be crucial to the successful completion of the project. One way to look at permit and approval requirements is to discern if there are reasonable alternatives which can be used if a particular permit or approval is not obtained. The number of reasonable alternatives shows whether a particular permit or approval is critical to the synthetic fuel project. The cost of the permit or approval, while important, is not necessarily determinative.

A second factor in evaluating the criticalness of a particular permit or approval is the point of time at which the permit or approval is obtained. At the planning stage of the project, while some flexibility in project design remains, there are likely more alternatives to a particular permit; consequently, the likelihood that a particular permit or approval is critical is reduced. Where, however, the project has progressed to the stage that actual construction or planned operation precludes certain alternatives, unobtained permits and approvals may become more critical than they were when alternatives were available. For example, once the decision is irrevocably made to use above-ground retorting of oil shale in whole (or in part as a necessary aspect of in situ means of recovery), the obtaining of a disposal site and necessary disposal permits for spent shale becomes critical. Without a disposal site, the project cannot function. While the unavailability of a disposal site may not affect the project if an in situ method of oil shale retorting were used, once the decision is made to use a process which results in the accumulation of above-ground spent shale, a means of disposal for the spent shale becomes critical.

Delays caused by permit and approval requirements may also af-

284. Access permits, as described in notes 172-178 supra and accompanying text are, of course, important to the successful completion of the project. They do not, however, ordinarily present significant impediments to project construction. Where they have in the past, see, e.g., Wilderness Society v. Morton, 479 F.2d 842 (D.C. Cir.), cert. denied, 411 U.S. 917 (1973) (strictly construing section 28 of the Mineral Leasing Act to preclude construction of the Trans-Alaska Pipeline), such constraints have been quickly set aside. See Act of November 16, 1973, Pub. L. No. 93-153, 87 Stat. 576, amending Section 28, 30 U.S.C. § 185(d) (1970) to allow the Secretary of the Interior to grant sufficiently wide rights-of-way to accommodate the construction of the pipeline.

285. See OIL SHALE TECHNOLOGIES, supra note 5, at 362-363.

286. For example, agency rules which place constraints upon rights-of-way or access rights necessary to build synthetic fuel projects on public lands are often framed in terms of reasonableness; see, e.g., United States v. Richardson, 599 F.2d 290 (9th Cir. 1979), cert. denied, 444 U.S. 1014 (1980) (affirming injunction against a prospector who “unreasonably” destroyed surface resources and forest environment).

287. See note 258 supra.
fect the project’s ability to obtain necessary component parts and key items as contemplated in procurement schedules. Synthetic fuel projects will likely involve a significant part of available United States manufacturing capacity for essential items such as valves, pumps, compressors, and pressure vessels. The anticipated supply shortage in items critical to any large scale synthetic fuel program will likely exacerbate supply schedules and costs. Any delay at the project end will lead to increased product costs and may result in the inability to obtain critical items, thus redoubling the problems created by delay.288

It may not always be possible to obtain all necessary permits and approvals before the commitment to undertake the project is made. Nor does a project necessarily have a vested interest in a permit or approval already obtained.289 Consequently, any project will carry a significant number of “critical” permits and approvals. The financial viability of the project will turn on the successful obtaining of those permits and approvals within anticipated costs; yet, any opinion concerning the satisfaction of this condition can never amount to anything more than “reasoned speculation.” The most serious and potentially fatal flaw of the Energy Security Act is that it is completely silent on ways in which reasonable positions can be taken regarding the likelihood that critical permits and approvals will be obtained and will be obtained expeditiously. It is altogether likely that the hazards and uncertainties presented by regulatory risk will prove unacceptable to the private sector unless the SFC, in effect, guarantees all debt investment, a position that SFC is statutorily prohibited from taking.290

The absence of statutory attention in the Energy Security Act to

288. Oil Shale Technologies, supra note 5, at 187. The Office of Technological Assessment concluded:

‘The deployment of a 400,000-bbl/d industry by 1990 would begin to markedly strain the capacity of U.S. manufacturers to supply heavy equipment to developers. To deploy a 1-million-bbl/d industry by that time would use between 15 and 30 percent of current U.S. annual production of this equipment. There would be a similar strain on the capacity of large integrated architectural/engineering firms capable of undertaking major process plant construction.

Id. at 181. A Bill introduced in the 97th Congress would only exacerbate the problem of strained equipment supplies. H.R. REP. No. 1032, 97th Cong., 1st Sess. (1981) (to amend the Energy Security Act to restrict use of foreign produced articles, materials, and supplies in the construction of synthetic fuel projected financially assisted by the SFC).

The OTA assessment should be contrasted with the production goals established by the Energy Security Act: “Production of at least 500,000 barrels of crude oil per day of synthetic fuel by 1987 and of at least 2,000,000 barrels of crude oil per day of synthetic fuel by 1992.” Energy Security Act, supra note 15, 42 U.S.C.A. § 8701(a)(2) (West Supp. 1980).

289. See note 122 supra.

290. See notes 35-42 and 56-58 supra and accompanying text.
the problem of regulatory risk exists due to the fact that the Energy Security Act was designed to work in conjunction with the Energy Mobilization Board proposal. The projects financed by the SFC were intended to be included within the regulatory "fast track" permit and approval procedures to be administered by the Energy Mobilization Board. The demise of the Energy Mobilization Board proposal created a regulatory problem that Congress did not anticipate. Given the close relationship between project financing and regulatory risk, it is a problem that may prove overwhelming to project sponsors unless the project can obtain critical permits and approvals before loan commitments are made.

2. The DOE "Fast Start" Solicitations

The DOE "fast start" solicitations under the two interim programs may provide some guidance as to how the SFC and the private sector will handle the problem of regulatory risk. The synthetic fuel program is largely one of unknown dimensions. Neither the private sector nor the federal government has had any prior experience regarding what works and what does not in this area. It should not be unexpected that SFC implementation of its program will follow approaches developed and used by DOE during the interim program.

Under both interim programs, the DOE has recognized that it is impossible to condition financial assistance on the prior obtaining of all necessary permits and approvals. One the other hand, the "proposed terms and conditions" for financial assistance specifically require that "[t]he Recipient shall procure all necessary permits or licenses and abide by all applicable laws, regulations and ordinances of the United States and of the state, territory, and political subdivisions." Reconciling these two points will be significant to the success of financial commitments made to assist the development of a synthetic fuel indus-

292. This is already occurring in the wake of the District of Columbia Court of Appeals decision in Office of Consumers' Counsel which disallowed certain essential tariffs approved by FERC. See note 13 supra and accompanying text and notes 63-66, supra, for a discussion of Office of Consumers' Counsel.
293. See notes 91-111 supra and accompanying text.
294. See note 112 supra and accompanying text.
295. This is implicit in the permit scheduling requirements imposed by both solicitations. See U.S. DEP'T OF ENERGY, Program Solicitation for Proposals under Nonnuclear Act, supra note 100 at III-12 and U.S. DEP'T OF ENERGY, Program Solicitation for Proposals for Financial Assistance of Title I, supra note 109, at III-13 [hereinafter collectively cited as Program Solicitations].
296. Id. at II-5, incorporating provision B-11.
try. The tenor of the solicitations shows that DOE has taken an approach focusing primarily on identification and scheduling as the means of assessing the effect of regulatory risk upon the adequacy of project financing.

a. Identification

The DOE solicitations require a project applicant to “[i]dentify all permits required for project initiation, construction and operation, and identify those permits not yet obtained. . . .”

Proper identification of regulatory requirements begins with a thorough assessment of the character of the project. Factors which must be considered include, among others: (1) the design of the project in terms of output; (2) the site including location and characteristics; (3) feedstock sources and requirements; (4) other materials requirements; (5) feedstock, materials and product transportation; (6) effects upon water quality and availability; and, (7) disposal and containment of waste products.

After the project has been thoroughly examined, it must then be equated with relevant regulatory requirements. The DOE solicitations provide little guidance beyond identifying several major federal programs which will have application, without question, to any synthetic fuel project. In effect, DOE has simply recast, without explanation or quantification, various concerns expressed in several studies examining the potential consequences arising out of the development of a domestic synthetic fuel industry. No attempt has been made to identify the relative importance of any one of the necessary permits or approvals except for a general admonition to “[i]dentify ‘critical’ path permits or other requirements and describe potential problem areas which

297. Id. at III-7.
298. Id. at III-8 to III-12.
299. Id. at III-12.
300. See Policy Analysis Report, supra note 167; Environmental Development Plans for Energy Technology Programs, Summary Report, 5-1 to 5-17 (DOE/EDP-0062).
301. Program Solicitations, supra note 295, at IV-2:

B. Relative Importance of Evaluation Criteria

1. No single evaluation criterion is so predominantly important as to overshadow other criteria. Rather, a balance is sought among all the criteria which will best meet the purpose of selecting projects which propose a viable technical process, and a well thought out, commercially viable project, which will become commercially competitive. The accuracy of the project cost estimate is important in that it largely dictates the commercial viability of the project, and the requirement for Government financial assistance. While the financial assistance being sought is a relatively flexible element of the proposal, the Government will seek to maximize the effect of
could prevent or delay the receipt of such permits." No definition of "critical path permits" is provided in either solicitation.

The DOE solicitations do envision that conditional commitments may be awarded. The conditional commitment will, however, be of little assistance if future conditional commitments follow the approach taken in the Great Plains Coal Gasification Project. In that project, DOE conditionally committed $250 million to assist in first year construction costs of a coal gasification project to be built in North Dakota. The conditional commitment provided:

**Licenses and permits.** The following conditions are relative to the obtaining of licenses, permits, certificates, and state/local clearances.

4.1 The borrower agrees to comply with all applicable Federal, State and local environmental, land use, water, health, safety, antitrust laws and applicable Federal regulations.

4.2 Prior to any disbursement under the loan, the borrower has available to it all critical Federal, State and local permits, licenses and certificates in order to undertake construction and operation of the proposed project and DOE is satisfied that all other permits, licenses and certificates will be acquired in an appropriate and timely manner.

4.3 The adverse community and worker impacts resulting from the proposed demonstration facility have been adequately evaluated by the borrower, in the opinion of DOE, and all steps necessary to mitigate such adverse impacts have or will be taken to DOE's satisfaction. . . .

Again, as with the solicitation itself, no attempt was made in the conditional commitment to specify what is or is not a "critical per-
The DOE was apparently prepared to treat the issue of "criticalness" as too fluid to subject to general definition. In effect, the determination of "criticalness" is left to negotiation between the parties. Consequently, an exact definition of "criticalness" will be significantly influenced by the parties' experience and knowledge of the specific regulatory processes involved in obtaining necessary permits and approvals relative to the specific project at hand.

b. Scheduling

The inability to define and predict what is or is not a "critical" permit, places tremendous importance on scheduling as a means of providing a check to assure that regulatory risk and financial viability remain in an acceptable equilibrium.

The interim solicitations require the project applicant to provide a permit and approval timetable which shows: (1) the data acquisition phase; (2) the date formal application for the permit or license must be made; (3) whether the granting agency must hold public hearings; and, (4) the anticipated date of the receipt of necessary permits and licenses. The project applicant is also required to show the relationship between the permit schedule and the overall project schedule.

While the applicant is not required to have all permits and licenses in place as a condition to the award of financial assistance under the DOE "fast start" programs, the applicant is required to identify (prior to obtaining financial assistance) all permits and approvals that will be required in conjunction with the construction and operation of the synthetic fuel project.

The solicitations' requirement of permit and approval identification and scheduling, constitutes the sum and substance of regulatory guidance regarding the interrelationship between the permit process and the financial viability of the project. The solicitations allow the project sponsors to make the necessary assumptions about which permits and approvals will prove to be "critical," and whether any signifi-

306. There is, however, a significant difference between the solicitations and the conditional commitment, in that the former do not require the obtaining of a "critical" permit before disbursement, whereas the latter does. Id. at § 4.2. It seems evident that, depending upon what permits have and have not been obtained at the time of disbursement, the DOE is prepared to schedule partial disbursements, with the disbursement schedule tied to permit acquisition.


308. Id.

309. Id.
cant problems are associated with the obtaining of any project permit or approval. Of course, the officials at DOE have some familiarity with the nuances of the regulatory process. It can therefore be anticipated that the quality and perceptiveness of the permit schedule and criticalness assumptions made by the project sponsors will be highly indicative of the sophistication and competence of the project sponsors with respect to the likelihood that they will secure the necessary regulatory clearances to complete the project. This in turn will no doubt influence DOE officials in determining which projects to extend assistance to under the “fast start” program.

3. The SFC Initial Solicitation

On Friday, October 31, 1980, the SFC published its “initial solicitation for project proposals.” The draft solicitation was exceedingly sketchy, contrasting sharply with the lengthy solicitations used by DOE under the interim “fast start” programs. The SFC decided not to require proposals to meet detailed specifications, deferring such requirements until a later phase of the solicitation process. Nevertheless, it is difficult to envision how a project applicant could respond to the SFC solicitation without substantially duplicating most of the requirements of the interim “fast start” solicitations. It is equally unclear how the SFC could make a reasonable decision about which proposals justify further study without most of the information required by the interim program. The SFC initial solicitation does not free the project applicant from providing most of the information which would have been required if the project were seeking financial assistance under the “fast start” program. It probably does allow greater flexibility of organization and structure of the proposal than was possible under the DOE-administered programs. Since this flexibility may result in a delay in the actual dissemination by the SFC of its project requirements, the desire to be flexible may prove counterproductive.

310. Id. at III-8.
311. This is required of project sponsors. See note 302 supra and accompanying text.
313. The two Interim Program Solicitations each exceeded 100 pages. The SFC solicitation was two pages long.
315. The information will be necessary in any event to complete phase 2 of the SFC solicitation Program.
IV. EXPEDITING AND HARMONIZING THE REGULATORY PROCESS

There is little dispute that government regulation of energy projects is chaotic and disorganized. While the disorder has been diagnosed, there is significant disagreement over the proper method of treatment. One suggested remedy anticipates the creation of a super agency with authority to impose order by mandating decision-making schedules and timetables with which regulatory agencies, at all levels of government, would be required to comply. This view was expressed in the proposal, now apparently defunct, to create an Energy Mobilization Board. The attempt to create a super agency was criticized recently by this author. While it was acknowledged that there is a need to expedite the decision-making process, attempts to coerce compliance are arguably unconstitutional within the framework proposed for the Energy Mobilization Board and probably ineffective even if the proposal were constitutional. Project decision expediting would be better accomplished within a framework of mutual assent. The Energy Security Act favors the restrained latter view in its requirement that projects located in states which indicate an intention to expedite all regulatory, licensing, and government agency activities related to synthetic fuel projects shall be afforded a priority in the awarding of financial assistance. While this view may be, for the reasons expressed in this article, a practical necessity, it is encouraging that Congress under-
stands the legitimate concerns of the states and their citizens in being able to exercise some control over their local environment and lifestyle.

Regulatory agencies and regulators are already trying to impose some order in the decision-making process attendant with building energy projects. Colorado has approached the problem of regulatory risk by attempting to bring together regulators, project sponsors, and interested parties; having these groups set forth and describe their needs and concerns, and voluntarily agree to coordinate their decision-making processes and self-implement the program. There is, unfortunately, a scarcity of information about the success or failure of the Colorado program. As with the consolidated permit proposals currently being implemented by the EPA, there seems to be some reluctance on the part of the private sector to embrace the Colorado program. Whether this is the result of substantive concerns regarding

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321. These efforts include consolidated permit programs, wherein an agency seeks to adminis-

322. The Program is known as the Colorado Joint Review Process. It is administered by the Colorado Department of Natural Resources. It is self described as follows:

Colorado's Joint Review Process for Major Energy and Mineral Resource Development Projects (JRP) is an intergovernmental review process that coordinates government's review of major energy and mineral resource development projects.

The JRP is a management system designed to coordinate regulatory and administrative reviews conducted by the three levels of government, thus expediting those review processes and improving the quality of project planning and review. It provides the public and industry with increased opportunity to become involved with government in the review of a project. Participation in the JRP is voluntary; its success depends on a high level of communication, cooperation, and compromise. The JRP is not a new regulatory program and does not establish new regulatory bureaucracy. It is not an attempt to create an energy facility siting procedure or other new decision-making authority.

This manual provides a suggested comprehensive set of coordination procedures that should be used when conducting joint reviews of "major" energy or mineral resource development (i.e., the end of exploration or the beginning of design/feasibility). Although specific step-by-step coordination procedures are provided, nothing in this manual should be considered mandatory or rigid. On the contrary, the manual is a flexible guideline which can and should be modified or scaled-down to accommodate the unique characteristics of projects undergoing joint review. Colorado's Joint Review Process for Major Energy and Mineral Resource Development Projects 1 (December, 1980).
the efficacy of the program or an unwillingness to be the first to participate in a new, untried process cannot be determined. 323

Whatever the eventual determination of the merits vel non of these programs, the awarding of financial assistance will probably be influenced by their mere existence because of section 127(f)(1). 324 Consequently, project sponsors must be prepared to deal with agency programs which seek to harmonize regulatory processes. 325

V. Conclusion

The construction of large scale energy projects, such as those envisioned by the Energy Security Act, entails the commitment of significant financial resources. Delays encountered in completing such projects, whether the result of built-in regulatory schedules, such as the requirement of one year's monitoring for a PSD permit 326 or the result of regulatory duplication, overlap and complexity, increase project cost. Where the time necessary to complete regulatory decisionmaking can be quantified, a decision can be made whether the project is currently financially viable, giving due weight to current financial conditions and uncertainties. Where, however, the time for agency decisionmaking cannot be quantified, a new uncertainty is added which, in a domino fashion, affects all other financial assumptions. A project which costs X amount of dollars if built today and completed in four years, costs X plus dollars if construction is delayed because certain agency permits or approvals are not in hand. 327 Consequently, a financial commitment based upon a project cost of X dollars may be lost or prove to be inadequate if the project now costs X plus dollars. The federal government has attempted to quantify the prospect of regulatory risk through identification and scheduling of regulatory requirements. Whether this quantification will be adequate depends

323. This may be changing. Recently, it was reported that a fourth major project has sought to be brought under the Joint Review Program. See SynFuels 10, McGraw-Hill, January 23, 1981 (W.R. Grace and Co.'s proposed coal-to-methanol project in Northwestern Colorado reported to have joined Colorado's Joint Review Process.)

324. See note 320 supra and accompanying text.

325. Some of these programs are voluntary, such as the Colorado Program; others, such as requirements imposed by state siting laws or cooperative agreements are not.


327. See notes 53 and 116 supra.
upon the perceptiveness of the parties making and evaluating the accuracy and completeness of the identification and the soundness of the schedule. It is a $20 billion gamble in human abilities to prophesize.328

328. [L]oan guarantees have consequences for both Government decisionmaking and the private sector. Such guarantees may result in Federal outlays although neither the timing nor the magnitude of those outlays can be forecast... Consequences for the private sector may include increasing the probability of default and of premature shutdowns and higher interest rates for borrowers who do not benefit from the guarantees.