

THE IMPACT OF RCRA (PL 94-580) ON OIL SHALE DEVELOPMENT

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ABSTRACT

The requirements of the Resource Conservation and Recovery Act (RCRA) of 1976 contain many thrusts, including the requirement that solid and hazardous wastes shall be disposed of by proper methods in order to assure protection of the public health and welfare. There are basically three regulatory options for dealing with spent shale wastes: regulation as a "hazardous waste," regulation as a "special waste," or control (non-federally regulated) as a solid waste. The current status and potential impacts of the RCRA regulatory program are assessed and analyzed within the paper, with the impact depending largely upon the extent to which the oil shale industry is commercialized when the evolving regulatory program is finalized and implemented.

INTRODUCTION

Although the timing and extent of oil shale development in the coming years will be affected by a number of current uncertainties and unknowns, it now appears that many of the major problems confronting industry development have been resolved, and several sites are ready to begin full-scale development when governmental incentives are finally agreed upon by both houses of Congress. Most developers feel they can live with the status quo of environmental rules and regulations promulgated to carry out the intent of the Clean Air Act, Clean Water Act, National Environmental Policy Act and others; however, there is one major piece of environmental legislation whose effects are yet to be felt. This law is the Resource Conservation and Recovery Act (RCRA) of 1976. (PL 94-580).

RCRA OVERVIEW - SOLID AND HAZARDOUS WASTES

In order to carry out its stated objectives of protecting health and welfare and conserving

material and energy resources, RCRA seeks to control solid and hazardous waste management procedures and encourage resource conservation and recovery (recycling, conversion of wastes to energy, etc.). The law consists of eight subtitles, two of which, Subtitle C (Hazardous Waste Management) and Subtitle D (State and Regional Solid Waste Plans) are most important.

Subtitle D allows solid waste management to remain primarily a State and local function, with the Federal role limited to:

- providing technical and financial assistance;
- encouraging regional and Statewide solid waste management planning; and,
- compelling the States to adopt minimum standards for design and operation of disposal sites, to close open dumps, and to use only sanitary landfills or other environmentally acceptable disposal practices.

Keep in mind that the definition of "solid" wastes includes solid, liquid, semi-solid, or contained gaseous materials.

Each State is encouraged (but not required) to prepare a State plan, specifying such State actions as:

- how the State will meet RCRA requirements for closing open dumps, use of a permit system, etc.;
- the initiation of a system of Statewide and regional planning, considering municipal, mining, and other solid wastes, and coordination with other planning functions (i.e., the 208 plan from the Clean Water Act); and,
- a method for consideration of resource recovery as an alternative to land disposal of wastes.

If a State plan is "approved" by EPA, the State is eligible for Federal funding for plan implementation.

While Subtitle D is certainly a key part of RCRA, it is Subtitle C, the control of hazardous wastes, which has taken on the role of EPA's top regulatory priority. Hazardous wastes are defined as a subset of "solid" wastes which, because of their characteristics pose a substantial present or potential hazard to human health or the environment when improperly managed. These characteristics include ignitability, corrosiveness, reactivity, toxicity and several others. Standardized laboratory procedures are to be used as much as possible in determining the degree of health hazard caused by a substance according to EPA specified criteria.

Seven RCRA sections in Subtitle C have become the heart and soul of the "cradle to grave" management system. These sections include:

- Definition, identification, and listing (Section 3001);
- Standards applicable to generators (Section 3002);
- Standards applicable to transporters (Section 3003);
- Construction, design and operating standards for treatment, storage, and management facilities (Section 3004);
- Permit system for treatment, storage and disposal facilities (Section 3005);
- State development of their own hazardous waste programs (Section 3006)¹; and
- Notification of hazardous waste generation to EPA (Section 3010).

Any parties directly involved in the generation, transportation, treatment, storage, or disposal of hazardous wastes during the management process are

¹ The hazardous waste program (including permit requirements) is a Federal program, although a State can qualify for takeover with an "EPA-approved" program. Regardless of who administers the program, EPA retains a primary regulatory role and can always enforce any violations.

required to conform to a series of specified actions including fulfillment of "manifest" obligations. The RCRA manifest is a detailed recordkeeping system in which the quantities and constituents of wastes are identified, and the disposition of these hazardous wastes from generation through disposal is planned, carried out, and recorded at each step of the process. Disposal of hazardous wastes can only occur in approved (permitted) facilities which conform to specified design, construction and operating procedures.

Rules and regulations have been proposed by EPA to carry out each goal of the above-listed RCRA sections; however, these guidelines have been highly controversial. Deadlines specified within RCRA for the promulgating of final rules and regulations for Subtitle C have not been met.

SPECIAL WASTES

Of specific concern for oil shale companies are the proposed Section 3004 rules (Part 250, Subpart D). A category called "special wastes" (distinct from hazardous wastes) was proposed to include utility wastes, gas and drilling muds and oil production brines, and several other specific types of wastes. EPA's rationale for this distinction was three-fold:

- large volumes of wastes are generated;
- portions of these wastes will probably be identified as hazardous, although the limited available information indicates that they pose a relatively low hazard to the environment; and
- these wastes generally are not amenable to the control techniques required in Part 250, Subpart D (RCRA Section 3004) of the proposed Subtitle C regulations.

Section 250.46-5 of these proposed rules consists of an open-ended category of special wastes called "other mining wastes." It has not been made clear what this category means and which specific mining industries are to be included; however, by requiring that "the treatment, storage, and disposal of discarded material from the extraction, beneficiation, and processing of ores and minerals...which are determined to be hazardous waste..." are subject to special disposal

procedures, EPA has certainly left the door open for classification of oil shale wastes as "special" wastes.

Oil shale wastes generated by surface retorting operations consist of an overwhelming percentage of spent shale with the remainder of wastes being spent catalysts, sludges, arsenic-laden solids, processed sanitary wastes, coke, and raw shale fines. The composition of oil shale process waste varies according to the characteristics of the shale as mined, the type of retorting process employed, and specific retorting conditions. It is important to realize that data currently available on the composition of oil shale wastes has been developed using wastes generated under experimental conditions during which the primary goal was to test the retorting technologies. There is the distinct possibility that these wastes may not be totally representative of material produced by full-scale commercial operations. Preliminary data from a wide variety of sources indicate that some materials within the spent shale, wastewater and other waste streams can be classified as hazardous according to current RCRA testing procedures and definitions, although the actual level of hazard to health and welfare is as yet not well defined. The Federal Interagency Committee on the Health and Environmental Effects of Energy Technologies has noted that development of criteria for proper oil shale solid waste disposal is of major importance at this stage in industry development. The panel specified that waste characterization should be site- and process-specific, and listed several critical oil shale waste research areas to further determine the actual extent of health risk posed by large-scale waste disposal.

The volumes of process wastes will be of levels rarely handled before. A 50,000 barrel per day (8,000 m³ shale oil/day) facility can be expected to generate 45,000 to 55,000 metric tons of spent shale waste per day, or 1.48×10^7 to 1.81×10^7 metric tons per year based on an operating year of 330 days. This spent shale occupies a volume of thirty to forty percent greater than that of the original ore as mined. Therefore, oil shale wastes certainly meet the criteria to be classified as "special" under the "other mining waste" category.

EPA apparently intended to develop at some point in the future special standards governing the disposal of each type of waste eventually classified as "special". In the interim, the proposed guidelines for "other mining wastes" are less stringent than those mandated for other wastes considered hazardous. These proposed standards for "other mining wastes" include:

- Waste Analysis - each management facility must perform a detailed chemical and physical analysis of each hazardous waste handled;
- Site Selection - facilities are not to be located in certain "environmentally sensitive areas" (ESAs) unless the facility is so designed, constructed and operated that it does not pose a threat to the environment or public health. Included as ESAs are:
 - a) active fault zones,
 - b) regulatory floodways, as adopted by communities participating in the National Flood Insurance Program,
 - c) coastal high hazard areas,
 - d) 500-year floodplains,
 - e) wetlands,
 - f) critical habitat areas, and
 - g) recharge zones of designated sole source aquifers;
- The facility must be adequately fenced and marked;
- Each generator and facility handling special waste must comply with the manifest system and recordkeeping and reporting requirements;
- The facility must conduct daily visual inspections;
- The facility is required to meet certain provisions under closure and post-closure regulations; and
- Each facility must comply with applicable requirements of Subpart D which relate to groundwater monitoring.

Facilities handling special wastes would be exempt from other storage, treatment and disposal (RCRA Section 3004) standards contained in Subpart D as well as regulations proposed in Subparts B and

C (RCRA Sections 3002 and 3003 for generators and transporters, respectively, of hazardous wastes). It is important to note that only those portions of the designated wastes which are identified as hazardous under the criteria of RCRA Section 3001 (Identification) are "special" wastes. Consequently, any portion of the wastes which is non-hazardous is not regulated under Subpart C and therefore is not a "special" waste. These non-hazardous wastes, however, would have to be disposed of in a facility in accordance with design criteria of RCRA Section 1008 under Subtitle D (Solid Waste Management). RCRA 1008 guidelines, although specifying minimum standards for design, construction and operation of solid waste disposal facilities, are less stringent and allow for much more flexibility as to how environmental resources are to be protected than do the proposed hazardous waste guidelines.

THE CHANGING RCRA REGULATORY FRAMEWORK

However, recall that the previously described special waste classification scenario is under the proposed RCRA regulations. Final regulations to carry out the intent of Sections 3002 (for generators of hazardous wastes) and 3003 (for transportation) were published in the February 26, 1980 Federal Register. These rules will not directly affect oil shale unless substantial changes occur in the proposed 3004 "special waste" rules or if oil shale were not designated as a "special waste." The important 3004 final rules (for treatment, storage, and management facilities) are near completion but are a well-guarded EPA secret at this writing.

EPA basically still has three options to regulate oil shale wastes:

- as a solid waste to be regulated under RCRA Subtitle D;
- as a hazardous waste to be regulated under the "cradle to grave" Subtitle C; or
- as a special waste similar in scope to the proposed regulations.

However, the legality of a "special waste" category was questioned during the comment period on the proposed regulations (RCRA specifies only hazardous waste or solid waste classifications, with no provisions for anything in between). It is uncertain if the special waste category will be

retained in the final rules. If the special waste categories are not retained, those oil shale wastes which would be considered hazardous under the RCRA provisions for identification of hazardous wastes may then require the extensive, costly and time-consuming "cradle to grave" management provisions of Subtitle C.

Currently, an estimated 57 million metric tons of wastes from all sources in the United States are considered hazardous by EPA. If spent shale were to be added to the list of hazardous materials, the amount of hazardous wastes managed within Subtitle C nationwide would double with a production rate of only 200,000 barrels of shale oil per day.

Another EPA alternative is to delay the decision on the proper standards for mining waste handling and disposal until more information is obtained. EPA, in fact, currently has several research projects underway in the Extraction Technology Branch of the Industrial Environmental Research Laboratory in Cincinnati which are designed to survey and evaluate best management practices for solid wastes from mining. The Department of Energy Laramie Energy Technology Center is also involved in the determination of proper oil shale waste management practices at its Anvil Points site, and is considering a project to formulate a management plan that will meet the goals of RCRA and serve as an example to regulatory agencies and to the oil shale industry.

SUMMARY AND CONCLUSIONS

In summary, although the actual RCRA regulatory framework is still evolving, a number of statements can be made concerning the status and potential impacts of RCRA on oil shale development.

- There is little experience from which to gain knowledge of best oil shale solid waste management practices;
- Much further study needs to be accomplished concerning the transport of hazardous pollutants contained within shale wastes, preferably on a site-specific and process-specific basis;
- EPA has three basic regulatory options to control potentially hazardous oil shale wastes under the RCRA regulatory program:

as a solid waste, as a hazardous waste, or as a "special waste";

- No matter which regulatory option is chosen in the coming months, the RCRA regulatory framework concerning oil shale waste can be expected to be in a continual evolutionary process as experience is gained and/or as energy/environmental goals change;
- If oil shale is regulated under the solid waste program, regulatory authority will be retained almost exclusively by the States;
- If oil shale is regulated under the hazardous or special waste programs, regulatory authority will be retained by EPA and/or the States, with EPA having primary responsibility;
- Oil shale developers will have to prepare detailed waste management plans specifying the procedures they will employ to meet RCRA standards;
- A waste disposal permit must be obtained from EPA or the State by each oil shale facility and the burden of proof of compliance with RCRA will definitely rest solely with the permit applicant;
- The cost and other implications of RCRA will be least severely felt by the oil shale industry if oil shale wastes are classified as solid wastes to be regulated by the States under RCRA Subtitle D due to increased flexibility and less stringent administrative and performance standards;
- The cost and other implications of RCRA will be most severely felt by the oil shale industry if oil shale wastes are classified as hazardous due to the detailed requirements of waste control from point of generation to point of disposal;
- Classification of oil shale wastes as "special" under the proposed RCRA Section 3004 regulations will result in increased administrative procedures and additional performance standards, but the cost and other implications of this designation are

slight when compared to the hazardous designation;

- EPA, in administering and enforcing the new and complex RCRA special or hazardous waste program, will most likely undergo a slow RCRA learning curve because of inadequate funding and shortages of qualified personnel;
- Industry, like EPA, will be forced into a slow RCRA learning curve under the special or hazardous waste program, as it determines what are, and what are not, the proper management techniques in response to the EPA learning curve and in response to the evolving regulatory program; and,
- Immediate impacts of the EPA and industry slow RCRA learning curves will be development delay and further uncertainty in investment decisions.