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OIL AND GAS EXEMPTION IN 3001(b)(2)(A) OF RCRA: IRON SPONGE
PROCESS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MAY 25 1983

MEMORANDUM

SUBJECT: Scope of Oil and Gas Waste Exemption
in Section 3001(b)(2)(A) of RCRA;
"Iron Sponge" Process

FROM: Lisa K. Friedman
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Division (LE-132S)

TO: Richard J. Nolan
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QUESTION PRESENTED

In your March 2, 1983, memorandum to me, you asked whether waste "iron sponge" generated during the sweetening of natural gas is exempt from the requirements of the hazardous waste regulatory program under Subtitle C of the Resource Conservation and Recovery Act (RCRA), by virtue of the exemption for oil and gas wastes in Section 3001(b)(2)(A).

ANSWER

Waste iron sponge is not within the Section 3001(b)(2)(A) exemption and, therefore, is subject to the hazardous waste regulatory program.

DISCUSSION

I. Factual Background

Waste iron sponge is a material which is produced during

a natural gas sweetening process (hydrogen sulfide removal). Its origin is best understood by reviewing the entire chain of operations used to extract and refine natural gas for transportation and sale.

Natural gas is extracted from the ground by bringing reservoir fluids to the surface. The gas may be extracted in association with oil or from a reservoir yielding predominantly gas. In any case, the gas generally is extracted together with other gaseous or liquid substances contained in the ground. The combined extracted material is passed through a physical gas-liquid separator so that the gas can be separated from the unwanted liquid components or solids (e.g., sand). (The separated liquids are typically returned to the ground or discharged to impoundments.)

After physical extraction and separation, the gas is generally processed or treated to improve its transportability and to achieve the quality required for commercial sale. If the extracted and separated gas is "sour" (i.e., it contains hydrogen sulfide), it is refined ("sweetened") to separate the hydrogen sulfide gases from the commercially sold gas. This operation is typically performed prior to long-distance transportation to reduce pipeline corrosion. The sweetening process often includes a sulfur recovery operation.

In addition to the sweetening and sulfur recovery operations, a natural gas processing plant often includes several other manufacturing operations. These include dehydration and dewpoint control of the sweetened gas, condensation stabilization, and distillation (to separate various gases for commercial sales).

The iron sponge process involves passing sour gas through an absorption tower containing redwood chips coated with hydrated ferric oxide (the "iron sponge"). The hydrogen sulfide-bearing gas reacts with the hydrated ferric oxide to produce ferric sulfide and residual water.

After three to four months, the iron sponge is "spent". It is then flooded with water, initiating a reaction which produces hydrogen sulfide. The spent iron sponge is then removed from the absorption tower and is placed on the ground, where, with the increased exposure to oxygen, it generates

heat. The heat dries the wood chips, which begin to smolder. The smoldering continues until the spent iron sponge is reduced to ashes. The ashes are then generally disposed of in a landfill.^{1/}

1/ You have not asked my opinion whether the spent iron sponge is a hazardous waste prior to completion of treatment. I have assumed for purposes of the question presented that it is hazardous and would be subject to the hazardous waste regulations unless exempted under Section 3001(b)(2)(A) of RCRA. (Footnote Continued on Next Page)

II. Legal Background

The current statutory exemption for wastes resulting from the exploration, development and production of crude oil or natural gas has its origins in EPA's proposed hazardous waste regulations, 43 Fed. Reg. 58946 (December 18, 1978). Proposed 40 CFR §250.46 contained "special waste standards" - reduced requirements for several types of wastes that are produced in large volume and that EPA believed may be relatively low in toxicity as compared to other hazardous wastes. One of these "special wastes" was "gas and oil drilling muds and oil production brines." EPA did not define this term in its December 18 proposal.

In the RCRA amendments of 1980, Congress exempted most of these "special wastes" from regulation as hazardous wastes pending further study by EPA. The oil and gas exemption (Section 3001(a)(2)(A)) reads in relevant part as follows:

(Footnote Continued from Previous Page)

As you know, it is the generator's responsibility to determine, on a case-by-case basis, whether a waste is hazardous. However, I can offer you some guidance to assist you in reviewing such determinations.

The Office of Solid Waste has reviewed the technical reports prepared by Camp, Dresser & McKee on April 8, 1982 and submitted to Region VIII by Holland and Hart on behalf

of Gary Energy Corporation on November 22, 1982. It is their opinion that, under the facts detailed in the report, the iron sponge would probably be hazardous. Since the spent iron sponge can generate considerable hydrogen sulfide if contacted with an acidic solution, it meets the characteristic of reactivity under 40 CFR §261.23(a)(5). Similarly, since it generates a great deal of heat when mixed with water, which results in the dissociation of ferric sulfide to release additional hydrogen sulfide, it meets the reactivity characteristic in §261.23(a)(4) as well.

It is possible, though less certain, that the spent iron sponge might also be ignitable in some circumstances under §261.21(a)(2). First, it is not a liquid and appears to be capable in some cases of causing fire through absorption of moisture. Second, it might be considered to burn "so vigorously and persistently that it creates a hazard" through persistent burning (e.g., special fire fighting techniques would be necessary to extinguish a fire) since the waste reacts with water to produce heat.

[D] rilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas or geothermal energy shall be subject only to existing State or Federal regulatory programs in lieu of subtitle C until at least 24 months after the date of enactment of the Solid Waste Disposal Act Amendments of 1980 and after promulgation of the regulations in accordance with subparagraphs (B) and (C) of this paragraph. It is the sense of Congress that such State or Federal programs should include, for waste disposal sites which are to be closed, provisions requiring at least the following:

- (i) The identification through surveying, platting, or other measures, together with recordation of such information on the public record, so as to assure that the location where such wastes are disposed of can be located in the future ...; and
- (ii) A chemical and physical analysis of a produced water and a composition of a drilling fluid suspected to contain a hazardous material, with such information to be acquired prior to closure

and to be placed on the public record. [Emphasis added.]

Legislative history defining the term "other wastes associated" is sparse. The primary source is the Conference Report, H.R. Rep. No. 96-1444, 96th Cong., 2d Sess. 32 (1980), (hereinafter "Conf. Rep.") which briefly explains:

The term "other wastes associated" is specifically included to designate waste materials intrinsically derived from the primary field operations associated with the exploration, development, or production of crude oil, natural gas, or geothermal energy. It would cover such substances as: hydrocarbon bearing soil in and around the related facilities; drill cuttings, materials (such as hydrocarbon water, sand and emulsion) produced from a well in conjunction with crude oil, natural gas, or geothermal energy; and the accumulated material (such as hydrocarbon, water, sand, and emulsion) from production separators, fluid treating vessels, storage vessels, and production impoundments.

The phrase "intrinsically derived from the primary field operation"... is intended to differentiate exploration, development and production operations from transportation (from the point of custody transfer or of production separation and dehydration) and manufacturing operations.

Floor statements on this exemption consist only of a few brief statements supporting the exemption. They do not define the exempted wastes. The speakers refer to muds and brines and not specifically to other associated wastes.

IV. Regulatory Status of Spent Iron Sponge

It is my conclusion, based upon the factual and legal background set forth above, that waste iron sponge is not within the Section 3001(a)(2)(A) exemption.

The key words in the status, "exploration, development, or production", all relate to locating oil and gas deposits of commercial value and extracting the oil and gas from those deposits. The only wastes specifically listed in the

statute are "drilling fluids" and "produced water". These are substances that were originally extracted from the ground together with the desired oil or gas or that were injected into the ground to enhance extraction of the oil or gas. They do not result from any process other than physical separation from the product. It is therefore reasonable to conclude that "other wastes" should similarly be materials extracted from the ground or injected into the ground to enhance oil or gas recovery and not wastes resulting from subsequent processing and manufacturing.

The legislative history supports this conclusion. It states that the term "other wastes" includes: hydrocarbon bearing soil; drill cuttings; and materials such as hydrocarbon, water, sand and emulsion that were "produced" from a well or from production separators, fluid treating vessels 2/, storage vessels, and production impoundments. Conf. Rep. at 32. Wastes from the iron sponge process are substantially different from these wastes. The iron sponge process goes beyond physical

2/ An argument might be made that the term "material ... from ... fluid treating vessels" in the Conference Report includes iron sponge used to treat sour gas. However, because the statute uses the term "fluid" only in conjunction with the term "drilling fluids", I think the most reasonable interpretation of the term "material ... from ... fluid treating vessels" is that it refers to wastes from the treatment of drilling fluids prior to their disposal or reintroduction into the well. So construed, this explicit reference to wastes from the treatment of drilling fluids strengthens the argument that wastes from the treatment of the natural gas product (e.g., iron sponge) are not included in the Section 3001(a)(2)(A) exemption.

separation of the gas from other produced materials or drilling fluids to processing the gas through a chemically treated material. It is thus a processing operation that is downstream from the production operations. The spent iron sponge waste consists of materials extraneous to drilling fluids and

production waters; it consists of commercially manufactured, chemically treated wood chips that have been further altered by reaction with the natural gas.

In addition, the difference between the spent iron sponge and the drilling fluids and produced waters manifests itself in the differing hazards presented by these wastes. The reactive nature of spent iron sponge is not shared by drilling fluids and produced waters. It is unlikely that Congress had this type of waste in mind when it exempted "drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas" from hazardous waste regulatory requirements.

Finally, I note that it would be incorrect to argue, based on the last sentence in the conference report language quoted above, that Congress intended to exempt all wastes generated prior to transportation of the natural gas. Such an argument would prove too much, since it would exempt all petroleum refining and chemical manufacturing wastes where such refining and manufacturing takes place near the wellhead. Furthermore, it would be inconsistent with the preceding language limiting "other wastes" to drilling materials and such natural constituents of the ground as soil, sand, water, hydrocarbons and emulsions. A better reading of the Conference Report, consistent with the plain language of the statute and logic of the exemption, is that only those wastes associated with exploration, development and production are exempt. Wastes resulting from manufacturing, whether they precede or follow transportation, are not exempt.