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United States Environmental Protection Agency
Washington, D.C. 20460
Office of Solid Waste and Emergency Response

May 21, 1991

MEMORANDUM

SUBJECT: Classification of Waste Fluids Associated with
Clean Up of Crude Oil Leaks in Active Oil
Fields

FROM: Sylvia K. Lowrance, Director
Office of Solid Waste

TO: Max H. Dodson, Director
Water Management Division, Region 8

On January 3, 1991, Paul Osborne of your staff sent a memo to Mike Fitzpatrick in our Special Wastes Branch. This memo inquired about the RCRA regulatory status of certain oilfield clean-up waste and requirements for disposal. The waste in question is described as snow-melt contaminated by crude oil spilled from a pipeline leak. The location of the pipeline leak is identified as occurring after the point of custody transfer of the crude oil. The January 3 memo also asks whether any additional standards and rules are applicable prior to disposal of a hazardous waste in a Class II well, and points out an apparent regulatory conflict between the RCRA and UIC regulations.

After careful review of the information provided in the memo and in follow up telephone discussions, we believe that the contaminated snow-melt is not covered by the oil and gas exemption under RCRA (see attachments for further discussion) and must be handled under the provisions of RCRA Subtitle C if it exhibits one or more of the hazardous characteristics. Furthermore, we do not believe there is a conflict between the RCRA and UIC programs in regard to the status of a non-exempt waste fluid that previously was allowed to be injected in a Class II well but now, due to changes in the RCRA toxicity characteristic, is a hazardous waste. In implementing the UIC program, EPA and the states are required to comply with other applicable environmental laws including the

relevant provisions of RCRA. Thus, neither EPA nor the states can authorize the disposal of hazardous wastes in a Class II well even though the waste was an authorized Class II fluid prior to the change in the RCRA toxicity characteristic.

Regardless of the RCRA status of the wastes from these pipeline leaks, the more fundamental question involves the prevention of any future leaks. We suggest that Region 8 look into other state and federal authorities (e.g., Section 311 of the Clean Water Act, and the Oil Spill Prevention Act) and undertake a review of existing regulations designed to prevent leaks or contamination from pipelines. In addition to enforcement actions that may be pursued, these other authorities may also provide incentives for the responsible operator to repair, replace or maintain existing pipelines rather than to simply attempt clean-up after a release has occurred.

If you or your staff have any further questions on this matter, please contact Mike Fitzpatrick at FTS 398-8411.

Attachments

cc: Waste Management Division Directors,
Regions 1 - 10
Tina Kaneen, OGC
James R. Elder, Director, OGDW

Attachment

Discussion of RCRA Exempt Status and UIC Requirements

The RCRA exemption for oil and gas exploration and production (EPA) wastes is limited by statutory language to "drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas or geothermal energy." The legislative history discusses the term "other wastes associated" as being those wastes "intrinsically derived from the primary field operations." As is made clear by the legislative history, this phrase is intended to differentiate E&P operations from transportation and manufacturing operations.

The point of transfer of the custody of the crude oil or natural gas products has been identified by Congress in the legislative history as one factor in determining when transportation begins and E&P operations end (H.R. Rep No. 1444, 96th Cong., 2d Sess. at 32 (1980)). In the absence of custody transfer, the point of production separation and dehydration can be used to determine the end point of E&P operations. Transportation may be for short or long distances, including both, main trunk pipelines and smaller local pipelines. For the purpose of the RCRA exemption, non exempt transportation-related wastes are those resulting from any mode of transportation, including pipelines, after the point of custody transfer or point of production separation or dehydration.

Since the waste in question is generated after the point of custody transfer, it would not be included within the scope of the RCRA exemption. Therefore, if this waste exceeds the toxicity characteristic for benzene (or any other hazardous characteristic), then it is a hazardous waste subject to the regulatory requirements of RCRA Subtitle C. Because the RCRA exempt status of an oilfield waste is based on the relationship of the waste to E&P operations, and not on the chemical nature of the waste, it is possible for an exempt waste and a non-exempt hazardous waste to be chemically very similar. Hazardous waste must be managed according to the requirements of RCRA Subtitle C regardless of the chemical similarity of a hazardous waste (contaminated snow-melt) to an exempt waste (produced water).

The January 3 memo fails to identify other wastes that may be

generated by the pipeline leak such as waste crude oil or soil contaminated at times when there is no snow, nor does it address current waste management practices for these other wastes. Since all wastes generated by the pipeline would be nonexempt. The above discussion of the contaminated snow-melt would apply other wastes equally well.

The January 3 memo also asks whether any additional standards and rules are applicable prior to disposal of a hazardous waste in a Class II well. This question may be best answered by quoting from a February 26, 1990, letter (copy attached) to the Chairman of the Alaska Oil and Gas Conservation Commission from Ronald A. Kreizenbeck, Acting Director, Water Division, EPA Region 10. This letter states:

Finally, in implementing the UIC program, EPA and the states are required to comply with other applicable environmental laws. Specifically, we must comply with the relevant provisions of the Resource Conservation and Recovery Act of 1976 (RCRA) as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA). Thus, in implementing the program we are required to be consistent with the temporary hazardous waste exemption granted to wastes produced by oil and gas development and production activities. In a similar vein, underground injection is one of the forms of land disposal of hazardous waste that is prohibited under the "land ban" provisions of RCRA as amended by HSWA. Thus, neither EPA nor the states can authorize the disposal of hazardous wastes of any kind in a Class II well.

The full text of this letter is included as Attachment 2.

Attachment 2

United States Environmental Protection Agency
Region 10
1200 Second Avenue
Seattle, Washington 98101

February 26, 1990

C.V. Chatterton, Chairman
Alaska Oil and Gas Conservation Commission
3001 Porcupine Drive
Anchorage, Alaska 99501-3192

Dear Mr. Chatterton:

I am writing in response to your August 3, 1989 letter discussing the Commission's position on the purpose of the Underground Injection Control (UIC) program and the approach which we should take to regulating Class II injection wells. The discussions in your letter give us a good understanding of your perspective on the program. We apologize for the relatively long hiatus between our receipt of your letter and the completion of this reply. We used that time to develop the reply in consultation with our attorneys and appropriate EPA Headquarters personnel. We believe that it would be worthwhile for us to articulate our understanding of the UIC program as it relates to Class II injection wells and the fluids which may be "defined" as Class II fluids, before we continue our discussion of what changes, if any, are needed in our Memorandum of Agreement (MOA).

Statutory Direction

Our understanding of the UIC program and its application to oil and gas development activities derives from the provisions of §1421 of the Safe Drinking Water Act (SDWA) which control how the program would interact with oil and gas activities.

First, EPA agrees that the purpose of the UIC program is to protect Underground Sources of Drinking Water (USDWs) from contamination. However, we disagree with your conclusion that §1421 does not create a waste management program and that we (EPA and the

State) are not in the business of regulating wastes. The SDWA is silent on how EPA and the states are to actually go about protecting USDWs, other than to say that, after the effective date of a state UIC program, the state's regulations must prohibit injection unless it is authorized by a permit or by rule. We draw two conclusions from this silence in the statute. First, EPA can choose essentially whatever means it deems are appropriate to protect USDWs. Second, no legal "person" has an inherent right to inject; that is, EPA or a state could, as some states have done, prohibit all injection in some class or classes of wells as a means of protecting USDWs.

EPA, in fact, has chosen to design and operate the UIC program as, essentially, a waste management program. Thus, the regulations often classify wells based upon the types of wastes (fluids) that would be injected in a well and the location of the injection zone with respect to USDWs. Although Class II and III wells are explicitly defined in terms of their uses rather than the fluids they inject or the location of the injection zone with respect to USDWs, each of the definitions contains implicit assumptions about the fluids which are likely to be injected and the likely location of the injection zone with respect to nearby USDWs. Similarly, the regulations specify the conditions under which injection may occur and impose a collection of design, construction, and operating requirements on the owners and operators of various classes of injection wells including Class II wells. We would, therefore, conclude that the UIC program has become a waste management (regulation) program. This is, in our view, the conceptual foundation for the operation of the program. EPA is not limited, however, in its authority to regulate any underground injection activity which may endanger USDWs, including those which may not technically constitute "waste management" (such as ground-water reinjection).

Second, we also agree that the SDWA does restrict the manner in which the UIC program may regulate oil and gas development activities. Specifically, the statute provides that:

"Regulations of the Administrator under this section for State underground injection control programs may not prescribe requirements which interfere with or impede--

(A) the underground injection of brine or other fluids which are brought to the surface in connection

with oil or natural gas production or natural gas storage requirements, or

(B) any underground injection for the secondary or tertiary recovery of oil or natural gas, unless such requirements are essential to assure that underground sources of drinking water will not be endangered by such injection." §1421(b)(2) Emphasis supplied.

This statutory language does not specify what types of fluids may or may not be injected in a well being used in oil and gas exploration, development, or production. That decision is left to the discretion of the Administrator. The statute further states that "a regulation prescribed by the Administrator under this section shall be deemed unnecessary only if, without such regulation, underground sources of drinking water will not be endangered by any underground injection." Thus, EPA and states with primacy may restrict, interfere with or impede these injection activities in any manner we deem necessary to prevent the endangerment of a USDW. This conclusion is consistent with the fact that the primary purpose of this portion of the statute is the protection of USDWs.

Finally, in implementing the UIC program, EPA and the states, are required to comply with other applicable environmental laws. Specifically, we must comply with the relevant provisions of the Resource Conservation and Recovery Act of 1976 (RCRA) as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA). Thus, in implementing the program we are required to be consistent with the temporary hazardous waste exemption granted to wastes produced by oil and gas development and production activities. In a similar vein, underground injection is one of the forms of land disposal of hazardous waste that is prohibited under the "land ban" provisions of RCRA as amended by HSWA. Thus, neither EPA nor the states can authorize the disposal of hazardous wastes of any kind in a Class II well. We can also not authorize the injection of any hazardous wastes falling within the scope of the land ban in any injection well, except under a very limited set of circumstances (see footnote 1).

When all of these statutory provisions are taken together with EPA's chosen approach of regulating injection activities based on the source and type of fluid involved, the definition of Class II fluids becomes a more critical question. This is true because the injection of any fluid determined to be a Class II fluid is

"entitled" to the less restrictive regulation provided for and by §1421(b)(2) of the SWDA.

RCRA Hazardous Wastes

As stated above, no RCRA hazardous waste may be injected down any Class II well. To determine whether a waste from oil and gas production is hazardous under RCRA, a two- to three-step analysis must be performed. First, the program director must determine whether the waste would fall within the scope of the exemption from RCRA regulation for "drilling fluids, produced wastes, and other wastes associated with the exploration, development, or production of crude oil or natural gas or geothermal energy." RCRA §3001(b)(2)(A).

The two RCRA documents we discussed previously provide guidance for answering this question. First, the regulatory determination published on July 6, 1988 (53 FR 25446) provides a list of wastes (fluids) which fall within the scope of the temporary exemption. It also provides a list of wastes which are not covered by this exemption. [Pages 25453-25454].

If the fluid is not one of the listed exempt wastes, the next (second) step which the program director must take is to determine whether it meets the RCRA definition of hazardous waste: Is the waste listed as hazardous under 40 CFR §§261.31-34 and/or does the waste exhibit one of the hazardous characteristics under 40 CFR §§261.11-.14? If the fluid is a listed or characteristic waste, then the program director must make one more check (the third step) to determine whether the fluid may still fall within the scope of the RCRA exemption. The most logical guidance for this determination is the general language in the Report to Congress (enclosed) quoted in the recommendations made in our performance audit of the Commission's UIC program.

There is one additional point of clarification which needs to be made with respect to this determination. Your letter suggests that states need to be able to make case-by-case determinations as to whether a fluid is an "associated waste" within the scope of the RCRA exemption in order to adapt to the differences among oil fields. This is not what EPA means by integrally or intrinsically associated with oil and gas production. The terms (integral and/or intrinsic) are meant to be applied to the industry as a whole, and not to any particular oil field. Thus, if a fluid is a

characteristic or listed hazardous waste, is not listed in the regulatory determination as being exempt, and is used or produced by operations other than oil and gas production operations (for example in another industry), then it is not covered by the RCRA temporary exemption and may not be disposed of via a Class II well or used in an enhanced recovery injection well.

Class II Fluids

Once a determination has been made that the waste in question is not hazardous under RCRA, the UIC program directory must then determine whether the waste may be injected into a Class II well. Class II wells are defined explicitly in the terms contained in the statute. The sections of the UIC regulations which your letter cites [40 CFR §144.5(b) and 40 CFR §146.5(b)] mostly reiterate the statutory language at §1421(b)(2) as a definition for Class II wells. The one amplification in the definition is, as described above, that fluids cannot be injected if they are classified as hazardous wastes at the time of the proposed injection.

Class II fluids are not completely defined in the UIC regulations. However, we can derive at least a partial definition from the statutory language and the related regulatory language implementing the relevant provisions of RCRA as amended by HSWA.

First, for Class II-D (disposal wells), brines or any other fluid brought to the surface in connection with natural gas storage operations or conventional oil and gas production may be injected as long as it is not a hazardous waste. These fluids may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as hazardous at the time of injection. The July 31, 1987 memorandum from Michael Cook does not alter or expand the list of allowable fluids in any substantial way. It clarifies what fluids fall within this "class" and indicates that fresh water added to or substituted for the brine may also be injected, as long as the only use of the water is for purposes integrally associated with oil and gas production or storage. Its purpose is simply to guide a state program director's decision when a fluid is proposed for injection that is not explicitly listed anywhere else as either a Class II or a non-Class II fluid.

Second, we have not attempted to develop a generic definition for the types of fluids which can be injected in enhanced recovery

wells (II-R or EOR wells). EPA, as a whole, has not done this, in part, because of the wide range of fluids which have been and are used for enhanced recovery especially in tertiary oil recovery projects. The only explicit restriction in current law and Agency policy is that hazardous waste (listed or characteristic) as defined under RCRA, HSWA, and their implementing regulations, may not be injected in enhanced recovery injection wells.

As you will recall, ARCO asked for and received permission from the Commission to inject treated sanitary waste in some of its EOR wells at Prudhoe Bay. Similarly, British Petroleum (BP) is currently designing a waste management and disposal project in which it is contemplating injecting treated industrial waste effluent in EOR wells. In each of these instances, we have concluded that it is within the scope of the Commission's delegated authority under the SDWA to approve this practice. However, an essential part of such an approval would be a requirement that the operator demonstrate that the fluids proposed for injection would be chemically similar to other fluids used for EOR such as produced water from the field or the treated water being produced at the Prudhoe Bay Waterflood Project. This demonstration would need to be made with respect to all substances of concern that might exceed acceptable levels in groundwater. Alternatively, the operator could be required to demonstrate that the proposed injectate is chemically similar to fluids typically used for secondary recovery in the industry. If tertiary recovery is ever proposed on the North Slope, then the appropriate comparison would be to fluids typically used in the industry for tertiary recovery. As a general rule, this demonstration would include injectate sampling under appropriate data quality assurance and quality control procedures. Additionally, if USDWs are present within the area of review of the EOR wells, then the approval would need to confirm that the injection of the specific proposed fluids would not contaminate or otherwise endanger these USDWs.

Conclusions

We recognize from our conversations with you and the content of your letter, that this issue is very important to the Commission. Due to the significance of your concerns, we developed this response with the assistance of our Office of Regional Counsel, EPA's Office of General Counsel, and with the advice of the Office of Drinking Water's Underground Injection Control Branch (UICB) at EPA Headquarters. All of these offices have concurred

with the views expressed in this letter concerning how a UIC program director should determine whether a particular fluid may be injected down a Class II injection well.

We would like very much to bring these issues to closure with you, as we know that they will continue to arise (as in the case of BP Alaska's proposed North Slope Waste Management Project). We recognize that Alaska's situation is, in many cases, unique, and that certain wastes can be safely injected in a manner that represents the most environmentally protective disposal alternative. Nonetheless, we are bound to interpret existing (duly adopted) regulations in a consistent manner nationwide. After you have had a chance to review this letter, please contact Janis Hastings, Chief of the Drinking Water Programs Branch at (206) 442-4092 to discuss our next steps, including changes to the MOA, to resolve the issues.

Sincerely,
Ronald A. Kreizenbeck, Acting Director
Water Division

- 1 After the applicable effective date of the land ban for the wastes in question (e.g., May 8, 1990 for wastes which exhibit a hazardous characteristic) these wastes may be land disposed (injected) only if the waste (a) meets applicable treatment standards, (b) is the subject of an approved extension to the effective date of the land ban, or (c) is the subject of an approved "no migration" petition. In all cases such disposal must be in a Class I well.

Enclosure

The test of whether a particular waste qualifies under the exemption can be made in relation to the following three separate criteria. No one criterion can be used as a standard when defining specific waste streams that are exempt. These criteria are as follows:

1. Exempt wastes must be associated with measures (1) to locate oil or gas deposits, (2) to remove oil or natural gas from the ground, or (3) to remove impurities from such substances, provided that the purification process is an integral part of primary field operations (see footnote 1).
2. Only waste streams intrinsic to the exploration for, or the development and production of, crude oil or natural gas are subject to exemption. Waste streams generated at oil or gas facilities that are not uniquely associated with exploration, development, or production activities are not exempt. (Examples would include spent solvents from equipment cleanup, or air emissions from diesel engines used to operate drilling rigs.)

Those substances that are extracted from the ground or injected into the ground to facilitate the drilling, operation, or maintenance of a well or to enhance the recovery of oil and gas are considered to be uniquely associated with exploration, development, or production activities. Additionally, the injection into the wellbore of materials that keep the pipes from freezing or serve as solvents to prevent paraffin accumulation is intrinsically associated with exploration, development, or production activities. With regard to injection for enhanced recovery, the injected materials must function primarily to enhance recovery of oil and gas and must be recognized by the Agency as being appropriate for enhanced recovery. An example would be produced water. In this context, "function primarily" means that the main reason for injecting the materials is to enhance recovery of oil and gas rather than to serve as a means for disposing of the injected materials.

3. Drilling fluids, produced waters, and other wastes intrinsically derived from primary field operations associated with the exploration, development, or production of crude oil, natural gas or geothermal energy are subject to exemption. Primary field operations encompass production-related activities but not transportation or manufacturing activities. With respect to oil production, primary field operations encompass those activities usually occurring at or near the wellhead, but prior to the transfer of oil from an individual field facility or a centrally located facility to a carrier (i.e., pipeline or trucking concern) for transport to a refinery or to a refiner.

With respect to natural gas production, primary field operations are those activities occurring at or near the wellhead or at the gas plant but prior to the point at which the gas is transferred from an individual field facility, a centrally located facility, or a gas plant to a carrier for transport to market. Primary field operations encompass the primary, secondary, and tertiary production of oil or gas.

Wastes generated by the transportation process itself are not exempt because they are not intrinsically associated with primary field operations. An example would be pigging waste from pipeline pumping stations. Transportation (for the oil and gas industry) may be for short or long distances.

Wastes associated with manufacturing are not exempt because they are not associated with exploration, development, or production and hence are not intrinsically associated with primary field operations. Manufacturing (for the oil and gas industry) is defined as any activity occurring within a refinery or other manufacturing facility the purpose of which is to render the product commercially saleable.

Using these definitions, Table 1 presents definitions of exempt wastes as defined by EPA for the purposes of this study. Note that this is only a partial list. Although it includes all the major waste streams that EPA has considered in the preparation of

this report, others may exist. In that case, the definitions listed above would be applied to determine the status of these wastes under Section 8002(m).

CHARACTERIZATION OF WASTES

Organic constituents, present at levels of potential concern in oil and gas wastes, are shown in Table 2. These include the hydrocarbons benzene and phenanthrene. Inorganic constituents of concern include lead, arsenic, barium, antimony, and fluoride.

- 1 Thus, wastes associated with such processes as oil refining and petrochemical-related manufacturing are not exempt because these processes are not an integral part of primary fuels operations.

Enclosure

Ref: 8WM-DW

United States Environmental Protection Agency
Region VII
999 18th Street - Suite 500
Denver, Colorado 80202-2405

January 3, 1991

MEMORANDUM

TO: Mike Fitzpatrick
Special Waste Branch, OSW

FROM: Paul S. Osborn
Regional Ground Water Expert

SUBJECT: Classification of Waste Fluids Associated with
Clean Up of Crude Oil Leaks in Active Oil

In response to our December 27, 1990, conversation regarding the coverage of the RCRA Oil and Gas Exemption as it relates to oil spills and pipeline leaks in active oil fields, I took a more detailed look at those portions of the UIC regulations and guidance relating to well classification. I was specifically looking at how the waste fluids from pipeline leaks would be classified for UIC purposes if they are not covered by the oil and gas exemption and fail the Modified Toxicity Characteristic Rule.

As indicated in my draft memo, which describes the issue in question, the fluids from the clean up of oil spills and leaks within an oil field are presently defined as Class II wastes under the UIC Program. This is based on the fact that the fluids were generated by a clean up of waste crude which meets the criteria of being "produced at the surface." A change of ownership of the oil within an active oil field would not affect the status of the UIC waste classification. You have indicated that the change of ownership of oil moving out of the oil fields to the main pipeline via collector lines could result in the crude oil not being covered by the RCRA Oil and Gas Exemption. The absence of the oil field exemption will most likely result in fluids associated with clean

up of crude oil being classified as hazardous because benzene levels exceed the limits established in the Modified Toxicity Characteristic Rule. The UIC regulations do not contain provisions to alter the Class II status of a given waste stream which has become hazardous because of a RCRA rule change. This appears to create a situation where the regulatory status is in conflict between the two programs.

The question created by the scenario outlined in the previous paragraph is: What additional standards and rules must the operator comply with prior to disposal of such a waste in a Class II well? The existing UIC regulations do not address such a situation. If it is determined that clean up of crude oil leaks from collector lines in active oil fields, where the oil has changed ownership, is not covered by the Oil and Gas Exemption Rule, I will need input from the Office of Solid Waste on the specific regulator actions required for disposal of hazardous Class II waste.

I would recommend that you ask OGC to consider how the change in the status of a particular UIC waste classification can be carried out.

cc: Francoise Brasier, Chief
UIC Branch, ODW
Felix Flechas, RCRA
Don Olson, Chief
Compl. & Enf. Sect., ODW