



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

DEC 5 - 1984

MEMORANDUM FOR: Vandy L. Miller, Chief
Material Licensing Branch
Division of Fuel Cycle and Material Safety

FROM: Leo B. Higginbotham, Chief
Low-Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management

SUBJECT: REQUEST FOR 10CFR 20.302 AMENDMENT TO LICENSE
HALLIBURTON SERVICES

The enclosed letter from Halliburton Services contains a request for a 20.302 amendment to their license for disposal of quantities of Iridium-192, an isotope with half-life of 74 days. Since this type of licensing request is under your purview, the Halliburton request is being forwarded for your action.

Leo B. Higginbotham, Chief
Low-Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management

Enclosure:
As stated

8604090558 860306
REG4 LIC30
35-00502-02 PDR



HALLIBURTON SERVICES

GOVERNMENT REGULATIONS DEPARTMENT

RON BECHTEL
Manager

DAN KELLY
Regulatory Specialist

Writer's Direct Dial Number
(405) 251-3749

WM Record File
426.7

WM Project _____

Docket No. _____

PDR _____

LPDR _____

DRAWER 1431, DUNCAN, OKLAHOMA 73536

Senior Environmental Engineers

STEVE BURFORD

RALPH HOUSER

BILL JONES

Environmental Engineer

JOHN PRESGROVE

Radiation Safety Officers

RICHARD LEONARDI

STEVE HOOK

November 19, 1984

Distribution:

RSA

LBA

MJL

(Return to WM, 623-SS)

Low Level Waste Division
U. S. Nuclear Regulatory Division
Washington, D. C. 20555

Dear Sirs:

Halliburton Services performs radioactive tracer studies in oil and gas wells throughout the United States in accordance with Byproduct Materials License Number 35-00502-02.

When tagging a fracturing operation the normal concentration is one millicurie Iridium-192 for each four thousand pounds of fracturing sand. The sand is transported in a viscous fluid at an average concentration of four pounds of sand per gallon of fluid. The fluid can be either aqueous or hydrocarbon. This computes to approximately one microcurie per gallon (265 picocuries/milliliter) of fluid pumped down hole into the fractured formation.

In the vast majority of the fracturing operations all the radioactive tagged sand is hydraulically pumped into the formation and remains there indefinitely. There are a few instances where a drastic pressure build up occurs and results in a sand-out. When this happens pumping of the sand laden fluid ceases and is left in the wellbore. It then becomes necessary to bail or circulate the sand laden fluid from the well and dispose of it. Due to the fact that it contains a small quantity of radioactive tracer, disposal or control is difficult (in many cases hazardous) and expensive.

Halliburton Services has tried several techniques to maintain control and satisfy regulatory requirements. In two such situations the radioactive material was circulated out of the well into a leased portable mud tank and then transferred by vacuum truck to a leased portable frac tank. The frac tank was secured at a remote location at one of our

Dupe ~~84-4090548~~

WM DOCKET CONTROL
CENTER
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field camps, properly labelled, sealed, access controlled and left for decay. The frac tank alone was leased at fifty dollars a day and we have had it leased for eighteen months.

In two other situations, one in Mississippi and one in South Texas, the radioactive sand laden fluid was circulated into a portable mud tank and transferred by hand and shovel into lined recovery drums, sealed, labelled, and transferred to our field camp location. It is my understanding that in the case of the Mississippi sand-out the drums are still secured and waiting for decay. In South Texas the drums were transported to a licensed holding facility at a tremendous cost. One of the incidents caused much concern. The carrier frac fluid was a gelled lease crude with a moderately low flash point. Two men were furnished anti-c clothing and respirators and made the transfer by bucket and shovel to recovery drums. A small spark could have resulted in disaster. This will never be done again. To my knowledge the largest of the disposal problems encountered was a deep well in Oklahoma where the sand circulated out weighed approximately 32,000 pounds and contained approximately eight millicuries of Iridium-192 coated on sand. The highest radiation level as measured by a survey meter with a GM probe at one centimeter was 0.08 mR/hr. The average over the entire sixteen tons was 0.05 mR/hr at one centimeter with a natural background of 0.02+ mR/hr. The returns were caught in a leased portable mud tank sectioned with a weir. The fluid (lease crude) was reclaimed and the sand transferred by vacuum truck to a frac tank and properly stored. Our cost to date has been thirty times the amount the customer was charged for the tracer study.

Our Chemical Research Department has determined that Iridium-192 has an extremely high ion exchange capacity and is totally absorbed by soil on immediate contact. Based on this and the fact that the Iridium-192 is baked on the sand grain at high temperatures with little or no wash-off and only has a 74 day half life, Halliburton Services in accordance with Title 10 CFR, Part 20, paragraph 20.302 requests approval for the following procedures to be used for disposal of the aforementioned generated waste.

In order to provide a procedure yielding a minimal hazard to human, animal or environment, at sparsely populated well locations and within an isolated, untrafficked area of the lease pad a trench will be dug six to eight feet deep, ten to twenty feet long, and approximately two bucket widths by a backhoe or dozer. The radioactive material will be bailed or circulated into the prepared pit and covered immediately. Radiation surveys will be performed during and after to assure no contamination to the surface. This will be done only upon approval of the well operator and land owner. Detailed reports will be made to the well operator and land owner as necessary, documenting the exact position

and depth of the disposal, the identity of the nuclide, approximate quantity in millicuries and the date of the disposal. All well locations are access controlled and the five or six feet of earth render the disposal area restricted.

There is absolutely no chance of contamination to water aquifers since the isotope is baked on sand and has a high ion-exchange capacity. There is no possibility of any hazard to human, animal or environment. The hazard exists only when it is necessary to attempt control in another prescribed procedure such as that previously attempted. The proposed procedure will never be employed within a populated area or within two hundred yards of an occupied home or an animal holding facility such as a barn or cattle lot. It will not be used if weather erosion could be a problem.

Sincerely,

Dan G. Kelly

DGK/cdd

cc: Mr. Richard A. Leonard, Jr.
Mr. Steve Hook

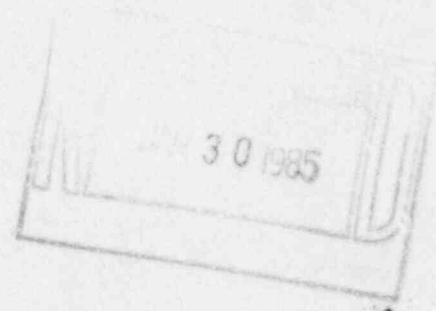


UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

12/10

BETWEEN: William O. Miller, Chief
License Fee Management Branch
Office of Administration

Regional License Section
Material Licensing Branch
FCMS, Office of Nuclear Material
Safety & Safeguards



LICENSE FEE TRANSMITTAL

A. REGION IV

1. APPLICATION ATTACHED

Applicant/Licensee: Halliburton
Application Dated: 11/19/84
Control No.: 18455
License No.: 35-00502-02

2. FEE ATTACHED

Amount: _____
Check No.: _____

3. COMMENTS

Signed _____
Date _____

B. LICENSE FEE MANAGEMENT BRANCH

1. Fee Category and Amount: 5A \$170
2. Correct Fee Paid. Application may be processed for:

Amendment ✓
Renewal _____
License _____

Signed Frances Brown
Date 1/24/85
DJ 1/25/85

Renewal
Pending
6/30/84



HALLIBURTON SERVICES

GOVERNMENT REGULATIONS DEPARTMENT

RON BECHTEL

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November 19, 1984

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REB

LBH

MJR

(Return to WM, 623-SS)

U.S. N.R.C.
FEE MGMT BRANCH

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RECEIVED

84 NOV 23 P 3:41

WM DOCKET CONTROL
CENTER

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U. S. Nuclear Regulatory Division
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November 19, 1984

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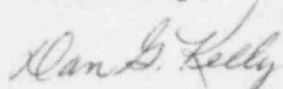
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cc: Mr. Richard A. Leonardi, Jr.
Mr. Steve Hook

18455