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Research & Development

1220



May 3, 1972

Mr. Robert E. Brinkman
Materials Branch
Division of Materials Licensing
U.S. ATOMIC ENERGY COMMISSION
Washington, D. C. 20545

Subject: Specific Information Required by
Sections 32.11(b) and (c), 10 CFR 32,
Carbon 14 and Hydrogen 3

Dear Mr. Brinkman:

In reply to your letter of April 7, 1972, below
is additional information which you requested
in accordance with Sections 32.11(b) and (c),
10 CFR 32.

32.11(b) Description of Product.

Heating oil, including such products as jet
fuel, diesel, No. 1 heating oil, No. 2 heating
oil, and No. 6 heating oil.

Intended Use of Byproduct.

Radioactive tracer tests to measure type of
flow distribution in heating oil catalytic
hydrogenation units.

Intended Use of Product Into Which Introduced.

Sold commercially as fuel oil.

Method of Introduction.

Radioactive tracer is inserted as a pulse in
front of the first reactor of the heating oil
processing unit concerned. In general, the
radioactivity is contained in a metal vessel
of cylindrical shape, closed by valves at each
end, materials introduced by pushing with a
pressure higher than the system pressure of the
parts of the unit concerned. Radioactive
material is flushed into unit with a volume of
liquid greatly in excess of the volume of the
tracer carrying liquid.

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Initial Concentration of Byproduct
Material in the Product.

Concentration in the fuel oil is
below 8×10^{-3} $\mu\text{c/ml}$ carbon 14 or
 3×10^{-2} $\mu\text{c/ml}$ hydrogen 3 listed in 30.70.

Control Methods to Assure That No More Than
Specified Concentration is Introduced.

The flow rates of feed and the product in the fuel oil processing unit are known. The volume of the blending tanks are known in advance. The amount of tracer per test is accurately measured by the use of a calibrated liquid scintillation spectrometer before introduction into the unit. Concentration of byproduct material in the final tank in the refinery is determined quantitatively. Time interval between introduction and transfer of the product and material is two to seven days.

Estimated Concentration of Radioisotopes
in Product at Time of Transfer.

The amount varies with the test. Minimum practical amount is always used and always less than exempt concentration, 8×10^{-3} $\mu\text{c/ml}$ carbon 14 or 3×10^{-2} $\mu\text{c/ml}$ hydrogen 3.

- 32.11(c) Provide reasonable assurance that the concentrations of byproduct material at the time of transfer will not exceed the concentrations in 30.70.

Total quantity used is actually measured in advance. Amount appearing is checked by line samples of effluent from unit concerned. Reconcentration of byproduct material in concentrations exceeding 30.70 are unlikely. Distillation properties of the tracer containing compounds is such that reconcentration is extremely unlikely in this intended use. Reconcentration is only possible with extremely precise distillation fractions which require extremely specialized equipment.

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Assurance that Use of Lower Concentrations
Is Not Feasible.

Our policy is to use lowest practical concentrations and of obtaining accurate measurements. In the use of Carbon 14, cost of the tracer is important. We have had enough experience over many years for this general type of application that our calculations of tracer concentration of the product are quite accurate in advance of the test.

Assurance that the product is not likely to be incorporated in any food, beverage, cosmetic, drug or other commodity or product designed for ingestion or inhalation by, or application to, a human being.

Since the products here are fuels, it is not likely that they will be incorporated in any food, beverage, cosmetic, drug or other commodity or product designed for ingestion or inhalation by, or application to, a human being.

We trust that the above information completes the requirements to amend License No. 12-00140-04.

Yours very truly,

ATLANTIC RICHFIELD COMPANY



A. I. Snow,
Chairman - Radioisotope Committee

AIS:msk