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Research & Development

1972



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

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