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

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Morton B. Margulies, Chairman
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Oscar H. Paris
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Emmeth A. Luebke
Administrative Judge
5500 Friendship Boulevard, Apt. 1923N
Chevy Chase, Maryland 20815

In the Matters of
ALL CHEMICAL ISOTOPE ENRICHMENT INC.
(AlChemIE Facility-1 CPDF)
Docket No. 50-603-CP/OL; ASLBP No. 88-570-01-CP/OL

and

(AlChemIE Facility-2 Oliver Springs)
Docket No. 50-604-CP; ASLBP No. 88-571-01-CP

Dear Administrative Judges:

On May 31, 1988, the State of Tennessee, on behalf of the Commissioner of the Tennessee Department of Health and Environment, by and through the Office of the Attorney General for the State of Tennessee, filed a request to participate in the above captioned proceedings as an interested state pursuant to 10 C.F.R.§2.715 (c). The Staff supported the State's participation in the mandatory construction permit hearing phase of these proceedings in a filing dated June 7, 1988.

The State's May 31 request stated, at page 3, that at this time it did not oppose the AlChemIE applications but that it did have certain concerns it would like to see addressed. Attached is a letter dated June 9, 1988 from the Applicant to the Staff which purports to address the State's concerns. It does not appear that copies of the letter in question went to anyone other than the Staff. In any event, the Staff has not yet reviewed Applicant's response to



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the State's concerns. Accordingly, this letter is sent to the Licensing Board and Counsel for the State of Tennessee at this time for informational purposes only.

Sincerely,

Bernard M. Bordenick

Bernard M. Bordenick
Counsel of NRC Staff

Enclosure: As stated

cc: Service List

50-603
50-604

# AlChemIE, Inc.

Al Chemical Isotope Enrichment, Inc.

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June 9, 1988

Docket No's: 50-603
50-604

Nuclear Regulatory Commission
Document Control Desk
Office Nuclear Materials Safety
& Safeguards
Washington, DC 20555

Attention: Mr. Hugh L. Thompson, Jr.
SS096-MNSS Docket Materials

Gentlemen:

The State of Tennessee in their request to participate in AlChemIE's licensing action as an interested State pursuant to 10CFR2.715(c) has raised two concerns relative to AlChemIE's operation of the gas centrifuge machines. Provided herein is AlChemIE's response to those concerns.

Concern: It appears entirely possible that the centrifuge machines proposed for use by AlChemIE may contain low levels of uranium not subject to regulation by the Commission, but subject to regulation by the State of Tennessee.

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Pine Ridge Office Park, Suite 202-B 702 Illinois Ave., Oak Ridge, TN 37830 (615) 482-0029

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Response: The uranium contained within the machines is estimated to be 95 ± 32 grams per machine at the Centrifuge Plant Demonstration Facility in Oak Ridge and 82 ± 31 grams per machine for the machines being relocated from DOE's Piketon, Ohio facility. The total amount of uranium contained at the Centrifuge Plant Demonstration Facility, machines, piping, etc., is 21.3kg. The total amount of uranium in the machines being relocated from Piketon is 59kg. Piping is not being relocated from Piketon.

Under NRC and DOE cognizance AlChemIE as a part of its NRC license, will be required to comply with the reporting requirements of 10CFR74.11, 10CFR74.13 and 10CFR74.15. These require AlChemIE to report loss or theft or attempted theft of special nuclear material, provide material status reports and provide nuclear material transfer reports, respectively. Consequently, AlChemIE will be regulated by both the NRC and DOE.

Concern: The process proposed by AlChemIE has the potential for enhancing naturally occurring radioactive material as a product.

Response: For the isotopes listed in AlChemIE's safety analysis report those that have naturally occurring radioactivity are listed in the attachment, hereto. As can be seen, only seven elements have naturally occurring radioactive isotopes and all have a half life greater the $10^{10}$years. Additionally, of these seven only tellurium and cadmium have any market potential at this time.

However, it is conceded that the gas centrifuge process will, in either the product or tails stream enrich these isotopes and

consequently, the radiological effect of a release should be estimated. If it is assumed that a product or tails cylinder of the same size as a feed cylinder and containing 176 pounds of pure radioactive tellurium-123 ruptures, then the radiological effects can be estimated. For tellurium the critical organ is the bone surface and from ICRP-30 the dose factor and effective equivalent dose factor are 0.26rem/$\mu$Ci and 0.01rem/$\mu$Ci, respectively. In that the facility volume at the AlChemIE Oliver Springs facility is somewhat smaller than the Centrifuge Plant Demonstration Facility it was assumed that the rupture of the cylinder occurred there.

Based on calculations performed by Science Applications International Corporation it was estimated that the bone surface dose for a person in the plant in which the contents of the cylinder had uniformly dispersed and breathing the air for two hours after the rupture would be $3.23X10^{-4}$rem. The effective dose after two hours would be $1.26X10^{-5}$rem.

At the maximum point of air concentration, approximately one-half kilometer downwind, the dose to a person breathing the discharge for eight hours was $3.5X10^{-9}$rem, bone surface and $1.3X10^{-10}$ effective dose. Finally, the dose to a person standing one-foot from an unruptured cylinder, neglecting the shielding effect of the cylinder was calculated to be $6X10^{-6}$rem/hr.

Similarly for cadmium-113 where the critical organ is the kidney the doses were computed. The two hour kidney and effective doses are $2.58X10^{-5}$ and $1.88X10^{-6}$rem, respectively. At one-half kilometer

and eight hour kidney and effective doses are $2.75 \times 10^{-10}$rem and $2.0 \times 10^{-11}$rem respectively.

As can be seen from the above, the calculated doses are very small. These doses are significantly less than the limiting dose in 10CFR20.101.

Finally, no natural abundance was found for carbon-14. It is assumed that its abundance is very small and therefore would not be enriched in any significantly quantity.

We trust that the above resolves the concerns expressed by the State of Tennessee, Division of Radiological Health. Should additional information be required please contact Mr. W.A. Pfeifer at AlChemIE.

Very truly yours,

ALCHEMIE, INC.

John H. Smelser, Jr.

John H. Smelser, Jr.
Chief Executive Officer

JHS/WAP/bc

cc: A. Thomas Clark, Jr./NRC

ATTACHMENT

| Isotope | Abundance | Half Life | Decay Method |
|---|---|---|---|
| Carbon - 14 | Not defined | 5730 yrs | $Beta^-$ |
| Vanadium - 50 | 0.25% | $3.9X10^{17}$ yrs | EC,gamma,Beta |
| Cadmium - 113 | 12.22% | $9X10^{15}$ yrs | $Beta^-$ |
| Indium - 115 | 95.7% | $4.4X10^{14}$ yrs | $Beta^-$ |
| Tellurium - 123 | 0.9% | $1.3X10^{13}$ yrs | EC |
| Tantalum - 180 | 0.012% | $> 10^{13}$ yrs | EC |
| Rhenium - 187 | 62.6% | $4.5X10^{10}$ yrs | $Beta^-$ |
| Osmium - 186 | 1.58% | $2X10^{15}$ yrs | Alpha |

Notes: 1) EC = electron captive
2) Carbon has been included in that some of the feed compounds contain carbon

Reference: Chart of the Nuclide, Knolts Atomic Power Laboratory, Thirteenth Edition, Revised July 1983.