RETURN TO 396-SS

AlChemIE, Inc.

All Chemical Isotope Enrichment, Inc.

February 3, 1988

U.S. Nuclear Regulatory Commission
Document Control Desk
Office Nuclear Material Safety & Safeguards
Washington, D.C. 20555

Attn: Mr. Hugh L. Thompson, Jr.
55396-MSS Docket Material

Docket No. 50-603

Gentlemen:

In response to your letter dated December 28, 1987 from Dr. A. Thomas Clark, Jr. please find enclosed the requested additional information. This information applies to AlChemIE's construction permit and operating license application for AlChemIE Facility - 1, CPDF.

We look forward to meeting with you in February to discuss our responses.

Very truly yours,

ALCHEMIE, INC.

Dennis L. Bell

Dennis L. Bell
Chief Executive Officer

Enclosure

DLB/lbm

FEE NOT REQUIRED
Supplement 1 pp
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Additional Information

for

AlChemIE Facility - 1, CPDF, Docket No 50-603

Request

Centrifuge Machine contamination

Please provide information which supports your discussion in Section 4.2.2.1 of the Preliminary Safety Analysis report pertaining to contamination of centrifuge machines by uranium. Specifically the Appendix mentioned in that section is not contained in the document. If the Department of Energy has provided information in this regard, it should be provided as part of your application.

Response

As it relates to AlChemIE's PSAR for Facility - 1, CPDF, Docket 50-603, the referenced Appendix A was inadvertently omitted. Copies of the requisite DOE letter documenting the contamination levels at CPDF are transmitted herewith.

Although not specifically stated in Appendix A the uranium contamination is in the form of uranyl fluoride (UO_2F_2). This low level of contamination will be plated on the centrifuge components and in the form of dust. In any case the bulk of the uranyl fluoride should be inside the centrifuge rotors.

Request

Decommissioning

Please provide any written agreements you have executed with the Department of Energy with regard to decommissioning.

Response

Article 7 of Contract No. DE-R005-880R21776, Centrifuge Equipment Agreement and Bill of Sale, between DOE and AlChemIE states:

> "7. Decontamination and Disposal. AlChemIE shall be responsible for the decontamination and disposal of all classified or contaminated equipment of which it has acquired ownership. It shall ascertain the cost for the protection, decontamination, and disposal of the entire classified or contaminated inventory received by AlChemIE. AlChemIE shall provide assurance, in an amount and form acceptable to DOE, that adequate funds will be available for decontamination and disposal of all classified and/or contaminated equipment should AlChemIE, for any reason, fail to do so."
>
> A similar clause will be contained in the lease and sales agreement between AlChemIE and DOE for the CPDF facility.

Request
Radioactive and Classified Waste Disposal
Please provide any written agreements you have executed with the Department of Energy with regard to acceptance of waste material 1) which is radioactively contaminated and 2) which is, in whole or in part, classified.

Response
In AlChemIE's negotiations with DOE relative to the lease of the CPDF facility and the procurement of the equipment from the Gas Centrifuge Enrichment Plant (GCEP) the disposal of classified and uranium contaminated equipment and materials has been discussed. Although no formal agreements have been reached it is our understanding that this equipment and materials will be stored or buried by DOE at the ORGDP site. This is noted in the attached Waste Managerment Plan.

Enviromental Report

1. Request Provide information describing the engineering features that will be used to prevent or mitigate the release of hazardous chemicals to the environment.

RESPONSE: (a) Loading and unloading of the feed, product and tails cylinders will be performed within an enclosed loading dock. Accidental release due to cylinder rupture associated with the task will be contained within this enclosed loading dock. If an accidental release should occur, the dock will be decontaminated prior to continued use. All materials used for decontamination will be collected and packaged for disposal in accordance with the enclosed Waste Management Plan.

(b) Feed, product and tails cylinders will be stored within the facility in a dedicated nominally air tight storage room. The storage room will be equipped with halogen and hydrocarbon monitors with an audible alarm. If a cylinder should leak, it will be removed, repaired or the contents will be transferred to a new cylinder. The storage room will be surveyed for contaminant deposition and decontaminated, if necessary.

(c) The gas centrifuge process is an inherently high vacuum system operating in the low torr to micron range, and with a low process gas inventory. Also, any disruption of this vacuum results in automatic process shut down. At shut down, isolation valves will automatically close preventing process gas release. Gas within the system will then be evacuated into a withdrawal cylinder prior to restarting the process system.

(d) All existing floor drains will be sealed prior to facility operations.

(e) All potentially hazardous chemicals associated with facility operation will be collected, packaged and disposed of as outlined in the enclosed waste management plan.

(f) Based upon the small amount of process gas in a centrifuge at any time and the fact that the process operates in a high vacuum, it is highly unlikely that a release of the process gas could be detected.

(g) All sanitary waste water will be processed by ORGDP by agreement with DOE and the Tennessee Department of Health and Environment (TDHE).

(h) The only planned releases to the environment directly associated with the CFDF operation are Xenon, Krypton and off-gas systems as discussed in 2(e) below. Those releases have been discussed with the THDE Division of Air Quality and it is expected that they will approve their release to the atmosphere.

2. Request Describe the off-gas systems for the process equipment, the ventilation system for the building, and the drain systems for process or hazardous chemical handling area.

RESPONSE: (a) There are five process off-gas systems in the building as follows: 1) Purge vacuum (PV), 2) Evacuation vacuum (EV), 3) Feed Purge and Evacuation (FPE), 4) Tails Purge and Evacuation (TPE). and 5) Product Purge and Evacuation (PPE).

Each of these systems will contain a cold trapping, a chemical trapping or a mechanical trapping system to collect the process gas, other than Xenon or Krypton as noted above, that has entered any of the off-gas piping systems during both normal process operations and off-stream operations (cylinder change-out, etc).

These traps will be installed in the inlet to vacuum pumps or in the purge piping as appropriate. All five of the process off-gas systems will be connected to a single common vent above the roof.

(b) HVAC System

Feed Area

The existing feed area has an independent HVAC System, however, this area will not be used by AlChemIE. Present plans are to utilize small "portable" systems for each process gas utilizing a hot water bath or forced hot air heating system. These systems will be self-contained and located in the cascade area as noted below and therefore require no further HVAC.

Cascade

The cascade area consists of two pad-mounted HV units and one platform-mounted unit. The first unit is located on the northeast end of the building and serves the north side of the building from the diesel generator room to corridor #1. This unit has a capacity of 33,600 cfm. The outside and return air are controlled by a switch. The thermostat is set at 85°F to maintain the cascade area temperature.

The second HV unit is located on the northwest side of the building and serves the north side of the building from corridor #1 to the northwest corner and the west side of the building. This unit has a capacity of 36,000 cfm. Both aforementioned units have freeze controllers to shut the unit down when the coil discharge temperature is below its setpoint.

The third cascade area unit is split into two 30,000 cfm capacity units, located on a platform in the equipment area at the east end of the cascade. One 30,000-cfm unit serves the east wall and around the south wall to the existing withdrawal area. The other 30,000-cfm unit feeds a perforated duct that runs along the top of the service module. Twelve temperature transmitters are located on the service module.

The service module temperature transmitters are set at 83°F and 80°F. When the 83°F temperature is sensed, an alarm is sounded, and the unit is shut down when the 80°F temperature is detected. The second area unit follows the same procedure, with the two duct temperature transmitters set at 78°F and 75°F, respectively. A drop in temperature, as described above, indicates a problem with the unit. The unit is shut down to prevent cold air from blowing on the machines.

The cascade area also contains 12 roof-mounted, damper-controlled ventilators (primarily used for summer ventilation) and six roof-mounted smoke removal fans. Should a fire occur, the operator will be alerted to shut down the system, thus sealing the building. Administrative controls will

Central Control Room (CCR)
The CCR is cooled by a roof-mounted air conditioner equipped with a steam-type humidifier. The unit contains a steam coil for heating, and cooling tower water is used as the cooling media in the condenser section. In the unlikely event of a release in the cascade area, operation of the CCR will be possible without danger to personnel through recirculation of the room air and shut-off of make-up from the outside.

(c) All floor drains will be sealed prior to operation of the facility. All potentially hazardous chemicals associated with facility operation will be collected, packaged and disposed of per the Waste Management Plan.

3. Request — Describe the quantities and types of hazardous materials which would be released from the facility under normal and abnormal circumstances. Such estimates should be supported by analysis and the environmental impact of these releases should be stated.

RESPONSE: No identified hazardous materials will be released from the facility under normal or abnormal circumstances.

4. Request — Based upon analysis discussed in Item 3, provide an environmental monitoring plan indicating species to be sampled and analayzed and methods and frequencies for such monitoring.

RESPONSE — Environmental monitoring is not proposed for this facility.

5. Request — Indicate the environmental regulations which are related to your facility and your plans for implementation.

RESPONSE: (a) Air Emissions: AlChemIE is working very closely with the TDHE-Air Quality Division in emission evaluation. AlChemIE plans to acquire a TDHE-Air Quality Permit for the discharge of Xenon, Krypton and process off-gas exhaust (see 2a above)..

(b) Hazardous Waste: An evaluation of the projected hazardous waste stream indicates that the facility will be classified as a small waste generator.

AlChemIE is seeking a determination from the TDHE-Division of Waste Management. The TDHE determination is expected by February 15, 1988.

(c) Solid Waste: An evaluation of the projected solid waste stream indicates that "special waste" will be generated. AlChemIE is seeking a determination from the TDHE-Division of Waste Management. The TDHE determination is expected by February 15, 1988. Classified waste both contaminated and uncontaminated, will be transferred to DOE for storage or burial at the ORGDP.

(d) Water Discharge Permit: All waste water will be directed into the ORGDP sanitary sewer system for treatment. The biodegradable cooling tower waste water and blowdown as well as the machine cooling water wastes, will also be directed to ORGDP facilities. A water discharge permit is not expected to be required.
TDHE-Division of Water Management is expected to provide a determination by February 15,1988.

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

May 12, 1987

SB-87-192

Mr. William A. Pfeifer, Director
Special Projects
AIChemIE
Pine Ridge Office Park, Suite 202-B
702 S. Illinois Ave.
Oak Ridge, TN 37830

Dear Mr. Pfeifer:

ESTIMATES OF CONTAMINATION LEVELS IN OAK RIDGE GASEOUS DIFFUSION PLANT (ORGDP) CENTRIFUGE FACILITIES

Reference: William A. Pfeifer to Wilbur L. Walker letter, dated February 26, 1987.

Based on your request, estimates have been made for the uranium contamination levels currently existing in the ORGDP Centrifuge Facilities. These estimates are based on accountability records and should be considered preliminary until such time as we can locate all of the supporting data which formed the basis of the estimates. I believe the level of information provided will meet the requirements for NRC. However, if you do require more exact estimates or estimates giving distributions among machines and headers, this would require removing machines and piping sections.

If you have any questions, please call me.

Sincerely,

Ronald J. Ooten

Ronald T. Ooten, Acting Director
Enrichment Expansion
Projects Division

EO-23:Ooten

Attachment

cc:
W. Manning, EO-22
W. Walker, EO-20

Attachment

A total of 21.3 kg uranium is carried on the accountability books for the CPDF. The average uranium content in the machines, based on previous studies is estimated to be 95 ± 32 grams per machine. We feel that this is a reasonable estimate for all machines regardless of position (stage) in the cascade. This assumption is based on the fact that a high percentage of the machine contamination is due to initial moisture and organic material on inside of rotor. The quantity of 21.3 Kg is distributed among 120 machines which were in CPDF and the associated piping, but not including the feed, product, or waste cylinders. Thus, the total uranium contamination and average U-235 content for the machines is 11.4 Kg and 0.09 Kg respectively with upper and lower confidence limits of ± 33 1/3%.

The total uranium in the process piping is thus 21.3 - (120 X .095 Kg) = 9.9 Kg. We again estimate the lower and upper 95 percentile limits as 6.6 and 13.2 KgU, respectively. The U-235 content is approximately 0.08 Kg.

The CPDF cascade operating history can be summarized as:

22 months at 2.88 ± 0.1% U-235 product
1 month at 3.7 ± 0.1% U-235 product
1 month at 2.2 ± 0.1% U-235 product

Because of the nature of UF_6 reactions with moisture or surface contamination, we could expect to find hot spots in the CPDF in which the U-235 concentration in total uranium might be as high as 3.7 ± 0.1 percent. We would not expect to find hot spots in the other facilities greater than 1.1% U-235 concentrations.

The total uranium contamination in the CVTF/FAEF is carried on the accountability books as 3.2 Kg. Twenty machines have been run in these facilities. A conservative estimate of 70 grams per machine would mean a total uranium content in machines of 1.4 Kg uranium. Thus, there would be 1.8 Kg uranium in the piping system.

An estimate of U-235 content can be estimated as follows:

Machines - 1400 gm at 0.011 wt fraction U-235 =	15.4 gm
Piping System - 1800 gm at 0.008 wt fraction U-235 =	14.4 gm
Total in System	29.8 gm

An estimate for AMDL is somewhat more tenuous since they were development machines. There is presently one machine in the facility. A total of 9 or 10 machines had been run in AMDL. The buildup of uranium in the machines is estimated as 45 gms per machine (about 1/2 of that for the CPDF). Thus, the total uranium in the 10 machines would have been 450 grams. Therefore, the total uranium in the piping system would have been 585 grams. At present, the uranium contamination would be:

Machine	45 grams at 1.1% U-235 =	0.5 gm
Piping	585 grams at 0.71% U-235 =	4.29 gm
	630 grams	4.34 gm

In addition to the above, small quantities of uranium deposits will exist in the purge and evacuation systems. It is estimated that 10-15 Kgs uranium were collected on the several traps and that the associated piping might contain 10% of that. We thus estimate that the purge and evacuation piping might contain 1-1.5 Kgs uranium. A breakdown into a distribution finer than this would be a guesstimate.

Gamma radiation surveys during the last few days have failed to reveal data to determine uranium deposit or the assays thereof.

More exact estimates and estimates giving distributions among machine and headers (including assays) in the seven stages will require removing machines and piping sections with complete dissolution and determination of the uranium contamination. We will continue to estimate the distribution of contamination within the process piping and will provide a recommendation at a later date relative to obtaining the additional data.

WASTE MANAGEMENT SUMMARY

120 MACHINE GAS CENTRIFUGE PLANT

CPDF FACILITY

STABLE ISOTOPE SEPARATION

ALCHEMIE, INC.

Description of Waste	Classification	Contamination	Quantity	Method of Disposal
Paper & Other Office Materials	U	U	Varies	Commercial garbage, once/week
Classified Documents	C	U	Varies	Return to DOE *
Floor Sweepings	U	U	100#/yr	Commercial garbage, once/week
Sanitary Sewer	U	U	50gpm max.	DOE/ORGDP treatment plant *
Storm Drainage	U	U	Varies	DOE/ORGDP underground system *
Steam Condensate	U	U	20gpm max.	Return to DOE/ORGDP steam plant *
Fire Water	U	U	As reqd	Storm drain *
Cooling Tower Blowdown, Biodegradable	U	U	100 gal/ yr	DOE/ORGDP storm drain *
Machine Cooling Water Leakage or Drainage, Biodegradable	U	U	50 gal/ yr	DOE/ORGDP storm drain *
Crankcase Oil for Diesel Generators	U	U	50 gal/ yr	Commercial disposal, change once/year
Vacuum Pump Oil	U	Toxic	150 gal/ yr	ChemWaste, Emelle, Ala. Dispose of in 50 gallon increments.

* Disposal at ORGDP to be negotiated with DOE as noted.

Description of Waste	Classification	Contamination	Quantity	Method of Disposal
Off-Gas Trapping Materials	U	Toxic	200#/yr	ChemWaste, Emelle, Ala. Ship to waste on six months basis.
HVAC Filters	U	U	150#/yr	Commercial garbage as replaced
Machine Mount Hardware	U	U	Five sets infant failures, 2 sets/yr	Scrap metal & commercial garbage
Protective Equipment (gloves, air masks, etc.)	U	U, Uranium, Toxic, & Mixed	100#/yr	Non-contaminated to commercial garbage. Uranium to DOE/ORGDP. Toxic to Emelle, Ala. Bag mixed waste and store for destruction in TOSCA facility at DOE/ORGDP or some other disposal site as available. Selective storage as used. Ship to waste on six months basis*
Misc. Nuts, Bolts Gaskets, etc.	U	U	200#/yr	Scrap metal and commercial garbage
Misc. Utility Mechanical Equip. (pumps, valves, etc.)	U	U	500#/yr	Scrap metal and commercial garbage
Misc. Electrical Electronic Equipment, PC Boards, etc.	U	U	100#/yr	Scrap metal and commercial garbage
Gauges, Pressure Elements, Etc.	U	U and Toxic	50#/yr	Scrap metal, commercial garbage and ChemWaste, Emelle, Ala. Selective storage as used. Ship to waste on six months basis.

*Disposal at ORGDP to be negotiated with DOE as noted.

Description of Waste	Classification	Contamination	Quantity	Method of Disposal
Misc. Process Equipment, Piping Valves, Flex. Connectors, O-rings, etc.	U & C	U, Uranium Toxic, & Mixed	500#/yr	Unclassified uncontaminated to scrap metal and commercial garbage. Classified, uranium, and uncontaminated to DOE/ORGDP. Unclassified toxic-contaminated to Emelle, Ala. Mixed and toxic contaminated, unclassified and classified, thru multi-stage decontamination and recovery. Classified waste to DOE/ORGDP unclassified waste to commercial garbage. Selective storage as used. Ship to waste on six month basis. *
Failed Centrifuge	C	Uranium	Five infant failures	Rotor, column, scoops, heat shield, lower drive, lower suspension, upper suspension & diffusion pump to DOE/ORGDP for burial. Reuse casing, process lines, lower head, wiring harness, and support yoke. Ship to waste as failures occur.*
Failed Centrifuge	C	Mixed	Two per year	Rotor, column, scoops, heat shield, lower drive, lower suspension, misc. gaskets and o-rings, thru multi-stage decontamination and recovery - waste to DOE/ORGDP for Burial. Declassify upper suspension, clean in multi-stage decontamination and recovery, reuse or waste to scrap. Clean as required and reuse diffusion pump, casing,

*Disposal at ORGDP to be negotiated with DOE as noted.

Description of Waste	Classification	Contamination	Quantity	Method of Disposal
				process lines, lower head, wiring harness, and support yoke. Ship to waste as failures occur.*
Freon TP-35	C	Mixed	10 gal/ yr	Bottle and store for destruction in the TOSCA facility at DOE/ORGDP or some other waste disposal site as available. Ship to waste once/year. *
Water/sand Mixture	C	Mixed	150 gal/ yr	Separate classified material, toxic, and uranium wastes. Uranium and classified waste to DOE/ORGDP. Toxic waste to Emelle, Ala. Reuse sand. Ship to waste once/year. *
Centrifuge Oils	C	U & Mixed	2 gal/ yr	Oil from lower suspension, upper suspension, and column damper are silicone base and will become part of failed centrifuge. The 50 to 60 cc of fluorinated hydrocarbon oil in the diffusion pump will be flushed with Freon TP-35 for destruction in the TOSCA facility at DOE/ORGDP or some other waste disposal site as it becomes available. Ship to waste once/year. *
Rags, Chemical Wipes, etc.	C	U & Mixed	25#/yr	Bag and store for destruction in the TOSCA Facility at DOE/ORGDP or some other waste disposal site as available. Ship to waste on six months basis. *
Vacuum System Exhaust Trapping on Scrubbing Materials	U	Toxic	50 Gal/yr	ChemWaste, Emelle, Ala. Ship to waste on six months basis.

*Disposal at ORGDP to be negotiated with DOE as noted.

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