December 29, 1965

SNM-928 License Amendment-Supporting Information for Scrap Recovery Activities (Process Area D)

References to pertinent previous submissions:

1) Original description of Scrap Recovery Operations - Supplement No. 4, June 2, 1965 (12 pages).

2) Supporting information, October 29, 1965 (10 pages).

The following information supersedes any possible conflicting criteria previously submitted for the Cimarron Facility. The equipment designations and neutron interaction calculations given in reference 2 are still accurate and applicable.

To clarify matters and aid in evaluating our up-to-date process descriptions, the following completely itemized listing of the current scrap recovery facilities is given with the applicable changes noted and appropriately described:

| Dwg. Item | Description |
|---|---|
| A | Pre-process Inspection Hood - no changes |
| B | Degreaser - no changes |
| C | Power Shear - no changes |
| D | Miscellaneous Batch Dissolvers - no changes |
| E | Filters - The filter systems proposed for use in the scrap recovery areas are always nuclearly safe by volume. The units are plate and frame filter presses capable of holding a maximum of 9 plates with internal measurements 5" x 5" x 3/4". The calculated total containment volume of a filter unit is thus about 186 $in^3$ including a 10% excess for solution feed and discharge lines. The filter dimensions 7" x 7" x 24" used in the interaction calculations represent maximum overall external dimensions only and were used to demonstrate and provide extreme conservatism in the interaction analyses. |
| F | Ion Exchange Column - no changes. |
| G | Destructive Distillation Unit - no changes |
| H | Uranium and Graphite Burner Hood - The hood is installed in the location shown on drawing NPD-222 (Rev. 8). Materials such as scrap uranium metal and contaminated graphite will be burned in this hood to convert the uranium to a form better suited for subsequent acid dissolution.<br><br>The equipment for burning contaminated graphite such as scrap reactor fuel materials consists of several nuclearly safe diameter burners made of 5" schedule 40 pipe by 3 feet long. The pipe burners are located in an in-line position in the hood on 19 inch centers. Flue gases pass through metal baffles at the top of each burner and are then vented |

through a cloth filter bag (Max. 5" ID filter container by 24") backed up with an absolute filter before exhausting to one of the main exhaust ducts in the plant. Scrap materials fed to the graphite burners will always have uranium densities less than 3.2 g U/cc and nuclear safety is assured by the use of 5" diameter pipes.

A similar unit for burning scrap uranium metal is designated to be geometrically nuclearly safe for heterogeneous feed material such as small metal pieces, machine turnings, sawdust, etc. The uranium burner consists of a 3 foot length of 3" diameter schedule 160 pipe and is nuclearly safe for uranium metal at any enrichment. The uranium burner is located in the hood at a center-to-center distance of 39 1/2" from the nearest graphite burner.

The ash remaining from either burning cycle is allowed to cool and is collected in a geometrically nuclearly safe vacuum cleaner (max. 5" ID). The uranium bearing ash is transferred for subsequent treatment to an acid dissolution operation for purification and recovery of the contained uranium.

I Crusher and Pulverizer - In reply to your specific question about a possible buildup of material in this unit, we submit that the pulverizer and crusher are electrically interlocked such that the pulverizer must be operating for the crusher to operate. Furthermore, an operator will be in constant attendance of this equipment while material is being fed to assure that the equipment is functioning properly. Previous operating experience with this type of equipment has demonstrated to us that it is incredible to have an unsafe accumulation of material in the discharge of the hammermills with operator controlled feeding as we propose. We contend that the crusher-pulverizer unit is nuclearly safe for its proposed use by design and stipulated administrative controls for batch feeding. We emphasize again that only dry materials will be fed to this unit and there are no water lines in the hood or the environment which could in any way cause flooding of the system.

J Tank Dissolvers - no changes

K Solids Separating Equipment - no changes

L Solution Accountability Weigh Stations - no changes

M Solution Storage - no changes

N Solvent Extraction Equipment - This equipment has been transferred from our plant in Cushing, Oklahoma, and is relocated as shown on drawing NPD-222 (Rev. 8) on the south wall of the solvent extraction area. Seven columns used in a batch uranium extraction process are numbered on the drawing as #23 through #29 and have the dimensions given in our interaction analysis (reference 2). The tanks (max. 5" ID) are safely spaced and mounted in-line with 30 inch center-to-center separations. The units consist of various columns and tanks for extraction, strip, scrub, process storage and overflows.

O Solvent Extraction - Equipment items O are located in the solvent extraction area on drawing NPD-222 (Rev. 8). This equipment is identified as tanks #1 through #22 and #30 through #33, and consists of separate solvent extraction process lines. The dimensions of the various units are accurately given in the interaction analysis (reference 2). Tanks #8 through #15 are nuclearly safe extraction, scrub and strip columns of maximum 5" ID and are mounted in-line on 30" centers. The remaining tanks are used for reagent storage, overflows, surge tanks and solvent flasher tanks. These tanks are also fixed in position and are generally mounted with 24" center-to-center spacings.

P Finishing Operations - The purified uranium solutions obtained from the solvent extraction operations are processed to convert the uranium to a form suitable for return to the AEC or for internal fuel conversion processes. The finishing operations consist of evaporation, denitration, product grinding and packaging. All of these operations are performed in equipment which is geometrically nuclearly safe for full enrichment materials.

The area contains evaporator process lines separated by five feet with the various tank dimensions given in our interaction analysis (reference 2). Each line has two safe geometry hold tanks (#11, 12, 18 and 19 on drawing NPD-222, Rev. 8) of maximum 5" ID for storing the purified uranium feed solution prior to evaporation. Tanks #7 through #10 and #14 through #17 are the evaporators which are electrically heated 5" ID tanks used for boiling off water to concentrate the solutions. Tanks #6 and #13 are used for storage of the concentrated product solution. The remaining tanks in the area shown on the drawing represent vapor condensers for each evaporator and condensate surge tanks. The evaporators and storage tanks are fixed in position on 3 foot centers.

The denitrator (item P-4) is also nuclearly safe by geometry. The mixing chamber of the denitrator is 5" ID by 18" long and has an overflow discharge opening such that the unit will never be more than about half-filled with uranium recovery products. The product from the denitrator will normally be fed through a grinder (item P-6) for comminution to a desired particle size. Total volume of the grinder, including hammermill, feed screw and feed funnel is less than two quarts. Following comminution in the grinding hood, the pulverized product is collected in safe geometry containers and transferred to the packaging station (item P-7) where the finished product is appropriately weighed, sampled and packaged.

Q $UF_6$ Cylinder Washing Hood - no changes

R Equipment Cleaning Station - no changes

S Batch Dissolution Tanks and Evaporators - The equipment in this area has been relocated from our Cushing Plant and consists of four dissolvers (tanks #1 through #4 on drawing), four evaporators (tanks #9 through #12), three process storage tanks (#5, 6 and 7) and a condenser overflow and level control pot (tank #8). The dimensions of the various tanks are given in our interaction analysis (reference 2). All of the tanks are

permanently mounted with 33" separation between centers for the dissolvers and evaporators and 30" separation between centers for the storage and overflow tanks. A hood for boildown of the recovery products is also located in the area as shown on the drawing. This hood may contain four pans 11" diameter by 3" high in fixed positions in-line with 23" between centers.

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