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AMERICAN NUCLEAR CORPORATION

40-4492

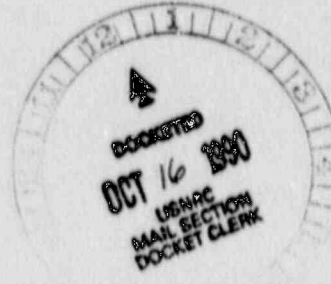
RETURN ORIGINAL TO PDR, HQ

JOHN C. FERGUSON, PRESIDENT
TELEPHONE (307) 265-7212

October 11, 1990

314 WEST MIDWEST AVE
P.O. BOX 2713
CASPER, WYOMING 82602

Ramon Hall
U.S. Nuclear Regulatory Commission
Uranium Recovery Field Office
Region IV
P.O. Box 25325
Denver, CO 80228



Re: SUA-667
Docket No. 40-4492

Dear Mr. Hall:

American Nuclear Corporation has entered into an agreement with Power Resources, Inc. to permanently dispose of radioactive waste material generated under Source and Byproduct Materials License SUA-1511 at their Highland Uranium ISL Project near Douglas, Wyoming. The agreement provides for radioactive waste disposal at American's Gas Hills mill site, subject to NRC's and other applicable regulatory approval, until December 31, 1992. It is estimated that their clean up operation will generate 500 cubic yards of PRI's waste material for disposal during this period. The waste material will consist of pond residue, pond liner, contaminated soils, process filters, miscellaneous fittings and parts, and building materials. The waste material is contaminated with the typical byproducts associated with an insitu uranium operation (Radium-226 and natural uranium). The estimated weighted average Radium-226 concentration for the waste material is expected to average 550 pCi/gram by volume. The pond sludge should not exceed a maximum of 50% contained moisture. Other hazardous waste materials will not be accepted for disposal.

Waste material shipped to the site will be accompanied by a manifest describing the waste material (activity, description, etc.) in accordance with all State and Federal requirements. The waste material will be permanently disposed of in a specific area of Tailings Pond No. 1 as shown on the attached plat. A permanent record will be kept showing the location of each waste material shipment placed at the site. Free volumes in the waste material will be minimized by filling, sectioning or crushing prior to placement. The waste material will be placed on the surface of the Tailings Pond or in shallow trenches, as appropriate. A one foot (1') thick intermediate cover will be placed over the waste material after each shipment. Contaminated soils and solids will be placed in layers not exceeding twelve inches (12") in thickness and will

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Certified By Mary C. Hood 332

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be compacted with at least one pass of the construction equipment. Evaporation pond residues will be spread in containment areas to enhance evaporation prior to covering.

American's approved reclamation plan provides for a minimum of four feet (4') of fill material, five and one-half feet (5.5') of compacted cover and one-half foot (.5') of topsoil to be placed over the waste disposal area. The attached calculation was made utilizing Regulatory Guide 3.64's "Calculation of Radon Flux Attenuation By Earthen Uranium Mill Tailings Covers", BASIC program. The radon flux calculation was 15.8 pCi/m²s. This was achieved with the before mentioned cover thickness. The parameters used are identified and attached to the calculation.

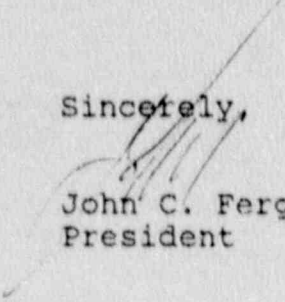
American's personnel radiation program will be expanded to include an air particulate monitor located in the vicinity of the disposal activities. The air pump filter will be site analyzed utilizing an energy independent alpha counting system (SAC R-5 and scaler) calibrated on a semiannual frequency. The gross alpha activity will be recorded and documentation will be made regarding employee exposure concentrations. The pump will be operating during the waste disposal and intermediate covering activities for this proposed amendment. No other changes to the program will be made.

The disposal of the PRI waste material in Tailings Pond No. 1 will not effect American's approved reclamation plan contours or elevations as the material will be substituted for other fill material located outside the licensed area. Receipt of the waste material will not interfere with our estimated time table for completion of reclamation on Tailings Pond No. 1 by the end of 1992.

American Nuclear hereby requests that License SUA-667 be amended to allow for the permanent disposal in Tailings Pond No. 1 of up to 500 cubic yards of waste material generated under License SUA-1511.

If you have any questions, please feel free to contact Bill Salisbury or myself.

Sincerely,


John C. Ferguson
President

JCF/WCS/mk

October 2, 1990

SUA-667, DOCKET No. 40-4492

AMERICAN NUCLEAR CORPORATION'S COVER CALCULATION FOR TAILINGS POND NO. 1, in association with the License Amendment for accepting waste material from Power Resources, Inc.'s Wyoming operation.

Regulatory Guide 3.64, "Calculation Of Radon Flux Attenuation By Earthen Uranium Mill Tailings Covers", and its associated BASIC program were used for the following cover calculation.

Constants as identified in the program were not changed. The print out from the RADON1-2.BAS program is attached and General Parameters are outlined accordingly.

The five layers identified are:

| | |
|---------|--|
| Layer 1 | Tailings |
| Layer 2 | Power Resources, Inc.'s ISL Waste Material |
| Layer 3 | Fill Material |
| Layer 4 | Compacted Cover Material |
| Layer 5 | Topsoil. |

Laboratory analyses were performed on the tailings and cover material so that site specific values of the following parameters could be entered into the program:

| | |
|----------------------------------|-------|
| Tailings Porosity | 0.57 |
| Tailings Weight % Moisture | 35% |
| Cover Material Weight % Moisture | 11.9% |

Regarding site specific historical data the following assumptions were made and entered into the program:

| | | |
|--|------|----------|
| Tailings in TP#1 | | |
| Thickness (uniform) | 457 | cm |
| Radium Activity (uniform) | 226 | pCi/gm |
| Power Resources, Inc.'s Waste Material | | |
| Thickness (uniform) assuming a 200' x 200' disposal area | 10 | cm |
| Porosity (default) | 0.40 | unitless |
| Radium Activity (uniform) | 550 | pCi/gm |
| Weight % Moisture (default) | 10% | |
| Fill Material | | |
| Thickness (uniform) | 122 | cm |
| Porosity (default) | 0.40 | unitless |
| Radium Activity (uniform) | 50 | pCi/gm |
| Weight % Moisture (default) | 10% | |
| Compacted Cover | | |
| Thickness (uniform) | 167 | cm |
| Porosity (default) | 0.40 | unitless |
| Radium Activity (uniform) | 10 | pCi/gm |
| Weight % Moisture (default) | 10% | |
| Topsoil | | |
| Thickness (uniform) | 15.2 | cm |
| Porosity (default) | 0.40 | unitless |
| Radium Activity (uniform) | 0 | pCi/gm |
| Weight % Moisture | 6% | |

RADON FLUX, CONCENTRATION AND TAILINGS COVER THICKNESS
ARE CALCULATED FOR MULTIPLE LAYERS

PRI Waste to TP#1

CONSTANTS

| | | |
|---------------------------------------|----------|-----------------|
| RADON DECAY CONSTANT | .0000021 | s ⁻¹ |
| RADON WATER/AIR PARTITION COEFFICIENT | .26 | |
| SPECIFIC GRAVITY OF COVER & TAILINGS | 2.65 | |

GENERAL INPUT PARAMETERS

| | | |
|-------------------------------------|----|-------------------------------------|
| LAYERS OF COVER AND TAILINGS | 5 | |
| DESIRED RADON FLUX LIMIT | 20 | pCi m ⁻² s ⁻¹ |
| LAYER THICKNESS NOT OPTIMIZED | | |
| DEFAULT SURFACE RADON CONCENTRATION | 0 | pCi l ⁻¹ |
| SURFACE FLUX PRECISION | .9 | pCi m ⁻² s ⁻¹ |

LAYER INPUT PARAMETERS

LAYER 1 Tailings

| | | |
|--------------------------------------|-----------|--------------------------------------|
| THICKNESS | 457 | cm |
| POROSITY | .57 | |
| CALCULATED MASS DENSITY | 1.1395 | g cm ⁻³ |
| MEASURED RADIUM ACTIVITY | 226 | pCi/g ⁻¹ |
| DEFAULT LAYER EMANATION COEFFICIENT | .35 | |
| CALCULATED SOURCE TERM CONCENTRATION | 3.321D-04 | pCi cm ⁻³ s ⁻¹ |
| WEIGHT % MOISTURE | 35 | % |
| MOISTURE SATURATION FRACTION | .700 | |
| CALCULATED DIFFUSION COEFFICIENT | 5.410D-03 | cm ² s ⁻¹ |

LAYER 2 PRI ISL Waste

| | | |
|--------------------------------------|-----------|--------------------------------------|
| THICKNESS | 10 | cm |
| DEFAULT POROSITY | .4 | |
| CALCULATED MASS DENSITY | 1.59 | g cm ⁻³ |
| MEASURED RADIUM ACTIVITY | 550 | pCi/g ⁻¹ |
| DEFAULT LAYER EMANATION COEFFICIENT | .35 | |
| CALCULATED SOURCE TERM CONCENTRATION | 1.607D-03 | pCi cm ⁻³ s ⁻¹ |
| WEIGHT % MOISTURE | 10 | % |
| MOISTURE SATURATION FRACTION | .397 | |
| CALCULATED DIFFUSION COEFFICIENT | 1.769D-02 | cm ² s ⁻¹ |

LAYER 3 Fill Material

| | | |
|--------------------------------------|-----------|--------------------------------------|
| THICKNESS | 122 | cm |
| DEFAULT POROSITY | .4 | |
| CALCULATED MASS DENSITY | 1.59 | g cm ⁻³ |
| MEASURED RADIUM ACTIVITY | 50 | pCi/g ⁻¹ |
| DEFAULT LAYER EMANATION COEFFICIENT | .35 | |
| CALCULATED SOURCE TERM CONCENTRATION | 1.461D-04 | pCi cm ⁻³ s ⁻¹ |
| WEIGHT % MOISTURE | 11.9 | % |
| MOISTURE SATURATION FRACTION | .473 | |
| CALCULATED DIFFUSION COEFFICIENT | 1.299D-02 | cm ² s ⁻¹ |

LAYER 4 Compacted Cover

| | | |
|--------------------------------------|-----------|--------------------------------------|
| THICKNESS | 167 | cm |
| DEFAULT POROSITY | .4 | |
| CALCULATED MASS DENSITY | 1.59 | g cm ⁻³ |
| MEASURED RADIUM ACTIVITY | 10 | pCi/g ⁻¹ |
| DEFAULT LAYER EMANATION COEFFICIENT | .35 | |
| CALCULATED SOURCE TERM CONCENTRATION | 2.922D-05 | pCi cm ⁻³ s ⁻¹ |
| WEIGHT % MOISTURE | 11.9 | % |
| MOISTURE SATURATION FRACTION | .473 | |
| CALCULATED DIFFUSION COEFFICIENT | 1.299D-02 | cm ² s ⁻¹ |

LAYER 5 Topsoil

| | | |
|--------------------------------------|-----------|--------------------------------------|
| THICKNESS | 15.2 | cm |
| DEFAULT POROSITY | .4 | |
| CALCULATED MASS DENSITY | 1.59 | g cm ⁻³ |
| MEASURED RADIUM ACTIVITY | 0 | pCi/g ⁻¹ |
| DEFAULT LAYER EMANATION COEFFICIENT | .35 | |
| CALCULATED SOURCE TERM CONCENTRATION | 0.000D+00 | pCi cm ⁻³ s ⁻¹ |
| WEIGHT % MOISTURE | 6 | % |
| MOISTURE SATURATION FRACTION | .238 | |
| CALCULATED DIFFUSION COEFFICIENT | 3.131D-02 | cm ² s ⁻¹ |

DATA SENT TO THE FILE 'RNDATA' ON DRIVE A:

| N | F01 | CN1 | ICOST | CRITJ | ACC |
|---|------------|-----------|-------|-----------|-----------|
| 5 | -1.000D+00 | 0.000D+00 | 0 | 2.000D+01 | 9.000D-01 |

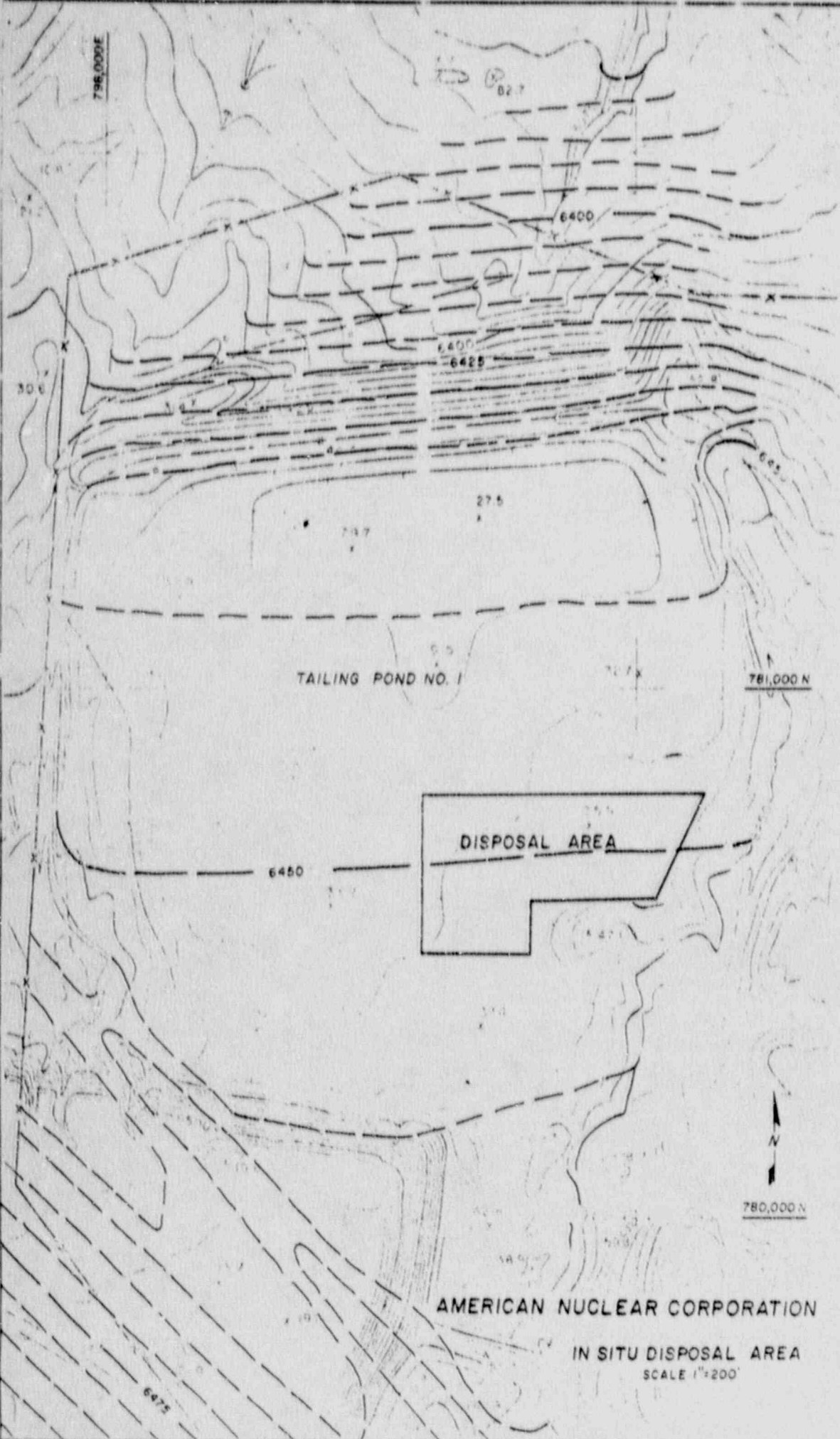
| LAYER | DX | D | P | Q | XMS | RHO |
|-------|-----------|-----------|-----------|-----------|-----------|-------|
| 1 | 4.570D+02 | 5.410D-03 | 5.700D-01 | 3.321D-04 | 6.997D-01 | 1.139 |
| 2 | 1.000D+01 | 1.769D-02 | 4.000D-01 | 1.607D-03 | 3.975D-01 | 1.590 |
| 3 | 1.220D+02 | 1.299D-02 | 4.000D-01 | 1.461E-04 | 4.730D-01 | 1.590 |
| 4 | 1.670D+02 | 1.299D-02 | 4.000D-01 | 2.922D-05 | 4.730D-01 | 1.590 |
| 5 | 1.520D+01 | 3.151D-02 | 4.000D-01 | 0.000D+00 | 2.385D-01 | 1.590 |

BARE SOURCE FLUX FROM LAYER 1: 9.606D+01 pCi m⁻² s⁻¹

RESULTS OF THE RADON DIFFUSION CALCULATIONS

| LAYER | THICKNESS (cm) | EXIT FLUX (pCi m ⁻² s ⁻¹) | EXIT CONC. (pCi l ⁻¹) |
|-------|-------------------|---|--------------------------------------|
| 1 | 4.570D+02 | 2.036D+01 | 1.246D+05 |
| 2 | 1.000D+01 | 6.954D+01 | 1.760D+05 |
| 3 | 1.220D+02 | 3.368D+01 | 6.052D+04 |
| 4 | 1.670D+02 | 1.591D+01 | 1.516D+03 |
| 5 | 1.520D+01 | 1.578D+01 | 0.000D+00 |

796,000E



TAILING POND NO. 1

DISPOSAL AREA

781,000 N

780,000 N

AMERICAN NUCLEAR CORPORATION

IN SITU DISPOSAL AREA
SCALE 1"=200'