AMERICAN NUCLEAR CORPORATION

40-4492

STEPHEN A. CARPENTER, PRESIDENT
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P.O. BOX 2713
CASPER, WYOMING 82602

November 16, 1992

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RETURN ORIGINAL TO PDR, HQ.

U. S. Nuclear Regulatory Commission
Region IV
Uranium Recovery Field Office
730 Simms Street
Golden, Colorado 80401

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Re: SUA-667
Docket No. 40-4492

Attention: Ms. Dawn L. Jacoby

Dear Mr. Jacoby:

During a meeting with James L. Grant you requested a copy of the specifications that will govern the construction of the covers on tailings ponds 1 and 2 at our Gas Hills site, laboratory testing to support the calculations of radon flux from the completed covers, and a map delineating the drainage areas around the tailings ponds. The requested material is enclosed.

Should you have any questions regarding this material please advise.

Sincerely,

William C. Salisbury

William C. Salisbury
Vice President

WCS:flm
Enclosures - 5 copies

080044

Certified By Mary C. Hardt

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FOR
Add Info
92-0074

American Nuclear Corporation

November 5, 1992

Laboratory Measurements of Radon Emanation Coefficients

Tailings

Pond	North-Coordinate	East-Coordinate	Emanation Coefficient	Average Coefficient
Tailings Pond 1				0.1404
	781361	798910	0.1736	
	781068	798152	0.1643	
	780300	798800	0.0832	
Tailings Pond 2				0.1513
	779800	800800	0.1825	
	778800	800800	0.1532	
	778600	800600	0.0966	
Bullrush				0.1319
	779400	796600	0.1227	
	779700	796100	0.1410	

Notes:
1. the average values indicated for each tailings source were used in the emission calculations
2. Source: Energy Laboratories, Inc. report titled American Nuclear, Gas Hills; November 19, 1991

Potential Cover Soils

Boring	Depth Interval	Emanation Coefficient	Suitability for Cover (based on acidity)
5	30 - 40	0.156	Unsuitable
6A	30 - 40	0.014	Suitable
10	45 - 55	0.156	Suitable
21C	5 - 20	0.043	Cobble Layer
37	35 - 55	0.112	Unsuitable
40	5 - 20	0.136	Suitable

Notes:
1. a conservatively large value of 0.2 was used as the emanation coefficient in the emission calculations
2. Source: Energy Laboratories, Inc. report titled Soil Analysis report - American Nuclear Corporation; October 5, 1992.

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

SOIL ANALYSIS REPORT - AMERICAN NUCLEAR CORPORATION

SAMPLE I.D.:	#5	#6A	#10	#21C	#39	#40
Sample Date:	---	---	---	---	---	---
Report Date:	09-29-92	09-29-92	09-29-92	09-29-92	09-29-92	09-29-92
Sample Number:	92-29189	92-29190	92-29191	92-29192	92-29193	92-29194
Radon Emanation:						
A° - Initial Activity net cpm after de-emanation	22.8	21.1	46.6	15.6	23.9	20.4
A_{∞} - Final Activity net cpm after 15 days	27.0	21.4	55.2	16.3	26.9	23.6
Radon Emanation Coefficient $(A_{\infty} - A^{\circ})/A_{\infty}$	0.156	0.014	0.156	0.043	0.112	0.136

Report Approved By: R.A. Seaburg

kmk

AMERICAN NUCLEAR CORPORATION - SOILS ANALYSIS

Project: Gas Hills
Report Date: November 19, 1991
Sample Date: October 16, 1991

Sample I.D.	TP No.1 NE	TP No. 1 NW	TP No.1	TP No. 2	TP No. 2	TP No. 2	TP No. 2	Bullrush	Bullrush
	N781361	N781068	N780300	N779800	N779000	N778800	N778600	N779400	N779700
	E798910	E798152	E798800	E800800	E800400	E800800	E800600	E796600	E796100
Elevation:	6424	6426	6433	6485	6506	6513.3	6519.5	6460-6457	6495-6485
Sample No.:	91-35914	91-35915	91-35916	91-35917	91-35918	91-35919	91-35920	91-35921	91-35922
Parameters:									
Radium 226 (pCi/g)	547	511	236	353	300	41.0	73.3	44.7	128
Precision	1.6	1.5	1.0	1.3	1.2	0.4	0.6	0.5	0.8
Emanation Coef.	0.1736	0.1643	0.0832	0.1825	0.1730	0.1532	0.0966	0.1227	0.1410
	TP No. 1			TP No.2				Bullrush	
Avg. Ra226 (pCi/g)	431			192				86.35	
Avg. Emanation Coef.	0.1404			0.1513				0.1319	

Q.A. MANAGER: K.A Starling
Energy Laboratories, Inc.
P.O. Box 3258
Casper, WY 82602

Data Analyzed by Chen Northern - Job No. 92-4312:

	TP No. 1	TP No. 1	TP No. 1	TP No. 2	TP No. 2	TP No. 2	TP No. 2
	N780300	N781361	N781068	N778600	N778800	N779800	N779000
	E798800	E798910	E798152	E800600	E800800	E800800	E800400
	6436	6427	6428	6519	6513	6485	6511
Moisture Content (%)	49.80	59.70	64.70	8.50	15.90	45.70	35.90
Dry Density (pcf)	64.90	57.20	57.80	87.40	84.80	64.20	75.30
Specific Gravity (%)	2.61	2.56	2.64	2.63	2.64	2.56	2.63
Degree of Sat. (%)	86.10	85.10	92.30	25.40	44.60	78.50	80.00
In-Place Porosity (%)	60.20	64.20	64.90	46.70	46.50	59.80	54.10
	TP No. 1			TP No. 2			
Avg. Moisture Content	58.07			26.50			
Avg. Dry Density	59.97			77.93			
Avg. Specific Gravity	2.60			2.62			
Avg. Degree of Sat.	87.83			57.13			
Avg. In-Place Porosity	63.10			52.28			
Mass Density = Dry Density * (1+decimal % moisture)							
Avg. Mass Density (pcf)	94.79			98.58			
Avg. Mass Density (g/cm3)	1.5197			1.5804			

ENERGY LABORATORIES, INC.

G. GENERAL SPECIFICATIONS

1. DESCRIPTION OF WORK

A. Project Location - The Project is located approximately 50 miles east of Riverton, 25 miles north of Jeffrey City, and 80 miles west of Casper, more particularly described as follows:

Township 33 North, Range 90 West, 6th P.M.
Fremont County, Wyoming
Section 28: Lot 2, NW¼ NW¼ S½ NW¼
NE¼ SW¼, W½ SW¼, W½ SE¼
Section 29: Lots 4, 5, 10
Section 33: Lot 1, NW¼ NE¼

B. Major Components of Work - The major components of work to be accomplished under these Specifications include the following:

1. Clean-up of windblown radioactive contaminants and burial on site as designated on the Plans and as directed by Owner.
2. Excavation and haulage of cover materials from designated sites to the areas to be reclaimed; placement, grading of cover materials to the lines and grades shown on the Drawings and as directed by the Owner.
3. The excavation and spreading of topsoil as required by the Plans or directed by Owner.
4. Purchasing, hauling, and placing riprap for erosion control in areas shown on the Plans or designated by Owner.
5. Disking and seeding of areas to be revegetated with designated seed mixes.
6. All miscellaneous work required to complete the final Project clean-up in accordance with these Specifications and the Plans that form this Contract.

C. Plans - The plans according to which this Work is to be accomplished are entitled American Nuclear Ponds 1 and 2 Closure, Gas Hills Mill Tailings Ponds 1 and 2, and dated April 9, 1992 *(date to be changed when closure concept is accepted by NRC, and final plans are prepared)*. These Plans were prepared by James L. Grant & Associates, Inc. on behalf of American Nuclear Corporation, and are included in this Contract by reference.

D. Disagreements between the Plans, Specifications, and the Contract - In case of a conflict between the provisions in the Plans, Specifications, and the Contract, the following decreasing order of precedence will be followed in resolving the conflict:

1. Contract
2. Specifications
3. Plans

2. ACCESS

The Contractor shall maintain those existing private access and haul roads indicated on the Plans so that private access by Owner, the regulatory governmental agencies and their personnel can occur at all times. The Contractor shall provide all signs, barricades, guards, flag persons, construction warnings and night lights required to protect the public at all times from injury as a

result of his operations. If the Contractor should fail to maintain sufficient signs, barricades, guards, flag persons, construction warning lights and night lights in the opinion of Owner, the Owner shall have the right to provide these and deduct such costs from payments due the Contractor.

The construction site, as shown on the Plans, is a radiologically controlled area. Contractor shall restrict access to the construction site as follows:

A. Private and personal vehicles will not be allowed on the construction site.

B. Parking of private or personal vehicles shall be in the Staging Area outside the construction site as shown on the Plans.

C. Construction vehicles will be monitored by Owner for radioactive contamination at the construction access gate before leaving. Contaminated vehicles will be decontaminated at the direction of the Radiation Safety Officer prior to leaving the site.

D. All personnel will be required to self-monitor for radioactive contamination before leaving the construction site. Contaminated personnel and clothing will be decontaminated at the direction of the Radiation Safety Officer prior to leaving the site.

E. Contractor will not be allowed to maintain living accommodations for his personnel and his Subcontractor's personnel on the Construction Site, Staging Area or adjacent lands belonging to Owner.

3. SCHEDULE OF WORK

A. Reference is made to Section F-2-H, "Before Starting Construction", and Section F-14, "Payments and Completion." At the preconstruction conference a comprehensive schedule shall be delivered to the Owner by the Contractor. Additional schedule submittals are required in a form satisfactory to the Owner when the Work progress falls behind schedule. Should it become evident that the Contractor may fall behind the construction schedule, the Contractor shall submit a revised schedule indicating operations, methods, overtime or additional labor by which lost time will be made up.

B. Payments will be withheld until an approved schedule has been submitted. Execution of the Work according to the accepted schedule of completion, or approved modifications, is hereby made an obligation of the Contract.

C. The obligations of the Contractor to revise original schedules shall not be determined by time lost due to non-working days, as defined hereinafter in these Specifications, i.e., adverse weather conditions.

4. PROJECT COORDINATION MEETINGS

A coordination meeting shall be held at times requested by the Owner. Owner, Contractor and all Subcontractors active on the site shall be represented at each conference. The Contractor shall be prepared to discuss his current work progress, the schedule of work anticipated during the next week, anticipated future changes to the schedule, and to discuss methods to incorporate into his work to get back on schedule, if behind.

5. SURVEYS, LINES AND GRADES

A. Initial staking which provides control points, benchmarks, grade/slope stakes, and other special items will be provided by the Owner on a one-time basis only unless otherwise agreed at the preconstruction meeting. Final survey to establish final grades and measurement of excavation and stockpiled material for payment will also be performed by the Owner. It will be the responsibility of the Contractor to provide his construction survey control and any additional staking necessary to complete the Project. Any stake, point, benchmark or monument disturbed or destroyed by the Contractor, Subcontractor or employees of either, will be replaced by the Owner at the expense of the Contractor.

B. The Contractor shall schedule grading operations to allow sufficient time for measurement of excavations and other pre and post construction surveys and will not be allowed extra Contract Time or damage claims due to scheduling survey operations, presence of survey personnel within the grading area, or delays due to adverse weather and/or hazardous surface conditions prohibiting survey work.

C. There are numerous existing mining survey control monuments and public land survey monuments within the areas requiring reclamation work which must be preserved. The Contractor will not commence work until these monuments have been referenced by the Owner to other surveying control monuments for later replacement by the Owner. It will be the duty of the Contractor to inquire of the Owner and schedule his work accordingly until these monuments are referenced aside.

6. SANITATION FACILITIES

A. The Contractor shall provide and maintain, in a neat and sanitary condition, such accommodation for the use of his employees and the Owner as may be necessary to comply with the requirements and regulations of the General Safety and Health Regulation of the Wyoming Occupational Health and Safety Commission and State and local Boards of Health as enforced by the County Health Officer. The Contractor shall not allow such facilities to become a public nuisance.

B. All expenses incurred in supply access, parking, and sanitation facilities shall be considered as incidental to the Project and no additional compensation will be made.

7. DUST AND MUD CONTROL

A. The Contractor shall provide and use dust control measures as may be set forth in the rules, regulations and standards promulgated with the Wyoming Environmental Quality Council through the State Department of Environmental Quality to prevent undue air pollution and hazardous traffic conditions.

Vigorous dust control measures by watering shall be accomplished by the Contractor in all phases of his operation, including but not limited to keeping the haul roads, unsuitable material stockpiles, borrow areas, and fill areas sufficiently wet at all times during the Contract to control fugitive dust. The use of chemical additives to the watering operations for cold weather work must be approved by Owner.

The furnishing of and the placement of water shall be in accordance with Section K-5, "Dust Control" and G-14, "Construction Water."

B. Access roads and haul roads shall not be used when they become heavily laden with mud in order to ensure safety and to prevent damage to the roadway and adjacent terrain.

Mud tracked onto access roads by the activities of the Contractor shall be removed by the Contractor as directed by the Owner.

C. Dust and mud control shall be considered as incidental to the Project and no extra compensation will be made.

Complaints on dust, mud or unsafe practices will be transmitted to the Contractor and prompt corrective actions will be required. Costs incurred by the Contractor while correcting or repairing such complaints shall be the Contractor's responsibility and no additional compensation will be made.

8. EASEMENT AND RIGHTS-OF-WAY

The Owner will obtain all easements required for the Project. Contractor shall limit his operations to the area indicated in the Plans as "Construction Limits" and shall not trespass on private property without written permission from the property owner.

9. LAND PROVIDED BY OWNER

The Owner may designate certain lands within the Project boundary as access routes, construction staging areas, work areas, or others as indicated in connection with the Work under the Contract together with the right of access to such lands. The Contractor shall not unreasonably encumber the premises with his equipment or materials.

10. AIR POLLUTION

The Contractor shall have informed himself of all applicable state rules and regulations pertaining to control of or abatement of air pollution. He shall have provided or be prepared to provide such air pollution control measures as are required to comply with the minimum standards established by such rules and regulations.

11. CLEAN-UP AND WASTE DISPOSAL

The Contractor shall maintain a clean work site during construction. At the end of construction the Contractor shall clean all areas affected by construction including petroleum products spills and soils contaminated by such spills, garbage, trash and debris which must be removed or buried in an area, and to a depth, designated by the Owner. All waste materials will be disposed of in accordance with state and local requirements. Damage to any areas by the Contractor will be repaired by the Contractor which may include any additional topsoil and seeding at the Contractor's expense. Reference is made to Specification Paragraphs F-6-H, F-6-M and F-14-B. The Contractor is reminded that initial acceptance and final payment shall not be made until the final clean-up is approved by the Owner. The cost of final clean-up is included in the price quoted for Mobilization.

12. DEFINITIONS

The following definitions interpret and describe the meaning and are given to help the Contractor interpret and understand the meaning of some of the specialty work involved. These definitions are sometimes further supplemented by specific additional explanations in this agreement.

A. **Unsuitable Materials** - soil or other earthen materials which contain Radium-226 in concentrations exceeding 15 picocuries per gram (pCi/gm) Radium-226 above background, or material which may contain undesirable levels of acid or acid forming compounds. Soils having a pH of less than 6 or an acid base potential greater than -5 are unsuitable soils.

B. **Cover and Fill Materials** - earthen material which contains levels of radioactivity less than 15 pCi/gm Radium-226 above background and do not contain undesirable levels of other contaminants, and which is suitable as a plant growth medium.

C. **Radiation Technician** - an individual or individuals trained in the use of and equipped with a hand held scintillation counter, working with the excavation and placement equipment to assure that the various levels of radioactive materials, acid forming compounds and other undesirable materials encountered during construction are placed in accordance with the requirements of the Owner.

D. **Overburden** - the term overburden is used in these Specifications in reference to any unconsolidated materials lying above bedrock. It shall include natural formation, fill and all rubble, stones and boulders.

E. **Radioactivity** - the spontaneous release of energy or atomic particles from an unstable atom as it decays or changes to a more stable elemental form. For this Project, radioactivity is measured in terms of gamma energy levels and picocuries per gram (pCi/gm) of Radium-226.

F. **Scintillation Counter** - a hand held device which measures the gamma energy. Common devices measure gamma energy in terms of Micro R/hr or Counts Per Second (CPS). The Micro R/hr meter is preferred.

G. **Subsoil** - generally, that portion of the overburden below the topsoil extending down to unaltered shale or sandstone, to be specifically defined by the Owner for all soil salvage and/or borrow areas.

H. **Topsoil** - general, the uppermost 0" to 6" of overburden to be specifically defined by the Owner for all soil salvage and/or stripping. Topsoil material is considered suitable material, and may be stockpiled separately at the direction of the Owner.

I. **Tailings Materials** - earthen materials that have been processed for their uranium content and which contains Radium-226 and other undesirable metals such as selenium, arsenic and lead.

J. **Gravel Mulch (also Cobble Layer, also Gravel Layer)** - coarse-grained materials comprised mostly of cobble- and gravel-sized particles, and placed over the surface of the closed tailings impoundments and beneath riprap materials to resist the erosive forces of water and wind.

K. **Riprap** - large stones placed within and around drainage conveyances and on and around designated areas of the closed tailings impoundments to resist the erosive forces of wind and water.

13. CONSTRUCTION WATER

The Contractor may use Owner's water well as a source of water for use in construction. Contractor shall be responsible for the repair and maintenance of Owner's well during Contractor's use thereof. The Contractor may secure water from other sources subject to the approval of the Owner.

Water well maintenance and repair shall be considered as incidental to the Project and no additional compensation will be made.

14. RADIATION SAFETY PLAN

The Contract work area is a radiologically controlled area subject to the jurisdiction, rules and regulations of the Nuclear Regulatory Commission and the Wyoming Department of Environmental Quality. All work shall be governed by the essential requirements given in the following paragraphs and Contractor shall cause all of his personnel and those of his Subcontractors to comply with such requirements.

A. Work Conditions:

1. Radiation Contaminated Area: The construction site is a radiation contaminated controlled area. Contractor shall provide protective clothing for all Contractor's personnel and his Subcontractor's personnel as required by Owner for contamination control.

2. Radiation Dressing Requirements: When required, protective clothing for contamination control could consist of coveralls, gloves, and rubber boots, shoe covers or any combination of the above. Personnel will be required to put on and remove the protective clothing within the controlled area. The Contractor shall ensure that removed items are properly stored and areas are maintained in proper order.

3. Personnel Monitoring: All personnel will be required to self-monitor for radioactive contamination upon leaving the controlled area. Personnel will be instructed in self-monitoring procedures in accordance with Paragraph 5 below defining Training Requirements. Contractor shall provide wash facilities for employees.

4. Vehicles and Other Monitoring: Vehicles, equipment and tools from the controlled area will be monitored for radioactive contamination by the Owner before leaving the area. No contaminated vehicle, equipment or tools will be allowed to leave the area without decontamination.

5. Training Requirements: In order to work in the controlled area, personnel shall be trained as Radiation Workers by the Owner. The training course is approximately four hours long and is available to Contractor personnel at no cost for instruction. A test will be given to all personnel at the conclusion of training to establish qualifications as Radiation Workers. Personnel must pass this test to work within the radiation control area.

   The use of respirators may be necessary on this project. If respirator use becomes necessary the respirators will be provided by the Owner, and training in the proper use of respirators in the performance of specific tasks will be provided by the Owner. This instruction is approximately two hours long and will be provided to the Contractor at no extra cost. No payment will be made to the Contractor for his employees attendance at respirator training provided by the Owner. Such costs shall

be considered as incidental to the Project and no additional compensation will be made.

6. Radiation Exposure Limits and Restrictions:

   a. Radiation exposure on this Project is expected to be well within allowable radiation exposures. Whole body radiation exposure in rem shall be determined by Personal Thermoluminescent Dosimeters (TLD) issued to each radiation worker. While working at the construction site each employee may be required to wear TLD badges issued and collected daily by the Owner.

   b. Prior to working at the construction site, each employee shall provide prior radiation exposure records as applicable.

   c. No one under the age of 18 shall be permitted to enter or work in the controlled area.

7. Some areas on the construction site may have localized Health Physics restrictions. These restrictions are indicated by ribbons, signs and tags. Such area restrictions shall be observed by the Contractor and applicable precautions taken.

B. Special Examinations:

1. Employees working in radiation control areas may be required to submit a bioassay sample prior to starting work in the radiation control areas and also upon termination or completion of the Contract. Certain Contractor employees, identified by the Owner based on potential exposure to airborne radionuclides, will be required to submit quarterly bioassay samples. Employees may be required to submit additional bioassay samples on an occasional basis, to ensure that applicable radionuclide exposure standards are being met. It is the Contractor's responsibility to ensure that each employee submits bioassay samples as required by the Contract. Payment for bioassays will be made by the Owner.

2. The Contractor shall notify the Owner of any personnel terminations or transfers within eight (8) working hours of termination or transfers. The Contractor shall also provide the Owner with weekly lists of all Contractor or Subcontractor employees employed by or for the Contractor who have been issued TLD radiation exposure badges. These weekly listings shall include full name, social security number, hire date, and termination/transfer date (if applicable) of all such employees.

C. The Owner will provide radiological surveillance over construction activities and advise Contractor on matters concerning radiation safety as related to activities or conditions affecting the construction work. Contractor will comply with radiation safety requirements.

D. Disposition of Contaminated Equipment, Tools, and Material:

1. The Contractor shall use his own or rental equipment in performing the required Work under this Contract. All tools, vehicles, equipment and material will be inspected for radioactive contamination by Owner prior to removal from the construction area.

2. Should the Contractor's tools, material, or equipment become contaminated as defined by the Radiation Safety Officer, they will have to be decontaminated before removal from the area. If decontamination becomes necessary, the Owner will provide instructions for decontamination by the Contractor. Decontamination may

consist of steam cleaning, dry brushing, or washing with appropriate liquids, and shall comply with decontamination limits specified in the Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use - U.S. NRC, Uranium Recovery Field Office, Region IV, September, 1984.

3. If decontamination proves impracticable or impossible, the tools, material or equipment in question will be retained by the Owner, and an equitable adjustment for same will be negotiated with the Contractor provided that:

   a. There is no fault or negligence of the Contractor contributing to the contamination;

   b. The Contractor has followed all the specific instructions of Owner;

   c. The Contractor allows reasonable time (a minimum of ten (10) working days, excluding weekends and holidays) in which to attempt decontamination of the item(s) in question. The reimbursement schedule will be as follows:

      1. Tools valued less than $200.00 at ninety percent (90%) of replacement cost.

      2. Tools/Equipment $200.00 and up: If less than one (1) year old or at top of depreciation schedule, at seventy-five percent (75%) of replacement cost; if at bottom of or off the depreciation schedule, at fifty percent (50%) of replacement cost.

H. MOBILIZATION

1. GENERAL

Upon receipt of Notice to Proceed, Contractor shall move in to the area designated for construction staging, furnish and install such temporary works, equipment and construction facilities as are necessary for successful completion of the Work. All clearing, grubbing, and minor earthwork required for installation of the temporary construction works shall be kept to a minimum and shall be included as Mobilization. The cost for this Work cannot exceed six percent (6%) of the total bid price. Note: the six percent (6%) cost includes mobilization, demobilization, staging areas, access roads, clean-up, bonding and insurance.

2. METHOD OF MEASUREMENT AND PAYMENT

A. Payment will be made for Mobilization to cover the costs of preparatory work and operations including but not limited to those necessary for the movement of personnel, equipment, supplies and incidentals to the Project site; for the establishment of all offices and other facilities necessary for the Work on the Project; and for all other work and operations which must be performed including but not limited to clearing, grubbing, staging area construction (fencing, topsoil handling, sanitation facilities, etc.), reclamation and dust control, or costs incurred prior to beginning work on the various items on the Project including the costs of providing bonding and insurance.

B. Utility relocations required to accommodate the Contractor's operations and facilities shall be paid for by the Contractor and shall be included as Mobilization.

C. Work included in Section I, "Construction Staging Area," shall also be included in the lump sum price quoted for Mobilization.

D. Demobilization shall include the removal of all Contractor's facilities, cleaning of the areas used by the Contractor to the satisfaction of the Owner, reclamation and revegetation of the staging area and access roads, and shall be included in the lump sum price quoted for Mobilization.

E. Payment for Mobilization will be made with the monthly progress payment as follows:

Progress payments will be made on a monthly basis in proportionate amounts based on the percentage of the total original contract amount completed to date, less ten percent (10%) held until final acceptance as stipulated in the General Conditions of this Contract.

F. Payment will be made under:

Pay Item	Pay Unit
Mobilization	Lump Sum

I. CONSTRUCTION STAGING AREA

1. GENERAL

A. The Contractor's construction staging area, equipment storage area, and materials laydown area shall be confined within the area shown on the Plans or as approved by the Owner.

B. The Contractor is responsible for his own work area, storage area, security, sanitation and health, cleanliness, dust control, and maintaining security against livestock intrusion. The construction and storage yards will be fenced, guarded and/or otherwise maintained by the Contractor to be adequate to prevent loss or damage to the Contractor's equipment and materials and to any instruments, equipment, or other materials brought to the site in support of the Project by the Owner. The Contractor will have the liability of negligent damage or loss of said equipment during Project life.

C. The cost to install a perimeter fence around the staging area, construct and maintain the staging area and/or equipment storage area in compliance with all regulations and final clean-up in accordance with Section G-12 is to be borne by the Contractor and shall be considered as incidental to the Project and no additional compensation will be made.

D. The disposal of solid waste, used petroleum products, sewage, and burning of trash, if allowed, is the responsibility of the Contractor. The Contractor must make his own applications and obtain the permits required by the federal, state and local regulatory agencies. Otherwise, the Contractor must contain all solid wastes and waste petroleum products for approved disposal. The Contractor must obtain permission from the Owner and pay all required fees to dispose of all solid waste in an approved landfill site. All waste petroleum products and cleaned-up materials from petroleum spills must be buried in an area and to the depth designated by the Owner with adequate reclamation of the site specified or approved by the Owner.

Waste material will be tested for radioactive contamination prior to removal from the construction site. Testing will be performed by the Owner at no cost to the Contractor. Radiologically contaminated waste shall be disposed of on site in an area designated by Owner.

Contractor shall immediately notify Owner if chemically hazardous or toxic wastes are encountered during construction. Such waste will be identified and disposed of by Owner in accordance with applicable state and federal hazardous waste management regulations.

Waste and debris shall not be allowed to accumulate in large enough quantities to create an unsightly appearance or a safety hazard. All construction areas shall be thoroughly cleaned to the satisfaction of the Owner prior to final acceptance of the completed Contract.

E. The Contractor shall strip the topsoil from the Staging Area site before moving onto that Site. The topsoil shall be stripped to a minimum depth of six inches (6") and as directed by Owner. The topsoil shall be excavated by the Contractor and stockpiled into a tight, well-dressed pile and marked with a sign of minimum dimensions of 24" x 36" with the message TOPSOIL. The topsoil in the stockpile will be located out of the way of traffic adjacent to the Staging Area or access roads. Contamination of the topsoil with other soils and other material is not acceptable.

The topsoil stock pile shall be seeded soon after the removal of the topsoil by the Contractor. The seed mixture shall be one-half pound of pure live seed (PLS) per acre of yellow sweet clover and twenty pounds of PLS per acre of oats, or other seed mixture acceptable to Owner. Application of seed may be by broadcasting. The cost of seeding and cutting of weeds, and etc. shall be considered as incidental to the Project and no additional compensation will be made.

2. RECLAMATION

A. At the end of construction, but not until the final clean-up has been approved in accordance with Section G-12, and after the site has been ripped, topsoil shall be replaced within the construction staging area and borrow areas as shown on the Plans unless otherwise directed by Owner. The removal, storage, and replacement of topsoil within the staging and borrow areas shall not be measured for payment, but the cost of this Work shall be considered as incidental to the Project and no additional compensation will be made.

B. Unless otherwise directed by Owner, the re-topsoiled and accepted staging and borrow areas shall be ripped and seeded in accordance with Sections L and M of these Specifications. The ripping and seeding shall not be measured for payment, but shall be considered as incidental to the Project and no additional compensation will be made.

3. METHOD OF MEASUREMENT AND PAYMENT

The costs for all work required to establish, maintain, and remove the construction staging area as herein specified will be included in the lump sum price quoted for Mobilization and the payment will be in accordance with the schedule in Section H and no additional compensation will be made.

J. ACCESS ROADS

1. GENERAL

This Work shall consist of repairing damages to designated access roads, maintaining existing site access roads used for construction haul roads, and reclaiming the designated access or haul roads indicated in the Plans. All traffic control devices and operations dealing with public traffic and roadways shall be in accordance with applicable Wyoming laws and the Manual on Uniform Traffic Control Devices for Streets and Highways (latest edition).

2. DESIGNATED ACCESS ROADS - PUBLIC ROAD

The Contractor shall be liable to Fremont County, Wyoming, the United States Bureau of Land Management and/or the State of Wyoming for damages to any public roads utilized by the Contractor. This includes rutting, loss of gravel, loss of shape, contamination of gravel (topsoil, cover material, etc.) cattle guard damage, etc. The appropriate government agency has the right to reduce weight limits in order to reduce road damage if it is found to be occurring. The Contractor shall reimburse the appropriate government agency for their costs to repair damages caused to public roads by the Contractor, Subcontractors, Work forces, support personnel, and suppliers, or repair said roads to specifications supplied by the appropriate government agency at their discretion and at no additional cost to the Owner.

3. SITE ACCESS ROADS

A. The designated site access road indicated in the Plans begins at the end of State Highway 136 and travels northwester to the construction Staging Area. This road is an existing haul road. Use of this road as a construction haul road to transport excavated materials will require the Contractor under this Contract to maintain the roadway and provide dust control for the duration of this type use.

B. Prior to any use of any existing access roads, the Contractor shall photograph and/or document in writing the existing condition of each designated access road and gain concurrence of Owner in writing. After all construction is complete, the Contractor shall review the road condition with the owner of the road and Owner to document the damage, if any, for which the Contractor is liable. At such time, an equitable reimbursement or correction to any damage caused by the Contractor shall be agreed to by all concerned.

4. SECONDARY ACCESS ROADS

A. Presently the designated secondary access roads are defined for purposes of this Contract as existing private roads, two track trails, and non-existing roads necessary for the Contractor to gain entry to the Project. All secondary access roads shall consist of those access roads and haul roads indicated on the Plans or approved in the field (in writing) by Owner. The Contractor will not be allowed to build or upgrade access roads not indicated in the Plans without prior written approval of Owner.

B. Prior to any access or haul road construction, the topsoil shall be stripped to a minimum depth of six inches (6") and as directed by the Owner. The topsoil shall be excavated by Contractor and stockpiled into a tight, well-dressed pile and marked with a sign of minimum dimensions of 24" x 36" with the message TOPSOIL. Every effort must be made to protect the topsoil stockpile from erosion and contamination to the extent possible. Topsoil that is contaminated and declared unsuitable for replacement as topsoil as a result of the Contractor's construction

activities shall be replaced at the Contractor's expense. All materials used to construct or upgrade haul roads shall be uncontaminated soils.

5. METHOD OF MEASUREMENT AND PAYMENT

No extra payment of any kind will be made for construction, repair, maintenance, dust control, or reclamation of access roads and/or haul roads. Payment for culverts, gates, and/or cattle guards installed at the Contractor's option; topsoil salvage; grading; routine maintenance and dust control of the access roads including all labor materials and incidental items shall be considered as incidental to the Project and no additional compensation will be made.

The costs for all Work required for access roads as herein specified will be included in the lump sum price quoted for Mobilization and the payment will be in accordance with the schedule in Section H.

K. EARTHWORK

1. GENERAL

A. The Contractor shall furnish all labor, tools, supplies, and equipment necessary to perform the site preparation, excavation (including clean-up of miscellaneous windblown tailings material), backfilling, compaction and grading for the recontouring of the tailings ponds, cover and fill on tailings ponds and outslopes, the rerouting of drainage ditches and draw around the reclaimed tailings ponds as shown on the Plans and as described herein or as directed by the Owner.

B. Excavation for earth fill shall be made in accordance with this section and shall occur in areas designated in the Plans. The materials are classified into the four major categories described in Subsection 2-C. Excavation shall include all material classifications removed from within the designated areas to the required grades as directed by the Owner. Excavation to prepare subgrades for all categories of materials shall include the removal and disposal of rocks, boulders, and other detached stones to the required grades shown on the Drawings or as directed by Owner. This Work shall also include hauling, placing and grading of fill (categorized as tailings, unsuitable, and cover soil, topsoil, and gravel mulch). Embankment construction consists of recontouring tailings dikes, covering unsuitable materials with compacted materials, rerouting drainage ditches and draws, hauling and placing of approved materials within the designated areas and to the required grade. Selective handling of unsuitable materials, cover soil, topsoil, and gravel mulch during excavation and cover construction is required.

C. During the excavation and placement of all material, a radiation technician, provided by Owner, will monitor the level of radioactivity and check for undesirable levels of acid-forming compounds in the materials being excavated and direct the placement of these materials in the locations and to the lines and grades shown on the Drawings and as directed by the Owner. Material excavated and placed prior to monitoring by the radiation technician shall not relieve the Contractor from his obligations to perform the Work in accordance with the requirements of the Specifications.

D. Accurate trimming of the slopes to within +/-0.3 feet will be required. All slopes will be bladed uniformly to provide continuity of and between the various slopes.

E. The thickness of the gravel mulch must be at least as great as the thickness shown on the Plans.

2. EXCAVATION AND FILL

A. The Contractor shall excavate, haul, place, and grade the materials as shown in the Plans or as directed by the Owner. The materials to be excavated, hauled, placed, and graded may include some or all of the following materials:

1. Fill Materials
    a. Unsuitable Materials
    b. Cover Soil
2. Gravel Mulch
3. Topsoil
4. Riprap

B. Topsoil stripping shall be conducted in all excavation and fill areas. Topsoil shall be removed to a minimum depth of six inches (6") or to a depth sufficient to salvage all topsoil as directed by Owner and shall be stockpiled for later placement on the areas to be revegetated.

C. Materials:

1. Fill Materials -

a. Unsuitable Materials - Unsuitable materials may result from concentrations of acidic soils and/or radioactive elements. Material will be considered unsuitable if it has a pH of less than 6 or an acid base potential greater than -5 or the radioactivity exceeds 15 pCi/gm Radium-226 above background or as directed by Owner. Excavation of these materials shall be completed in a very selective manner so as to excavate only the unsuitable materials with minimal disruption to suitable materials surrounding or underlying the unsuitable materials. Excavation shall be as accurate as possible and shall be within +/-0.3 feet. Any over excavation by the Contractor will not be payable unless so directed by the Owner. Unsuitable material could be encountered during any excavation. The presence and concentrations of these materials shall be determined and their locations defined in the field by Owner. It is the Contractor's responsibility to perform the Work in accordance with the requirements of the Specifications. The Contractor shall not at any time make claim for additional payments or consideration because of any misunderstanding regarding the nature of the materials or variation in quantities encountered in the excavations or additional time required while this material is being selectively handled.

b. Cover Soil - Cover soil is earthen material which contains levels of radioactivity less than 15 pCi/gm Radium-226 above background, no heavy metals, and does not have other constituents or properties which would preclude the use of the material as a plant growth medium. Cover soil to be used as unclassified fill is not required to meet any other specification. Cover soils to be used to construct the radon barrier will be overburden or stockpiled silty or clayey sand or sandy silt or sandy clay meeting the above requirement, and having no less than 30% fines (passing the 200 screen) and a PI of at least 10. The soil used for the radon barrier will be free of objectionable quantities of roots or other organic material and will not contain rocks larger than three (3) inches in diameter. Cover soil borrow locations have been defined on the drawings and on the respective cross-sections. Overburden or stockpiled material in these areas generally meets the above requirements. The actual boundaries of cover soil borrow areas will be defined in the field by the Owner to provide better control over the quality of the borrow material. These materials shall be excavated by the Contractor and placed at the locations and to the lines and grades shown on the drawings and as directed by Owner. Excavation shall be as accurate as possible and shall be within +/-0.3 feet. Cover soil shall not be wasted or contaminated by the Contractor's construction activities. The Contractor is responsible for obtaining the Owner's approval prior to wasting or stockpiling cover soil. Cover soil contaminated and declared unsuitable for replacement as cover soil as a result of the Contractor's construction activities shall be replaced at the Contractor's expense. Excavation from borrow sources shall be

within the designated areas and to the required depths as directed by Owner.

c. Topsoil - Topsoil consists of any soil suitable for the growth of grass or other cover crops reasonably free from hard dirt, clay, rocks, and materials which inhibit the germination of seeds or growth of cover crops. The types of soil suitable for topsoil will be as directed by Owner. Potential topsoil locations include all areas where plant growth currently exists, pre-mining surfaces, and some areas that may be encountered during excavations within the interiors of existing stockpiles. The actual locations of topsoil will be defined by Owner. Topsoil shall not be wasted or contaminated by the Contractor's construction activities. The Contractor is responsible for obtaining Owner's approval prior to wasting or stockpiling potential topsoil. Topsoil contaminated and declared unsuitable for replacement as topsoil as a result of the Contractor's construction activities shall be replaced at the Contractor's expense.

There are approximately 130,000 cubic yards of topsoil stockpiled at various locations as shown on the Plans.

3. Gravel Mulch - Gravel mulch will be obtained on-site from the gravel and cobble deposit known as the Dry Coyote Conglomerate. The locations of borrow pits from which these materials will be obtained are shown on the Plans. Borrow may be obtained from other locations with the permission of the Owner. Overburden materials removed to access the gravel mulch will be used for construction of the other components of the tailings pond covers where possible. Unsuitable materials in the overburden will be handled in the same manner as other unsuitable materials. Excess overburden or overburden that cannot be used directly in the construction of the cover will be stockpiled for later use or used directly to reclaim other borrow areas. The Contractor shall use care in excavating the gravel mulch to avoid segregation. Stockpiling of the gravel mulch will not be allowed without the prior approval of the Owner, and any segregation of the material that occurs as a result of stockpiling shall be corrected at the sole expense of the Contractor. Borrow to obtain gravel mulch will be tested to determine particle sizes and rock quality before the material is excavated. Coarse material used to construct the gravel mulch layer will be a reasonably well-graded material with a minimum of twenty-five percent (25%) of the material (by weight) larger than 3.6 inches, and will score at least 185 when evaluated for specific gravity, absorption, sodium sulfate soundness, and LA abrasion according to the procedures in Appendix D of the *Final Staff Technical Position, Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites*, dated August, 1990.

4. Riprap - Riprap is comprised of large stones to be placed in drainage channels and on the pond covers in locations shown on the Plans. Riprap will be imported from approved off-site sources. Riprap with average diameters of 8 and 16 inches will be used in the construction. The riprap will be reasonably well-graded within the following limits:

Percentage of rock fragments of various sizes				
Nominal average Diameter	Maximum diameter	40 to 50 percent greater than	50 to 60 percent from - to	0 to 10 percent less than
8 inches	12 inches	8 inches	3.2 - 8 inches	3.2 inches
16 inches	24 inches	16 inches	6 - 16 inches	6 inches

Materials used for riprap will score at least 185 when evaluated for specific gravity, absorption, sodium sulfate soundness, and LA abrasion according to the procedures in Appendix D of the *Final Staff Technical Position, Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites*, dated August, 1990. If riprap of suitable quality cannot be found, then the Owner may specify oversized stone of lesser quality in accordance with the *Final Staff Technical Position...*

3. PLACEMENT AND CONSTRUCTION METHODS

A. Unsuitable Materials - Excavation of unsuitable materials shall be completed in a very selective manner so as to excavate only the unsuitable material with minimal disruption to the surrounding or underlying suitable materials. Excavation limits shall be accurate within +/-0.3 feet. During excavation, topsoil and cover material will be encountered within areas of unsuitable materials. The Owner will survey and measure for Radium-226, heavy metals, and cover material suitability. Material found suitable for cover material shall be stockpiled or direct hauled. Material found to be unsuitable shall be directly placed in the location shown on the drawings and in accordance with the Specifications and as directed by Owner. Stockpiling materials for the Contractor's convenience of scheduling Work will not be measured for payment. Stockpiles for payment must first be authorized in writing by Owner.

B. Cover Soil - Generally, cover soil shall be excavated, hauled, and placed when the contour grading of the tailings piles is complete. Direct hauling and placement of suitable cover soil from excavation site to placement site shall be performed whenever possible. Placement shall begin in the lowest section of the area to receive cover soil. The surface of each layer shall be approximately horizontal, but will be provided with sufficient longitudinal and transverse slope to provide for runoff of surface water from every point unless otherwise directed by Owner. Cover soil will be placed to within six inches (6") of final grade parallel with the contours on sloping areas or as directed by Owner. When cover soils are encountered in the excavation and direct hauling and placement is not possible, Owner may direct salvage of these soils by stockpiling to allow access to other categories of materials. When this Work is directed, the Contractor shall excavate, transport, and stockpile the selected materials. Stockpile locations will be determined by Owner and limited to the size directed. Materials within stockpiles will be placed later in the areas designated by Owner. Stockpiling for the Contractor's convenience of scheduling Work will not be measured for payment. Stockpiles for payment must first be authorized in writing by Owner.

C. Placing Fill - The Contractor shall conduct the placement and compaction of fill material (excluding topsoil) as shown on the Plans and as described herein and as directed by Owner. No materials shall be placed on any portion of the tailings ponds or against or upon any structure without consent of Owner. Each layer shall be placed in continuous and approximately horizontal layers, not exceeding twelve inches (12") in thickness, for their full length and width, unless otherwise specified by the Owner. Unless otherwise directed by Owner, fill materials shall be placed to a grade no less than one and one-half percent (1.5%) to facilitate drainage of water. In areas where ponding cannot be prevented or ponding has

occurred, fill shall not be placed until the area is dewatered and Contractor has obtained Owner's permission. Frozen material shall not be used as fill within 4.5 feet of final grade over areas containing tailings material. Soils which are unsuitable due to their acidity level, as determined by Owner, shall not be placed within 2.5 feet of final grade. Allowable radioactivity in soils used in the covers will be determined by the Owner, and will be consistent with the limits prescribed in Paragraph H below.

D. Compaction - Each layer of tailings material, cover material, and unsuitable material shall be compacted by at least one pass of construction equipment. Compaction will be uniform, and coverage of the compactive effort will be complete. Each layer of cover material (compacted cover) placed within the radon barrier as shown on the Plans shall be compacted by at least three passes of construction or compaction equipment to at least ninety-five percent (95%) of maximum dry density as determined by ASTM D698 and at a moisture content between minus 1 percent (-1%) and plus two percent (+2%) of optimum. Uniform moisture distribution shall be obtained by disking, bladeing, or other methods approved by the Owner prior to compaction of a layer. If the surface of the prepared foundation or the rolled surface of any layer of cover is too dry or too smooth to bond properly with the layer of material to be placed thereon, it shall be scarified and moistened by sprinkling to the acceptable moisture content prior to placement of the next layer of cover. If the rolled surface of any layer of the cover in place is too wet for proper compaction of the layer of cover material to be placed thereon, it shall be removed, allowed to dry or Worked with harrow, scarified, or other suitable equipment to reduce the water content to the required amount, and then re-compacted before the next succeeding layer of cover is placed. Cover placed at densities lower than the specified minimum dry density or at a moisture content outside the specified acceptable range of density and moisture requirements shall be removed and replaced by acceptable cover compacted to meet these requirements.

The dike constructed on the drainage south of the mill shall be to the same compaction and construction techniques as described in Paragraph 3.E of this Section K.

E. Topsoil -

1. Stripping and Storing Topsoil - Stripping shall be conducted in all excavation and fill areas where topsoil has been determined suitable. The top six inches (6") of material or to a depth sufficient to salvage all topsoil as directed by Owner shall be stripped and stockpiled, unless it can be placed directly on the prepared slopes. Topsoil shall be stockpiled at the location shown on the drawings or as directed by Owner in such manner as to isolate the topsoil from natural dispersive forces (wind and water erosion). The stockpiles shall be of such uniformity and dimension that they can be conveniently measured by cross section methods. Stockpiles shall be clearly marked with a sign of dimensions 24" high x 36" wide with the word TOPSOIL in bold letters, furnished by the Contractor, and placed at the location or locations designated by Owner. Topsoil may be encountered within the designated area for cover materials or borrowed from exposed suitable pre-mining surfaces, and additional borrow areas established in the field by Owner. The top six inches (6") of the natural ground in topsoil borrow areas shall be stripped and stockpiled for later replacement onto the borrow area. The operation of stripping and hauling to the temporary stockpile, and the later removal from the stockpile for replacement onto the borrow area shall each be measured and paid as topsoil. There shall be approximately six inches (6") of topsoil remaining in the designated topsoil borrow area after the borrowed topsoil is removed. The topsoil borrow site shall have a minimum topsoil requirement of twelve inches (12") after replacing the upper six

inches (6") of natural ground. The thickness and quantity of topsoil to be removed from the topsoil borrow areas shall be as directed by Owner.

2. Preparation of Areas - The embankment or cut slope areas to be covered with topsoil shall be completed to the designated lines and grades. Embankment areas, all cut slopes, and all areas which have become crusted or re-compacted shall be scarified to a minimum depth of twelve inches (12") with maximum spacing between scarifier teeth of twenty (20") inches prior to placement of topsoil. Scarifying shall be parallel to the contour.

3. Placing Topsoil - Topsoil shall be taken from existing stockpiles, temporary stockpiles or stripped from its original position and placed in approximately horizontal layers parallel with the contours on sloping areas over the reclamation surface as shown on the Plans to a minimum depth of six inches (6") or as directed by Owner. Topsoil will not be placed in areas where tailings materials have been covered without the consent of Owner. Topsoil will not be excavated or spread when excess moisture is present in the soil which may result in clodding, rutting, or excess moisture conditions.

F. Gravel Mulch - Gravel mulch will be placed by dumping and spreading the rocky material over the prepared subgrade. The Contractor shall exercise care in placing and spreading the material to avoid segregating the material. The surface of the material will be shaped to the elevation shown on the Plans, and the material will be compacted by rolling with construction or compaction equipment. Control of the moisture content of the material during placement or compaction is not required except as may be required for dust control.

G. Riprap will not be compacted, but shall be placed to grade in a manner that will ensure that the larger rock fragments are uniformly distributed and the smaller fragments fill the spaces between the larger rocks in a densely placed, uniform layer of riprap of the specified thickness. Hand placing will be required only to the extent necessary to achieve these results.

H. Unacceptable soils will not be used to construct the pond covers. Soils having a pH of less than 6, or an acid base potential greater than -5 will be segregated and will not be placed within 2.5 feet of finished grade. Soils having a radiation greater than 5 pCi/gm Radium-226 above background will not be placed within six inches (6") of finished grade, and soils having a radiation greater than 15 pCi/gm Radium-226 above background will be placed at least twelve inches (12") below finished grade. No soils having an emanation coefficient larger than 20 $pCi/m/sec^2$ will be used to construct the pond covers.

4. CONSTRUCTION SEQUENCE AND SPECIAL REQUIREMENTS

A. This section describes the general construction sequence for each individual area considered necessary to achieve the overall reclamation goals for the Project. This section is not intended to release the Contractor of any obligation to provide a comprehensive schedule of Work, but is provided to increase the Contractor's understanding of the Project. *Portions of the reclamation that already have been completed are not included in this list.*

1. Remove topsoil from excavation and fill areas.

2. Excavate windblown tailings and place in Pond No. 1.

3. Cover Tailings Pond No. 1.

4. Recontour Tailings Pond No. 2. Cover Tailings Pond No. 2 to subgrade with fill material from borrow area, grading to final approved contour.

5. Construct drainage ditch and dike west of Tailings Pond No. 1.

6. Place radon barrier, unclassified fill, and gravel mulch over tailings ponds.

7. Construct drainage ditch south of former mill area.

8. Place riprap in drainage channels and on pond covers where required by Plans.

9. Place six inches (6") of topsoil on staging and borrow areas. Topsoil shall not be placed over areas containing tailings materials.

10. Revegetate all disturbed areas indicated on the Plans to be revegetated.

B. The Contractor shall coordinate his grading activities to control and prevent soil erosion that will adversely affect construction operations or damage adjacent property. Temporary erosion control measures include but are not limited to the construction of temporary berms, dikes, dams, sediment basins, silt fences, and other temporary control measures.

5. INSPECTION AND TESTING

The Owner will observe, inspect, and test the Work being performed to the degree necessary to assure the Owner that the Work is being performed in accordance with the Plans and Specifications. The observations, inspections, and testing performed by the Owner are solely for his benefit, and do not relieve the Contractor in any way of his obligations for the quality or timeliness of the Work. The Contractor will cooperate fully with the Owner to facilitate this quality control.

The observations, inspections and testing to be completed by the Owner are described in the following sections. The numbers and frequencies of testing described in those paragraphs represent minimum numbers. Additional testing may be completed at the discretion of the Owner.

A. Inspection

1. Subgrade - The Owner will inspect all areas to receive controlled fill, gravel mulch, or riprap to determine if the subgrade is prepared in accordance with these Specifications. The inspection will comprise a visual inspection of the subgrade for signs of rutting, erosion, frost heave, drying, or any other visible evidence of damage that would render the subgrade unsuitable to support the overlying material. During this inspection, the Owner may require proofrolling of areas that, in the Owner's opinion, appear soft or unstable.

   The inspection will determine if any objectionable standing water is present, and that the moisture of the subgrade is proper to receive the overlying fill. The inspection also will determine if the surface of cohesive subgrades has been scarified as necessary to assure proper bonding with the incoming fill.

   Defects identified during the subgrade inspection will be corrected before the fill material is placed.

2. Radon Barriers and Soil Covers - Materials for radon barriers, unclassified fill for soil covers, gravel mulch, and riprap will be qualified by observation and testing before the material is placed. Excavation of these materials will be observed to assure that the materials are removed from the designated borrow areas, and that the excavation process does not unnecessarily mix the borrow materials or otherwise reduce the quality of the borrow materials. Placement and compaction of the

materials will be observed to assure that the soil upon which a layer of soil is placed has been prepared properly (see subgrade inspection), that the materials are placed in lifts of appropriate thickness, and that the compactive effort applied to each lift is appropriate and uniform over the lift.

3. Topsoil - Topsoil excavation and stockpiling will be observed to assure that the stripping is in the appropriate locations and to the appropriate depths, and that the excavated topsoil is not mixed unduly with other soils. Topsoil placement will be observed to assure that the thickness of the topsoil conforms with the Plans, and that compaction, disking, and scarification required by the Plans is performed.

4. Gravel Mulch - Materials to be used for gravel mulch will be tested before excavation to determine the gradation and durability of the stone. Excavation of the material will be observed to assure that the excavation is within the designated borrow areas, and that the material is not unduly contaminated or segregated during the excavation. Placement of the material will be observed to assure that the material is placed in locations required by the Plans, or designated by the Owner, that the thickness and elevation of the lift placed is in accordance with the Plans, and that the material is not damaged or segregated during hauling and placement.

5. Riprap - Materials to be used for riprap will be tested before being brought to the site to determine the gradation and durability of the stone. Placement of riprap will be observed to assure that the material is placed in locations specified by the Plans or designated by the Owner, that the thickness and elevation of the lift placed is in accordance with the Plans, that the material is not damaged or segregated during hauling and placement, and that the placement of the riprap is in accordance with these Specifications.

B. Testing Frequencies

1. Subgrade - Prepared subgrades will not be tested according to a formal program. However, density testing or proofrolling may be conducted in areas where, in the opinion of the Owner, the strength or character of the subgrade does not meet to the requirements of the Plans or Specifications. Unsuitable material will be removed and replaced, or repaired as appropriate. Fill imported or material reworked to correct subgrade deficiencies will be considered fill material, and will be tested as described in the section Radon Barriers and Soil Covers.

2. Radon Barriers and Soil Covers - Borrow materials will be tested before being excavated to characterize the composition, physical properties, and variability of the soils to be excavated. The number, type, and locations of these tests will be determined by the Owner, and will depend upon the quality and variability of the material being tested. This series of tests is performed solely for the benefit of the Owner and the Contractor.

   Material being placed will be tested to document compaction, moisture content, and material properties (plasticity and gradation). Compaction tests will be conducted to measure the moisture content and degree of compaction of the radon barrier soils. One test will be conducted for approximately each 500 cubic yards or fraction thereof f radon barrier soil placed, and one test for each 1,000 cubic yards or fraction thereof of soil cover placed. At least two tests will be conducted for each day that soils are placed, provided that testing may not be performed if the amount of material placed during a single shift is less than 150 cubic yards. Generally, the locations of the tests will be chosen at random by the Owner, however, at least one

test will be performed for each Work shift and at least one test will be performed in each layer of the fill.

Gradation and Atterberg limits will be tested on randomly-selected samples taken from each approximately 1,000 cubic yards of radon barrier material placed. These tests will not be performed on soils placed for unspecified soil cover fill.

The degree of compaction will be determined by comparing the dry unit weight of soil in-place with the maximum dry density as determined by the standard Proctor test (ASTM D-698). Before construction of the radon barrier and soil cover begins, Proctor curves will be determined for the expected range of materials to be used in the construction. Plug Proctor tests (unit weight of the soil being placed when compacted at ambient compaction moisture according to ASTM D-698) will be completed on a frequency of about one test for every five field density tests, or more frequently when the Owner believes that the character of the material has changed. Supplementary Proctor tests will be performed on the material being placed at a frequency of about every 5,000 to 10,000 cubic yards of material placed, depending upon the variability of the material. Supplemental Proctors will be obtained at any time the Owner believes that the character of the soil being placed may have changed.

3. Topsoil - Topsoil to support vegetative growth will be placed only on borrow areas and other disturbed areas to be revegetated. No topsoil will be placed on the surface of the closed tailings ponds. No density testing will be conducted during topsoil placement. The thickness of the topsoil layers being placed will be measured, and the Owner will observe the compaction and disking procedures to assure that they are in accordance with the Specifications.

4. Gravel Mulch - Samples from sources of gravel mulch will be tested to characterize the particle size distribution and durability properties before the material is excavated. Sampling and testing the material will be conducted in general accordance with ASTM D-4992. Gradation of the materials will be determined, and durability will be assessed by performing LA Abrasion, specific gravity, sodium sulfate, and adsorption tests. The numbers of tests performed will be at the discretion of the Owner, and will depend upon the variability of the material in the borrow pit.

   The same tests will be performed on material being placed. One suite of tests will be performed for approximately every 10,000 cubic yards of material placed. More frequent tests may be performed if, in the opinion of the Owner, the character of the material changes during placement.

5. Riprap - Samples from riprap sources will be tested to characterize the particle size distribution and durability properties before the material is brought to the site. Gradation of the materials will be determined, and durability will be assessed by performing LA Abrasion, specific gravity, sodium sulfate, and adsorption tests. The numbers of tests performed will be at the discretion of the Owner, and will depend upon the variability of the material at the source.

   The same tests will be performed on material being placed. One suite of tests will be performed for approximately every 10,000 cubic yards of material placed. More frequent tests may be performed if, in the opinion of the Owner, the character of the material changes during placement.

6. Test Methods - Testing methods will follow procedures established by ASTM. The following procedures may be used:

Test	ASTM Standard	Comments
Soil Compaction Properties	D-698	Standard Proctor
In-Place Density	D-2937	Drive Cylinder, to be used only if coarse particles do not interfere with test
	D-1556	Sand Cone Method, to be used when materials contain coarse-grained particles
	D-2922	Nuclear Density, requires check tests by D-2937 or D-1556 (see note 1)
Moisture Content	D-4959	Oven method
	D-4643	Microwave oven method
	D-3017	Nuclear method, requires check test by oven or microwave methods (see note 1)
Plasticity	D-4318	Atterberg Limits
Gradation	D-422	For soils
	C-136	For stone and gravel mulch
Riprap and Gravel Mulch	D-4992	For stone and gravel mulch
Sodium Sulfate	C-88	Use 50 pieces weighing 1 kg
Specific gravity	C-127	Modified for rock size
LA Abrasion	C-535	Modified for rock size
Absorption	C-127	Modified for rock size

Note 1 - Requires correlation test by D-2937 or D-1556 every five (5) tests in tailings, and every ten (10) tests in other soils.

7. Testing and Inspection Records - The Owner will maintain a daily log of construction and inspection activities. This log will be kept in a permanently bound field book. Each page will be numbered. The date and initials of the Owner's representative making each entry will be noted. The log will include the results of visual inspections, measurements, and will describe and summarize tests performed during the day. The actual test data will be maintained in a testing file, and referenced in the log. The log will summarize volumes of construction materials placed, discuss problems encountered and their resolution, and include any other information pertinent to the progress and quality of the construction. The log will provide sufficient details so that the acceptability of any corrective action or resolution of deviations from the Specifications can be reviewed independently.

   Weekly reports summarizing the construction and testing activities will be prepared. These reports, the daily log, and all test reports will form the permanent record of the construction.

   Test reports will include the date, the name of the person making the test, a description and the source of the item tested, the test procedure or standard, the test

results, acceptability and acceptance criteria, and the identification and calibration status of the test apparatus.

6. DUST CONTROL

A. The Contractor shall provide dust control measures for health, safety and convenience, the reduction of the dust nuisance to adjacent property and to minimize wind erosion. The measures shall consist of the application of water to the disturbed surfaces. Water shall be uniformly applied in a fine spray by means of controllable pressure and spray bars or nozzles and in such a manner that will avoid ponding, erosion or overwetting.

B. The Contractor shall be responsible for furnishing the construction water and for obtaining necessary permits. Contractor may use Owner's source of water at his expense. The furnishing of construction water shall be in accordance with Section G-14.

7. METHOD OF MEASUREMENT AND PAYMENT

A. Fill Materials -

1. Unsuitable Material - will be measured by the cubic yard in its placed position (embankment) by cross sections determined from initial and final surveys of the construction areas. No differentiation will be made between unsuitable material and cover material for payments. The volumes will be computed by the average end area method less the quantities of materials identified as Compacted Cover. Monthly progress payments will be estimated.

2. Cover Material - will be measured by the cubic yard in its placed position (embankment) by cross sections determined from initial and final surveys of the construction areas. No differentiation will be made between cover material and unsuitable material for payments. Cover materials for which the Owner has identified as requiring more than one handling prior to final placement shall be stockpiled and will be measured by the cubic yard with cross sections determined from the stockpiled material. Stockpiling for the Contractor's convenience of schedule Work will not be measured for payment. Stockpiles for payment must first be authorized in writing by Owner. The volumes of cover material will be computed by the average end area method less the quantities of materials identified as Compacted Cover. Monthly progress payments will be estimated.

B. Compacted Cover Material - will be measured by the cubic yard in its placed position (embankment) by cross section determined from initial and final surveys of the construction areas. The volume will be computed by the average end area method. Monthly progress payments will be estimated.

C. Topsoil - stored in authorized temporary stockpiles shall be measured for topsoil by the cubic yard basis on the quantity of material placed in the stockpiles. The pay item Topsoil (CY.) includes all Work performed during hauling and stockpiling of topsoil as required by these Specifications. Any additional handling of stockpiled topsoil material, prior to final placement, will not be measured for payment. When topsoil is taken from stockpiles for final placement, the measurement for topsoil in cubic yards will be the difference between the quantity in the stockpile and that remaining after the topsoil is placed on the slopes. If topsoil is stripped from its original position and placed directly in its final position the volumes for topsoil will be determined by the difference between the original and final cross sections of the original position. Stockpiling for the Contractor's convenience will not be measured for payment.

Stockpiles for payment must first be authorized in writing by Owner. The volumes of topsoil will be computed by the average end method. Monthly progress payments will be estimated.

Topsoil which has been determined to be unsuitable material will be measured by the cubic yard in its placed position by cross sections determined from initial and final surveys of the construction areas. No differentiation will be made between unsuitable topsoil and fill material for payments.

D. Gravel mulch - will be measured in the same manner as cover material.

E. Riprap - will be measured by the ton of material in place according to the Plans and Specifications and accepted. Quarry weigh bills may be accepted by the Owner, or the Owner may require weighing by scales provided by the Owner on-site or at the quarry. Unsuitable material delivered to the site will not be paid, and must be removed from the site at the Contractor's expense.

F. Quantity Determination

1. Where it is impractical to measure material by the cross section method because of the erratic location of isolated deposits, three-dimensional measurements may be used. The Contractor shall coordinate with the Owner to provide adequate time for field surveys and quantity determinations.

2. The sum of quantities for individual materials within a given borrow area will not exceed the total volume of embankment as determined from initial and final cross sections computed by the average end area method.

3. Overexcavation, as directed by the Owner, to remove cover materials, and/or unsuitable material will be included in the measurements for payment. Overexcavation not directed by the Owner will not be measured for payment.

4. The Owner and Contractor shall compare records daily as to the number of loads for each type of material that was hauled and placed. Equipment capacities used to estimate the monthly quantities will be determined and mutually agreed upon prior to hauling. These load count measurements will be considered to be loose cubic yards (LCY) and will be adjusted to reflect bank cubic yards (BCY). The Owner and Contractor shall determine the BCY hauled by each size and piece of equipment and for all classification of material.

5. The Contractor's attention is specifically directed to the following:

The quantities for the major categorizations of embankment materials: 1) Fill Materials (Cover/Unsuitable Materials); 2) Compacted Cover Material; 3) Topsoil; 4) Tailings Material; 5) gravel mulch; and 6) riprap may vary from the quantities shown on the Plans. The quantities estimated are based on information gathered and interpreted from original aerial cross-sections and from final field survey surface elevations. Owner has placed a cover over Tailings Pond No. 1 and changed other surface elevations. Final surface elevations and quantities for the major categorizations of embankment materials will be determined by Owner and incorporated in revised Plans prior to the issuance of a Notice to Proceed.

G. The boundaries of classified materials and subsequent excavation or embankment placement, along with the resultant volumes are estimates and intended to serve as a guide in outlining

the scope of Work and evaluating the bids. All excavated material will be subject to approval of Owner. The accepted final quantities of embankment will be measured and paid for at the Contract unit price per cubic yard for the class of material placed. The quantities will be determined from initial and final cross sections of the construction areas.

H. When the accepted quantities of Work vary from the quantities in the bid schedule, the Contractor shall accept as payment in full, so far as the Contract items are concerned, payment at the original Contract unit prices for the accepted quantities of Work done. No allowance will be made for any increase expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from field changes or conditions, or indirectly from unbalanced unit bid prices among the Contract items for overhead expense on the part of the Contractor and subsequent loss of expected reimbursements therefore or from any other cause.

I. If the accepted quantities of Work vary more than thirty percent (30%) from the quantities in the bid schedule, unit prices may be renegotiated. Substantial and detailed documentation shall be provided by the Contractor to justify any such unit price adjustment. The Owner and Contractor will determine any justifiable unit price changes.

J. Quantities for monthly progress payment will be estimated. The sum of estimates for payment shall not exceed the quantities in the bid schedule. The final quantities will be determined from initial and final cross sections of the borrow areas. The accepted quantities of excavation will be paid for at the Contract unit price per cubic yard. Double handling will be paid for at the Contract unit price per cubic yard for the classification of materials originally excavated. Payment at the unit price shall be full compensation for excavating, hauling, placing, grading, shaping, trimming, and compacting materials as specified, including all labor, equipment, tools, and incidentals necessary to complete the Work, and temporary erosion control measures.

Payment will be made under:

Pay Item	Pay Unit
Tailings Material	Cubic Yard
Fill Material - (Cover/Unsuitable Material)	Cubic Yard
Compacted Cover Material Topsoil	Cubic Yard
Topsoil	Cubic Yard
Gravel Mulch	Cubic Yard
Riprap	Ton

L. RIPPING AND DISKING

1. GENERAL

This Work shall consist of furnishing all labor, equipment, and materials necessary to complete the ripping and disking of the cover material and topsoil as required by these Specifications and the Owner. Ripping and disking shall be done after the cover material and topsoil has been placed or as directed by Owner.

2. CONSTRUCTION REQUIREMENTS

A. Ripping, disking, and other agronomic activities shall only be done under appropriate soil and climatic conditions for agronomic purposes as determined by Owner.

B. Ripping - Ripping shall be done on all areas to be seeded or as directed by Owner. Ripping shall be done to a minimum depth of twelve inches (12") parallel to the contour at intervals not to exceed twelve inches (12") between rip lines. Construction equipment shall not be allowed on ripped areas except for other agronomic activities.

C. Disking - Disking may be required after ripping of the subgrade or after placement of the topsoil as directed by Owner. Construction equipment shall not be allowed on disked areas except for agronomic activities. The condition of the surface after ripping may require disking on areas designated by the Owner. Disking shall be done to a minimum depth of eight inches (8") parallel to the contour by using a double-gang disk with a minimum diameter of twenty-four inches (24") or any other implement which is suitable for completion of this task and approved by Owner. The disking process shall produce soil texture which is acceptable to Owner for plant growth.

3. METHOD OF MEASUREMENT

A. Ripping - Ripping of the graded surface shall be measured for "RIPPING" by the flat horizontal plane acre basis to the nearest 0.1 of an acre, for the area designated and approved by Owner. Any additional areas which have been ripped without the Owner's prior approval will not be measured for payment.

B. Disking - Disking of the graded surface shall be measured for "DISKING" by the flat horizontal plane acre basis to the nearest 0.1 of an acre, for the area designated and approved by Owner. Any additional areas which have been disked with Owner's prior approval will not be measured for payment.

4. BASIS OF PAYMENT

The accepted quantities of ripping and disking will be paid for at the Contract price per acre as measured on a flat horizontal plane.

Payment will be made under:

Pay Item	Pay Unit
Ripping	Acre
Disking	Acre

M. REVEGETATION

1. GENERAL

A. This Work shall consist of seeding and fertilizing of designated areas as shown on the Plans or as directed by Owner.

B. Areas disturbed during construction will be reclaimed and revegetated in accordance with these Specifications and in conformance with the Plans. Exceptions to the above areas such as roads, trails, and operating areas may be broadcast seeded as directed by Owner.

C. No revegetation will be done on the Bullrush Borrow Area and its associated access road outside the Site boundary.

2. MATERIALS

Materials shall meet the requirements listed in this section.

A. Grass Seed - Seed must be purchased through a dealer licensed with the Wyoming Department of Agriculture. Proof of such licensing must be provided. All seeds shall be furnished in sealed containers and shall be plainly labeled showing:

1. The commonly accepted name of the species and variety of seed.
2. The full name and address of the supplier.
3. The percentage of pure seed, crop seed, inert matter, weed seeds by weight, germination and hard seed.
4. The month and year of the germination test.
5. Origin of seed.
6. Lot number.
7. Name and number of each kind of secondary noxious weed seeds as listed in Wyoming Seed Law. Seed shall not contain any of the primary noxious weed seeds as designated by the Wyoming Seed Law.
8. Net weight of seed in each container.
9. The words "poisonous treated" shall appear in bold print on the label of seed treated with chemicals which are toxic to either humans or livestock.

B. Prior to seeding, the Contractor shall furnish to Owner duplicate copies of a certification signed by the vendor, certifying that each lot of seed has been tested by a recognized State Seed Testing Laboratory or by a commercial laboratory employing a certified seed analysis technician(s). The seed must have been tested not more than nine (9) months prior to the date of seeding on the Project. The Contractor shall also furnish to Owner duplicate copies of the seed analysis reports as prepared by the respective Seed Testing Laboratory. A Tetrazolium Viability Test will be accepted in lieu of the germination portion of the Service Sample Seed Analysis Report as prepared by the respective testing laboratory. The total percentage of "crop seed" shall not exceed three percent (3%) by weight. All seed must be certified, and planting rates stated are for the PLS. Bag tags shall be submitted to Owner from all seed bags used on the Project. All seed must be in good condition prior to planting.

C. Seed mixture

Species	Lbs . PLS/Acre*
Thickspike Wheatgrass *(Agropyron dasystachyum)*	3
Western Wheatgrass *(Agropyron smithii, Rosana Var.)*	3
Beardless Bluebunch Wheatgrass *(Agropyron spicatum inerme, Whitmar Var.)*	3
Small Burnet *(Sanguisorba minor)*	2
Antelope Bitterbush *(Purshia Tridentata)*	1
Four-Wing Saltbush *(Atriplex canescens)*	2
Common Winterfat *(Eurotia lanata)*	1
Douglas Rabbitbrush *(Chrysitgamnus viscidiflorus)*	0.5
Total	15.5*

* Acres as determined along the ground surface.

Common Winterfat and Douglas Rabbitbrush shall be seeded by broadcasting. In areas that are seeded by broadcasting the application rates shall be doubled.

D. A fertilizer mixture of ammonium nitrate and phosphate (P_2O_5) shall be applied at the rate of 40 pounds of available nitrogen and 20 pounds of available phosphorus per acre along the ground surface. Areas to be revegetated will be fertilized and disked prior to seeding in order to mix the fertilizer and provide a suitable seed bed.

3. CONSTRUCTION REQUIREMENTS

A. Fertilizing, seeding, and other agronomic activities under appropriate soil and climatic conditions for agronomic purposes as determined by Owner.

B. Disking and Seeding - The ground surface will be brought to the lines and grades shown on the Plans to blend with adjacent topography at the completion of grading operations. Ripping and disking in accordance with the Specifications Section L or as directed by the Owner shall be done prior to seeding. When cover material has been placed, it may require protection. If seeding and fertilizing is not complete within two weeks, cover material shall be roughened as directed by Owner for wind and water erosion protection by chisel plowing eight inches (8") deep on twelve inch (12") centers along the contour. No additional payment will be made for chisel plowing; this item shall be incidental to Revegetation.

The Contractor shall proceed with each seeding operation in its proper sequence and in a continuous manner. Any delay in the Contractor's operations resulting in damage to the prepared slopes or loss of material shall be repaired or replaced at the Contractor's expense.

C. Rate of Seed Application - A range land drill shall be used to apply the seed at a depth of one-half inch (0.5"). Prior to general seeding activities, test plots shall be established for the initial seeding in order to calibrate the mechanical seeders and insure the proper seed application rate. Calibration shall be accomplished in the presence of Owner and recalibration may be required as directed by Owner. Maintaining the proper seed application rate shall be the responsibility of the Contractor.

D. Time of Seeding - Seeding shall be done as directed by Owner between September 1 and the time that frost prevents proper seeding or after the frost leaves the ground and before May t.

E. Mulching - Mulch shall be applied to areas as shown on the Plans and other areas as directed by Owner at a rate of 2.0 tons of grass hay per acre. Mulch shall be evenly distributed, leaving no bare areas or thick piles of mulch material. Mulching may not proceed during windy conditions, as determined by the Owner. Crimping must immediately follow mulching operations (within approximately two (2) hours or less) to minimize the occurrence of wind blowing the mulch prior to crimping. Crimping operations shall be done on the contour. No additional payment will be made for mulching; this Work shall be incidental to Revegetation.

F. Preservation of Seeded Areas - The Contractor shall protect seeded areas from damage by traffic or construction equipment through final acceptance. Any area damaged from these causes will be repaired at the expense of the Contractor.

4. SEQUENCE OF OPERATIONS

A. Areas receiving topsoil shall be scarified before placing topsoil.

B. Topsoil shall be evenly placed on the scarified surface and immediately scarified.

C. Fertilizer shall be applied and disked into the topsoil.

D. Seeding of the prepared areas shall be done at the direction of Owner.

E. Mulch will be applied to required areas after seeding and immediately crimped.

5. METHOD OF MEASUREMENT AND PAYMENT

A. Accepted revegetation within authorized areas will be measured by the flat horizontal plane acre basis to the nearest 0.1 of an acre. Areas to be included for measurement shall be those areas authorized for and containing accepted seeding and fertilizing and shall include designated site access roads, access trails, and construction campsite reclamation. Areas disturbed or caused to be disturbed by the Contractor for his convenience or by his negligence shall be seeded as directed by Owner at the Contractor's expense.

B. Payment will only be made for revegetation when these materials and practices are properly installed and accepted by the Owner.

C. The accepted quantities will be paid for at the Contract unit price per acre as measured on a flat horizontal plane. Payment will be made under:

Pay Item	Pay Unit
Revegetation	Acre

American Nuclear Corporation
November 5, 1992

Laboratory Measurements of Radon Emanation Coefficients

Tailings

Pond	North-Coordinate	East-Coordinate	Emanation Coefficient	Average Coefficient
Tailings Pond 1				0.1404
	781361	798910	0.1736	
	781068	798152	0.1643	
	780300	798800	0.0832	
Tailings Pond 2				0.1513
	779800	800800	0.1825	
	778800	800800	0.1532	
	778600	800600	0.0966	
Bullrush				0.1319
	779400	796600	0.1227	
	779700	796100	0.1410	

Notes:
1. the average values indicated for each tailings source were used in the emission calculations
2. Source: Energy Laboratories, Inc. report titled American Nuclear, Gas Hills; November 19, 1991

Potential Cover Soils

Boring	Depth Interval	Emanation Coefficient	Suitability for Cover (based on acidity)
5	30 - 40	0.156	Unsuitable
6A	30 - 40	0.014	Suitable
10	45 - 55	0.156	Suitable
21C	5 - 20	0.043	Cobble Layer
37	35 - 55	0.112	Unsuitable
40	5 - 20	0.156	Suitable

Notes:
1. a conservatively large value of 0.2 was used as the emanation coefficient in the emission calculations
2. Source: Energy Laboratories, Inc. report titled Soil Analysis report - American Nuclear Corporation; October 5, 1992.

...CAR MINERAL OPERATION - SOILS ANALYSIS

Project: Gas Hills
Report Date: November 19, 1991
Sample Date: October 16, 1991

Sample I.D.	TP Bo.1 SE	TP Bo. 1 SW	TP Bo.1	TP Bo. 2	TP Bo. 2	TP Bo. 2	TP Bo. 2	Bullrush	Bullrush
	N781361	N781068	N780300	N779800	N779000	N778800	N778600	N779400	N779780
	E798910	E798152	E798600	E800800	E800400	E800600	E800600	E796600	E796100
								6460-	6495
Elevation:	6424	6426	6433	6485	6506	6513.3	6519.5	6457	6485
Sample No.:	91-35914	91-35915	91-35916	91-35917	91-35918	91-35919	91-35920	91-35921	91-35922
Parameters:									
Radium 226 (pCi/g)	547	511	236	353	300	41.0	73.3	44.7	125
Precision	1.6	1.5	1.0	1.3	1.2	0.4	0.6	0.5	0.8
Emanation Coef.	0.1736	0.1643	0.0832	0.1825	0.1730	0.1532	0.0966	0.1227	0.1410
	TP Bo. 1			TP Bo.2				Bullrush	
Avg. Ra226 (pCi/g)	431			192				84.3	
Avg. Emanation Coef.	0.1404			0.1513				0.1319	

Q.A. MANAGER: W.A. Linsley
Energy Laboratories, Inc.
P.O. Box 3258
Casper, WY 82602

Data Analyzed by Chen Northern - Job No. 92-4312:

	TP Bo. 1	TP Bo. 1	TP Bo. 1	TP Bo. 2	TP Bo. 2	TP Bo. 2	TP Bo. 2
	N780300	N781361	N781068	N778600	N778800	N779800	N779000
	E798800	E798910	E798152	E800600	E800800	E800800	E800400
	6436	6427	6428	6519	6513	6485	6511
Moisture Content (%)	49.80	59.70	64.70	8.50	15.90	45.70	35.90
Dry Density (pcf)	64.90	57.20	57.80	87.40	84.80	64.20	75.30
Specific Gravity (%)	2.61	2.56	2.64	2.63	2.64	2.56	2.63
Degree of Sat. (%)	86.10	85.10	92.30	25.40	44.60	78.50	90.00
In-Place Porosity (%)	60.20	64.20	64.90	44.70	48.50	59.80	54.10
	TP Bo. 1			TP Bo. 2			
Avg. Moisture Content	58.07			26.50			
Avg. Dry Density	59.97			77.93			
Avg. Specific Gravity	2.60			2.62			
Avg. Degree of Sat.	87.83			57.13			
Avg. In-Place Porosity	63.10			52.28			
Mass Density = Dry Density * (1+decimal % moisture)							
Avg. Mass Density (pcf)	94.79			98.58			
Avg. Mass Density (g/cm3)	1.5197			1.5804			

ENERGY LABORATORIES, INC.

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

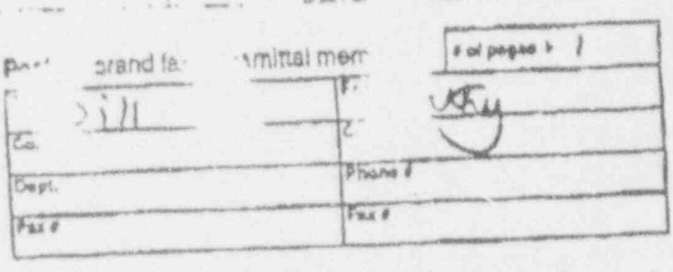
SOIL ANALYSIS REPORT - AMERICAN NUCLEAR CORPORATION

SAMPLE I.D.:	#5	#6A	#10	#21C	#39	#40
Sample Date:	---	---	---	---	---	---
Report Date:	09-29-92	09-29-92	09-29-92	09-29-92	09-29-92	09-29-92
Sample Number:	92-29189	92-29190	92-29191	92-29192	92-29193	92-29194
Radon Emanation:						
A' - Initial Activity net cpm after de-emanation	22.8	21.1	46.6	15.6	23.9	20.4
A_∞ - Final Activity net cpm after 15 days	27.0	21.4	55.2	16.3	26.9	23.6
Radon Emanation Coefficient $(A_\infty - A')/A_\infty$	0.156	0.014	0.156	0.043	0.112	0.136

Bore hole	Depth	Class
#5	30-40'	unsuitable
#6A	30-40'	suitable
#10	45-55'	suitable
#21C	5'-20'	cobble
#39	35-55'	unsuitable
#40	5'-20'	suitable

Report Approved By: R.C Vaile

kmk



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