Department of Energy
Albuquerque Field Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

MAR 08 1994

Mr. Joseph J. Holonich, Acting Chief
Uranium Recovery Branch
Division of Low-Level Waste
Management and Decommissioning
Office of Nuclear Materials Safety and Safeguards
Mail Stop 5E-4 OWFN
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Holonich:

The Uranium Mill Tailings Remedial Action (UMTRA) Project Office (PO) has reviewed the Nuclear Regulatory Commission (NRC) Staff Evaluation, dated January 10, 1994, which resulted from their review of the bedrock permeability testing and UNSAT2 analysis performed on the Estes Gulch disposal site. We appreciate the positive comments provided by your staff regarding the level of detail contained within the reports, and would like to thank them for their timely review and response to these rather extensive and complicated documents.

The UMTRA PO is concerned with some of the technical statements and conclusions made within the NRC Staff Evaluation regarding the uncertainties associated with the results of the permeability tests and our associated UNSAT2 modeling. Further, the UMTRA PO does not agree with the NRC assessment that field verification of the radon barrier permeability is a necessary measure to provide reasonable assurance of design performance. In an effort to clarify any misunderstandings, we have enclosed responses to the specific statements which cause concern. Based on the information contained in these responses, the UMTRA PO requests that the NRC re-evaluate the requirement to perform additional field verification testing.

However, in the event that NRC continues to require additional field verification testing, the UMTRA PO has decided the most proactive and cost effective approach to resolving this issue is to perform the Daniel and Benson test method as outlined in the December 1990 and February 1993 editions of the American Society of Civil Engineering (ASCE) Geotechnical Journals. We plan to perform this testing in a two phased approach. In Phase I we will perform laboratory tests to determine the relationship between bentonite content and permeability. This study will be performed to determine whether it is possible to reduce the bentonite content to eight percent or less. The second phase of the study will evaluate the relationship of moisture content and compaction as they relate to permeability. Enclosed for your review is a copy of the proposed Phase I testing. Should you have any problems with this phase of the testing, please contact

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this office immediately. The Phase II testing program is currently being developed and a copy will be provided to your office for review as soon as it is completed. We expect to begin the Phase I testing in mid-March.

At the present time, we do not anticipate a need to modify the Remedial Action Inspection Plan as a result of this testing. However, a modification to the Remedial Action Plan is forthcoming to incorporate the new design cover permeability of $1X10^{-7}$ cm/sec, as approved by the NRC. A future RAP modification may be required depending upon the results of the test program.

In addition, the UMTRA PO intends to incorporate into the Long-Term Surveillance Plan for the Estes Gulch disposal cell a plan for monitoring and ultimate closure of the stand-pipes. It is our intention to negotiate an acceptable criterion for closure of the stand-pipes with both the NRC and Colorado Department of Health.

Should you have any questions please contact me at (505) 845-5668.

Sincerely,

Sharon J. Arp

Sharon J. Arp
Site Manager
Uranium Mill Tailings Remedial Action
Project Office

2 Enclosures

cc w/1 enclosure:
Response to Staff Evaluation
A. Chernoff, UMTRA
C. Smythe, UMTRA
N. Abramiuk, RAC

cc w/enclosures:
J. Hams, CDH
S. Cox, TAC

RESPONSES TO NRC TECHNICAL STAFF EVALUATION

1. <u>NRC Comment</u>. The results presented in DOE's report, indicate the highest average permeability of 4 X 10^{-7} cm/sec occurs within the Group II subgrade designation.

   <u>DOE Response</u>. The average permeability value of 4 X 10^{-7} cm/sec is not the highest average permeability for the sandstones, rather it is the lowest average permeability. The 4 X 10^{-7} cm/sec value was calculated using extrapolated data to obtain a *conservative* lower bound average permeability value. Using the *in situ* results gives an upper bound average permeability value of 2 X 10^{-6} cm/sec for the sandstone. The *conservative* lower bound average permeability value was calculated in an effort to account for uncertainties (as discussed in the NRC Staff Evaluation) associated with the test.

2. <u>NRC Comment</u>. It is well documented that there is some degree of error involved in constructing an earthen cover to a specified permeability.

   <u>DOE Response</u>. It is well documented that compacted clay covers have variable permeability characteristics. This is one of the main reasons for incorporating conservatism in a design and for performing *in situ* testing of covers with specified permeabilities of less than 1 X 10^{-7} cm/sec. Because of the relative ease of obtaining cover permeabilities of 1 X 10^{-7} cm/sec when using clayey soils for cover construction, most designers opt to specify this permeability value rather than try to confirm a lower value. In Benson's February 1994 ASCE Geotechnical Journal article, page 382, figure 6B, he reported that the 90th percentile cover permeability value for 67 tested landfill sites was 1 X 10^{-7} cm/sec. Using sheepsfoot rollers, like those used on UMTRA sites, Benson reported that the 90th percentile permeability value was 6 X 10^{-8} cm/sec, and the median permeability for sheepsfoot compacted covers was 1.4 X 10^{-8} cm/sec.

   In the case of the Rifle site cover design, we are using processed or "manufactured" soil that is blended with bentonite in a pug mill, rather than using "natural" soil. By designing the cover with a readily attainable permeability value of 1 X 10^{-7} cm/sec and using manufactured soils, the variability of the material properties is significantly reduced and assurance that the cover's design permeability will be uniformly met over the entire site is significantly increased. In addition, a stringent field verification testing program is required to ensure critical parameters (compaction and moisture content) are met.

3. <u>NRC Comment</u>. The data from several infiltrometers did not reach a steady-state condition. This unfortunate circumstance only permitted an interpretation of the earlier data from many of the infiltrometer tests, which added to the uncertainty of the analysis.

   <u>DOE Response</u>. From thorough evaluation of the *in situ* sealed-double ring infiltrometer data, steady-state flow was achieved by all the SDRI tests or they

were very close to steady-state convergence. Three of the tests, however, provided results which varied from the expected norm (increasing permeability with time versus decreasing), and therefore, required extensive evaluation to determine their validity. Test pits 2, 3 and 5 were thoroughly inspected during decommissioning to determine reasons for this variation. No failure could be detected within the test. Therefore, physical considerations of the material were evaluated. As outlined in section 2.2 of the report entitled, "In-situ Permeability Tests on Bedrock at the Excavated Bottom of the Estes Gulch Disposal Site," dated October 1993, a number of possible explanations were provided to account for this variance.

4. NRC Comment. DOE also performed several other types of permeability testing, including air-entry permeameters, in an effort to compensate for the shortcomings of the infiltrometer testing.

   DOE Response. The NRC has misunderstood the reason for performing the other types of permeability testing. Prior to initiating the SDRI testing, it was suggested that other, more timely and cost-effective tests could be performed, i.e., air-entry permeameter (AEP), rather than the SDRI. Since the SDRI had been successfully used at the Grand Junction, Colorado, site and the success of the AEP on bedrock material were unquantified, it was decided that these other tests would be performed to complement the permeability tests at each location, and to identify potential alternatives to the SDRI that would be quicker and less expensive than SDRI testing. When compared to the SDRI results, the AEP test results are quite favorable, and therefore, will be considered if future testing at an UMTRA site is required. Other permeameter tests that were performed by Stevens and Associates were performed at the request of Stevens and were not considered directly comparable with the SDRI and AEP results.

5. NRC Comment. The modeling did not incorporate a sensitivity analysis to address the uncertainties associated with the inherent errors of the subgrade permeability or the constructed cover infiltration flux.

   DOE Response. A sensitivity analysis was not performed because the input parameters used in the UNSAT2 analysis were considered to be conservative. A sensitivity analysis would have been required if we had used the more probable parameter values. Use of the lower bound case saved analysis time and cost (one iteration of the UNSAT2 program took 1 to 2 days of continuous "running" on an IBM compatible model 486, 66 MHz machine).

The following conservatism was used in the UNSAT2 model:

1. Bedrock Permeability. As outlined in Table 11 of the report entitled, "Permeability Test Results and Their Implications as to Bathtub Potential for the Estes Gulch Disposal Site," dated October 1993, a

range of permeabilities was determined for each of the four material groups found within the footprint of the cell. The Group II materials were found to range from 1 X 10^{-6} cm/sec to 2 X 10^{-7} cm/sec. In the UNSAT2 analysis the lower bound value of 2 X 10^{-7} cm/sec value was used to represent the Group II bedrock. The Group III materials were found to range from 9 X 10^{-7} cm/sec to 2 X 10^{-7} cm/sec. For additional conservatism, a value of 1 X 10^{-7} cm/sec was used. The Groups I and IV materials were assumed to be very impermeable with a value of 1 X 10^{-8} cm/sec assigned to them.

2. Cover Effects. The effect of the 6 to 9.5 foot layer, consisting of a frost barrier and two drain layers, which covers the radon barrier and retards infiltration of precipitation into the radon barrier was not considered in the UNSAT2 modeling.

3. Radon Barrier. Even though the radon barrier will be unsaturated through out much of its design life, a saturated flux of 1 X 10^{-7} cm/sec was used in the model for the entire period.

4. Cell Toe Area. For UNSAT2 modeling, a no flow vertical boundary was imposed at the downstream end (i.e., south boundary) of the cell. This no flow boundary would tend to back up water in the cell and raise the phreatic surface.

MORRISON KNUDSEN CORPORATION
ENVIRONMENTAL SERVICES DIVISION

UMTRA PROJECT
INTER-OFFICE CORRESPONDENCE

To: R. E. Lawrence	Date: 3 March 1994
Attn: C. R. Spencer	Doc. No.: 3885-RFL-I-01-05179-02
Location: MKF, Albuquerque	From: D. R. Sanders
Subject: UMTRA Project-Rifle	Location: San Francisco
Phase I Testing to Determine	
Optimum Bentonite Content for Radon Barrier	

This IOC has been revised from Rev. 01 which was issued on 18 February 1994. The changes in this IOC from Rev. 01 are in the Sampling Instructions to the Rifle field staff and elimination of the requirement for compaction at 95% of Standard Proctor. The number of tests to be carried out has also been increased to reflect the fact that samples will be taken from approximately 5 test pits excavated in the radon barrier stockpile.

The current construction specifications for the Rifle Disposal Cell call for the radon barrier cover to consist of an 18-inch-thick layer of compacted clay with the top 12 inches amended with 10% by dry weight, of bentonite to increase the imperviousness of the cover. The material is to be compacted to a minimum of 100% of maximum dry density in accordance with ASTM D-698 at a moisture content of 0 to plus 3% of Optimum Moisture Content. Preliminary laboratory permeability tests on samples of clay taken from test pits excavated at the site of the Disposal Cell and amended with 10% bentonite by dry weight have given laboratory permeability values lower than 1×10^{-7} cms/sec.

Because of the high costs (approx. $1.2 million) and constructability problems involved in blending and compacting the bentonite amended soil, we recommend that additional laboratory permeability tests be carried out on samples of the clay material stockpiled at the site for future use as radon barrier material. It is estimated that a reduction in bentonite content of the radon barrier from 10% to 8% could result in a total potential savings of approximately $260,000 with approximately $240,000 of the savings resulting from a reduction in material costs. (see the attached memo of February 8, 1994 from Bruce Stevens to Grant Cherrington).

The purpose of the tests would be to:

1) Determine more precisely the percent of bentonite that would have to be added to the stockpiled clay soils to give a permeability of 1×10^{-7} cms/sec.

2) Determine whether the required permeability can be achieved with a reduction in bentonite content.

The testing program which will be designated Phase I, will involve having the Rifle field staff, with MKES support, take bulk samples of material from the radon barrier stockpile and sending them to a geotechnical laboratory for testing to determine permeability.

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Basically, the testing will consist of determining the permeability of the clay material to be used for the radon barrier with varying amounts of bentonite added and compactive efforts of 100% of Standard Proctor.

We have not recommended any triaxial strength tests at this time based on our judgment that the shear strength of the radon barrier would probably increase with a reduction in the bentonite content. Strength tests can be conducted at a later date, should it be required by the NRC.

Attached for your review please find the following:

1) Sampling instructions for the Rifle Field Staff.

2) Instructions for the laboratory testing program.

3) A table detailing the tests to be performed.

4) A table giving the Schedule of Quantities and Prices for the required tests.

5) A cost estimate for carrying out the tests ($18,000).

6) A telecon of 7 February 1994 between G. Cherrington of MKES and Sam Burton of Chen Northern re-permeability testing.

7) A telecon of 2 March 1994 between G. Cherrington of MKES and Jim Weaver of SHB Agra re-permeability testing.

8) A schedule for carrying out the testing and related analyses (approximately 11 weeks).

9) An estimate of the MKES hours to be expended in carrying out the testing and related analyses (160 manhours).

10) An estimate prepared by the MKES Estimating Manager (B. Stevens) of the savings (approximately $260,000) resulting from a two percent reduction in the bentonite content of the radon barrier.

Please contact P. K. Chen or Grant Cherrington of this office if you have any questions.

Robert A. Claire
D. R. Sanders

DRS/GGC/nad

cc: R. Withee
S. Arp, DOE

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UMTRA PROJECT - RIFLE
SAMPLING INSTRUCTIONS FOR
RIFLE FIELD STAFF
PHASE I AND PHASE II TESTING

1) Approximately 400# of material should be taken from approximately 5 test pits to be placed at different locations on the stockpile for the radon barrier material. The number of test pits will depend on the variability of the material encountered in the samples. The depth from which the sample should be taken should be commensurate with the depth in the pile from which the material to be placed in the top 12 inches of the radon barrier will be taken. The samples should be placed in 50# pails and sealed to prevent moisture loss. The material in each pail should be representative of the total sample. Take 2 moisture content samples from each pail and test in the field laboratory. Also, in the field laboratory, run on the total sample from each test pit, two Atterberg Limit tests, one compaction curve and two tests to determine the percent passing the no 200 sieve. (These results will be used as a cross check against the results obtained by the testing laboratory).

2) The 400# of sample from each test pit will result in approximately 8 pails of sample from each of the approximately 5 test pits for a total of approximately 40 pails. Approx 2 pails from each test pit will be sent to the designated testing laboratory to carry out the Phase I testing program which is to determine the appropriate bentonite content to be incorporated in the top 12 inches of the radon barrier. The balance of the material will be held at the site for any backup testing required for the Phase I testing and for use in carrying out the Phase II testing program. Phase II consists of carrying out additional tests to determine the relationships between compactive effort and permeability as presented by Daniel and Benson in a paper in the ASCE Journal of Geotechnical Engineering, Vol. 116, No. 12, December, 1990. The bentonite content as determined in the Phase I testing program will be used in the Phase II testing program. (The Phase II testing program will be the subject of an IOC to be issued in the near future).

3) Arrange for a fresh 100 pound sample of Wyoming sodium bentonite as specified in Specification Section 2200, Part 2.1.B.3., be shipped to the designated testing laboratory. The bentonite should be shipped in moisture proof containers. If the subcontractor has selected an approved supplier, the bentonite should be supplied by the approved supplier.

4) An engineer from the MKES office in San Francisco will come to Rifle to assist in the selection and taking of the samples.

UMTRA PROJECT - RIFLE

PHASE I - LABORATORY TESTING PROGRAM

RADON BARRIER MATERIALS AMENDED WITH BENTONITE

This laboratory testing program (Phase I) is designed to determine the permeability of bentonite amended clay soils designated to be used as a radon barrier for the Estes Gulch Disposal Cell. Compensation for this program shall be made in accordance with the payments listed in the Schedules of Quantities and Prices.

The laboratory testing program shall conform with all applicable specifications as set forth in the contract and as listed below.

1) The bentonite to be used in the tests will be supplied by MK-Ferguson or its designate.

2) Approximately five test pits will be sampled and eight - 50# pails containing samples of soil will be taken from each test pit. Two - 50# pails from each test pit will be delivered to the laboratory. The two 50# pails of soil samples are to be blended together and then the designated percentage of bentonite is to be added to the sample. This procedure will result in five composite samples, one from each of the five test pits.

3) The characterization tests (Natural Moisture Content, Specific Gravity, Atterberg Limits, Particle Size Analysis and Moisture Density Relations) should then be carried out. Upon completion of these tests, the results should be transmitted to the Engineer for review.

   After completion of the review, the Engineer will give the laboratory direction in proceeding with the permeability testing. Permeability testing is not to proceed without the prior approval of the Engineer.

4) The permeability tests are to be run in a triaxial cell after compaction by kneading type compaction to 100% of maximum dry density as determined by ASTM D-698 with a moisture content at 1.5% wet of optimum.

5) Triaxial permeability tests with back pressures shall be performed in accordance with ASTM D-5084. A confining pressure of 2 psi shall be used. The first permeability tests shall be run on samples amended with 8% bentonite. Additional tests will be specified after the permeability test results using 8% bentonite have been received and evaluated by MKES.

6) A written report shall be prepared at the completion of the testing program for the permeability tests and shall include as a minimum the following information on each sample:

- Amount of bentonite added to the sample by dry weight (%).
- Soil classification.
- Confining pressure used.
- Initial conditions (water content, dry density).
- B parameter before the permeability testing begins.
- Final conditions (water content, dry density and a sketch of the sample in the triaxial cell at the completion of the test).
- All calculations relating to determination of the permeability of the sample.

7) A summary of tests to be performed is shown on the attached sheet.

UMTRA - RIFLE

PERMEABILITY TESTS

Percent Bentonite (by dry weight)	Natural Moisture Content	Specific Gravity	Atterberg Limits	Particle Size Analysis with Hydrometer	Moisture Density Relations	Constant Head Triaxial Permeability At 100% of ASTM D698	
	ASTM D2216	ASTM D854	ASTM D4318	ASTM D422	ASTM D698	ASTM D5084	Confining Pressure = 2 psi
8.0	2 @ 5 = 10	1 @ 5 = 5	1 @ 5 = 5	1 @ 5 = 5	1 @ 5 = 5	3 @ 5 = 15	
*	2 @ 5 = 10	1 @ 5 = 5	1 @ 5 = 5	1 @ 5 = 5	1@ 5 = 5	3 @ 5 = 15	Back Pressure = 10 psi
*	2 @ 5 = 10	1 @ 5 = 5	1 @ 5 = 5	1 @5 = 5	1 @ 5 = 5	3 @ 5 = 15	

Note:

Approximately five samples will be tested at each designated bentonite content. Additional bentonite test values will be determined after reviewing the permeability values obtained by adding 8% bentonite by weight to the samples.

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PERMEABILITY TESTS

SCHEDULE OF QUANTITIES AND PRICES

Item	Quantity	Estimated Unit Price	Amount
1. Mobilization/Demobilization (including handling, mixing, and preparation of samples).	1	LS	______
2. Natural moisture content (ASTM D2216)	30 each	____/ea	______
3. Specific gravity (ASTM D854)	15 each	____/ea	______
4. Atterberg Limits (ASTM D4318)	15 each	____/ea	______
5. Particle size analysis with hydrometer (ASTM D422)	15 each	____/ea	______
6. Moisture Density Relations (ASTM D698)	15 each	____/ea	______
7. Triaxial Permeability (ASTM D5084)	45 each	____/ea	______
TOTAL PRICE			______

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UMTRA - RIFLE

PERMEABILITY TESTS

COST ESTIMATE

Item	Quantity	Estimated Unit Price	Amount
1. Mobilization/Demobilization (including handling, mixing, blending, addition of bentonite and preparation of samples).	1	LS	$1000.0
2. Natural moisture content (ASTM D2216).	30 each	$ 6.00/ea	180.00
3. Specific gravity (ASTM D854).	15 each	30.00/ea	450.00
4. Atterberg Limits (ASTM D4318).	15 each	50.00/ea	750.00
5. Particle size analysis with hydrometer.	15 each	50.00/ea	750.00
6. Moisture Density Relations (ASTM D698).	15 each	80.00/ea	1,200.00
7. Triaxial Permeability (ASTM D5084).	45 each	300.00/ea	13,500.00
TOTAL PRICE			$17,830.00
		Say	$18,000.00

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MK-ENVIRONMENTAL SERVICES

UMTRA PROJECT
Telephone Conversation Record

DATE 7Feb94 TIME 8:30 AM ☑ PM ☐ DOC. NO. 3885-RFL-T-01-05198-00

TO ☐ FROM ☐ Sam Burton RECORDED BY G. Cherrington

LOCATION Denver CO

AFFILIATION Chen Northern PHONE NO. 303-744-7105

SUBJECT Permeability tests on Rifle radon barrier

I have had several voice mail conversations with Sam Burton of Chen Northern in Denver , Colorado (ph 303-744-7105) concerning their carrying out permeability tests on bentonite amended radon barrier material for the Rifle cell.
We finally connected today and I confirmed the following:

1)They have 20 cells, but only 7 can be used at any one time.

2)The cells are currently occupied but should be available in another two to three weeks.

3)I told him that we would run the tests in groups of 6.The 6 would have the same bentonite content but 3 would be run at 95% and 3 would be run at 100 % of stnd Proctor.We would run up to 5 pore volumes of water thru the samples. After we had reviewed the results of the first 6, we would then give the bentonite contents for the remaining tests.Tests would be in conformance with ASTM D5084.

4)Sam Burton said it would take about 3 weeks for each set of 6 tests and would cost $250 per test or $1500 for each group of 6 tests.

I said we would probably be in touch in a couple of weeks concerning when we would want to start the tests.

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H.M.
ODC
MK-F
Proj. Director
N. Abramiuk

MK-ENVIRONMENTAL SERVICES

UMTRA PROJECT

Telephone Conversation Record

RECEIVED-MKF MAR 2 1994 UMTRA-S.F.

DATE 2 Mar 94 TIME ______ AM ☐ PM ☐ DOC. NO. 3886-RFL-T-01-05213-00

TO ☑ FROM ☐ Jim Weaver RECORDED BY G. Cherrington

LOCATION Phoenix Az

AFFILIATION SHB Agra PHONE NO. 602-272-6848

SUBJECT Permeability Testing for Rifle

I spoke to Jim Weaver of SHB Agra in Phoenix yesterday and today concerning their capabilities for carrying out permeability tests on compacted clay samples for the radon barrier at Rifle.

They have 12 permeability cells available in Phoenix and a few more in Reno. It would take approx 24 to 48 hours to saturate the compacted samples and the actual test could be run in 2 to 3 hours using a Constant Volume(CV)permeameter (this seems pretty optimistic to me).The test would be per the ASTM D-5048 method.

He says that they can run 3 tests a day after the samples have been saturated. On one occasion they ran 100 permeability tests in 30 days.

Their standard prices are given below.We might see lower prices on a bid.

Atterberg Limits	=$38
Moisture Content	=$8
Compaction D-698	=$80
Compaction D-1557	=$90
Particle Size D-422	=$35
Spec Gravity	=$45
Permeability D-5084	=$200 (flexwall) 2 week turnaround
Permeability D-5084	=$300 (const. volume) 4 to 5 day turnaround

He has talked to Don Blasdel in MKF purchasing and has been put on the bidders list to so they can be considered for the Rifle permeability testing if and when it goes out for bid.

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Dep. E&D Mgr.	PKC ✓
Proj. QA Mgr.	
Site Des. Eng.	GGC ✓
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Chron File	X
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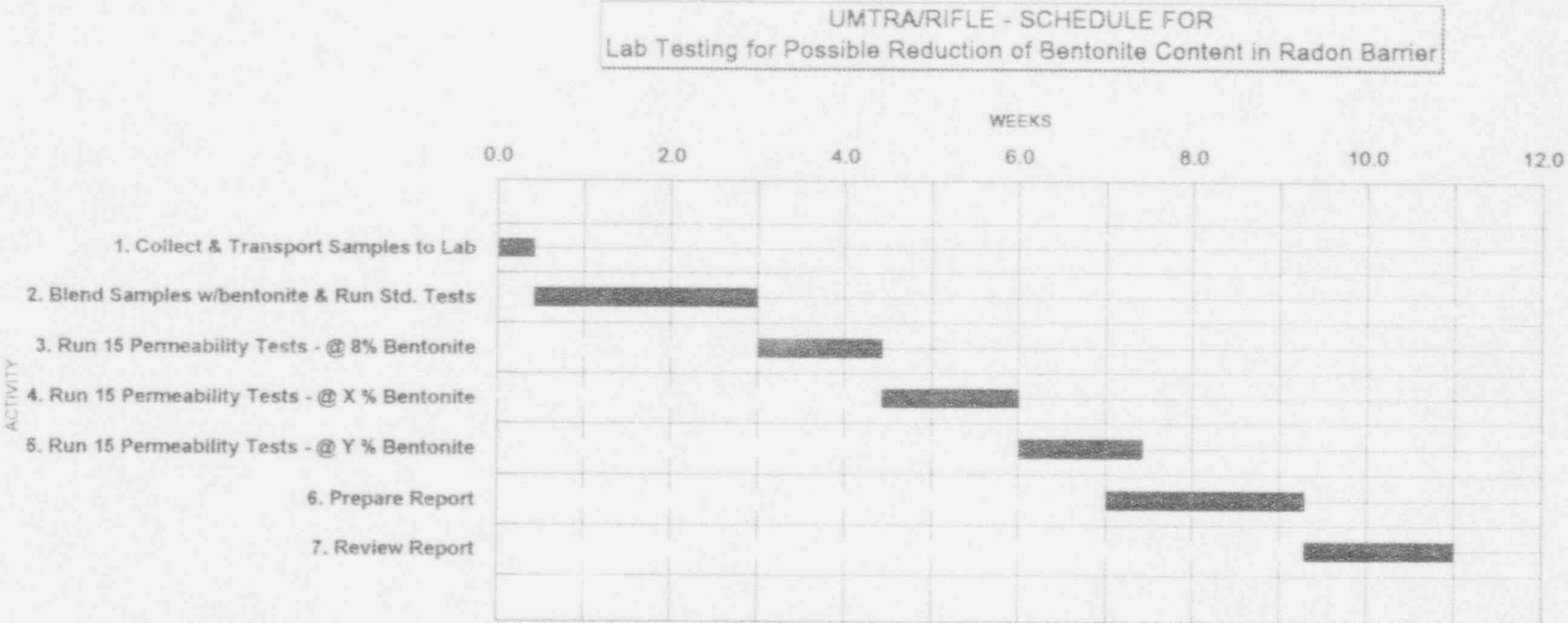
DOC	
MK-F	
Proj. Director	
N. Abramiuk	
R. Withee-RFL	



Note: X % and Y % bentonite will be determined by MKES based on the results of the permeability tests run with 8 % bentonite

UMTRA - RIFLE

WORKSHEET A-1. MKES MANHOURS FOR LAB TESTING FOR POSSIBLE REDUCTION OF BENTONITE CONTENT IN RADON BARRIER

		MANHOUR BY MONTH			
ACTIVITY	ASSIGNED TO	1	2	3	TOTALS
1. Prepare Contract Documents and Specifications	G. Cherrington P.K. Chen H. Lubis	20 5 10			20 5 10
2. Travel to site to monitor sampling	G. Cherrington	20			20
2. Coordinate with Field and Lab on Testing Requirements (Sampling to be done by Field Staff w/MKES support)	G. Cherrington P.K. Chen H. Lubis	20 5 10	5 1		25 6 10
3. Review Permeability Report	G. Cherrington P.K. Chen H. Lubis			15 5 5	15 5 5
4. Q.A. Review	D. Sanders	1		1	2
5. Response to Comments	G. Cherrington P.K. Chen			22	22
6. Support - Typing		10		5	15
	TOTALS=	101	6	53	160

=GRAND TOTAL

To: G. Grant Cherrington@SFO@MKEnvironmental
Cc:
Bcc:
From: Bruce L. Stevens@SFO@MKEnvironmental
Subject: Rifle, Bentonite Reduction
Date: Tuesday, February 8, 1994 13:16:39 PST
Attach:
Certify: N
Forwarded by:

I have looked at the 10% vs 8% bentonite reduction again and have a slightly different approach than before

	10% Bentonite	8% Bentonite
Direct Costs	941,746	941,746
20% less Bentonite	N/A	(241,920)
Subtotal Direct Costs	941,746	699,826
Overhead, (Fixed Cost)	141,262	141,262
Subtotal	1,083,008	841,088
Profit	103,592	80,452
Total	1,186,600	921,540

Reduction ($265,060), compares with ($206,413) from my last guess.

Bentonite reduction of ($241,920) is derived from reducing the total purchase of bentonite in the last rifle estimate by 20%.