Umetco Minerals Corporation

P.O. BOX 1029
GRAND JUNCTION, COLORADO 81502
☎ (970) 245-3700

April 15, 2008

Mr. Richard Chang, Project Manager
Special Projects Branch
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs
Two White Flint North
11545 Rockville Pike
Rockville, Maryland 20852-2738

Re: Response to Request for Additional Information – License Amendment to Reflect Completion of Reclamation, Source Material License SUA-648, Docket 40-0299, Umetco Gas Hills, Wyoming, Site (TAC J00531)

Dear Mr. Chang:

This letter provides responses to requests for additional information contained in NRC letter dated March 31, 2008. Please find attached two copies of the responses providing additional information and clarification regarding the Construction Completion Report dated June 29, 2007 and the associated license amendment request dated February 19, 2008.

If you have any questions or require additional information, please contact me by telephone at (970) 256-8889 or by e-mail at gieckte@dow.com.

Sincerely,

Thomas E. Gieck
Remediation Leader

TEG/jfc

Attachments: As stated

cc: Mark Moxley, WDEQ

08-040.doc

Response to NRC Request for Additional Information
License Amendment to Reflect Completion of Reclamation
Source Material License SUA-648, Docket 40-0299
Umetco Gas Hills, Wyoming Site

Comment No. 1A. *Provide additional information related to the hydraulic conductivity testing during construction of the radon barrier for the Heap Leach, Above Ground Tailings Impoundment (AGTI), A-9 repository, and Gas Hills Pond (GHP) No. 2 areas.*

Basis: *10 Code of Federal Regulations (CFR) Part 40, Appendix A, Criterion (6) specifies that features necessary for the long term control of tailings must be completed in accordance with a Commission approved reclamation plan. The approved September 25, 1996 Reclamation Plan for the Heap Leach area requires a maximum hydraulic conductivity of $1x10^{-7}$ centimeters (cm)/second (sec) for the clay used to construct the radon barrier. These tests were required at a frequency of at least one test for every 5,000 cubic yards (CY) of radon barrier soil placed. The test results in Table B.3 of the Completion Report, Volume II, indicate that 11 hydraulic conductivity tests were performed on the radon barrier material; this corresponds to a testing frequency of approximately one test for every 7,714 CY of radon barrier placed. No hydraulic conductivity tests were performed during the construction of the AGTI, A-9 Repository, or GHP No. 2 areas (note that the radon barrier in these areas was required to have a hydraulic conductivity of less than $1x10^{-7}$ cm/sec, but there does not appear to be a required quality control test frequency to verify this parameter). In the Completion Report, Section 4 of Volume 1 discusses the variability of the test results of the soil classification, gradation, Atterberg limits, and compaction. Variability of the hydraulic conductivity test results was not addressed in this section.*

Discussion: *Additional information should be provided as follows:*

(1) A discussion of the hydraulic conductivity sampling locations and sample collection methodology within the stockpile should be included in the Completion Report. This discussion should identify the timeframe within which the samples were collected.
(2) The variability of the hydraulic conductivity test results and the impact of this variability on the ability to meet the required hydraulic conductivity value for all areas requiring a radon barrier should be discussed.
(3) The techniques used to add moisture to and maintain the moisture content of the radon barrier soil stockpile should be addressed. Any changes to these maintenance techniques should also be identified.
(4) A detailed description of the methods used to place and compact the radon barrier soils for each area and a discussion of any changes to these methods from area to area should be provided.

Response to Comment No. 1A.

It should be noted at the onset of this discussion that all clay soils used for radon barrier construction on AGTI, Heap Leach, A-9 and GHP No. 2 were obtained from an off-site borrow source located about 6 miles from the site. The borrow source provided Umetco with a very uniform and consistent soil that comprised of fat clays (CH) and lean clays (CL) with generally greater then 95 percent passing the No. 200 sieve and plastic index always greater then 20.

Umetco has recently identified seven additional hydraulic conductivity tests performed during construction of the Heap Leach radon barrier. These test results were performed as part of the 1998 Heap Leach cover construction and were not included in the summary of test results provided in the Completion Report. The seven additional hydraulic conductivity tests were on file with our contract geotechnical testing laboratory, Inberg-Miller Engineers. The reason these test results were not placed in our QC files for the Heap Leach reclamation remains unknown to us.

Laboratory hydraulic conductivity tests shown on Table B.3 of the Completion Report (Volume II) were obtained from the clay soil stockpile just prior to placement as part of the Heap Leach radon barrier. The sample identification (R-1 through R-11) for samples shown on Table B.3 of the Completion Report (Volume II) correspond to sample identification on Table B.2 Laboratory Standard Proctor and Table B.5 Classification Testing (Particle Size Analysis and Atterberg Limits), i.e. large bulk sample obtained to complete all required tests. Sample identification for samples obtained during the 1998 construction season (R12 through R-18) and <u>not</u> shown on Table B.3 also correspond to the same sample identification on Table B.2 Laboratory Standard Proctor and Table B.5 Classification Testing (Particle Size Analysis and Atterberg Limits).

Laboratory hydraulic conductivity tests were performed using a flexible wall permeameter (ASTM D 5984, Method C) Falling-Head Test with Increasing Tailwater Level. All samples were remolded at 95 percent of the Standard Proctor maximum density at optimum moisture content. Accordingly, these tests provide a conservative measure of the actual hydraulic conductivity as radon barrier soils were compacted to greater than 95 percent at a moisture content of optimum or greater which yields a lower hydraulic conductivity. Results of the laboratory hydraulic conductivity tests not shown on Table B.3 are shown below.

Sample I.D.	Hydraulic Conductivity (cm/sec)	Date Tested
R-12	8.9×10^{-9}	11/28/1998
R-13	1.0×10^{-8}	11/28/1998
R-14	8.0×10^{-9}	11/28/1998
R-15	8.0×10^{-9}	1/25/1999
R-16	7.8×10^{-9}	1/25/1999
R-17	7.8×10^{-9}	4/2/1999
R-18	8.6×10^{-9}	4/2/1999

Considering the additional test results, the frequency of hydraulic conductivity tests for the Heap Leach radon barrier is 1 test for each 4,714 cubic yards placed.

The initial reclamation work for the Above Grade Tailing Impoundment (AGTI) was completed in accordance with the "previously approved" reclamation plan. In a letter dated August 2, 1991, the NRC requested that Umetco review the previously approved reclamation plan and compare the design with current reclamation criteria as described in 10 CFR 40, Appendix A. Initial reclamation work was also completed on the heap leach facility prior to 1992, however, Umetco elected to proceed with the heap leach reclamation activities prior to formal NRC approval.

As a result of the NRC final position on previously approved reclamation plans as well as updated requirements for license termination, Umetco elected to enhance the previously approved reclamation design for AGTI, Heap Leach and A-9. Since portions of the AGTI and Heap Leach reclamation work had already been completed, the enhanced design included an evaluation of remedial activities completed to date, inclusive of geotechnical suitability of existing radon barrier material.

As part of the evaluation of the suitability of the existing radon barrier for the Heap Leach and AGTI, Umetco completed a series of field hydraulic conductivity tests on the completed radon barrier layer. These tests were completed using Boutwell Permeameters to perform two-stage, borehole hydraulic conductivity tests (Daniel, D.E., In Situ Hydraulic Conductivity Test for Compacted Clay, Journal of Geotechnical Engineering, Vol. 115, No. 9, September 1989). This test method is suitable for hydraulic conductivity down to about 10^{-9} cm/sec (NUREG/CR 5432, Volume 2). Results of field hydraulic conductivity tests for the Heap Leach were submitted to the NRC by Umetco letter dated September 25, 1996, *Re: Umetco Minerals Corporation, Gas Hills, Wyoming, Heap Leach Reclamation Plan Modifications*. The resulting hydraulic conductivity for this series of five field tests ranged from $4x10^{-9}$ cm/sec to $3x10^{-9}$ cm/sec. These test results were not included in the list of hydraulic conductivity tests shown on Table B.3, Volume 2 of the Completion Report.

Concurrently, a series of field hydraulic conductivity tests were performed on the existing radon barrier layer for the AGTI. This series of field tests resulted in hydraulic conductivity values ranging from $5.6x10^{-9}$ to $1.0x10^{-9}$. Results of these tests and testing methodology were submitted to the NRC by Umetco letter dated October 28, 1997, Re: *Gas Hills, license No. SUA-648, Docket #40-0299, Above-Grade Tailings Enhanced Reclamation Design.*

While reclamation construction was in progress for the Heap Leach and AGTI, the NRC was reviewing Umetco's enhanced reclamation design for *Enhancement of the Previously approved Reclamation Plan for the A-9 Repository (March 1999).* This design was also submitted concurrent to on-going reclamation activities and NRC inspection (July 30, 1997) and observation of radon barrier placement. NRC comments prior to approval of the A-9 enhanced reclamation design were provided by NRC letter dated February 16, 1999 which addressed the suitability of the clay material (Cody Shale) used for construction of the radon barrier layer. NRC review comment 14 and subsequent response stated:

NRC Comment 14: As discussed with licensee on December 17, 1998, additional information regarding the Cody Shale soil which will be used for the radon barrier should be provided. Since the Cody Shale has been extensively characterized in earlier design and construction phases, it may be satisfactory to simply refer to the appropriate historical documents demonstrating the consistency of the clay borrow material and that the area to be used for the A-9 cover has been tested.

Response to Comment 14: The proposed radon barrier material is a locally available clay that was used for radon barrier on the Heap Leach.

The soils consist of claystone soils from a site approximately 6 miles northeast of the East Gas Hills Facility known as Cody shale. Cody shale generally consist of Fat Clays (CH) and some Lean Clays (CL) with generally greater than 95 percent passing the No. 200 sieve. The specific gravity of this soil ranges from 2.75 to 2.78.

The maximum Standard Proctor density of he material ranges from 100 pcf to 110 pcf with an optimum moisture content ranging from 17 to 22 percent. The in-place density of the existing radon barrier material on the heap leach ranges from 100 to 109 pcf averaging about 106 pcf. The long-term moisture content of this soil has been estimated by laboratory measurement of the 15-bar water retention value. Results of this testing indicate an average long-term moisture content (by dry weight) of 12.9 percent (Umetco 1996).

Soils from the Cody shale stock pile are generally very consistent. Umetco will conduct classification and index tests during construction to verify that soils used for radon barrier on the A-9 Repository are consistent with those described above and that were used on the Heap Leach pile.

During this period of reclamation construction and plan approval it is clear that Umetco and NRC reviewers, perhaps to a lesser extent, had a great deal of confidence in the clay soil being used for radon barrier layer construction. Umetco did have conversations with NRC during the early phases of reclamation construction on the Heap Leach regarding the frequency and need for hydraulic conductivity testing of this soil, although, we do not have documentation to support this statement. However, it is clear that subsequent enhanced reclamation designs for the AGTI, A-9 and GHP No. 2 were approved without a testing requirement for hydraulic conductivity and was more predicated on the demonstration of consistency for this soil, i.e., gradation, Atterberg limits, specific gravity, moisture-density relationship, etc.

The procedure for construction of the radon barrier layers for enhanced designs associated with all four reclamation covers at the site (Heap Leach, A-9, AGTI and GHP No. 2) has been the same and is described below.

- Clay (Cody Shale) was imported to the site from a borrow source located about 6 miles from the site and placed into a large stockpile. This was performed well in advance (at least six months) prior to radon barrier construction on the various cells.
- Clay soil was moisture conditioned in the stockpile utilizing a sprinkler system, conventional off-highway water trucks and disking to a uniform moisture content. Typically the moisture content was increased to greater than optimum in the stockpile prior to load and transport to radon barrier placement area.

- Placement of the radon barrier layer occurred in pre-established surveyed panels with nominal 6-inch compacted lifts. Compaction of radon barrier lifts was achieved using various models (different contractors) of sheepsfoot type compactors. Progression of radon barrier panel construction was such that construction of subsequent panels or lifts was not permitted until QC testing was completed and accepted.
- Desiccation of the completed radon barrier was prevented by immediate placement of initial frost protection layer and/or wetting. If an exposed panel of completed radon barrier layer became dry or desiccated the upper lift was reworked and tested to conform to moisture density specifications prior to placement of the frost protection layers.

Select photographs are provided in Attachment 1 showing radon barrier construction on each of the covers and conditioning in the stockpile. The complete photo library associated with cover construction is very large and available for review, however, not provided with this response due to size. In addition to the photo library, video documentation of cover construction, soil cleanup and verification is also available.

Comment No. 1B. *Provide additional information on the soil classification test results used to construct the frost protection layers for the Heap Leach, AHTI, A-9 Repository, and GPH No. 2 areas.*

Basis: *10 CFR Part 40, Appendix A, Criterion (6) specifies that features necessary for the long term control of tailings must be completed in accordance with a Commission approved reclamation plan. The approved reclamation plans require that soils used to construct the frost protection layer be classified as clayey sands (SC) or silty sands (SM) material according to the Unified Soil Classification System. The quality control test results for the Heap Leach, AGTI, A-9 Repository, and GHP No. 2 areas indicate that a percentage of the soil used to construct the frost protection layer did not meet this material specification. The percentage of soil in nonconformance with the material specification ranged from 3 percent for GHP No. 2 to 14 percent for the Heap Leach.*

Discussion: *The Completion Report should address the impacts that the presence of non SC or SM material will have on the long term performance on the frost protection layer.*

Response to Comment No. 1B.

In total soils used to construct the frost protection layers for the Heap Leach, AGTI, A-9 and GHP No. 2 consist of 93.64 % SC, SM or SC-SM (Unified Soil Classification System) as specified by the approved reclamation design. 5.63% of the soils used for construction of the frost protection layers are classified as a CL or CL-ML which would enhance the long-term performance of the cover design as a result of added radon attenuation and reduced infiltration, i.e., CL or CL-ML is a finer (<50% passing #200 sieve) more plastic soil. Less than one percent of the frost protection materials tested resulted in a SW-SC (0.24%), SW-SM (0.32%) or SP-SM (0.16%) classification. Although the presence of these soils in the frost protection layers do not provide enhanced characteristics with respect to radon attenuation and infiltration, the occurrence

of SW-SC, SW-SM or SP-SM soils exist in very isolated locations in the frost protection cover layers (less then 1% in each cover) and do not present a detrimental impact to either long-term cover performance or in cover design assumptions.

Comment No. 1C. *Provide additional information on the Proctor test methods used to determine the maximum dry density and optimum moisture content for the radon barrier soils in the Heap Leach area.*

Basis: *10CFR Part 40, Appendix A, Criterions (6) specifies that features necessary for the long term control of tailings must be completed in accordance with a Commission approved reclamation plan. The reclamation plan for the Heap Leach area required both Standard Proctor testing and One-Point Proctor testing of the radon barrier soils. Standard Proctor tests were required at a frequency of one test for every 15,000 CY of radon barrier soils placed; One-Point Proctor tests were required at a frequency of one test for every 5,000 CY of radon barrier soil placed. The quality control test results presented in Appendix B of Volume II do not differentiate between the standard Proctor test results and the one-point proctor test results.*

Discussion: *Volume II of the Completion Report should provide a breakdown of he number of Standard Proctor and One-Point Proctor test results to verify that the required testing frequencies were met.*

Response to Comment No. 1C.

One-point Proctor tests were not performed for construction of the Heap Leach radon barrier layer. At the onset of radon barrier construction and QC activities for the Heap Leach it became apparent that utilization of One-Point Proctor tests would not provide sufficient control needed to achieve quality placement of radon barrier. Accordingly, the QC staff performed completed Standard Proctor tests at the frequency (1 test per 5,000 CY) required for One-Point Proctor tests resulting in the desired control for placement of radon barrier soils and more conservative than specified testing frequency.

Comment No. 2A. *Please provide a description or reference to the quality assurance procedures used for ensuring that the remaining clay pond liner was removed from the North and South Evaporation Ponds.*

Basis: *10 CFR Part 40, Appendix A, Criterion (6) specifies that features necessary for the long term control of tailings mist be completed in accordance with a Commission approved reclamation plan. In the approved October 27, 1998 Reclamation Plan, a commitment was made that the remaining clay liner would be removed and disposed of in the A-9 Repository.*

Discussion: *Volume IV of the Completion Report should provide detailed pictures and procedures used to ensure that the clay liner was removed in its entirety.*

Response to Comment No. 2A.

Comments regarding the removal of the North and South Evaporation Ponds Clay Liner have been addressed in Addendum 1 of the Final Status Survey Report, Gas Hills, Wyoming Site, and Response to Comment 1.

Survey verification points were established at 200 foot intervals in the area of the North and South Evaporation Pond Areas on June 23, 2000 prior to excavating the remaining clay liner material (see Figure 2.1). The clay liner was removed from June 26, 2000 to July 26, 2000. The contaminated clayey material was hauled and placed in the contaminated fill area of the A-9 Repository. The fill was placed and compacted as per the approved A-9 Plans and Specifications. The progress of work was continuously monitored and documented. The final excavation in the North and South Evaporation Pond Area was visually inspected to ensure that all of the clayey liner material had been removed. The area was then resurveyed for verification on July 27 and 28, 2000 to verify that the remaining 2 feet of the clayey liner had been removed.

Attachment 2 provides survey verification for this work and photo documentation for removal of the clay liner material.

Comment No. 2B. *Provide additional information documenting that the remaining unaffected waste rock in the North and South Evaporation Pond area was regraded in accordance with the site-wide grading plan.*

Basis: *10 CFR 40, Appendix A, Criterion (6) specifies that features necessary for the long term control of tailings must be completed in accordance with a Commission approved reclamation plan. In the approved October 27, 1998 Reclamation Plan, a commitment was made that the North and South Evaporation Ponds would be regarded in accordance with the site-wide grading plan.*

Discussion: *Volume IV of the Completion Report should provide additional information to verify that the commitments made in the approved 1998 Reclamation Plan were met.*

Response to Comment No. 2B.

The final grading for the North and South Evaporation Ponds is shown on Plate 1 of the Final construction Completion Report Gas Hills, Wyoming Site, Volume 1 (also attached). The grading for the North and South Evaporation Ponds was modified from the original plan submitted in 1998 (See Response to NRC Review Comments, March 1999, SMI Response to Comment 11). This modification involved redesign of the south slope of the South Evaporation Pond to avoid placement of material on previously undisturbed land and necessary WDEQ permit boundary changes. The modifications that were made to the North and South Evaporation Ponds grading plan had no effect on the surface water drainage basin and hydrology for the A-9 Enhancement. The materials excavated (subsequent to required byproduct cleanup) from the North and South Evaporation Ponds were used for fill for the B-5 Pit and for reshaping of the North and South Evaporation Ponds area to the west side.

Comment No. 3A. *Please state weather the submitted June 29, 2007 Completion Report is also considered the decommissioning report.*

Basis: *10 CDR 40 Part 40.42 discusses the need for a decommissioning plan, In Umetco's approved May 2, 1990, and June 18, 1990, Mill Decommissioning Plan submittals, a commitment is made that a final decommissioning report will be submitted to the NRC after completion of activities.*

Discussion: *Provide a statement clarifying weather the submitted Completion Report is also a decommissioning report.*

Response to Comment No. 3A.

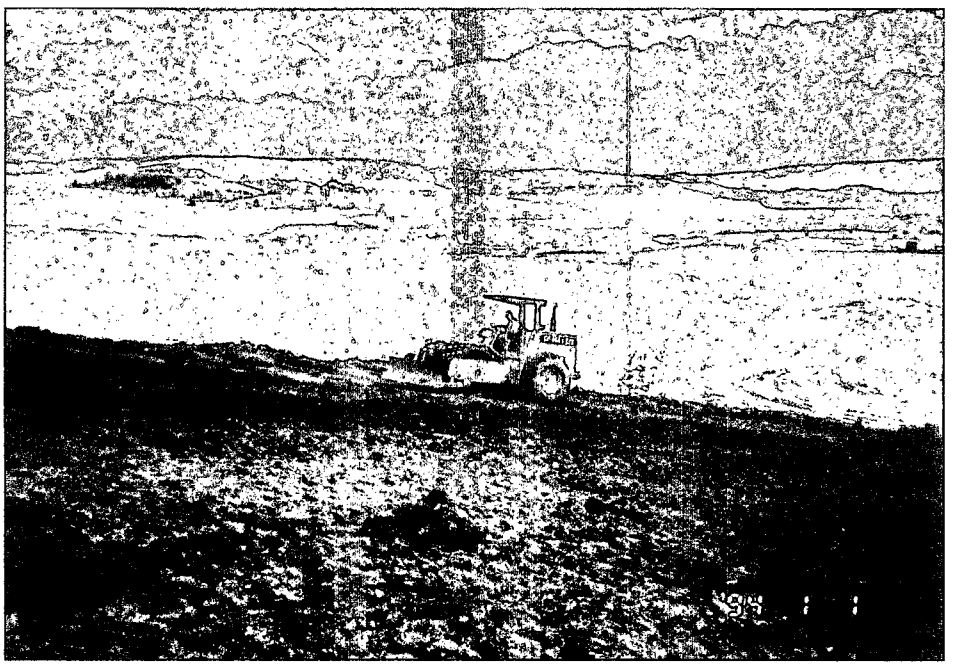
The June 29, 2007 Completion Report was prepared to also satisfy the approved May 2, 1990, and June 18, 1990 plan requirement for submittal of a final decommissioning report.

ATTACHMENT 1

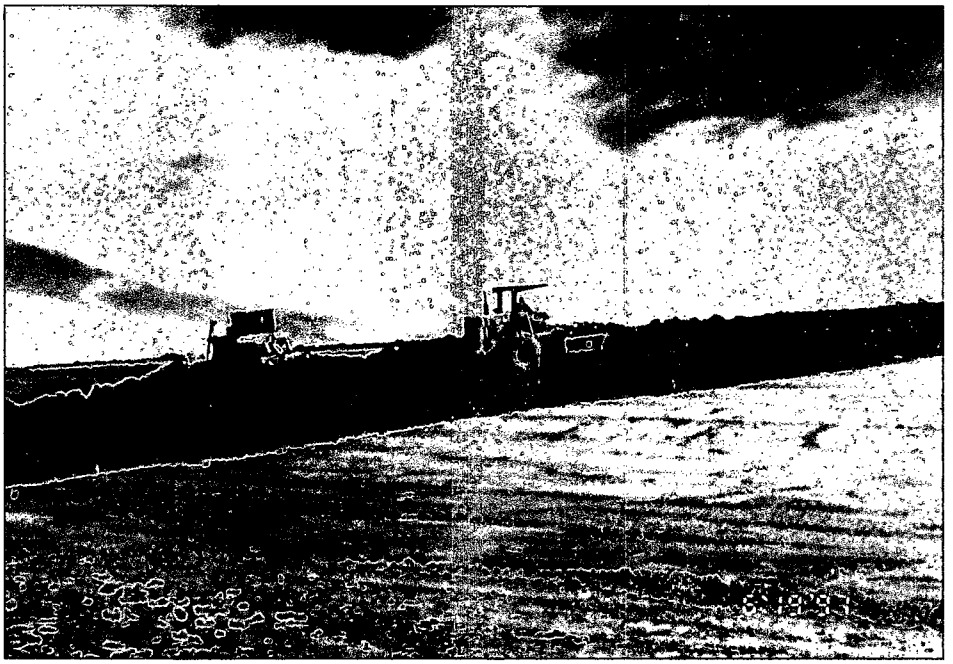
Gas Hills, Wyoming
Radon Barrier Placement Photographs

Heap Leach / Gap Reclamation

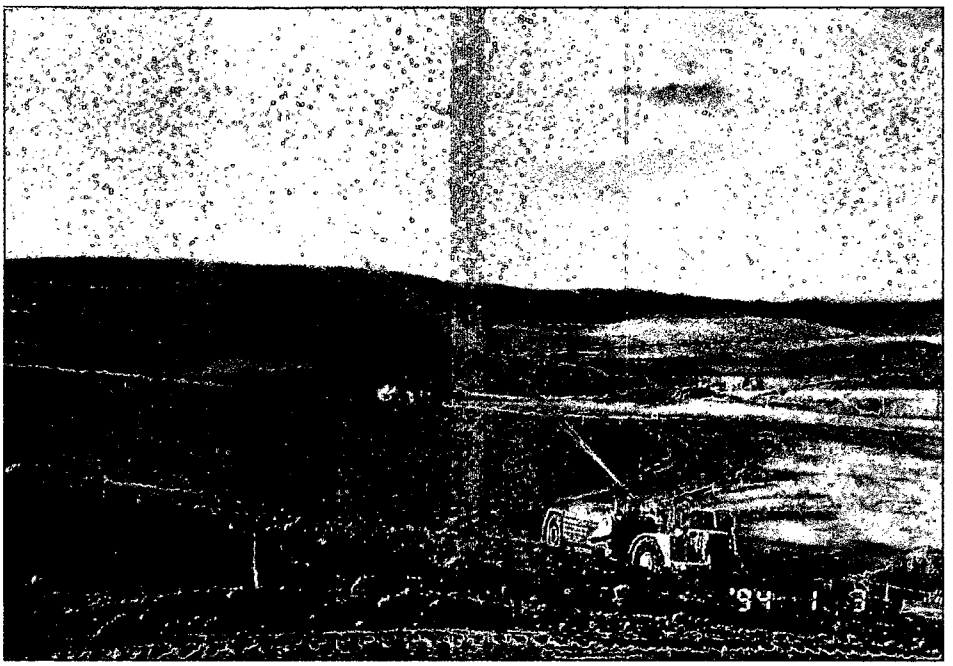
Heap Leach - Placing first 6-inch lift of Radon Barrier material using a CAT D6 Dozer, June 13, 1997



Heap Leach – Compacting placed Radon Barrier with a CAT CP-563 sheep foot Compactor, June 1997.

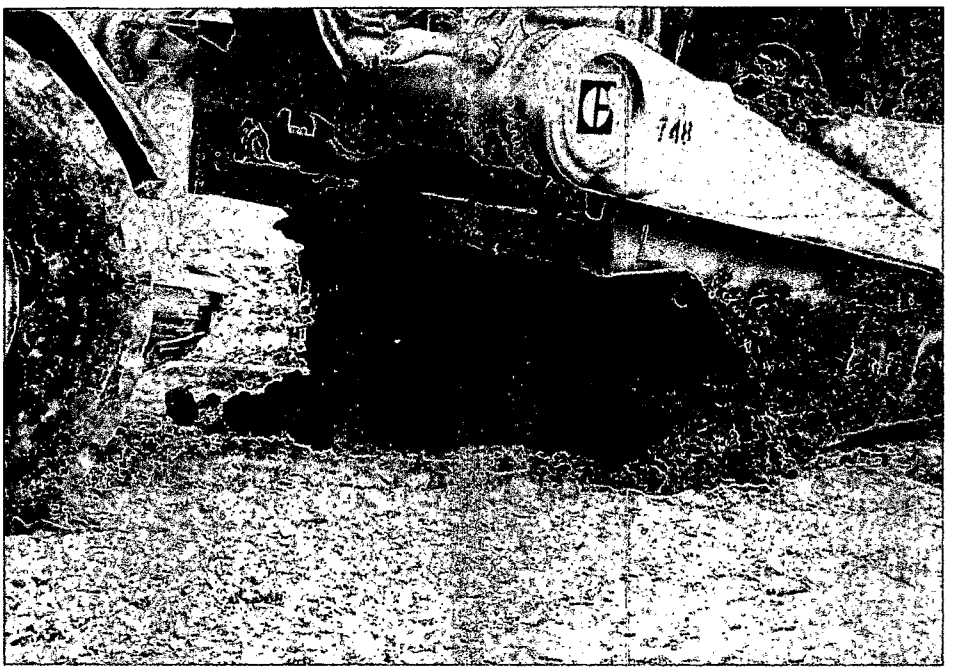


Heap Leach – Spreading First Lift of Radon Barrier material with a dozer and compacting placed lift with a sheep foot compactor, June 19, 1997.

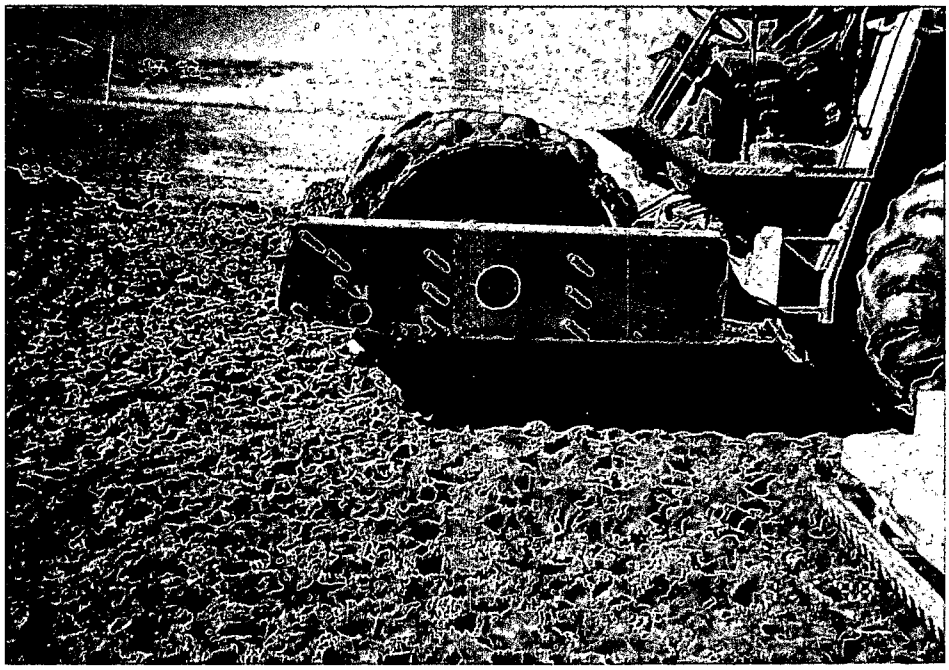


Heap Leach – Protecting placed Radon Barrier from desiccation using a cannon on a CAT 631 Water Wagon, June 1997.

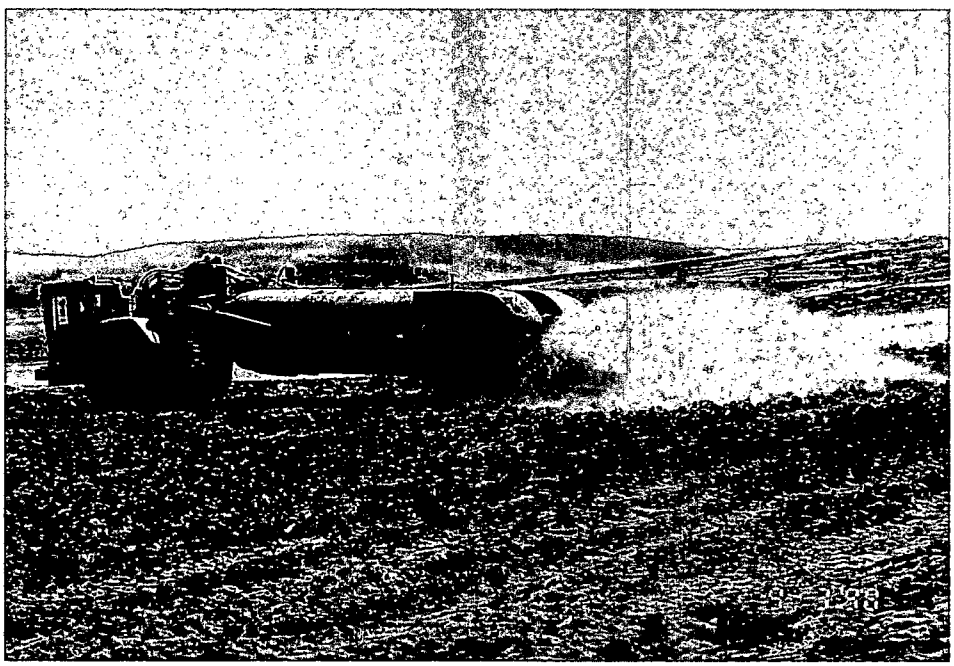
Heap Leach – Grading next lift of Radon Barrier using a CAT D6 Dozer and compacting the placed lift behind the placement activities, July 1997.



Heap Leach / Gap – Placing the first lift of Radon Barrier using a CAT 651 Scraper, August 4, 1998.

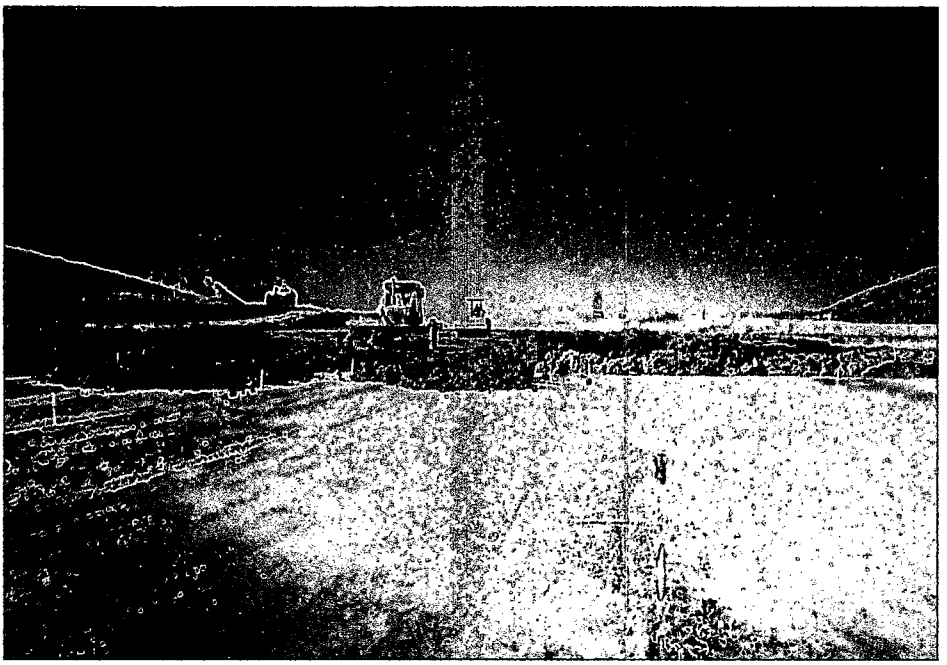


Heap Leach / Gap – Compacting the placed Radon Barrier material using a sheep foot compactor, August 5, 1998.

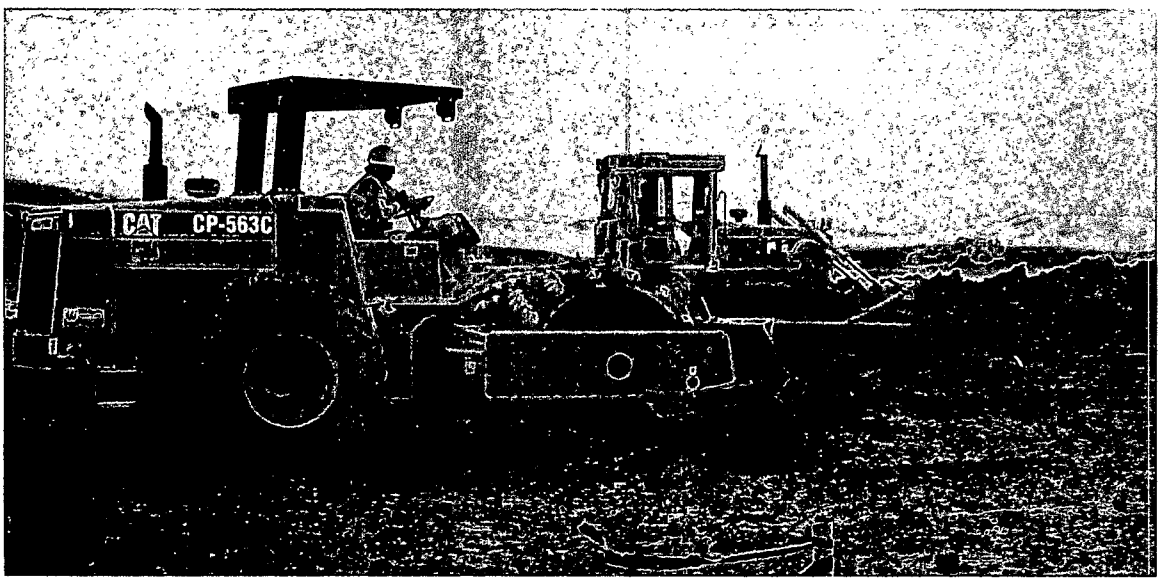


Heap Leach / Gap – Watering Radon Barrier between lifts using the spray bar on a CAT 651 Water Wagon, September 3, 1998.

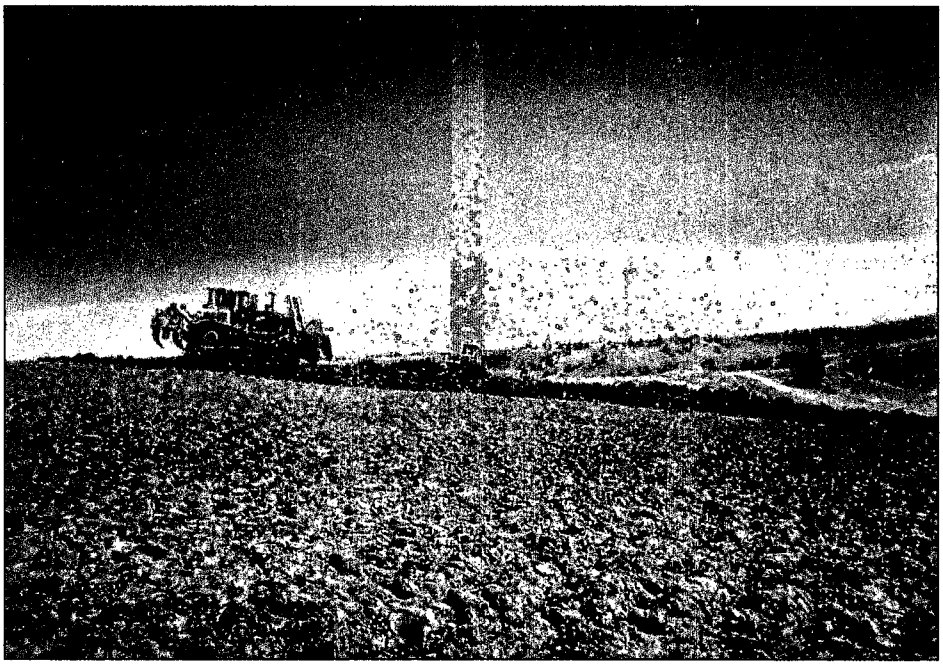
Above-Grade Tailings Impoundment Enhancement



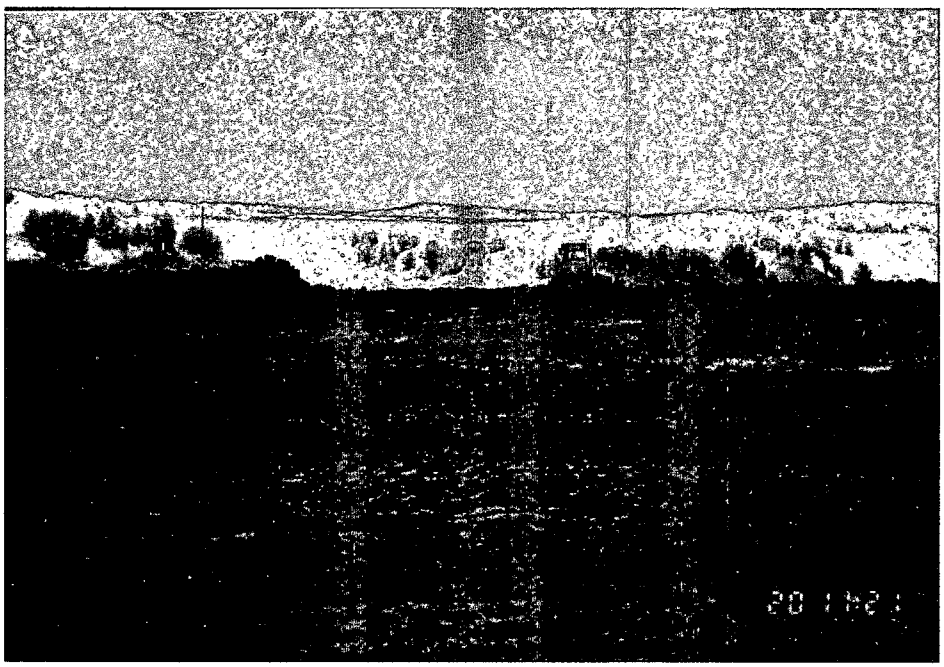
Above-Grade – Grading first lift of Radon Barrier material using a CAT D6 Dozer and compacting lift behind placement activities, 1999.



Above-Grade – Radon Barrier material being graded using a CAT D6 Dozer and being compacted using a CAT 563 sheep foot compactor, 1999.



Above-Grade – Placing second lift of Radon Barrier material. Radon Barrier material being graded across fill area using a CAT D6 Dozer, 1999.

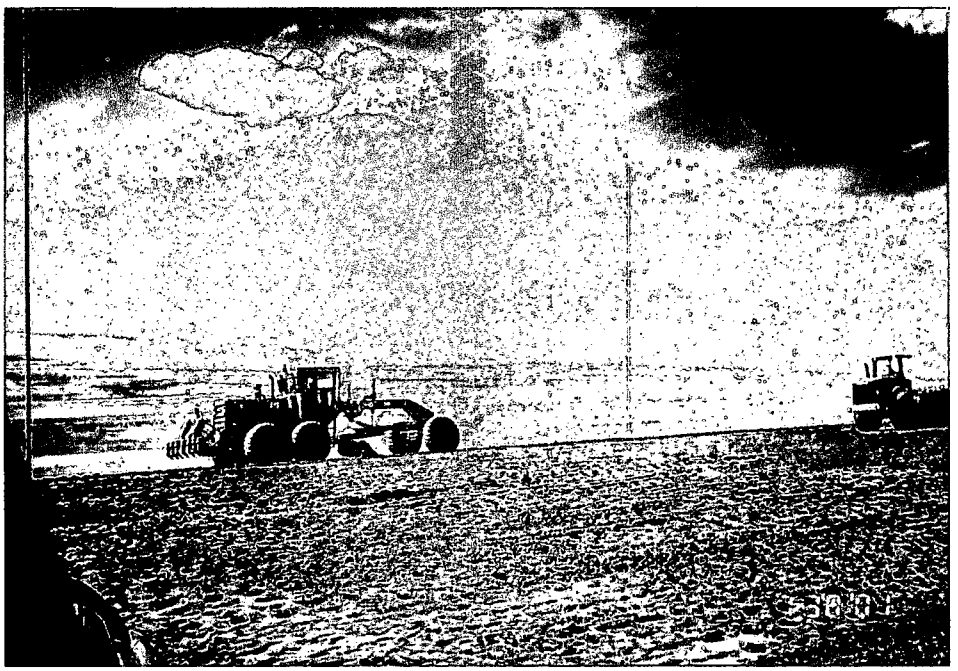


Above-Grade – Placed and compacted Radon Barrier, 1999.

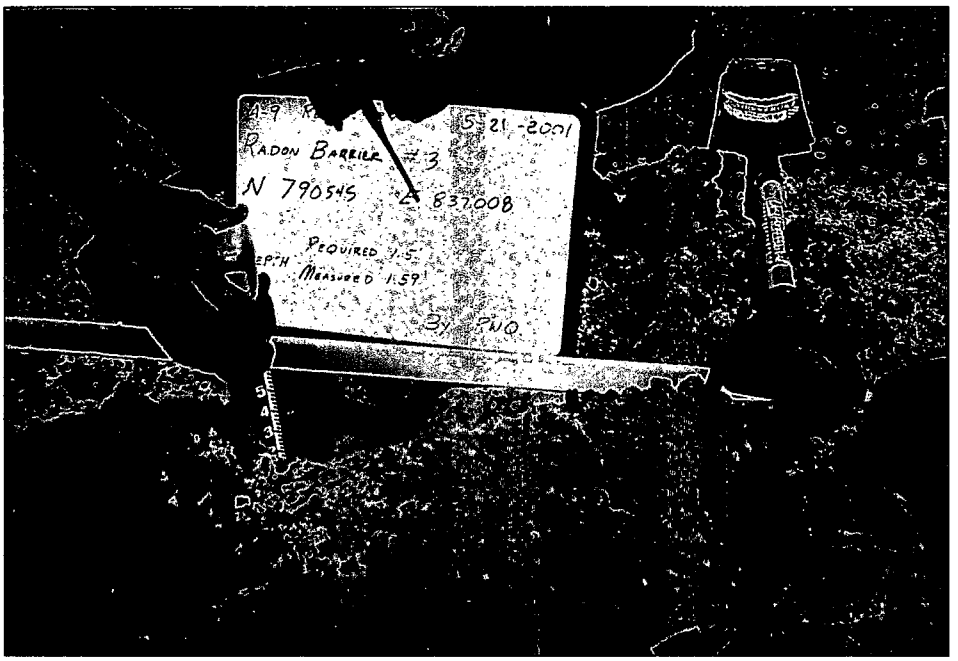
Above-Grade – A visual depth on the a completed Radon Barrier panel, June 9, 1999.

A-9 Repository Enhancement

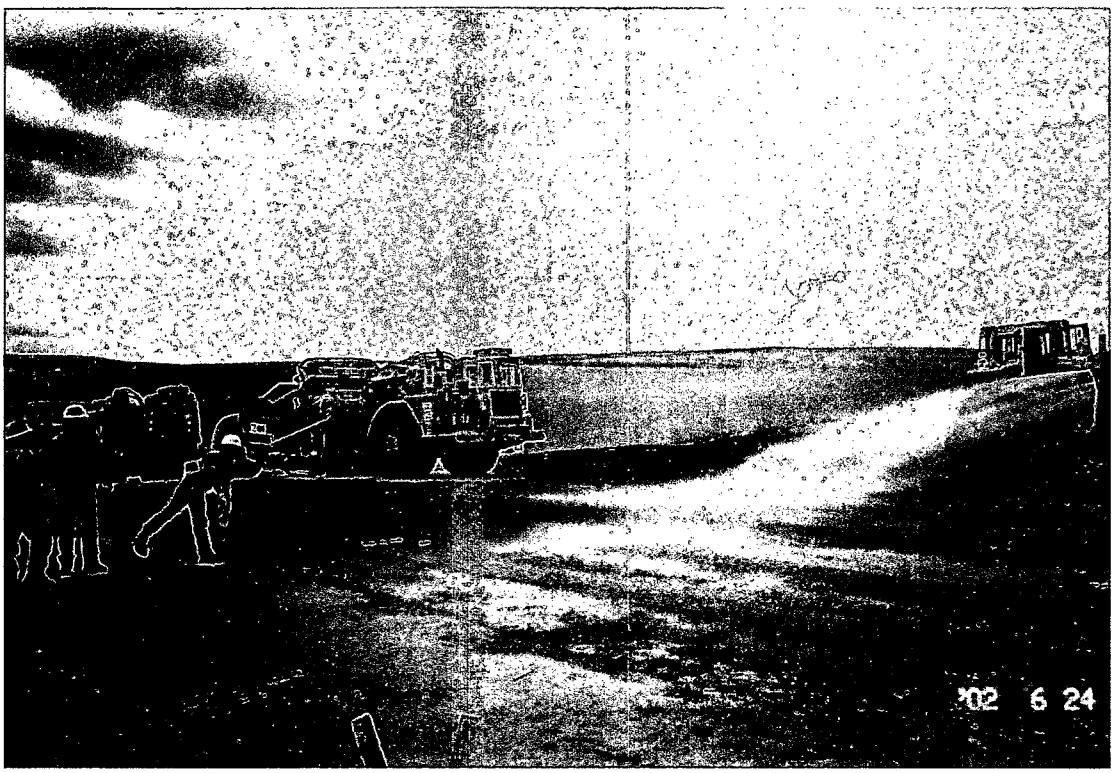
A-9 – Placing first panel of Radon Barrier material at the north end of the A-9 Repository, June 14, 2001.



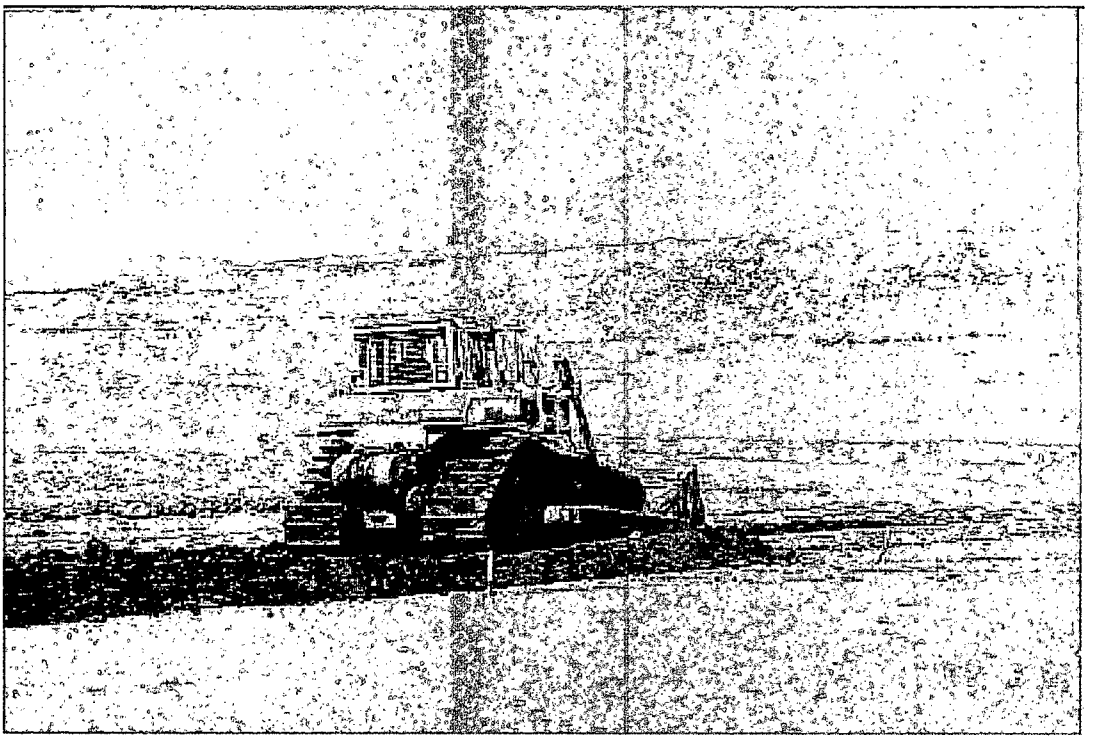
A-9 – Compacting and grading the third lift of Radon Barrier placement. A CAT 14 Blade is used to trim the placed Radon Barrier material to design finished grade, July 30, 2001.



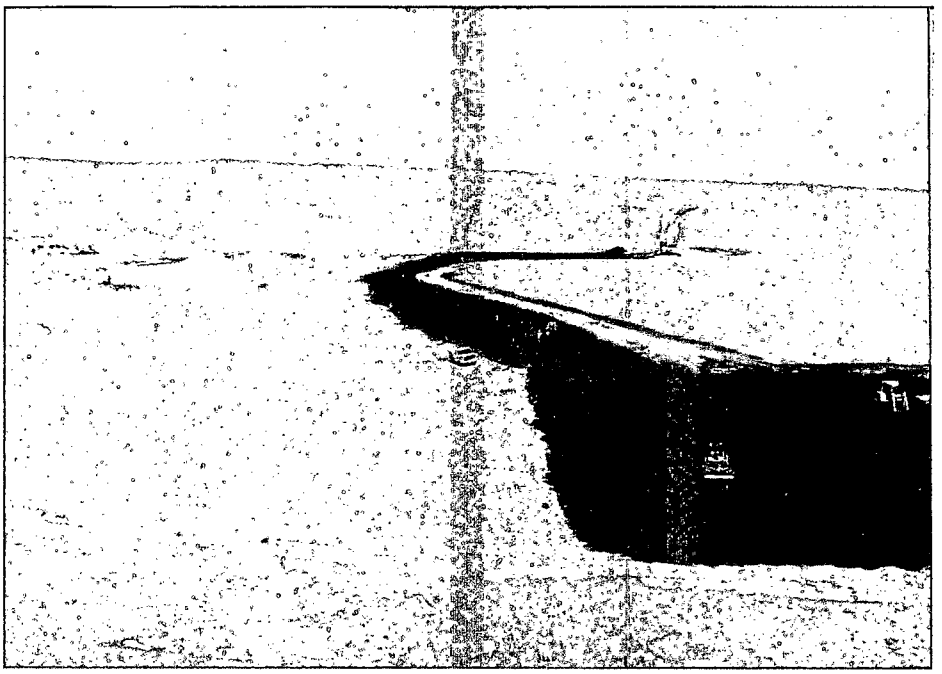
A-9 – Visual depth check of the completed Radon Barrier panel,
May 21, 2001.



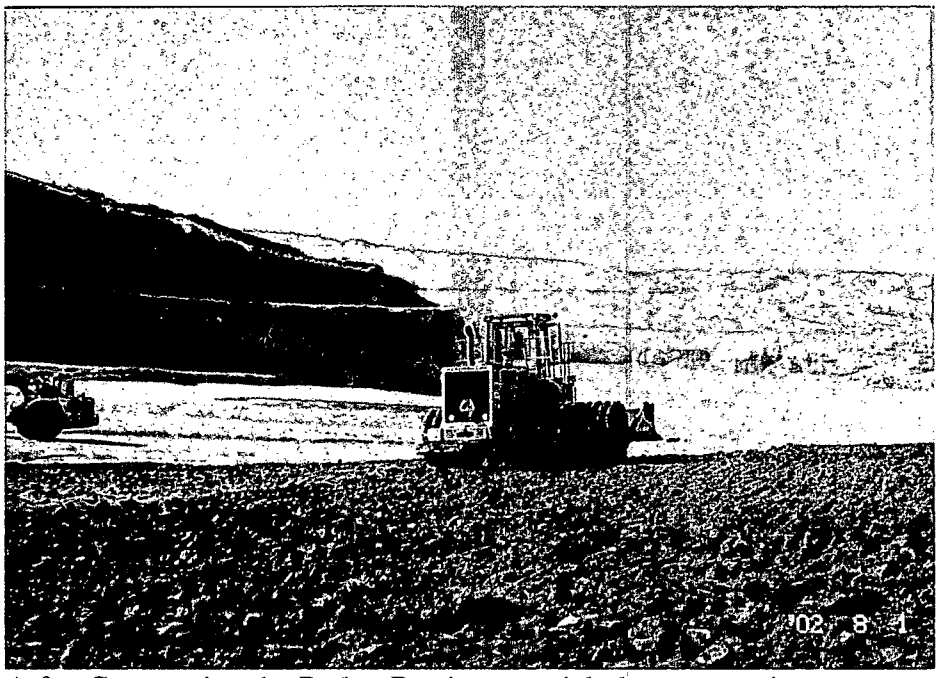
A-9 – Pre-wetting the contaminated subgrade prior to placing the Radon Barrier material.
Radon Barrier material being hauled from the stockpile to the fill area using
CAT 633 Scrapers, June 24, 2002.



A-9 – Grading Radon Barrier material across the slope using a CAT D6 Dozer, June 24, 2002.



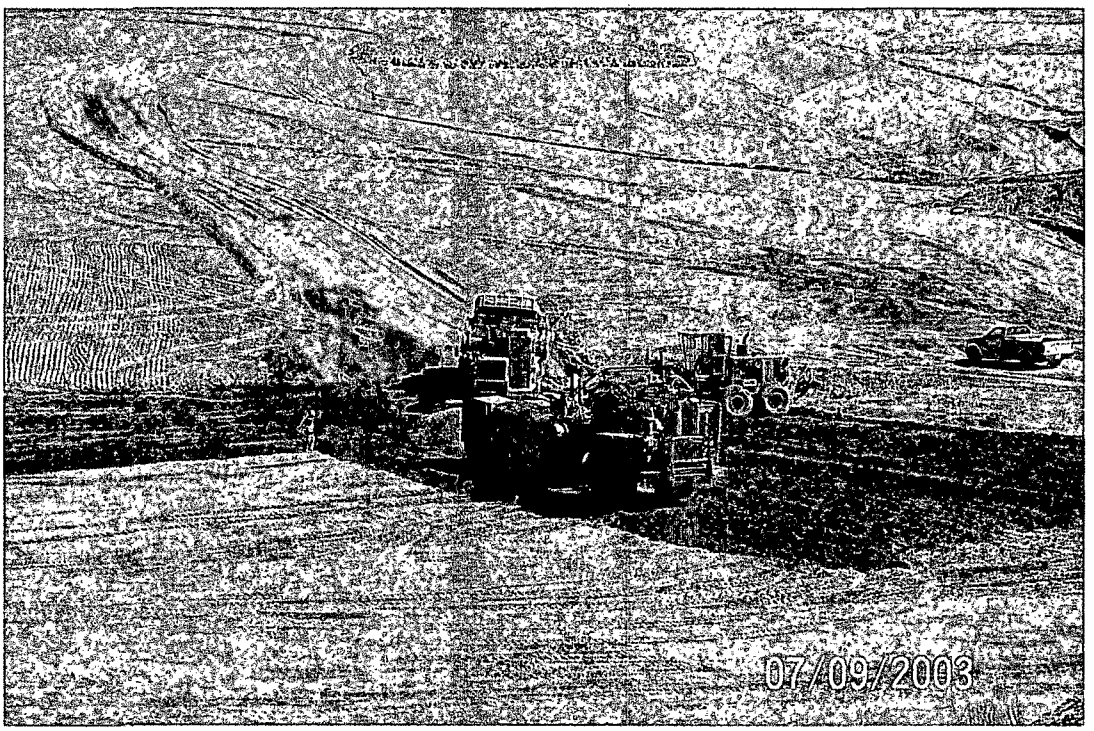
A-9 – Placing Radon Barrier material on the east side of the A-9 Repository, July 23, 2002.



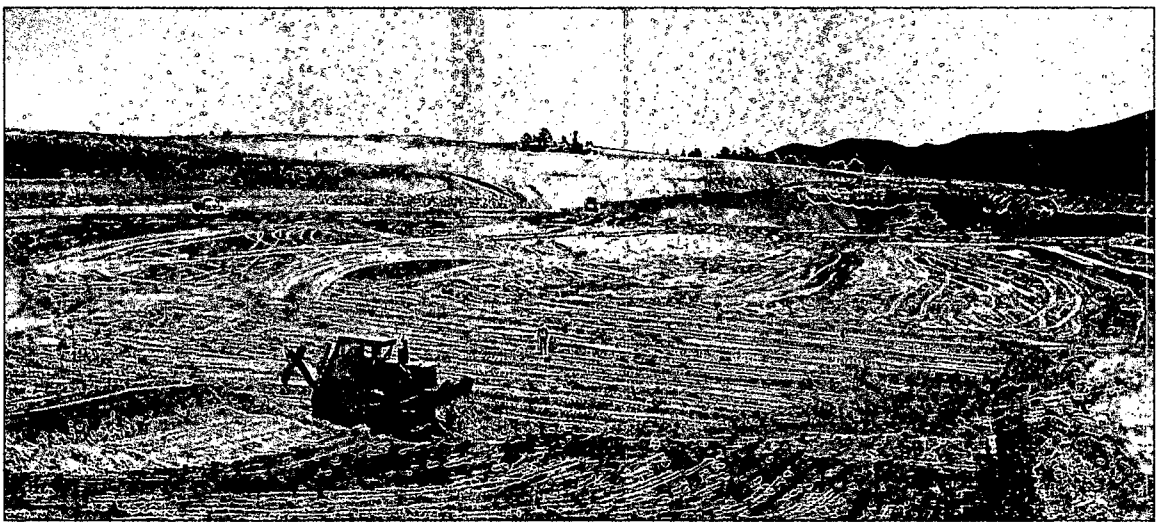
A-9 – Compacting the Radon Barrier material placement using a CAT 825 Compactor, August 1, 2002.

A-9 – Placing Radon Barrier material at the south end of the A-9 Repository. Radon Barrier material is being transported from the stockpile to the fill area using CAT 633 Scrapers. A D6 Dozer Grades the Radom Barrier across the fill area. The placed Radon Barrier material is being compacted using a CAT 825 Compactor, June 18, 2003.

A-9 – Quality Control Survey on the finished placed thickness of Radon Barrier material , July 1, 2003.

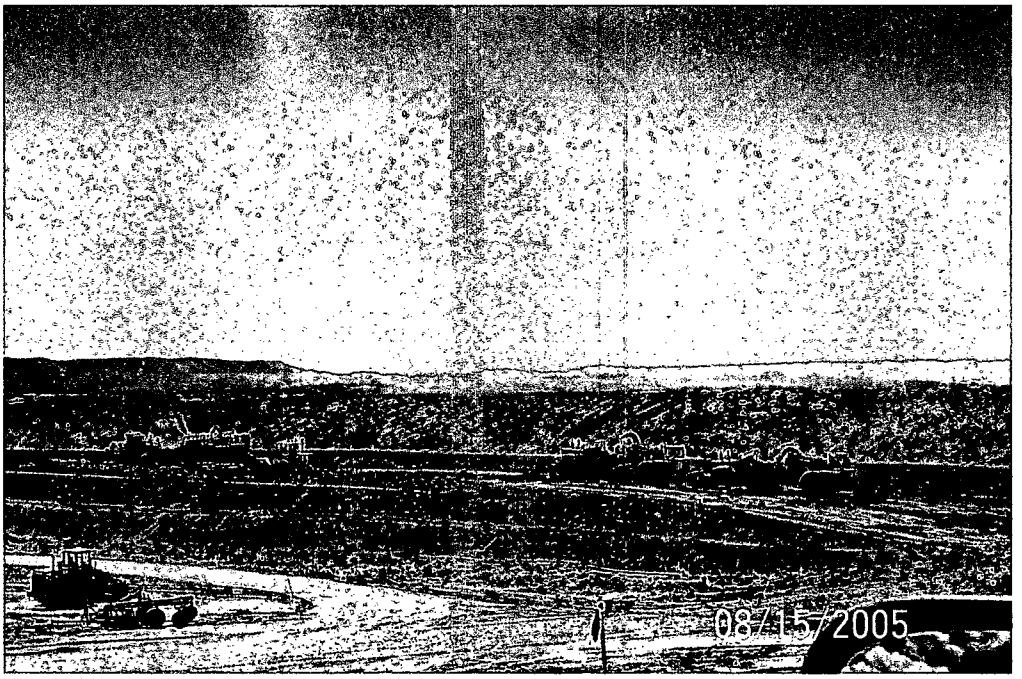


A-9 – Wetting the placed Radon Barrier material prior to the placement of the next lift, July 9, 2003.

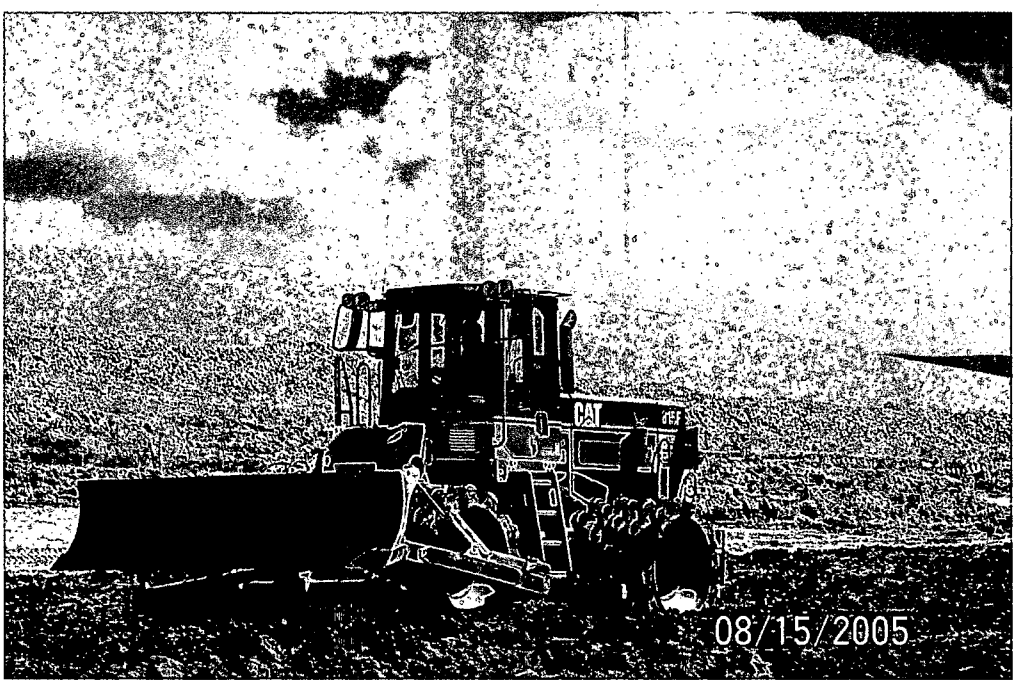


A-9 – Covering the last panel of approved Radon Barrier placement with Frost Protection fill material. The Radon Barrier is keep moist while cover material is being pushed out over the finished product, July 22, 2003.

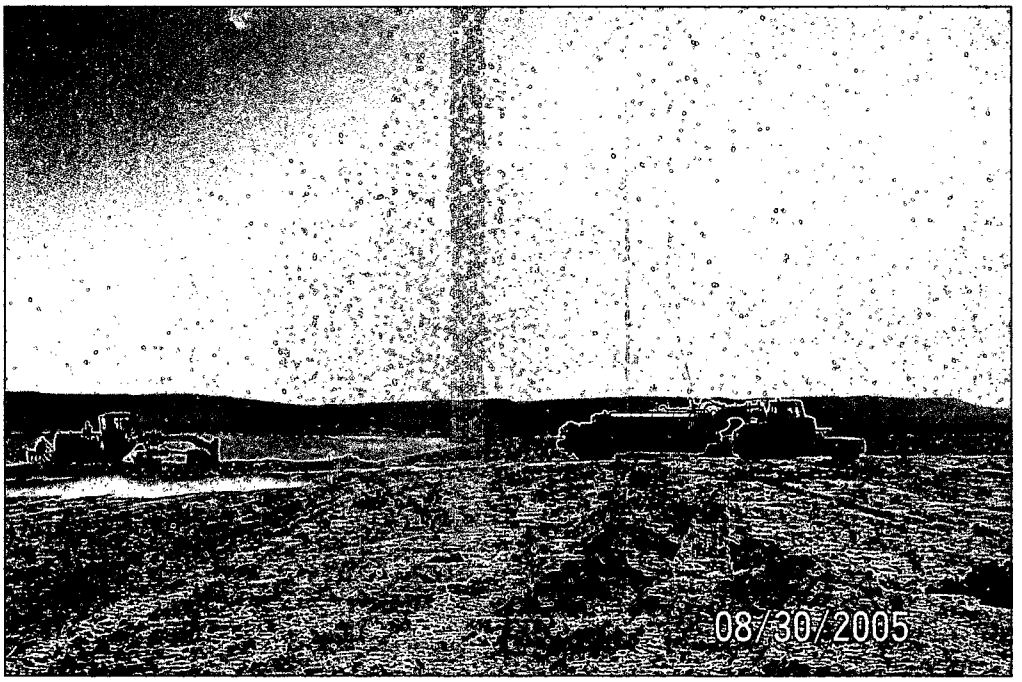
Gas Hills Pond No. 2



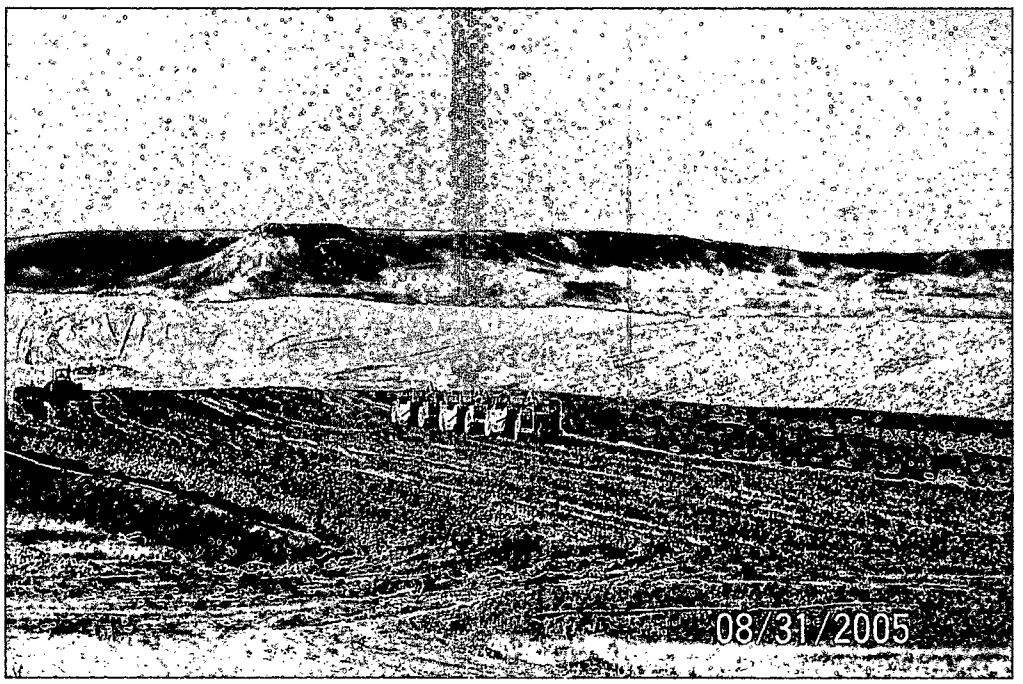
GHP-2 – Processing Radon Barrier material in the Stockpile using a tractor with a disc. CAT 637 Scrapers excavate Radon Barrier material from the the stockpile and deliver to the fill area on GHP-2 Repository, August 15, 2005.



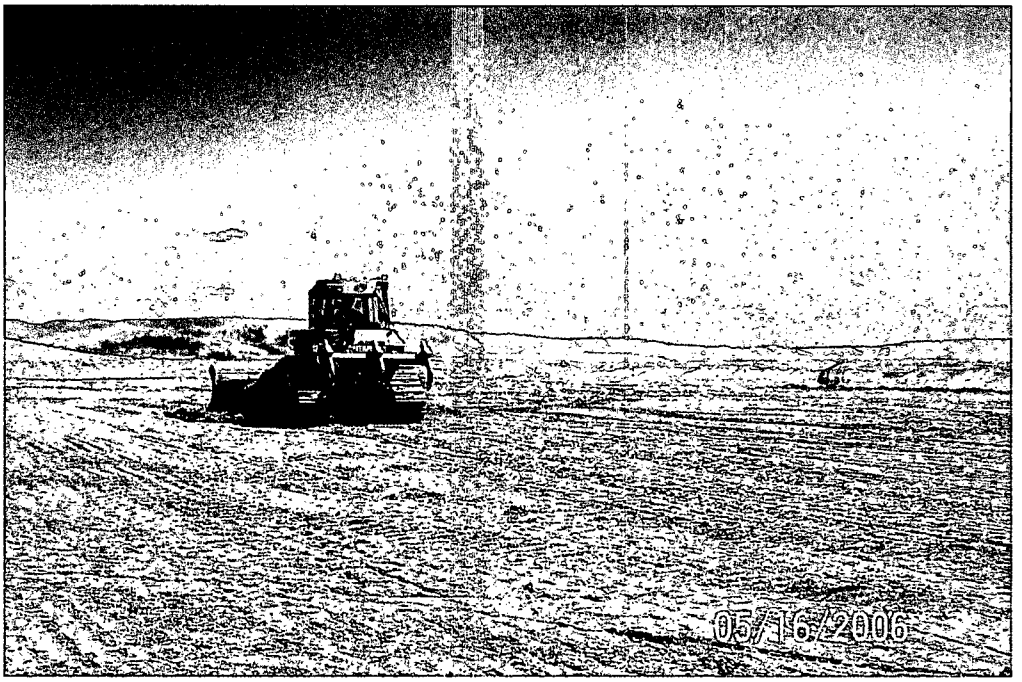
GHP-2 – The placed Radon Barrier material being compacted using a CAT 825 Compactor, August 15, 2005.



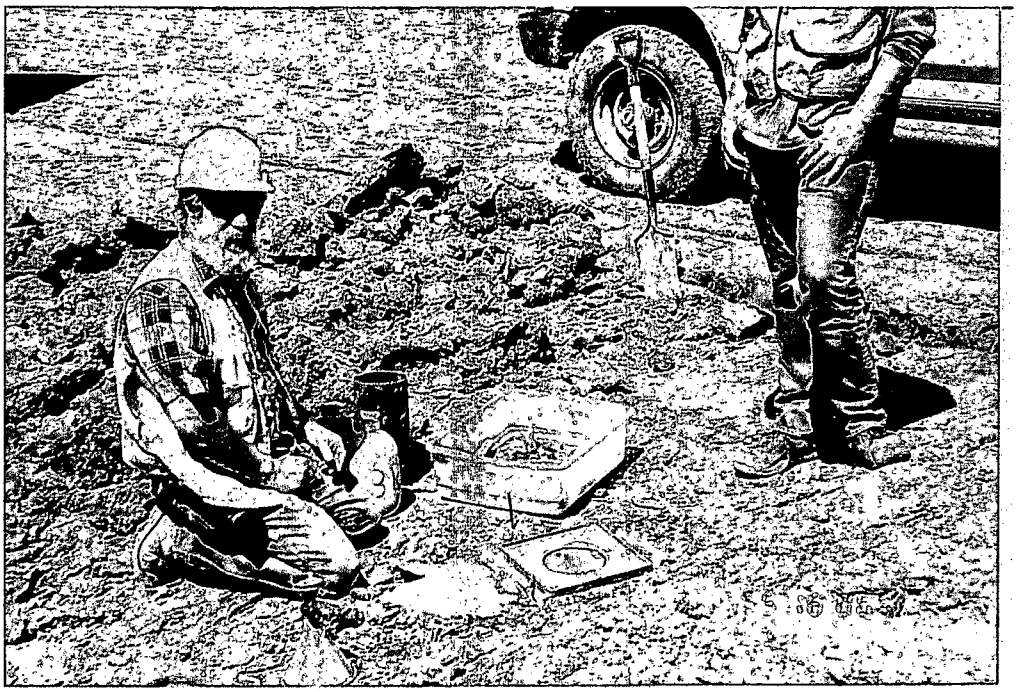
GHP-2 – Keeping finished Radon Barrier from desiccating using the cannon on a CAT 621 Water Wagon, August 30, 2005.



GHP-2 – Three CAT 637 Scrapers excavate processed Radon Barrier material from the stockpile to be delivered to GHP-2 fill area, August 31, 2005

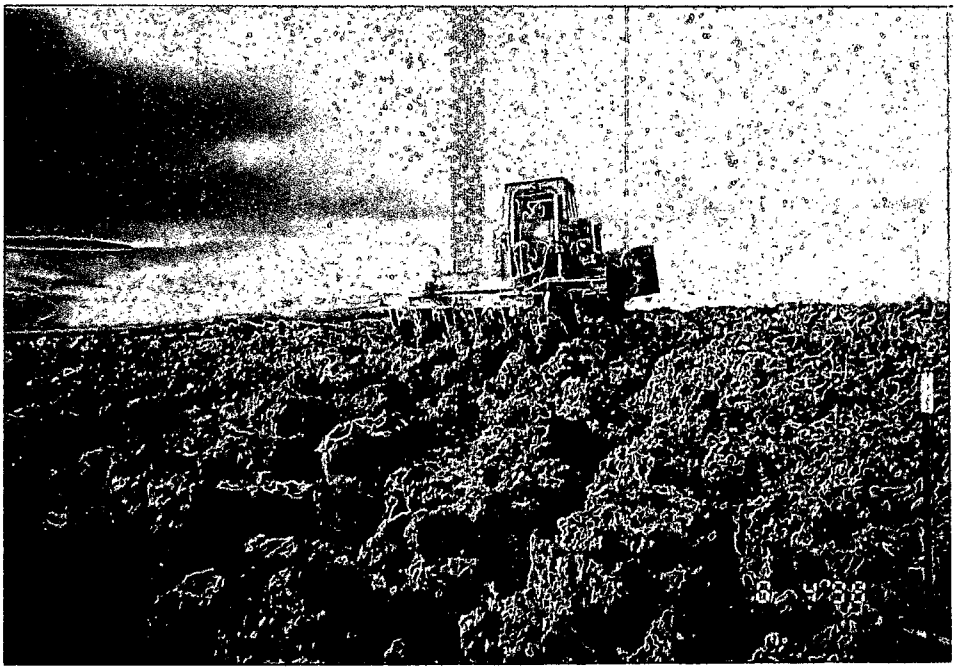


GHP-2 – Finished Grade of the last panel of Radon Barrier material placement, May 16, 2006.



GHP-2 - Last compaction test for the Radon Barrier material placement, May 16, 2006.

Conditioning and Processing Clay Material in the On-Site Stockpile
And
Excavating the Processed Clay Material for use as Radon Barrier Fill

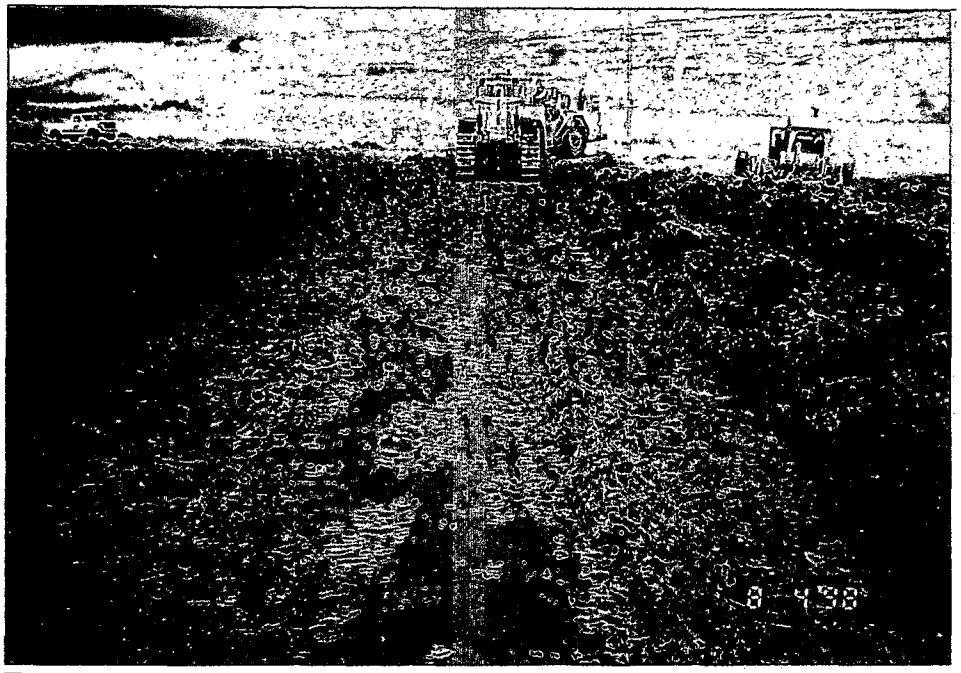


Processing moisture into clay material using a CAT D8 Dozer with a disc, August 4, 1998

Disc used to process moisture into clay material, August 4, 1998.

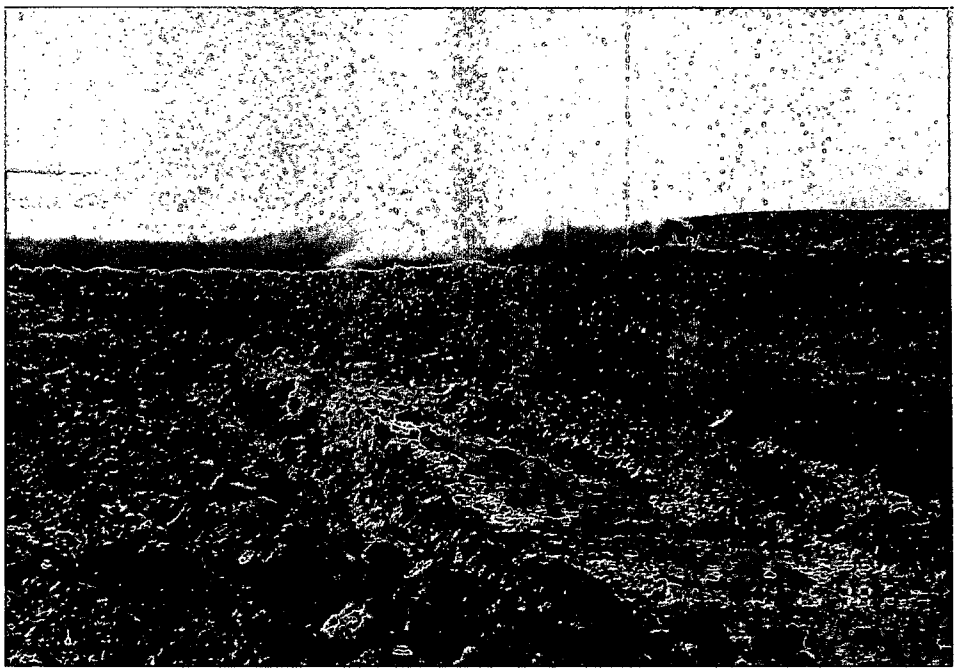
Disking clay in stockpile, August 4, 1998

Excavating processed clay material using a CAT 651 Scraper and a Cat D10 Dozer, August 4, 1998.

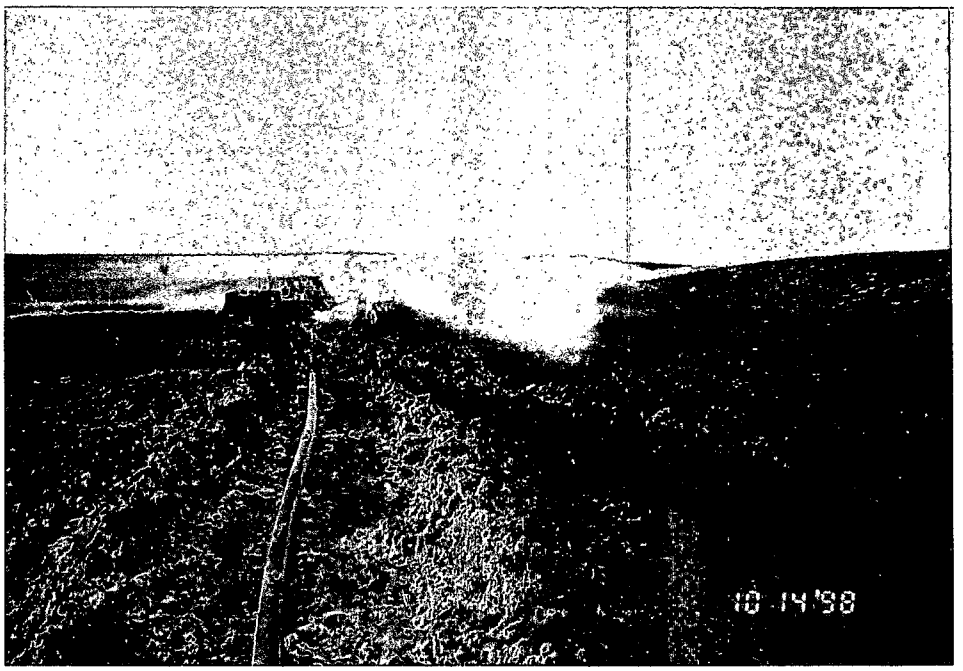


Excavating processed using a CAT 651 Scraper and a CAT D10 Dozer.
A Cat D8 Dozer with a disc process clay at the right, August 4, 1998.

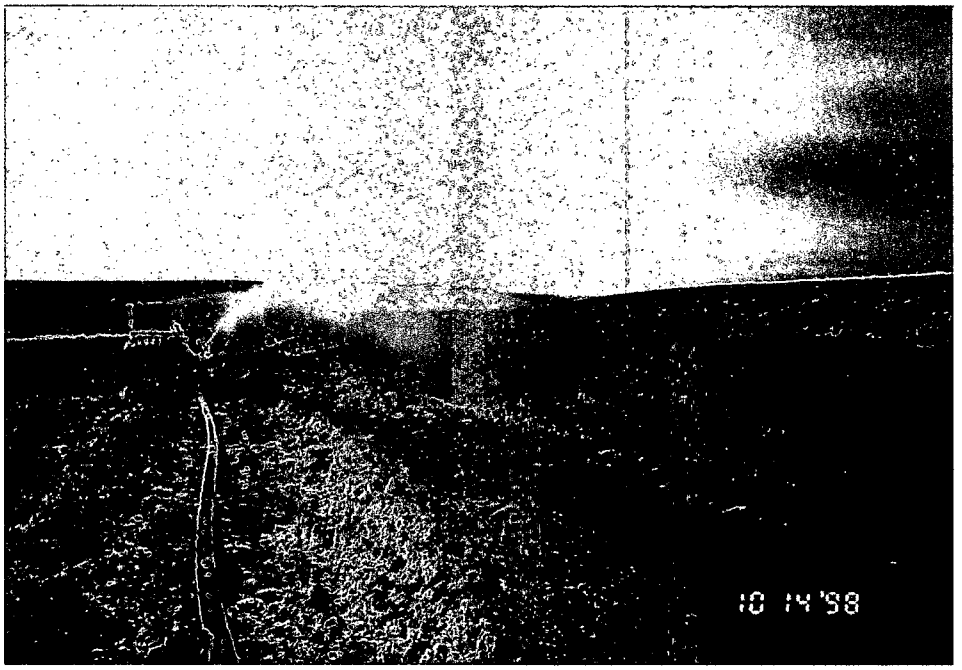
Adding moisture to the clay stockpile using a rain bird sprinkler system,
October 14, 1998.



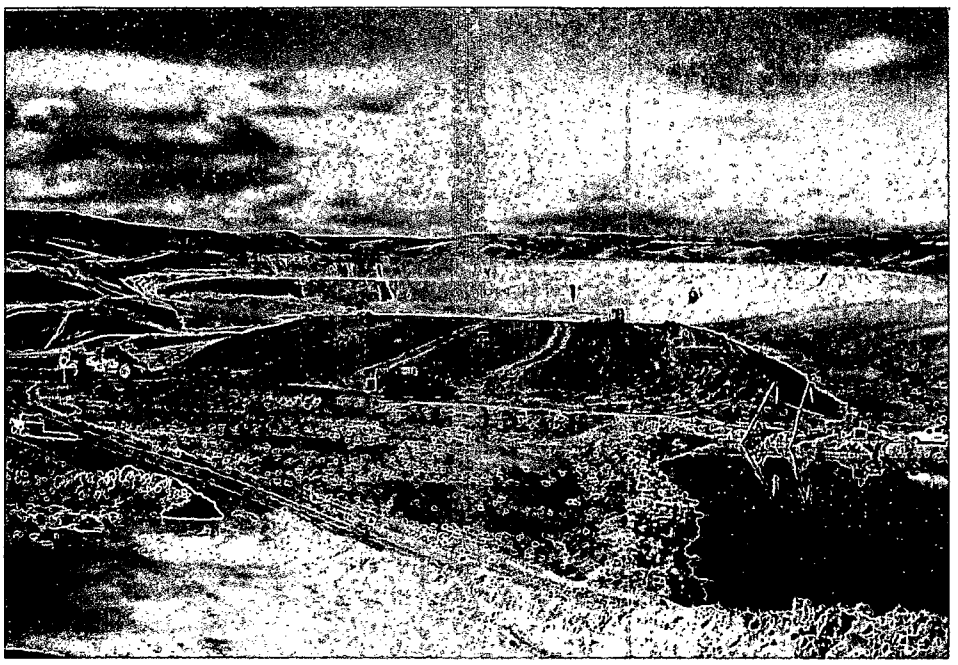
Adding moisture to the clay stockpile using a rain bird sprinkler system, October 15, 1998.

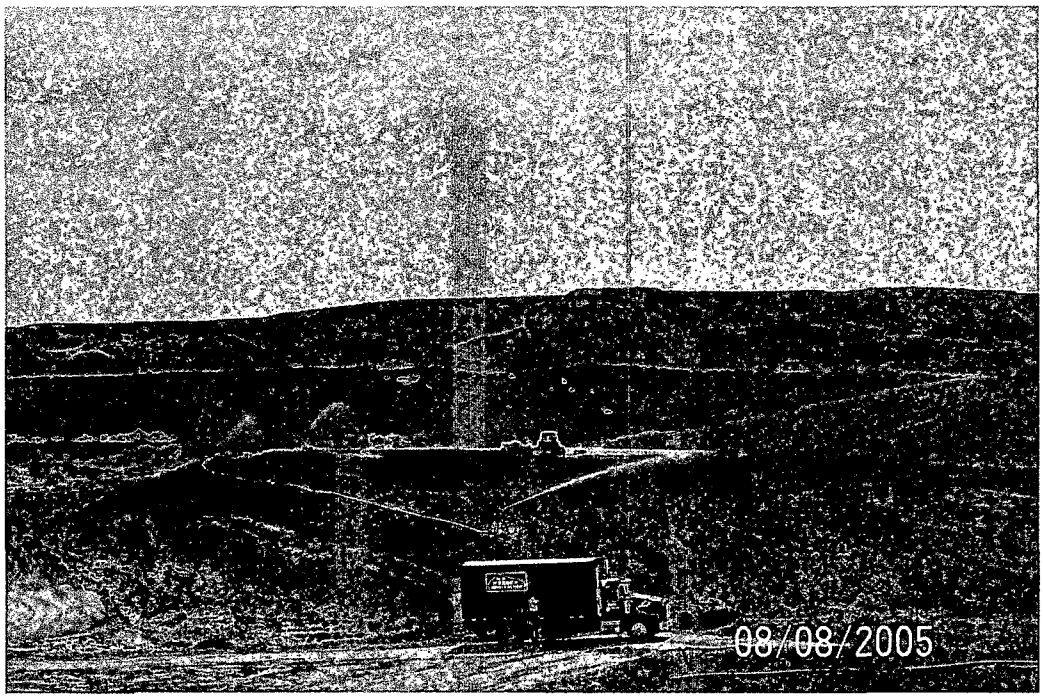


Adding moisture and processing the clay stockpile, October 14, 1998.

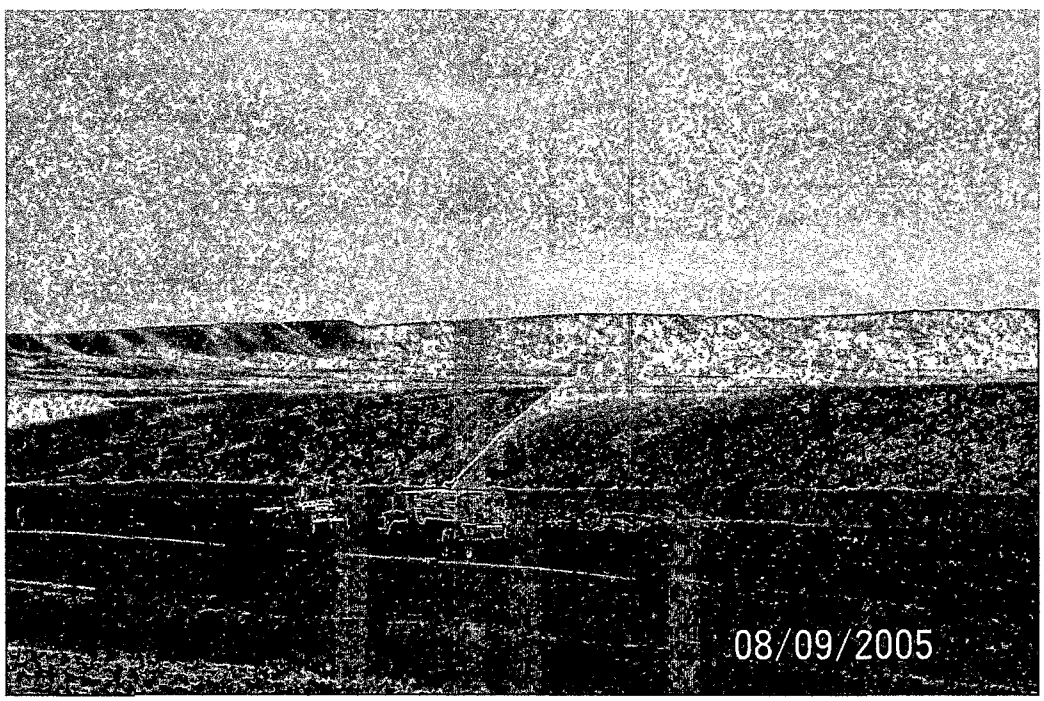


Disking moisture into clay material on the stockpile using a CAT D8 Dozer with a disc, October 10, 1998.

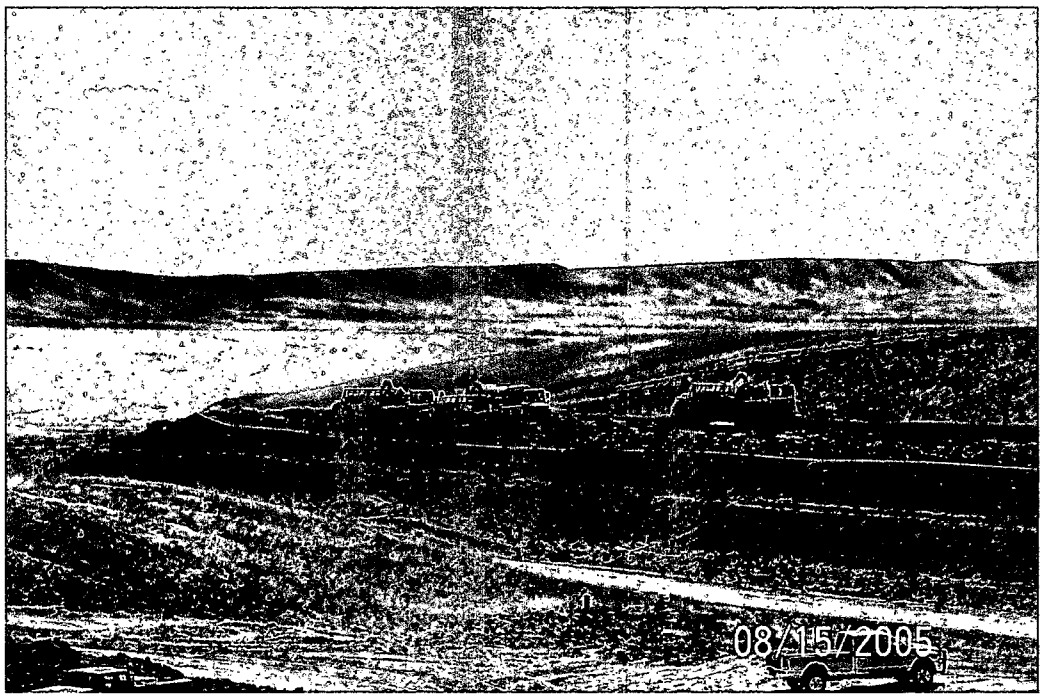

Clay Stockpile – Clay material being processed and excavated for use as Radon Barrier fill for the A-9, May 30, 2001.



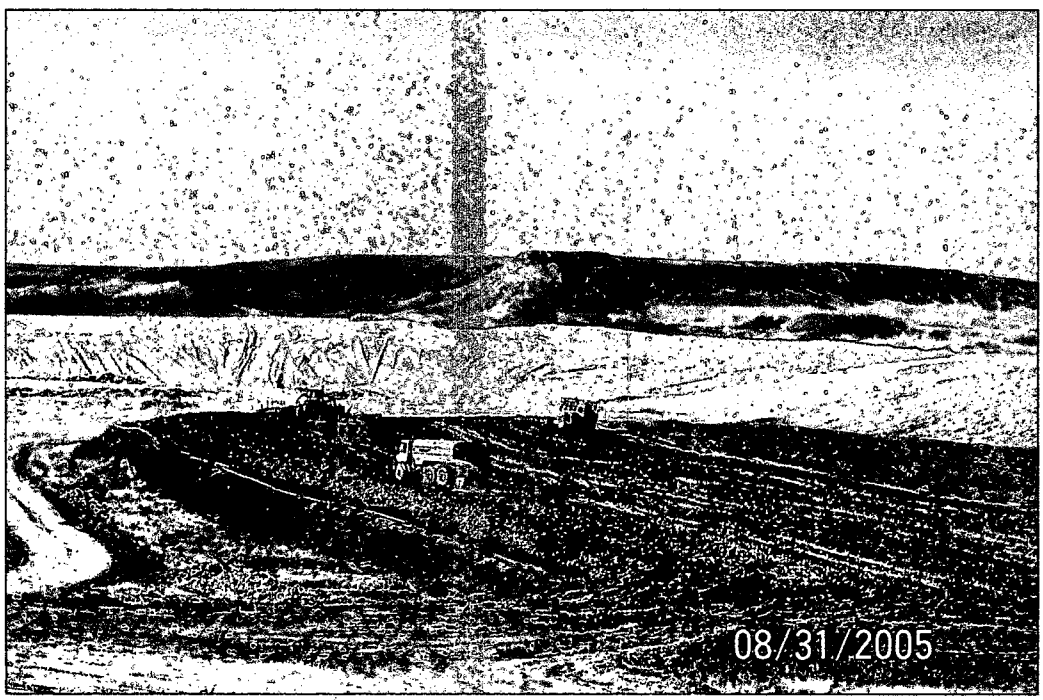
Adding moisture to the clay stockpile for use as Radon Barrier for GHP-2 Repository, August 8, 2005.



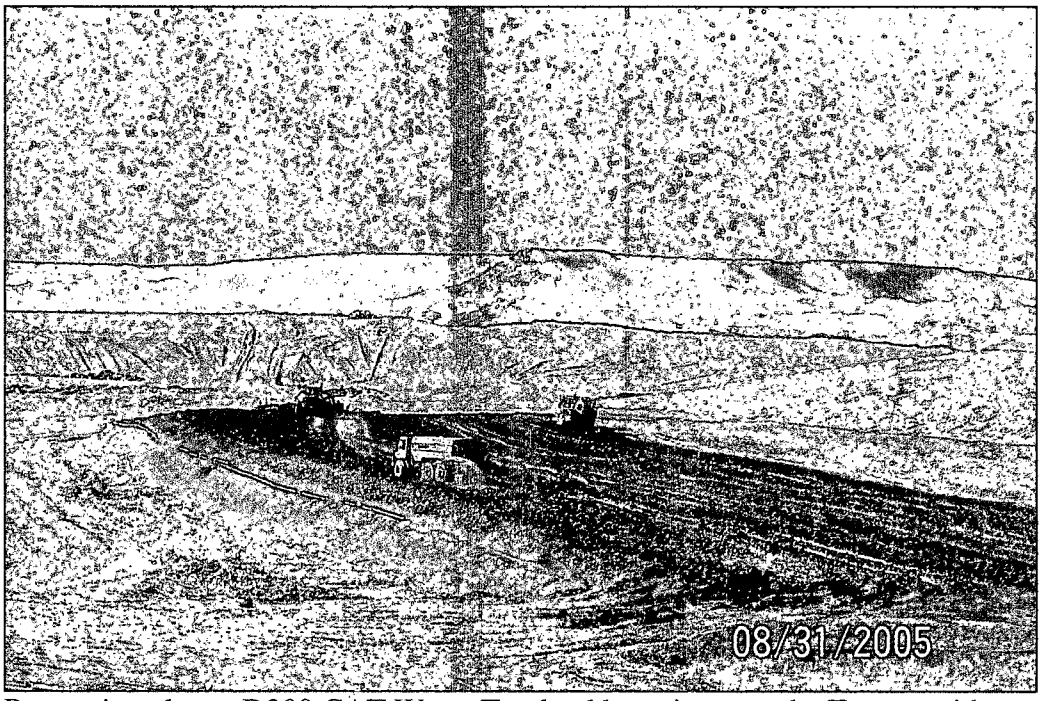
Processing clay in the stockpile using a CAT D8 Dozer and a CAT D300 Water Truck, August 9, 2005.



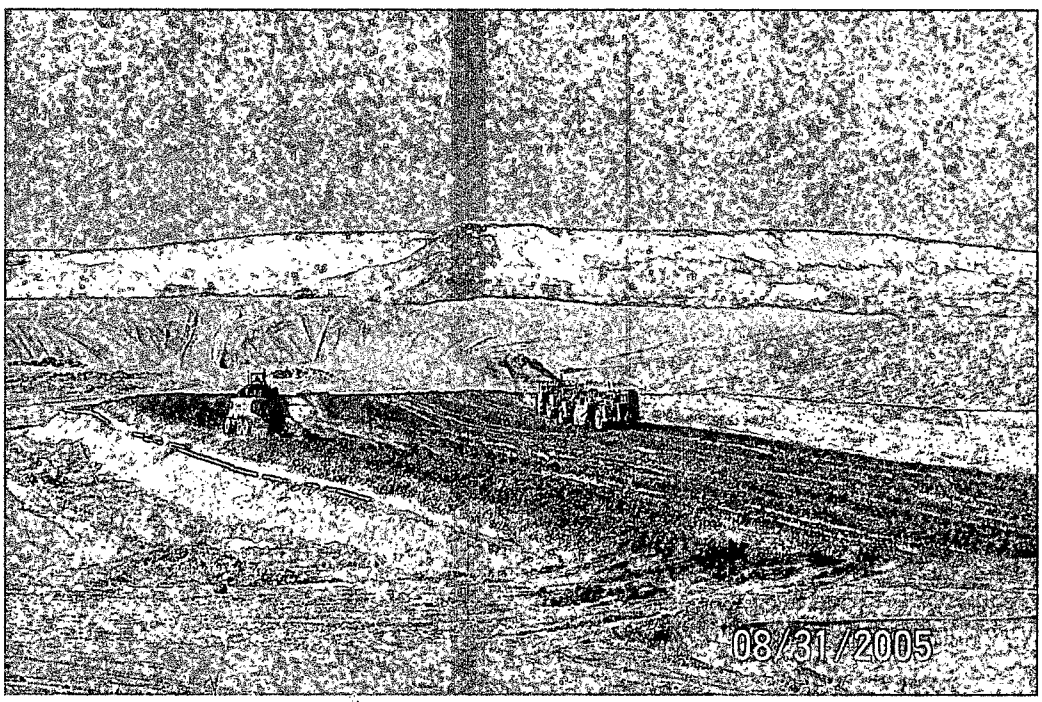
Excavating processed clay from the stockpile using CAT 637 Scrapers, August 15, 2005.



Processing clay, a D300 CAT Water Truck adds moisture and a Tractor with a disc blends the moisture into clay material, August 31, 2005.

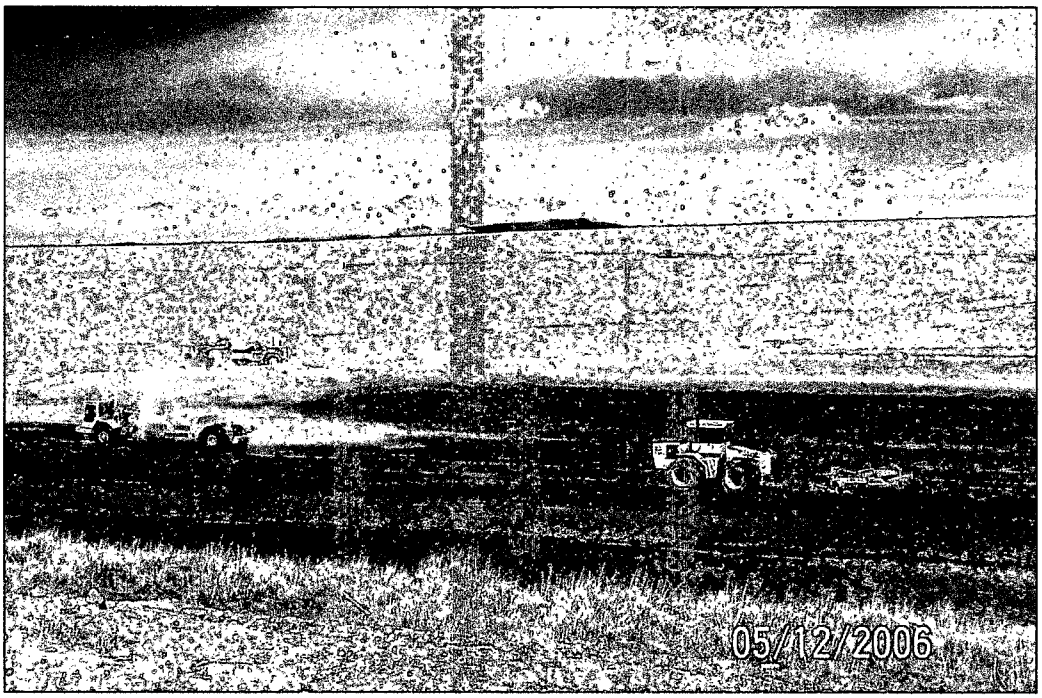


Processing clay, a D300 CAT Water Truck adds moisture and a Tractor with a disc blends the moisture into clay material, August 31, 2005.

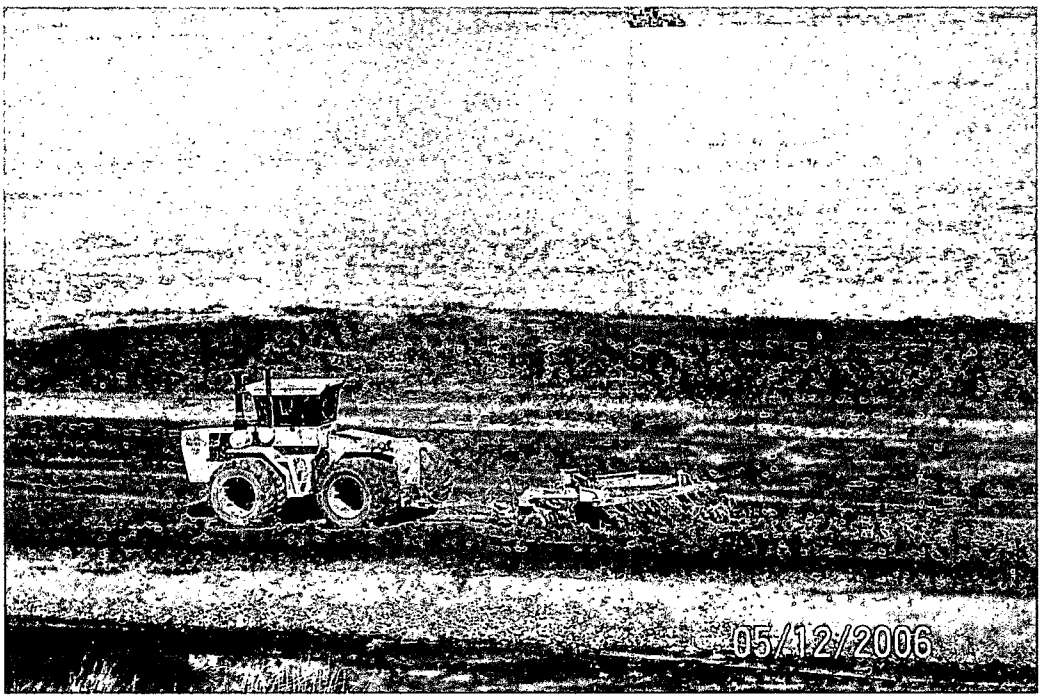


Processing clay, a D300 CAT Water Truck adds moisture and a Tractor with a disc blends the moisture into clay material. Three Cat 637 Scrapers excavate processed clay for use as Radon Barrier for GHP-2, August 31, 2005.

Clay being processed using a Steiger Tractor with a disc. A CAT 637 Scraper excavates processed clay, May 11, 2006.



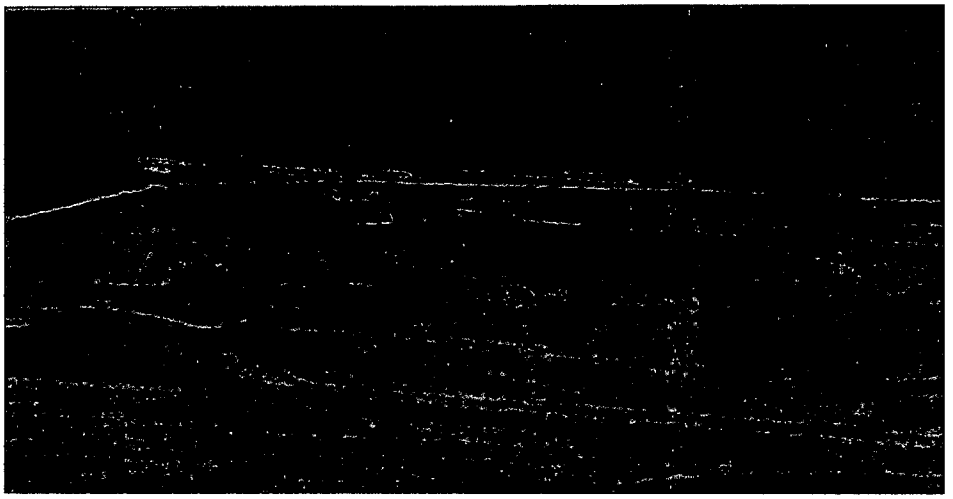
Clay being processed using a Steiger Tractor with a disc and a CAT 621 Water Wagon adds moisture, May 12, 2006.



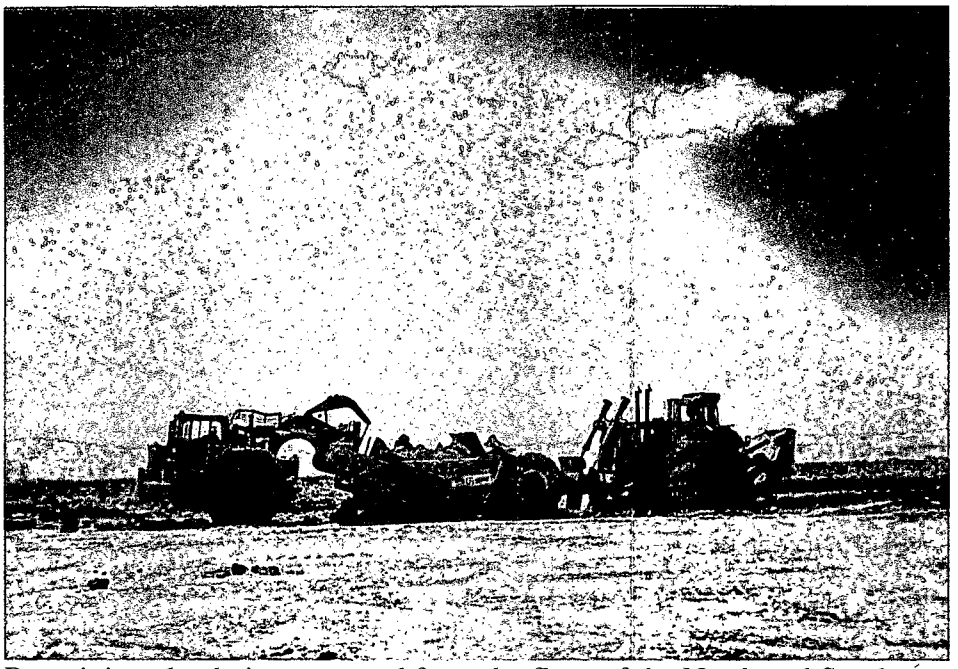
Processing Clay with Steiger with a disc, May 12, 2006.

ATTACHMENT 2

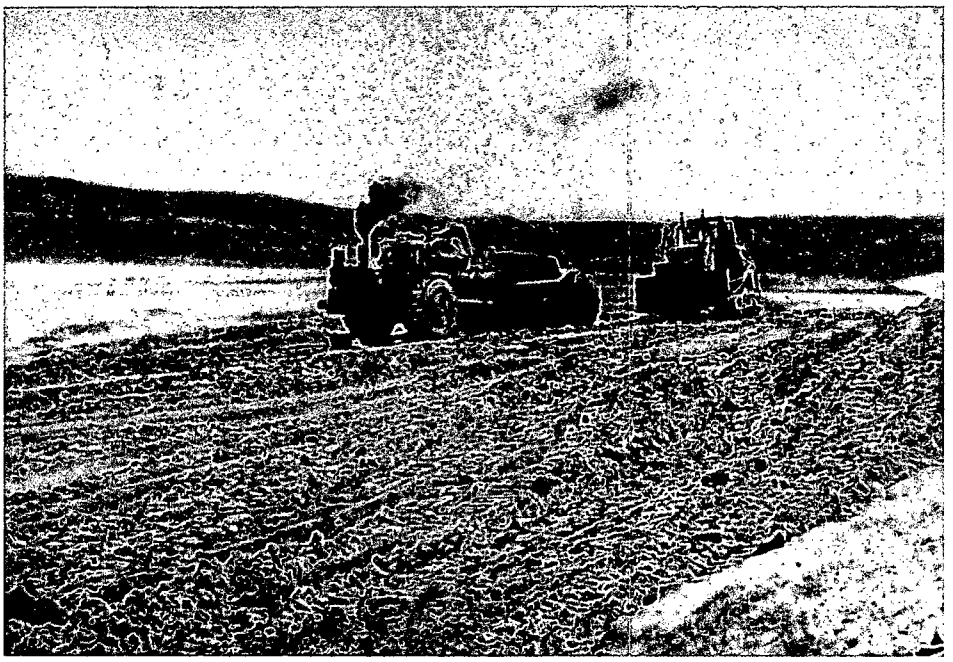
Gas Hills, Wyoming
North and South Evaporation Ponds
Remaining Clay Removal Photographs



North and South Evaporation Ponds overview. The removal of the remaining clay area is at the top of the photograph. The material being placed in the A-9 Repository is shown at the bottom of the photograph, July 2000.

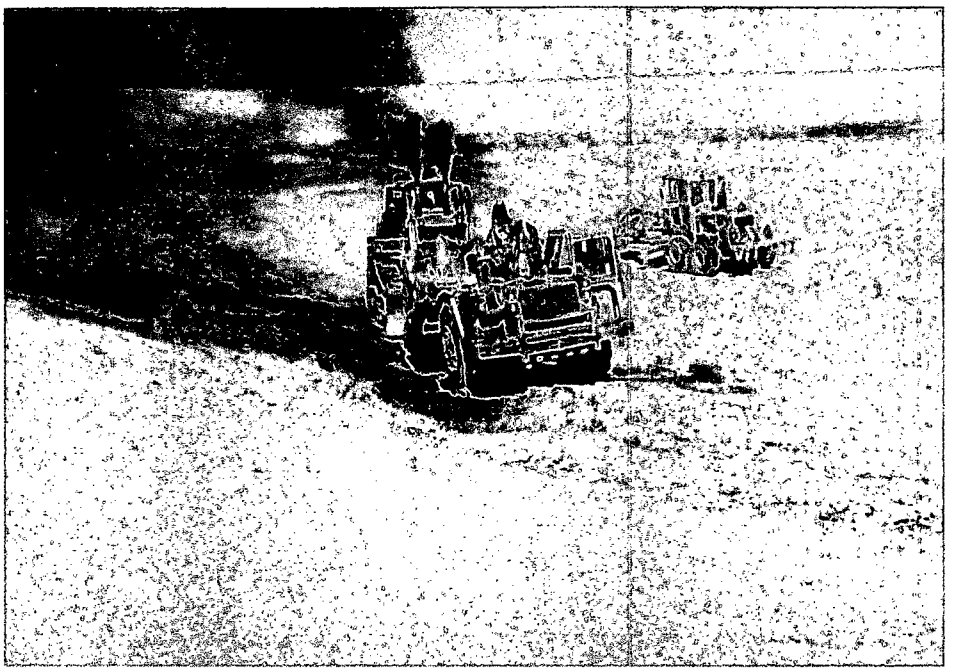


Remaining clay being removed from the floor of the North and South Evaporation Ponds using a CAT 651 Scraper and a CAT D10 Dozer, July 2000.



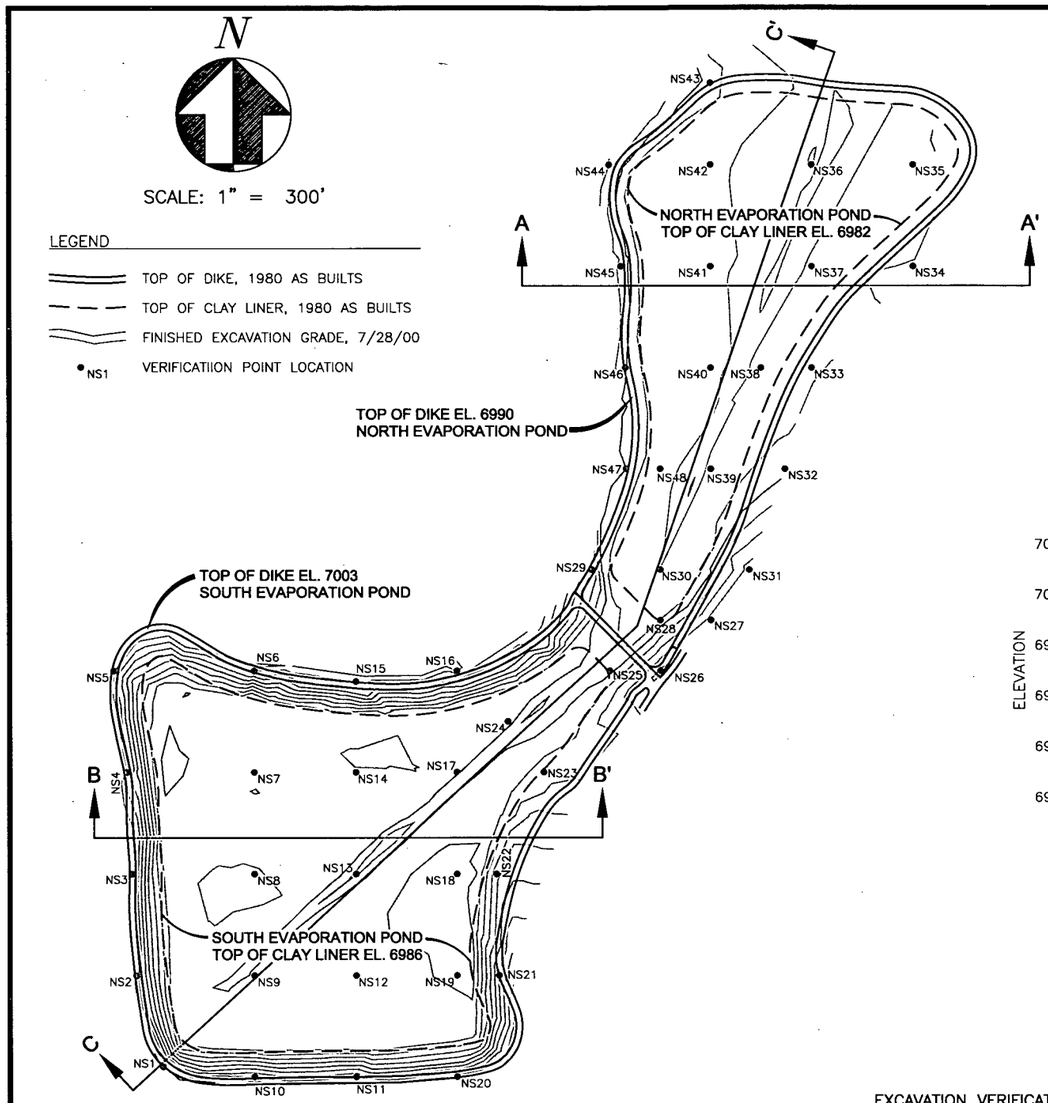
Remaining clay being removed from the floor of the North and South Evaporation Ponds using a CAT 651 Scraper and a CAT D10 Dozer, July 2000.

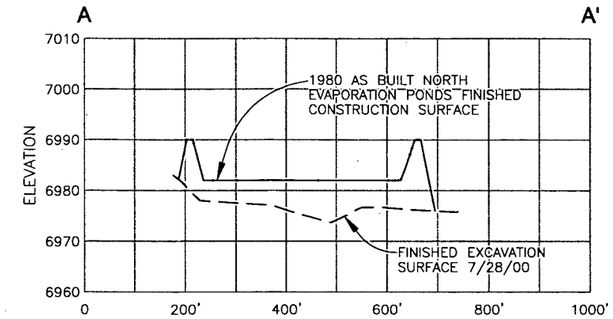
Remaining clay being removed from the floor of the North and South Evaporation Ponds using a CAT 651 Scraper and a CAT D10 Dozer. The foreground shows the clay has been removed from the floor of the North and South Evaporation Pond, July 2000.



Remaining clay being removed from the floor along the toe of the dike of the North and South Evaporation Ponds using a CAT 651 Scraper and a CAT D10 Dozer. A CAT 14 Blade windrows up any material left for the Scrapers to pickup, July 2000.

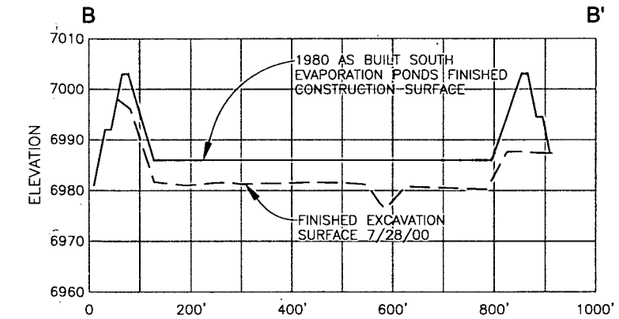
Remaining clay being removed from the slopes of the dikes of the North and South Evaporation Ponds using a CAT 651 Scraper and a CAT D10 Dozer. The floor and the slope areas to the left and right of the scrapers have been cleaned, July 2000.





SECTION A–A'

SCALE: HORIZ. 1" = 300'
VERT. 1" = 30'



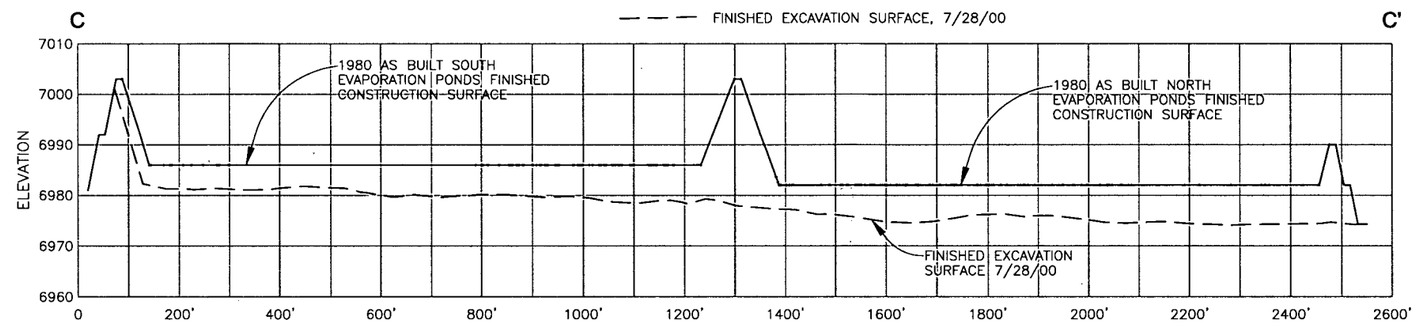
SECTION B–B'

SCALE: HORIZ. 1" = 300'
VERT. 1" = 30'

LEGEND – SECTIONS

FINISHED GRADE NORTH & SOUTH EVAVPORATION PONDS, 1980 AS BUILTS

FINISHED EXCAVATION SURFACE, 7/28/00



SECTION C–C'

SCALE: HORIZ. 1" = 300'
VERT. 1" = 30'

NOTE:

ALL CONTAMINATED SOILS WERE EXCAVATED AND PLACED IN THE A–9 REPOSITORY FROM JUNE 26, 2000 THRU JULY 26, 2000 IN ACCORDANCE WITH SECTION 6.0 AND 3.2 OF THE APPROVED (DECEMBER 9, 1999) DESIGN REPORT PART 1, "DESIGN FOR ENHANCEMENT OF THE PREVIOUSLY APPROVED RECLAMATION PLAN FOR THE A–9 REPOSITORY", PREPARED BY SHEPHERD MILLER, INC., OCTOBER 1998.

EXCAVATION VERIFICATION DATA

POINT I.D.	DESCRIPTION	NORTHING	EASTING	ELEVATION FROM AS–BUILTS OR FIELD SURVEYS	ELEVATION FINISHED EXCAVATION	TOTAL MATERIAL REMOVED (FEET)
NS1	1980 As Built Top of Dike	789220.20	835420.07	7003	7000.6	2.4
NS2	1980 As Built Top of Dike	789399.94	835367.74	7003	6997.5	5.5
NS3	1980 As Built Top of Dike	789600.03	835358.93	7003	6997.8	5.2
NS4	1980 As Built Top of Dike	789800.07	835348.63	7003	6996.1	6.9
NS5	1980 As Built Top of Dike	790000.03	835323.51	7003	6996.4	6.6
NS6	1980 As Built Top of Dike	790000.06	835600.00	7003	6995.2	7.8
NS7	1980 As Built Top of Clay Liner	789799.93	835599.95	6986	6981.7	4.3
NS8	1980 As Built Top of Clay Liner	789600.00	835600.05	6986	6982.2	3.8
NS9	1980 As Built Top of Clay Liner	789400.01	835600.00	6986	6981.2	4.8
NS10	1980 As Built Top of Dike	789200.07	835599.86	7003	6996.1	6.9
NS11	1980 As Built Top of Dike	789200.02	835800.00	7003	6995.6	7.4
NS12	1980 As Built Top of Clay Liner	789400.06	835800.00	6986	6981.9	4.1
NS13	1980 As Built Top of Clay Liner	789600.11	835800.00	6986	6977.6	8.4
NS14	1980 As Built Top of Clay Liner	789800.04	835799.91	6986	6981.9	4.1
NS15	1980 As Built Top of Dike	789978.92	835800.03	7003	6996.5	6.5
NS16	1980 As Built Top of Dike	790000.13	836000.03	7003	6998.2	4.8
NS17	1980 As Built Top of Clay Liner	789800.04	836000.01	6986	6980.9	5.1
NS18	1980 As Built Top of Clay Liner	789599.90	836000.05	6986	6978.9	7.1
NS19	1980 As Built Top of Clay Liner	789400.02	835999.95	6986	6979.0	7.0
NS20	1980 As Built Top of Dike	789200.01	835999.92	7003	6998.8	4.2
NS21	1980 As Built Top of Dike	789400.06	836082.33	7003	6992.3	10.7
NS22	Existing Side Slope 6/23/2000	789599.79	836077.39	6993.6	6987.5	6.1
NS23	Existing Side Slope 6/23/2000	789800.03	836170.54	6987.9	6983.0	4.9
NS24	1980 As Built Top of Clay Liner	789900.10	836100.05	6986	6981.5	4.5

POINT I.D.	DESCRIPTION	NORTHING	EASTING	ELEVATION FROM AS–BUILTS OR FIELD SURVEYS	ELEVATION FINISHED EXCAVATION	TOTAL MATERIAL REMOVED (FEET)
NS25	Existing Side Slope 6/23/2000	789999.90	836300.13	6984.8	6979.3	5.5
NS26	1980 As Built Top of Dike	790000.06	836400.05	7000.5	6988.2	12.3
NS27	Existing Grade 6/23/2000	790100.09	836500.00	6989.7	6986.7	3.0
NS28	Existing Grade 6/23/2000	790099.99	836400.00	6992.6	6978.7	13.9
NS29	Existing Grade 6/23/2000	790200.09	836264.59	6995.9	6985.8	10.1
NS30	1980 As Built Top of Clay Liner	790200.04	836399.95	6982	6976.1	5.9
NS31	Existing Grade 6/23/2000	790199.93	836575.76	6988.4	6986.8	1.6
NS32	Existing Grade 6/23/2000	790400.05	836647.00	6986.3	6979.2	7.1
NS33	Existing Grade 6/23/2000	790600.02	836699.90	6982.8	6977.2	5.6
NS34	Existing Grade 6/23/2000	790800.10	836899.97	6976.1	6975.9	0.2
NS35	1980 As Built Top of Clay Liner	791000.05	836899.97	6982	6976.6	5.4
NS36	1980 As Built Top of Clay Liner	790999.95	836700.05	6982	6976.5	5.5
NS37	1980 As Built Top of Clay Liner	790800.02	836700.09	6982	6976.5	5.5
NS38	1980 As Built Top of Clay Liner	790599.97	836600.06	6982	6977.2	4.8
NS39	1980 As Built Top of Clay Liner	790400.03	836500.04	6982	6977.1	4.9
NS40	1980 As Built Top of Clay Liner	790599.98	836500.08	6982	6977.4	4.6
NS41	1980 As Built Top of Clay Liner	790800.06	836500.07	6982	6977.1	4.9
NS42	1980 As Built Top of Clay Liner	790999.89	836500.06	6982	6976.7	5.3
NS43	1980 As Built Top of Dike	791161.45	836499.98	6990	6979.2	10.8
NS44	1980 As Built Top of Dike	790999.95	836299.92	6990	6984.2	5.8
NS45	1980 As Built Top of Dike	790800.00	836323.45	6990	6981.4	8.6
NS46	1980 As Built Top of Dike	790600.09	836332.52	6990	6980.2	9.8
NS47	1980 As Built Top of Dike	790400.10	836333.52	6990	6980.0	10.0
NS48	1980 As Built Top of Clay Liner	790400.08	836399.94	6982	6977.8	4.2

UMETCO MINERALS CORPORATION

NORTH AND SOUTH EVAPORATION PONDS CONTAMINATED (BYPRODUCT) SOIL REMOVAL

GAS HILLS, WYOMING

APRIL 2004

FIGURE 2.1

FIG 2–1.DWG

TOTAL MATERIAL REMOVED IN 2000

PRE-EXCAVATION CONTROL POINTS 6/23/2000

SURVEY DATE	POINT NUMBER	NORTHERING	EASTING	ELEVATION	DESCRIPTION
6/23/2000	1	789220.204	835420.0703	7002.7194	NS1
6/23/2000	2	789399.9392	835367.7362	7002.1207	NS2
6/23/2000	3	789600.0346	835358.9317	7001.9826	NS3
6/23/2000	4	789800.0706	835348.6313	7002.1726	NS4
6/23/2000	5	790000.0349	835323.5057	6996.5083	NS5
6/23/2000	6	790000.064	835599.9766	7001.1888	NS6
6/23/2000	7	789799.9348	835599.9495	6983.8739	NS7
6/23/2000	8	789600.0029	835600.0471	6984.2676	NS8
6/23/2000	9	789400.0063	835599.971	6984.0065	NS9
6/23/2000	10	789200.0705	835599.8617	7003.343	NS10
6/23/2000	11	789200.0211	835799.9699	7000.9475	NS11
6/23/2000	12	789400.0576	835799.9946	6984.1336	NS12
6/23/2000	13	789600.1057	835799.966	6983.9408	NS13
6/23/2000	14	789800.0435	835799.9136	6984.442	NS14
6/23/2000	15	789978.9177	835800.0253	7001.6206	NS15
6/23/2000	16	790000.1338	836000.0305	7002.1522	NS16
6/23/2000	17	789800.0437	836000.0066	6983.721	NS17
6/23/2000	18	789599.8957	836000.0452	6983.9694	NS18
6/23/2000	19	789400.0222	835999.9467	6984.5138	NS19
6/23/2000	20	789200.0131	835999.9164	7001.2776	NS20
6/23/2000	21	789400.0566	836082.3292	6998.8617	NS21
6/23/2000	22	789599.79	836077.3922	6993.6323	NS22
6/23/2000	23	789800.027	836170.538	6987.8724	NS23
6/23/2000	24	789900.0953	836100.0548	6983.3627	NS24
6/23/2000	25	789999.9038	836300.1256	6984.8491	NS25
6/23/2000	26	790000.0644	836400.0493	6990.6526	NS26
6/23/2000	27	790100.0904	836499.9896	6989.7393	NS27
6/23/2000	28	790099.9927	836399.977	6992.5963	NS28
6/23/2000	29	790200.0936	836264.5927	6995.8627	NS29
6/23/2000	30	790200.0374	836399.951	6980.4875	NS30
6/23/2000	31	790199.9335	836575.756	6988.4024	NS31
6/23/2000	32	790400.0485	836646.9595	6986.2612	NS32
6/23/2000	33	790600.0246	836699.9009	6982.7783	NS33
6/23/2000	34	790800.0974	836899.9658	6976.1164	NS34
6/23/2000	35	791000.0469	836899.9717	6980.1268	NS35
6/23/2000	36	790999.9523	836700.0485	6979.4426	NS36
6/23/2000	37	790800.0246	836700.0852	6980.7456	NS37
6/23/2000	38	790599.9674	836600.0557	6982.5788	NS38
6/23/2000	39	790400.0324	836500.0405	6980.4585	NS39
6/23/2000	40	790599.9835	836500.0809	6980.3895	NS40
6/23/2000	41	790800.0572	836500.068	6980.2932	NS41
6/23/2000	42	790999.8882	836500.063	6979.8022	NS42
6/23/2000	43	791161.4515	836499.9833	6987.8065	NS43
6/23/2000	44	790999.9527	836299.9207	6990.6593	NS44
6/23/2000	45	790800.0002	836323.4505	6989.2418	NS45
6/23/2000	46	790600.0946	836332.519	6989.4385	NS46
6/23/2000	47	790400.102	836333.5153	6988.5341	NS47
6/23/2000	48	790400.0813	836399.9439	6982.224	NS48

POST-EXCAVATION CONTROL POINTS 7/27 & 28/2000

SURVEY DATE	POINT NUMBER	NORTHERING	EASTING	ELEVATION	DESCRIPTION	TOTAL DEPTH REMOVED IN 2000
7/28/2000	1	789220.175	835420.096	7000.633	NS1	2.0864
7/28/2000	2	789399.934	835367.782	6997.52	NS2	4.6007
7/28/2000	3	789600.057	835358.979	6997.817	NS3	4.1656
7/28/2000	4	789800.115	835348.62	6996.116	NS4	6.0566
7/28/2000	5	790000.017	835323.502	6996.36	NS5	0.1483
7/28/2000	6	790000.057	835600.068	6995.16	NS6	6.0288
7/28/2000	7	789800.046	835599.962	6981.682	NS7	2.1919
7/28/2000	8	789600.13	835600.081	6982.161	NS8	2.1066
7/28/2000	9	789400.103	835599.994	6981.236	NS9	2.7705
7/28/2000	10	789200.042	835599.833	6996.072	NS10	7.271
7/28/2000	11	789200.078	835799.93	6995.57	NS11	5.3775
7/28/2000	12	789400.023	835799.884	6981.927	NS12	2.2066
7/28/2000	13	789600.145	835799.824	6977.589	NS13	6.3518
7/28/2000	14	789800.131	835799.965	6981.925	NS14	2.517
7/28/2000	15	789978.973	835800.043	6996.536	NS15	5.0846
7/28/2000	16	790000.147	835999.984	6998.195	NS16	3.9572
7/28/2000	17	789800.126	835999.986	6980.888	NS17	2.833
7/28/2000	18	789599.858	835999.952	6978.89	NS18	5.0794
7/28/2000	19	789400.002	835999.895	6978.976	NS19	5.5378
7/28/2000	20	789199.966	835999.962	6998.808	NS20	2.4696
7/28/2000	21	789400.004	836082.287	6992.264	NS21	6.5977
7/28/2000	22	789599.707	836077.406	6987.457	NS22	6.1753
7/28/2000	23	789799.938	836170.514	6982.981	NS23	4.8914
7/28/2000	24	789900.024	836099.988	6981.505	NS24	1.8577
7/27/2000	25	790000.385	836300.045	6979.256	NS25	5.5931
7/27/2000	26	790000.806	836399.83	6988.179	NS26	2.4736
7/27/2000	27	790100.112	836499.642	6986.691	NS27	3.0483
7/27/2000	28	790098.993	836399.394	6978.737	NS28	13.8593
7/28/2000	29	790200.018	836264.585	6985.816	NS29	10.0467
7/27/2000	30	790200.523	836399.702	6976.118	NS30	4.3695
7/28/2000	31	790199.891	836575.675	6986.809	NS31	1.5934
7/27/2000	32	790400.435	836647.093	6979.183	NS32	7.0782
7/27/2000	33	790600.438	836699.869	6977.212	NS33	5.5663
7/27/2000	34	790800.145	836899.844	6975.903	NS34	0.2134
7/27/2000	35	790999.836	836899.62	6976.592	NS35	3.5348
7/28/2000	36	790999.943	836699.929	6976.525	NS36	2.9176
7/28/2000	37	790800.089	836700.144	6976.514	NS37	4.2316
7/28/2000	38	790599.945	836600.146	6977.208	NS38	5.3708
7/28/2000	39	790400.037	836500.04	6977.134	NS39	3.3245
7/28/2000	40	790599.939	836500.107	6977.364	NS40	3.0255
7/28/2000	41	790800.051	836500.028	6977.068	NS41	3.2252
7/28/2000	42	790999.866	836500.045	6976.654	NS42	3.1482
7/28/2000	43	791161.411	836499.973	6979.191	NS43	8.6155
7/28/2000	44	790999.937	836299.899	6984.163	NS44	6.4963
7/28/2000	45	790800	836323.528	6981.396	NS45	7.8458
7/28/2000	46	790600.079	836332.491	6980.208	NS46	9.2305
7/28/2000	47	790400.141	836333.484	6980.02	NS47	8.5141
7/28/2000	48	790400.01	836399.893	6977.828	NS48	4.396

TOTAL MATERIAL REMOVED FROM 1980 ELEVATIONS

PRE-EXCAVATION 1980 ELEVATIONS & CONTROL POINTS 6/23/2000

POINT I.D.	NORTHING	EASTING	ELEVATION FROM AS-BUILTS & FIELD SURVEYS	DESCRIPTION	ELEVATION FINISHED EXCAVATION 7/28/2000	TOTAL MATERIAL REMOVED
NS1	789220.204	835420.0703	7003	1980 As Built Top of Dike	7000.6	2.4
NS2	789399.9392	835367.7362	7003	1980 As Built Top of Dike	6997.5	5.5
NS3	789600.0346	835358.9317	7003	1980 As Built Top of Dike	6997.8	5.2
NS4	789800.0706	835348.6313	7003	1980 As Built Top of Dike	6996.1	6.9
NS5	790000.0349	835323.5057	7003	1980 As Built Top of Dike	6996.4	6.6
NS6	790000.064	835599.9766	7003	1980 As Built Top of Dike	6995.2	7.8
NS7	789799.9348	835599.9495	6986	1980 As Built Top of Clay Liner	6981.7	4.3
NS8	789600.0029	835600.0471	6986	1980 As Built Top of Clay Liner	6982.2	3.8
NS9	789400.0063	835599.971	6986	1980 As Built Top of Clay Liner	6981.2	4.8
NS10	789200.0705	835599.8617	7003	1980 As Built Top of Dike	6996.1	6.9
NS11	789200.0211	835799.9699	7003	1980 As Built Top of Dike	6995.6	7.4
NS12	789400.0576	835799.9946	6986	1980 As Built Top of Clay Liner	6981.9	4.1
NS13	789600.1057	835799.966	6986	1980 As Built Top of Clay Liner	6977.6	8.4
NS14	789800.0435	835799.9136	6986	1980 As Built Top of Clay Liner	6981.9	4.1
NS15	789978.9177	835800.0253	7003	1980 As Built Top of Dike	6996.5	6.5
NS16	790000.1338	836000.0305	7003	1980 As Built Top of Dike	6998.2	4.8
NS17	789800.0437	836000.0066	6986	1980 As Built Top of Clay Liner	6980.9	5.1
NS18	789599.8957	836000.0452	6986	1980 As Built Top of Clay Liner	6978.9	7.1
NS19	789400.0222	835999.9467	6986	1980 As Built Top of Clay Liner	6979.0	7.0
NS20	789200.0131	835999.9164	7003	1980 As Built Top of Dike	6998.8	4.2
NS21	789400.0566	836082.3292	7003	1980 As Built Top of Dike	6992.3	10.7
NS22	789599.79	836077.3922	6993.6	Existing Side Slope 6/23/2000	6987.5	6.1
NS23	789800.027	836170.538	6987.9	Existing Side Slope 6/23/2000	6983.0	4.9
NS24	789900.0953	836100.0548	6986	1980 As Built Top of Clay Liner	6981.5	4.5
NS25	789999.9038	836300.1256	6984.8	Existing Side Slope 6/23/2000	6979.3	5.5
NS26	790000.0644	836400.0493	7000.5	1980 As Built Top of Dike	6988.2	12.3
NS27	790100.0904	836499.9896	6989.7	Existing Grade Outside As Built Dike 6/23/2000	6986.7	3.0
NS28	790099.9927	836399.977	6992.6	Existing Grade Outside As Built Dike 6/23/2000	6978.7	13.9
NS29	790200.0936	836264.5927	6995.9	Existing Grade Outside As Built Dike 6/23/2000	6985.8	10.1
NS30	790200.0374	836399.951	6982	1980 As Built Top of Clay Liner	6976.1	5.9
NS31	790199.9335	836575.756	6988.4	Existing Grade Outside As Built Dike 6/23/2000	6986.8	1.6
NS32	790400.0485	836646.9595	6986.3	Existing Grade Outside As Built Dike 6/23/2000	6979.2	7.1
NS33	790600.0246	836699.9009	6982.8	Existing Grade Outside As Built Dike 6/23/2000	6977.2	5.6
NS34	790800.0974	836899.9658	6976.1	Existing Grade Outside As Built Dike 6/23/2000	6975.9	0.2
NS35	791000.0469	836899.9717	6982	1980 As Built Top of Clay Liner	6976.6	5.4
NS36	790999.9523	836700.0485	6982	1980 As Built Top of Clay Liner	6976.5	5.5
NS37	790800.0246	836700.0852	6982	1980 As Built Top of Clay Liner	6976.5	5.5
NS38	790599.9674	836600.0557	6982	1980 As Built Top of Clay Liner	6977.2	4.8
NS39	790400.0324	836500.0405	6982	1980 As Built Top of Clay Liner	6977.1	4.9
NS40	790599.9835	836500.0809	6982	1980 As Built Top of Clay Liner	6977.4	4.6
NS41	790800.0572	836500.068	6982	1980 As Built Top of Clay Liner	6977.1	4.9
NS42	790999.8882	836500.063	6982	1980 As Built Top of Clay Liner	6976.7	5.3
NS43	791161.4515	836499.9833	6990	1980 As Built Top of Dike	6979.2	10.8
NS44	790999.9527	836299.9207	6990	1980 As Built Top of Dike	6984.2	5.8
NS45	790800.0002	836323.4505	6990	1980 As Built Top of Dike	6981.4	8.6
NS46	790600.0946	836332.519	6990	1980 As Built Top of Dike	6980.2	9.8
NS47	790400.102	836333.5153	6990	1980 As Built Top of Dike	6980.0	10.0
NS48	790400.0813	836399.9439	6982	1980 As Built Top of Clay Liner	6977.8	4.2