UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

October 17, 2011

Mr. Thomas E. Gieck
Remediation Leader
Umetco Minerals Corp.
P.O. Box 1029
Grand Junction, CO 81502

SUBJECT: NRC INSPECTION REPORT 040-00299/11-001

Dear Mr. Gieck:

This refers to the inspection conducted on September 20, 2011, at the Umetco Gas Hills facility in Natrona County, Wyoming. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The preliminary inspection results were presented to you at the conclusion of the onsite inspection, and the final inspection results were presented to you by telephone on October 11, 2011. The enclosed report presents the results of this inspection. No violations were identified, and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Mr. Robert Evans, Senior Health Physicist, at 817-860-8234 or the undersigned at 817-860-8191.

Sincerely,

/RA/

D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch

Docket: 040-00299
License: SUA-648

Enclosure:
NRC Inspection Report 040-00299/11-001

cc w/enclosure:
Scott Surovchak
Legacy Management
U.S. Department of Energy
110255 Dover St. Suite 1000
Westminster, Colorado 80021

Mark Moxley
District 2 Supervisor
510 Meadowview Drive
Lander, WY 82520

Scott W. Ramsay
Radiological Services Supervisor
Wyoming Office of Homeland Security
2421 E. 7th Street
Cheyenne, WY 82001

bcc w/enclosure via e-mail:
Dominick Orlando, FSME/DWMEP/DURLD
Lydia Chang, FSME/DWMEP/DURLD
Matthew Meyer, FSME/DWMEP/DURLD
Ted Johnson (tedjohnson22@comcast.net)
Roy Caniano, D:DNMS
Vivian Campbell, DD:DNMS
Chuck Cain, SMA:DNMS
Blair Spitzberg, C:RSFS
Robert Evans, RSFS
Gerald Schlapper, RSFS
Linda Gersey, RSFS
M. Herrera, Fee Coordinator, DRMA

Hard copy:
DNMS Materials File Room
DNMS Secretarial File

DRAFT: S:\DNMS\!NMSB-B\RJE\Umetco Minerals IR 2011-001.docx
FINAL: R:_DNMS\!2011\Umetco Minerals Report 2011-001.docx ML11290A292

ADAMS	■Yes ☐ No	■SUNSI Rev Complete	Reviewer Initials:	RJE
Publicly Avail.	■Yes ☐ No	Sensitive Value:		

RIV:DNMS:RSFS	FSME/DWMEP	C:RSFS	
RJEvans	TLJohnson	DBSpitzberg	
/RA/	***E – RJEvans***	***/RA/***	
10/13/11	10/12/11	10/17/11	

OFFICIAL RECORD COPY T=Telephone E=E-mail F=Fax

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	040-00299
License:	SUA-648
Report:	040-00299/11-001
Licensee:	Umetco Minerals Corp.
Facility:	Gas Hills facility
Location:	Natrona County, Wyoming
Date:	September 20, 2011
Inspectors:	Robert Evans, PE, CHP, Senior Health Physicist Repository and Spent Fuel Safety Branch Ted Johnson, Consultant Decommissioning and Uranium Recovery Licensing Directorate Division of Waste Management and Environmental Protection Office of Federal and State Materials and Environmental Management Programs
Accompanied By:	Dominick Orlando, Senior Project Manager Decommissioning and Uranium Recovery Licensing Directorate Division of Waste Management and Environmental Protection Office of Federal and State Materials and Environmental Management Programs
Approved By:	D. Blair Spitzberg, PhD, Chief Repository and Spent Fuel Safety Branch
Attachments:	Supplemental Inspection Information Photographs of Construction Activities

Enclosure

EXECUTIVE SUMMARY

Umetco Minerals Corporation Gas Hills Facility
NRC Inspection Report 040-00299/11-001

This inspection included a review of reclamation construction activities in progress at the licensee's Gas Hills, Wyoming, facility. In summary, site activities were being conducted in compliance with license and regulatory requirements.

Management Organization and Controls

- The organizational structure and staffing levels met license requirements and were sufficient for the work in progress. Site procedures were maintained up-to-date. While audit activities were conducted in accordance with license and regulatory requirements, the licensee did not identify the omission of a required sampling event during the December 2010 audit (Section 1).

Radiation Protection, Operator Training/Retraining, and Maintenance/Surveillance Testing

- The licensee implemented a radiation protection and training program that met the requirements of 10 CFR Part 20 and the license (Section 2).

On-site Construction

- The required tests and inspections were performed by the licensee to ensure that erosion protection materials were properly selected and placed. The licensee's documentation indicated that placement of materials was routinely inspected to ensure that the rock size and gradation specifications were met. Likewise, the thickness of the rock layers was verified to ensure compliance with the specifications. The licensee conducted testing in accordance with specified test procedures. The inspection frequencies for materials used for erosion protection were in compliance with the frequencies specified in the reclamation plan. Finally, the erosion protection aspects of the design and construction were in accordance with the specifications in the reclamation plan and met the requirements of 10 CFR Part 40, Appendix A, Criteria 1(c), 4(d), 6(1), and 12 (Section 3).

Environmental Protection

- The licensee implemented a groundwater monitoring program in accordance with license requirements. All sample results for point-of-compliance wells were below the respective alternate concentration limits. The sample results for one model validation well exceeded the target levels for sulfate and chloride, and the licensee continued to trend these sample results. The inspectors identified conflicts with the detection limits for selected groundwater samples, and the licensee was considering a license amendment to resolve these conflicts (Section 4).

Transportation of Radioactive Materials, Radioactive Waste Management, and Emergency Preparedness

- The licensee implemented access control and perimeter posting requirements as required by the license. The inspectors did not review the licensee's transportation and radwaste

handling programs because the licensee had not transported or handled radioactive waste since the previous inspection. The licensee had implemented an emergency preparedness program for industrial safety (Section 5).

Report Details

Site Status

By letter dated December 21, 2010, the licensee submitted the Erosion Protection Enhancement Design Report for Umetco's Gas Hills Reclamation Project to the NRC for review and approval. In this submittal, the licensee proposed to implement several repairs to the erosion cover currently in place over the tailings material. The NRC subsequently approved the licensee's proposal by License Amendment 64 dated August 22, 2011.

At the time of the inspection, the licensee was conducting repairs of the erosion cover. The work started concurrently with the approval of the license amendment on August 22, 2011. The construction work included: (1) installation of an improved bedding layer underneath the Above Grade Tailings Impoundment and A-9 rock covers, (2) installation of multi-layer filter zones in the launch rock structure, (3) repair of erosion sink holes (rills) under the ATGI and A-9 and upstream of the launch rock structure, and (4) repair of the erosion control apron located on the southeastern corner of the Above Grade Tailings Impoundment. Details of these work activities are provided in Section 3 of this inspection report.

1 Management Organization and Controls (88005)

1.1 Inspection Scope

The inspectors reviewed management organization and controls to ensure that the licensee was maintaining effective oversight of decommissioning activities.

1.2 Observations and Findings

License Condition 10.B provides the organizational requirements. This license condition states that the licensee is required to submit the organizational chart to the NRC on an annual basis. The inspectors compared the current organizational structure to the information provided in the most recent annual report dated September 30, 2011. Prior to the start of the erosion cover repair work, site staffing consisted of the remediation leader, contract radiation safety officer (RSO), and other contractors as needed. The inspectors considered this level of staffing to be acceptable because limited work had been conducted during 2008 through mid-2011. The primary work activity during this time frame was routine water sampling.

At the time of the inspection, erosion cover repair work was in progress. Licensee staffing consisted of the remediation leader, contract RSO, design engineer, and three quality assurance/quality control individuals. In addition, approximately 25 contract workers were conducting repairs of the erosion cover. The inspectors concluded that the licensee had sufficient staff to conduct these repairs.

License Condition 15 states that the RSO shall perform an annual documented review of site procedures. The inspectors noted that the RSO had performed these reviews within the required timeframes. The RSO conducted the procedure review most recently during December 2010.

License Condition 16 states that the licensee shall conduct an annual as low as reasonably achievable (ALARA) audit. The inspectors reviewed the ALARA audit for

calendar year 2010 during the inspection. The only work activities completed at the site during 2010 were various inspections and investigations. This audit documented that the licensee conducted ambient gamma radiation surveys during the previous year. The licensee did not identify any significant radiological issues during the annual audit.

1.3 Conclusions

The organizational structure and staffing levels met license requirements and were sufficient for the work in progress. Site procedures were maintained up-to-date. While audit activities were conducted in accordance with license and regulatory requirements, the licensee did not identify the omission of a required sampling event during the December 2010 audit.

2 Radiation Protection (83822), Operator Training/Retraining (88010), and Maintenance/Surveillance Testing (88025)

2.1 Inspection Scope

The inspectors reviewed the licensee's implementation of it's radiation protection and training programs to ensure compliance with license and regulatory requirements.

2.2 Observations and Findings

The inspectors reviewed the licensee's implementation of its radiation protection program for calendar years 2008-2011, prior to the start of repair work on the erosion cover. The licensee discontinued occupational exposure monitoring during 2007, as allowed by 10 CFR 20.1502, because the tailings material had been permanently covered with a radon barrier and erosion protection cover. The licensee also discontinued the collection of bioassays during 2007. As a result, no worker received an occupational dose during 2008-2011.

The radiation work permit requirements are provided in License Condition 10.A. The licensee issued two radiation work permits since the last inspection. During October 2008, the licensee issued one radiation work permit to support work on a well that was accidently filled with bentenite. This radiation work permit was issued because the workers could come into contact with potentially contaminated water. Radiological controls in place at the time included collection of breathing zone air samples and surveys of personnel and equipment.

A second radiation work permit was issued during 2010 to support the licensee's investigation of erosion damage on the Above Grade Tailings Impoundment. Although this work was not expected to involve radioactive tailings material, a radiation work permit was issued primarily because a procedure was not available for the work being conducted. The licensee conducted ambient gamma radiation surveys during the work, and all sample results remained at background levels.

During the inspection, contract workers were conducting repairs of the erosion cover. The work in progress did not involve tailings material; therefore, no special radiation protection controls were implemented. In addition, the work was being conducted using site procedures; therefore, the RSO did not issue a radiation work permit for the erosion repair.

At the beginning of work, the licensee collected several breathing zone air samples. The licensee analyzed the samples at an offsite location, and the results were less than 2 percent of the derived air concentration levels as specified in regulations. As allowed by 10 CFR 20.1502, internal and external monitoring was not being used since occupational exposure doses were expected to be less than 10 percent of the regulatory limit.

License Condition 22 specifies the requirements for the free-release of equipment and packages from the restricted area. The licensee conducted surveys of incoming construction equipment to ensure that the equipment had not been contaminated at a different location. The current work is expected to be completed during December 2011, and the licensee will conduct radiological surveys of trailers, equipment, and vehicles being released from the site at that time. Since the vehicles and workers are not expected to come into contact with tailings material, the licensee does not believe that the equipment will become contaminated during current work activities.

During August 2011, the licensee commenced with weekly surveys of the office trailers and lunch rooms for contamination. To date, the licensee has not identified any contamination in the trailers. The licensee decided not to conduct contamination surveys of personnel because site workers were not coming into contact with tailings material or uranium ore.

License Condition 20 provides the instrument calibration requirements. The RSO stated that the breathing zone samplers were calibrated prior to use, and the samplers were obtained from a different licensee site. Survey meters were available for use on loan from other sites. The RSO stated that survey meters were verified to be within calibration and were functionally tested daily prior to use. The inspector did not review these calibration records because they were not located at this site.

License Condition 10.D provides the training requirements. The licensee stated that training was presented to the construction contractors during July 2011, prior to the start of work. The licensee provided tailgate safety meetings to all site workers on a daily basis when construction work was conducted. Also, annual training was provided to permanent site workers during February 2011. In summary, the licensee conducted training that met the intent of the license.

License Condition 32 requires, in part, that the licensee conduct an annual survey of land use within 5 miles of any portion of the restricted area. The most recent land use survey was included in the annual report dated September 30, 2011. The annual survey indicated that the nearest resident was located 5 miles from the site. Accordingly, the inspectors concluded that licensed activities had little radiological impact on members of the public.

2.3 Conclusions

The licensee implemented a radiation protection and training program that met the requirements of 10 CFR Part 20 and the license.

3 On-site Construction (88001)

3.1 Inspection Scope

The inspectors reviewed on-site construction activities to ensure that work was being conducted in accordance with license requirements.

3.2 Observations and Findings

The license recently identified possible problems with the erosion protection layer in the covers for areas Above Grade Tailings Impoundment and A-9. In particular, sub-grade erosion resulted in isolated, shallow incisions of the underlying cover soils. This erosion had no impact on the tailings material or the radon barrier located between the tailings and the erosion cover. The licensee proposed placing a bedding layer under the Above Grade Tailings Impoundment and A-9 covers by one of two methods. The licensee also proposed repairs to the launch rock structure and the apron channel. The NRC subsequently approved the licensee's proposals by Amendment 64 to the license. The licensee commenced with the work during August 2011.

The inspectors reviewed the licensee's construction activities during the on-site inspection. The inspectors evaluated the construction of the additional filter layers needed to prevent further erosion of the soil underlying the riprap layers. In summary, the inspectors determined that testing, placement, gradations, and riprap configurations complied with specifications provided in the NRC-approved reclamation plan.

The inspectors' review included visual examination of the completed work, visual examination of work in progress, and examination of quality assurance/quality control records.

Visual inspections of the completed work indicated that the licensee was accomplishing the filter addition in a satisfactory manner. The licensee was placing the filter to the required minimum depth, and the rock voids in the larger rock were filled satisfactorily to prevent high-velocity flows from occurring in the rock voids. The licensee was using two acceptable techniques to place the bedding layer filter into place: (1) removal of the large rock, placement of the filter, and replacement of the large rock; and (2) distributing the filter material into the rock voids by placing the material directly on the cover and vibrating it through the cover to the frost protection layer. Based on several hand excavation examinations of random spots on the completed cover and visual inspection of a test trench opened by the licensee during the inspection, the filter layers were found to be in place and of an acceptable thickness.

The inspectors visually reviewed the techniques used in several areas where the work was still in progress. These techniques were found to be acceptable and showed that the Type C rock layers were being restored to their original configuration, after addition of the filter layer.

Finally, the inspectors examined records of gradation tests required to be performed at specific intervals. Review of the gradation test records for the filter layer and Type A rock indicated that the gradations were acceptable. The NRC staff noted that several of the gradation tests were slightly outside of the specification bands, but the staff determined that the deviations were insignificant and would not affect the overall

performance of the filter layer or the Type A rock. For example, one test showed that 37 percent of the material passed the ¾-inch screen, when the requirement was that a minimum of 40 percent should pass. Based on NRC staff experience, this type of deviation is insignificant (and may actually be beneficial) because the overall rock size is slightly larger than it needs to be. The inspectors concluded that the construction specifications were conservative, and minor deviations from them were deemed to be acceptable.

3.3 Conclusions

The required tests and inspections were performed by the licensee to ensure that erosion protection materials were properly selected and placed. The licensee's documentation indicated that placement of materials was routinely inspected to ensure that the rock size and gradation specifications were met. Likewise, the thickness of the rock layers was verified to ensure compliance with the specifications. The licensee conducted testing in accordance with specified test procedures. The inspection frequencies for materials used for erosion protection were in compliance with the frequencies specified in the reclamation plan. Finally, the erosion protection aspects of the design and construction were in accordance with the specifications in the reclamation plan and met the requirements of 10 CFR Part 40, Appendix A, Criteria 1(c), 4(d), 6(1), and 12.

4 Environmental Protection (88045)

4.1 Inspection Scope

The inspectors reviewed the licensee's implementation of its environmental protection program to ensure compliance with license requirements.

4.2 Observations and Findings

At the time of the inspection, the environmental monitoring program consisted of groundwater sampling. License Condition 35 provides the groundwater monitoring program requirements. Also, License Condition 39 states that the results of monitoring shall be submitted to the NRC on an annual basis. License Amendment 59 dated March 16, 2007, allowed the licensee to discontinue environmental air particulate, ambient gamma, and gaseous radon-222 monitoring.

At the time of the inspection, groundwater sampling consisted of collection of water samples from four point-of-compliance wells, nine other wells, and one local spring. The licensee also sampled four wells for validation of groundwater modeling. The wells were sampled either annually or semiannually, depending on the well in question. The results were submitted annually to the NRC. The most recent report of the monitoring results was submitted to the NRC by letter dated September 30, 2011.

By letter dated June 9, 2011, the licensee submitted a license amendment request to the NRC. The licensee proposed to delete one well and the local spring from the sampling program. In addition, the licensee proposed to sample all wells on an annual basis instead of sampling some wells on a semiannual basis. At the time of the inspection, the NRC had not completed its review of the licensee's request.

The inspectors reviewed the groundwater monitoring results for mid-2008 through mid-2011 and compared these results to the alternate concentration limits and lower limits of detection as specified in License Condition 35. Most importantly, the sample results for the point-of-compliance wells were less than the alternate concentrations limits during this timeframe.

Three semiannual sample results exceeded the sulfate and chloride target levels for model validation Well MW28. The June 2010 and October 2010 sample results exceeded the chloride target level, while the June 2011 sample result exceeded the sulfate target level. The licensee does not consider these sample results to be a negative trend. The licensee plans to resample the well during November 2011, and these sample results will be used to help the licensee determine if an adverse trend is present or if the model assumptions will have to be reconsidered. Regardless, the inspectors concluded that these exceedances were not safety significant because the sample results remained below the state's water quality standard for livestock.

The NRC-approved groundwater monitoring program states that, if a target level is exceeded for one of the model validation well samples, the licensee will collect a confirmation sample. The target level is not a safety target, but rather an estimated value used by the licensee to demonstrate that the site hydrogeology is behaving as predicted in the Groundwater Monitoring Plan. The inspectors noted that the licensee failed to collect a confirmation sample within 3 months of the October 2010 sampling event for monitoring Well MW28. The inspectors, in consultation with the NRC project manager, determined that this failure was not safety significant because the license does not specify that any particular corrective action be taken, except for re-sampling a well, if a target level is exceeded. The inspectors noted that the groundwater monitoring program further states that exceedance of a target level was expected to have a negligible impact on the potential risks at the groundwater point of exposure. In response to this NRC finding, the licensee stated that it would closely review the trend for Well MW28 and would take future actions as necessary, including reassessment of the model simulations and assumptions for Well MW28. The licensee also stated that it planned to issue a condition report/problem report to ensure that effective corrective actions are taken.

The inspectors reviewed the lower limits of detection for water quality analyses, as specified in License Condition 35.D. The inspectors noted that the licensee's laboratory did not always meet the license-specified detection limit for some chemical constituents. For example, the license-required detection limit for sulfate was 1.0, but the actual detection limit was 100 for point-of-compliance Well MW21A. The licensee stated that the license-specified detection limit was considered to be the optimum calibration range of the laboratory equipment for samples with lower quantities of chemical constituents. That is, low detection limits tend to be effective primarily for samples with low concentrations of chemical constituents. For samples with higher quantities of chemical constituents, the laboratory has to dilute the sample, an action which causes the detection limit to increase significantly. In response to the inspectors' finding, the licensee will reconsider this license condition and will most likely propose a revision to the license to resolve this detection limit discrepancy.

The inspectors identified an error in the September 2010 annual report regarding the licensee's comparison of the sample results to the target levels for the four model validation wells. In the report, the licensee stated that the sulfate and chloride target

levels had not been exceeded in any of the model verification (validation) wells. However, the inspectors noted that the chloride target level was exceeded for Well MW28 during June 2010. This error in the licensee's analysis was referred to the licensee for further review. As noted earlier, the licensee stated that it would reassess the sample results for this monitoring well, after receipt of the November 2011 sample results, to determine if additional actions, such as reconsideration of the model assumptions, will be necessary.

In addition, the inspectors noted that the target levels were unclear for samples collected during 2011. The licensee's original groundwater modeling analysis, submitted to the NRC on January 5, 2004, provides target levels for calendar years 2002-2010. The inspectors noted that the licensee would either have to use the 2010 target levels for 2011 and beyond or would have to recalculate new target levels based on updated modeling. The licensee has not decided which option to use, pending review of the sample results from the November 2011 sampling event and further review of the previous sampling results for Well MW28.

While the inspectors concluded that the issues identified above do not constitute a safety problem, they may indicate that oversight of the work activities at the sight may need improvement. The licensee agreed to issue a problem/condition report to document the issues and to formulate effective corrective actions.

4.3 Conclusions

The licensee implemented a groundwater monitoring program in accordance with license requirements. All sample results for point-of-compliance wells were below the respective alternate concentration limits. The sample results for one model validation well exceeded the target levels for sulfate and chloride, and the licensee continued to trend these sample results. The inspectors identified conflicts with the detection limits for selected groundwater samples, and the licensee was considering a license amendment to resolve these conflicts.

5 Transportation of Radioactive Materials, Radioactive Waste Management, and Emergency Preparedness (86740/88035/88050)

5.1 Inspection Scope

The inspectors reviewed the licensee's transportation, waste disposal, and emergency preparedness activities to ensure these activities were being conducted in compliance with license and regulatory requirements.

5.2 Observations and Findings

License Condition 10.E provides the access control requirements. Access control includes the use of site personnel during normal work hours and physical barriers during off-hours. Also, License Condition 13 provides the site posting requirements. During the site tour, the inspectors observed site postings, fences, and gates. The perimeter postings were found to be in accordance with license requirements. The RSO stated that five gates were located at various locations around the site perimeter, and all gates were posted in accordance with the license.

Procedure R-15, Inspection of Restricted Area Fence, requires periodic inspection of the fence. The licensee's representative stated that it conducted the fence inspection several weeks prior to the onsite inspection. The licensee repaired the fence as necessary. During the site tour, fences and gates appeared to be in good working order.

In regard to shipping and transportation activities, the licensee stated that it had not shipped any radioactive material since the previous inspection. Further, the licensee had not received any wastes for disposal, since it no longer had an area for disposal of this material. The licensee's emergency preparedness program consisted of instructions for industrial safety and injured workers. The licensee had archived procedures that could be used if the licensee elected to handle wastes or ship radioactive material in the future.

5.3 Conclusions

The licensee implemented access control and perimeter posting requirements as required by the license. The inspectors did not review the licensee's transportation and radwaste handling programs because the licensee had not transported or handled radioactive waste since the previous inspection. The licensee had implemented an emergency preparedness program for industrial safety.

6 Exit Meeting Summary

The inspectors presented the inspection results to the licensee's representatives at the conclusion of the onsite inspection. A final exit briefing was held with the licensee by telephone on October 11, 2011. Representatives of the licensee acknowledged the findings as presented. During the inspection, the licensee did not identify any information reviewed by the inspectors as propriety.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Geick, Remediation Leader
J. Heck, Design Engineer, URS
R. Quinn, Quality Assurance/Quality Control, URS
S. Schierman Radiation Safety Officer

INSPECTION PROCEDURES USED

88005	Management Organization and Control
83822	Radiation Protection
88010	Operator Training/Retraining
88025	Maintenance and Surveillance Testing
88045	Environmental Protection
86740	Transportation of Radioactive Material
88035	Radioactive Waste Management
88050	Emergency Preparedness
88001	On-Site Construction

ITEMS OPENED, CLOSED, AND DISCUSSED

Open

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ALARA	as low as is reasonably achievable
RSO	radiation safety officer

SUPPLEMENTAL INFORMATION

PHOTOGRAPHS OF CONSTRUCTION ACTIVITIES

Repair of launch rock structure

Mechanical vibrators in operation to “shake” bedding layer material under Type C rock

Visual inspection of bedding layer material under Type C rock

Bottom of test trench showing results of bedding layer emplacement using vibration method