FINAL CONSTRUCTION REPORT
TROUT UNLIMITED
AMERICAN FORK CANYON HOME RIVERS PROJECT

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Trout Unlimited Project Manager
November 17, 2006

Synopsis – The work performed at the Pacific Mine site, also including the Pacific Mill, Blue Rock Mine, Scotchman #2 Mine, and the borrow area, consisted of the planned work at each of these locations with minor exceptions and adjustments. The total cost of the work attributable to expenses paid by Trout Unlimited (TU) and reimbursable by the Natural Resource Conservation Service (NRCS) totaled $134,212. The funds available for that work were $135,000. Snowbird Ski and Summer Resort (Snowbird) contributed the labor involved in the earth moving activities and, under contract with TU, provided the heavy equipment to perform this work with the cost for the equipment use to be paid by TU. The contract estimated the equipment use at $48,440, with a maximum of $55,000 to be paid for the actual hours of equipment use. The total equipment use at the contract use rates totaled $55,631.28. Snowbird also provided all the fuel for the heavy equipment. Snowbird rented the heavy equipment from Wheeler Machinery at a reduction in normal rental rates of 20% which was passed on to the project. Snowbird's contribution, although not reduced to a dollar amount in this report, was very significant.

The volume of material excavated from the Blue Rock and Scotchman #2 locations exceeded the estimated quantities. Deposition of that additional material in the repository resulted in the top elevation of the repository being approximately 7 feet higher than was originally designed. The additional volume of material contained in the repository is about 2,500 cubic yards. The effort required in excavating, hauling, and placing this additional material was the reason the equipment use overran the contract estimate for the equipment use. The increase in use at the contract price for the additional use was $7,191.28. This reflects a rate of only $2.88 per cubic yard for disposing of the additional 2500 cubic yards – which is very economical.

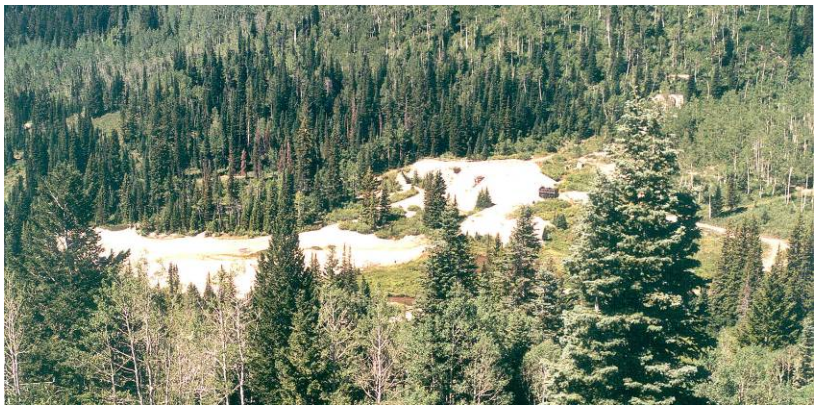
The $55,000 cost for earth moving was included for reimbursement from NRCS under the 2006 Earmark. The resulting cost of constructing the repository exhausted the available funds in the 2006 Earmark, before inclusion of the revegetation expenses. The cost of seeding and fertilizing ($2,861.05) was shifted to the 2005 Earmark.

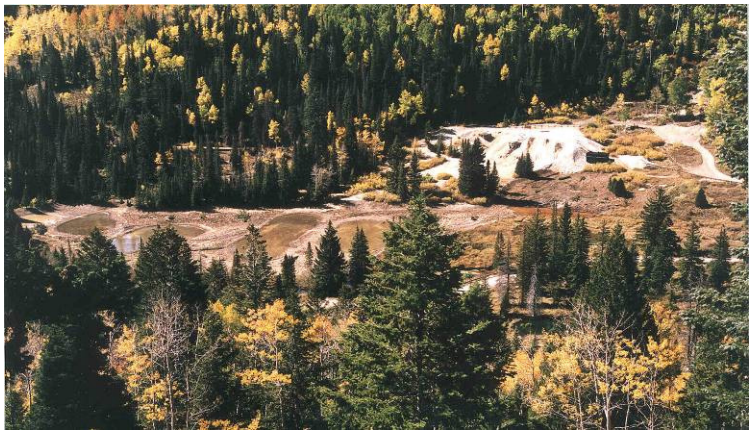
The scope of work for the project remained as originally conceived. All planned work was accomplished. The 2006 project started with mobilization of heavy equipment on August 7. The last piece of equipment left the project site on September 5. However, the kiosk for the interpretive signing was delayed by the fabricator. The timber frame for the kiosk was installed September 26. The last day of work on the project was October 17.

A final inspection of the project was conducted on September 27 by Kerry Goodrich – NRCS, Pete Stevenson – EPA, Jim Baker – Snowbird, and Ted Fitzgerald – TU. All work was substantially complete at that time and acceptable to all parties. The work performed after the final inspection consisted of installing a roof and deck at the interpretive kiosk and spreading fertilizer over all the areas disturbed by the project.

Pacific Mine and Mill Site 1916

Pacific Mine Waste Rock Pile and Mill Tailings Pond 2002





Pacific Partially Reclaimed By Forest Service Oxidation Ponds Replaced Mill Tailings Pond 2003

Pacific Repository Constructed by Trout Unlimited And Snowbird 2006

Background - Trout Unlimited (TU) embarked on the American Fork Canyon (AFC) mine restoration project in March, 2003. A Memorandum of Understanding (MOU) was signed between TU and Snowbird Ski and Summer Resort (representing Dick Bass, the land owner of the various sites involved in the Pacific Mine restoration and repository) assigning the lead for this project to Trout Unlimited. A second MOU was signed by TU and the Uinta National Forest. This set the stage for TU to explore opportunities to work with various parties including Federal, State and local authorities to perform mine restoration activities at the Pacific Mine site. The intent was to develop a "Demonstration Project" to improve environmental conditions in the North Fork of American Fork Canyon with the intent to reduce heavy metal impacts to the river and the cold water fishery designated by the State of Utah as the beneficial use of those public waters.

After numerous contacts and presentations had been made to Congressional staffers from various states, Senator Robert Bennett, R-UT expressed interest in the project offering to provide assistance with funding needed to perform the mine restoration and construct a repository to contain potentially toxic mine waste at Pacific Mine in AFC. The Engineer's estimate for construction operations was $150,000 combined with Snowbird's commitment to provide and fund the labor needed to perform the proposed work.

Two consecutive earmarks of funds allocated to the Natural Resource Conservation Service (NRCS) in 2005 and 2006 provided the needed construction funds. The 2005 earmark was for $50,000 to initiate mine restoration activities in AFC. The 2006 earmark provided an additional $100,000 to complete the restoration project. The language in the earmarks set aside 10% of both amounts to be retained by NRCS for administrative costs associated with the project, resulting in $135,000 available to TU for purchase of all materials, services, and equipment use. These funds turned out to be sufficient to complete all the prescribed work when combined with the contributions made by Snowbird, TU, and TU's Project Manager.

Because of the nature of this work, technically involving removal of materials containing potentially toxic materials - in this case varying concentrations of heavy metals, provisions of the Comprehensive Environmental Response, Compensation, and Liability Act had to be satisfied in the design and construction of the project. Trout Unlimited engaged the Environmental Protection Agency (EPA) in negotiations which would ultimately allow TU to proceed with the designated work while limiting the long term liability normally associated with this type of work. Administrative Orders On Consent (AOC) issued by EPA in 2005 and 2006, with TU's concurrence and agreement, provided the legal authorization and terms for TU to proceed with the work.

The 2005 earmark provided only a portion of the amount needed to complete the project. It was essential that TU demonstrate in 2005 that this project could indeed be implemented, which would then lead to the 2006 earmark. Trout Unlimited informed NRCS that only work that could be accomplished to initiate work at AFC without significant disturbance of the potentially toxic materials could be undertaken in 2005 and that work would not be extensive enough to expend the full $45,000 available to TU under the contract. NRCS prepared a contract (#65-8D43-5-5) with TU for the 2005 earmark with a list of "deliverables" that were to be completed with those funds.

NRCS agreed to carry over the additional funds to 2006 when a second earmark would be forthcoming providing adequate funds to complete the project. The project was split into two phases of construction. Phase 1 - project initiation work was to be completed in 2005. The actual removal actions and repository construction was to be accomplished as Phase 2 in 2006. Accordingly, work plans, construction plans and specifications were developed by TU and Phase 1 was completed in October 2005. *(Note*: *The Phase 1 Accomplishment Report dated October 31, 2006 is attached to this Final Construction Report. No further documentation of Phase 1 is provided in this report.)*

EPA regulations provide for authorization of this type of work to be issued only for the work that is fully funded. The 2005 AOC was issued October 3, 2005 just as the work was to begin on Phase 1. A second AOC was issued in August 2006 after a second earmark of NRCS funds provided the balance of the funds needed to complete the project. Similarly a second contract was developed with NRCS for the 2006 earmark, contract #69-8D45-6-1.

Construction equipment and personnel moved onto the project site on August 7, 2006 to perform the designated removal actions and construct the Pacific Repository.

Extent of the Designated Work – The work contemplated by TU remained unchanged from initial conception of the project through construction and completion of work. This project was a continuation of restoration of disturbed mining lands in the North Fork of American Fork Canyon. The Forest Service (FS) began this work with a construction project in 2003 removing mining waste from National Forest System lands adjacent to the river in AFC to reduce adverse water quality and environmental impacts contributable to the mine wastes at various sites. Those wastes and potentially toxic materials were deposited in a repository constructed at Dutchman Flat on NFS lands.

After completion of the FS project, the On-Scene Coordinator, Ted V. Fitzgerald, retired from Government service. Two months later TU hired Mr. Fitzgerald to serve as their Project Manager for the American Fork Canyon Home Rivers Project. It was TU's intent to complete the mine restoration work along the river corridor by removing the mine wastes on private land that were still impacting the AFC environment, river and fishery.

Four separate mine and mill sites were identified for removal from Snowbird's land with the wastes to be consolidated at the existing Pacific mine waste rock pile. The sites included the Pacific mine waste rock pile, the Pacific mill site, the Blue Rock mine waste rock pile, and the Scotchman #2 mine waste rock pile.

A ground water monitoring well had been installed through the Pacific mine waste rock pile in 2000 extending approximately 20 feet below the mine waste into in situ soils. During the ensuing years periodic monitoring of the well indicated ground water did not come in contact with the waste rock pile as the well never contained more than a couple of inches of water. The footprint of the Pacific waste rock pile was selected as the site for the Pacific repository.

PACIFIC MINE AT CONCLUSION OF PHASE 1

The plan for and execution of Phase 2 of the project called for the steep slopes of the Pacific mine waste rock pile to be flattened to 3:1 with the excess material being placed on top of the remaining waste rock pile. To accomplish this it was necessary to demolish two loading chutes that extended from the face of the waste rock pile. However, a third loading chute was to be retained for cultural resource purposes presenting evidence of historic mining in the North Fork of American Fork Canyon.

As that work was ongoing the contaminated material in the Pacific Mill site was to be excavated by a trackhoe, piled at the bottom of the hillside, then hauled to the repository and placed on top of the reshaped Pacific waste rock. One objective at the mill was to retain as many concrete walls and footings as possible, again for cultural resource purposes. However some components of the mill had to be removed to allow effective excavation of the contaminated soils at this site.

PACIFIC MILL SITE BEFORE EXCAVATION

SCOTCHMAN #2 MINE
WASTE ROCK PILE

The next material to be placed in the repository was the waste rock from the Scotchman #2 mine waste rock pile. This pile contained a large amount of course rock which would be problematic if it were placed as the top layer of the repository. The course material was very angular and could potentially puncture the impervious liner that was designed for the top of the repository.

The waste rock pile from the Blue Rock mine was to be the last waste material added to the repository. This material was fine grained compared to Scotchman and would make a good cap for the repository on which to install the composite liner.

Blue Rock Mine
Waste Rock Pile

After all the waste was in place it was to be final shaped with the top of the waste sloped back into the hillside with at least a minus 2% slope. A composite liner was to cover the top of the repository. The liner extended up the hillside at the back of the repository to form an interceptor ditch to drain overland flow away from the repository. The liner would also prevent any precipitation from percolating down into the waste material and saturating the repository deposits. No liner was to be placed on the face of the repository because the 3:1 slope sheds water before it can percolate through the cover soil.

The liner and face of the repository was to be covered with about 3 feet of uncontaminated soil obtained from a borrow site on private land ¼ mile up canyon from the repository. Loose riprap was to be placed over the liner about 6 feet wide the full length of the repository next to the hillside in the interceptor ditch. The ditch was to slope to drain toward the draining adit at Pacific. Any water draining from the repository top would enter the surface ditch carrying the mine drainage and flow around the repository to the FS oxidation ponds before eventually reaching the river.

All the disturbed areas were to be seeded with the Snowbird native seed mix and fertilized with Biosol. The steep slopes of the repository and reclaimed Blue Rock and Scotchman #2 sites were to have straw mulch matting to help hold the seed and soil in place until the vegetation gets established. Signing and a CorTen guardrail barrier were to be installed at the repository to prevent recreational riding of ATV's and motorcycles over the site. Interpretive signing explaining the history of mining and restoration efforts in the canyon were to be displayed in a kiosk adjacent to the Pacific repository.

Construction Operations – Four pieces of heavy equipment were used to excavate and haul the waste materials and construct the repository. They included two tracked excavators (trackhoes) – a Cat 315CL and a Cat 325D and two Cat 735 articulated dump trucks. Snowbird rented this equipment from Wheeler Machinery and provided the operators and drivers. Trout Unlimited paid for the equipment use from monies in the 2006 NRCS earmark. Snowbird paid for the labor and the fuel for the equipment. Fuel was delivered to the project at least every other day during earth moving operations via a Snowbird fuel truck. A small fuel tank was kept on site containing sufficient fuel reserve to prevent any equipment from running out of fuel before the next shipment arrived.

The work proceeded as laid out in the work plan. The operators would begin work at about 7:00 AM each morning and quit at 5:30 PM each day, Monday through Saturday. Minor variations in that schedule occurred as circumstances dictated. TU's Project Manager kept a log of the number of hours that each piece of equipment worked each day. Snowbird's foreman signed that log daily. The total number of hours of equipment use that were paid for were the number of hours recorded in this log. Also the project manager maintained a daily diary of the events occurring on the project while Snowbird's people and equipment were on site.

Transforming the Pacific Waste Rock Pile
To Form the Base of the Pacific Repository

The first task undertaken by the heavy equipment was to reshape the exposed slopes of the waste rock pile to achieve a consistent 3:1 slope. Material was excavated from the face of the waste rock pile by the 735D trackhoe, loaded into the 735 articulated trucks and hauled to the top of the waste rock pile where it was dumped.

The timber loading chute visible at the left of the truck was to be retained as historic evidence of mining activity at this location. Two other structures were removed from the face of the waste rock pile as it was reshaped.

Here the first layer of waste rock from the face of the Pacific pile has been leveled by the trackhoe and a second lift is being dumped by the trucks as the work continued at Pacific. Some of the timbers from one of the loading chutes that had to be demolished are visible. These materials were buried in the repository, as was the vegetative material removed from the hillside as the repository raised in height.

The trackhoe would spread the material deposited on the top of the waste rock pile for permanent containment in the repository. After the trackhoe had spread the piled material, the loaded articulated dump trucks would compact each layer as they delivered additional material to the repository.

A groundwater monitoring well was installed thru the Pacific waste rock pile during the Forest Service investigation of the mine sites in AFC. The well casing was extended during the execution of TU's project to retain the capability to examine ground water below the repository in the future. In this picture the first 10 foot extension has been attached to the original well. Eventually the well was raised approximately 17 feet and capped at the top of the repository.

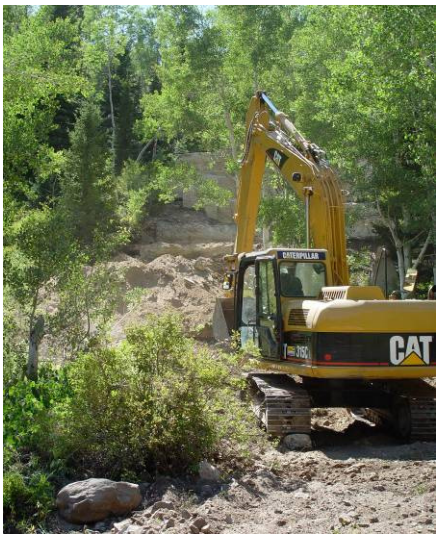
After four days of work the Pacific waste rock pile had been reshaped with all the exterior slopes reduced to 3:1 as shown in this picture. Note the relative height of the pile compared to the timber loading chute for future reverence in later pictures as the repository increases in height.

Excavating the Contaminated Soils
From the Pacific Mill Site

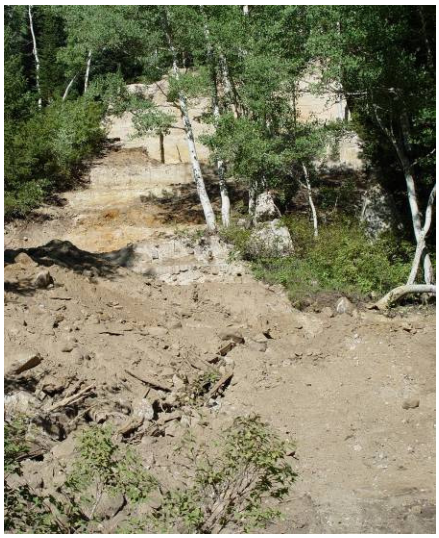
While the 325D trackhoe and the trucks worked at Pacific to reshape the waste pile, the 315CL trackhoe was busy at the Pacific Mill site.

Here the hoe is completing a pioneer road up the hillside to access the upper reaches of the mill and begin removing the contaminate soil beginning at the base of the highest concrete wall.

This picture was taken through a hole in the upper wall of the mill. The hoe had moved down the slope after stripping the contaminated soil from the higher reaches of the mill. The material would be scraped from the surface and cast down the slope. Then the hoe would move to a lower location and resume moving the contaminated soils down the slope. As this work began the XRF soil monitoring device was malfunctioning and would not display the heavy metal concentrations in the exposed soils after excavation of the contaminated soils. Work proceeded by excavating until it appeared in situ material had been exposed.



Eventually the contaminated soils were piled at the bottom of the mill site, ready for loading into trucks and disposal in the repository. But before that was done the waste rock from Scotchman #2 was moved to the repository.



Excavating Scotchman #2 Mine
Waste Rock Pile

Excavation of the Scotchman #2 waste rock pile was fairly difficult because of the limited access to the site. The Miller Hill access road crossed the top of this pile but moving the waste rock up the slope to that road for removal and hauling was not practical. It was fortunate that truck access could be developed to the bottom of the waste rock pile without much ground disturbance. But it did require a stream crossing.

A dispersed camping site adjacent to the Mineral Basin road was directly across the river from the Scotchman #2 waste rock pile on privately owned lands. This disturbed area provided access to the river for the equipment after removing one small tree.

The Forest Service had agreed to removal of a culvert in a dry river course at the Miller Hill Tunnel mine which had provided vehicle access to a camp site along the river before the river changed course. In 2003 the Forest Service had installed rock barriers to prevent vehicles from entering the dispersed camp site but recreationists had moved some of the boulders and created a new vehicle trail to the dispersed site.

TU was allowed to remove the culvert and use it to gain access to the bottom of Scotchman waste pile. The culvert had already partially collapsed before it was removed from the Miller Hill Tunnel site. After the work was complete at Scotchman, the culvert was removed from the river crossing and disposed of in the repository.

Culvert In The
Closed Miller Hill Tunnel
Access Road

The culvert was salvaged and moved to the Scotchman site. The road at Miller Hill Tunnel was obliterated, the rock barriers reset, and closure signing installed with FS concurrence.

The salvaged culvert was installed at the Scotchman site providing access for the trackhoe to the base of the waste rock pile. The 315 CL pioneered the work area at this site but then moved to the top of the pile via the Miller Hill access road to feed material to the 325D hoe which loaded it on the trucks for removal to the repository.

It should be mentioned that before any work began two construction signs were installed on the Mineral Basin Road to warn the public of the heavy equipment working in the area. One of the signs, pictured here, was installed 200 feet from the Scotchman site while the other was 200 feet above the borrow area. There were no problems or incidents involving recreationist's vehicles during execution of this project, although there was some vandalism in the camps occupied by the work crews and to a Snowbird ATV rented by a photographer that was parked at the repository overnight.

As noted previously, the volume of material that was excavated from the Scotchman #2 waste rock pile exceeded the volume estimated in the construction plans and specs. The culvert was installed at Scotchman on August 11 and all the equipment was fully engaged at Scotchman the next three work days. The 315 hoe and one truck removed the culvert and soil backfill from the stream on August 16 while the 325 hoe and the other truck moved the contaminated soils from the mill site to the repository.

In this picture the 315 hoe has completed all the excavation from the top of the Scotchman waste rock pile that it could. The dark soil visible on the steep hillside is the original topsoil underlying the waste rock pile. A shallow layer of waste rock remains below the upper hoe. The challenge became getting the hoe down from this level to the bottom!

There were a few white knuckle moments for the hoe operator and those of us that watched as the 315 slid down the slope to the pad below. But the skill and experience of the operator made this possible.

This picture shows Scotchman #2 after all the waste rock has been removed. XRF readings for lead (Pb) concentrations at this site after it was excavated ranged from 144 to 580 ppm, well below the PRG of 1900 ppm. The edge of the Miller Hill access road is visible at the top of the excavated area.

Stream after the culvert was removed at Scotchman left and the waste from Scotchman added to the repository at right.

Excavating Blue Rock Mine
Waste Rock Pile

Access to the Blue Rock waste rock pile presented challenges of its own. The pile was located at the mouth of a side canyon about 500 feet up a steep hillside. The original access road was widened during the 2005 Phase 1 construction project but only to the lowest portion of the waste rock pile. A turn around was constructed at this location so the articulated dump trucks could reverse direction and haul out the waste material.

But to work the site efficiently the equipment had to have access further up the hillside so the waste material could be loaded into the trucks without having to handle some of the material 3 or 4 times. TU's project manager directed that a road be constructed along the lower edge of the waste rock pile to access the lower edge of the pile. It took but one hour to construct the road extension while saving several days and many hours for the trackhoes to excavate and load the waste rock.

Continuing the methods used at Scotchman, the 315 hoe was put on top of the Blue Rock waste pile to feed material to the 325 hoe that worked along the lower face of the pile and loaded the trucks.

Work at the Blue Rock site started on August 17 and took 6 days of hard work to complete the excavation on August 24, the same day the subcontractor hired by TU to install the liner on the top of the repository arrived. By mid morning on the 24th the repository was final shaped and ready for the liner. Blue Rock had taken two days longer to excavate than scheduled in the work plan resulting in additional hours of use for all four pieces of equipment. The extra time was due to the material overrun at Blue Rock.

Blue Rock Waste Rock Pile
As the Last of the Contaminated
Material is Being Removed

Blue Rock Waste Rock Pile
After All the Waste Rock Was Removed
- - -
Snowbird Had Their Crew Demolish and
Bury the Abandoned Cabin Before
The Access Road Was Obliterated

Ultimately the disturbed area at the Blue Rock Mine was seeded, covered with straw erosion control blankets, and fertilized with BioSol. The access road was obliterated and left in a very rough condition to prevent future ATV use. The road was also seeded and fertilized.

Constructing the Pacific Repository

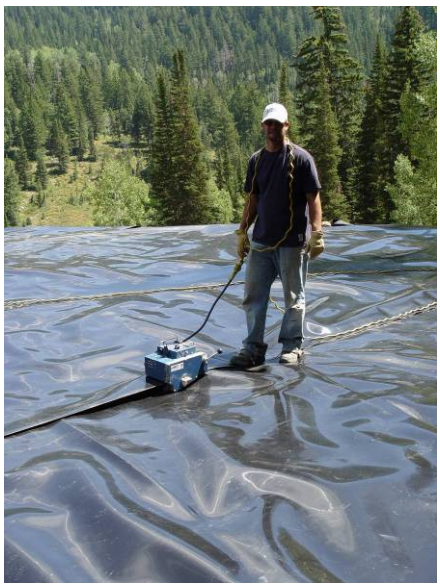
Previously in this report, a description of how the Pacific waste rock pile was reshaped to form the base of the Pacific repository was presented with exemplary photographs. As the last of the contaminated material to be disposed of in the repository was hauled from the Blue Rock site, the 325 trackhoe put the final touches on the exterior slopes and prepared the top for installation of the composite liner.

In this photo all the waste material has been hauled to the repository. The composite liner materials are stockpiled and ready for the installer. The trackhoe is shaping the top of the repository so it will drain back toward the hillside and off the pile near the liner stockpile. The darker material on the face of the repository has yet to be laid back to the 3:1 slope. The repository contains more material than originally planned as explained previously because of overruns in waste at Blue Rock and Scotchman. As a result of that extra material the repository is 7 feet higher than originally designed and the repository was expanded along the face shown in this view. The last of the waste from Blue Rock was comprised primarily of what appeared to be rich topsoil as the last of the waste rock was scraped from the surface of the excavated waste pile. Two XRF readings of the dark soil in this picture revealed that it contained Pb concentrations of 3000 and 9600 ppm.

On August 24 the workmen from H2J Environmental arrived to install the composite liner over the top of the repository. Snowbird's crew finished shaping and compacting the repository just as H2J's equipment arrived. Snowbird's trackhoe lifted the various rolls of the liner to the top of the repository and H2J rolled them out to form the impervious composite liner. As the liner went on top, Snowbird began placing cover material from the borrow area on the face of the repository. The trucks would back up the 3:1 slope as far as they could and dump the soil which the trackhoe then spread to form a 3 foot cover of uncontaminated material suitable for vegetation growth.

The composite liner went down in three layers. The first layer is a non-woven filter fabric, Propex 4512, which cushioned the second layer – a 60 Mil HDPE liner that was heat welded together at the seams to form an impervious membrane to prevent water from percolating into the waste deposits below. The top layer of the composite liner is a very porous drainage blanket, Transnet 270-2-6, alloying the water that reaches the HDPE to flow quickly to the ditch at the back edge of the repository. The Transnet came with a filter fabric attached to its top which prevents soil from plugging the porous netting below. Additional filter fabric had been purchased and delivered to the project for placement over the drainage blanket but because the blanket came with fabric attached, two rolls of filter fabric were returned to the supplier.

In this photo the cushioning filter fabric has been placed over the top of the repository and the HPDE is being rolled out to form the second layer. A "boot" was installed around the PVC pipe for the water monitoring well and welded to the HDPE liner to prevent infiltration of water around the well.



An electric welder is being used to heat the High Density Polyethylene while pressing the edge of the upper layer onto the underlying layer. These welds create a seam that is water tight with a shear strength greater than the original material.

Below H2J's crew is installing the drainage blanket over the HDPE liner. Installing the liner required only one afternoon to complete.

As soon as the composite liner was installed, cover material from the borrow area was placed on top of the liner anchoring the liner to prevent it from shifting due to thermal contraction and expansion of the HDPE material. When that occurs the liner can move several inches or even a foot or more and is very difficult to move back into place.

Covering the repository with borrow material continued along the face of the repository until the lower reaches were covered. After the one day of placing the cover embankment a rain storm made it difficult for the trucks to continue backing up the 3:1 face to dump their loads. The remainder of the cover material was hauled to the top of the repository and dumped over the side until a sufficient quantity was available for the 325 hoe to place it over the entire face of the repository.

After the cover material was uniformly spread over the top of the repository, riprap was placed in the interceptor ditch so water draining from the hillside, or through the drainage blanket under the cover soils, could flow to the low edge of the repository without erosion occurring. The underlying liner extended up the hillside and buried, as shown, so overland flow would not get under the liner and into the waste deposits.

An earth berm was formed on the perimeter at the top of the repository to prevent any water from running off the top and down the slopes.

The interceptor ditch sloped toward the plugged adit discharging mine drainage from Pacific Mine. A channel was formed down the face of the 3:1 slope, filter fabric installed over the channel, and riprap placed over the fabric. Water draining from the repository will accumulate in the interceptor ditch and be released into the mine drainage channel. It will flow in that channel around the repository, through the culvert in the bypass road, and into the FS oxidation ponds before reaching the river.

The photo on the right gives another view of the berm around the perimeter of the repository top. Before removing the road accessing the top of the repository, several bundles of erosion control blankets were lifted to the top to facilitate easier installation of the blankets on the face of the repository. After the road to the top had been blended into the 3:1 slopes it was covered with borrow material, completing the repository earthwork.

The work now shifted to installing guardrail barriers and closure signs at the repository. The guardrail posts were held in place by hand until the trackhoe could push them into the ground. Invariably there would be rocks in line with where the posts were to go. In some cases the posts could be driven into the ground, displacing the buried rocks, resulting in posts that were tilted one direction or another. In other locations the buried boulders were too large for the posts to penetrate or displace. That require that the post be pulled out and a hole excavated by the hoe so the post could be installed after which the hole was backfilled. This work began utilizing the 325 hoe on the afternoon of August 31 with the help of two additional laborers provided by Snowbird.

The guardrail barrier extended around the base of the repository at the edge of the inside shoulder of the bypass road. It continued in front of the mill site. Signs notify the public that vehicle use is prohibited behind the barrier.

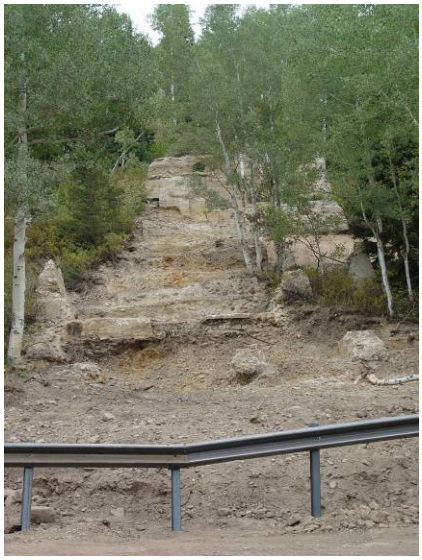
As other work was underway at the repository and after all the cover material had been excavated from the borrow area, the stockpiled topsoil at the borrow area was loaded into trucks, dumped in piles sporadically around the borrow area and spread in a 4 to 6 inch non compacted layer.

The roads leading into the borrow area were obliterated and a vehicle barrier using some excess guardrail components, boulders, and large quaken aspen logs was erected. The borrow area, obliterated roads, and top soil stockpile areas were seeded and fertilized. Some excess erosion control blankets were placed on the higher 2:1 slopes forming the back slope in the reclaimed borrow area.

The 325 trackhoe and both dump trucks were removed from the project on September 1. By September 5 all the work that could be accomplished by the trackhoe, including excavating a hole to set the timbers for the interpretive kiosk and reconstructing two waterbars in the Mineral Basin Road, was completed. The 315 hoe, the last piece of heavy equipment on the project, was demobilized the next day. Work was still ongoing on the project as laborers were finishing the seeding and installation of the erosion control blankets.

At the Scotchman #2 mine site, the upper reaches of the excavated slopes were still comprised of course rock excavated from the mine. This material could not be removed because to do so would have undercut the Miller Hill Access road. XRF readings in this area showed lead concentrations of 580 ppm or less. This upper slope was not seeded but the remainder of the site received seed and fertilizer with erosion control blankets over the excavated hillside.

The construction road that was pioneered into the hillside to reach the upper part of Pacific Mill was put back to contour. Although not shown in the picture this area was seeded, fertilized, and covered with erosion control blankets.



The mill site itself was not seeded because it is primarily concrete structures with near vertical earth slopes in between that are better left exposed for viewing by the public for historic interpretation. The disturbed areas around the mill site were all seeded and fertilized. The erosion control blankets on the reclaimed construction road are visible in this photo.

The erosion control blankets were rolled out over the face of the repository and staked down with wire staples (typical of all sites) after the site had been seeded. Eventually the entire face of the repository was covered with the blankets.

All the planned work on the project was completed by September 7, 2006 except for two items. Euclid Timber Frames, Inc. was unable to deliver the kiosk frame on schedule so that work was delayed until they were able to fabricate those structures. Also no fertilizer had been applied to the reclaimed sites because of a perceived lack of funds as the project neared completion.

Throughout the project, TU's project manager was tracking costs to ensure sufficient funds were available to cover all the work. Crunch time came when the additional equipment use hours ate up over $6,000 more than had been anticipated. At that point it appeared that there was not enough money left to buy and apply the BioSol. That was not too much of a concern because Snowbird's facility manager shared his experience that the seed mix used on this project, the same seed mix that Snowbird uses at its facility, responded well without fertilizer. BioSol had been used by Snowbird in previous years but because of the comparatively high price they had discontinued using it.

Consultation with the reclamation specialist at Granite Seed yielded an opinion that if BioSol was not used to carry over the winter months, it would be fruitless to use another commercial fertilizer because without a root system to capture it, the nitrogen in the mix would pass through the soil and not be available when the seeds germinated next spring. He recommended not using fertilizer unless it was BioSol.

Still the Project Manager regretted not applying BioSol because of the good success he had experienced using that product in revegetating two other mine repositories.

As work at Pacific was delayed awaiting the kiosk timbers, a review of the project expenditures and available funds showed an error in the spread sheets summarizing the project costs. The price of the interpretive signs had been tripled in the summary. It was realized that there were funds available to purchase and apply the BioSol. Arrangements were made with Granite Seed Company for pickup of the fertilizer during the time the kiosk was being installed.

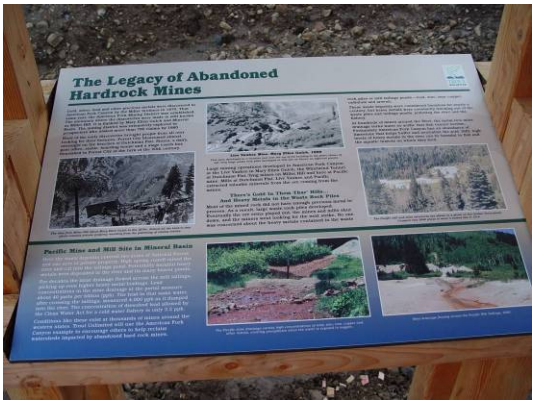
Euclid delivered the kiosk timbers on September 26 after waiting a few days for a storm front to pass. Four Euclid workers and TU's project manager muscled the timbers into place, one unit at a time.

The bottom of the timbers were painted with an asphalt emulsion as they were set in place. The units were leveled, braced, and bolted together. Then Euclid's people left.

The Project Manager spent the afternoon placing backfill in the holes. After working until dark and only getting the holes backfilled about one third of their depth it was decided to try to get some help. Earlier in the year the local TU chapters were contacted and invited to participate in the project with the idea that volunteers could assist in spreading seed, applying fertilizer and erosion control blankets, and to help with the kiosk construction. Unfortunately no volunteers came forward.

Snowbird was contacted to see if they had people available to help but the snow storms during the past two weeks had put their projects behind schedule and they were under the gun to get that work done before the heavy snows started accumulating. Skill Staff, a firm providing temporary workers, did agree to provide two laborers to work backfilling the kiosk and spreading the fertilizer. These laborers worked on backfilling the kiosk for two and a half days before finally got the holes filled.

The Project Manager worked on installing the roof on the kiosk while the backfilling was being performed. He also constructed a redwood deck at the kiosk and installed the interpretive signs without assistance.



The last day of work on the project was October 17, 2006. The kiosk was completed the day before and the last of the fertilizer was applied on this day by the Project Manager.