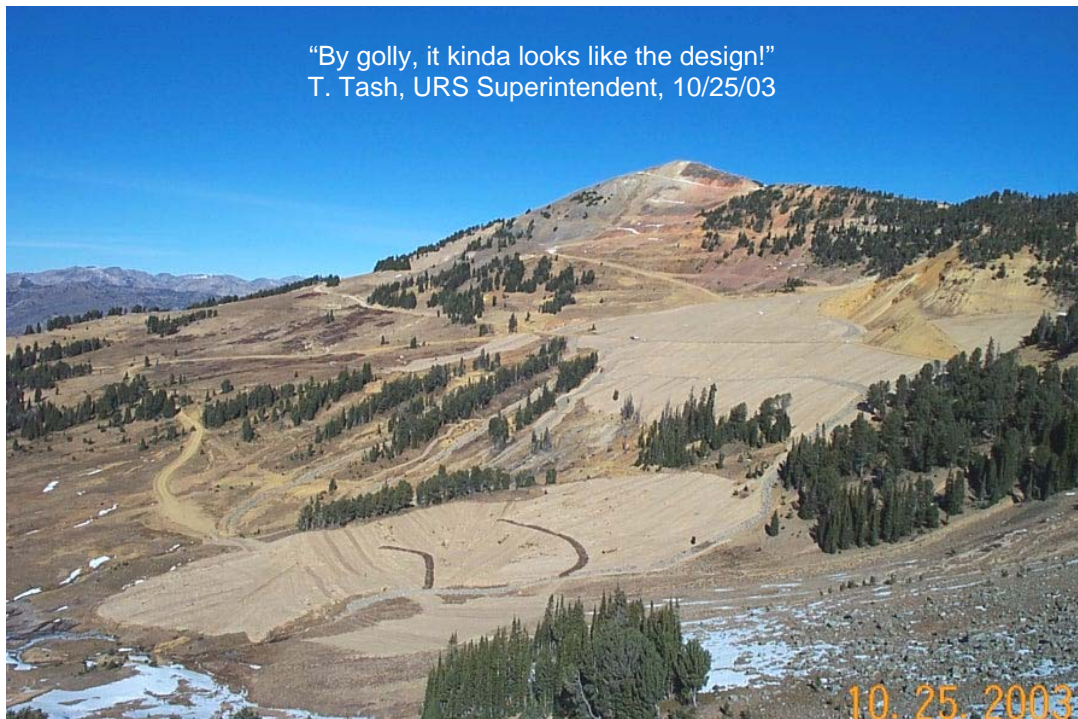


**CONSTRUCTION REPORT  
McLAREN PIT RESPONSE ACTION  
CONTRACT 50-0398-2-001  
2002-2004  
NEW WORLD MINING DISTRICT  
RESPONSE AND RESTORATION PROJECT**

**USDA Forest Service  
Gallatin National Forest  
Bozeman, Montana**



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**July 2006**



**FINAL CONSTRUCTION REPORT**

**McLAREN PIT RESPONSE ACTION**

**NEW WORLD MINE RECLAMATION PHASE II**

**CONTRACT 50-0398-2-001**

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**FINAL CONSTRUCTION REPORT**  
**McLAREN PIT RESPONSE ACTION**  
**NEW WORLD MINE RECLAMATION PHASE II**  
**CONTRACT 50-0398-2-001**

**INTRODUCTION**

This contract was the second major action for the New World Mining District Response and Restoration Project (NWMR&R). The New World Mining District is an area near Cooke City, Montana, impacted by historical mining activities. The NWMR&R Project is a non-time critical CERCLA removal action with the goal of achieving the highest and best water quality practicably attainable within the district. This second major action within the district was analyzed and proposed with the McLaren Pit Response Action Engineering Evaluation/Cost Analysis (EE/CA) issued in December 2001. The objectives the response action are to stabilize the pit and to reduce the amount of run-on water and infiltration of water through the waste rock, thus improving the down gradient water quality. The EE/CA proposed reshaping the historic five hectare (ha) McLaren Pit waste to flatten slopes, covering the pit with an impermeable geosynthetic liner, covering the liner with 1 meter of cover soil from a nearby borrow site, constructing run-on water diversions, and fortifying existing runoff drainages for the anticipated 10 fold increase in runoff water. This contract implements the selected alternative from the EE/CA and the resulting Action Memorandum.



The major work components of this contract include:

- Construction of 375 meters (m) of rock lined run-on channels diverting potential snow melt runoff flows around the site.
- Reshaping 42,000 cubic meters (m<sup>3</sup>) of existing waste rock to flatten slopes on the lower portion of the site to provide slopes stable under saturated conditions.
- Cover the reshaped waste rock with 46,200 square meters (m<sup>2</sup>) of geosynthetic liner system to prevent infiltration of snowmelt and to drain the cover soil placed on the geosynthetics.
- Import and place 50,400 m<sup>3</sup> cover soil with 1,245 m of surface and subsurface drainage diversions.
- Reinforce 1,368m of runoff channels with various grades of riprap to protect the channels from the anticipated increase runoff caused by sealing the pit surface.
- Improvement and construction of 1 km of road accessing the borrow source.
- Development of the 2 ha cover soil source.
- 9.0 ha of revegetation of the various disturbed areas.

The USDA Forest Service (USDA-FS) issued a Request for Proposals (RFP) on April 1, 2002, using negotiated contract procedures wherein the contract award is based on the best value to the government, not necessarily the low bid. Proposals were received on May 1. The Technical Evaluation Team evaluated contractor proposals in early May 2002 resulting in the identification of the most highly qualified firms. The contract was awarded to URS Group on June 6, 2002.

### **CONTRACT DATA**

CONTRACT NAME: McLaren Pit Response Action, New World Mine Reclamation Phase II

CONTRACT NUMBER: 50-0398-2-001

CONTRACT AWARD DATE: June 5, 2002

CONTRACT SUBSTANTIALLY COMPLETE: October 18, 2003

CONTRACT CLOSURE: December 28, 2004

CONTRACTORS: URS Group, Inc., Helena, MT

ORIGINAL CONTRACT AMOUNT: \$3,987,695.20

FINAL CONTRACT AMOUNT: \$4,097,966.87 (Appendix A)

ORIGINAL CONTRACT TIME: 450 days

CONTRACT TIME USED TO SUBSTANTIAL COMPLETION: 463 days

DESIGNER: Maxim Technologies

CONTRACTING OFFICER: William M. Pfeifer

CONTRACTING OFFICER'S REPRESENTATIVE: Frank C. Ehernberger

## **CONTRACT PROTEST**

A competing contractor filed a protest of the contract award with the General Accounting Office (GAO) on June 19, 2002, as provided by FAR 33.104(a)(2). The basis of the protest was the failure of the government to award the contract based on best value (the protesting contractor proposed a price 10% lower than the awarded contractor). As required by the FAR, the Contracting Officer notified URS of the protest, and that further performance was suspended until a final decision was issued by the Comptroller General (CG). URS was advised the FAR allows up to 120 days for the CG to issue a decision, and that typically the GAO uses the full 120 days before a decision is issued. Assuming the field season was lost due to the protest, URS canceled subcontracts and related mobilization plans for the rest of the year.

USDA and USDA-FS officials determined the McLaren Pit Response Action was an emergency action, and that the contract should proceed. The USDA Office of the General Counsel notified the GAO that the government was proceeding with the contracted work despite the protest as provided by the FAR. The CO verbally notified URS that the government was proceeding with the contract on July 2, 2002. The Notice to Proceed was issued on July 12, and URS mobilized equipment to the site. URS also advised the COR they would probably be seeking monetary damages for the demobilization and subsequent re-mobilization caused by the protest.

The Comptroller General issued the decision on the protest on September 19, 2002, finding in favor of the protestor. The GAO found that even though the protestor's proposal was poorly prepared and the government's Technical Evaluation of proposals clearly identified the most highly qualified contractor, the CO's Best Value Determination failed to specifically identify the difference in values of the proposals submitted by the two contractors. The CG ordered the government to redo the Best Value Determination, award the contract to the firm providing the best value to the government, and reimburse the protesting contractor attorney's fees incurred for the protest. The CO revised the Best Value Determination, which again supported award of the contract to URS. The protesting contractor was reimbursed \$25,000 for attorney's fees incurred with the protest. URS later submitted a "request for equitable adjustment" near the end of the contract which included monetary damages caused by the protest (reference Post Completion Contract Settlements section).

## **REPORT ORGANIZATION**

Overall contract performance and major problems are summarized below. Construction activities, problems encountered, and resolution for each project component are also described below. Although the various activities are discussed by section, the reader needs to understand that many activities were going on at any given time, especially in the 2003 construction season. The initial and final contract quantities and costs are displayed in Appendix A. Contract modifications and changes are summarized in Appendix B. Work Orders are summarized in Appendix C. Digital photographs of contract activities are include as a viewable CD in Appendix D. Initial and final as-built

drawings are contained in the final contract files. Digital files of the contract drawings are also held in the final contract files.

## **OVERALL PERFORMANCE AND PROBLEMS**

The URS Group approached the project in a professional and aggressive manner. Crews were generally well organized, equipment was well maintained, there was a positive safety program, and the company maintained good community relations.

The Project Manager (PM) assigned in 2002 was apparently a contract employee for URS. The manager at times had a difficult time obtaining resources from URS headquarters. For example, the Quality Control Manager assigned to the project was only marginally qualified for the type of work involved. The COR observed the Project Manager attempting to get additional assistance for the Q/C Manager from the



corporate headquarters with little success. Initial payrolls from corporate headquarters did not meet contract requirements, and although the PM was fully aware of the contract requirements, he appeared to have a difficult time explaining to the headquarters unit what precisely was required. These and other problems with the corporate headquarters may have been due to the fact the PM was a contract employee, or they may have been due to a recent reorganization of URS. It must be noted that the Project Manager was highly qualified, and fostered excellent communications with the COR and the community.

The first project field superintendent left URS in late July, 2002, and was replaced with a new superintendent on August 8, 2002. Although highly qualified, the new superintendent needed about a week to become familiar with the project and crews.

URS assigned a new management team to the project in 2003, including a new Project Manager, Q/C Manager, two superintendents, and the Safety Officer. This team also was very well qualified, working closely with the COR to get the project completed. The COR did not observe the problems with corporate headquarters that occurred the first year of the project.

As mentioned, the Q/C Manager for the project in 2002 was only marginally qualified. Although well versed in the contract specifications, he appeared to lack experience with major earthmoving and drainage projects. This caused some errors with materials tests

and grade controls which in turn required corrective action when the errors were discovered. Other than causing some delays in the work for correcting the errors and raising the frustration level of equipment operators, the Q/C problems caused no permanent impact to the final project. The project Q/C Manager assigned in 2003 was experienced and very competent, and was instrumental in successfully completing the contract.

When the Notice to Proceed was issued to URS on July 12, 2002, URS notified the CO in writing the protest had caused a delay of about two weeks, and a disruption of equipment and manpower availability. URS intended to submit a request for an Equitable Adjustment under the FARS at some future date, but also intended to revise their initial schedule to accelerate work to make up for the lost time. After mobilizing on July 15, the COR noted the crusher on site was not adequate for producing the required drain rock and channel rock from the quarry. There was a delay in arrival of all the articulated trucks needed for the work, and some of the trucks were in poor condition. These problems were apparently caused by the demobilization/remobilization on short notice due to the June, 2002, protest. URS never did mobilize an adequate crusher to the project, consequently the drain rock needed for 2003 work items was not produced in 2002. The 2003 PM overcame this shortfall in manufactured rock by purchasing and hauling aggregate from a pit near Cody, 75 miles from the project.

### **QUARRY OPERATIONS**

The McLaren Pit design called for six grades of riprap totaling about 3,100m<sup>3</sup>, 1,500 m<sup>3</sup> of filter rock, and 3,100m<sup>3</sup> of drain rock. URS elected to produce this material from the existing quarry at MP 0.2 on the Lulu Pass Road. The contract required quarry operations to be completed in the 2002 work season because the Federal Highway Administration planned to use the quarry starting in 2003. This timing restriction necessitated all rock products to be produced and hauled from the quarry in the first season, even though nearly half the product was not needed until the second season (2003).



URS started quarry operations on July 16, 2002, with stripping of the site. Drilling started July 19, and hauling of riprap to McLaren Pit started July 30. During stripping operations the contractor pushed slash and debris beyond the staked limits covering and closing about 400 ft. of the trail designated to be protected. The contractor was ordered

to move the debris back into the quarry limits and immediately rebuild the trail.

A small bull crusher started producing 3 inch minus filter rock August 6. The crusher was grossly undersized; the jaws could not handle the quartzite rock in the quarry causing the crusher to break down continuously. When the crusher attempted to produce the required 1-inch minus drain rock, the product did not meet specifications even with multiple screenings. The bull crusher was not operated from August 27 to September 26, when it was used only to produce filter rock. A screen plant was brought on site with a grizzly on August 26 and used the rest of the season to produce smaller rip rap and filter rock. Acceptable drain rock was never produced from the quarry. Prior to the season demobilization, all rock product meeting specifications was removed from the quarry and stockpiled at the repository or in McLaren Pit.

The URS management team for the 2003 season elected to import drain rock from commercial sources to complete the project.

### **ACCESS ROADS**

The access to McLaren Pit from the quarry includes 1 mile of Lulu Pass Road, 1 mile of Upper Connect Road, and 3 miles of the Daisy Pass Road. URS recognized these roads would need grading and minor improvement for efficient hauling of rock and materials to McLaren Pit. Grading of the roads and removal of heavy water bars started July 16, 2002. The contractor inspected the road drainage and culverts for adequacy and condition, cleaning ditches and culverts as needed. A trial run with 35 ton articulated trucks revealed many culverts lacked sufficient cover; three culverts on Upper Connect were partially smashed, necessitating later replacement. The contractor elected to “bridge” nearly all culverts on the haul route by placing an additional two feet of aggregate over the tops of the culverts.

#### **Daisy Pass Road**

The contractor inspection crew found a culvert at MP 2.9, Daisy Pass Road, which had rotted out completely. Replacement of the culvert was not the contractor’s responsibility because this was a preexisting condition. The COR directed URS to replace the culvert with a government furnished 24 inch corrugated metal pipe (CMP) with Modification 1 (Mod 1). Heavy riprap haul to McLaren Pit commenced July 30.



**Rotted culvert  
on Daisy Road**

## Lulu Pass and Upper Connect Roads

During hauling of riprap, two arch culverts on the Upper Connect Road, Sta. 0+990 and 1+064, and one culvert at the Lulu/Connect intersection, were partially smashed by the heavy loads. The Lulu/Connect intersection culvert was replaced on September 19. The



arch culverts on Upper Connect were replaced on October 11, 2002, during 2002 demobilization under blizzard conditions. Due to the snow conditions, the installations were marginal and the contractor was advised the culverts would be monitored in 2003, and may need to be re-installed. The culverts held up under haul in 2003, and did not need to be re-installed.

There was an existing 18 inch CMP at the intersection of the Upper Connect Road and the Lulu Pass Road which was barely long enough for the existing roadbed. The road width at the intersection needed to be widened about 20 feet to allow for off-tracking of long semi trucks hauling materials to McLaren Pit. The contractor was authorized to add 22 feet to the culvert and widen the curve about 20 feet [Work Oder (WO) C].

At MP 0.4 on Lulu Pass Road, a creek crossing consisted of a 30 inch CMP and a 42X29 inch corrugated metal pipe arch (CMPA). The lower 1/3 of the CMPA was smashed by truck traffic on September 11, 2002. The contractor was directed to replace the CMPA before the 2002 demobilization. The crew demobilizing during the blizzard on October 11 removed both the good 30 inch culvert and the damaged arch culvert, and replaced them only with a new 42X29 inch CMPA. By the time the COR and Project Manager realized what had happened, the area had received 18 inches of snow, and all equipment had been removed from the project. The contractor was directed to monitor the culvert during the 2003 runoff, and be prepared to take action if the culvert overtopped because the single culvert was under sized for the creek. The contractor was also directed to install the missing 30 inch CMP in 2003. The culvert did overtop in June, 2003, but did not cause significant damage to the road. The new CMPA was again damaged during 2003 haul, and the contractor was directed to replace both the 30 inch CMP and the damaged 42X29 inch CMPA. The contractor requested, and was authorized, to install one 53X42 inch CMPA instead of the twin culverts originally at the site (WO K). The installation was completed on October 23, 2003.

## Miller Water Source Road

As for most earth moving construction projects, a substantial amount of water was needed for dust control on haul roads and compaction of material within the McLaren Pit. The intended water source for the project was a ford across Miller Creek near MP 2.3 on

the Daisy Pass Road. In mid July, 2002, it was determined that the Soda Butte drainage water compact between the State of Montana and Yellowstone National Park prohibited a removal of surface water within the drainage. Although the project is exempt from permitting because the work was being performed under CERCLA authority, legal advisors determined the SB water compact constituted a property right; thus use of surface water was prohibited by the compact, and there were tight restrictions for removal of subsurface water even from existing wells. The water compact did allow for removal of groundwater up to 35 gallons per minute with a minimum permit from the MT Dept. of Natural Resources (DNRC).

The USDA-Forest Service obtained an expedited permit from DNRC in mid-August to take water from a well 0.3 miles down a side road from MP 3.1 Daisy Pass Road. Until the permit was issued, the contractor placed restrictions on the quarry to McLaren haul to minimize dust hazards. The well access road had several boggy areas and wet stream crossings, and was not suitable for access by water trucks. WO B authorized the contractor to install three 18 inch CMP's, stabilize the first 500 ft. of road with shot rock, and grade the road for drainage. This work was accomplished in August, 2002. The contractor installed a generator and submersible pump at the well to feed water trucks used for dust control during both seasons.

### **Borrow Access Road**

Access to the designated cover soil borrow area was designed to be down the first 0.3 miles of Lake Abundance Road, then about 0.4 miles on an abandoned drill road to the borrow source. The contract required installation of 11 culverts on this route, and stabilization of the Lake Abundance Road with a shot rock overlay for 300 ft. The contractor started work on the Lake Abundance Road on August 5, 2002, with the stabilization work. Through an apparent miscommunication with equipment operators, the stabilization section was sub-excavated about 10 ft., much greater than necessary. The muck excavated from this area was not suitable for backfill of the 300 ft. swimming pool created by this excavation, so the contractor backfilled the section with shot rock from the quarry. Culverts were installed essentially as designed on the borrow access in early August, 2002.



The initial contract design called for obliteration of the reconstructed drill road after borrow haul was completed. In 2003, the District Ranger decided the access from Lake Abundance Road to near the borrow area should remain as a permanent road to a future trailhead. The contract was modified to delete the obliteration work, add one culvert, and

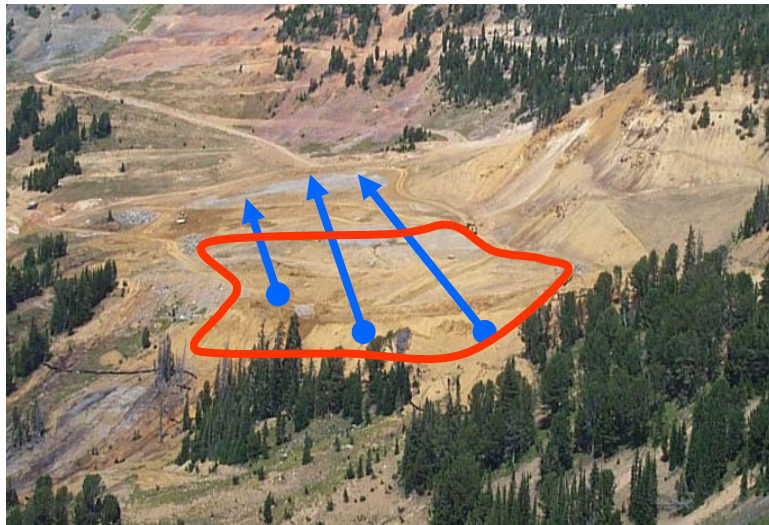
a final hard blading of this access road (Mod 10). The culverts installed on this access road are galvanized metal corrugated pipes. Due to the acidity of the runoff water passing through the CMP's, the culvert inverts were showing signs of severe corrosion after just two seasons. The COR recommends monitoring of the culverts, and replacing them with polyethylene plastic pipe in the future.

### **McLaren Pit Bypass Road**

The initial contract called for closing Daisy Pass Road, a county road, through McLaren Pit during construction activities for both seasons of work. Recognizing that this closure could cause conflicts with the traveling public and potential safety issues if the public violated the closure, the contractor requested designating an ATV bypass route on old drill roads around the upper pit and coming down the northerly run-on channel. URS posted guide signs along the route for the public to follow. This bypass worked well, and conflicts with public traffic attempting access through the McLaren Pit work zone were minimal during the project.

### **WASTE ROCK SHAPING**

The existing McLaren Pit site consisted of a pit area on the north that had been partially backfilled with waste rock, waste rock and spoils on the south side which had been pushed out of the pit onto steep ground, and adjacent waste rock piles and contaminated zones. The initial design for the McLaren Pit called for shaping of the existing waste rock, spoils, and adjacent waste piles by moving them from the steep slopes in the lower part (south) of the pit to the upper (north) part of the pit. The estimated design quantity of waste to be placed was 42,000 m<sup>3</sup>. The southerly steep area had slopes up to 1:1 ¼ (V:H); the objective was to flatten this zone to a slope of 1:2 ½. The material placed in the upper, north zone was designed for slopes of 1:3 or flatter. The waste rock shaping incorporated a series of 4m wide benches and one 5.5m bench to accommodate the cover subdrainage and surface drainage system.



At the Pre-Work Meeting on July 12, 2002, URS advised that their digital modeling of the site indicated 49,000 m<sup>3</sup> of waste rock needed to be moved and placed, a considerable increase over the design quantity. Maxim designers checked their design calculations and determined there was no significant error in the design quantities. The COR advised URS accordingly, and suggested URS may have not used the proper digital model.

On August 9, 2002, URS advised the COR their field surveys indicated existing ground elevations in the lower portion of the pit were nearly one meter lower than the design model. The government design model elevations were based on aerial photography modeling. It was conceivable the true ground elevations could indeed be off by up to one meter in this area. After consultation with Maxim design engineers, the COR advised URS to proceed with the waste rock excavation to the finish design elevations, and that the government anticipated the final waste rock quantities to be 5,000 m<sup>3</sup> to 6,000 m<sup>3</sup> less than the design quantity. The COR also advised URS this quantity under run may require adjustment of benches during final grading in the north portion of the pit where the waste was designed to be placed.

### Overall Shaping Process

The initial operations in McLaren Pit started July 27, 2002, with installation of silt fences below the pit and exploratory excavations along the perimeter and construction of benched haul roads. The contractor started haul of the waste rock on August 13 using a Cat 345 excavator and Volvo 25t and 35t articulated trucks. Approximately 30,000 m<sup>3</sup> of waste rock was placed in 2002 before winterization started on October 3. The final 5,300 m<sup>3</sup> of waste rock was placed in the 2003 construction season. The final quantity placed was 35,374 m<sup>3</sup>, 6,626 m<sup>3</sup> less than the design quantity.

The design called for removal of 1m of waste rock outside the lined area on the southeast



side of the pit. The exploratory excavation indicated the waste rock depth ranged from 1m to 10m to native soil in this area. It was determined maximum slope of the native soil in this zone was 1:2. The COR directed the contractor to remove the waste rock to native soil in this zone provided the finished slope did not exceed 1:1.5.

The contractor failed to provide timely compaction tests as the waste was being placed in the initial waste rock haul operations. The project manager finally explained the waste rock compaction tests were only at about 85% of proctor, well under the required 95%. The COR observed the material appeared to be adequately compacted, and questioned the in place density test procedures. URS requested an independent consulting firm to check their density tests, but retest would have taken more than a week. The COR directed the project to continue with placement and compaction of the waste rock, with the provision the waste was rolled until the roller walked out (displacement ceases) of the fill. The independent consultant arrived (August 22) and determined the URS Q/C

manager was not running the nuclear densometer correctly. There were no further problems with the in place density testing procedures.

The contractor initially attempted to compact the waste backfill with a towed sheepsfoot roller during the first few weeks of waste rock placement in August 2002. This provided varying degrees of compaction, requiring the contractor to make multiple passes with the roller to meet density requirements, and the procedure also required an additional D6 dozer to tow the roller. The COR recommended using a self propelled tamping foot roller, which the contractor provided in late August obtained from another contractor in the area. The tamping foot roller greatly improved the compaction operations.



As is typical of the area, unpredictable severe thunderstorms and snow storms interfered with waste excavation and haul operations in August and September 2002, causing earthwork operations to shut down for a day or two at a time. About 1.5 days per week were lost to weather in the 2002 construction season.



Nine monitoring wells were abandoned on August 20. The original contract quantity was 10 wells, but the government decided to keep DCMW2 well on the north side of the pit (Mod 3). Three of the wells abandoned were deep wells with water. Specifications required grouting these wells from the bottom. The licensed well driller overseeing the well abandonment claimed that was not necessary. After consulting the DNRC, the COR advised the contractor these wells would indeed be grouted from the bottom.

In late August, 2002, the contractor encountered wet waste rock mixed with clay in the lower center portion of the pit. Moisture contents ranged from 17% to 22%, with the optimum moisture for compaction at 11%. This wet zone was not anticipated in the design. If the waste rock from the lower portion of the pit all remained wet, as much as 14,000 m<sup>3</sup> of waste rock could have been affected, causing significant problems with achieving compaction of the waste. The COR requested URS to prepare a proposal to



amend the wet waste rock with calcium oxide (lime) to improve compaction characteristics. The COR estimated costs for amending the waste rock to run as high as \$150,000 if the wet zones were extensive in the excavation. The project manager attempted for several weeks to find a source for calcium oxide and the equipment needed to incorporate the lime into the waste rock without success.

One trial load was placed in the waste embankment zone and rolled into the waste, showing some benefit for compaction. By the second week of September, the clay content of the waste rock seemed to be reduced. Several point sources of subsurface water were diverted from the waste rock excavation area, reducing the moisture content of the waste rock being placed. By mixing the wet waste rock with dryer underlying material in the waste placement area, the contractor was able to meet compaction requirements the rest of September.

URS controlled the finish grades in McLaren Pit using GPS procedures in 2002. The Q/C manager had minimal experience using survey grade GPS equipment, and learned on the fly. The COR occasionally pointed out stake controls which were obviously in error, asking the Q/C manager to redo areas of finish staking.

The equipment operators complained they were finish an area in the waste placement zone, only to have new finish stake appear the next day causing the operators to redo areas they had thought were finished. One frustrated D8 dozer operator buried the Q/C manager's field records with the dozer. By mid-



September, the Q/C manager became somewhat proficient with the GPS equipment, and field staking proceeded without further problems.

Waste excavation, haul, and placement continued sporadically through the month of September. The contractor's priority was the completion of run-on and run-off channels, and intermittent rain and snow storms stopped waste rock excavation several days after each event. Snow storms at the end of September brought the waste excavation work to a near standstill. A foot of snow fell on the site October 5, and URS decided to start demobilization of equipment from McLaren Pit. Winterization of the site started October 5, 2002.

The design called for winterization of the site by rough grading the design benches into the subgrade, insloping the benches and placing Type 2 riprap check dams at a specified spacing on the check dams, and placing straw bales at the down gradient edge of the excavation limits. URS had the straw bales stockpiled on site, but the access roads were



too slick to haul and place the Type 2 riprap for the check dams. Due to the lack of rock on site, URS built check dams out of the earthen material on the benches. Straw bales were placed and anchored below the excavation limits. In addition, URS built a series of deep settling basins at the outfall of the benched drainage system, using straw bales to control erosion of the outfall of the settling basins. Winterization was completed on October 10. There was 18 inches of snow in McLaren Pit on October 11, 2002.



The new URS management team reviewed the project area on snowmobiles in early June 2003. The contractor started plowing Daisy Pass Road through Daisy Pass to McLaren Pit June 27, 2003. Crews started plowing snow off McLaren Pit on July 9, with access to the pit only by foot or tracked equipment due to the soft road bed. The initial activities were directed at controlling sediment leaving the site during snow melt and runoff. The site typically flashes melt water in the afternoons and early evenings, then runoff decreases dramatically at night due to the cooler temperatures. URS spent the first five days on site with crews patrolling, maintaining and adding silt fence, straw bales, and sediment traps as needed.

The major snow melt on site was essentially over by July 15, when URS resumed waste rock excavation and placement. The waste rock placed in 2002 in the north part of the pit was saturated from snow melt. URS spent about four days tilling and mixing the waste rock with dozers, a grader, and excavators drying and recompacting the previously placed waste rock. Haul of waste rock resumed in earnest on July 18, and was completed on July 27. The hot pile below McLaren Adit was excavated and placed in the pit July 29 to August 5. Grade and compaction controls were greatly improved compared to the previous season. Compaction was achieved with a vibratory smooth drum roller which was also used for final subgrade finishing for the liner placement. To achieve a smooth subgrade surface for liner placement, areas with coarse rock showing were “patched” with clean sand which was then rolled to provide a surface suitable for liner placement.

Maxim installed 9 moisture monitoring tubes at various locations in the pit on July 25, 26, and 30. URS placed concrete seals at finish subgrade elevation on these monitoring tubes, and extended 3 monitoring wells with concrete seals as required by the design. The initial



design called for abandonment of 10 monitoring wells, and recompletion of two wells. In 2002, the government determined monitoring well (MW) 5, on the northwest of the pit, should not be abandoned but instead should be recompleted (Mod 3).

Approximately 6,000 m<sup>3</sup> of waste rock was placed in 2003. The final volume of waste rock was about 6,600 m<sup>3</sup> less than the design quantity. During the final placement, it became apparent there was insufficient waste rock to build the upper bench into the waste rock subgrade as designed and still maintain the maximum 1:3 subgrade slope objective. The project manager recommended maintaining a 1:3 subgrade slope from the north edge to bench #2, then building the upper bench into the cover soil placed on the liner. The COR concurred, recognizing there would be a quantity overrun in cover soil of about 3,000 m<sup>3</sup> (WO D).

### **Subsurface Water Problems**

As mentioned, saturated waste rock was encountered in the lower south part of the pit in late August 2002. The COR and superintendent identified two point sources of water on September 24, 2002. The contractor and COR agreed the water from these sources should be collected and transported away from the site even though the 2002 construction season was drawing to a close. The rationale was that building the collection system, even though temporary, would facilitate drying of the waste rock in 2003 for final removal and placement. The COR designed two sumps consisting of drain rock wrapped in geotextile, with a 100mm flexible PVC pipe transmitting the collected water to the northwest edge of the site (Mod 5). This system was installed October 7, just a few days before site winterization. Portions of the subdrain system installed in 2002 were destroyed or damaged during waste rock excavation in early July 2003, but they appeared to have served their function by reducing the moisture content of the excavated waste rock.



During excavation and placement of waste rock, four point source seeps were identified by Inspector Werner on July 15, 2003. The upper location was at the toe of the high wall at the northeast part of the pit where a series of seeps came from the high wall bedrock for about 50 feet. Three point sources in bedrock were found in the lower part of the pit; one on the up hill side of the county road alignment, and two

more about 75 feet and 200 feet down hill from the road. These seeps were flowing an estimated 3 to 5 gallons per minute (gpm) each. All four seeps were in a line down the fall line of the pit slope, indicating some sort of ground water source possible through a

bedrock fault. These seeps were developed and monitored for several days with no decrease in flow, indicating the source was groundwater and not snowmelt.

If the seeps were not treated, subgrade finish for the liner would have been difficult at best, or possibly not achievable. The COR also had concerns about the affects of the groundwater on the long term stability of the waste rock. It was decided to install a permanent subdrain system to collect the water from the seeps and transport the water northwest to the run-off channels below the pit. The COR and URS project manager



designed a system using a french drain at the high wall at sumps at the three rock point sources, and transporting the water to runoff channels in 4 inch PVC flex pipe (Mod 6). The work on the subdrain system started July 23 and was completed on July 29, 2003.

### **Toe Berm Construction**

The McLaren pit design included a reinforced earth toe berm at the bottom of the steep waste area on the south side to support the cover soil when placed on the liner. The toe berm design consisted of a bottom layer of geocomposite, compacted borrow with high strength geo-grid placed at 1m intervals in the backfill lifts, tying the liner system into the toe berm with a sand drainage layer, and revegetation of the face of the berm including placement of erosion mat between the backfill and geo-grid wrap on the face.

URS started construction on the toe berm on July 31, 2003, after most of the waste rock had been placed and shaped. The initial work consisted of pioneering a work access road through the toe berm location below the waste rock. The contractor encountered a wet zone in native material above the second draw, at about the middle of the toe berm. The problem was corrected by importing and placing several truck loads of coarse rock, and laying in a length of scrap four inch perforated PVC pipe.

The contractor had problems establishing construction grade controls for the toe berm because the work area was in satellite “shadow” causing the GPS instruments to function only intermittently. After several attempts to establish controls with the GPS equipment, the contractor resorted to a combination of GPS and manual survey methods to set controls for the toe of the liner and finish grades of the toe berm. The project manager pointed out that placing the erosion mat under the geo-grid face during construction would be physically impossible. The COR modified the design to provide for placing the erosion mat on the face of the toe berm over the geo-grid (WO D).

The initial contract called for a geo-grid which did not satisfy the design engineer's long term criteria. The contract specifications were modified to require geo-grid with a long term strength criteria of 43 kN/m (Mod 7). The contractor proposed furnishing Enkagrid Pro 120, which met the new contract requirements. The COR noted the actual geo-grid delivered to the project was Enkagrid Pro 180 which exceeded the contract strength requirements by 60%.



The liner subcontractor placed the bottom layer of geocomposite, extending from the pit liner system, on August 14 and 15. Backfilling, compaction and installation of geo-grid started August 15, and continued intermittently until completion on October 2, 2003. The contractor installed the geo-grid the wrong direction in the initial construction stage. The COR explained the proper direction for placement of the geo-grid, and the problem was corrected. The toe berm was completed October 18 with seeding, fertilizing, compost and erosion mat stapled to the face.

## **RUNON/RUNOFF CHANNELS**

The design anticipated water runoff volumes would increase ten-fold because of the liner over the pit area. The design included riprapping five runoff channels to accommodate a 10 year storm event with little or no increase in erosion of the channels. The design did not attempt to harden the channels to accommodate a 100 year event, instead allowing nature to run its course with a major storm event. There were three types of channel section specified for the five runoff channels, depending on the gradient of the channel and the volume of water anticipated to flow in the channels. The channel types varied with the size of specified riprap (Type 4, 5, or 6) and the channel depth and width.

Included in the design were water run-on diversion channels to keep major flows off the pit cover and avoiding erosion of the cover soil. The run-on diversion channels were designed to handle a 100 year storm event. Four types of run-on diversion channels were specified to handle the anticipated flows. The channel types all used Type 4 riprap, but varied with the channel depth and width, and whether a liner was required in the channel. Run-on controls also included an upper stilling basin at the transition between the Type 2 run-on channel and the Type 3 channel, a stilling basin at the northwest toe where the Type 4 run-on channel crosses the county road, and three overflow structures in the county road. The overflow structures were designed with Type 7 (Volkswagen size) riprap with the intent of protecting the toe of the liner and road structure during a major storm event.

## Runoff Channels

The design concept for the runoff channels was to riprap only those portions of existing drainage draws that were cut into native soil. Riprapping was not needed where the existing drainage bed and/or sides were in native rock. The three middle channels were all existing deep V draws, while the north and south channels were very shallow drainages. The COR and site superintendent walked all the channels, agreeing on the level of riprap treatment

needed; whether to riprap the bed and/or sides of the channel depending on the amount of ferrocrete rock exposed. The COR initially had concerns construction of the middle three channels would cause extensive damage to the vegetation and scrub timber next to the channels due to the steep topography and incised draws. The superintendent and operators devised a plan

whereby the riprap haul trucks would drive down the channels from McLaren Pit, dump their load, and drive empty down the channel to the borrow access road. This worked well although occasionally a truck box would tip over when encountering soft ground.



The contractor started haul to runoff channel #2 (second from north) on August 30, 2002, and proceeded with channels #3, #4, and #5 progressively. All four of these channels had riprap in place on September 17. Channels #2, #3, and #4 were then shaped to conform to the design sections. Channel #5, the southerly channel, was not shaped until August 2003.



The northerly #1 channel was designed to run through the hot pile area once the pile was moved into the body of the pit. The hot pile foot print was immediately above an area of native sulfide, acidic soils. The purpose of runoff channel #1 was primarily to drain water from the McLaren Adit. Government contractors occasionally entered McLaren Adit for investigation and assessment, sometimes releasing thousands of gallons of

contaminated water. The COR got fed up with cleaning up after AK, thus decided to extend runoff channel #1 through the sulfide soils to a flat area, and install a 6,000 gallon sediment retention pond (WO J). Runoff channel #1 and the settling pond were completed on September 25, 2003, after removal of the hot pile.



Lake Kirk

### Run-on Channels and Controls

As previously mentioned, the run-on channels were designed to prevent overland flows from running across the completed McLaren Pit cap in case of a major 100 year storm event. The design included a relatively small Type 1 riprapped channel extending from above the high wall on the east to a point above the mid point of the east edge of the cover, then transitioning into a larger Type 2 channel down a 50% slope to stilling basin and splash apron next to the liner edge, then north in a lined, fairly deep Type 3 channel along the liner edge, then west along the north liner edge with a Type 4 lined channel culminating in a 40 meter long stilling basin at the northwest corner of the pit next to the county road. This stilling basin collects not only the Type 4 run-on channel flows, but also the cover soil surface and subsurface drains above the county road. Water dumping into the stilling basin is piped under the road to run-off channel #2. An overflow structure was designed into the county road at the pipe location in the event the pipe could not handle the flows into the stilling basin.

Field verification of the Type 1 channel location revealed that the design had located the channel on an 80% slope immediately above the high wall. This location was not feasible due to the steep slopes without incorporation of some sort of retaining structure. Construction on this location would have been hazardous to crews building the channel as well as any workers in the pit below the high wall. The COR and URS superintendent relocated the channel up hill, shortening the channel at the south end so as to avoid obliterating an existing access road needed in the future. The Type 1 channel essentially paralleled an old small run-on control ditch originally built by Crown Butte Mines (CBMI).



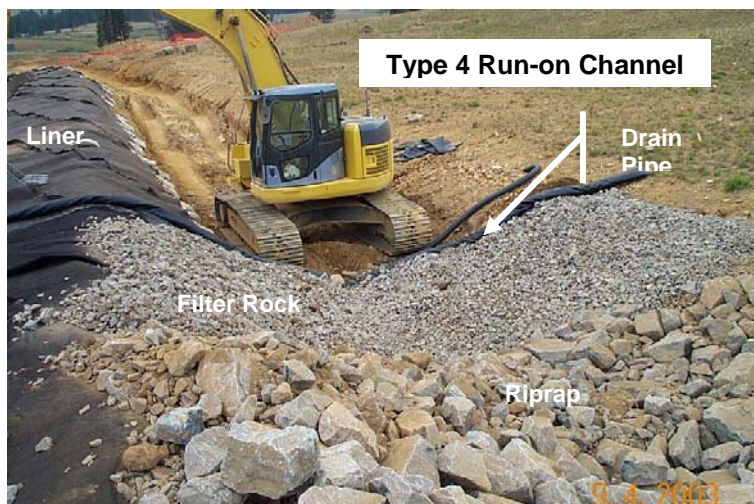
Type 2 Run-on Riprap

URS completed the subgrade for the Type 1 and 2 channels on September 10, 2002. Filter rock and riprap placement in these channels started September 17, and was completed to the upper stilling basin September 24, 2002. The riprap was hauled from the Daisy Pass Road to the upper Type 1 channel by way of the Fisher Mountain Road, then the trucks were backed down the channel on previously placed riprap to the unload site above the splash apron.

The Type 3 and 4 run-on channels were designed on old diversion channel locations built by CBMI in the early 1990's. These old channels were built with sulfide bearing riprap on top of a PVC liner. Prior to shaping the new Type 3 and 4 channel subgrade, URS removed the old PVC liner and sulfide rock, hauling the PVC liner off site and incorporating the sulfide rock into the pit for disposal. URS was unable to obtain the specified 40 mil PVC liner for the new Type 3 and 4 channels in 2002. The COR authorized them to use 30 mil PVC liner. Only about half the liner needed was delivered to the site in 2002. The subgrade for the Type 3 and 4 channels was rough graded by September 25, 2002, but winter weather prevented any additional work in the 2002 season.

In mid-July 2003, when the new URS team assumed operations, a series of seeps were encountered for about 80 meters along the uphill toe of the Type 3 channel subgrade. The channel design required a PVC liner to minimize seepage under the channel. These seeps would have been under the liner and would have had an adverse effect on the stability of the channel, and could have introduced water into the covered waste rock in the McLaren Pit. The COR directed the contractor to install a 4 inch perforated flex pipe in geotextile sock at the uphill toe of the Type 3 and 4 channels to capture the seepage water and transport it to the lower stilling basin (Mod 6).

The initial liner design called for terminating the HDPE liner and geocomposite on the outside, downhill slope of the Type 3 and 4 channels. The liner subcontractor and COR had concerns this would not provide sufficient anchorage on the northeast perimeter where the pit slopes were 1:3. The COR directed the contractor to lap the HDPE liner and geocomposite over the crest of the Type 3 and 4 channels prior to placing the PVC liner into the channels (WO F). URS provided and installed the specified 40 mil PVC liner for these channels in 2003. Work on the Type 3 and Type 4 channels



started July 18, 2003, and continued intermittently until complete on September 9, 2003. The progress was extremely slow due to placement of the pit liner system, toe drain pipe,

PVC channel liner, filter rock, and riprap. All these operations had to take place in 25 to 35 foot sections.

The design for the lower, county road stilling basin called for sub excavating the basin 2 meters, and backfilling with huge Type 7 riprap. During preliminary exploratory excavation in 2002, it was determined the 40 meter long stilling basin site was founded in ferrocete bedrock. The design was modified to riprap only the down gradient face of the stilling basin with Type 7 riprap, adjacent to the county road.

### **LINER SYSTEM PLACEMENT**

The liner system design consists of 60 mil HDPE geomembrane, textured both sides, and covered with a thick geocomposite with a very high hydraulic transmissivity (capacity to transport water). Two small areas of the lined area incorporated two or three layers of geocomposite separated by a thin layer of 3/8 inch gravel. The purpose of the multiple layers was to increase the transmissivity of the system where water was expected to accumulate. One area was between the county road and high wall, and the other area was on the 1:2.5 slopes immediately below the road on the south end of the pit.

The waste rock subgrade design incorporated 5 - three meter wide benches plus the county road for construction of the cover soil drains. The liner system was designed to anchor at the top, northeast pit, then lay down to the first bench with this first run of liner curled up to form the subgrade seal for the cover soil drainage system. A second run of liner system was then to be laid under the bottom of the first run of liner and laid down to the next bench, once again forming a cover soil drain seal. This sequence of liner placement between benches was to continue to the bottom of the pit. This design left an opening in the liner system where the upper run of liner lapped the lower liner at the benches, leaving some potential for free water to seep into the waste rock underneath.

At the suggestion and recommendation of the liner subcontractor, the contract was modified to allow a continuous run of the HDPE geomembrane from top to bottom (WO D). The cover soil drain seal (flap) would then be extrusion welded to the base HDPE geomembrane to form the base for the drains. This procedure had the advantage of providing a complete seal of the system, reduced waste of the geomembrane materials because it would not have to be cut at each bench, and increasing production with an attendant reduction of time on the project.

The liner system design also provided various details for tying the liner into the native soils on the perimeter. There were a series of minor modifications in these



perimeter details as needed to fit ground conditions, all documented on work orders. The most significant modification was on the upper, northeast anchor into the run-on diversion ditch previously mentioned, which lapped the liner system into the ditch rather than terminating the liner edge at the crest of the diversion ditch.

During subgrade exploration in 2002, it was found that the waste rock was less than one meter deep at the location of the middle overflow drain. The design called for 2.5 meters of subexcavation of the native soil and waste rock at this location, placement of the liner system, then construction of the massive rock overflow on top of the liner. The liner was designed to extend less than 10 meters down grade from the overflow structure. This approach would slow construction and greatly increase the potential for damage to the liner. The COR directed the contractor to change the perimeter edge of the liner to immediately above the overflow and move the waste rock in the vicinity of the overflow to the lined pit area (WO E).

The first two truckloads of geocomposite to arrive on site in late July 2003 did not meet the contract specifications for hydraulic transmissivity as shown on the accompanying factory tests. These loads were rejected by the contractor. A representative of the manufacturer came to the site to investigate and admitted the geocomposite came from a plant other than the one designated for the project. The COR advised the contractor geocomposite within 10% of the target value for transmissivity could be accepted provided 90% of the geocomposite met or exceeded the target value. There were no further problems with the quality of the HDPE geomembrane or geocomposite.

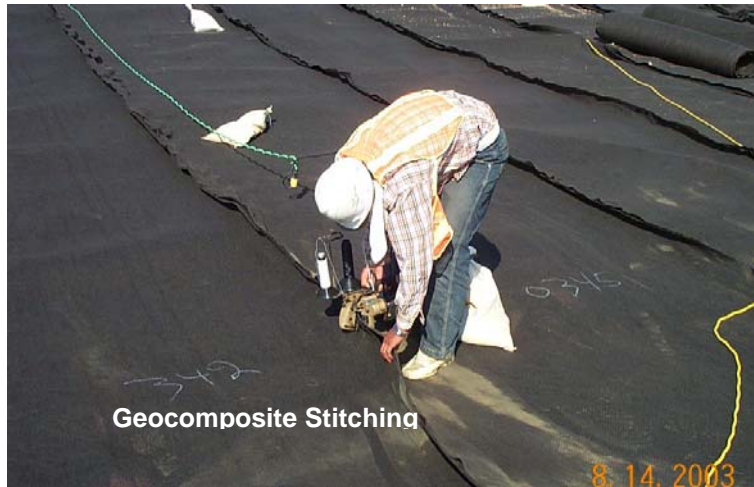
Installation of the liner system started July 29, 2003, from the middle of the pit above the county road and proceeding south to the area below the high wall. Maxim Technologies provided the detail inspection of the liner installation. The installation proceeded north to the north perimeter followed by installation of the liner below the county road. During the



liner installation, the contractor had to make wedge cuts where the subgrade slope contours flowed and rounded through the pit. The wedge cuts needed to be made in the HDPE geomembrane, geocomposite, and the liner flaps. This slowed production to some degree, especially wedge cuts needed in the liner flaps. The requirement for off-site destructive tests of geomembrane fusion weld seams took about three days per test. The liner subcontractor would not place geocomposite over the geomembrane until test results were returned causing some delay in the work.

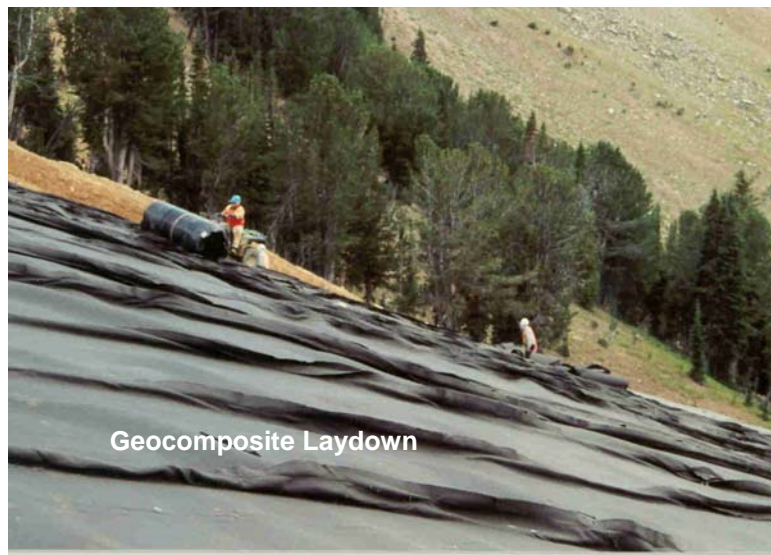
The COR noted that after the geomembrane had been placed with no covering of geocomposite and an afternoon rain shower hit the site, there was “one heck of a lot of water running off” because the rainwater could not soak into the subgrade. This occasionally caused rilling of the prepared subgrade below placed geomembrane which the contractor then had to repair.

The double and triple layers of geocomposite above the county road were placed as designed. The double layer technique was particularly time consuming because the 3/8 inch gravel had to be ferried onto the geocomposite with wheelbarrows and hand spread to prevent damage to the first layer of geocomposite. Placing a double layer of



geocomposite on the steep 1:2.5 slopes below the county road was found to be unfeasible because the pea gravel just rolled off the bottom geocomposite. The pea gravel was needed for the double layer geocomposite to improve bonding of the two layers. After consultation with geotechnical engineers, the COR deleted the requirement for double layer geocomposite below the road, but required placement of cover soil in this area which was all less than 50mm in size and had at least 15% fines (minus 200 mesh) (WO F).

The design called for extending three monitoring wells and 9 moisture monitoring tubes through the liner system with polyethylene boots. After the first few boots were installed in the afternoon, the inspectors noticed that contraction of the geomembrane over night due to the cool air actually tore the liner around the boots. From then on the liner boots were installed during the cooler morning hours when temperatures were below 40° with some slack in the liner.



During placement of the cover soil, the geocomposite layer was hooked or torn by the spread dozer several times. The contractor promptly exposed the damage by hand and repaired the damage by stitching a patch over the tears. The geomembrane was never damaged by the spread equipment.

The liner system was completed on September 19, 2003. The final quantity of HDPE geomembrane placed was 46,433m<sup>2</sup> compared to the design quantity of 46,200m<sup>2</sup>. The final quantity of geocomposite placed was 53,545m<sup>2</sup>, 2,055m<sup>2</sup> less than the design quantity.

### **COVER SOIL PLACEMENT**

The design called for placing 50,400 m<sup>3</sup> of amended cover soil over the liner system including a cover soil sub-drainage and surface drainage system. The cover soil was designed for a minimum depth of 900 mm (3 feet) consisting of 300 mm of soil screened to 50 mm (2 inch) minus soil, and topped with 600 mm of unscreened soil. Depth of cover soil ranged up to 2.5 m deep under the county road and drainage benches. The source for the cover soil was a borrow site located about 150 m west and down grade from the south end of the pit.

The cover soil sub-drainage system consisted of 6 – 300mm perforated HDPE lateral drains placed on the 5 benches and county road built into the waste rock subgrade. These drain pipes were placed on the flaps welded into the liner geomembrane, surrounded with clean drainage gravel, covered with geotextile and 1 m of cover soil. A riprap lined surface drainage ditch was then built above and slightly uphill of the sub-drain. The purpose of the sub-drains is to intercept water flowing down grade in the liner geocomposite so the geocomposite flow capacity is not exceeded. The purpose of the surface ditches is to intercept surface runoff flows to avoid high volume flow concentrations which could erode or wash away the cover soil and damage the integrity of the cover system. The sub-surface and surface drains transport water cross slope to discharge points at the head of the runoff channels.

The initial design required amending the cover soil with calcium carbonate (lime) because preconstruction acid base accounting (ABA) testing of the borrow source indicated the soils, especially the coarse particles, could be acid generating. Humidity cell tests better define the acid generation potential of rocky material, but take nearly half a year to run. Humidity cell tests were completed in September 2002, after the contract was awarded. The results indicated a relatively low potential for acid generation from the cover soil, and no need for amending the soil. The liming item was deleted from the contract with Modification 7.

### **Borrow Access**

The cover soil borrow source was located on a glacial moraine below and to the west of the south end of McLaren Pit. The moraine had a perennial stream channel on the north and an intermittent drainage channel on the south limit. The two channels converge about 50 m west of the pit limits. Access to the borrow site was designed down the Lake

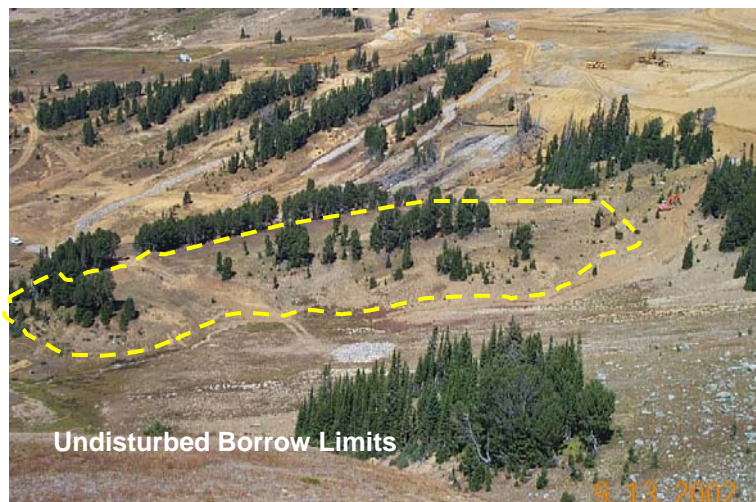
Abundance Road from the north end of McLaren Pit, then 500 m on an old drill access road below the west side of the pit, then cross country 300 m to the north borrow limit at the north side drainage, then 200 m around the west borrow limits with a designed entrance into the borrow site on the south. This last leg was not needed because the borrow site could be accessed by going straight south into the borrow area from where the road first came to the borrow limits. Final contract quantities were reduced by the 200 m of unneeded road.

The government had identified a potential prehistoric archeological site near the borrow source, but did not have the opportunity to do a cultural survey of the borrow area before awarding the contract. The contract prohibited work in the vicinity of the borrow site until August 20, 2002, to give the government an opportunity to do an archeological field survey. The Forest Service completed a survey of the area by mid-August. He determined there was a probable prehistoric site immediately to the north of the west end of the borrow, but there was no evidence of any cultural site within the borrow limits. The contractor was notified of the findings, and directed to protect the archeological site with orange construction fence.

### **Borrow Source Development and Operation**

The borrow source was designed to remove most of the glacial moraine down to the elevation of the south drainage channel. A grove of white bark pine trees on the north side of the moraine was to be protected. Slopes in the borrow area were designed for a 1:3 maximum. 150mm of topsoil were to be stripped after clearing and stockpiled to the south across the intermittent drainage. Reclamation of the site included topsoiling, construction of three cross slope ditches lined with reinforcement mat to prevent erosion of the finished slopes. The only work on the site in 2002 was trucks crossing the area to access the south #5 McLaren Pit runoff channel. The contractor also stockpiled about 1,500 m<sup>3</sup> of riprap in the topsoil stockpile area for use in 2003.

Clearing and topsoil stripping of the borrow site started July 12, 2003. The COR directed the contractor to cut and dispose of stumps from the few trees on the site, but to leave the limbs on the trees and stockpile the trees along the perimeter of the borrow site. The trees were then scattered on the finished slopes during reclamation. There was very little true topsoil evident during the initial stripping operations. Some area showed no organics, and most of the site only had a few inches of soil. The COR authorized the contractor to stockpile what little soil



that was salvageable along the north and east site limits. The contractor used some of the borrow soil to harden and improve the access roads because the native glacial till was actually a very good aggregate.



The screening plant arrived July 23, and started production of screened 50 mm minus product July 29. The URS project manager verbally notified the COR of a probable differing site condition in the borrow site August 26, and followed up with an initial written notification on September 2. The project manager cited reduced screening plant production caused by more

clay and oversize material in the till than could have been anticipated based on the contract solicitation. The COR advised the project manager to continue with borrow screening operations. The COR and the contractor began monitoring the screen plant production closely to determine if there truly was a loss in production and the possible causes of the decrease in production. The COR did note the plant was gumming up due to wet fines and clays which slowed production as crews cleaned the screens. After consultation with design engineers, the COR changed the size of the first lift of cover soil from 50 mm minus to 100 mm minus except on slopes steeper than 1:3 (WO I) so that the COR would have some hope of going home before Christmas. The change in maximum size from 50 mm to 100 mm did improve production because there was less plugging of the larger screens and less reject material.

Woolsey Shale bedrock was encountered in the borrow excavation near the center of the borrow site at the toe of the east back slope September 18. The bedrock was within one meter of the design finish elevation thus causing no problems. Several seeps were encountered near the toe of the east back slope, but they were channeled into the



center of the borrow area presenting no problem. Groundwater was encountered close to the designed floor elevation of the borrow area. The contractor stopped excavation in

these areas. The wet areas remained mushy the rest of the season but did not cause significant problems and should develop into minor wetlands in the future.

The design limits of the borrow site were reached on September 29. The COR extended the borrow site limits 6 m easterly to provide the estimated amount of borrow needed to complete the cover system (WO K). In order to maintain and increase the screening plant production, the COR changed the gradation of the cover soil on the steeper 1:2.5 slopes in the pit from 50mm minus to 100mm minus provided at least 85% of the cover soil was 50mm minus (WO K). This change was based on the recommendations of the design engineers. The screen plant was demobilized on October 7, 2003.

Reclamation of the borrow site proceeded essentially as designed. The floor of the borrow area was flatter than designed, but was shaped to provide drainage to the south. The surface diversion channels were constructed as designed and lined with the specified reinforced mat except for the lower channel in the flat zone. The revegetation contractor instead lined this flat channel with erosion mat because they ran out of reinforced mat. This erosion mat for this channel is acceptable because of the flat gradient of the channel (< 2%), the COR advised this portion of channel would not be included in final pay quantities for borrow diversion ditches. The borrow site reclamation was completed on October 24, 2004.

### **Cover Soil Placement**

Spreading and compaction of cover soil started August 5, 2003, in the southeast corner of the pit between the high wall and county road. The contractor wanted to spread the cover soil down hill between the drainage benches. Contract specifications require the soil to be spread uphill to avoid stress on the liner system, but uphill spread was impractical with the HDPE geomembrane flaps. After consultation with the design engineers, the COR authorized the contractor to place soil cross slope with the caution to watch for and avoid wave wrinkles in the geocomposite. The contractor proceeded with spreading screened cover soil in the first 300mm lift using a D5 low ground pressure (LGP) dozer to avoid damaging the liner system. The initial lift was followed by two more 300mm lifts of unscreened soil. Operations proceeded from the southeast corner toward the north end of the pit above the county road following the liner installation crew.



As the liner installation and soil placement continued to the north, the contractor built a detour road into the cover soil on bench #3 (first bench above the county road). This was needed because once the liner installation was complete above the road, liner would be placed across the county road down to the lower pit limit proceeding from the north end to the south. Placement of cover soil continued essentially as designed with few problems other than frequent high intensity thunderstorms.

Because the upper #1 bench was not built into the waste rock subgrade, the bench was built into the cover soil. This worked well, although the bench construction consumed about 4,000 m<sup>3</sup> of soil than had been in the estimated quantities. The south end of bench two and three needed to be field adjusted to tie into the fishhook at the north side of the high wall in order to maintain a satisfactory grade for drainage. As the operation moved to the south below the county road, it became apparent that access to the pit from Daisy Pass would be blocked between the southeast corner triangle and the high wall while liner and soil were placed on this section. The contractor requested authorization to build a steep (25 %+ ) temporary access road from the southeast pit corner over the triangle and



down an old mine exploration bench, terminating on the cover soil on the flat below the high wall. The COR authorized this temporary access with provisions for recontouring and reclaiming the road after the county road access was reestablished (WO H). The jump up bypass road was built September 6, and reclaimed on September 24, 2003.

As part of the cover soil operation, the contractor was responsible for extending three monitoring wells and nine moisture monitoring (MM) tubes from the liner boot to 1.5m above the cover soil surface. When the contractor started the MM tube extensions, they found the tubes that had been installed by the government were schedule 40 PVC, not schedule 80 PVC as shown on the drawings. This caused a minor delay in cover soil operations while the contractor furnished schedule 40 PVC extensions. During placement of the cover soil, three of the nine MM tubes that had been extended through the soil were apparently blocked. A template used to check tube clearance would not pass. The contractor excavated cover soil away from the tubes and found two tubes were slightly bent by the cover soil operations. The contractor could not find anything wrong with MM #9, and neither could the COR. But at contract closure, this tube still would not pass the moisture measuring device.

The county road through the pit was designed to be built out of 2 m of cover soil placed on the liner system and installation of 4 ADS culverts. The design also called for

removal of three existing galvanized metal culverts which were installed in 1999. When removed in 2002, it was found that the inverts of the metal pipe had completely corroded through in three years due to the acidic water carried by the pipe.

The contract called for 150mm of crushed aggregate surface course to be placed on the road. The screened cover soil gradations were very close to the specified crushed aggregate gradation. The COR authorized the contractor to place screened cover soil as a road surface course in lieu of the specified crushed aggregate with an appropriate price reduction (Mod 9). The



county road design called for a clay sealer in the ditch line along the liner system interface from the triangle to the high wall to serve as a seal along the liner edge. The contractor found and conserved a clay seam in the cover soil borrow for this purpose. The clay seal was installed as designed. The county road design showed the road crossing the three riprap overflows by placing the aggregate surface course directly on the riprap. This approach would have caused the surface course to be lost by filtering through the riprap. The COR directed the contractor to place a geotextile separator between the surface course and riprap (Mod 9). The design estimated quantity for cover soil was 50,400 m<sup>3</sup>. The final quantity placed was 59,654 m<sup>3</sup>, an overrun of 9,264 m<sup>3</sup>. Most of this overrun can be attributed to building bench #1 from the cover soil, which was caused by an underrun in the waste rock quantity.

### Cover Soil Drainage System

As the cover soil was shaped to support the flaps for the cover drainage system, the contractor welded the 300mm diameter HDPE perforated drainage pipe off site either to the north or south end. Once the drainage channel was formed with the geomembrane flap and cover soil, URS would snake 75m to 200m sections of the pipe into the formed drainage channel. The uphill run of geocomposite was



laid into the channel so water collected by the geocomposite would drain into the formed drain channel and be transported by the HDPE pipe and drain rock. The channels were then backfilled with clean drain rock, covered with geotextile, and capped with one meter of cover soil. The surface diversion ditch was then formed into the cover soil and lined with filter rock and riprap. The cover soil drainage system was installed essentially as designed with minor adjustments for small deviations in the benches. Several of the outfall points into the runoff channels and stilling basin needed to be field fitted and detailed, but there were no significant problems.



Final quantities for the drainage system were within 3% of the original estimated quantity.

### **SITE REVEGETATION**

The contract required revegetation of all disturbed areas by mixing fertilizer, phosphorous and compost into the top 150mm of cover soil, seeding, and covering the treated area with high quality erosion mat held in place with organic staples. The specifications also called for lining the borrow site diversion channels with turf reinforcement mat (TRM), a mat formed with PVC mesh and coir fabric. The specification for compost was modified because the design compost material specification was difficult to interpret and out of date (WO G). The triangle area outside the original construction limits near the southeast corner of the pit was added to the area to be treated because revegetation monitoring indicated the area needed additional treatment. The treatment for this area included topical application of fertilizer, compost, agricultural lime and seed, and protecting the treated area with erosion mat (Mod 9). The COR also added revegetation to about 0.5 ha down grade from McLaren



Adit which was originally outside the construction limits. This was an area disturbed by historic mining activities which contained acid generating native soils. Although the area had not been disturbed in decades, there was no evidence of natural regeneration. The area was treated with the contract revegetation specifications. In hindsight, the area should have also received a heavy application of lime to neutralize the soil's acidity.

Revegetation started September 21, 2003, and was completed October 25, 2003. The seeding subcontractor was using fairly light equipment for tilling the fertilizer and compost into the cover soil. The equipment was not capable of tilling more than 50mm to 100mm deep. The seeding subcontractor complained that tilling the full depth in the compacted cover soil would roll large rocks to the surface. The COR told the contractor this is the Rocky Mountains, and rocks could therefore be expected. After two areas of fertilizer/compost application and tilling were rejected by the COR, the contractor assisted the subcontractor with heavier equipment for tilling the cover soil surface. The seeding subcontractor replaced the on site foreman, apparently because of the problems with complying with specifications.



After the initial start up confrontations, the revegetation work proceeded smoothly to the completion of the work. The contractor elected to use wood stakes for erosion mat staples which did not have sawn hooks in the top. Without hooks, the seed laborers needed to wrap the erosion mat thread around the wood stakes to anchor the mat. This approach appeared to be time consuming and not particularly efficient. The design estimated quantity for revegetation was 9.0 ha. The final measured quantity was 8.49 ha, an under-run of 0.51 ha.

### **MISCELLANEOUS ADDED WORK**

The contractor and the government anticipated early in the contract that unforeseen conditions and other needs for use of the contractor's equipment could be encountered. The COR and contractor negotiated hourly rates for the equipment on site so the equipment could be used at the direction of the government (Mod. 4 and 8). This section describes the various tasks for which added and directed hourly work was used.

**Gold Dust Bridge 7/30-8/1/02:** In the spring of 2002, the ford across Fisher Creek on the Gold Dust Road washed out, making the crossing impassable to vehicles. This road was needed for access to the Gold Dust Mine for mine assessment and future access for removal and reclamation of the mine waste rock dump. The Forest Service had a 50 foot “portable” bridge rated for off highway loads from a previous project stockpiled about 1.5 miles from the Gold Dust Road. The COR negotiated a modification with URS to transport and install the bridge across Fisher Creek in a location suitable for use by off highway haul trucks in the future (Mod 2, \$13,500).



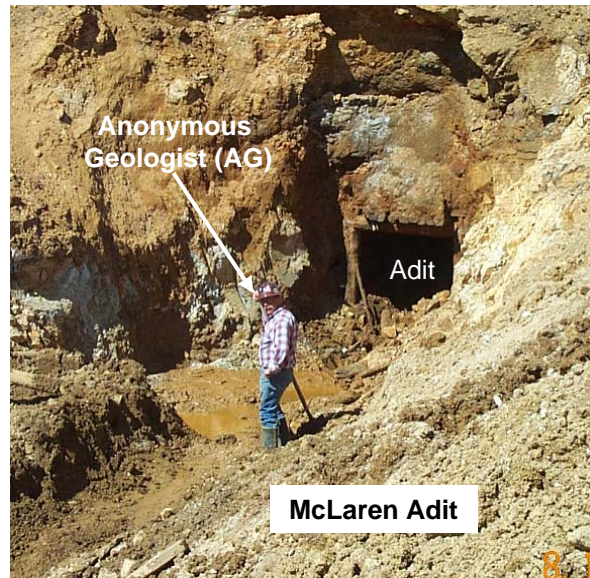
**Gold Dust Mine Oil Removal 8/2/02:** In 2001, the Forest Service found full barrel of drill oil in a collapsed building at the Gold Dust Mine site. There was a concern the barrel could be punctured, spilling the oil and causing a hazmat cleanup action. The URS quarry driller agreed to accept the oil for disposal by use. The URS Volvo Integrated Tool Carrier (IT) transported the barrel to the quarry in one hour. (Reference Maxim Memo “Oil Stored at the Gold Dust Adit,” April 17, 2002).

**Transport FS Driller Supplies 8/12/02:** 3.5 hours Volvo IT were used to transport drill supplies (sand & bentonite) from Daisy Pass to the lower McLaren Pit area for a FS contracted monitoring well driller.

**Como Test Pits 8/13/02:** 3.5 hours Hitachi 200 excavator were used to excavate exploratory test pits in Como Basin for Maxim engineers.

**Transport Drill Sand 8/14/02:** 1 hour Volvo IT used to transport drill sand to well sites near McLaren Pit.

**Open McLaren Adit 8/15 – 8/16/02:** On July 26, 2002, a very large boulder rolled into and blocked the portal, which had been opened in 2001. 7 hours of Cat 345 excavator and 3 hours of 35T Volvo truck were used to remove the boulder under direction of a Maxim geologist who shall remain anonymous. When the boulder was pulled loose, several thousand gallons of water and spooge were released, filling the upper settling basin, washing out the lower settling basin, and flooding an area several hundred feet downhill of the hot pile. Although removal of the boulder did not take long, most of the equipment time was spent cleaning out and rebuilding the settling basins.



**McLaren Settling Ponds 9/9/02:** 6 hours Hitachi 200 excavator to build two temporary settling ponds down grade of the hot pile to handle expected sediment release from McLaren Adit scheduled to be stabilized September 12, 2002. Considering who would be doing the stabilization (AG), the COR felt it would be prudent to have the largest ponds feasible.



**McLaren Adit Portal Stabilization 9/10/02 and 9/12/02:**

1 hour Hitachi 200 excavator and 3 hours Cat 345 excavator to assist other FS contractors with stabilization of the portal by inserted an arch corrugated metal pipe into the portal, installation of a small drain pipe, and preparing a work pad outside the portal. Reference Maxim report “McLaren Adit Assessment” January 10, 2003.



**McLaren Settling Pond Removal 10/4/02:** 2 hours Hitachi 200 excavator to obliterate the temporary settling ponds built on September 9.

**Upper Drill Pad 7/28/03:** 2 hours Cat D8 dozer, 2 hours Volvo 240 excavator and 1 hour Volvo 460 excavator to level and widen a drill pad on the exploration road above McLaren Pit for installation of a monitoring well by other FS contractors.

**High Wall Seep Drain Repairs 7/29/03:** 6 hours Cat 446 backhoe for repair and adjustment of the drainage system installed under Mod. 6.

**Lower Drill Pad 8/5/03:** 5 hours Cat D8 dozer and 3 hours Volvo 460 excavator to build a drill pad at the north end of the toe berm for installation of a monitoring well by other FS contractors.

**Repository Borrow Site Test Pits 9/10/03:** 6.5 hours Cat 446 backhoe to excavate test pits in the future repository borrow area.

**McLaren Adit Borehole Investigation 9/11, 9/18, and 9/21/03:** 3.5 hours Komatsu 228 excavator to assist Maxim geologist (AG) in a futile attempt to find the collar of a borehole which intercepts the McLaren Adit.

**Permanent McLaren Settling Pond 9/18-9/24/03:** 4 hours Volvo A25 truck and 8 hours Komatsu 228 excavator to build a riprap lined settling pond down grade from McLaren Adit to protect Daisy Creek from sudden sediment laden releases from the adit when AG enters the mine (Reference photo under runoff section).

## **POST-COMPLETION CONTRACT SETTLEMENTS**

All field construction work on the project was complete on October 25, 2003. The project manager had indicated in late August 2003 that URS would be submitting a request for an equitable adjustment for the differing site condition in the cover soil borrow area. URS submitted a detailed request for an equitable adjustment on October 22, 2003, in the amount of \$229,056 for the borrow differing site conditions. On November 4, 2003, the Contracting Officer requested a certification of the claim as provided by the FAR. URS responded on March 12, 2004, with the certification and a revision of their original request for an equitable adjustment to \$309,715 (URS reference title Change Order 1 [CO 1]). In their response, URS made it clear that they did not consider their request to be a contract claim, but rather a request for an equitable adjustment under the FAR, thus referring to their requests as “change orders.” The Contracting Officer felt URS had submitted a contract claim regardless of what they wanted to call it. The COR felt that URS was only attempting to maintain their reputation and avoid the ominous term “claim.”

URS also submitted a separate request for an equitable adjustment in the amount of \$128,984 for monetary damages caused by the contract protest in 2002 (CO 2). On March 15, 2004, URS submitted a request for an equitable adjustment under the Variation In Quantities clause of the FAR (CO 3). After a detailed analysis of the three requests, the COR requested additional information on April 30, 2004. Therein ensued an exchange of correspondence, telephone calls, and conference calls between the government and URS. The URS requests for compensation kept increasing, and they submitted a voluminous amount of data and analyses to support their request. The COR submitted his final analysis and recommendations to the Contracting Officer on September 22, 2004. A summary of the COR recommendations follows:

**Borrow Differing Site Condition (CO 1):** URS contended the borrow site information for the borrow site did not represent the conditions they actually encountered when generating the cover soil. Specifically, they contended there was a larger amount of over size rock than indicated in the test pit logs and test results in the contract solicitation. URS also contended there was higher clay content than should have been expected based on the test results in the contract solicitation. URS stated these differences resulted in a lower production by the screening plant than anticipated when the project was bid, and subsequently this lower screen plant production resulted in delays and reduced production for the rest of the project. Their final request for compensation for this item was \$191,272 based on an e-mail from URS (9/25/04) to the Contracting Officer.

The COR found there was indeed a Type 1 Differing Site Condition based on a review of the materials data represented in the contract solicitation versus actual field observations. The COR expected the field conditions actually encountered based on past experience on contracts in the New World District, but recognized the contract solicitation did not truly represent actual conditions. The COR did

not agree with the URS analysis of the monetary impacts of the differing site condition. The COR recommended an equitable adjustment of \$146,160.

**Contract Protest Impacts (CO 2):** URS contended the contract protest in June 2002 and subsequent notification by the government caused them to cancel mobilization plans including material and equipment rental contracts. When the government notified URS in early July 2002 that the contract would proceed, URS suffered monetary damage because they had to quickly acquire materials and equipment at higher costs than they had used when bidding and prices in place when the contract was awarded to them. URS also contended the delay in the Notice to Proceed delayed completion of the project into the poor fall weather of the second season of operation which in turn increased their costs due to reduced efficiencies in the fall inclement weather.

The COR found that the proposed impacts and costs of the contractor's demobilization and remobilization caused by the protest were fair and reasonable. The COR did not agree with the second season delays and monetary impacts because URS had submitted a project schedule at the pre-work meeting which showed the project would be completed by October 1, 2003, and there was unusually good weather in October 2003. The COR recommended an equitable adjustment of \$90,295 provided the Contracting Officer could find the legal rationale for compensating a contractor for monetary damages incurred prior to issuance of the Notice to Proceed.

**Variation in Quantities Impacts (CO 3):** FAR 52.211-18 Variation in Estimated Quantities provides for an equitable adjustment in unit price when requested by either party when final quantities are 115% or more of the contract estimated quantity, or 85% or less than the contract estimated quantity. Generally, as the quantity is reduced one would expect the unit price to increase; when the quantity is increased one would expect the unit price to decrease.

URS requested an equitable adjustment for pay items for which final quantities were less than 85% of the original contract quantity. URS contended they had unrecovered indirect expenses related to the reduction or deletion of a number of items including:

- Item 2.4 Culverts
- Item 2.5 New Access Road
- Item 2.6 Borrow Topsoil
- Item 2.9 Calcium Carbonate
- Item 3.3 Excavate & Place Waster Rock
- Item 4.11 High Wall Road Channel Construction

URS also requested an increase in price for those items which overran by 15% or more, citing their actual construction costs which exceeded the contract awarded price in all instances. URS correctly requested an adjustment in price for those quantities which exceeded 115% of the original contract quantity. These items

included Item 2.7 Borrow Excavation, Item 5.3 Diversion Channel Type 3 and Item 5.7 Diversion Channel Type 7. URS did not request a price increase for the portion of the quantities which were within 15% of the contract estimated quantity. URS provided voluminous data and analyses to support their request.

The COR did not completely agree with the URS analyses in regards to costs, but did agree with the merit of their request and their basic approach to the analysis. In the event a pay item overruns by 15% or more, the contractor should be compensated for the true, supportable cost of providing that item which exceeds 115% of the original contract quantity. After several discussions with URS for clarifications, the COR recommended an equitable adjustment of \$91,331 for Variation in Quantities impacts.

The total adjustment recommended by the COR for all issues was \$327,816.

URS did not agree with the costs proposed by the COR, even though the monetary difference between the two parties was less than \$40,000. The Contracting Officer negotiated a settlement with URS on October 5, 2004:

Borrow Differing Site Condition, CO 1 =	\$168,736
Protest Impacts, CO 2 =	\$90,295
Variation in Quantities, CO 3 =	<u>\$83,366</u>
Total Equitable Adjustment =	\$342,397

As-built drawings submitted by URS in December 2003 did not comply with the contract requirements, lacking some detail and elevation data. The COR withheld \$12,720 from the December 2003 payment for insufficient as-built drawings. After the final cost settlement on October 5, 2004, URS submitted revised as-built drawings with digital files on December 17, 2004. These drawings are acceptable, but they are somewhat difficult to interpret, especially with regard to the cover drain location and elevations. The contract was finally closed with the final payment on December 28, 2004.

## **RECOMMENDATIONS**

**1. McLaren Pit Subdrain System:** The subdrain system added to the contract with Mod 6 drains into runoff channels #3 and #4. The water draining from the subdrain pipes is acidic and of poor quality. In the event the subdrain system fails, the integrity of the pit and cover system could be affected because the waste rock could become saturated.

**Recommendation:** Continue to monitor the flows from the drains for water quality and quantity on a regular basis. In the event flows dramatically decrease from any of the three outfall pipes, some investigation of the cause may be needed.

**2. Borrow Access Road:** This road was built as a temporary access to the borrow area, including nine galvanized metal culverts and shallow ditches only where needed. At the

request of the Gallatin National Forest, the road was not obliterated as planned, but was left in place to access a proposed trailhead immediately northwest of the borrow area. The drainages crossing the road all have acidic water which tends to corrode metal pipe. (Side note, the culvert next to the borrow area was found to have a completely corroded invert when it was removed after one year of exposure to the water).

**Recommendation:** Assuming this road will remain a permanent Forest Development road, replace the galvanized culverts on this road with polyethylene or ABS plastic pipe. Shape the ditches and backslopes as needed to provide positive, stable drainage.

**3. Upper Drill Road:** There is an existing drill road coming off Fisher Mountain terminating at the north end of McLaren Pit at the edge of the deep Type 4 run-on channel. This road is presently blocked with an earthen barrier at the new monitoring well on Fisher Mountain above the pit. There is potential for ATV's or motorcycles to go around this barrier, down the road and crash into the unmarked, heavily ripped run-on channel.

**Recommendation:** Obliterate the road by re-contouring as soon as feasible to correct a public safety hazard.

**4. Surveys and As-built Drawings:** Although URS was continuously surveying the site using GPS equipment, the contractor was not providing the government with survey submittals on every layer of construction in a timely manner. When survey data and as-builts were submitted in December 2003, some survey data was missing and the as-builts did not fully comply with the contract requirements. Since this was after completion of the work and winter closure of the operations, it was too late to recover the data needed. URS was able to finally complete marginally acceptable as-built drawings in December 2004 through much effort and interpolation of data. This same problem has occurred on previous contracts. Submittal of final as-built drawings is the last work required in these contracts, and it is easy for contractors and the COR to forget to "put the frosting on the cake," essentially saying we have the data and we will put it together when we have time. But the drawings and data are important for the record of the project. If the contract had been more specific as to the precise survey data and as-built drawings needed, and if the COR had strictly enforced the requirement for timely submittals of survey data and drawings, fully acceptable as-builts could have been easily provided.

**Recommendation:** Strengthen contract language to require very specific items, locations, and elevations to be included in the contractor surveys, and specify the exact digital formats which will be acceptable to the government.

**Recommendation:** The COR needs to strictly enforce the contract requirements for timely surveys and submittal of data and drawings.

## **APPENDICES**

- A. Original and Final Schedule of Items**
- B. Summary of Contract Modifications**
- C. Summary of Contract Work Orders**
- D. Digital Photographs and Report Files on CD**



## MCLAREN PIT RESPONSE ACTION FINAL CONSTRUCTION REPORT

### Appendix A Original and Final Schedule of Items

				Awarded Schedule of Items			Final Schedule of Items		
	Description	Method of Meas.	Pay Unit	Original Quantity	Original Price	TOTAL	Final Quantity	Unit Price	TOTAL
<b>1.0</b>	<b>MOBILIZATION</b>								
1.1	Mobilization 601 (01) Mobilization	AQ	ls	1	\$636,000.00	\$636,000.00	1	\$636,000.00	\$636,000.00
1.2A	Equipment Rental 637(01)A Cat D-8 Dozer	AQ	hr			\$0.00	0	\$169.00	\$0.00
1.2B	Equipment Rental 637(01)B Volvo L70C Tool Carr	AQ	hr			\$0.00	6	\$90.00	\$540.00
1.2C	Equipment Rental 637(01)C 30 ton Off Road Dump Truck	AQ	hr			\$0.00	3	\$151.00	\$453.00
1.2D	Equipment Rental 637(01)D Hitachi 200 Excavator	AQ	hr			\$0.00	8	\$120.00	\$960.00
1.2E	Equipment Rental 637(01)E Cat 330 BL Track Excavator	AQ	hr			\$0.00	0	\$132.00	\$0.00
1.2F	Equipment Rental 637(01)F Cat 345 Track Excavator	AQ	hr			\$0.00	7	\$165.00	\$1,155.00
1.2G	Equipment Rental 637(01)G Cat 140H Grader	AQ	hr			\$0.00	0	\$117.00	\$0.00
1.3A	Equipment Rental 637(01)A Cat D-8 Dozer	AQ	hr			\$0.00	7	\$169.00	\$1,183.00
1.3B	Equipment Rental 637(01)B Cat D6M LGP Dozer	AQ	hr			\$0.00	0	\$114.00	\$0.00
1.3C	Equipment Rental 637(01)C Volvo 672B AWB Grader	AQ	hr			\$0.00	0	\$117.00	\$0.00
1.3D	Equipment Rental 637(01)D Cat 446 Backhoe	AQ	hr			\$0.00	12.5	\$82.00	\$1,025.00
1.3E	Equipment Rental 637(01)E Volvo A35 Truck	AQ	hr			\$0.00	0	\$151.00	\$0.00
1.3F	Equipment Rental 637(01)F Volvo A25 Truck	AQ	hr			\$0.00	4	\$132.00	\$528.00

## MCLAREN PIT RESPONSE ACTION FINAL CONSTRUCTION REPORT

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1.3G	Equipment Rental 637(01)G Volvo 150 Loader	AQ	hr			\$0.00	0	\$111.00	\$0.00
1.3H	Equipment Rental 637(01)A Volvo 240 Excavator	AQ	hr			\$0.00	14	\$132.00	\$1,848.00
1.3I	Equipment Rental 637(01)B Volvo 460 Excavator	AQ	hr			\$0.00	4	\$165.00	\$660.00
<b>2.0</b>	<b>SOIL BORROW SITE DEVELOPMENT</b>								
2.1	Clearing and Grubbing 201 (03) Slash treatment method for tops and limbs Method 4; Stumps Method 4; Logs Method 4;Utilization of Timber Method 4	LSQ	ls	1	\$5,200.00	\$5,200.00	1	\$5,200.00	\$5,200.00
2.2	Preserve Historic and Pre-Historic Features 642 (01) Preserve Historic and Pre-Historic Features	LSQ	ls	1	\$4,200.00	\$4,200.00	1	\$4,200.00	\$4,200.00
2.3	Upgrade and Reclaim Existing Access Road 249 (01) Composite Road Construction	DQ	km	0.61	\$74,000.00	\$45,140.00	0.61	\$74,000.00	\$45,140.00
2.4	Culverts for Lake Abundance Road 603 (01) Metal Pipe Method C	AQ	m	105	\$250.00	\$26,250.00	65.4	\$250.00	\$16,350.00
2.5	Construct New Access Road 249 (01) Composite Road Construction	DQ	km	0.4	\$227,800.00	\$91,120.00	0.23	\$227,800.00	\$52,394.00
2.5A	Road Reconditioning Adjustment	LSQ	ls			\$0.00	1	\$4,820.00	\$4,820.00
2.6	Topsoil Stripping, Stockpiling, and Replacing 203 (19) Topsoil (stockpiled)and 624 (04) Placing Topsoil	AQ	m <sup>3</sup>	2300	\$11.80	\$27,140.00	1150	\$11.80	\$13,570.00
2.7	Excavate, Screen, Load, Haul, and Place Soil 203 (11) Borrow Excavation, Placement Method 2	AQ	m <sup>3</sup>	50400	\$5.90	\$297,360.00	59654	\$5.90	\$351,958.60
2.8	Construct Drainage Channel 643 (01) Borrow Area Diversion Ditch	AQ	m	225	\$55.00	\$12,375.00	237	\$55.00	\$13,035.00

## MCLAREN PIT RESPONSE ACTION FINAL CONSTRUCTION REPORT

### Appendix A Original and Final Schedule of Items

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	Description	Method of Meas.	Pay Unit	Original Quantity	Original Price	TOTAL	Final Quantity	Unit Price	TOTAL
2.9	Calcium Carbonate Amendment 657 (01) Calcium Carbonate Amendment	AQ	mt	3300	\$60.00	\$198,000.00	0	\$60.00	\$0.00
<b>3.0</b>	<b>MINE WASTE CONSOLIDATION AND GRADING</b>								
3.1	Monitoring Well Abandonment 644 (01) Monitoring Well Abandonment	AQ	ea	10	\$700.00	\$7,000.00	9	\$700.00	\$6,300.00
3.2	Monitoring Well Re-Completion 645 (01) Monitoring Well Re-Completion	AQ	ea	2	\$7,000.00	\$14,000.00	3	\$7,000.00	\$21,000.00
3.3	Excavate, Load, Haul, and Place Waste 203 (11), Embankment, placement method 4	AQ	m <sup>3</sup>	42000	\$3.75	\$157,500.00	35374	\$3.75	\$132,652.50
3.4	Cover Monitoring System Completion 646 (01) Access Tube Completion	AQ	ea	10	\$900.00	\$9,000.00	9	\$900.00	\$8,100.00
3.5	Erosion Control Measures 204 (19) Soil Erosion and Pollution Control	LSQ	ls	1	\$12,500.00	\$12,500.00	1	\$12,500.00	\$12,500.00
3.6	Waste Subdrainage System (2002)	LSQ	ls			\$0.00	1	\$6,160.00	\$6,160.00
3.7	Waste Secondary Subdrainage System (2003)	LSQ	ls			\$0.00	1	\$23,880.00	\$23,880.00
<b>4.0</b>	<b>COVER CONSTRUCTION</b>								
4.1	High Density Polyethylene Liner, 60 mil 652 (01) B HDPE Liner	AQ	m <sup>2</sup>	46200	\$8.15	\$376,530.00	46433	\$8.15	\$378,428.95
4.2	Construct Toe Berm 203 (23) Embankment Placement Method 4	LSQ	ls	1	\$84,300.00	\$84,300.00	1	\$84,300.00	\$84,300.00
4.2A	Construct Toe Berm(Geogrid Modification) 203 (23) Embankment Placement Method 4	LSQ	ls			\$0.00	1	\$4,851.00	\$4,851.00
4.3	Geocomposite Drain Material 221 (01) A Earthwork Geotextile (type geocomposite)	AQ	m <sup>2</sup>	55600	\$15.40	\$856,240.00	53545	\$15.40	\$824,593.00
4.4	Geotextile - GT-1 221 (01) B Earthwork Geotextile	AQ	m <sup>2</sup>	0	\$0.00	\$0.00	162	\$2.71	\$439.02

## MCLAREN PIT RESPONSE ACTION FINAL CONSTRUCTION REPORT

### Appendix A Original and Final Schedule of Items

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	Description	Method of Meas.	Pay Unit	Original Quantity	Original Price	TOTAL	Final Quantity	Unit Price	TOTAL
4.5	Surface Course for New County Road 304 (10) Crushed Aggregate, Compaction B	DQ	m <sup>3</sup>	420	\$48.00	\$20,160.00			\$0.00
4.5	Surface Course for New County Road 304 (7) Screened Aggregate, Max Size 50mm, Compaction B	DQ	m <sup>3</sup>			\$0.00	420	\$23.52	\$9,878.40
4.6	Culvert for County Road 603B (01)A 450 mm plastic pipe, Method C	AQ	m	45.6	\$234.00	\$10,670.40	45.6	\$234.00	\$10,670.40
4.7	Culvert for County Road 603B (01)A 600 mm plastic pipe, Method C	AQ	m	15.2	\$309.00	\$4,696.80	15.2	\$309.00	\$4,696.80
4.8	Bench Channel Construction 653 (09) Diversion Channel	AQ	m	740	\$342.00	\$253,080.00	696.2	\$342.00	\$238,100.40
4.9	Steep Slope Bench Channel Construction 653 (10) Diversion Channel	AQ	m	25	\$473.00	\$11,825.00	25	\$473.00	\$11,825.00
4.10	West Road Channel Construction 653 (11) Diversion Channel	AQ	m	205	\$314.00	\$64,370.00	202.2	\$314.00	\$63,490.80
4.11	Highwall Road Channel Construction 653 (12) Diversion Channel	AQ	m	125	\$292.00	\$36,500.00	99.8	\$292.00	\$29,141.60
4.12	Crest of Cap Channel Construction 653 (13) Diversion Channel	AQ	m	150	\$323.00	\$48,450.00	149.1	\$323.00	\$48,159.30
<b>5.0</b>	<b>SURFACE WATER RUNON AND RUNOFF DIVERSION CHANNEL CONSTRUCTION</b>								
5.1	Diversion Channel Type 1 653 (01) Diversion Channel Type 1	AQ	m	96	\$217.00	\$20,832.00	89.4	\$217.00	\$19,399.80
5.2	Diversion Channel Type 2 653 (02) Diversion Channel Type 2	AQ	m	31	\$262.00	\$8,122.00	28.9	\$262.00	\$7,571.80
5.3	Diversion Channel Type 3 653 (03) Diversion Channel Type 3	AQ	m	113	\$333.00	\$37,629.00	139.4	\$333.00	\$46,420.20
5.4	Diversion Channel Type 4 653 (04) Diversion Channel Type 4	AQ	m	134	\$597.00	\$79,998.00	124.7	\$597.00	\$74,445.90
5.5	Diversion Channel Type 5 653 (05) Diversion Channel Type 5	AQ	m	407	\$89.00	\$36,223.00	389.2	\$89.00	\$34,638.80

## MCLAREN PIT RESPONSE ACTION FINAL CONSTRUCTION REPORT

### Appendix A Original and Final Schedule of Items

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	Description	Method of Meas.	Pay Unit	Original Quantity	Original Price	TOTAL	Final Quantity	Unit Price	TOTAL
5.6	Diversion Channel Type 6 653 (06) Diversion Channel Type 6	AQ	m	731	\$114.00	\$83,334.00	726.6	\$114.00	\$82,832.40
5.7	Diversion Channel Type 7 653 (07) Diversion Channel Type 7	AQ	m	230	\$103.00	\$23,690.00	326.4	\$103.00	\$33,619.20
5.8	County Road Overflow 653 (08) County Road Overflow	AQ	ea	3	\$10,290.00	\$30,870.00	3	\$10,290.00	\$30,870.00
5.9	County Road Stilling Basin 653 (14) County Road Stilling Basin	AQ	ea	1	\$9,690.00	\$9,690.00	1	\$9,690.00	\$9,690.00
5.10	Runon Ditch Stilling Basin 653 (15) Runon Ditch Stilling Basin	AQ	ea	1	\$6,600.00	\$6,600.00	1	\$6,600.00	\$6,600.00
<b>6.0</b>	<b>REVEGETATION OF BORROW AREA, ACCESS ROADS, FINAL COVER, AND OTHER DISTURBED AREAS</b>								
6.1	Seeding and Mulching 625 (02) Seeding Dry Method (with mulch)	AQ	ha	9	37,900.00	\$341,100.00	8.49	37,900.00	\$321,771.00
6.1A	Triangle Lime	LSQ	ls				1	610.00	\$610.00
6.2	Stockpiled Materials	LSQ	ls				1	\$914.00	\$914.00
7.1	450mmX16.2m CMP, MP 2.9 Daisy Pass Road 603(01) Corrugated Metal Pipe, Gov't Furnished	LSQ	ls				1	\$2,500.00	\$2,500.00
Mod 2	Gold Dust Bridge	LSQ	ls				1	\$13,500.00	\$13,500.00
Mod 13	Final Equitable Adjustment	LSQ	ls				1	\$342,397.00	\$342,397.00
<b>TOTAL AMOUNT</b>					<b>\$3,987,695.20</b>			<b>\$4,097,966.87</b>	



**McLAREN PIT RESPONSE ACTION FINAL CONSTRUCTION REPORT**  
**Appendix B, Summary of Contract Modifications**

Mod No.	Date	Description	Cost
1	07/24/02	Adds Item 7.1, 450mm X 16.2m CMP, MP 2.9 Daisy Pass Road: Inspection identified an old rotted CMP. Item added removal and disposal of CMP and replacement with a gov't. furnished CMP.	+\$2,500
2	07/29/02	Adds Item Mod 2, Gold Dust Bridge: The ford across Fisher Cr. on the Gold Dust Road washed out. Item adds transportation and installation of gov't. furnished portable bridge to maintain access to the Gold Dust Mine.	+\$13,500
3	08/12/02	Changes MW2 from Abandonment (Item 3.1) to Recompletion (Item 3.2)	+\$6,300
4	08/12/02	Adds equipment rental rates and estimated future use to the schedule for equipment on site.	+\$10,340
5	10/08/02	Adds Item 3.6, Waste Subdrainage System for temporary subdrains to drain 3 point sources of water in McLaren Pit.	+\$6,160
6	07/28/03	Adds Item 3.7, Waste Secondary Subdrainage System to drain a series of seeps and point sources of water were identified in the southerly portion of McLaren Pit and in the toe of the Type 3 run-on channel.	+\$23,880
7	07/31/03	Deletes Item 2.9, Calcium Carbonate Amendment Adds Item 4.2(a) Geogrid Modification to change the type of geogrid required for the toe berm.	-\$193,149
8	08/02/03	Adjusts 2002 eqpt. rental, Mod 4, time to Actual Quantity invoiced. Adds 2003 eqpt. rental rates Items 1.3xx.	+\$4,518
9	09/19/03	Deletes Item 4.5, Crushed Surface Course for County Road. Adds Item 4.5A, Screened Surface Course for County Road. Adds Item 4.4, Geotextile GT-1 for road overflows and settling pond. Adds Item 6.1A, Triangle Lime for incorporation with topical treatment of the Triangle.	-\$9,130
10	10/20/03	Actual Quantity (AQ) adjustments for Item 2.4, Culverts for Lake Abundance Road, and Item 2.5 Construct New Access Road. Adds Item 2.5A, Road Reconditioning Adjustment on the borrow access road to remove obliteration requirement and add road reconditioning, add on ABS culvert, and add a road closure gate.	-\$43,806
11	10/01/03	Administrative	0
12	12/09/03	Final Actual Quantity Adjustments	-\$53,239
13	10/01/04	URS CO #1, #2, and #3 Equitable Adjustment Settlement	+\$342,397



**McLAREN PIT RESPONSE ACTION FINAL CONSTRUCTION REPORT**  
**Appendix C, Summary of Contract Work Orders**

WO No.	Date	Description
A	07/31/02	Payroll Noncompliance Order at request of URS Project Manager.
B	08/17/03	Site authorizations for Miller Well Site, lab trailer, and fuel storage.
C	07/15/03	Site authorizations for culvert extensions on Lulu Pass Road and URS office trailer site near FS warehouse.
D	07/25/03	Modify geomembrane details to provide for continuous run of geomembrane and welding geomembrane surface drain flaps to main geomembrane liner. Modify toe berm details by replacing the jute mat under the geogrid face to stapling erosion mat over the geogrid face.
E	07/31/03	Acceptance of waste rock compaction. Directed to build bench one from cover soil rather than building it into the waste rock surface. Adjust the location of the last 50m of bench 3 due to shortage of waste rock embankment. Change the liner limits in the vicinity of the middle road overflow. Changes the geocomposite placement details in the cover drain system.
F	08/14/03	Change the liner anchorage system details where it ties into the Type 3 run-on channel. Deletes the second layer of geocomposite on the 1:2.5 slopes below the County Road.
G	08/20/03	Changes to the compost specifications, Subsection 625.02.
H	0827/03	Authorization to build a temporary bypass road outside construction limits across the Triangle on the southeast side of the pit.
I	08/28/03	Authorized to increase the maximum size of the screened cover soil from 50mm to 100mm on slopes 1:3 and flatter.
J	09/19/03	Extends the No. 1, Type 7, runoff channel 100m downgrade through the acidic soils. Directs installation of a settling pond as directed lined with riprap on this runoff channel extension with compensation based on equipment rental rates. Adds a Type 7 runoff channel extending from the north end of the toe berm to the No. 4 runoff channel. Adds excavation of an exploration pit at the Cumberland dump with compensation based on equipment rental rates.
K	09/30/03	Authorized the contractor to use a 50-50 blend of filter rock and Type 1 riprap for channel filter rock because the filter rock stockpile was almost depleted. Authorized the contractor to use 100mm minus screened material on slopes up to 1:2.5 due to excessive clays in the borrow area. Extends the east limits of the borrow source 6m due to the depletion of available borrow for cover soil. Authorized the contractor to replace the smashed twin culverts at MP 0.1 on Lulu Pass Road with one 53"X41" CMPA.



## **McLAREN PIT RESPONSE ACTION FINAL CONSTRUCTION REPORT**

### **Appendix D, Digital Photographs and Report Files**

Digital files related to the McLaren Pit Response Action are included in the CD attached to the back cover of the report.