FACT SHEET
(pursuant to Nevada Administrative Code [NAC] 445A.401)

Permittee Name: **Round Mountain Gold Corporation**

Project Name: **Smoky Valley Common Operation—Valley Rapid Infiltration Basin Complex (VRC)**

Permit Number: **NEV0091030 (Renewal 2013)**

A. Location and General Description

Location: Round Mountain Gold Corporation (RMGC)-Smoky Valley Common Operation (SVCO), Valley Rapid Infiltration Basin (RIB) Complex (VRC) is located in Big Smoky Valley in northwest Nye County, Nevada, approximately 45 miles north (by air) of the town of Tonopah and 54 miles south (by air) of the town of Austin. The RIBs and associated conveyance channels are located within Sections 14, 15, 22, 23 and 24, Township 10 North, Range 43 East, Mount Diablo Baseline and Meridian (MDB&M).

RMGC-SVCO (the Permittee) currently operates and maintains two separate RIB sites, the VRC (Water Pollution Control Permit [WPCP] NEV0091030) and the South RIB Complex (WPCP NEV2012102) for the purpose of managing dewatering water from the SVCO Mine and re-introducing the water into the local groundwater basin.

VRC Site Access: *From Tonopah*--proceed on U.S. Route-6, six miles east to the junction of S.R.-376 and then proceed north on S.R.-376 approximately 40 miles to the SVCO mine site entrance. *From Austin*--proceed 12 miles east on U.S. Route-50, to the junction of S.R.-376 and then proceed south on S.R.-376 approximately 58 miles to the SVCO mine site entrance. The VRC is located on the west side of S.R.-376, approximately 9,000 feet northwest of the mine entrance and approximately 11,000 feet west of the open pit.

General Description: WPCP NEV0091030 authorizes the Permittee to collect, convey, and infiltrate excess mine dewatering water generated at the SVCO Mine (WPCP NEV0087052) that meets background water quality and not consumed on site (or discharged into the South RIB Complex) into the VRC. The VRC permitted annual average maximum infiltration rate is 3,400 gallons per minute (gpm) and 4,896,000 gallons per day (gpd). During 2012, the average annual flow to the VRC was 1,359 gpm, the majority of which occurred during the winter months. The VRC is designed to be constructed, operated, and closed without any discharge or release of water in excess of those standards established in the permit or in regulation except for meteorological events which exceed the design storm event.

The Permittee is not proposing any changes to the Permitted RIB discharge and infiltration rates in conjunction with the 2013 Renewal. The recent commissioning of the South RIB Complex (SRC) has resulted in the operation of the VRC being relegated to a secondary or "as-needed" role by the Permittee.

A Schedule of Compliance (SOC) item in WPCP NEV0091030 requires that for each subsequent submittal for renewal of the Permit or operational or facility change that could affect the VRC most recent predictive modeling results, the Permittee must reevaluate the model and provide, based on the evaluation and as necessary, an update or modification of the model and its predictions.

For the 2013 Renewal, the predictive hydrological model for the VRC was updated, recalibrated, and rerun to reflect the operation of the newly commissioned SRC. The predictive model was run under maximum discharge and infiltration scenarios and the reduced operation of the VRC for the purpose of determining the impacts these various operating may have on the local hydrology and groundwater quality. Refer to the subsection *"Predictive Modeling 2013 Renewal"* for additional details.

B. Synopsis

Background and Design: From the late 1970's and up until 1990, all dewatering water generated during the mining of the SVCO pit, was consumed on-site by the mining and milling operations. With the expansion and deepening of the SVCO pit, it soon became apparent that the amount of dewatering water generated would begin to exceed both mine and mill consumptive requirements.

In early 1991, Knight-Piésold Consulting, Inc. (KP) performed a series of column tests and attenuation studies on behalf of the Permittee to identify the creation of either a potential wetland area or RIB as a method for managing the excess dewatering water. KP's test results indicated that the alluvium on the west side of the highway was suitable for infiltration with a location approximately 9,000 feet northwest of the mine entrance eventually selected.

On May 2, 1991, the Permittee submitted an application to the Division (e.g. Bureau of Water Pollution Control or BWPC) for the construction, operation and closure of a single RIB at the SVCO mine site. The RIB (later referred to as the "North" RIB), is approximately 800 feet by 800 feet by 2 feet deep with 2 feet of freeboard. An average infiltration/percolation rate of 0.13 inches per minute (5.4 x 10^{-3} cm/sec) and an extremely conservative RIB inflow rate of 5,000 gpm (7.2 million gpd) were used to size the RIB. The local pan evaporation rate of 56 inches per year was considered to have an insignificant impact on RIB performance.

WPCP NEV0091030 first became effective on September 23, 1992 and later renewed on July 31, 1997 with a maximum permitted annual average infiltration

rate of 1,000 gpm (1.44 million gpd). A renewal application and fee were received by on January 31, 2002 however no Permit renewal was issued. The Division's Bureau of Mining Regulation and Reclamation (BMRR) assumed responsibility and regulatory oversight of the Permit, following its transfer from BWPC during the 1st quarter of 2005. Following BMRR's review of the application materials and updated predictive modeling results, the average annual infiltration rate was increased to 3,400 gpm (4.89 million gpd) and the WPCP for the SVCO RIB was renewed on April 7, 2008 and became effective on April 22, 2008.

Further expansion and deepening of the SVCO pit resulted in an increase in the volume of dewatering water requiring management via infiltration. In an effort to better manage the additional volume of dewatering water generated, the Permittee submitted on December 2, 2009, a Minor Modification for the phased expansion of the existing RIB system. The second RIB (e.g. the "South" RIB) was proposed for construction within the same area and topography of the existing RIB (e.g. the "North" RIB) and also utilized the existing earthworks from retention ponds that were constructed to serve the historic placer dredging operation. Collectively, the RIBs would be referred to as the VRC.

Included with the 2009 Minor Modification submittal was an updated predictive model run by Schlumberger Water Services (SWS) to address potential groundwater impacts and the fate and transport of arsenic and fluoride from the addition of a second RIB (South RIB) next to the existing RIB (North RIB).

Predictive modeling results indicated that constituent concentration increases were nearly 50 percent lower than what was predicted previously, due to the increase in infiltration area by the addition of the South RIB. The additional area available appeared to decrease the mass and water flux rates in the vadose zone and decrease mounding and groundwater gradient between the mound and the surrounding groundwater system. In addition, the sub-surface contact area is increased for the adsorption and attenuation of arsenic, thereby reducing the simulated peak concentrations. SWS concluded and the Division agreed that the operation of the South RIB would have a minimal impact on the groundwater and the fate and transport of arsenic and fluoride.

The Minor Modification was approved by the Division on March 15, 2010 with all construction completed by January 2011. Infiltration operations for the South RIB commenced in March 2011 following the submittal and Division approval of the "As-Built" Report and Quality Assurance/Quality Control (QA/QC) documentation.

With SVCO dewatering projected to increase to 7,500 gpm (10.8 million gpd) by 2020, mine and mill consumptive uses are only expected to increase slightly. To keep pace with the excess dewatering water generated, SVCO determined that additional infiltration capacity would be necessary. Further expansion of the

VRC was out of the question due to public land boundary constraints and hydrological concerns, the decision was made to construct an entirely new series of RIBs (the SRC), south of the existing SVCO South Dedicated Heap Leach Pad (SDHLP)-Phase 5 Expansion and east of the proposed Tailings Storage Facility (TSF) Cell B and C expansions. The SRC was intended to serve as the primary infiltration site because of its larger area and far superior infiltration characteristics, while the VRC would be relegated to a secondary or back-up role.

The SRC was completed in 2012 and authorization to initiate infiltration of up to 4,500 gpm dewatering water was granted by the Division in January 2013. For additional details regarding the design, construction, operation, and closure of the SRC, refer to WPCP NEV2012102--Fact Sheet.

Current Dewatering Operation: The SVCO pit is dewatered by a network of 42 wells located within and outside of the pit. Only a small number of these wells are active at any given time due to scheduled mining in and around the pit.

Each of the active dewatering wells is sampled annually for BMRR Profile I constituents. The dewatering water quality generally meets the Profile I criteria standards, with occasional exceedences of the arsenic and fluoride Profile I standards. The elevated levels of fluoride and arsenic are derived from natural geothermal waters present to the south of the SVCO mine site, rather than through contact with the actual orebody or any mined materials. Most of the dewatering water at SVCO is pumped from alluvial wells that are up-gradient of the mine and intercept the groundwater before it reaches the pit.

Water removed from dewatering wells DW-26, -28, -31, -32, -39, -40 and -41 accounts for almost 90 percent of the chemical load from the dewatering operation. An extensive pumping/piping network allows RMGC to optimize water distribution and management within the mine, mill and RIBs. Currently, there is no need to treat dewatering water prior to its discharge to the RIBs.

The dewatering water is pumped to temporary storage tanks and to the lined reservoirs referred to as the Upper and Lower Fire Ponds and distribution throughout the property for heap leach process water make-up, milling, dust control, and fire suppression. Water exceeding the volume consumed by these uses is discharged from the Lower Fire Pond to a surface drainage channel that conveys the water to an existing off-site RIB. Pursuant to WPCP NEV0091030, the Permittee performs water quality monitoring for Profile I constituents and water quantity monitoring for volumes pumped for each dewatering well on a quarterly basis.

Water from the dewatering system is collected into tanks and two water storage pond facilities. The Upper Fire Pond is located at 6,445 feet above mean sea level (amsl) elevation, approximately 1,600 ft south of the south pit rim. The Lower Fire Pond (including two adjacent ponds) is located at 6,040 feet amsl elevation

and 1,000 feet west of the west pit rim. The two ponds are connected via pipeline and water is transferred between them based on system demands.

Water quality for the Upper and Lower fire ponds is variable depending on the relative proportion of water supplied by each dewatering well. Of the two ponds, the Upper Fire Pond typically has higher fluoride concentrations, whereas the arsenic concentration in both ponds is essentially the same.

RIB Operation and Compliance Monitoring: As stated previously, dewatering water not used for consumptive purposes (or generated during a system upset) exiting the settling basins is conveyed through an unlined 5 feet wide by 2 feet deep channel over a distance of approximately 14,500 feet from the spillway at the lower sedimentation pond to the VRC RIB Diversion Collection and Control Box (DCBX). From the DCBX the water is conveyed a distance of approximately 500 feet to the VRC North RIB and a distance of approximately 1,700 feet to the VRC South RIB.

A box weir system has been installed at the Lower Sedimentation Pond spillway (referred to as the *"Upper Discharge Weir"*) to regulate the amount of discharge exiting the Lower Sedimentation Pond. Discharge from the Upper Weir enters an unlined channel (referred to as the *"Main Channel"*) where it is conveyed a distance of approximately 300 feet to the Discharge Weir (also referred to as the *"Middle Discharge Weir"*).

The Discharge Weir controls the amount of water entering the Main RIB Conveyance Channel. A culvert diverts the flow under S.R.-376 where the conveyance channel continues to its terminus at the RIB.

A third weir (referred to as the *"Lower Discharge Weir"* or *"RIB Discharge Weir"*) initially served as a control point for the original RIB and a convenient monitoring point. A pre-cast concrete Diversion Control Structure (DCS), approximately 10 feet by 10 feet by 6 feet deep has been placed 16 feet downstream from the existing weir to divert dewatering water to either or both RIBs. The structure is equipped with a 6 feet long by 2 feet wide intake weir on the east side and a pair of mechanical head gates 3 feet wide by 2 feet deep on the west and south sides of the diversion box that can be open or closed to control flow to the North and/or South Conveyance Channels.

The DCS manages the volume of dewatering water discharged to the either or both RIB conveyance channels through the use of manually operated head gates, with adjustment of the gates dependent on RIB pool conditions and mine dewatering requirements. At least one head gate must be open during active dewatering operations and periods of inactivity. Under the current RIB operating plan, 100 percent of the flow is discharged to either the VRC North or VRC South RIB Conveyance Channel or equally split to flow to both RIB conveyance channels.

Discharge from the North and South Head Gates is currently monitored monthly (when present) for TDS, pH, arsenic, fluoride, boron, selenium, magnesium, chloride and sulfate, and in the first quarter for all Profile I parameters and boron.

The VRC South RIB Conveyance Channel is approximately 1,700 feet in length by 12 feet wide (at the channel floor) and conveys water from the diversion collection and control box to the VRC South RIB at a grade of 0.1 percent. This results in a bank to ban shallow flow under normal full-flow operating conditions and very low channel velocity between 1 and 2 feet per second (ft/sec).

This low head water conveyance system results in a low-energy transport of water and eliminates the need for armoring. Channel depth is a minimum of 2 feet for the first 1,200 feet of run and decreases as it nears the VRC South RIB pool. Overtopping of the banks during flood events in the area where the bank height decreases allows the water to spill into the RIB. Assuming a Manning's coefficient of 0.03 (open channel flow in silt), the calculated water depth in the channel at 11 cubic feet per second (cu ft/sec) is approximately 0.8 ft. The maximum storm event flow of 37 cu ft/sec requires a depth of 1.9 ft and the bank-full flow rate is 40 cu ft/sec at a velocity of 2 ft/sec. At a point approximately 350 feet before it reaches the South RIB, the channel mouth opens up and allows the water to spread and flow directly to the South RIB.

Groundwater is monitored upgradient and down gradient of the conveyance channel and RIBs. Upgradient groundwater monitoring well BMW-3 and down gradient groundwater monitoring wells BMW-1, MW-103, MW-104 and MW-109 through MW-112 are monitored weekly for groundwater elevation, quarterly for TDS, pH, arsenic, fluoride, boron, selenium, magnesium, chloride and sulfate concentrations and annually for Profile I parameters.

The RIBs are monitored weekly for depth of water via a staff gauge and each dewatering well is equipped with a flow meter that records a monthly total of gallons of dewatering water pumped and is monitored daily for gallons of dewatering water pumped and is monitored in the first quarter (or when operating if pumping did not occur during the first quarter) for Profile I constituents. Four piezometers (RP-1 through RP-4), have been centrally located on each side of the RIB to delineate the shape and extent of any infiltration mounding beneath the RIB.

VRC North RIB Design: KP designed a RIB approximately 800 feet by 800 feet with an operating depth of 2 feet plus 2 feet of freeboard. An average infiltration/percolation rate of 0.13 inches per minute was used to size the RIB, with a maximum RIB inflow rate of 16,000 gpm (23 million gpd). The local pan evaporation rate of 56 inches per year was considered to have an insignificant impact on RIB performance.

VRC South RIB Design: The VRC South RIB design is similar to that of the existing VRC North RIB. The design provides for a RIB pool of approximately 37 acres at a maximum pool elevation of 5,771 feet above mean sea level (ft amsl). The floor of the VRC South RIB generally slopes from the southeast to the northwest. By excavating the alluvium between the 5,770 and 5,771 foot elevations, an additional 10.5 acres of flat ground is available to facilitate infiltration. From this flat area, the gradient is in a northwest direction until it reaches the 5,766 to 5,767 foot elevation. Average RIB pool depth is approximately 2 feet with a maximum depth of 5 feet. The VRC South RIB is designed to be constructed, operated and closed without any discharge or release in excess of those standards established in the Permit or in regulation except for meteorological events, which exceed the design storm event.

The north embankment of the VRC South RIB shares the southern embankment of the existing VRC North RIB. A linear toe drain runs the entire length of the north embankment, approximately one-third of the total toe-to-toe width (maximum of 25 feet) inward from the downstream toe. The purpose of the toe drain is to collect seepage and allow it to flow into the VRC North RIB.

The drain consists of geofabric surrounding crushed limestone from the SVCO pit with a permeability of not less than 1×10^{-3} cm/sec. The drain floor corresponds with the local toe elevation (approximately 5,763 feet amsl at the embankment center) and is placed to a depth of 4 feet (5,767 feet amsl) elevation. A single continuous 4-inch diameter N-12 slotted pipe runs the entire length of the drain and joins 6, 4-inch diameter solid pipes on approximately 300 foot centers that daylight to the toe of the embankment and allow seepage to exit the drain.

Material excavated from the floor of the VRC South RIB is will be placed around the north and west edges of the VRC South RIB in compacted 1-foot lifts. Fill to the north is placed on the downstream face of the existing embankment in compacted lifts not greater than one foot from the toe elevation to the crest elevation of 5,774 feet amsl. The downstream slope is constructed to a final slope of 3.5 horizontal (h):1 vertical (v) or shallower, resulting in a minimum embankment crest with of 12 feet. The interior slope is similarly graded to 3.5h:1v or shallower.

The proposed embankment design provides for a crest elevation of 5,774 feet amsl and slopes of 3.5h:1v for both interior and exterior embankment faces. The remainder of the fill to the west of the existing western berm is used to bring the natural ground surface up to the 5,771 feet amsl elevation. By bringing the native ground surface up to the same elevation as the maximum pool elevation, the west embankment serves only to provide freeboard against wave action or temporarily hold the additional 0.3 foot in water volume from the design storm event. The operating pool is not above the native ground surface and the west berm therefore does not serve as an embankment for water retention under normal operations.

Spillway Design: A 60-mil high-density polyethylene (HDPE) lined spillway is constructed with an invert elevation of 5,771.3 feet amsl to control the maximum VRC South RIB pool elevation. The spillway has a floor width of 10 feet with a side slope of 2.5:1 or shallower with a minimum 5 percent drop in grade. The spillway is lined with geomembrane to armor the channel and provide grade control within the pool that cannot be achieved with the placement of rip-rap or other coarse armoring material. Broad-crested weir calculations indicate design flows of 11 cu ft/sec exiting the spillway would require a 0.4 foot elevation rise.

The spillway flows into a geofabric-lined stilling basin to reduce exit velocity and erosion near the outlet. The stilling basin is round in shape with side slopes of approximately 2:1. The bottom surface is a minimum 12 foot diameter circle at the 5,758 foot amsl elevation. The spillway liner continues to line the stilling basin and is covered with 18-inch layer of rip-rap with a d_{50} size of 12 inches.

Predictive Modeling 2013 Renewal—The hydraulic performance and effects on groundwater conditions associated with operation of the VRC at a RIB discharge flow rate of 1,700 gpm and operation of the SRC at a maximum RIB discharge flow rate of 7,500 gpm for a combined RIB discharge of 9,200 gpm. The basin-scale MODFLOW-SURFACT model was utilized to generate a fate and transport model of the alluvium.

The basin-scale model is intended to evaluate drawdown in the groundwater system and potential water quantity impacts in Big Smoky Valley as a result of planned dewatering operations at the RMGC Pit Expansion (referred to as RMX). For the current study, an alluvium fate and transport model previously used for the permitting of the SRC, at a discharge flow rate of 4,500 gpm, was modified to include additional upper alluvial layers to more accurately represent near surface alluvial conditions in Big Smoky Valley. The alluvium fate and transport model was constructed for a sub-area within the basin-scale model to simulate VRC and SRC infiltration using the basin-scale RMGC model boundary conditions and hydraulic parameters.

The alluvium fate and transport groundwater model domain covers an area of 102 square miles in the alluvial basin of Big Smoky Valley. Simulated heads from the basin-scale RMGC groundwater model provided the boundary condition heads for the alluvium fate and transport model. The basin-scale RMGC groundwater model was developed and calibrated to steady-state (prior to 1990) and transient (1990-2012) conditions. The model was then adapted to the alluvium fate and transport model with the following parameters to more accurately simulate site conditions at the Valley RIB and South RIB Complex sites.

The alluvium fate and transport model is 14.4 miles long by 8.9 miles wide, covering the alluvial groundwater system of Big Smoky Valley but covers a smaller area than the basin-scale mode. Model boundaries were chosen to ensure

that simulation of VRC and SRC operations is not overly influenced by the location of the basin-scale model perimeter boundary conditions.

Model boundaries are based on the simulated head conditions from the RMGC basin-scale model from calibration through the end of 2012. Hydrogeologic parameters, alluvial fan distributions, and alluvium thickness measured from alluvial well logs at the VRC and SRC sites were used to update the hydrogeologic properties within the entire alluvium fate and transport model area. The inclusion of recent wells drilled during 2012 at the VRC and SRC sites provided additional alluvial characterization data that was lacking in the previous SRC predictive model.

Horizontal hydraulic conductivity under the VRC was simulated at 1.8 ft/day representing RIB floor sediments with a vertical hydraulic conductivity of 0.18 ft/day. These values were derived from model calibration to groundwater elevations in eight VRC piezometers and four VRC monitoring wells completed in floor sediments.

A simulation of fate and transport of arsenic and fluoride at the VRC was performed because of the naturally occurring elevated arsenic and fluoride concentrations in pit dewatering water discharge. The feed water chemistry used for VRC solute transport model simulations was the actual measured arsenic and fluoride concentrations from well DW-40 of 0.096 and 11 mg/L, respectively. The arsenic and fluoride concentrations in DW-40 are higher than the average combined concentration from 2008 to 2012 in the Upper and Lower Fire Ponds (0.083 and 8.37 mg/L, respectively).

Alluvium and pit dewatering was simulated using pumping wells during the mine pit deepening phase. At the end of pit deepening in 2020 an open pit lake will begin to develop. This lake is included in the alluvium fate and transport model domain as a specified withdrawal of groundwater flux to match separately predicted flows to pit lake storage and evaporative losses.

The alluvium fate and transport model was modified for vadose zone flow and solute transport capabilities using Richard's equation and the Total Variation Diminishing (TVD) transport capability in MODFLOW-SURFACT V3.0. The VanGenuchten equation was chosen to simulate unsaturated soil hydraulic conductivity and moisture retention.

2013 Predictive Model Results, Summary and Conclusions: The results of model simulations for the VRC and VRC Conveyance Channel area using an infiltration rate of 1,700 gpm at the Upper Discharge Weir (UDW), an arsenic concentration 20 percent higher, and a fluoride concentration 50 percent higher than the current discharge indicate:

- Water applied to the VRC produces a mound with surface expression during operations (2013-2020). Water levels in surrounding piezometers rise 5 to 16 feet a result of the increased application rate. The groundwater mound forms during mining operations, and dissipates within 3 to 5 years after VRC operation terminates.
- Groundwater in the more permeable alluvium beneath the upper lake bed sediments draws down approximately 3 feet as a result of the increased dewatering pumping adjacent to the Round Mountain open pit. Groundwater flow gradients in the basin alluvium shifts towards the northeast as a result of the dewatering pumping stress, and subsequent evaporation at the Round Mountain open pit.
- The mound of water beneath the VRC dissipates after mining operation ceases, and the migration of VRC water downward is greatly slowed. The combined effects of low hydraulic conductivity in lake bed sediments and the reduced hydraulic gradient impede the transport of fluoride and arsenic. As a result, the majority of arsenic and fluoride resulting from VRC operation remains isolated in lake bed sediments.
- The transport of arsenic and fluoride is limited by the lower permeability of lake bed sediments and solute retardation. Mounding during operations produce a groundwater gradient that migrates from the VRC downward towards more transmissive lower alluvium sediments.
- Simulated concentrations of arsenic and fluoride are not predicted to incrementally increase by more than 0.01 mg/L for arsenic and 1.0 mg/L for fluoride over the previous quarter at the current monitoring well locations. The greatest incremental increase at permitted monitoring locations is simulated to occur at MW-110, which predicts an increase of 0.65 mg/L for fluoride and 0.006 mg/L for arsenic. Concentrations at MW-110 slowly increase after the cessation of mining to their maximum values at approximately 100 years post-mining.

Discharged water which infiltrates between the UDW and MDW monitoring points along the conveyance channel is partially collected by dewatering wells and the SVCO Pit Lake. Water travels north along the regional groundwater gradient. Between the MDW and LDW the conveyance channel crosses several sediment zones with variable hydraulic conductivity including: sand and gravel, silty sand or fan deposits, and lake bed sediments with a higher percentage of fine-grained material.

Operating, Action Levels and Contingency Plans: In an effort to validate the predictive modeling results and provide a mechanism to ensure that there are no exceedences of the threshold concentrations, action levels and contingency plans to address increasing arsenic and fluoride concentrations were first established in 2008 as part of the WPCP Renewal. For the 2013 Renewal, these will remain unchanged.

Action concentration levels are based on a percentage (90 percent) of the future worse-case arsenic and fluoride discharge concentrations (arsenic--0.25 mg/l and

fluoride--14 mg/l) utilized in the predictive modeling exercises. The action concentrations for arsenic and fluoride are 0.18 mg/l and 12.0 mg/l, respectively.

In the event monthly monitoring results indicate an increasing trend in arsenic and fluoride concentrations at the discharge weir (MDW), but still below their respective target threshold levels of 0.18 mg/l and 12 mg/l, a Tentative Contingency Plan will first be implemented.

Under this tentative plan, the Permittee will continue to monitor and manage the current dewatering system to preferentially route wells with higher arsenic and/or fluoride concentration to the SVCO mine and mill facility for on site consumption. The Permittee shall begin development of a Final Contingency Plan for submittal and approval by the Division.

Should arsenic and fluoride concentrations continue on their increasing trend and increase to above 0.18 mg/L for arsenic and 12 mg/l target concentrations at MDW or if there are any incremental increases in arsenic greater than 0.01 mg/l or any increases in fluoride greater than 1 mg/L above the previous quarterly monitoring well results, the Permittee shall conduct an assessment and evaluation of the entire SVCO RIB system, including but not limited to the conveyance channel, monitoring network, dewatering and discharge rates and water chemistry and submit to the Division a report of the findings within 180 days.

The evaluation may include additional sampling to confirm the results, an assessment of whether the increasing trend is likely to continue, and an assessment of the actual dewatering rate and the parameter loading that has been discharged to the RIB system. The monitoring well data shall be reviewed to determine any potential downstream influences. The numerical model will be updated, recalibrated, and re-run with the latest information.

On the basis of the evaluation, a Final Contingency Plan and action plan shall be prepared and submitted to BMRR within 180 days after receiving the results. The action plan may include options such a reduction in inflow to the RIB, implementing water treatment, and/or relocating of the RIB to an area where background groundwater arsenic and fluoride concentrations are higher.

C. Receiving Water Characteristics

The Smoky Valley Common Operation--RIB is located in the southern portion of the Big Smoky Valley Hydrologic Basin (HA-137B) on the western slope of the Toquima Range. Surface drainage is ephemeral and, in general, is a result of precipitation events. No monitoring of surface waters is currently required under WPCP NEV0091030.

Dewatering Water Characteristics: As stated previously, the pit dewatering system discharges water to both the Upper and Lower Fire Ponds where water from

many wells is mixed. Water in these ponds contains arsenic and fluoride concentrations greater than 0.01 and 4 mg/L, respectively. These two elements are naturally occurring in the mine area and may be associated with deep groundwater upwelling in the vicinity of the pit along structural flow paths.

Arsenic concentrations at the mine range up to 0.146 mg/L. Fluoride in the dewatering water is variable, ranging from below detection limit to 23 mg/L. Water quality in the Upper and Lower Fire Ponds is variable depending on the relative proportion of water supplied by dewatering wells, a mixture that changes based on distribution system design, valve settings, and process plant demand for make-up water. The Lower Fire Pond tends to have lower fluoride concentration, possibly because of dilution from inflowing alluvial aquifer water from the west. For this reason the Upper and Lower Ponds have different water quality.

The average arsenic concentration in the Upper and Lower Fire Ponds from 2008 to 2012 were 0.087 and 0.078 mg/L, respectively, for an average combined arsenic concentration of 0.083 mg/L. Average fluoride concentrations in the Upper and Lower Fire Ponds from 2008 to 2012 were 9.69 and 7.04 mg/L, respectively, for an average combined fluoride concentration of 8.37 mg/L. Some mixing of water from these ponds may occur because of dewatering system operational adjustments. However, all of the water discharged by gravity to the Valley RIB and pumped to the South RIB Complex originates from the Lower Fire Pond, and will have lower fluoride concentrations because of dilution from low fluoride alluvial groundwater.

The average fire pond arsenic concentration exceeds the values observed in monitoring wells located west, northwest, and southwest of the SRC. The average fire pond fluoride concentration, however, is less than in wells DMW-1, DMW-2, and MW-105, the nearest wells located downgradient to the north and northwest of the South RIB Complex site. The average fire pond fluoride concentration is greater than the concentrations in wells located downgradient to the west of the South RIB Complex.

Groundwater Characteristics: Current depth to groundwater ranges from 40 to 60 feet below ground surface (5,721 feet amsl) in the immediate vicinity of the RIB. Groundwater movement is generally south to north. The background water quality established shows arsenic and fluoride concentrations above the current Profile I criteria. In addition, slightly elevated concentrations of antimony, boron, chloride, nitrate, magnesium, selenium, sulfate, and TDS have been observed on occasion, but these concentrations have continuously remained below the current Profile I criteria.

The nearest downgradient receptors to the RIB are the JK and Fisher ranch wells located approximately 3 miles to the north. The next-nearest downgradient receptors include Spring 17 (4 miles), Carvers (5 miles) and flowing ranch wells (7 to 9 miles). Approximately two miles south and upgradient of the RIB is the town of Hadley.

Overall groundwater flow direction beneath the main part of the RIB is to the north, as evidenced by the northerly gradient when little water is being routed to the RIB system. Active operation of the RIB produces the greatest rise in water levels in piezometer RP-1 (north side of the RIB), indicating that much of the water percolating from the main part of the RIB is moving northward in the vadose zone.

The groundwater level in RP-4 (east side of the RIB) is slightly lower than the other piezometers, indicating the area to the east of the main part of the RIB is most likely being influenced by drawdown from the mine dewatering system. The water level in RP-4 is consistent with observed water levels from monitoring wells MW-103, MW-104, MW-109, and MW-110 which are located along the alignment of the conveyance channel. Beginning in the 4th quarter of 2006, observed water levels in monitoring wells MW-103, MW-104, MW-109, and MW-110, indicated that the groundwater gradient beneath the RIB channel flows east towards the pit.

Groundwater Chemistry: Monitoring wells MW-103 and MW-104 are located closest to the SVCO pit. Monitoring results indicate respective arsenic concentrations ranging from 0.032 to 0.039 mg/l and fluoride concentrations ranging from 6.14 to 6.24 mg/l. Monitoring well MW-109, along the conveyance channel, shows a slightly higher arsenic concentration of 0.052 mg/l and a slightly lower fluoride concentration of 5.8 mg/l than MW-103 or MW-104. Monitoring well MW-110, further to the west and up-gradient of MW-109, shows lower levels of arsenic and fluoride of <0.025 and 0.232 mg/l, respectively.

The main source of fluoride appears to be a zone south of the SVCO mine site that is fed by geothermal waters. Fluoride concentrations throughout the valley generally show a reduction with increasing distance away from this zone. Arsenic is also derived from this geothermal source. However, additional naturally occurring arsenic occurs due to mineralized grains in the lower alluvial sequence immediately down-slope from the SVCO ore body. The data indicates that at some point between MW-109 and MW-110, the groundwater quality within the alluvium begins to show less influence from the geothermal water source and more influence of recharge from the ephemeral streams that cross the piedmont slope and flow towards the playa areas.

Groundwater towards the center of the valley typically shows minimal influence from the geothermal source to the south of SVCO. The main recharge to the central part of the valley is from the ephemeral streams from the mountain blocks that reach the playa areas. Natural mobilization of gypsum, halite and other evaporite minerals by the infiltrating stream flows has a strong influence on the background groundwater chemistry. Monitoring wells BMW-1 and BMW-3 have consistently shown fluoride concentrations of <0.1 mg/l and arsenic values of <0.025 mg/l. In addition, no observable changes in arsenic and fluoride have occurred in the 12 years of RIB operation and monitoring.

Monitoring wells MW-111 and MW-112, monitor conditions north of the main portion of the RIB and outside of the predicted mound. Water chemistry data from MW-111 show an arsenic concentration below the method detection level (MDL) and a fluoride concentration of 0.13 mg/l. However, MW-111 also showed elevated values of sulfate (568 mg/l), TDS (1,250 mg/l) and selenium (0.0158 mg/l).

For comparison, typical sulfate concentrations in the RIB discharge water are about 60 mg/l, TDS is typically about 275 mg/l and selenium is usually below its MDL. According to RMGC, the elevated parameters in MW-111 are most likely associated with water infiltrating from natural streams that cross the playa. Significant playa deposits are present in the area close to MW-111. All parameters in MW-112 are below the Profile I reference values, with an arsenic concentration below its MDL and a fluoride concentration of 0.12 mg/l. Other monitoring wells that are closer to the central part of the valley typically also exhibit low background values of fluoride and arsenic than wells closer to the mine because there is less influence of the geothermal waters and a greater influence of natural recharge from the ephemeral streams reaching the central part of the valley.

Conveyance Channel Chemistry: A sampling program carried out in 2006 investigated potential arsenic attenuation along the RIB conveyance channel. Analysis for ferric and ferrous iron was also conducted in the field, and arsenic speciation analyses were conducted in the laboratory, to determine if any attenuation of arsenic was occurring along the length of the channel.

Analytical data confirms that the water entering the RIB system contains no significant dissolved iron, and that all arsenic is in its oxidized state (As^{5+}). The data also confirms that arsenic concentrations remain constant along the RIB conveyance channel. If any arsenic attenuation is occurring, it is most likely beneath the conveyance channel and RIB as the downward percolating water reacts with the iron in the underlying alluvial soils.

D. Procedures for Public Comment

The Notice of the Division's intent to issue the permit, authorizing the facility to construct, operate, and close subject to the conditions contained within the permit, is being sent to the **Tonopah Times-Bonanza and Goldfield News** in Tonopah for publication. The notice is being mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit can do so in writing within a period of 30 days following the date of the public notice. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

A public hearing on the proposed determination can be requested by the applicant,

any affected State, any affected intrastate agency, the regional administrator, or any interested agency, person or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.403 through NAC 445A.406. The final determination of the Administrator may be appealed within 15 days of the decision to the State Environmental Commission pursuant to Nevada Revised Statute (NRS) 445A.605.

E. Proposed Determination

The Division has made the tentative determination to renew the proposed permit.

F. Proposed Effluent Limitations, Schedule of Compliance and Special Conditions

Refer to WPCP NEV0091030 (Renewal 2013), Section I for specific details.

G. Rational for Permit Requirements

The discharge quality must meet permit and regulatory requirements to prevent degradation of the waters of the State. Routine monitoring and inspection are required in accordance with the permit to assure the Division that no discharge is occurring that will result in degradation of the waters of the State.

H. Federal Migratory Bird Treaty Act

Under the Federal Migratory Bird Treaty Act, 16 United States Code (USC) 701-718, it is unlawful to kill migratory birds without license or permit, and no permits are issued to take migratory birds using toxic ponds. The Federal list of migratory birds (50 Code of Federal Regulations [CFR] 10, 15 April 1985) includes nearly every bird species found in the State of Nevada.

The U.S. Fish and Wildlife Service is authorized to enforce the prevention of migratory bird mortalities at ponds and tailings impoundments. Compliance with state permits may not be adequate to ensure protection of migratory birds for compliance with provisions of Federal statutes to protect wildlife. Open waters attract migratory waterfowl and other avian species. High mortality rates of birds have resulted from contact with toxic ponds at operations utilizing toxic substances.

The Service is aware of two approaches that are available to prevent migratory

bird mortality: 1) physical isolation of toxic water bodies through barriers (covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of toxic water. Methods which attempt to make uncovered ponds unattractive to wildlife are not always effective. Contact the U.S. Fish and Wildlife Service at 1340 Financial Blvd., Reno, Nevada 89502, (775) 861-6300, for additional information.

Prepared by:	*Rob Kuczynski, P.E.*
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