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

Permittee Name:	Barrick Goldstrike Mines Inc.
Project Name:	Boulder Valley Infiltration Project
Permit Number:	NEV0089068 (Renewal 2015, Fact Sheet Revision 00)

A. <u>Description of Facility</u>

Location: The facility is located in Eureka County, within Sections 22, 23, 24, 27, 32, 33, and 34, Township 36 North (T36N), Range 49 East (R49E); Sections 3, 4, 5, 7, 8, 17, 18, 19, 20, 29, 30, 31, 32, 33, 34, 35, and 36, T35N, R49E; Sections 24, 25, 26, 35, and 36, T35N, R48E; Sections 4, 5, 6, 8, 11, 14, 15, 16, 17, 21, 22, and 27, T34N, R49E; and Sections 1, 2, 11, 14, and 15, T34N, R48E; Mount Diablo Baseline and Meridian, approximately 27 miles north of Carlin, Nevada.

General Description: This Project consists of management and reintroduction of dewatering water from the Barrick Goldstrike Mine and the Leeville Mine operated by Newmont Mining Corporation, including collection of spring flows into the Sand Dune Canal and the distribution of the water to infiltration basins, the TS Ranch Reservoir, and irrigated areas within Boulder Valley. The Project includes an arsenic treatment plant located near the pump station P1 at the end of the Sand Dune Canal. An additional arsenic treatment plant is located at the head of the cooling channel and cooling channel bypass. The Project is designed, constructed, and will be 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.

B. Synopsis

Water Pollution Control Permit (WPCP) NEV0089068 (Permit) covers specific portions of the water management system in Boulder Valley. The system as a whole consists of collection, management, reintroduction of dewatering water to the groundwaters of the State via rapid infiltration basins, injection, or irrigation, and recirculation of water from the Sand Dune, Knob, and Green springs back to the water management system. The WPCP NEV0095114 Boulder Valley Recirculation Project will be incorporated into NEV0089068 with the 2015 renewal. The injection of dewatering water is authorized by Underground Injection Control (UIC) permit UNEV93209 and the irrigation system is operated by Newmont Mining Corporation. Discharges to the Humboldt River are authorized by National Pollutant Discharge Elimination System (NPDES) permit number NV0022675.

Runoff from the upper watersheds drains to Boulder Creek, which flows through Boulder

Narrows before discharging to Boulder Flat. The Goldstrike Mine is located above the entrance to Boulder Narrows, where mining activities have required dewatering, principally of the carbonate aquifer.

East of the carbonate aquifer, across the Post Fault in Little Boulder Basin, is a moderately permeable Paleozoic rock aquifer and an overlying low permeability alluvial aquifer. Mining activities have required dewatering in these formations in addition to the carbonate aquifer. Further east is the low permeability rock of the Tuscarora Mountain block.

The carbonate aquifer lies between the Post Fault on the east and the Siphon Fault on the west. This aquifer is highly permeable, with a nearly flat hydraulic gradient, running north-west to south-east, and is mostly covered by alluvium. The alluvium recharges the carbonate aquifer at the upper end, near the Post Fault. Before dewatering, the aquifer discharged to the alluvium at the lower end, near the Siphon Fault.

A volcanic aquifer lies to the west of the Siphon Fault in Boulder Valley. Water pumped from the carbonate aquifer by mine dewatering to the TS Ranch Reservoir has been seeping into this volcanic aquifer. This aquifer is also highly permeable, with hydraulic gradients measurable only over long distances, and covered by alluvium. As a result of TS Ranch Reservoir leakage, the alluvium now recharges the volcanic aquifer at the upper end, near the Siphon Fault and the water in the aquifer is then discharged to the Boulder Flat alluvium below Boulder Narrows.

Boulder Flat is the eventual recipient of all discharge from the carbonate and volcanic aquifers. Boulder Flat receives an estimated 19,000 acre-feet per year (afy) from Boulder Creek and the volcanic aquifer along with an estimated 29,000 afy from Rock Creek which drains the Willow Creek, Antelope Creek, and Rock Creek basins. Most surface water reaching Boulder Flat evaporates or infiltrates to groundwater without reaching the Humboldt River. The Humboldt River, forming the southern edge of Boulder Flat, discharges an estimated 20,000 afy into Boulder Flat alluvium. Boulder Flat evapotranspirates virtually all received water with a small portion discharging to Clovers Area to the west.

Water is pumped from the ground via dewatering wells around the Permittee's Betze Pit and Meikle Mine, and from Newmont's Leeville Mine. A portion of the water is used for mining, milling, and road dust suppression. The remainder of the dewatering water is conveyed by pipelines to the cooling channel/cooling channel bypass, the TS Ranch Reservoir, an infiltration point, and ultimately to injection, irrigation, or infiltration. The Permit allows up to 101 million gallons per day (MGD) to be discharged to the infiltration basins. The actual discharge rate has varied from 0 to 96.4 MGD.

Infiltration System

The original construction of the Boulder Valley Infiltration (BVI) system included four settling ponds that were designed to overflow into a cross pond for water re-entry into the irrigation delivery pipeline. These ponds were lined with 100-mil white high-density polyethylene (HDPE). The total combined impoundment of the four ponds as designed was approximately 45 acre-feet. These ponds did not function as planned and were bypassed after approximately one (1) year of use. In March 2009, an Engineering Design Change (EDC) was submitted which proposed closing the two middle ponds and reducing the size of the north and south ponds to make room for the construction of a haul road through this area. The reduced north and south ponds now function as an unlined stormwater collection pond (south) and a lined fill stand make-up water sump (north). The change resulted in the removal of monitoring point GFPD-2A upstream of the white ponds. A new monitoring point, GFPD-2B, was established at the new downstream reconnection point of the dewatering pipeline.

A buried gravity-flow pipeline, referred to as the 72-inch diameter pipeline, first used on 6 August 1993, was built to convey dewatering water from the northwest side of the Betze Pit to the cooling channel before entering a coffer dam at the TS Ranch Reservoir. A 54-inch diameter pipeline carries water from the reservoir to Boulder Valley for irrigation. The water can be diverted into a 24-inch diameter pipeline which takes it to three infiltration basins. A 46-inch diameter Pump-back Pipeline, a 46-inch diameter Recirculation Pipeline, a 36-inch diameter Pipeline to Welch's Farm, and two (2) pump stations, P1 and P2, are also used for water management in Boulder Valley.

The Cooling Channel is a two (2) mile long open, HDPE-lined channel that was built to maximize cooling and minimize gradient prior to discharge to the TS Ranch Reservoir. An EDC was approved in August 2007, to make permanent the installation of a ferric sulfate injection plant to reduce elevated arsenic levels identified in the dewatering water discharge. The plant is comprised of a ferric sulfate tank placed within a secondary containment tank, a dedicated pump, and conveyance pipelines placed within the pump building HDPE-lined containment area. Ferric sulfate solution is metered into the 36-inch diameter Dissipater Pipeline located at the outfall structure near the upgradient end of the HDPE-lined Cooling Channel. Arsenic levels in the feed water have ranged as high as 0.077 milligrams per liter (mg/L) but are reduced to below 0.01 mg/L by the treatment system. The plant is operated year round due to the infiltration at the TS Ranch Reservoir.

In March 2014, an EDC was approved for the construction of a cooling channel bypass pipeline to convey dewatering water from the existing dewatering pipeline outfall at the cooling channel to the TS Ranch Coffer Dam. The Permittee intends to increase dewatering at the minesite and initial plans to accommodate increased flow included conducting

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maintenance of the cooling channel. This change creates a cooling channel bypass pipeline 1,900 feet long. A 36-inch HDPE bypass pipeline is connected at the outfall of the existing 50-inch carbon steel (CS) dewatering pipeline, downstream of an existing non-operational gate valve which is located at the upstream end of the cooling channel. The 36-inch HDEP bypass pipeline parallels and existing roadway and flows by gravity to discharge into the lined Coffer Dam pond. The existing double-walled ferric tank was relocated to the north of the 50-inch CS pipe. The monitoring point which was previously at the cooling channel end will be moved temporarily to the coffer dam outfall, and sampled weekly for two (2) months. In order to adequately evaluate water chemistry at the new sampling point and ensure the results are not skewed by system modifications. In lieu of conducting maintenance on the existing cooling channel, the Permittee has submitted an EDC in order to install a new settling pond (further described below); accordingly, no maintenance of the cooling channel has been performed. The existing cooling channel will remain in place for use as a possible disposal site for accumulated sediments prior to closure.

In March of 2015, the Permittee submitted an EDC to construct a settling pond along the cooling channel bypass pipeline. The settling pond will accommodate both increased flow rates and allow for increased residence time for settling of ferric hydroxide floc and particulate matter for increased operational and maintenance capability. Effluent from the settling pond will overflow into a weir and then be discharged to the existing Coffer Dam or the TS Ranch Reservoir. The pond will be double-lined with HDPE and an intermediate leak collection and recovery system. The pond can be dredged to remove solids for transport and disposal at an approved permitted location.

The earthen TS Ranch Reservoir was built as a water storage facility for the Permittee's dewatering operations. Water from dewatering the Permittee's Betze Pit and Meikle Mine and Newmont's Leeville Mine is stored in the reservoir for delivery to the irrigation systems, infiltration basins, or injection wells. The reservoir was designed for four stages of construction. Stage 3 was completed in the summer of 1990. The existing embankment has a height of 80 feet and a crest elevation of 5,065 to 5,100 feet amsl. The reservoir (including the coffer dam area) has a storage capacity of approximately 1,758 acre-feet.

The system includes three infiltration basins that are approximately 650 feet to 800 feet long and 200 feet wide. Water directed to these basins is introduced by closing valve V-1 and opening valve V-3. The excavated basin embankments are lined with riprap.

Recirculation System

WPCP NEV0095114 previously covered the Boulder Valley Recirculation Project. The recirculation system specifically covers the recirculation portion of the Water Management System, sending dewatering water back from the Sand Dune Canal into the TS Ranch

Reservoir and/or into the rapid infiltration basins when demand for irrigation water is low. The discharge water must have a quality that will not degrade the water in the receiving aquifer above the Profile I reference values and/or established baseline groundwater concentrations.

The need for the recirculation system developed when filling of the TS Reservoir was initiated in 1990. Water was pumped into the reservoir to dewater the Goldstrike Mine. The reservoir subsequently drained in April of 1991, when a previously unknown fault in the bottom of the reservoir washed out and allowed the water to flow into the volcanic rocks below. As a result of the fault, three springs began to flow in early 1992. The flow from the three (3) springs now makes up the discharge into the Sand Dune Canal. The springs are located below the reservoir in volcanic rock exposed along the valleys edge. From east to west the springs are named Sane Dune, Knob, and Green.

The principal components of the recirculation system are the earthen Sand Dune Canal, the water treatment plant (arsenic co-precipitation), various pipelines to distribute water throughout Boulder Valley, pump stations, pivot irrigators, infiltration basins, and the TS Ranch Reservoir. Due to the tendency of the spring water to dissolve naturally occurring salts in the soils on its way to the canal, arsenic levels occasionally exceed the Profile I reference value of 0.01 mg/L requiring periodic operation of the water treatment plant. The water treatment plant uses the ferric sulfate co-precipitation process to reduce the arsenic concentrations below the established baseline groundwater quality standard of 0.017 mg/L prior to release into the TS Ranch Reservoir or the infiltration basins.

The recirculation system is capable of delivering 45,000 gallons per minute but discharge from the water treatment plant is limited by the Permit to 28.8 MGD. The system is capable of discharging up to 64.8 MGD. During the months of March through October the water is primarily used for irrigation. During the months of November through February the water is mainly diverted to the infiltration basins or to the TS Ranch Reservoir. The water treatment plant at pump station 1 is shut down during irrigation months due to the discharge meeting irrigation standards. WPCP NEV0095114 will be incorporated into the Boulder Valley Infiltration Discharge Permit NEV0089068 in April 2015.

Petroleum Contaminated Soil (PCS) Management

In December 2011, the Permittee submitted an EDC proposing that all PCS resulting from site activity be managed according to the approved PCS Management Plan for the North Block Project WPCP NEV0091029. The PCS Management Plan allows PCS to be transported to the roaster PCS stockpile pad where it is stored prior to being fed into the roaster for combustion of all petroleum constituents. A secondary PCS stockpile pad is located on the Bazza Waste Rock Facility that is utilized only when the PCS stockpile pad at

the Roaster is at maximum capacity. Hazardous waste, and any other PCS that cannot be roasted, must be properly disposed of off-site at an authorized facility. The EDC was approved by the Division in January 2012.

C. <u>Receiving Water Characteristics</u>

The receiving water is groundwater in both the alluvium and bedrock aquifers of Boulder Valley. Depths to groundwater at wells near the permitted facilities since 2007 have been as follows:

IMW93-2 (just southwest of RIBs) – 206-215 ft (trending deeper) IMW93-3 (west of northern irrigation site) – 50-59 ft (trending deeper) IMW93-4 (east of northern irrigation site) – 51-67 ft (trending shallower) IMW95-1 (west of central irrigation site) – 58-72 ft (trending shallower) NA-23 (at TS Ranch Reservoir) – 333-363 feet (trending deeper) NA-29 (west of BVI system, upgradient) – 873-893 ft (trending shallower)

Note that monitoring data for NA-23 and IMW93-3 is only available since 2009. These wells are sampled periodically as part of the Permittee's ongoing Boulder Valley hydrogeological monitoring. The groundwater gradient in this area is generally northwest to southeast. In general, laboratory testing of the monitoring well samples has shown compliance with the Profile I reference values. The only recorded exceedances were slightly elevated pH values in IMW95-1 (periodic excursions up to 8.7) and NA-29 (one instance of 8.8) which are not considered significant but will continue to be observed to ensure they do not go higher. Sub-surface water levels are elevated near the infiltration areas of the TS Ranch Reservoir, near the infiltration ponds, and in the areas of active irrigation. This infiltration mounding in each of these areas increases during the periods of heaviest use.

Extensive monitoring programs are in place in the Boulder Valley as well as in the Betze Pit/Meikle Mine areas to establish water quality. A total of 76 monitoring wells provide data for the various permits in the project area, including 6 wells dedicated to NEV0089068 - upgradient wells NA-18, NA-22, and NA-29; and downgradient wells NA-26, NA-32, and NA-34. Based on these programs, monitoring data indicate that the post treatment dewatering water quality meets or exceeds the baseline groundwater quality of the aquifer beneath the Boulder Valley and/or the Profile I reference values.

Since groundwater mounding in the Boulder Valley groundwater began in 1991 from discharge activities there have been no obvious rising trends in the arsenic concentrations. Current arsenic concentrations are nearly identical to those measured in in 1991 before groundwater mounding began. Based on pre-construction background receiving groundwater characterization, analysis of water samples from downgradient monitoring wells will not result in exceedances of the following maximum constituent concentrations arsenic (0.017)

mg/L) and antimony (0.006 mg/L). All detectable arsenic concentrations measured in the three (3) downgradient monitoring wells (NA-26, NA-32, and NA-34) were analyzed statistically. It was determined that the data set best fits a normal probability distribution function with a mean standard deviation of 0.008 and 0.003 mg/L, respectively. Considering the pre-mounding arsenic concentrations at the downgradient compliance points a maximum arsenic concentration of 0.017 mg/L with a standard deviation of 0.003 mg/L was selected. The discharge to the RIBs shall not exceed an arsenic concentration of 0.020 mg/L for two (2) consecutive months. The same criteria apply to the outfall from the WTP at the end of the Sand Dune Canal during non-irrigation months. If the average arsenic concentration is above 0.02 mg/L for more than 2 consecutive months; an action plan must be developed to reduce the concentrations to or below 0.02 mg/L.

In January 2015, the Permittee provided documentation to show that antimony attenuation is occurring within the volcanic rocks adjacent to the TS Ranch Reservoir. Since 2005, the dewatering water antimony concentrations have increased and at times are in excess of 0.015 mg/L. Treatment with polyferric sulfate has on average reduced antimony concentrations by 25%. Post-treatment antimony is occasionally above the Profile I reference value of .006 mg/L. Monitor well NA-23 is the closest monitoring point downgradient of the TS Ranch Reservoir, located within the groundwater mound footprint, but screened below the pre-infiltration water table. The well has remained non-detect for antimony over time. Antimony is consistently below detection at the springs and pumpback system. Groundwater modelling for the prediction of antimony concentrations, indicate that for the most likely scenario there remains 15 years of attenuation capacity in the flow path between the TS Ranch Reservoir and well NA-23. In order to confirm the model results, wells NA-14 and NA-23 were added to this Permit as antimony attenuation model calibration wells.

D. <u>Procedures for Public Comment</u>

The Notice of the Division's intent to issue a Permit authorizing the facility to construct, operate, and close, subject to the conditions within the Permit, is being sent to the **Elko Daily Free Press** for publication. The Notice is being mailed to interested persons on the Bureau of Mining Regulation and Reclamation 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 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, 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 445A.406.

E. <u>Proposed Determination</u>

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

F. <u>Proposed Effluent Limitations, Schedule of Compliance, Monitoring, and Special</u> <u>Conditions</u>

See Section I of the Permit.

G. <u>Rational for Permit Requirements</u>

The facility must not discharge a pollutant that would result in the degradation of existing or potential underground sources of drinking water, or that would cause an exceedance of an applicable surface water quality standard or regulation.

The primary methods for ensuring compliance will be required routine monitoring and reporting, augmented by Division site inspections. Specific monitoring requirements can be found in the Permit.

H. Federal Migratory Bird Treaty Act

Under the Federal Migratory Bird Treaty Act, 16 U.S. Code 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 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 (e.g., by covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of the 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

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Financial Boulevard, Suite 234, Reno, Nevada 89502-7147, (775) 861-6300, for additional information.

Prepared by: Date: Revision 00: Joe Sawyer April 2015 Permit Renewal 2015

Incorporated Permit NEV0095114 Boulder Valley Recirculation Permit to eliminate substantial overlap between permits.