CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

Office
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waterboards.ca.gov/coloradoriver/

ORDER R7-2020-0004

Order Information

Dischargers:	Castle Mountain Venture, Equinox Gold Corporation, U.S. Department of Interior, Bureau of Land Management
Facility:	Castle Mountain Mine
Address:	115575 Hart Mine Road Ivanpah, California 92309
County:	San Bernardino County
WDID:	7A362179002
GeoTracker ID:	L10005247058
Prior Order(s):	R7-2010-0045, R7-2005-0092, 99-015, 91-002

I, PAULA RASMUSSEN, Executive Officer, hereby certify that the following is a full, true, and correct copy of the order adopted by the California Regional Water Quality Control Board, Colorado River Basin Region, on June 24, 2020.

Original signed by
PAULA RASMUSSEN
Executive Officer

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WASTE DISCHARGE REQUIREMENTS
FOR
CASTLE MOUNTAIN VENTURE, OPERATOR
EQUINOX GOLD CORPORATION AND U.S. BUREAU OF LAND MANAGEMENT, OWNERS
CASTLE MOUNTAIN MINE
HEAP LEACH PAD, TANK POND, EVENT POND, AND CONVEYANCE SYSTEM
SAN BERNARDINO COUNTY

The California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board) hereby makes the following Findings:

1. Castle Mountain Venture (CMV)—a California General Partnership between Viceroy Gold Corporation (Viceroy) and Telegraph Gold Inc. (TGI)—plans to reopen and operate the Castle Mountain Mine, an open-pit gold mine, after constructing a new, triple-lined heap leach pad, double-lined tank pond, double-lined-solution-conveyance channel, a double-lined event pond, and other supportive infrastructure, including access roads, entrance facilities, office building, maintenance building, and utilities (Facility). The Facility's address is 115575 Hart Mine Road, Ivanpah, CA 92309, and is owned by the parent company of Viceroy and TGI, Equinox Gold Corporation (Equinox). The U.S. Bureau of Land Management (BLM) also owns a portion of the land upon which the mine is situated. CMV, Equinox, and the BLM are collectively referred to herein as the "Discharger."[1]

2. The Discharger plans to recover gold and other metals using a heap leach process. Heap leaching is a metallurgical process for extracting metals from ore using a series of chemical reactions, involving mostly a dilute sodium cyanide solution. The solution will be run through ore that has been stacked (in heaps) on a large, triple-lined, outdoor pad to leach out gold and other metals for processing. The solution will be recovered from the pad's primary liner and solution collection pipes located within the ore heap; the solution will then be transported through a closed pipe located in a triple-protected solution conveyance channel to the double-lined tank pond and/or event pond area for initial processing; and then the gold will be separated out from the solution in tanks using an activated carbon adsorption-desorption process.

[1] Primary responsibility is assigned to CMV and secondary responsibility to Equinox and the BLM. If CMV fails to meet the requirements of this Order, then Equinox and the BLM will become the primary responsible parties for Order compliance.

3. On November 15, 2018, the Discharger submitted a Report of Waste Discharge (ROWD) applying for Waste Discharge Requirements (WDRs) for the Facility. The Discharger submitted a revised ROWD on February 25, 2019 that included a phased construction of the heap leach pad, as well as an updated stormwater system design. The Discharger also submitted a third, updated ROWD on April 26, 2019, that included updated process plant drawings, process flow sheets, process water supply information, and non-mining waste handling procedures.

4. This Order issues WDRs to the Facility and covers mining operations at the site, including, but not limited to:

    a. Construction of a new 235-acre, triple-lined heap leach pad (with 159 acres on native soils and 76 acres on the existing, closed heap leach pad footprint);

    b. Maintaining the height of mined ore at 150' above the prepared subgrade/beneath the secondary liner interface on the heap leach pad;

    c. Construction of a new, double-lined storm event pond, double-lined processing tank pond; a double-lined solution conveyance system; adsorption-desorption and recovery plant (ADR Plant); and other supporting infrastructure and facilities like office and maintenance buildings, an onsite lab, and access roads; and

    d. Use of previously crushed, leached, and rinsed ore as protective over-liner material and other earthfall as necessary to support construction of the new heap leach pad. Relocation of old liner material from previous mine operations within the footprint of the closed heap leach pad.

    The Facility is assigned California Integrated Water Quality System (CIWQS) number 7A362179002 and GeoTracker Global Identification number L10005247058.

5. These WDRs regulating the Facility are issued pursuant to several different state laws and regulations, including but not limited to division 7 of the Water Code and California Code of Regulations, title 27, section 20005 et seq., which contain special requirements for discharges of mining waste[2] and owners/operators of a waste management unit used for the treatment, storage, or disposal of mining waste (mining unit).

Facility Location and Site History

6. The Facility is located within the historic Hart Mining District, about 100 miles east of Barstow and nine miles west of the Nevada-California border in San Bernardino

[2] "Mining waste" means all materials (solid, semi solid, and liquid) from the mining and processing of ores and minerals including soil, waste rock, and other forms of overburden as well as tailings, slag, and other processed mining wastes. (Cal Code Regs., tit. 27, § 20164; see also Cal. Code Regs., tit. 27, §22480(a), Wat. Code, § 13050(q)(1).)

County. Primary access to the Facility is via Walking Box Ranch Road for about 18 miles from Highway 164 and other mine access roads. The Facility's location is depicted in **Attachment A** (Site Map) and **Attachment B** (General Facility Map), made part of the Order by reference.

7. The Facility site comprises 2,609 acres of public lands (unpatented mining claims) administered by the BLM and the National Park Service, and 1,301 acres of private lands (patented mining claims) administered by the County of San Bernardino. The Facility is located within all or a portion of the following sections of the San Bernardino Baseline and Meridian:

Table 1: Township Range, Section, and Subsection of the Facility

Town	Range	Section	Subsection
14N	17E	13	S ½
14N	17E	14	E ½, S ¼
14N	17E	22	SE ¼, S ½, NE ¼
14N	17E	23	S ½, S ½ of N ½, 1/2, NE ¼ of NE ¼
14N	17E	24	All
14N	17E	25	All
14N	17E	26	All
14N	17E	27	E ½
14N	18E	18	W 3/4 of SW ¼
14N	18E	19	W 3/4 of W ½
14N	18E	30	W ¾ of W ½

8. The only land use within 1,000' of the Facility include undeveloped public lands managed by either the BLM or the National Park Service. A Presidential Proclamation created the Castle Mountains National Monument (Monument) on February 12, 2016; Monument lands are administered by the National Park Service. The Monument surrounds the Castle Mountain Mine site on all sides, but the BLM land largely remains as a buffer between the Monument and the mine area to the north, west, and south. However, the location of several production water wells in an area known as the West Well Field is now located on Monument lands managed by the National Park Service.[3] The land use within a one-mile radius of the mine is designated as open space/recreation (S-1). The BLM's Desert Renewable Energy

[3] Because there is no discharge or potential discharge of mining waste occurring on land managed by the National Park Service, the National Park Service is not named as a discharger herein.

Conservation Plan dated September 2016 designates the Facility area as High Priority Mining Operations Exclusion Area.

9. The mining claims owned by Viceroy and associated Assessor's Parcel Numbers include:

Table 2: Mining Claims and APNs

Claim Name	Patent Number	APN
Milma	1113695	569-291-04
Pacific Clay Deposit 1	1101406	569-291-13
Pacific Clay Deposit 2	1101406	569-291-08
Pacific Clay Deposit 3	1101406	569-291-09
Ore Belle	424670	569-291-05
Ore Belle Fraction	424670	569-291-05
Ore Belle No. 1	649101	569-291-05
2007 Patent Lode Claims	04-2007-0003	0569-291-04, 0569-291-05, 0569-291-06, 0569-291-08, 0569-291-09, 0569-291-13, 0569-291-14
2007 Patent Mill Sites	04-2007-0004	0569-291-02, 0569-291-03, 0569-291-04, 0569-291-06, 0569-291-08, 0569-291-09, 0569-291-10, 0569-291-11, 0569-291-13, 0569-291-14, 0569-301-10, 0569-301-16.
2007 Patent Mill Sites	04-2007-0005	0569-291-04, 0569-291-06, 0569-291-08, 0569-291-09, 0569-291-13, 0569-291-14, 0569-361-11
2009 Patent Appeal Mill Sites	04-2009-2009	0569-291-25
CMV HL-1 to CMV HL-109	(unpatented)	0569-291-17, 0569-291-23, 0569-291-18, 0569-291-16, 0569-291-24
ROB-1 to ROB-108	(unpatented)	0569-291-01, 0569-291-12, 0569-291-23
ROB-200 to ROB-233	(unpatented)	0569-291-17, 0569-291-18

10. Gold mining began in the region in 1907 with the discovery of high-grade gold, and as a result, thousands of people migrated to the area to form the town of Hart. Although Hart lost most of its residents by 1918, the 1930s saw a resurgence of mining activity, this time focused on high quality clay, kaolin, and perlite. Clay

quarrying continued sporadically in the area through the early 1980s. Viceroy first began exploration activity in the Hart Mining District in 1984.

11. On January 16, 1991, the Regional Water Board issued WDRs Order 90-002, authorizing the construction and operation of an open-pit gold mine known as Castle Mountain Mine. Viceroy recovered gold using a cyanide solution and a heap leach process. Prior authorization from the BLM and County of San Bernardino were obtained in 1990, including through approvals of a joint federal/state Plan of Operations/Mine and Reclamation Plan, designated by the county as Mine and Reclamation Plan No. 90M-013. Preproduction mining in the first open pit (Lesley Ann) commenced in June 1991, and first gold production in February 1992.

12. In 1998, the BLM and County of San Bernardino amended and revised the Mine and Reclamation Plan to allow an expansion of mining activities from the originally permitted 890 acres by an additional 485 acres. The county also issued a revised Conditional Use Permit. On June 10, 1999, the Regional Water Board issued WDRs Order 99-015, which also authorized mining waste discharges related to the expansion of mining activities.

13. Mining at the Facility site continued until May 2001, at which point Viceroy halted mining operations. Gold production ended in 2004. The mining waste on the heap leach pad was rinsed, drained, and reclassified as a Group C (inert overburden) mine waste pursuant to closure WDRs Order R7-2005-0092, which the Regional Water Board issued on June 29, 2005. Under the oversight of the BLM and the County of San Bernardino, land reclamation and revegetation activities were also conducted at the site. The Regional Water Board issued Order R7-2010-0045, rescinding Order R7-2005-0092, when the site closure activities and post-closure monitoring at the heap leach pad were completed in 2010.

14. Throughout its prior period of operation between 1991 and 2004, the Castle Mountain Mine was one of the largest producers of gold in California and provided year-round employment for a work force of over 200 people.

Overview of Facility and Mining Units

15. Authorized activities under the original 1990 Mine and Reclamation Plan included mining of the three open-mine pits called the Lesley Ann, Jumbo, and Oro Belle pits, as well as the construction of heap leach pads, ore crushing facilities, process facilities, gold recovery plant, access road, overhead electric transmission line, groundwater supply system, and buildings for maintenance and administrative activities. The plan called for mining of approximately 90 million tons of material, which consisted of approximately 30 million tons of ore and 60 million tons of overburden. The total estimated surface disturbance was 890 acres, and the nominal rate of ore mining was set at 11,500 tpd.

16. Additional mining in the Jumbo Pit, Oro Belle pit, Hart Tunnel pit (a pit contiguous to the Oro Belle), and pit in the South Extension area (an extension of the Lesley Ann

pit) was authorized in the revised 1998 Mine and Reclamation Plan. The plan also allowed the placement of overburden in a new area identified as the North Overburden Pile and the consolidation of the heap leach pads into one, larger pad. The plan authorized enlarged open pits, heap leach pads, and overburden sites designed to accommodate up to 71 million tons of ore, and 223 million tons of overburden. The plan authorized an additional 485 acres of surface disturbance and increased allowed the mining rate.[4]

17. Following cessation of mining activities, most of the above-described buildings and facilities were decommissioned during the site reclamation that occurred between 2001 to 2006.

18. The Discharger now proposes to reopen Castle Mountain Mine and to construct a new heap leach pad adjacent to and on top of the western/southern slope of the closed heap leach pad,[5] in addition to other mining units and infrastructure generally authorized under the 1998 Mine and Reclamation Plan. A summary of the proposed mining units authorized by this Order are as follows:

Table 3: Mining Units at the Facility

Unit	Measurement	Liner System	Unit Description and Status
Heap Leach Pad	235 acres total: Phase 1A - 69.2 acres; Phase 1B - 43.4 acres; Phase 1C - 47.8 acres; Phase 2A - 36.8 acres; and Phase 2B - 36.3 acres.	4” Solution Collection Pipes; Primary containment - 80 mil Low Linear Density Polyethylene (LLDPE); Leachate Collection and Removal System (LCRS) layer- 2’ of drainage gravel and 4” monitoring pipes; Secondary containment liner 80 mil LLDPE; and Vadose Zone Monitoring System (VZMS) 1’ of drainage gravel with 2” monitoring pipes; Tertiary containment 80 mil LLDPE liner.	The Capacity is estimated to be 44.5 million tons of ore or 8 years of life. It is technically designed to be a multi-lift pad with a maximum airspace of 400, but currently the maximum authorized is 150’. Each phase of construction will tie into the previous liner system. Each phase is also split into several cells to allow for selective leaching of cells, in case a leak needs to be repaired in a specific cell.

[4] The County and BLM set different rates, and the local Air Quality Management District set the most conservative rate at 15,000 tpd.
[5] The existing, decommissioned heap leach pad may not be used for heap leaching under this Order.

Unit	Measurement	Liner System	Unit Description and Status
Solution Conveyance Channel	Phase 1A - 2,5490'; Phase 1B - 4,040'; Phase 1C - 6,980'; Phase 2A - 9,710'; and Phase 2B - 11,120'.	Primary containment - 28" HDPE (High Density Polyethylene) pipe; Secondary containment - 80 mil LLDPE; and Tertiary containment - 80 mil LLDPE.	A gravity driven, stormwater diversion and solution conveyance ditch that collects and diverts all recovered pregnant solution and stormwater from the Heap Leach Pad to either the Tank Pond, during normal flow operations, or the Event Pond, during a storm/overflow event. Monitoring will be accomplished through routine visual monitoring and sampling (if liquid is detected).
Event Pond	19,045,000-gallon maximum capacity; 1.3-acres lined footprint; and The Event Pond has a reported depth of 24.77'.	Primary liner- 80 mil HDPE; LCRS 12" monitoring pipes in 2' of drainage gravel; geonet; VZMS -1' drainage gravel and 8" collection pipes; and Secondary containment 60 mil HDPE	In the case of a stormwater or other emergency overflow event, the pregnant solution and the excess runoff from the Heap Leach Pad will be routed to the Event Pond for temporary containment (NOTE: this is only if the Tank Pond return pumps cannot keep up with incoming flow from the heap pad). A trash pump will then cycle the Event Pond's contents to the barren solution tank in the Tank Pond for recirculation through the Heap Leach Pad.
Tank Pond	3,309,000 gallon maximum pond capacity; 225,000 gallon maximum Barren Solution Tank capacity; 400,000 gallon maximum Pregnant Solution Tank capacity; and Depth of 20'.	Primary Containment- 3 carbon steel tanks (2 Pregnant and 1 Solution); Secondary containment- 60 mil HDPE; VZMS- 1.5' drainage gravel and 12" diameter collection pipes; and Tertiary containment- 60 mil HDPE liner.	The Tank Pond is a double lined pond which houses three total tanks; two pregnant solution and one barren solution enclosed steel tanks, which will be used for initial gold processing.

Unit	Measurement	Liner System	Unit Description and Status
North Overburden Pile	273 acres of disturbance permitted. To date, 56-acres have been disturbed, leaving 217 acres remaining.	Unlined.[1]	Overburden soil and rock, and waste rock from mining operations, are deposited in piles surrounding the mining pits or used as backfill within the pits. Total estimated annual rate of overburden placement is 1,250,000 tons per year.
South Overburden Pile	307 acres of disturbance permitted. To date, 214 acres have been disturbed, leaving 93 acres remaining.	Unlined.[1]	Overburden soil and rock, and waste rock from mining operations, are deposited in piles surrounding the mining pits or used as backfill within the pits. Total estimated annual rate of overburden placement is 1,250,000 tons per year.
North Growth Media Stockpile	98 acres total permitted disturbance	Unlined.[1]	Up to 12-18” of topsoil is scraped and stockpiled based on elevation, grade, and underlying geology for future closure activities.
South Growth Media Stockpile	98 acres total permitted disturbance	Unlined.[1]	Up to 12-18” of topsoil is scraped and stockpiled based on elevation, grade, and underlying geology for future closure activities.

[1] Exempt from liner and LCRS requirements per California Code of Regulations, title 27, section 22470(c)(3).

19. The Discharger obtained approval of a revised Mine and Reclamation Plan from the County of San Bernardino on August 23, 2019 and from BLM on February 27, 2020. The open pits, heap leach pad, and overburden storage sites described in the 2019 Plan are designed to accommodate up to approximately 71 million tons of ore, and 128 million tons of overburden. An additional 95 million tons of overburden is planned to be sequentially backfilled into the Lesley Ann, Jumbo, and South Extension pits. The Discharger plans to begin with processing Run-of-Mine/Protore[6]

[6] Run-of-Mine/Protore means previously excavated ore that was originally mined under less favorable economic conditions, such that it was not valuable enough to process previously. This ore will not undergo any additional crushing and will be transported directly to the heap leach pile for leaching.

previously used to backfill the Lesley Ann pit before commencing any active mining operations.

20. The Facility will be in operation 24 hours a day, seven days a week, 365 days a year, placing a maximum of 17,000 tpd. Based on the remaining capacity of the Heap Leach Pad, approximately 37 million tons of ore, the life expectancy for the Facility is 8 years.

21. Processing the gold-bearing ore will involve the following steps:

    a. Run-of-mine and/or crushed ore is delivered to the Heap Leach Pad from the open pits in mine trucks. Then, lime is added to the ore for pH control before the ore is dumped onto the pad.

    b. A leaching solution of sodium cyanide is then be applied onto the piles (heaps) of gold-bearing ore, located on the Heap Leach Pad, to dissolve gold from the ore.

    c. Gold-impregnated solution (pregnant solution) is then collected from within the ore heaps through pipes and transported for processing via the Solution Conveyance Channel. The Solution Conveyance Channel contains a closed pipe that acts as primary containment, and a ditch that is double lined with impermeable geomembrane liner, which acts as secondary and tertiary containment for the pregnant solution. From the Solution Conveyance Channel, the pregnant solution is sent to a series of flume boxes that will divert the fluid to either the pregnant solution pump box and storage tank, during normal operations (Tank Pond), or to the event pond, during a storm event (Event Pond).

    d. From the pregnant-solution-pump box, the gold bearing solution is pumped to the carbon-in-column units (CICs), which are arranged in series. The gold is recovered from the pregnant solution by piping it through activated carbon in the CICs. The solution is now considered barren and needs to be reconstituted into fresh leach solution by adding more liquid sodium cyanide, fresh makeup water, liquid caustic, and anti-scalant within the barren pump box. The solution is then ready to be recirculated through the heaps again.

    e. Loaded activated carbon from the CIC circuit is then pumped to the adjacent desorption circuit. There, the loaded carbon is stripped of gold in a conventional pressure strip circuit. After which, the barren carbon is returned to the CIC circuit. Electrowinning cells are used to recover gold precipitate from the strip solution. The precipitate is dried, retorted, and then placed in a high temperature induction furnace to produce a pure gold ore after separating impurities.

    f. Alternatively, loaded carbon from the CIC circuit can be transported off-site for stripping and refining of the gold by other facilities. In this case, loaded carbon from the CIC is pumped to storage tanks adjacent to the CIC circuit, then, periodically pumped into a transport vessel and shipped. Stripped/barren carbon

from the off-site stripping facility is periodically returned to site and pumped back to the carbon storage tanks.

22. Caustic soda, solid or liquid sodium cyanide, anti-scalant, hydrochloric acid, and lime is received in bulk quantities and stored in tanks or bins. Storage and containment facilities are provided for all the reagents and all acids are stored separately from all cyanide mixing and distribution areas.

23. Overburden rock from the mining operations, are deposited in either the North or South Overburden Piles or used as backfill within the pits. Topsoil from the mining operations are deposited in either the North or South Growth Media Stockpiles and will be used for in the future for revegetation associated with the mine area's reclamation activities.

Waste Characterization

24. California Code of Regulations, title 27, section 22480 provides that mining wastes must classified as "Group A," "Group B" or "Group C" based on an assessment of the potential risk of water quality degradation posed by each waste, as follows:

    a. Group A. These are wastes that must be managed as hazardous waste pursuant to division 4.5 of California Code of Regulations, title 22, chapter 11, provided the Regional Water Board finds that such mining wastes pose a significant threat to water quality;

    b. Group B. These are either:

        i. Mining wastes that consist of or contain hazardous wastes, that qualify for a variance under division 4.5 of chapter 11 of title 22, provided that the Regional Water Board finds that such mining wastes pose a low risk to water quality; or

        ii. Mining wastes that consist of or contain nonhazardous, soluble pollutants of concentrations which exceed water quality objectives for, or could cause, degradation of waters of the state; or

    c. Group C. These are wastes from which any discharge would be in compliance with the applicable water quality control plan, including water quality objectives other than turbidity.

25. In reaching decisions regarding classification of a mining waste as a Group B or Group C waste, the Regional Water Board can consider the following factors:

    a. Whether the waste contains hazardous constituents only at low concentrations;

    b. Whether the waste has no or low acid generating potential; and

c. Whether, because of its intrinsic properties, the waste is readily containable by less stringent measures.

26. None of the mining wastes at the Facility are Group A wastes. In 1996, Viceroy analyzed samples of the ore and overburden at the Facility site for heavy metals. The results for the overburden were that no heavy metal constituent was detected above the laboratory detection limits. While the ore had several hits of heavy metals detected by the laboratory, all of the results were beneath the STLC/TTLC[7] regulatory limits for hazardous waste.

27. The host rock and overburden at the Facility is divided into three lithologic zones that have been sampled and characterized for Acid-Base Accounting (ABA):

    a. Unaltered Rhyolite Zone: Extrusive granitic rock type that consist of quartz, potassium feldspar, sodium plagioclase, muscovite, biotite, and hornblende. Iron and manganese oxides are found in the fractures and fissures as a result of weathering.

    b. Altered Rhyolite Zone: Silica occurs in fracture zones in the rhyolite grangue, and silica is the primary mineral zone in which the ore occurs. Sulfide bearing minerals include pyrite, but they are likely encapsulated in silica, rendering them less prone to oxidation and the generation of acids.

    c. Lahar Materials Zone: Cemented tertiary gravels which do not contain pyrite or other sulfide bearing minerals.

    The ABA of the ore collected from the three open pits were tested for after crushing the sample, which may overestimate the Acid Generation Potential (AGP) of the ore because of the increased surface area compared to the uncrushed overburden.

28. Mine sites that have host rock with high sulfide minerals throughout the ore deposit pose a threat to ground and surface waters of the state. The U.S. Environmental Protection Agency (USEPA) has developed a classification of the ore body based upon the Neutralizing Potential (NP) of the ore body compare to its AGP, if this ratio is less than 3:1, than further testing (such as kinetic testing) is recommended to determine acid potential.

29. The raw ore's AGP is similar to the overburden ores' AGP, and it is likely an overestimate of the potential threat of sulfide bearing minerals in the ore body. The overburden rock samples from each of the three pits for AGP came back as Non-Detect, therefore all NP:AGP ratios in the table below represent a minimum value. Also, because the overburden ore was also crushed before sampling for its AGP, which is not normally done, it will yield a conservative value due to the increased

[7] California Code of Regulations, title 22, section 66261.24(a)(2)(A), Table II - List of Inorganic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentration (TTLC) Values.

surface area. The leached ore has the lowest AGP because all the sulfide bearing minerals have all been leached out of the ore by the time it has been completely processed for its gold bearing potential, and it therefore poses a very low threat to water quality. This fact, coupled with relatively low areal precipitation rates, and lack of connectivity to surface waters of the state, indicate that the potential threat from acid mine waste at the Facility is low.

Table 4: Summary of Acid Base Accounting

Material Type	Ore source	# of samples	Total Sulfur Acid Generating otential[1] (AGP) (tons $CaCO_3$/kt)	Acid Neutralizing Potential[1] (NP) (tons $CaCO_3$/kt)	NP:AGP
Overburden	Oro Belle	3	ND	3.8	> 2.54
Overburden	Hart Tunnel	4	ND	4.1	> 2.73
Overburden	Jumbo	5	ND	3.2	>2.13
Raw ore[3]	-	2	1.9	5.3	>2.79
Leached ore[3]	-	2	<0.3	2.4	>8.0

[1] EPA Method 6012-78-054
[2] ND – Non-Detect. Detection Limits are AP = 1.5 and NP = 0.25.
[3] Agglomerated at ratio of 9 tons of leach grade ore to 1 ton of mill grade.

30. Based on the above analysis, runoff from raw ore placed in the North and South Overburden Piles is not likely to contain pollutants in concentrations which exceed water quality objectives or likely to cause degradation of waters of the state. This waste stream is classified as a Group C waste.

31. Similarly, the topsoil contained in the North and South Growth Media Stockpiles is classified as a Group C waste. The topsoil has relatively no acid-generating potential, contains no hazardous constituent concentrations, and has not been chemically altered in the stockpiling or harvesting process. Adequate topsoil is stockpiled during initial ground disturbance and saved for use during mine closure and land reclamation.

32. Wastes associated with the heap leaching process pose a more significant risk to areal water quality, because the ore that will be stacked on the Heap Leach Pad will also be leached with dilute amounts of cyanide solution that will contain anti-scalant and other chemicals used in the gold leaching process. If the cyanide solution would leak or otherwise be discharged from the closed loop system, water quality objectives would be exceeded. The raw, unleached ore also contains higher levels of soluble metals than the overburden or Run-of-Mine. Accordingly, the waste streams associated with the heap leaching process are classified as Group B wastes.

Heap Leach Pad

33. The new, 235-acre Heap Leach Pad will be located on a relatively flat-lying, alluvial surface. Past studies show the alluvium is 13 to 230' thick and is composed of well-graded rhyolitic gravelly sands.

34. The Heap Leach Pad liner system will be comprised of the following layers:

    a. Prepared subgrade - Crushed, compacted, rinsed, and detoxified 3/8" fine ore from the previous mine operation (bottom);

    b. Tertiary – 80-mil LLDPE geomembrane liner;

    c. VZMS - Pan lysimeter with two-inch perforated buried riser pipes in a one-foot deep gravel trench;

    d. Secondary – 80-mil linear LLDPE geomembrane liner;

    e. LCRS – Two feet crushed gravel with four-inch riser pipes;

    f. Primary – 80-mil LLDPE geomembrane liner;

    g. Solution Collection Pipes - Four-inch lateral and 18" central solution recovery pipes; and

    h. Working Face – Two-feet (minimum) crushed gravel layer (top).

35. The Heap Leach Pad will be built with a maximum and final slope of 3H:1V with 15' drainage benches every 50'. The top deck will be graded to two percent or more.

36. The Heap Leach Pad will be constructed in several distinct phases. Each phase will be constructed to have unique drainage areas separated by internal berms at the base of the heap leach. The solution that is recovered within each drainage area will have distribution manifolds at the low point of each drainage area that contain diversion valves and will direct the flow to either the barren or pregnant tanks to either be recirculated through the Heap Leach Pad or sent to the gold processing area. Freshly stacked ore requires two rinses of leaching solution before it is sufficiently impregnated with gold.

37. The LCRS will consist of a two feet thick gravel layer positioned below the primary containment liner that is sloped towards a central depression point, where the four-inch riser pipe is located. The riser pipes will convey liquids to gravel-filled sumps at the downstream end of each pad cell. The sumps will be connected to solid HDPE pipe and will allow liquids to drain by gravity to the Tank Pond area where the barren and pregnant solution tanks will be positioned. Liquids draining from LCRS sumps will be metered and monitored weekly to ensure that excessive head build up on the secondary line is not promoted.

38. The Vadose Zone Monitoring System (VZMS) is designed to act like a pan lysimeter that will be positioned directly below the secondary liner's depression point. The pan lysimeter will consist of a minimum 10' wide geomembrane, sloped to a central, slotted HDPE collection pipe, and will be overlain by the two-feet thick LCRS gravel layer. Like the LCRS, the VZMS will be subdivided into unique drainage areas. The leach pad VZMS riser pipes will convey any liquids that are collected to gravel-filled sumps at the downstream end of each pad cell. The leach pad area sumps will be connected to solid HDPE pipe to allow liquids to drain by gravity to the Tank Pond. The valves will be opened weekly and inspected for the presence of liquid in accordance with the Sample Collection and Analysis Plan (SCAP), and the results will be recorded in a permanent logbook kept on-site.

39. The 69.2-acre, Phase 1A will extend over the area immediately west and adjacent to the closed heap leach pad. This pad will buttress up against the closed pad to a maximum height of 150'. The liner system will continue up the west slope of the closed pad, so as to keep the 1A Phase separate from the liner system of the heap leach pad closed under Order R7-2010-0045. The Heap Leach Pad is expected to give approximately 16 months of operation or 7.1 million tons of capacity. The previously mined ore is expected to be placed on the Heap Leach Pad at a rate of 17,000 tpd, as authorized by local Air Quality Management District permits.

40. The 43.4-acre, Pad 1B will provide about 4.4 tons of capacity or ten months of operational life, and previously mined ore is expected to be placed on the Heap Leach Pad at a rate of 17,000 tpd.

41. The 47.8-acre, Pad 1C will provide an additional 23.5 tons of capacity or 11 months of operational life.

42. The 36.8-acre Pad 2A will provide an additional 3.8 tons of capacity or nine months of operational life.

43. The 36.3-acre Pad 2B will provide an additional 3.7 tons of capacity or eight months of operational life.

44. The Discharger must submit new construction drawings and specifications consistent with Section F.3 of this Order. The site life will be reported to the Regional Water Board in the submitted Monitoring Report due at the end of each reporting period.

Event Pond

45. The Event Pond is designed to temporarily contain a 100-year, 24-hour storm event run-off (5.02") that could originate from the Heap Leach Pad, including solution form the operational leaching processes. The Event Pond has a maximum capacity of 19,045,000 gallons and is equipped with a trash pump that will pump any storm event runoff to the barren solution tank in the Tank Pond. From here, the stormwater

will be recirculated through the heap leach by being pumped from the barren solution tank to the top of the Heap Leach Pad.

46. The Event Pond will be approximately 450’ long by 380’ wide by 25’ deep and has primary and secondary containment provided by 80-mil HDPE geomembranes separated by a geonet.

47. The Event Pond will also be equipped with a 12” LCRS pipes monitoring system. The LCRS will be included within the intermediate gravel layer between both geomembrane liner layers. The collection system will detect and collect leaks that may occur through the primary liner and will be constructed using a series of perforated and non-perforated pipe connected to a sump located along the low point within the pond. The Event Pond LCRS sump will be connected to an HDPE pipe “riser” that will extend up from the base of the pond to surface grades at the top of the pond. Electric sounders or transducers will be used to detect the presence of any liquids that may accumulate within the sump. A pump will be used to convey liquids to the solution tanks. The LCRS pump will also include a flow meter measuring the volume of liquids that are pumped.

48. Vadose zone monitoring will be performed below the Event Pond. The VZMS will be a pan lysimeter positioned below the secondary liner, directly below the LCRS header lines. The pan lysimeter will consist of a minimum ten feet wide geomembrane, sloped to a central, slotted HDPE collection pipe, and overlain by a two feet thick gravel layer. Like the LCRS within the Heap Leach Pad area, the VZMS will be subdivided so that individual VZMS monitoring is conducted for each individual leach pad cell. The leach pad VZMS collector pipes will convey any liquids that are collected to gravel-filled sumps at the downstream end of each pad cell. The leach pad area sumps will be connected to solid HDPE pipe to allow liquids to drain by gravity to the Event Pond area, where solution tanks will be positioned. The VZMS sump within the Event Pond area will be positioned below the Event Pond LCRS sump. It too will be connected to an HDPE pipe “riser” extending up from the base of the pond to surface grades at the top of the pond. VZMS sump pipelines will be equipped with valves where the pipe “daylights” the leach pad. The valves will be opened weekly and inspected for the presence of liquid in accordance with the SCAP, and the results will be recorded in a permanent logbook kept on-site. Electric sounders or transducers will be used to detect the presence of any liquids that may accumulate within the Event Pond VZMS sump. A pump will be used to convey liquids to the solution tanks. The VZMS pump will also include a flow meter measuring the volume of liquids that are pumped.

49. The Event Pond will be built with:

    a. Prepared subgrade - Crushed, compacted, rinsed, and detoxified 3/8” fine ore from the previous mine operation (bottom);

    b. secondary - 60 mil high density polyethylene (HDPE);

c. VZMS - 1.5’ of drainage gravel with eight-inch riser pipes;

d. Geonet;

e. LCRS - 1.5’ of drainage gravel with 12” riser pipes; and

f. Primary - 60 mil HDPE.

50. **Attachment D** shows the Tank and Event Pond Diagram Map, which is incorporated herein and made part of this Order by reference.

Tank Pond

51. The Tank Pond is designed to process the pregnant solution within a single circuit composed of three, bolted carbon steel tanks. The first two tanks are pregnant solution tanks with capacity of 400,000 gallons each, while the third tank is a barren solution tank with a capacity of 225,000 gallons.

52. The Tank Pond will be approximately 400’ long by 200’ wide by 20’ deep and contains a series of tanks as described above. The ponds will be equipped with a submersible trash pump used to transfer excess solution to the barren solution tank from the Tank Pond’s containment basin, as well as from the Event Pond in the case of a storm event. The recaptured solution will be repumped back onto the top of the Heap Leach Pad to be recirculated.

53. The Tank Pond will not have a traditional LCRS system because the primary containment is not provided by an impermeable geomembrane, but rather by a closed steel tank. Any leaks in the primary containment will be evidenced by ponded liquid forming underneath the three tanks, correlated with the lack of a storm event.

54. The Tank Pond has a VZMS designed to monitor for any free liquid escaping from the ponds’ secondary liner by capturing any pore moisture with a pan lysimeter that will drain to a central depression point. Any liquid captured will be stored in the VZMS’s sump and monitored at least weekly by inspecting the riser pipes.

55. The Tank Pond will be built with:

a. Prepared subgrade crushed, compacted, rinsed, and detoxified 3/8” fine ore from the previous mine operation (bottom);

b. Tertiary – 60-mil high density polyethylene (HDPE);

c. VZMS – 1.5’ of drainage gravel with 12” riser pipes;

d. Secondary – 60-mil HDPE; and

e. Primary – Steel tanks.

56. **Attachment D** shows the Tank and Event Pond Diagram Map, which is incorporated herein and made part of this Order by reference.

Solution Conveyance Channel

57. The Solution Conveyance Channel lies within the Heap Leach Pad and conveys all pregnant solution and stormwater runoff via gravity facilitated drainage from the Heap Leach pad to the gold processing area of the Facility. The Heap Leach Pad will be built with unique internal cell berms directing flow over a spillway into the perimeter berm and then into the adjacent Solution Conveyance Channel routes along the western, southern, and eastern perimeter of the Heap Leach Pad within a conveyance berm, and eventually will convey the solution to and from the gold processing area of the Facility.

58. The Solution Conveyance Channel starts with four-inch, HDPE corrugated, perforated pipes that feed into 18", HDPE corrugated, non-perforated pipe. These pipes work to actively drain the pregnant solution from above the primary liner within the Heap Leach Pad after the cyanide solution has percolated through the ore and is impregnated with gold. The four-inch pipes run north to south and are spaced every 16' while the 18" central pipes run east to west and are spaced approximately every 100' within the Heap Leach Pad. The 18" pipe will extend out from the Heap Leach Pad towards the Solution Conveyance Channel on the side of the Heap Leach Pad.

59. The Solution Conveyance Channel is double lined, with 80 mil LLDPE geomembranes, separated by a geonet, which act as secondary and tertiary containment for the 28" closed pipe, which is the primary containment. The majority of the time, flows will be managed by the primary solution containment pipe; only when large design flows occur will flow be diverted/directed into the adjacent double-lined Solution Conveyance Channel.

60. The Solution Conveyance Channel will not have a traditional LCRS system because the primary containment is not provided by an impermeable geomembrane, but rather by a closed steel pipe. Any leaks in the primary containment will be evidenced by ponded liquid forming underneath the pipe, correlated with the lack of a storm event.

61. The Solution Conveyance Channel is roughly 25' wide and separated from the Heap Leach Pad by a six feet wide berm. Where the 18" pipes from the Heap Leach Pad and the 28" closed pipe from the Solution Conveyance Channel meet, there is an engineered structure called a Launder Box, within the channel. The Launder Box contains an overflow weir that will drain any overflow from a 100-year, 24-hour storm event into the double-lined Solution Conveyance Channel. There is also an internal berm located at the junction of the conveyance ditch that leads to Tank Pond and to the Event Pond. The berm is double lined and is engineered route any overflow to the Event Pond rather than the Tank Pond. The solution contained within the 28" closed pipe continues through this internal berm and leads to one of the two

pregnant solution tanks within the Tank Pond for processing.

Solution Application and Storage

62. The Heap Leach Pad will be leached in a two-stage leach configuration using barren (i.e. virgin) and intermediate (i.e., recycled) leach solutions (ILS). Each Heap Leach Pad phase will have its own unique parallel network systems of header and sub-header supporting piping. First, barren sodium cyanide solution is pumped from the barren solution tank, located within the Tank Pond to the heap. Dilute cyanide solution will be applied to the Heap Leach Pad using drip emitters to minimize the amount of evaporations; estimated application rates are 0.004 gpm/ft^2. After the solution is recovered and drains to the Tank Pond, concentrated liquid cyanide solution and anti-scalant are added the dilute-pregnant solution by metering pumps located near the barren/ILS storage tanks. The solution is then ready for a second leach cycle through the Heap Leach Pad.

63. After the pregnant solution is recovered from the Solution Conveyance System a second time, it is stored in one of the pregnant storage tanks (located within the Tank Pond). From there, the pregnant solution is sent to the onsite laboratory for processing. The laboratory and onsite processing area are not classified as mining units under this Order. Gold processing involves the ADR Plant to separate the gold and other recovered metals into a refined form. The ADR circuit will consist of one train of five cascade-type, open-top, upflow carbon adsorption columns. Pregnant leach solution will flow by gravity through each set of five columns in series, exiting the lowest (final) column as barren solution. Adsorption of gold and silver from pregnant leach solution is a continuous process, with the flow of pregnant leach solution countercurrent to the advance of activated carbon. Periodically, the carbon contained in the lead or first column in the series becomes loaded with gold and silver and must be transferred to the desorption circuit. Carbon in the remaining columns will be advanced and a batch of new (or regenerated) carbon will be transferred into the final column.

64. Gold saturated or loaded activated carbon from the adsorption (CIC) circuit will then be pumped to the adjacent desorption circuit. There, the loaded carbon is stripped of gold in a conventional, modified-pressure Zadra system into a concentrated eluate solution. The metals are desorbed from the carbon under controlled temperature, pH (controlled by sodium cyanide or sodium hydroxide), and pressure. Metals will then be recovered from this solution using electrowinning cells. The loaded carbon will be pumped to an elution column or to the acid wash vessel. Precious metals will then be stripped using mercury (desorbed) from the loaded carbon and deposited onto stainless steel cathodes. The solution will become barren again and continuously recycled through the electrowinning cells, until the carbon is completely stripped of metals. The activated carbon is ready to be regenerated in either the acid wash circuit or the carbon regeneration kiln dewatering system to remove scale and other inorganic contaminants. The regenerated carbon is added to the fifth/last CIC in series.

65. A mercury retort will be the primary device for controlling/removing mercury. It will collect mercury vapor from the electrowinning cathode metal sludge after a heating operation (retorting), which is then followed by cooling and condensing the mercury-laden off-gas and collection in a separate vessel. The mercury retort will be fitted with a dedicated sulfur-impregnated carbon bed for scavenging any mercury in off-gases that were not collected after the condensing operation. Along with the mercury retort's access door, the smelting furnace, exhaust circuit of the electrowinning cells, barren eluant return tank, eluant tank, cathode wash box, and carbon kiln will also be fitted routed through an overhead hood, then a wet scrubber for particulate matter control, and then directed to the shared sulfur-impregnated carbon bed. The system will be designed to remove over 99.5% of the particulates present in the exhaust fumes.

66. Occasionally, the electrowinning cells will be pressure washed, *in situ*, and the spray water will be filtered, pressed, and dried. Once dry, the flux will be added to reduce the melting temperature of the metal, the slag and dore will be poured into molds, cooled, and sampled before being prepared for shipment.

67. A back up system is also located on site for gold stripping. Loaded carbon from the CIC circuit can be transported off-site for stripping and refining of the gold by other parties. Loaded carbon from the CIC would be pumped to storage tanks adjacent to the CIC circuit, then, periodically pumped into a transport vessel and shipped. Stripped/barren carbon from the off-site stripping facility is periodically returned to the site and pumped back to the carbon storage tanks to replace any carbon shipped offsite. The holding tanks and shipping vessel (both while being loaded and when returned) will all be located in the same concrete containment area as the CIC circuit.

68. After flowing through a static screen to separate any floating carbon from the barren solution, the barren solution will flow by gravity to the barren solution tank in the Tank Pond, where it is reconstituted with more liquid sodium cyanide, fresh makeup water, liquid caustic, and anti-scalant. The barren solution is then ready to be pumped back onto the heap for subsequent, first stage leaching.

69. A complete strip (desorption) cycle, including carbon transfers and strip solution preparation, will take nominally 11 hours.

Overburden and Waste Rock Piles

70. The existing, closed heap leach pad will provide an abundance of material for the new Heap Leach Pad over liner and other earth fill requirements; therefore, no stockpiles of material needed for construction are anticipated.

71. The Protore that is proposed to be processed first will be excavated from the Lesley Ann pit, where it was stored when the previous mining operation halted. The Protore/Lesley Ann pit is not considered an overburden or stockpile area (i.e., mining unit).

72. The Facility has two overburden piles: the North and South Overburden Piles. To date, the North Overburden Pile has disturbed 56 acres of the permitted 273 acres under the Mine Reclamation Plan, and the South Overburden Pile has disturbed 214 acres out of the 307 acres permitted.

73. The Facility has two growth media stockpiles, the North and South Growth Media Stockpiles. The topsoil will be stockpiled north and south of the Heap Leach Pad area. The growth media will be stored and later used during final closure as required under the approved Mine Reclamation Plan. All soil stockpiles will be constructed with 3:1 side slopes and positioned so as not to interfere with site operations. Drainage benches will be provided every 50' vertical and be a minimum of 15' wide to accommodate both equipment access and drainage. Stockpile top decks will be graded at a minimum slope of two percent and a maximum of five percent towards over-side drainage inlets.

Hydrogeologic and Climate Conditions

74. The Castle Mountain Mine is located near the northern end of Lanfair Valley, an intermountain valley bounded by the New York Mountains to the west, the Castle Mountains to the north, and the Piute Range to the east, and the Hackberry Mountains and Vontrigger Hills to the south. The valley floor is approximately 20 miles wide from east to west, and about 17 miles wide north to south. The valley floor is relatively flat, and elevations range from about 3,000' along its southern margin to over 5,000' in the north near the New York Mountains.

75. No active or potentially active faults have been identified in the region, and the faults that have been identified in the area are generally associated with Miocene extensional tectonics. Miocene continental extension produced the volcanism and structural trends of Miocene rocks and faults in the region. The southern part of the Castle Mountains appears to be a volcano-tectonic depression created by the eruption of rhyolite and tuff units.

76. The closest active fault is the Garlock Fault, which is 108 kilometers (67 miles) from the site. The Garlock Fault moves at a rate of between 2 and 11 millimeters (mm) per year, with an average slip rate of around 7 mm per year. While most of the fault is locked, certain segments have been shown to move by aseismic creep. The Garlock Fault is not considered to be a particularly active fault, seldom producing any ground shaking detectable by humans, although it has been known to generate sympathetic seismic events when triggered by other earthquakes and in one instance by the removal of groundwater.

77. The following fault (segments) were evaluated: Garlock (East), Garlock (Central), and Calico-Hidalgo Fault Zones. The National Earthquake Hazard Reduction Program (NEHRP) rock boundary was used in this evaluation, which is representative of a medium with a shear wave velocity (V_s) of 760 m/s (2,500 ft/s).

Seismic hazard parameters and stability analyses were performed for both static and seismic conditions.

Table 8: Seismic Hazard Parameters

Parameter	Value
Controlling Fault	Garlock (East)
Design M[3]	M 7.7
Distance	108 km
Bedrock PHGA[1]	0.045 g
Seismic Coefficient, k_s[2]	0.05

[1] PHGA = Peak Horizontal Ground Acceleration in hypothetical bedrock outcrop at the geometric center of the site.
[2] k_s = Seism c Coefficient (empirical constant). Bedrock is defined as a medium with shear wave velocity of 760 m/s (2,500 ft/sec).
[3] M = Moment Magnitude.

78. The Castle Mountains are divided into northern and southern parts by west- to northwest-striking faults with steep dips. The high-angle faults locally exhibit dip-slip offsets that generally are on the order of tens of meters. Geometric relations indicate that horizontal offsets on some faults may be as great as 300 to 1,000 meters.

79. The Castle Mountains are located near the western margin of the Colorado River extensional corridor, a major regional tectonic feature. The volcano-tectonic evolution of the Castle Mountains and accompanying synvolcanic gold mineralization is believed to be associated with formation of the Colorado River extensional corridor, an area dominated by a Miocene, calc-alkaline rhyolite dome field. Like ranges to the east and west, the Castle Mountains contain a Proterozoic metamorphic-plutonic basement complex composed mostly of well-foliated gneiss and leucocratic granitoids. The basement complex is intruded and overlain by Miocene-age, intermediate to felsic volcanic units including the Peach Spring rhyolite tuff, andesite flows and epiclastic sedimentary units of the Jacks Well Formation, as well as rhyolitic flows, domes, and tuffs of the Linder Peak and subsequent Hart Peak Formations.

80. The following geological units are located beneath the Facility site:

    a. Artificial Fill - The artificial fill is comprised mostly of granular materials generated from mining activities used for berms, road fill, and other miscellaneous uses;

    b. Mine Run Material - The mine run material includes the ore stacked on the various heap leach pads;

c. Young Alluvium;

d. Intermediate-Age Alluvium;

e. Old Alluvium; and

f. Volcanic Units.

81. The beginning of the alluvium basin, known as the Lanfair Valley Groundwater Basin, is estimated to begin immediately south from the Facility. The valley slopes southeasterly with valley floor elevations ranging from 3,500 to 5,000' above sea level. The basin is bounded by impermeable rocks. The geology of the northern Lanfair Valley is complex, with interbedded volcanic and alluvial fill. Continuity of lithologic units is limited, and wells in proximity can produce water at substantially different rates.

82. The climate at the Castle Mountains is typically arid with high temperatures as high as 100 to 110 °F in the summer and moderate temperatures in the winter, generally 58 to 63 °F and rarely below 32 °F.

83. Average precipitation at the Facility is two-inches per year with minimal to zero snowfall. The annual evaporation is estimated at more than 100" and greatly exceeds the precipitation rate on an average annual basis.

84. The wind direction in the immediate vicinity of the Facility follows two general patterns:

a. Seasonally from late fall through early spring, prevailing winds are from the west and northwest. Humidity is lowest under these conditions.

b. Summer weather patterns are often dominated by an intense, heat-induced low-pressure area that forms over the interior deserts, drawing air from the south; humidity is highest under these "monsoon" conditions.

85. The Federal Emergency Management Agency (FEMA) classifies the Facility site as Zone D, undetermined; there is no FEMA flood map for the site for a 100-year flood plain. The 100-year 24-hour storm event is estimated at 5.02"[8].

Surface Water and Groundwater Conditions

86. The Castle Mountain Mine area surface drainages flow south where the infrequent surface flows infiltrate into the ground or evaporate. Regional drainage channels such as Sacramento Wash originate further south of the mine area and drain to the south and southeast. These drainages are normally dry, carrying flow only during infrequent precipitation events.

[8] National Oceanographic and Atmospheric Administration (NOAA) Atlas 14, Volume 6, Version 2.

87. Piute Spring discharges groundwater from Lanfair Valley to an adjacent valley and other smaller springs are found throughout the area. The 1997 Castle Mountain Mine Expansion Project Environmental Impact Report (1997 EIR/EIS) indicated that there had been no discernable change in flow patterns at Piute Springs before or after groundwater pumping for use in mining operations began in 1991. The spring was sampled on a quarterly basis. After seventeen years of monitoring, the BLM eliminated the requirement to monitor Piute Spring in 2003.

88. Groundwater at the Facility is present within unconsolidated sediments interbedded with volcanic rocks at approximately 350 to 600' below ground surface (bgs). The groundwater gradient is dominated by a north-south flow and has steepest gradients in the western and northern sections of the basin, likely due to the shallower depth of alluvium.

89. The 1997 EIR/EIS calculated the groundwater flow gradient across the Lanfair Valley to range from 0.053 feet per foot (ft/ft) along the western side of the valley and 0.0068 ft/ft near the distal, eastern end near the Piute Range. In 2017, Geo-Logic Associates investigations assumed an average hydraulic conductivity of 0.39 ft/day and an effective porosity of 0.037, which estimated the groundwater velocity to be 0.07-0.55 ft/day.

90. Groundwater in the Facility area is sodium chloride in character with a total dissolved solids (TDS) concentration of approximately 250 mg/L. This concentration is the average TDS value of samples taken from three groundwater wells in the vicinity of the planned location of the Heap Leach Pad. Background data from the three monitoring wells installed in 2017 and sampled for eight consecutive quarters is shown below:

Table 9: Average Background Groundwater Quality Data

Analyte	Units	2017-MW-1	2017-MW-2	2017-MW-3
Date installed	Date	09/16/17	09/29/17	10/16/17
Depth	Feet	755	755	755
Depth to groundwater	Feet below ground surface	466.22	535.73	166.71
Drilling fluid	Type	Bentonite	Bentonite	Bentonite
Drill bit	Type	Rotary, tri-cone	Rotary, tri-cone	Rotary, tri-cone
Alkalinity	mg/L	361	220	207
Antimony	µg/L	0.62	0.67	0.91

Analyte	Units	2017-MW-1	2017-MW-2	2017-MW-3
Arsenic[9]	µg/L	23.29	25.29	10.50
Calcium	mg/L	30.41	14.29	23.43
Chloride	mg/L	37	33	37
Cyanide (total)	mg/L	.0016	.0016	ND
Fluoride	mg/L	0.8	0.68	0.82
Mercury	µg/L	0.28	0.06	ND
Molybdenum	µg/L	62	30	22
Nitrate as N	mg/L	0.21	1.23	0.17
Sulfate	mg/L	39	22	51
Aluminum	µg/L	6871	300	61
Beryllium	µg/L	1.52	0.08	0.05
Chromium (total)	µg/L	8.16	0.81	0.51
Iron	µg/L	4314	204	73
Lead	µg/L	0.66	0.29	0.06
Total Dissolved Solids (TDS)	mg/L	1094	421	414
Dissolved Oxygen	mg/L	2.61	3.13	3.68
ORP	mV	-18.29	177	174
pH	pH	7.96	7.53	7.49
Specific Conductance	µs/cm	492	328	359
TPH	µg/L	159	ND	ND

91. The Discharger is currently permitted or authorized by the BLM, County, and/or National Park Service to use up to 625 acre-feet of water per year from the West Well Field and East Well Field.

[9] Throughout the Mojave Desert region of California, arsenic presents itself naturally in otherwise uncontaminated groundwater and in concentrations often above the Primary Maximum Containment Level of 10 µg/L.

92. The East Well Field was initially developed during the 1998 mine expansion and currently hosts production wells CMM-W-01 and CMM-W-02. The latter two wells will provide the majority of process water required for the heap leaching process. The wells will be connected to a 440,00-gallon water tank located on the historic heap leach area, northwest of the ADR Plant. The water tank will also act as a fire water storage tank. The East Well Field is estimated to be able to supply up to 200 gallons per minute (gpm) of sustained water production each for a total of 400 gpm.

93. The West Well Field is the main production water source for the potable water system and dust control. Groundwater in this well field ranges from 165 to 542 or more feet bgs as measured in 2018. The prior discharger installed 13 production wells in the West Well Field, but abandoned 10 due to poor production. Currently, only wells W-14, W-18, and W-45 are in use.

Table 10: Average Chemistry of Production Water

Analyte	Units	W-18	W-14	Pitt Well
Date	Date	3/13/2001	3/13/2001	06/14/1999
TDS	µg/L	270	240	260
Conductivity	ms/cm	460	410	326
pH	pH	7.5	7.4	7.6
Alkalinity	mg/L	170	150	134.2
Bicarbonate	µg/L	200	180	--
Hardness	µg/L	180	180	76
Calcium	µg/L	41	47	21.3
Manganese	µg/L	18	14	5.52
Sodium	µg/L	34	21	39.3
Potassium	µg/L	4.4	4.8	2.6
Chloride	µg/L	31	32	18.7
Sulfate	µg/L	23	16	23.4
Nitrate (NO_3)	µg/L	13	13	2.08
Iron	µg/L	29	29	--
Copper	µg/L	ND	ND	0.081
Turbidity	µg/L	15.7	5.5	--

Analyte	Units	W-18	W-14	Pitt Well
Arsenic	µg/L	0.052	0.043	0.025

94. There are no domestic wells within the boundaries of the Facility.

Monitoring Systems

95. The Discharger installed three groundwater monitoring wells (MW-1, MW-2, and MW-3) in fall 2017 around the perimeter of the planned Heap Leach Pad. The boreholes extended to depth of 755' and the well screens were installed between 690-740'. MW-1 had alluvium to 90 feet bgs, MW-2 had two feet of alluvium bgs, and MW-3 had 20' of alluvium bgs. MW-1 and 2 were dominated more by rhyolitic derivatives whereas MW-3 had kaolinite tuffs that were not as hardened and compacted.

96. The Discharger has indicated that two of these wells will need to be relocated for the construction of the new Heap Leach Pad, Tank Pond, and Event Pond. Additionally, this Order requires the Discharger to submit a **Groundwater Monitoring Network Workplan** to evaluate the number and location of additional monitoring wells needed to bring the Facility into compliance with the requirements of title 27 of the California Code of Regulations.

97. With the exception of the overburden and waste rock piles, the Discharger has designed each mining unit authorized by this Order to be underlain by a Leachate Collection and Removal System (LCRS) and/or a Vadose Zone Monitoring System (VZMS), as described in detail above. The LCRS layer serves to minimize the head buildup on the secondary liner caused by any leaks in the primary liner, whereas the VZMS serves to monitor the intactness of the secondary liner and not the head buildup.

98. This Order requires the Discharger to submit an **Unsaturated Zone Monitoring Workplan** for installing unsaturated/vadose zone monitoring systems under the Class B mining units that meet the requirements of California Code Regulations, title 27, section 20415.

Prior Release-Related Actions

99. Two known releases to land beneath the closed heap leach pad occurred under previous Orders as follows:

    a. One release occurred during the initial stages of the heap leach operation when process liquids were discovered in the leak detection system below one of the former heap leach pad cells. Leaching was immediately stopped, and the processed ore stacked on the cell was removed to find the leak. It was discovered that during the initial ore placement, the liner over a separation

berm had been torn. The liner was repaired by a certified liner installer, and the cell was placed back in operation. The quantity of process fluid present in the leak detection system was small, and the quantity of process fluid that may have been discharged below the liner, if any, is not known.

b. The second discharge to land beneath the former heap leach pad occurred approximately midway through the life of the heap leach pad. A leak in the liner was again detected by the presence of process fluid in the leak detection system. The cell in question contained 110' of ore, so instead of removing the ore and repairing the leak, the Regional Water Board required Viceroy Gold to stop leaching the cell and parts of the adjacent cells and to install additional vadose monitoring points.

Basin Plan and Related Regulatory Considerations

100. The Water Quality Control Plan for the Colorado River Basin (Basin Plan), which was adopted on November 17, 1993, and amended on January 8, 2019, designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. Pursuant to Water Code section 13263, subdivision (a), WDRs must implement the Basin Plan and take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the provisions of Water Code section 13241.

101. The Facility is in the Lanfair Hydrologic Area of the Homer Hydrologic Unit. The beneficial uses of groundwater in the Lanfair Hydrologic Area are:

a. Municipal supply (MUN);

b. Industrial Service Supply (IND); and

c. Agricultural Supply (AGR).

102. This Order establishes WDRs pursuant to division 7, chapter 41, article 4 of the Water Code for discharges that are not subject to regulation under Clean Water Act section 402 (33 U.S.C. § 1342).

103. These WDRs implement numeric and narrative water quality objectives for groundwater established by the Basin Plan. The numeric objectives for groundwater designated for municipal and domestic supply (MUN) include the Maximum Contaminant Levels (MCLs) and bacteriological limits specified in California Code of Regulations, title 22, section 64421 et seq. The Basin Plan states that groundwater for use as domestic or municipal water supply (MUN) must not contain taste- or odor-producing substances in concentrations that adversely affect beneficial uses as a result of human activity.

104. It is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order promotes that policy by requiring discharges to meet the MCLs designed to protect human health and ensure that water is safe for domestic use.

105. These WDRs also implement state regulations applicable to the discharge of solid waste to land (including mining waste) found in California Code of Regulations, title 27, division 2, subdivision 1, commencing with section 20005 ("Consolidated Regulations for Treatment, Storage, Processing or Disposal of Solid Waste"). These regulations contain classification criteria for wastes and for disposal sites, and prescribe minimum standards for the siting, design, construction, monitoring, and closure of waste management units.

106. Surface mining operations at the Facility are subject to the California Surface Mining and Reclamation Act (SMARA; Public Resources Code, § 2710 et seq.). California Code of Regulations, title 27, section 22510 requires the Regional Water Board to issue WDRs incorporating the relevant provisions of the approved mining and reclamation plan, prescribe additional conditions as necessary to prevent water quality degradation, and ensure that there will be no significant increase in the concentration of indicator parameters or waste constituents in groundwater or surface water, unless requirements are waived. This Order complies with this directive.

107. Pursuant to Water Code section 13263.1, the Regional Water Board finds that the proposed mining waste discharge is consistent with a waste management strategy that prevents pollution or contamination of the waters of the state.

108. Consistent with Water Code section 13241, the Regional Water Board, in establishing the requirements contained herein, considered factors including, but not limited to, the following:

    a. Past, present, and probable future beneficial uses of water.

    b. Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

    c. Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

    d. Economic considerations.

    e. The need for developing housing within the region(s).

    f. The need to develop and use recycled water.

109. Water Code section 13267 authorizes the Colorado River Basin Water Board to require technical and monitoring reports. The monitoring and reporting requirements in Monitoring and Reporting Program (MRP) R7-2020-0004 are necessary to demonstrate compliance with the Order. The State Water Resources Control Board's (State Water Board) electronic database, GeoTracker Information Systems, facilitates the submittal and review of monitoring and reporting documents. The burden, including costs, of the MRP bears a reasonable relationship to the need for that information and the benefits to be obtained from that information.

110. Pursuant to Water Code section 13263, subdivision (g), the discharge of waste is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

Antidegradation Analysis

111. State Water Resource Control Board (State Water Board) Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California* (Resolution 68-16), generally prohibits the Regional Water Board from authorizing discharges that will result in the degradation of high quality waters, unless it is demonstrated that any change in water quality will (a) be consistent with maximum benefit to the people of the state, (b) not unreasonably affect beneficial uses, and (c) not result in water quality less than that prescribed in state and regional policies (e.g., the violation of one or more water quality objectives). The discharger must also employ best practicable treatment or control (BPTC) to minimize the degradation of high-quality waters. High quality waters are surface waters or areas of groundwater that have a baseline water quality better than required by water quality control plans and policies.

112. The Order complies with Resolution 68-16 by requiring the Discharger to design, construct, and maintain waste containment systems—including the Heap Leach Pad, Event Pond, Tank Pond, and Solution Conveyance Channel—that fully contain and prevent "Class B" discharges of mining waste and waste constituents to waters of the state; therefore, no degradation of the underlying groundwater is expected to occur from these mining units.

113. The Heap Leach Pad will be underlain by the triple-lined LCRS and VZMS. All the leach/pregnant solution that is applied to the heap will be collected and recovered within the LCRS. All recovered fluids will be contained and transported within a closed-loop conveyance pipe system that is itself housed in a system of impermeable double-lined ditches that collectively act as a secondary and tertiary containment unit. The Tank Pond and the Event Pond are also a part of this closed loop system that provides three levels of containment. The VZMS is a pan lysimeter that is designed to capture any fluids which escape the primary liner containment and the secondary LCRS containment. Both the LCRS and the VZMS are equipped with riser sumps, which will allow for the detection, sampling, and removal of any fluids so that excessive head buildup on the secondary liner does not occur.

114. Within the closed system and upon completion of the heap leach process, each pile or segment will be flushed with fresh water or otherwise treated after completion of leaching operations to reduce cyanide concentrations to an acceptable level that would result in a change of mining waste classification from Group B to Group C, as defined in California Code of Regulations, title 27, section 22480(b)(3). The pile would then eventually be removed, recycled, or otherwise closed in accordance with an approved closure plan for the Facility.

115. The North Overburden Pile, South Overburden Pile, North Growth Media Stockpile, and South Growth Media Stockpile consist of waste that has been classified as "Group C" mining waste, or chemically inert and non-hazardous with characteristics that would not otherwise conflict with the Basin Plan for potential constituents of concern (COCs) other than turbidity. This waste has also been analyzed to demonstrate that the overburden does not contain the minerals necessary to have the potential to generate acid or acid mine waste. These stockpiles and overburden piles shall be monitored to ensure proper surface drainage that complies with the Facility's construction and/or industrial stormwater permits, and that all/any erosion or maintenance that the waste piles may need is conducted in a timely manner as to not pose a threat to groundwater quality.

116. Degradation of groundwater by some of the typical waste constituents associated with overburden and waste rock stockpiling, namely turbidity, is consistent with the maximum benefit to the people of the state. The Discharger supports the economic prosperity of the community by the employment of full-time and part-time personnel at the gold mine. The economic prosperity of surrounding communities and associated industries is of maximum benefit to the people of the state and provides sufficient justification for allowing any limited groundwater degradation that may occur pursuant to this Order.

Stormwater

117. The final surfaces, interim surfaces, and top deck areas of the Heap Leach Pad will be sloped to promote controlled run-off of stormwater which falls directly onto the pad. Channels, basins, and other drainage control structures will be constructed during various phases of construction and operations.

118. During a storm or overflow event, the overflow and any leach solution from normal operations will be collected and routed inside of a double-lined perimeter Solution Conveyance Channel along the western, southern, and eastern side of the Heap Leach Pad. This channel has a closed 28" carbon steel pipe for primary containment and has two layers of 80 mil LLDPE geomembranes providing secondary and tertiary containment. The Solution Conveyance System will convey all the overflow from the 28" conveyance pipe through the double-lined conveyance ditch, towards the double-lined Event Pond. The Event Pond's contents will be temporarily stored and pumped back into the barren solution tank within the Tank Pond, and then pumped again to the top of the Heap Leach Pad so that it may be recirculated through the

Heap Leach Pad and conveyance system under normal flow conditions. Therefore, no on-site stormwater discharges are anticipated, as all stormwater collected within the Heap Leach Pad area will be incorporated in the leaching process solutions.

119. There is also a stormwater conveyance channel that is engineered to divert and convey off-site stormwater runoff from north and west of the Facility in a controlled manner to minimize erosion, and discharge the stormwater towards a natural drainage on the southeastern side of the Facility. The stormwater conveyance ditch is separated from the pregnant solution conveyance system by the site's perimeter access road. The access road will have a safety berm on either side to prevent vehicles from entering either the stormwater conveyance ditch or the pregnant solution conveyance ditch. The access road and ditches will be approximately 25' in width total. The stormwater conveyance ditch will be approximately 14' wide. The flow will discharge into the native arroyo away from the Heap Leach Pad at the southeast corner of the property.

120. For active soil stockpiles, the Discharger will use micro-catchments provided by tracking heavy equipment up and down the surface of the piles. Once the Discharger is done adding material to these stockpiles, more permanent stormwater best management practices (BMPs) will be installed including:

- Coarse rock riprap armoring if nearby ephemeral surface water flow;
- Rock mulching; and
- Seeding with native seed mix collected on site.

121. Federal regulations for stormwater discharges were promulgated by the U.S. Environmental Protection Agency (USEPA) on November 16, 1990 (40 C.F.R. parts 122, 123, and 124) to implement the Clean Water Act's stormwater program set forth in Clean Water Act section 402(p) (33 U.S.C. §1342(p)). In relevant part, the regulations require specific categories of facilities that discharge stormwater associated with industrial activity to "waters of the United States" to obtain National Pollutant Discharge Elimination System (NPDES) permits and to require control of such pollutant discharges using Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to prevent and reduce pollutants and any more stringent controls necessary to meet water quality standards.

122. The State Water Board adopted Order 2014-0057-DWQ (NPDES No. CAS000001), *General Permit for Storm Water Discharges Associated with Industrial Activities* (Industrial General Permit), which became effective on July 1, 2015. The Industrial General Permit regulates discharges of stormwater associated with certain industrial activities, excluding construction activities, and requires submittal of a Notice of Intent (NOI) to be covered under the permit. The Facility filed a Notice of Non-Applicability (NONA) under Industrial General Permit on the basis that the Facility is not hydrologically connected to waters of the United States; in a letter dated June 10, 2019, the U.S. Army Corps of Engineers agreed that there

is no hydrological connection from the Facility to waters of the United States.

123. The State Water Board also adopted Order 2009-0009-DWQ (NPDES NO. CAS000002), *General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit), which regulates Dischargers whose projects disturb one or more acres of soil, or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres. The Facility filed has indicated that it does not intend to enroll under the Construction General Permit during the construction phase because the Facility is not hydrologically connected to waters of the United States.

124. Nevertheless, the Discharger must comply with all pertinent stormwater requirements contained in title 27 of the California Code of Regulations and in this Order.

Financial Assurances

125. The State Water Board-promulgated provisions of title 27 of the California Code of Regulations require maintenance of appropriate financial assurance mechanisms to cover all expenses related to the following:

    a. Closure Activities (Cal. Code Regs., tit. 27, §§ 22207, 22510) – In at least the amount of the current closure cost estimate;

    b. Post-closure Maintenance (Cal. Code Regs., tit. 27, §§ 22212, 22510) – In at least the amount of the current post-closure cost estimate; and

126. Appendix N of the ROWD from November 2018 included a statement regarding estimated costs for closure and post-closure maintenance. The relevant costs listed in that document include activities such as revegetation and erosion control, monitoring and maintenance, drainage maintenance and repair, security, site inspections, and a 20% contingency factor. The estimated costs are as follows:

a.	Final grading	$389,260
b.	Drilling, sampling, and laboratory analysis	$416,090
c.	Structure demolition and removal	$270,000
d.	Final closure and post closure maintenance plans	$50,000
e.	20% contingency cost	$225,070

127. If the lead agency for SMARA acting under the authority of Public Resources Code section 2774, subdivision (a) requires assurances of financial responsibility, these assurances can be used to fulfill all comparable requirements under title 27, provided

that: (1) the Regional Water Board approves the financial assurance; and (2) the Regional Water Board is named as alternate payee. (Cal. Code Regs, tit. 27, § 22510, subd. (g).)

128. The County of San Bernardino is the lead agency for purposes of SMARA and has approved the Discharger's updated Mine and Reclamation Plan (90M-013) and related financial assurance for the cost of reclaiming all disturbed areas. The Discharger is currently in the process of finalizing an updated financial assurance with the county.

129. Within 90 days following the issuance of this Order, the Discharger must provide appropriate assurances of financial responsibility in compliance with title 27 of the California Code of Regulations.

CEQA and Public Participation

130. Prior to the opening of Castle Mountain Mine in 1990, the BLM and the County of San Bernardino—acting as the lead agencies under the National Environmental Policy Act (NEPA; 42 U.S.C. § 4321 et seq.) and the California Environmental Quality Act (CEQA; Public Resources Code, § 21000 et seq.), respectively—prepared a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the operation of Castle Mountain Mine (State Clearinghouse [SCH] No. 88062708). The County of San Bernardino certified the EIR and filed a Notice of Determination on September 27, 1990. The BLM issued a Record of Decision and certified EIS No. 890053 on October 31, 1990.

131. Thereafter, in or about 1997, the BLM and County of San Bernardino prepared a joint subsequent EIS/EIR in response to Viceroy's proposal to expand active mining operations at Castle Mountain Mine (1997 EIS/ EIR). The county certified the EIR at a public hearing in front of the County Planning Commission on November 6, 1997 (SCH No. 95081031), and the BLM issued a Record of Decision approving expansion on March 19, 1998.

132. In January 2019, the Discharger requested revisions to the approved Mine and Reclamation Plan (90M-013) from the BLM and County of San Bernardino. On August 23, 2019, the County of San Bernardino approved the 2019 amendment to the Mine and Reclamation Plan, granting a 10-year extension to the life of the mine. In issuing this approval, the County of San Bernardino, acting as lead agency under CEQA, determined that no further environmental review beyond that conducted in the 1997 EIS/EIR was required pursuant to Public Resources Code section 21166 and California Code of Regulations, title 14, section 15162. On February 5, 2020, the County of San Bernardino sent a letter to the Regional Water Board confirming that it had conducted this analysis and explaining the rationale for its determination.

133. Additionally, on February 27, 2020, the BLM issued a Record of Decision approving the requested modification to the Mine and Reclamation Plan. The Record of

Decision relied upon the concurrent issuance of a Finding of No Significant Impact (FONSI) under NEPA and other supporting documents.

134. As a responsible agency under CEQA, the Regional Water Board has considered the 1900 EIS/EIR, 1997 EIS/EIR, and addendum analysis in the County of San Bernardino's February 4, 2020 letter, and in making its determinations and findings, must presume that the adopted environmental documents comport with the requirements of CEQA and are valid. (Pub. Resources Code, § 21080.1(a).21167.2.). The Regional Water Board has reviewed and considered the environmental documents and finds that they adequately address the project's impacts within the scope of the Regional Water Board's discretionary approval. (Cal. Code Regs., tit. 14, § 15096, subds. (f), (h).)

135. The Regional Water Board also finds that further CEQA review is not required pursuant to Public Resources Code section 21166 and California Code of Regulations, title 14, section 15162, because the activities authorized by this Order were previously analyzed in the 1990 EIS/EIR, 1997 EIS/EIR, and recent addendum analysis by the County of San Bernardino and do not exceed the scope of their analyses. The activities authorized by this Order are substantially similar to activities authorized under prior WDRs Orders 90-002 and 99-015, and subject to discharge requirements no less stringent under this Order than in prior orders. The Regional Water Board concludes that there are no project changes, changed circumstances, or new information within the meaning of Public Resources Code section 21166 that will create new or more severe significant environmental effects in the area of the Regional Water Board's jurisdiction.

136. The Regional Water Board has notified the Discharger and all known interested agencies and persons of its intent to update the WDRs for this discharge and has provided them with an opportunity for a public meeting and to submit comments.

137. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED pursuant to Water Code sections 13263 and 13267 that the Discharger shall comply with the following:

A. Discharge Prohibitions

1. Discharge of waste classified as "hazardous," as defined in California Code of Regulations, title 27, section 20164, is prohibited.

2. The disposal of incompatible wastes or wastes that, when mixed or commingled with other wastes, may create heat, pressure, fire, explosion, toxic by-products, or other chemical reactions that: (1) impair the integrity of the containment structures, or (2) generate products requiring a higher level of containment than provided by the waste management unit/mining unit into which the wastes are placed, is prohibited.

3. The discharge of “Group B” mining waste other than the permitted discharge is prohibited. For the purposes of this Order, the term “Group B” mining waste is defined in California Code of Regulations, title 27 section 22480.

4. The discharge of any waste other than mining waste at the Facility is prohibited. Prohibited wastes may include, but are not limited to oil, grease, solvents, other petroleum products, and toxic and hazardous materials.

5. The discharge of wastes outside of the mining unit(s) or portions of a mining unit specifically designed for their containment is prohibited.

6. The discharge of Class B mining wastes to the unsaturated/vadose zone or to groundwater is prohibited.

7. The discharge of mining waste to land not owned or controlled by the Discharger is prohibited.

8. The discharge of waste to any surface water or surface drainage courses is prohibited.

9. The storage, treatment, or disposal of wastes at the Facility shall not cause contamination, pollution, or nuisance as defined in Water Code section 13050, subdivisions (k), (l), and (m).

B. General Discharge Specifications

1. The Discharger shall comply with all applicable provisions of title 27 (Cal. Code Regs., tit. 27, § 20005 et seq.), even if not specifically referenced in this Order.

2. Wastes shall be discharged only into mining units specifically designed for their containment and/or treatment, as described in this Order.

3. The Discharger is responsible for accurate characterization of wastes, including determinations of whether wastes will be compatible with containment features and other wastes at the mining unit, and whether the wastes are required to be managed as a “hazardous” waste.

4. The Discharger shall not cause the concentration of any Constituent of Concern (including Laboratory Monitoring Parameters), as specified in the MRP R7-2020-0004 and incorporated herein by reference, to exceed its representative concentration limit in any monitoring medium (i.e., exceed the Water Quality Protection Standard). The concentration limit for each constituent will be set in accordance with the MRP. Data analysis shall be performed in accordance with the MRP.

5. Mining waste shall be treated or neutralized whenever feasible to minimize the threat to water quality and minimize the need to install waste containment structures.

6. All mining units shall be operated to ensure that wastes, including leachate, will be a minimum of five feet above the highest anticipated elevation of underlying groundwater, including the capillary fringe.

7. The Discharger shall promptly notify the Regional Water Board of any slope failure occurring at a mining unit. The Discharger shall promptly correct any failure which threatens the integrity of containment features or the unit in accordance with the method approved by the Regional Water Board's Executive Officer.

8. The Discharger shall promptly remove and properly dispose of any unpermitted wastes that are discharged at the Facility in violation of these requirements.

9. Groundwater used for site maintenance shall be limited to the amount necessary for dust control.

C. "Group B" Mining Unit Specifications[10]

1. The LCRS for each Group B mining unit shall be designed, constructed, maintained, and operated to collect and remove twice the maximum anticipated daily volume of leachate from the unit.

2. Leachate generation by an LCRS for a mining unit shall not exceed 85% of the design capacity of (a) the LCRS, or (b) the sump pump. If leachate generation exceeds this value and/or if the depth of the fluid in an LCRS exceeds the minimum needed for safe pump operation, then the Discharger shall immediately notify the Regional Water Board in writing within **seven (7) days**. Notification shall include a timetable for a remedial action to repair the containment structures or other action necessary to reduce leachate production.

3. Each LCRS shall be operated to function without clogging through the scheduled closure of the applicable mining unit and during the post-closure maintenance period. Each LCRS shall be tested at least **annually** to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions.

4. The Discharger shall notify the Regional Water Board within **seven (7) days** if fluid is detected in a previously-dry LCRS or unsaturated zone monitoring system, or if a progressive increase is detected in the volume of fluid in an LCRS

[10] "Group B" mining units include the Heap Leach Pad, Event Pond, Tank Pond, and Solution Conveyance Channel.

which exceeds the previously-observed range of volumes for that location, or exceeds the Leakage Rate (LR) specified in the MRP.

5. The Discharger shall maintain sufficient freeboard in Group B mining units to accommodate seasonal precipitation and to contain a 100 year, 24-hour storm event, but in no case no less than two feet of freeboard (measured vertically).

6. Any direct-line discharge to Group B mining units shall have fail-safe equipment or operating procedures to prevent overfilling. Discharges shall be stopped in the event of any containment system failure which causes a threat to water quality.

7. All visible portions of synthetic liners shall be inspected **weekly** until all free liquid is removed from the Group B mining unit as part of closure. If during the active life of the impoundment, the wastes are removed and the bottom of the impoundment is cleaned down to the liner, an inspection shall be made of the bottom of the liner prior to refilling of the impoundment.

8. LCRS maintenance and repair plans shall be submitted to the Regional Water Board in advance of any work. Group B mining unit repair plans and liner Construction Quality Assurance (CQA) Plans shall be developed and stamped by a licensed professional experienced in this type of work.

9. Within the Heap Leach Pad, the Discharger shall maintain devices installed in the ore piles that measure solution depth (hydraulic head) within each ore pile over the liner.

10. Cyanide solutions shall be contained only in the Heap Leach Pad, Solution Conveyance System, Tank Pond, Event Pond, and/or other leak-proof containers.

11. There shall be no wind transport of cyanide solution or ore containing cyanide away from the Heap Leach Pad area.

12. Standby emergency facilities shall be available to assure continual circulation of the leaching solution if a planned processing configuration or rate could, in an emergency, result in a flow in excess of existing Event Pond capacity.

D. "Group C" Mining Unit Specifications[11]

1. The Discharger shall maintain all overburden and stockpiles to prevent excess erosion and stormwater ponding through the use of best management practices, such as micro-catchments from machine tracks; coarse rock riprap armoring if nearby ephemeral surface water flow; rock mulching; and seeding with native seed mix collected on site.

[11] "Group C" mining units include the North and South Overburden Piles and the North and South Growth Media Stockpiles.

2. The perimeter of all Group C mining units shall be inspected monthly for erosion, ponding, excessive plant growth, and incompatible wastes.

E. Stormwater Specifications

1. The Facility shall be designed, operated, and maintained to prevent inundation, washout, or erosion of wastes or covering material, which could occur as a result of floods having a predicted frequency of once in 100 years.

2. Surface and subsurface drainage from outside of a mining unit shall be diverted from the unit.

3. Leached ore residual shall not be placed in perennial, intermittent, or ephemeral stream channels, unless provisions are made to divert runoff around the waste in a non-erosive manner. Waste shall not be placed where they can be eroded by stream flows or cause accelerated stream bank erosion.

4. Diversion and drainage facilities shall be designed, constructed, and maintained to:

    a. Accommodate the anticipated volume of precipitation and peak flows from surface runoff and under the precipitation conditions for the mining unit.

    b. Effectively divert sheet flow runoff laterally, via the shortest distance, into the drainage and collection facilities.

    c. Prevent surface erosion through the use of energy dissipators where required to decrease the velocity of runoff, slope protection, and other erosion control measures where needed to prevent erosion.

    d. Control and intercept run-on, in order to isolate uncontaminated surface waters from water that might have come into contact with waste.

    e. Take into account:

        i. For closed mining units and for closed portions of units, the expected final contours of the closed unit, including its planned drainage pattern.

        ii. For operating portions of mining units other than surface impoundments, the unit’s drainage pattern at any given time.

        iii. The possible effects of the mining unit’s drainage pattern on and by the regional watershed.

        iv. The design capacity of drainage systems of downstream and adjacent properties by providing for the gradual release of retained water downstream in a manner which does not exceed

the expected peak flow rate at the point of discharge if there were no Facility.

f. Preserve the system's function. The Discharger shall periodically remove accumulated sediment from sedimentation or detention basins as needed to preserve the design capacity of the system.

5. Collection and holding facilities associated with precipitation and drainage control systems shall be emptied immediately following each storm or otherwise managed to maintain the design capacity of the system.

F. Construction Specifications

1. Construction shall be performed in accordance with a Construction Quality Assurance Plan that complies with California Code of Regulations, title 27, section 20324 and is prepared by a registered civil engineer or certified engineering geologist.

2. The Construction Quality Assurance program, including all relevant aspects of construction quality control, shall provide evidence that materials and procedures utilized in the placement of the any containment feature at any mining unit will be tested and monitored to assure the structure is constructed in accordance with the design specifications approved by the Regional Water Board.

3. **Preconstruction Notice.** At least **60 days** prior to the commencement of construction of each phase/component of the Facility, the Discharger shall submit a technical report to the Regional Water Board for approval by the Executive Officer, which shall include a plan showing in detail the proposed construction of that phase/component. Any portion of the 60-day requirement may be waived in writing by the Executive Officer at the request of the Discharger.

4. **Pre-operations Notification.** At least **10 days** prior to commencement of operations at any new component, or at least **20 days** prior to loading ore onto any new Heap Leach Pad phase, the Discharger shall submit a certificate to the Regional Water Board, signed by a California Registered Civil Engineer or Certified Engineering Geologist, stating that the pads, containment basins, leakage detection system, flood protection and attendant facilities, and/or disposal areas are constructed in accordance with the respective technical report as approved by the Executive Officer to meet the requirements of this Order.

5. **CQA Final Report**. Within **90 days** of the completion of construction, the Discharger shall submit a final Construction Quality Assurance (CQA) report documenting the construction process and containing the quality assurance documentation described in the ROWD and required by section 20324(d) of title 27 of the California Code of Regulations.

G. Corrective Action Specifications

1. For all mining units in a corrective action program to address a release from the unit, the Discharger shall implement all corrective measures necessary to remediate the release and to ensure that the Discharger achieves compliance with the Water Quality Protection Standard (as defined in the MRP) adopted for that unit. To show cleanup of all water-bearing media affected by the release, the Discharger shall complete the demonstration required under California Code of Regulations, title 27, section 20430(g).

2. The cessation of any corrective action measure (e.g. leachate and groundwater extraction) is prohibited without written approval from the Regional Water Board's Executive Officer. If routine maintenance or a breakdown results in cessation of corrective action for greater than 24 hours, the Discharger shall notify Regional Water Board staff.

3. Following an earthquake that generates significant ground shaking (Modified Mercalli Intensity Scale V or greater) at or near the Facility, the Discharger shall submit a detailed post-earthquake inspection and corrective action plan. The plan shall address damage to and corrective measures for: containment structures; leachate control and stormwater management systems; wells and equipment to monitor groundwater; and any other system/structure potentially impacted by static and seismic deformations of the mining unit. The Discharger shall notify the Regional Water Board's Executive Officer immediately, but no later than 24 hours, of damage to the Facility due to an earthquake, and provide a post-earthquake inspection report within **15 business days**.

H. Monitoring Specifications

1. The Discharger shall implement MRP R7-2020-0004 and any revisions thereto to detect at the earliest opportunity unauthorized discharges of waste constituents from the Facility, or any impairment of beneficial uses that result from discharges of waste to the Facility. The Discharger shall report the results of all onsite monitoring in accordance with MRP R7-2020-0004 and revisions thereto.

2. Pursuant to California Code of Regulations, title 27, section 22500, the Discharger shall conduct a water quality monitoring and response program in accordance with MRP R7-2020-0004 and any future amendments thereto, including:

    a. Detection Monitoring. The Discharger shall institute a detection monitoring program pursuant to California Code of Regulations, title 27, section 20420.

b. Evaluation Monitoring. The Discharger shall institute an evaluation monitoring program under California Code of Regulations, title 27, section 20425:

i. Whenever there is "measurably significant" (as defined in section 20164) evidence of a release from a mining unit under the detection monitoring program; or

ii. Whenever there is significant physical evidence of a release from a mining unit. Significant physical evidence of a release includes unexplained volumetric changes in surface impoundments, unexplained stress in biological communities, unexplained changes in soil characteristics, visible signs of leachate migration, and unexplained water table mounding beneath or adjacent to the unit and any other change to the environment that could reasonably be expected to be the result of a release from the unit.

c. Corrective Action Monitoring. The Discharger shall institute a corrective action program under California Code of Regulations, title 27, 20430 when the Regional Water Board determines that the assessment of the nature and extent of the release and the design of a corrective action program have been satisfactorily completed.

3. **Sample Collection and Analysis Plan.** Within **90 days** of the adoption of these WDRs, the Discharger shall submit to the Regional Water Board for review and approval a comprehensive Sample Collection and Analysis Plan (SCAP) that shall describe in detail the methods to be used to perform all monitoring activities for all onsite features, including:

a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;

b. Sample preservation information and shipment procedures;

c. Sample analytical methods and procedures;

d. Sample quality assurance/quality control (QA/QC) procedures;

e. Chain of custody control; and

f. Sample analysis information including sample preparation techniques to avoid matrix interferences, method detection limits (MDLs), practical quantitation limits (PQLs) and reporting limits (RLs), and procedures for reporting trace results between the MDL and PQL.

Once the SCAP is approved, the Discharger may request changes to the approved SCAP, as needed, but shall use the procedures described in the approved SCAP until such changes are authorized by the Regional Water Board's Executive Officer.

4. **Groundwater Monitoring Network Workplan.** Within **90 days** of the adoption of this Order, the Discharger shall submit to the Regional Water Board's Executive Officer for review and approval a workplan describing how many new wells are needed to properly monitor groundwater at the Facility in compliance with California Code of Regulations, title 27, section 20415, and propose a time schedule, location(s), and methods of installation for the new monitoring well(s). Within **30 days** of approval of the workplan by the Executive Officer, the Discharger shall begin implementation of the work plan in accordance with the time schedule. The time schedule for implementation shall not exceed 12 months. The Discharger shall not begin discharging the cyanide leach solution to any Group B mining units until an approved groundwater monitoring network is in place.

5. **Unsaturated Zone Monitoring Workplan.** Within **90 days** of the adoption of this Order, the Discharger shall submit to the Regional Water Board for review and approval a workplan for installing unsaturated/vadose zone monitoring systems under the Group B mining units that meet the requirements of California Code Regulations, title 27, section 20415.

I. Financial Assurances Specifications

1. The Discharger shall obtain and maintain adequate assurances of financial responsibility for closure and post-closure maintenance at the Facility in accordance with California Code of Regulations, title 27, section 22510.

2. Financial Assurances Approval. Within **90 days** of the adoption of these WDRs, the Discharger shall demonstrate to the Regional Water Board that it has established acceptable financial assurance mechanisms described in subchapter 3 ("Allowable Mechanisms") of California Code of Regulations, title 27, division 2, subdivision 1, chapter 6 in at least the amount of the cost estimates for closure and post-closure maintenance approved by the Regional Water Board's Executive Officer.

3. Yearly Financial Assurances Report. The Discharger shall submit, by June 1 of each year, a report calculating the increase in the cost estimates for closure and post-closure maintenance due to the inflation factor (specified in Cal. Code Regs., tit. 27, § 22236) for the previous calendar year.

4. Documents supporting the amount and active status of the required financial assurance mechanisms shall be included in the Facility's ROWD and revisions. Annual cost estimates and inflation factors shall be submitted to the Regional Water Board as an addendum to the ROWD.

J. Closure and Post-Closure Specifications

1. New and existing mining units shall be closed so that they no longer pose a threat to water quality. No post-closure land uses shall be permitted that might impair the integrity of containment structures.

2. The Discharger shall notify the Regional Water Board in writing of the final closure or partial final closure of a mining unit at least **180 days** prior to beginning any final closure activities. The notice shall include a statement that all closure activities will conform to the most recently-approved final or partial final closure plan and that the plan provides for site closure in compliance with all applicable federal and state regulations.

3. The Discharger shall carry out closure of a mining unit or a portion of a unit only in accordance with a closure and post-closure maintenance plan approved by the Regional Water Board through the issuance of closure Waste Discharge Requirements.

K. Special Provisions

1. **Spill Prevention Plan.** Within **90 days** of the adoption of this Order, the Discharger shall submit the Spill Prevention Plan for approval by the Regional Water Board's Executive Officer. The Discharger shall develop and implement a plan for immediate detection of leaks or failures in the aboveground pipelines carrying leaching, barren, or pregnant effluent. An alarm or shutoff device shall be installed on the pump used in the leaching, barren, or pregnant effluent pipelines. Pumping of leaching, barren, or pregnant effluent shall be suspended immediately following major pipeline failure. The plan shall include daily inspection of the entire length of aboveground line in operation at the time, and the maintenance of a daily log. Minor leaks shall be repaired immediately upon being identified. Lines should be sign posted or marked to identify the fluid being pumped and alerting the public of the potential danger.

2. **Cyanide Solution Spill Reporting.** If leaks or failures in the aboveground pipelines carrying cyanide solution occur, or if there is any spill of cyanide solution, the Discharger shall do the following:

a. Orally report to the Regional Water Board office and the Office of Emergency Services within **24 hours** of when the Discharger becomes aware of the incident. If noncompliance occurs outside of business hours, the Discharger shall leave a message on the Regional Water Board's office voicemail.

b. Provide a written report within **five business days** of the time the Discharger becomes aware of the incident. The written report shall contain a description of the noncompliance and its cause, the period of noncompliance, the anticipated time to achieve full compliance, and the steps taken or planned, to reduce, eliminate, and prevent recurrence of the noncompliance. The

Discharger shall estimate the total volume as well as the vertical and horizontal extent of the spill/leak/release.

c. Submit a follow-up report within **30 days** that includes confirmation sampling results indicating that cleanup goals have been achieved.

L. Standard Provisions

1. **Noncompliance.** The Discharger shall comply with all of the terms, requirements, and conditions of this Order and MRP 2020-0004. Noncompliance is a violation of the Porter-Cologne Water Quality Control Act (California Water Code, § 13000 et seq.) and grounds for: (1) an enforcement action; (2) termination, revocation and reissuance, or modification of these waste discharge requirements; or (3) denial of an Order renewal application.

2. **Enforcement.** Regional Water Board reserves the right to take any enforcement action authorized by law. Accordingly, failure to timely comply with any provisions of this Order may subject the Discharger to enforcement action. Such actions include, but are not limited to, the assessment of administrative civil liability pursuant to Water Code sections 13323, 13268, and 13350, a Time Schedule Order (TSO) issued pursuant to Water Code section 13308, or referral to the California Attorney General for recovery of judicial civil liability.

3. **Proper Operation and Maintenance.** The Discharger shall at all times properly operate and maintain all systems and components of collection, treatment, and control installed or used by the Discharger to achieve compliance with this Order. Proper operation and maintenance includes, but is not limited to, effective performance, adequate process controls, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities/systems when necessary to achieve compliance with this Order. All systems in service or reserved shall be inspected and maintained on a regular basis. Records of inspections and maintenance shall be retained and made available to the Regional Water Board on request.

4. **Reporting of Noncompliance.** The Discharger shall report any noncompliance that may endanger human health or the environment. Information shall be provided orally to the Regional Water Board office and the Office of Emergency Services within twenty-four (24) hours of when the Discharger becomes aware of the incident. If noncompliance occurs outside of business hours, the Discharger shall leave a message on the Regional Water Board's office voicemail. A written report shall also be provided within five (5) business days of the time the Discharger becomes aware of the incident. The written report shall contain a description of the noncompliance and its cause, the period of noncompliance, the anticipated time to achieve full compliance, and the steps taken or planned, to reduce, eliminate, and prevent recurrence of the noncompliance. All other forms of noncompliance shall be reported with the

Discharger's next scheduled Self-Monitoring Report (SMR), or earlier if requested by the Regional Water Board's Executive Officer.

5. **Duty to Mitigate.** The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment.

6. **Material Changes.** Prior to any modifications which would result in any material change in the quality or quantity of wastewater treated or discharged, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the Regional Water Board, and if required by the Regional Water Board, obtain revised requirements before any modifications are implemented. A material change includes, but is not limited to, the following:

    a. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements;

    b. A significant change in disposal method, location, or volume (e.g., change from land disposal to land treatment);

    c. A change in the type of waste being accepted for disposal; or

    d. A change to previously-approved liner systems or final cover systems that would eliminate components or reduce the engineering properties of components.

7. **Operational Personnel.** The Facility shall be supervised and operated by persons possessing the necessary expertise in the construction, operation, and maintenance of mining units and disposal of mining waste.

8. **Familiarity with Order.** The Discharger shall ensure that all site-operating personnel are familiar with the content of this Order and maintain a copy of this Order at the site.

9. **Inspection and Entry.** The Discharger shall allow the Regional Water Board, or an authorized representative, upon presentation of credentials and other documents as may be required by law, to:

    a. Enter the premises regulated by this Order, or the place where records are kept under the conditions of this Order;

    b. Have access to and copy, at reasonable times, records kept under the conditions of this Order;

    c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

d. Sample or monitor at reasonable times, for the purpose of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at this location.

10. **Change in Ownership.** This Order is not transferable to any person without written approval by the Regional Water Board's Executive Officer. Prior to any change in ownership of this operation, the Discharger shall notify the Regional Water Board's Executive Officer in writing at least 30 days in advance. The notice must include a written transfer agreement between the existing owner and the new owner. At a minimum, the transfer agreement must contain a specific date for transfer of responsibility for compliance with this Order and an acknowledgment that the new owner or operator is liable for compliance with this Order from the date of transfer. The Regional Water Board may require modification or revocation and reissuance of this Order to change the name of the Discharger and incorporate other requirements as may be necessary under the Water Code.

11. **Monitoring Wells.** The Discharger shall comply with all notice and reporting requirements of the California Department of Water Resources and with any well permitting requirements imposed by a local agency regarding the construction, alteration, destruction, maintenance, or abandonment of any monitoring wells used for compliance with this Order and the accompanying MRP, as required under Water Code sections 13750 and 13755 and local agency requirements.

12. **Format of Technical Reports.** The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with California Code of Regulations, title 23, division 3, chapter 30, as groundwater raw data uploads electronically over the internet into the State Water Board's GeoTracker database. Documents that are normally mailed by the Discharger, such as regulatory documents, narrative monitoring reports, materials, data, and correspondence, to the Regional Water Board shall also be uploaded into GeoTracker in the appropriate Microsoft Office software application, such as Word or Excel, or as a Portable Document Format (PDF) file. Large documents are to be split into manageable file sizes appropriately labelled and uploaded into GeoTracker.

13. **Qualified Professionals.** In accordance with Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of California registered professionals (i.e., civil engineer, engineering geologist, geologist, etc.) competent and proficient in the fields pertinent to the required activities. All technical reports required under this Order that contain work plans, describe the conduct of investigations and studies, or contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall contain a

statement of qualifications of the responsible licensed professional(s) as well as the professional's signature and/or stamp of the seal. Additionally, all field activities are to be conducted under the direct supervision of one or more of these professionals.

14. **Certification Under Penalty of Perjury.** All technical reports required in conjunction with this Order shall include a statement by the Discharger, or an authorized representative of the Discharger, certifying under penalty of perjury under the laws of the State of California, that the reports were prepared under his or her supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted, and that based on his or her inquiry of the person or persons who manage the system, the information submitted is, to the best of his or her knowledge and belief, true, complete, and accurate.

15. **Violation of Law.** This Order does not authorize violation of any federal, state, or local laws or regulations.

16. **Property Rights.** This Order does not convey property rights of any sort, or exclusive privileges, nor does it authorize injury to private property or invasion of personal rights.

17. **Modification, Revocation, Termination.** This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for an Order modification, rescission, or reissuance, or the Discharger's notification of planned changes or anticipated noncompliance, does not stay any Order condition. Causes for modification include, but are not limited to, the violation of any term or condition contained in this Order, a material change in the character, location, or volume of discharge, a change in land application plans or sludge use/disposal practices, or the adoption of new regulations by the State Water Board, Regional Water Board (including revisions to the Basin Plan), or federal government.

18. **Severability.** The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of these requirements shall not be affected.

Any person aggrieved by this Regional Water Board action may petition the State Water Board for review in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 et seq. The State Water Board must receive the petition by 5:00 p.m. on the 30th day after the adoption date of this Order; if the 30th day falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the statutes and regulations applicable to filing petitions are available on the State Water Board's website and can be provided upon request.

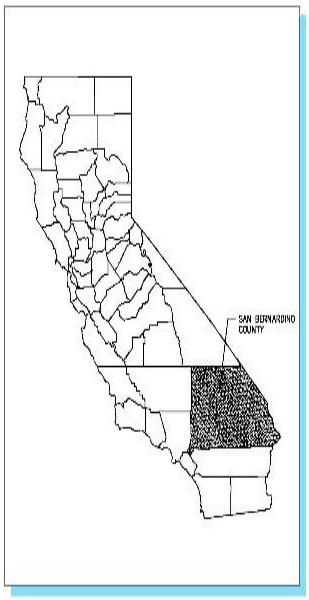
Order Attachments
Attachment A—Site Map
Attachment B—General Facility Map
Attachment C—Heap Pad Map
Attachment D—Event Pond Map
Attachment E—Monitoring Well Map
Attachment F—MRP R7-2020-0004

ATTACHMENT A—SITE MAP

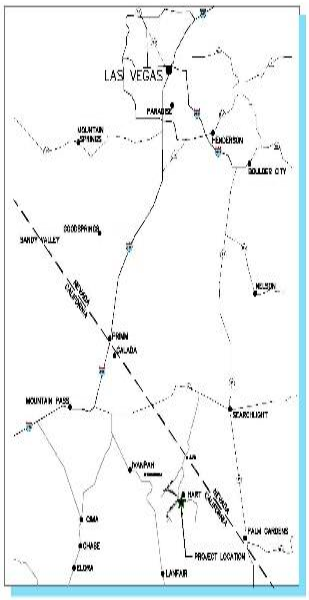
CASTLE MOUNTAIN MINE
HEAP LEACH EXPANSION PROJECT

PREPARED FOR:

CASTLE MOUNTAIN VENTURE
An Equinox Gold Group Company



CALIFORNIA COUNTIES

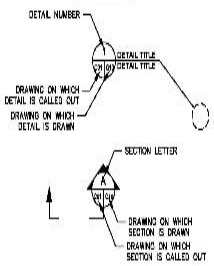


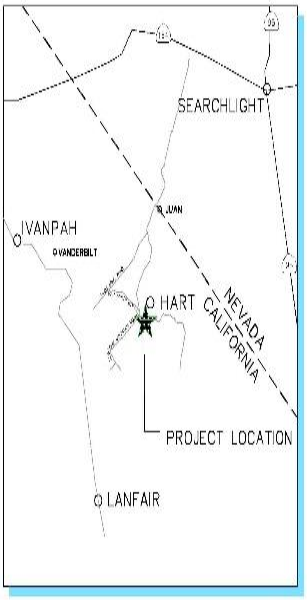
REGIONAL MAP

ABBREVIATIONS

ø	DIAMETER	OC	ON CENTER
FT	FEET	oz	OUNCE
HDPE	HIGH DENSITY POLYETHYLENE	NTS	NOT TO SCALE
MAX	MAXIMUM	%	PERCENT
MIN	MINIMUM	TYP	TYPICAL
NIS	NOT IN SECTION		

SYMBOLS





VICINITY MAP

DRAWING INDEX

DRAWING NUMBER	TITLE AND DESCRIPTION	LATEST REVISION NUMBER	LATEST REVISION DATE
GENERAL			
G01	TITLE PAGE	0	11/09/2018
G02	GENERAL LAYOUT	0	11/09/2018
CIVIL			
C01	LEACH PAD GRADING AND HAUL ROAD	0	11/09/2018
C02	ROM HEAP LAYOUT	0	11/09/2018
C03	NORTHERN PAD COLLECTION PIPES LAYOUT	0	11/09/2018
C04	SOUTHERN PAD COLLECTION PIPES LAYOUT	0	11/09/2018
C05	EVENT POND LAYOUT	0	11/09/2018
C06	FINAL CLOSURE GRADING PLAN	0	11/09/2018
C07–C09	RESERVED	0	11/09/2018
C10	DETAILS	0	11/09/2018
C11	DETAILS	0	11/09/2018
C12	DETAILS	0	11/09/2018
C13	DETAILS	0	11/09/2018
C14	DETAILS	0	11/09/2018
C15	DETAILS	0	11/09/2018
C16	DETAILS	0	11/09/2018
C17	DETAILS	0	11/09/2018
C18	DETAILS	0	11/09/2018
C19	POND DETAILS	0	11/09/2018
C20	POND DETAILS	0	11/09/2018
C21	POND DETAILS	0	11/09/2018

NOTES:
1. PIPE BENDS AND GEOSYNTHETICS ARE SHOWN NTS.

1	11/09/18	ISSUED FOR PERMITTING	JWS	DAS	DAS	TMW

DATE OF ISSUE 11/09/2018

Geo-Logic Associates
1481E Spring Hill Dr, Grass Valley, California 95945
geo-eng.com | 530.272.2448

CASTLE MOUNTAIN VENTURE
An Equinox Gold Group Company

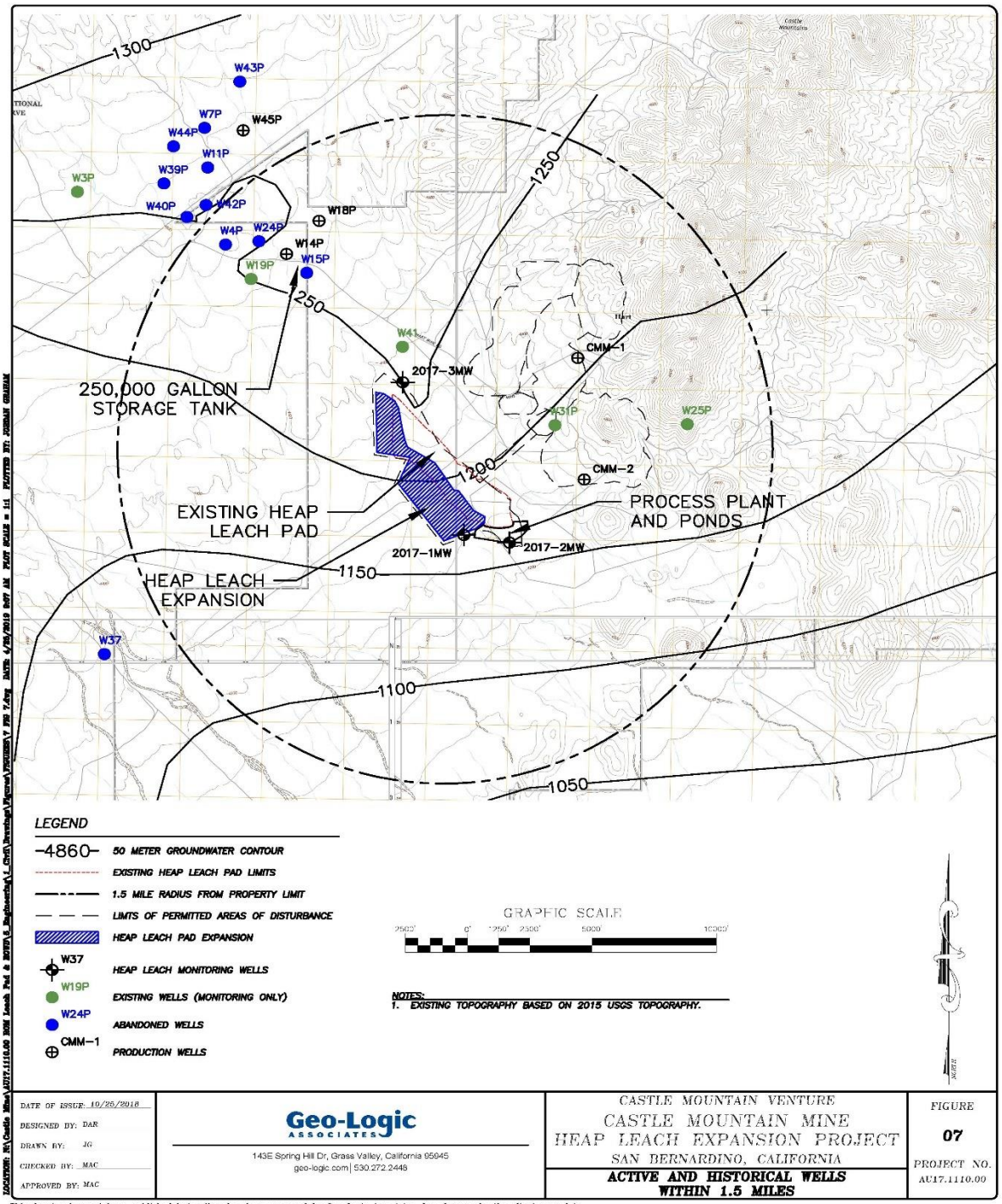
CASTLE MOUNTAIN MINE
HEAP LEACH EXPANSION PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA
TITLE PAGE

DRAWING NO. G01
PROJECT NO. 0172.110.00

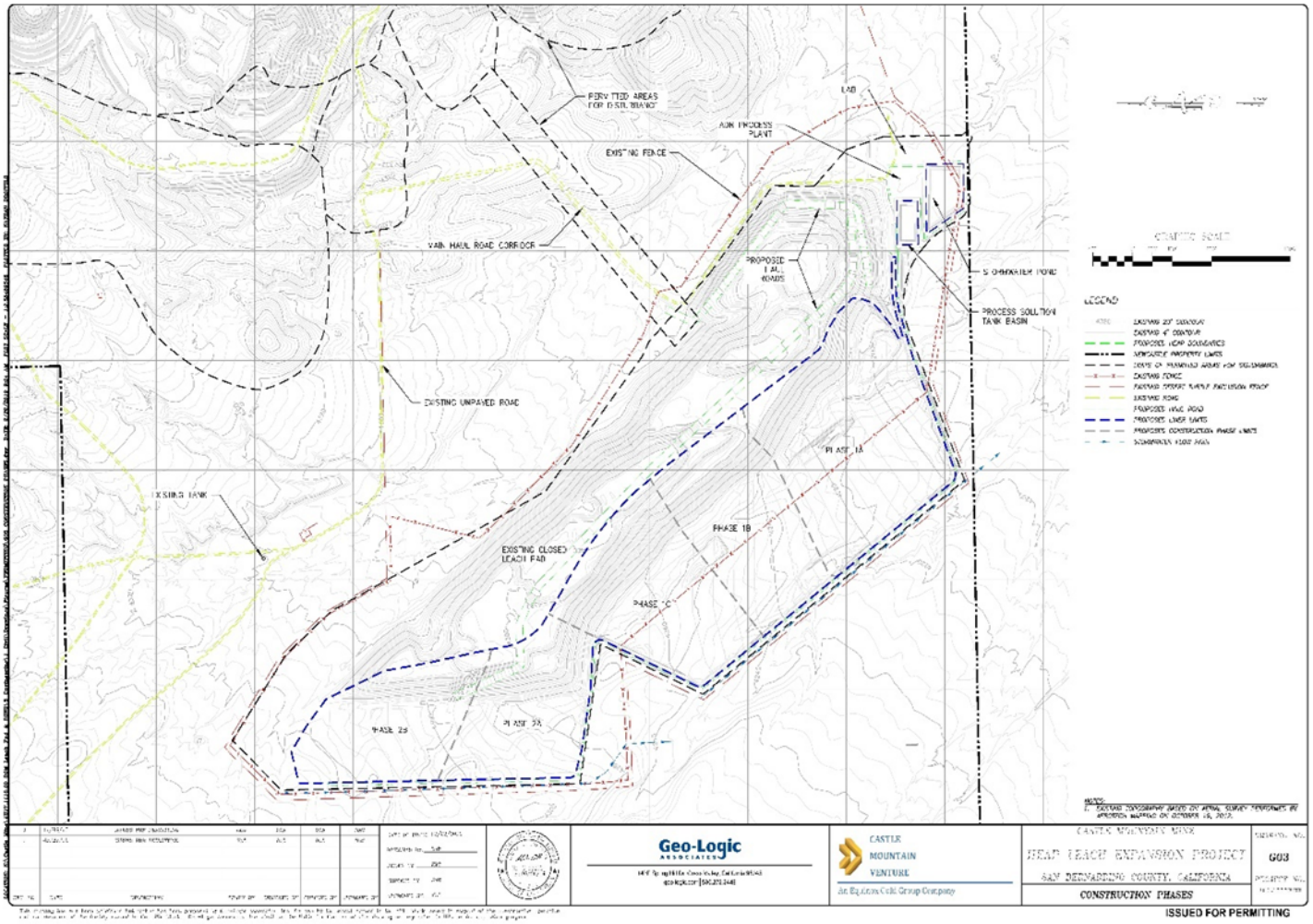
This drawing has been published but rather has been prepared by Geo-Logic Associates, Inc. for use by the client named in the title block, mainly in respect of the construction operation, and maintenance of the finally turned-in facility shown. Geo-Logic Associates, Inc. shall not be held liable for the use of this drawing on any other project or for any other purpose.

ISSUED FOR PERMITTING

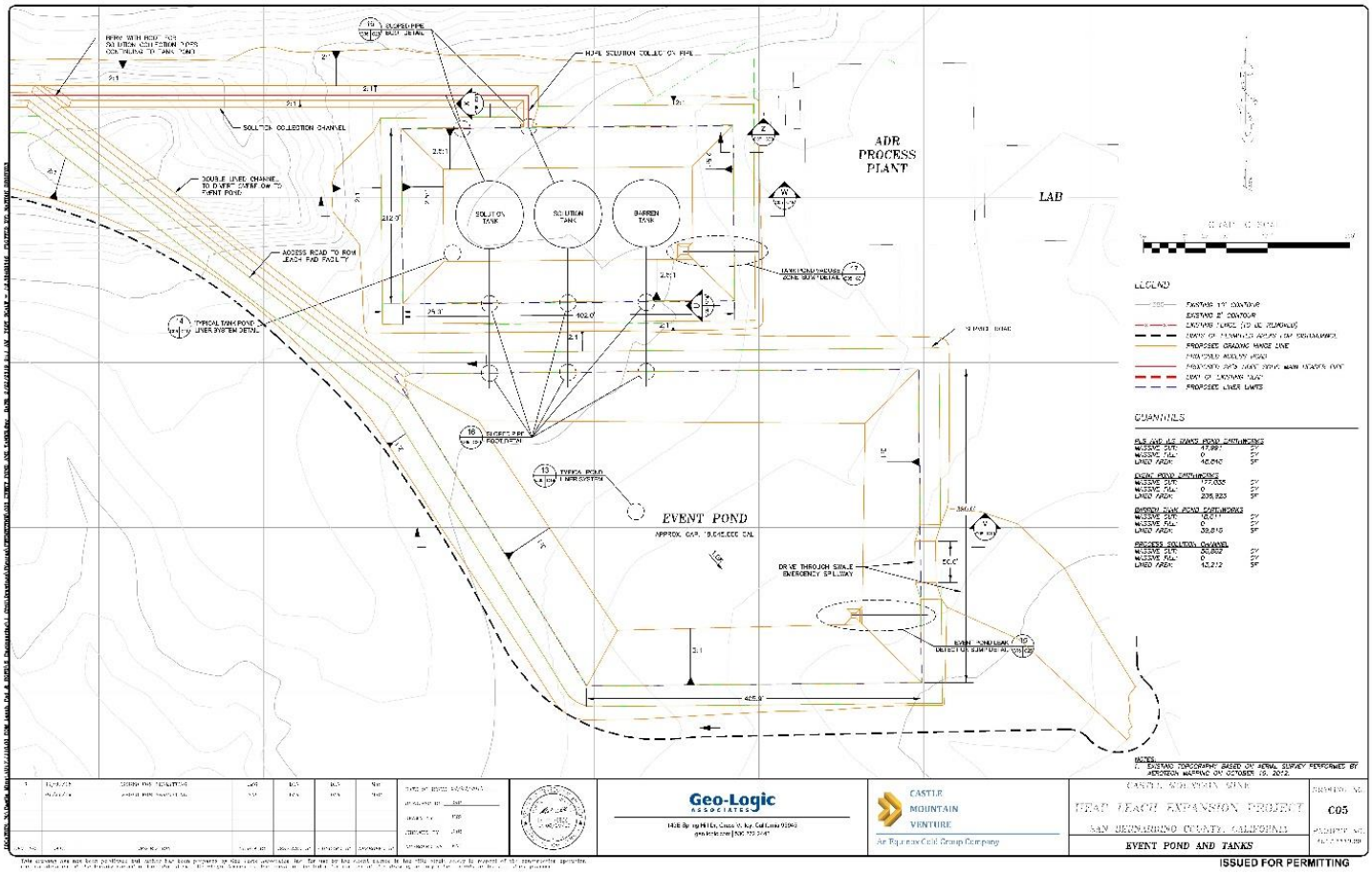
ATTACHMENT B—GENERAL FACILITY MAP



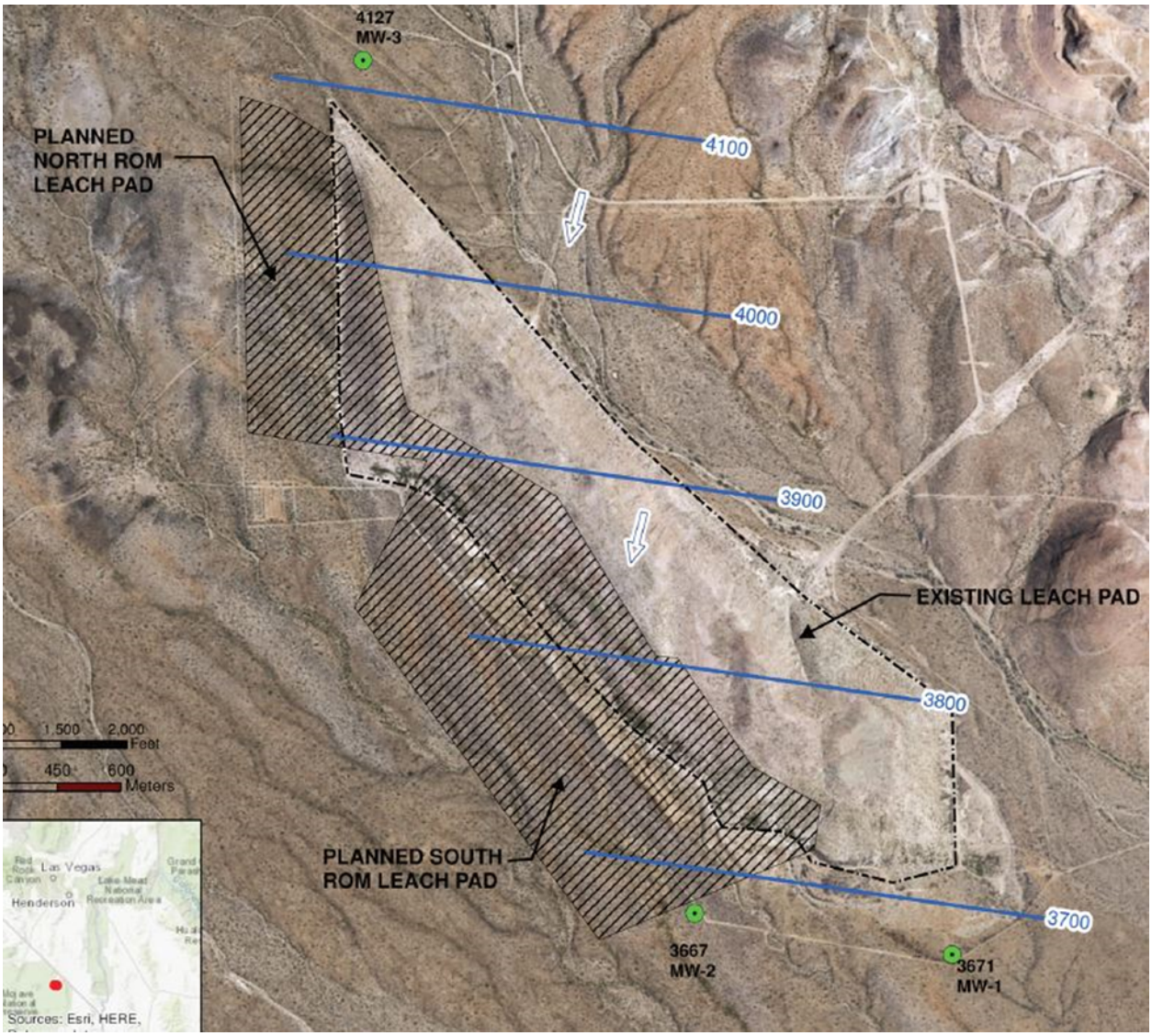
ATTACHMENT C—HEAP PAD MAP



ATTACHMENT D—EVENT POND MAP



ATTACHMENT E—MONITORING WELL MAP



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ATTACHMENT F—MONTIORING AND REPORTING PROGRAM R7-2020-0004
FOR
CASTLE MOUNTAIN VENTURE, OPERATOR
EQUINOX GOLD CORPORATION AND U.S. BUREAU OF LAND MANAGEMENT, OWNERS
CASTLE MOUNTAIN MINE
HEAP LEACH PAD, TANK POND, EVENT POND, AND CONVEYANCE SYSTEM
SAN BERNARDINO COUNTY

This Monitoring and Reporting Program (MRP) is issued pursuant to Water Code section 13267 and incorporates requirements for surface water, groundwater, and unsaturated zone detection monitoring, special monitoring provisions relating to individual waste management units, evaluation monitoring, and corrective action monitoring. Monitoring requirements in this MRP are necessary to determine if the Castle Mountain Mine (Facility) is in compliance with Waste Discharge Requirements Order R7-2020-0004 (Order) and to ensure early detection of any releases of waste constituents from the Facility. The Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board) or its Executive Officer.

PART I: SAMPLING AND ANALYSIS GENERAL REQUIREMENTS

A. Sampling and Analysis General Requirements

1. As provided in Monitoring Specification H.3 of the Order, the Discharger shall submit a Sample Collection and Analysis Plan (SCAP) that incorporates the standard monitoring provisions below and describes the sampling and analysis protocols to be used for all monitoring activities, including for the groundwater and unsaturated zone detection programs at the Facility. The SCAP shall also incorporate procedures for stockpiling, testing, and disposal of mining overburden wastes obtained from the mining operation at the Facility. The SCAP must be received by the Regional Water Board within **90 days** of adoption of the Order and this MRP.

2. Once the SCAP is approved, the Discharger may request changes to the approved SCAP, as needed, but shall use the procedures described in the approved SCAP until such changes are authorized by the Regional Water Board's Executive Officer.

B. Standard Monitoring Provisions

1. **Analytical Methods.** Specific methods of analysis for monitored waste constituents shall be identified in the SCAP. If the Discharger proposes to use methods other than those in the latest edition of the U.S. Environmental Protection Agency's (USEPA) *Test Methods For Evaluating Solid Waste: Physical/Chemical Methods Compendium* (SW-846) or *Guidelines Establishing Test Procedures For Analysis Of Pollutants* (40 C.F.R. part 136), the SCAP must explain the rationale for the change. The change must be approved by the Regional Water Board's Executive Officer prior to use.

2. **Monitoring Test Procedures.** The collection, preservation, and holding times of all samples shall be in accordance with protocols included in USEPA's SW-846 or 40 C.F.R. part 136, or as otherwise approved by the Regional Water Board. The Regional Water Board may, in its discretion, require methods more sensitive than those specified by USEPA.

3. **30-day Sample Procurement Limitation.** For any given monitored medium, the initial samples collected from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be collected within a span not to exceed 30 days, unless a longer time period is approved by the Regional Water Board's Executive Officer and shall be collected in a manner that ensures sample independence to the greatest extent feasible. Pursuant to California Code of Regulations, title 27, section 20415(e)(8)(E)(3), if verification sampling and analysis is warranted due to the results of an initial sample analysis, the verification sampling shall be performed within 30 days of the time that the Discharger determines that the retesting is warranted.

4. **Laboratory Certification.** Unless otherwise approved by the Regional Water Board's Executive Officer, all analyses shall be conducted by a laboratory certified by the State Water Resources Control Board (State Water Board), Division of Drinking Water's Environmental Laboratory Accreditation Program (ELAP).

5. **Reporting Levels.** All analytical data shall be reported with method detection limits (MDLs) and with either the reporting level or limits of quantitation (LOQs) according to 40 Code of Federal Regulations part 136, Appendix B. The laboratory reporting limit for all reported monitoring data shall be no greater than the practical quantitation limit (PQL).

6. **QA/QC Data.** All quality control / quality assurance (QA/QC) data shall be reported, along with the sample results to which they apply, including the method, equipment, and analytical detection limits, the recovery rates, an explanation of any recovery rate that is less than 80 percent, the results of equipment and method blanks, the results of spiked and surrogate samples, and the frequency of quality control analyses. Sample results shall be reported unadjusted for blank results or spike recovery. In cases where contaminants are detected in QA/QC samples (i.e.,

field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged, but the analytical results shall not be adjusted. All laboratory data included in tables shall match the values provided by the laboratory except in instances where other evidence proves the laboratory data is in error, in which case the Discharger shall prominently flag the changes and provide justification for any adjustments.

7. **Instrumentation and Calibration.** All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated, as necessary, to ensure their continued accuracy. If continuous monitoring equipment is out of service for a period greater than 24 hours, the Discharger shall obtain representative grab samples each day the equipment is out of service. The Discharger shall correct the cause(s) of failure of the continuous monitoring equipment as soon as practicable. The Discharger shall report the period(s) during which the equipment was out of service and if the problem has not been corrected, shall identify the steps which the Discharger is taking or proposes to take to bring the equipment back into service and the schedule for these actions.

8. **Field Test Instruments.** Field test instruments (such as those used to test pH, dissolved oxygen, and electrical conductivity) may be used provided that:

    a. The user is trained in proper use and maintenance of the instruments;

    b. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency;

    c. The instruments are field calibrated prior to monitoring events at the frequency recommended by the manufacturer; and

    d. Field calibration reports are submitted.

9. **Records Retention.** The Discharger shall maintain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, for a minimum of five years from the date of sampling or measurement. This period may be extended by request of the Regional Water Board's Executive Officer at any time. Records of monitoring information shall include:

    a. The date, exact place, and time of sampling or measurements;

    b. The individual(s) who performed the sampling, and/or measurements;

    c. The methods used for groundwater purging/sampling;

    d. The date(s) analyses were performed;

e. The individual(s) who performed the analyses;

f. The analytical techniques or method used; and

g. All sampling and analytical results, including:

i. Units of measurement used;

ii. Minimum reporting limit for the analyses;

iii. Results less than the reporting limit but above the method detection limit (MDL);

iv. Data qualifiers and a description of the qualifiers;

v. Quality control test results (and a written copy of the laboratory quality assurance plan);

vi. Dilution factors, if used; and

vii. Sample matrix type.

PART II: SITE-SPECIFIC MONITORING REQUIREMENTS

This part describes the site-specific monitoring program requirements to be implemented for the Facility and is organized by the type of monitoring to be performed. The methods used shall be as described in the approved SCAP.

The site-specific monitoring program of this MRP includes:

Table 1. Summary of Site-Specific Monitoring

Section	Monitoring Program
A	Groundwater Monitoring
B	Unsaturated Zone Monitoring
C	Surface Water Monitoring
D	Special WMU Monitoring – Surface Impoundments
E	Special WMU Monitoring – Overburden Piles & Growth Media Stockpiles
F	Evaluation Monitoring
G	Corrective Action Monitoring

A. Groundwater Monitoring

The Discharger shall operate and maintain a groundwater monitoring system that complies with the applicable provisions of California Code of Regulations, title 27, sections 20415 and 20420.[12] Monitoring shall be performed in accordance with the locations, frequencies, and parameters described below:

1. Monitoring Well Locations

Upgradient wells are considered background monitoring points. Downgradient wells where no releases have been detected are used for detection monitoring. Downgradient wells where releases have been detected are part of Corrective Action (Corr. Action) monitoring. The groundwater monitoring network shall consist of the following monitoring wells and any new monitoring wells added at the Facility (as approved by the Regional Water Board's Executive Officer):

Table 2. Monitoring Wells Summary

Well	Locality	WMU	Monitored Status	Frequency
MW-1	Southeast	Background	Detection	Semi-Annually
MW-2	South	Heap Leach Pad	Detection	Semi-Annually
MW-3	North	Heap Leach Pad	Background	Semi-Annually

Groundwater Monitoring Wells Workplan. As provided in Monitoring Specification H.4 of the Order, the Discharger is required to submit a workplan for the installation of additional groundwater monitoring wells within **90 days** of adoption of the Order.

2. Parameters/Constituents Monitored

Groundwater samples shall be collected from the detection monitoring wells and any additional wells added as part of the approved groundwater monitoring system. The collected samples shall be analyzed for the Monitoring Parameters and Constituents of Concern specified below in accordance with the specified methods and frequencies.

"Monitoring Parameters" and "Constituents of Concern" shall have the meaning specified in California Code of Regulations, title 27, section 20164. "Monitoring Parameters" means the group of constituents specified below and includes physical parameters, waste constituents, reaction products, and hazardous constituents that provide a reliable indication of a release from a waste management unit. "Constituents of Concern" (COCs) include a larger group of waste constituents and mean any waste constituents, reaction products, and hazardous constituents reasonably expected to be in or derived from waste contained in a waste management unit.

Various Constituents of Concern are included as Monitoring Parameters, although the full list of Constituents of Concern are not included as Monitoring Parameters and need only be sampled for once every 5 years, as specified below.

a. **Monitoring Parameters**

"Monitoring Parameters" shall consist of the (1) Field Monitoring Parameters and (2) Laboratory Monitoring Parameters specified below:

i. Field Monitoring Parameters – During each groundwater monitoring event,[13] the following field parameters shall be measured:

Table 3. Field Parameters Monitoring

Parameter	Unit
pH	pH units
Groundwater elevation[14]	Feet above sea level (USGS Datum)
Specific conductance	Micromhos/cm
Temperature	Degrees F
Turbidity	Nephelometric Turbidity Units (NTU)
Dissolved oxygen	Milligrams per liter (mg/L) and percent saturation
Oxidation-Reduction Potential (ORP)	Millivolts (mV)

ii. Laboratory Monitoring Parameters – Twice per year (semi-annually), groundwater samples shall be analyzed at a laboratory for the following constituents (at a minimum):

[13] Pursuant to Cal. Code Regs., tit. 27, § 20415(e)(13).
[14] Semi-annual measurement of groundwater elevations is approved pursuant to title 27, section 20380(e), allowing engineered alternatives provided they achieve the goals of the monitoring program.

Table 4. Laboratory Monitoring Parameters Monitoring

Constituents	Units	Sample Type	Reporting Freq.
Total Dissolved Solids	mg/L	Grab	Semi-Annually
Sulfate	mg/L	Grab	Semi-Annually
Bicarbonate (HCO_3)	mg/L	Grab	Semi-Annually
Chloride	mg/L	Grab	Semi-Annually
Nitrate (as N)	mg/L	Grab	Semi-Annually
Nitrite (as N)	mg/L	Grab	Semi-Annually
Chemical Oxygen Demand (COD)	mg/L	Grab	Semi-Annually
Biological Oxygen Demand (BOD)	mg/L	Grab	Semi-Annually
Lead	mg/L	Grab	Semi-Annually
Aluminum	mg/L	Grab	Semi-Annually
Iron	mg/L	Grab	Semi-Annually
Free Cyanide	mg/L	Grab	Semi-Annually
Beryllium	mg/L	Grab	Semi-Annually
Total Petroleum Hydrocarbons (TPH)	mg/L	Grab	Semi-Annually

b. Additional Constituents of Concern, Required Every Five Years (5-Year COCs)

In addition to the Monitoring Parameters listed above, the groundwater shall be analyzed at a laboratory every five years, with the next monitoring event to be performed in the second half of 2020, and alternating between the two monitoring episodes for each five-year reporting period thereafter, for the following 5-Year COCs (and any additional COCs required by the Regional Water Board's Executive Officer):

Table 5. List of 5-Year COCs

Constituents	Units	Sample Type	Reporting Freq.
Carbonate (CO_3)	mg/L	Grab	Semi-Annually

Constituents	Units	Sample Type	Reporting Freq.
Total Alkalinity	mg/L	Grab	Semi-Annually
17 Heavy Metals (Cal. Code Regs., tit. 22, § 66261.24 / CAM 17)	mg/L	Grab	Semi-Annually
Pesticides (40 C.F.R., Appendix II)	mg/L	Grab	Semi-Annually
Herbicides (40 C.F.R., Appendix II)	mg/L	Grab	Semi-Annually
Semi-Volatile Phenols (USEPA Method 8270)	mg/L	Grab	Semi-Annually
Volatile Organic Compounds (USEPA Method 8260)	mg/L	Grab	Semi-Annually

The results of the 5-Year COC sampling shall be reported in the Annual Monitoring Report for the year in which the samples were collected.

Note that the broader term “COCs” includes both the Monitoring Parameters and 5-Year COCs.

B. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated/vadose zone detection monitoring system that complies with the applicable provisions of California Code of Regulations, title 27, sections 20415 and 20420.

1. Soil Pore Liquid Monitoring Locations

Unsaturated zone monitoring at the Facility includes soil pore liquid monitoring underneath the Heap Leach Pad, the Tank Pond, and the Event Pond, as described below. There is no soil-gas monitoring that has been proposed at this Facility, because there is no expectation of gases forming from decomposition of the ore and/or overburden.

a. Heap Leach Pad. Unsaturated/vadose zone monitoring will be performed below the Heap Leach Pad, consisting of a pan lysimeter that will be positioned directly below the secondary liner below the LCRS header lines. The pan lysimeter will consist of a minimum ten feet wide geomembrane, sloped to a central, slotted HDPE collection pipe, and overlain by a two-feet thick gravel layer. Within the leach pad area, the vadose zone monitoring system (VZMS) will be subdivided so that individual VZMS monitoring is conducted for each individual leach pad cell. The leach pad VZMS collector

pipes will convey any liquids that are collected to gravel-filled sumps at the downstream end of each pad cell. The leach pad area sumps will be connected to solid HDPE pipe to allow liquids to drain by gravity to the Event Pond area, where solution tanks will be positioned.

b. Event Pond. Unsaturated/vadose zone monitoring will be performed below the Event Pond, consisting of a pan lysimeter positioned directly below the secondary liner below the LCRS header lines. The pan lysimeter will consist of a minimum ten feet wide geomembrane, sloped to a central, slotted HDPE collection pipe, and overlain by a two feet thick gravel layer. The VZMS sump within the Event Pond area will be positioned below the Event Pond LCRS sump. It too will be connected to an HDPE pipe "riser" that will extend up from the base of the pond to surface grades at the top of the pond. VZMS sump pipelines will be equipped with valves where the pipe "daylights" the leach pad. The valves will be opened weekly and inspected for the presence of liquid in accordance with the SCAP, and the results will be recorded in a permanent logbook kept on-site. Electric sounders or transducers will be used to detect the presence of any liquids that may accumulate within the Event Pond VZMS sump. A pump will be used to convey liquids to the solution tanks in the Tank Pond. The VZMS pump will also include a flow meter which will allow the volume of liquids that are pumped to be measured.

c. Tank Pond. Unsaturated/vadose zone monitoring will be performed at the Tank Pond, consisting of a pan-style lysimeter that sits on top of a 60 millimeter, HDPE impermeable geomembrane. The width of the drainage layer is 18" thick, and it houses a 12", perforated HDPE pipe that sits at the central depression point of the VZMS. The pipe and gravel drainage layer are designed to capture any liquid that escapes the 60 mil HDPE secondary containment layer.

As provided in Monitoring Specification H.5 of the Order, the Discharger is required to submit an **Unsaturated Zone Monitoring Workplan** for the Heap Leach Pad, Tank Pond, And Event Pond within **90 days** of adoption of the Order.

2. Monitoring Requirements

a. The Facility shall monitor the height of liquid in the VZMS and the LCRS sumps at least **weekly** to an accuracy of one-quarter inch. The Discharger shall record the data in the weekly monitoring logs and include the data in the Semi-Annual Monitoring Report.

b. The Discharger shall measure the electrical conductivity and pH of any liquid in the sumps **quarterly**;

c. The first time liquid is found in an VZMS/LCRS sump, the Discharger shall:

i. The Regional Water Board shall be notified verbally within **seven days**; and

ii. Collect at least one sample of the leachate within **30 days** and analyze it for the Monitoring Parameters and 5-Year COCs used for groundwater monitoring.

d. The Discharger shall remove fluids from the VZMS and the LCRS sump as often as necessary to prevent the liquid in the sump from backing up into the collection portion of the VZMS and the LCRS. The Discharger shall use this information to identify the leakage rate into the sump. The removal dates, volumes and calculated leakage rates shall be included in the Semi-Annual Monitoring Report.

e. If an automated sump-pump is installed, an alarm shall also be installed to indicate if the sump fills beyond the upper limit of the sump-pump settings. Automated systems shall also include a means of monitoring changes in the height of liquid in the sump and measuring the frequency and volume of pumping. This data shall be converted to a daily leakage rate and summarized in the Semi-Annual Monitoring Report.

f. The rate at which liquid accumulates in the sumps shall be calculated using the difference between the last reading obtained during one visit and the first reading obtained during the next visit and reported in gallons per day. If the liquid extends higher in the VZMS and the LCRS sump than the connection point of the drainage pipe leading from the LCRS, the volume of that drainage pipe shall be included in the calculation.

g. If leakage rates exceed the reporting threshold (RT), the Discharger shall follow the steps in Part II.F.3 – Excessive Leachate Production.

h. If an accumulation of moisture is present in one or more of the riser pipes, the Discharger shall follow the steps in Part II.F.3 – Excessive Leachate Production.

C. Surface Water Monitoring

Perennial streams are not located at the Facility and the occurrence of surface water should be limited to (1) immediately after significant storm events, and (2) if seeps develop along the perimeter of a waste management unit.

1. **Observed Surface Water Monitoring.** If surface water is observed at the Facility, the source of the surface water shall be identified, and observations of the following shall be included in the next Semi-Annual Monitoring Report:

   a. Flow rate and source of water;

b. Floating and suspended materials of waste origin: Presence or absence, source, and size of affected area;

c. Discoloration and turbidity: Description of color, source, and size of affected area;

d. Evidence of odors: Presence or absence, characterization, source, and distance of travel from source; and

e. Weather conditions: Wind direction and estimated velocity, total precipitation during the previous five days and on the day of observation.

2. **Stormwater Monitoring.** After each significant storm event, the remaining freeboard (in vertical feet) and storage capacity (in gallons and/or acre-feet) of each stormwater retention basin shall be identified. If the remaining storage capacity of a stormwater retention basin drops below the volume needed to retain a 100-year storm event, the Discharger shall take steps to remove water from the stormwater basin until the remaining capacity is at least enough to hold a 100-year storm event. Any stormwater-related actions shall be reported in the next Semi-Annual Monitoring Report.

3. **Seep Monitoring.** If a seep is identified in proximity to any of the waste management units:

   a. The location, flow rate, and other characteristics (such as color and odor) shall be orally reported to the Regional Water Board within **48 hours**, and a written report concerning the seep shall be submitted to the Regional Water Board **within seven days**.

   b. Flow from the seep shall be contained to preclude the seep from adversely affecting surface waters.

   c. A sample of the seepage shall be collected and tested for the Field Monitoring Parameters described in Part II.A.2.i.

   d. If the Field Monitoring Parameters indicate the seepage is not groundwater, or if it is unlikely the source of the seep is groundwater, the sample shall be analyzed for the Monitoring Parameters and 5-Year COCs described in Part II.A.2.a and b.

   e. The results of all testing shall be reported to the Regional Water Board **within seven days** of receipt of the written laboratory report.

   f. Seeps that continue to exist for more than one reporting period shall be monitored during each reporting period and the results shall be included in the Semi-Annual Monitoring Report.

D. Special WMU Monitoring – Surface Impoundments (Heap Leach Pad, Tank Pond, Event Pond)

1. Freeboard Monitoring

The following shall be monitored at least once per month in the Heap Leach Pad, Event Pond, and Tank Pond, and included in the Semi-Annual Monitoring Report:

a. The water level and freeboard in each impoundment cell, and the available storage capacity of the impoundment cells.

b. Observations of erosion, settlement, and/or subsidence along the visible areas of the impoundment(s), including the top of the berm, outer slopes, and upper region of the inner slope. Repairs shall be performed as needed and document in the inspection logs.

2. LCRS Monitoring

a. See Part II.B - Unsaturated Zone Monitoring.

b. The LCRSs must be designed and operated to function without clogging through the scheduled closure of the waste management unit and during the post-closure maintenance period. The Discharger shall test each LCRS annually pursuant to California Code of Regulations, title 27, section 20340(d) to demonstrate proper operation. Except for the first annual test, the results of this testing shall be compared to earlier tests made under comparable conditions.

c. The LCRS sump(s) shall be emptied, as needed. The removed liquid shall be disposed of in accordance with the requirements in the Order.

3. Waste Volumes Monitoring (Heap Leach Pad Only)

Different volumes of several types of mining waste shall be monitored, and the following information included in each Semi-Annual Monitoring Report:

Table 6. Mining Waste Volumes

Parameter	Unit	Reporting frequency
Tons of ore produced	Tons	Semi-Annually
Tons of ore processed	Tons	Semi-Annually
Heap pad life	Years	Semi-Annually
Heap pad remaining capacity	%	Semi-Annually

Parameter	Unit	Reporting frequency
Volume of barren solution applied to the heap	Gallons	Semi-Annually
Volume of pregnant solution recovered from the heap	Gallons	Semi-Annually

E. Special WMU Monitoring – Overburden Piles and Growth Media Stockpiles

1. North and South Overburden Piles

Volumes of mining waste shall be monitored in the North and South Overburden Piles, and the following information included in each Semi-Annual Monitoring Report:

Table 7. Overburden Pile Waste Volumes

Parameter	Unit	Reporting frequency
Tons of overburden produced	Tons	Semi-Annually
Acres of disturbance	Acres	Semi-Annually
Observations of erosion, settlement, and/or subsidence along the visible areas of the piles, including the outer slopes. Repairs shall be performed as needed and documented in the inspection logs.	Narrative	Semi-Annually

2. North and South Growth Media Stockpiles

Volumes of mining waste shall be monitored in the North and South Growth Media Stockpiles, and the following information included in each Semi-Annual Monitoring Report:

Table 8. Growth Media Stockpile Waste Volumes

Parameter	Unit	Reporting frequency
Tons of soil harvested	Tons	Semi-Annually
Acres of disturbance	Acres	Semi-Annually

Parameter	Unit	Reporting frequency
Tons of soil removed	Acres	Semi-Annually
Observations of erosion, settlement, and/or subsidence along the visible areas of the pile, including the outer slopes. Repairs shall be performed as needed and documented in the inspection logs.	Narrative	Semi-Annually

F. Evaluation Monitoring

1. Notification of a Release

Should the Discharger discover a release from the Facility, the Discharger shall:

a. Initial Notification. Notify the Regional Water Board by phone or e-mail **within 24 hours**, and by mail **within seven days**, when the Discharger determines from monitoring results that there is measurably significant evidence of a release. (Cal. Code Regs., tit. 27, § 20420(j)(1).)

b. Retest. The Discharger may immediately initiate the verification procedure specified in Part III.B.3 to verify that there is a "measurably significant" evidence of a release of particular constituent.[15] (Cal. Code Regs., tit. 27, § 20420(j)(2).)

c. Notice to Nearby Landowners. The Discharger shall, **within 14 days** of confirming measurably significant evidence of a release, notify all persons who own the land or reside on the land that directly overlies any portion of the plume of contamination, if sampling of detection monitoring wells indicates contaminants have migrated off-site. (40 C.F.R. § 258.55(g)(1)(iii).)

2. Evaluation of a Release

If the Discharger determines that a previously unknown release from the Facility has occurred, the following actions shall be taken:

a. Non-Statistical COC Scan. If the detection was made based upon sampling and analysis for Monitoring Parameters, the Discharger shall immediately sample all monitoring points in the affected medium at that waste

[15] Under California Code of Regulations, title 27, section 20420(k)(7), the Discharger may also demonstrate that a source other than the waste management unit caused the release.

management unit and determine the concentration of all Monitoring Parameters and Constituents of Concern for comparison with established concentration limits. Because this scan does not involve statistical testing, the Discharger will only need to collect and analyze a single water sample from each monitoring point in the affected medium. (Cal. Code Regs., tit. 27, § 20420(k)(1).)

b. Amended ROWD for Evaluation Monitoring Program (EMP). The Discharger shall, **within 90 days** of confirming a measurably significant evidence of a release, submit an amended Report of Waste Discharge (ROWD) proposing an evaluation monitoring program that meets the requirements of California Code of Regulations, title 27, sections 20420(k)(5) and 20425. The evaluation monitoring program shall be designed for the collection and analysis of all data necessary to assess the nature and extent of the release and to determine the spatial distribution and concentration of each constituent throughout the zone affected by the release. (Cal. Code Regs., tit. 27, §§ 20420(k)(5) and 20425(b).) For releases from MSW landfill units, the evaluation monitoring program shall also include any additional proposals necessary to comply with 40 C.F.R. § 258.55, particularly the additional monitoring wells required by 40 C.F.R. § 258.55(g)(1)(ii). Additionally, the Discharger shall add any 5-Year COC for which there is a confirmed measurably significant release to the list of Monitoring Parameters.

c. Preliminary EFS. The Discharger shall, **within 180 days** of confirming a measurably significant evidence of a release, submit to the Regional Water Board a preliminary engineering feasibility study (EFS) report for a corrective action program that meets the requirements of California Code of Regulations, title 27, sections 20420(k)(6) and 20430. At a minimum, the feasibility study shall contain a detailed description of the corrective action measures that could be taken to achieve background concentrations for all COCs.

d. Additional EMP Required Actions. The Discharger shall, **within 90 days** of establishing an evaluation monitoring program (i.e., from the date of Regional Water Board approval of the program), complete and submit the following:

    i. A report with the results and assessment/delineation of the release based on the approved evaluation monitoring program. (Cal. Code Regs, tit. 27 § 20425(b).)

    ii. An updated engineering feasibility study for corrective action based on the data collected to delineate the release and data from the ongoing monitoring program required under title 27, section 20425(e). (Cal. Code Regs., tit. 27, § 20425(c).)

iii. An amended ROWD to establish a corrective action program meeting the requirements of title 27, section 20430 based on the data collected to delineate the release and based on the updated engineering feasibility study. (Cal. Code Regs., tit. 27, § 20425(d).)[16]

3. Excessive Leachate Production - Surface Impoundments (Heap Leach Pad, Tank Pond, Event Pond)

a. If leakage rates in any the VZMS and the LCRS exceed the reporting threshold (RT), the Discharger shall report this to the Regional Water Board within **48 hours** and propose further actions to evaluate whether repairs are needed. Unless a Facility-specific RT is approved by the Regional Water Board, the default RT shall be one half of the volume of the sump per day.

b. If an accumulation of moisture is present in one or more of the riser pipes, samples shall be collected (without purging) and analyzed for the Monitoring Parameters and 5-Year COCs the first time a sample is collected, and for the Monitoring Parameters on all subsequent events. If insufficient liquid is collected to analyze the entire analyte list, laboratory testing shall be performed preferentially as follows:

i. TDS, lead, cyanide, and iron;

ii. Remainder of Monitoring Parameters; and

iii. Remainder of 5-Year COCs.

G. CORRECTIVE ACTION MONITORING – N/A

PART III: EVALUATION OF MONITORING DATA

Part III of this MRP provides the requirements for the analysis of detection, evaluation, and corrective action monitoring data collected from monitoring wells associated with the Facility.

A. Water Quality Protection Standard

For each waste management unit, the Water Quality Protection Standard (Water Standard) consists of all COCs (under title 27, section 20395), the concentration limit for each COC (under title 27, section 20400), and the points of compliance for each monitored medium (under title 27, section 20405) for the duration of the compliance period (under title 27, section 20410).

[16] The Discharger shall (for releases from MSW landfill units) discuss the results of the updated engineering feasibility study, prior to the final selection of a remedy, in a public meeting with interested and affected parties. (40 C.F.R. § 258.56(d).)

1. Constituents of Concern (COCs)

a. The COCs are as defined above in Part II.A.2 and include both Monitoring Parameters and 5-Year COCs.

2. Concentration Limits

a. **Default Limits.** The following concentration limits shall apply, unless the Regional Water Board approves a Concentration Limit Greater than Background (CLGB), as provided in Part III.A.2.b below:

i. **Non-natural Constituents**. For COCs that are not naturally occurring, the concentration limit shall be the detection limit of the laboratory testing procedure.

ii. **Naturally-Occurring Constituents**. For naturally-occurring COCs, the concentration limit shall be the background concentration determined through either inter-well or intra-well comparisons.

b. **CLGB.** Use of a CLGB may be proposed by the Discharger provided it is justified through a statistical analysis of relevant data (including the background dataset) and a demonstration that background concentrations would not be technologically or economically feasible for the COCs for a given monitoring well. (Cal. Code Regs., tit. 27, § 20400, subd. (c).) A concentration limit greater than background will only be considered for COCs present in monitoring wells associated with corrective action monitoring. (Cal. Code Regs., tit. 27, § 20400, subd. (h).)

c. **Procedure for Approval of Concentration Limits.** The Discharger shall submit a report proposing applicable background concentrations for each COC under Part III.A.2.a in the next Annual Monitoring Report. The Regional Water Board will review proposed concentration limits from the Discharger and approve, modify, or disapprove each proposed limit. (Cal. Code Regs., title 27, § 20400.) Following initial approval of the concentration limits, the Discharger shall reevaluate and propose any updates to the concentration limits **every five years** thereafter.

3. Compliance Period

a. The compliance period for each waste management unit includes the active life of each waste management unit, the closure period, the post-closure maintenance period, and any compliance period under California Code of Regulations, title 27, section 20410.

4. Points of Compliance

a. All monitoring wells established for the detection monitoring program shall constitute the points of compliance for the Water Standard.

B. Statistical and Non-Statistical Analysis of Data

1. General Requirements

a. California Code of Regulations, title 27, section 20415(e) describes a range of statistical and non-statistical data analysis methods that can be used to evaluate data collected during monitoring. In addition, USEPA published *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (EPA 530/R-09-007) in 2009.

b. The Discharger shall evaluate the data obtained during a monitoring period using either a statistical or non-statistical method described in title 27 or may propose another method for approval by the Regional Water Board's Executive Officer, as long as it achieves the goal of the monitoring program at least as well as the most appropriate method described in title 27, section 20415.

c. The Discharger shall propose data analysis methods to be used in evaluating water quality monitoring data for each COC. (Cal. Code Regs., tit. 27, § 20415(e)(7).) The specifications for each data analysis method shall include a detailed description of the criteria to be used for determining "measurably significant" (as that term is defined in title 27, 20164) evidence of any release from the waste management unit and for determining compliance with the Water Standard.

d. Monitoring reports shall describe the statistical or non-statistical method used for each COC at each monitoring point.

2. Background Values

a. Pursuant to California Code of Regulations, title 27, section 20415(e)(10), the Discharger shall in a technical report justify the use of a procedure for determining the background value for each COC.

b. Inter-well comparisons may be used where upgradient and downgradient wells intercept the same aquifer and are expected to have similar concentrations of naturally-occurring constituents. Intra-well comparisons shall be used where uncontaminated background wells are not present, or the chemical composition of upgradient and downgradient wells are significantly different.

c. In establishing background values for COCs, the Discharger shall ensure that sampling methods used comply with California Code of Regulations, title 27, section 20415(e)(12), including that the number and kinds of samples collected must be appropriate for the form of data analysis employed and, in the case of statistical data analysis, follow generally accepted statistical principles. The sampling method (including the sampling frequency and the interval of time between successive samples) shall be appropriate for the medium from which samples are taken (e.g., groundwater, surface water, and soil-pore liquid). (See also Cal. Code Regs., tit. 27, § 20415(e)(6).) For groundwater, sampling shall be scheduled to include the times of expected highest and lowest elevations of the potentiometric surface.

3. Determination of Measurably Significant Evidence of a Release

a. Initial Determination of Measurably Significant Evidence of a Release. The Discharger shall use a statistical or nonstatistical data analysis method that complies with California Code of Regulations, title 27, section 20415(e)(7)-(10) to compare the concentration of each COC with its respective background concentration to determine whether there has been measurably significant evidence of a release from the waste management unit. Whenever a COC is detected at a detection monitoring point at a concentration that exceeds the concentration limit from the Water Standard, the Discharger shall preliminarily conclude that there is measurably significant evidence of a release and follow the notification procedures in Part II.F.1. (Cal. Code Regs., tit. 27, § 20420(i).)

b. Confirmation of a Measurably Significant Evidence of a Release. If there is a preliminary indication of a release, within **30 days** of such indication (Cal. Code Regs., tit. 27, § 20415(e)(8)(E)(3)), the Discharger may implement a verification procedure/retest option in accordance with California Code of Regulations, title 27, section 20415(e)(8)(E).[17]

i. Retest Method. The verification procedure shall include either: (1) a single “composite” retest (i.e., a statistical analysis that augments and reanalyzes the data from the monitoring point that indicated a release), or (2) at least two “discrete” retests (i.e., statistical analyses, each of which analyzes only newly-acquired data from the monitoring point that indicated a release). (Cal. Code Regs., tit. 27, § 20415(e)(8)(E).) The Discharger may use an alternate method with prior approval by the Regional Water Board that complies with the requirements of title 27, section 20415(e)(8)(E) in addition to the performance standards of title 27, section 20415(e)(9).

[17] Under California Code of Regulations, title 27, section 20420(k)(7), the Discharger may also demonstrate that a source other than the waste management unit caused the release.

ii. Retest Samples. The retest samples shall be collected from the monitoring point where the release is preliminarily indicated and shall be analyzed for the constituents that caused the need for the retest. (Cal. Code Regs., tit. 27, § 20415(e)(8)(E)(7).)

iii. Retest Reporting. The Discharger shall report to the Regional Water Board the results of both the initial statistical test and the results of the verification procedure, as well as all concentration data collected for use in these tests, within **seven days** of the last laboratory analysis of the samples collected for the verification procedure. (Cal. Code Regs., tit. 27, § 20415(e)(8)(E)(6).)

If the retest results of one or more of the retest data suites confirm the original indication, the Discharger shall conclude that measurably significant evidence of a release has been confirmed. The Discharger shall then follow the procedures identified in Part II.F.2.

PART IV: REPORTS TO BE FILED WITH THE REGIONAL WATER BOARD

Part IV provides a description of the reports required to be submitted to the Regional Water Board for the Facility.

A. Required Reports

1. **Semi-Annual Self-Monitoring Reports –** For each monitored medium, all monitoring results shall be reported semi-annually. Semi-Annual Monitoring Reports shall include, at a minimum, the following:

   a. **Topographic Map.** A topographic map (or copy of an aerial photograph), at an appropriate scale, identifying the maximum lateral extent of wastes in the Facility, the locations of observation stations, monitoring points, background monitoring points, the groundwater elevation contours with interpreted groundwater flow direction and gradient.

   b. **Groundwater Elevations.** The method and time of groundwater elevation measurements, a description of the method used to purge the well and collect groundwater samples, and quality assurance/quality control (QA/QC) procedures used.

   c. **Field Logs.** Field logs used during well purging and sampling. At a minimum, the field logs should include the following:

      i. The well number;

      ii. The sampling date and time;

iii. The method of monitoring Field Monitoring Parameters and calibration of equipment used to monitor Field Monitoring Parameters;

iv. The purge method (if a pump is used, include the depth of pump placement in each well and the pumping rate); and

v. The purge and sample collection information such as: date each well was purged; well recovery time; method of disposal of the purged water; an estimate of the volume of water purged from each well; the results of all field analyses; depth to groundwater prior to purging, at the conclusion of purging, and when the sample was collected; the method of measuring the water level; and field personnel names and signature.

d. **Data Tables.** Cumulative tabulated monitoring data for all monitoring points and constituents (including the Monitoring Parameters and 5-Year COCs). Concentrations below the laboratory reporting limit shall not be reported as "ND," unless the reporting limit is also given in the table. Otherwise, they shall be reported "<" next to the reporting limit (e.g., <0.10). Upon request of Regional Water Board staff, data files shall be provided electronically in a file format approved by the Regional Water Board. Any electronic files submitted to the Regional Water Board in accordance with Order R9-2020-0004 and this MRP, shall not be password protected.

e. **Graphical Display.** For monitoring wells in corrective action or evaluation monitoring, a graphical display of groundwater concentrations for all COCs for which there is measurably significant evidence of a release, including all historical data for those COCs from at least 5 years prior to the detection of a release at that location. Each graph shall plot the concentration of one or more constituents at an appropriate scale that allows changes in concentrations to be discerned, including the use of a semi-log scale for concentrations that change by more than three orders of magnitude.

f. **Summary of Groundwater Conditions.** A written summary of the monitoring results and any changes to the groundwater monitoring system since the previous report. The written summary shall include a discussion of the groundwater flow rate and direction,[18] the appearance of trends or other information that may indicate a potential change in the hydrogeologic conditions beneath and adjacent to the Facility.

[18] The estimated quarterly groundwater flow rate and direction in the uppermost aquifer, in any zones of perched water, and in any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report. (Cal. Code Regs., tit 27, § 20415(e)(15).)

g. **Evaluation of Groundwater Data.** An evaluation of the groundwater monitoring data analyzed according to the methods described in Part III of this MRP, and whether the analysis indicates a release of waste constituents or waste degradation products from the Facility.

h. **Leachate Evaluation.** A summary of leachate data for each applicable mining unit, including any laboratory results and measurements of the height of liquids in the VZMS and the LCRS sumps. The Discharger shall also calculate the leakage rate.

i. **Waste Volumes.** A summary of all required information concerning waste volumes for the Heap Leach Pad, North and South Overburden Piles, and North and South Growth Media Stockpiles.

j. **Site Inspections.** A written summary of inspections by the Discharger, County of San Bernardino, BLM, and/or Regional Water Board and any related correspondence shall be included in an appropriate place in the Semi-Annual Monitoring Report. Copies of inspection reports prepared by the Discharger shall be included in an appendix to the report.

2. **Annual Summary Report –** The Discharger shall submit an annual report covering the period from January 1 through December 31 to the Regional Water Board. If desired, the Annual Monitoring Report may be combined with the Semi-Annual Monitoring Report, but if so, shall clearly state that it is both a semi-annual and annual monitoring report in its title. The Annual Summary Report shall include, at a minimum, the following:

   a. **Topographic Map.** A topographic map (or copy of an aerial photograph), at an appropriate scale, identifying all monitoring points, and groundwater elevation contours with interpreted groundwater flow direction and gradient. Maps must also be updated to show the maximum extent of any waste constituent or waste degradation product in groundwater.

   b. **Summary of Groundwater Monitoring Data.** A written summary of the groundwater monitoring results, indicating any changes made or observed since the previous Annual Summary Report. If a 5-year COC event was performed, then these parameters shall be presented in tabular format. All analytical data obtained during the previous year shall be presented in tabular form. Upon request of the Regional Water Board, the data shall be provided electronically in a file format and media acceptable to the Regional Water Board.

   c. **Graphical Display.** A graphical display for all data collected for each monitoring point and background monitoring point. Each graph shall plot the concentration of one or more constituents over time for a given monitoring point. For any given constituent, the scale for all plots should be the same to facilitate comparison and identification of trends. On the basis of any

outliers noted in the plotted data, the Regional Water Board may direct the Discharger to carry out a preliminary investigation, in accordance with Part II.F of this MRP, to determine whether a release is indicated. Trend analyses shall include identification of current trends, a comparison to previously identified trends, and a discussion of any significant changes in the trends. This shall be prepared for groundwater and any unsaturated/vadose zone monitoring points (including subdrains, lysimeters, or landfill gas).

d. **Background Concentration Limits Update.** Reevaluate background concentration limits (required every five years per Part III.A.2.c) and propose any appropriate changes.

e. **Leachate Data Summary.** A summary of leachate data for each applicable mining unit, consisting of the monthly total volume of leachate collected during the reporting year from the VZMS and the LCRS and any other leachate collection systems to demonstrate the effectiveness of the leachate collection and removal system. This summary shall contain a brief discussion of the leachate sampling results and volume produced and how the leachate was disposed of during the reporting period. This summary shall also include a table consisting of the last five years of leachate data collected at the Facility.

f. **Annual Waste Summary.** An annual summary consisting of the total volume of mining wastes generated at the Facility. The summary shall contain a table that lists each category of waste and the volume accepted at the Facility during the reporting period.

g. **Site Conditions Summary.** Include a comprehensive discussion regarding the condition of the Facility, including, but not limited to, the current operational area, maintenance roads, the erosion and drainage control measures implemented to control run-on and run-off during the rainy season, the condition of monitoring wells, piezometers, and any other monitoring device located at the Facility. The discussion should also highlight any areas of noncompliance observed and repaired, and/or any spills and subsequent cleanups, during the previous year and should be documented with photographs and inspection reports.

h. **Compliance Summary.** Include a comprehensive discussion of the compliance issues during the reporting period (the past year), and of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the Order or this MRP.

B. Report Schedule

Semi-annual monitoring reports shall be submitted to the Regional Water Board in accordance with the following schedule:

Table 7. Semi-Annual Reporting Schedule

Monitoring Period	Report Due
January – June	August 15
July - December	February 15

Annual monitoring reports shall be submitted to the Regional Water Board by February 15 of the following year.

C. Standard Reporting Procedures

1. A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report.

2. In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner as to clearly illustrate whether the Facility is operating in compliance with the WDRs. Where appropriate, the Discharger shall include supporting calculations (e.g., for monthly averages).

3. The results of any analysis taken more frequently than required at the locations specified in this MRP shall be reported to the Regional Water Board.

4. As specified in Standard Provisions L.13, all monitoring reports shall be certified under penalty of perjury to be true and correct. Each report shall contain the following completed declaration:

"I certify under the penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

Executed on the _____day of _____ at _____

_____(Signature)

_____(Title)”

5. The monitoring reports and any other information requested by the Regional Water Board shall be signed by a principal executive officer or ranking elected official. A duly authorized representative of the Discharger may sign the documents if:

i. The authorization is made in writing by the person described above;

j. The authorization specified an individual or person having responsibility for the overall operation of the regulated disposal system; and

k. The written authorization is submitted to the Regional Water Board’s Executive Officer.

6. As specified in Standard Provisions L.12, technical reports shall be prepared by or under the direction of appropriately qualified professional(s). Each technical report submitted shall contain a statement of qualifications of the responsible licensed professional(s) as well as the professional's signature and/or stamp of the seal.

7. As specified in Standard Provisions L.11, the Discharger shall comply with Electronic Submittal of Information (ESI) requirements by submitting all correspondence and reports required under this MRP and future revisions thereto, including groundwater monitoring data and discharge location data (latitude and longitude), correspondence, and monitoring reports to the State Water Board’s Geotracker database. Documents that are too large to be uploaded into Geotracker should be broken down into smaller electronic files and labelled properly prior to uploading into Geotracker.