



**STATE OF NEW MEXICO
BEFORE THE SECRETARY OF ENVIRONMENT**

**IN THE MATTER OF:)
THE APPLICATION OF)
NEW MEXICO COPPER CORPORATION)
FOR A GROUNDWATER DISCHARGE)
PERMIT FOR THE COPPER FLAT MINE)
(DP-1840).)**

Docket No. GWB-18-06 (P)

**JOINT PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW BY
TURNER RANCH PROPERTIES, L.P. AND HILLSBORO PITCHFORK RANCH, LLC**

Pursuant to the New Mexico Environment Department’s Permit Procedures, 20.1.4.500.B NMAC, Turner Ranch Properties, L.P., owner of the Ladder Ranch, and Hillsboro Pitchfork Ranch, LLC, owner of the Hillsboro Pitchfork Ranch, (collectively the “Ranches”) hereby jointly submit their proposed Findings of Fact and Conclusions of Law on the proposed groundwater discharge permit, DP-1840, for the Copper Flat Mine located near Hillsboro, in Sierra County, New Mexico. The New Mexico Environment Department (“Department”) proposes to issue the discharge permit to New Mexico Copper Corporation (“N.M. Copper Corp.”), the current operator of the Copper Flat Mine, under the New Mexico Water Quality Act (“WQA”), NMSA 1978 §§ 74-6-1 to 74-6-17 (1993), and the Water Quality Regulations and Copper Mine Regulations issued thereunder, 20.6.2 NMAC, 20.6.7 NMAC. The Environment Department held a hearing on the proposed Permit from September 24 through September 28, 2018, in Truth or Consequences, New Mexico.

PROPOSED FINDINGS OF FACT

I. THE PARTIES

A. THE MINING COMPANY

1. N.M. Copper Corp. is a corporation organized in 2010 under the laws of the State of New Mexico. It is a wholly-owned subsidiary of THEMAC Resources Group Ltd., a Canadian company. N.M. Copper Corp. is the owner of the Copper Flat Mine assets, including a portion of the Mine Area property. Smith Test. Tr. vol. 1, p. 41, line 24 to p. 42, line 10, p. 43, lines 15-21; AR-12376.
2. N.M. Copper Corp. is the applicant for a groundwater discharge permit, DP-1840, which is the subject of this proceeding.

B. THE ENVIRONMENT DEPARTMENT

3. The New Mexico Environment Department is authorized to implement the New Mexico Water Quality Act and the water quality regulations, including the issuance of groundwater discharge permits. NMED Ex. 2, p. 2.

C. THE RANCHES

4. Turner Ranch Properties, L.P. is a limited partnership organized in the State of Georgia. It is the owner of the Ladder Ranch.
5. Hillsboro Pitchfork Ranch LLC is a limited liability company organized in the State of Texas. It is the owner of the Hillsboro Pitchfork Ranch.

D. THE IRRIGATION DISTRICT

6. Elephant Butte Irrigation District (the "District") is an irrigation district and quasi-municipal corporation organized in the State of New Mexico. EBID Ex. 6.

II. BACKGROUND

A. HISTORY OF THE MINE

7. Inspiration Development, a mining company based in Arizona, acquired the Copper Flat Mine in 1967 and conducted investigation of the site's mineral reserves. By 1973, Inspiration Development conducted a feasibility study and developed a plan for an open pit mine. AR-17747; Kuipers Test. Tr. vol. 3, p. 925, lines 9-11.
8. Inspiration Development leased the Copper Flat Mine out to other parties to develop because it was not a type of project Inspiration had confidence would make money. Kuipers Test. Tr. vol. 3, p. 925, lines 20-22.
9. On July 15, 1974, Quintana Minerals Corporation leased Copper Flat Mine from Inspiration Development and undertook a program of exploration to estimate ore reserves. Quintana Mineral Corp.'s investigation continued through 1976 at a cost of \$3.32 million. Quintana expanded the Copper Flat Mine project to 12,000 acres of private, state, and federal lands. Quintana Mineral Corp. suspended its work at the Copper Flat Mine in late-1976 due to the low price of copper. AR-17748.
10. Quintana Minerals Corp. could not put the mining project into production due to the low price of copper, an inability to successfully negotiate a smelter contract, and difficulties with obtaining the necessary permits to operate the mine. AR-17748.
11. In September 1979, Quintana Minerals Corp. and Phibro, Inc., a Delaware corporation, signed a letter of intent to form a partnership to develop a mining operation at Copper Flat. AR-17749.
12. Quintana Minerals Corp. and Phibro jointly renewed efforts to develop Copper Flat in June 1980 under the name Copper Flat Partnership with Quintana Minerals Corp. having a separate role as the operator and managing agent of the mine and mill. AR-17749.

13. [DATE] Copper Flat Partnership leased Copper Flat Mine from Inspiration Development. The lease consisted of twenty-three patented mining claims totaling 430 acres, 294 unpatented mining claims, and 160 unpatented millsites. AR-17749.
14. By July 1980, Quintana Minerals Corp. had invested over \$7 million in the project. AR-17750.
15. Copper Flat Partnership arranged financing for the Copper Flat project in the amount of \$75 million with the Canadian Imperial Bank of Commerce (CIBC), based in Toronto, Canada. On June 11, 1980, Copper Flat Partnership and CIBC executed a deed of trust, with Copper Flat Partnership as the borrower/debtor, CIBC as the creditor/lender, and the First National Bank of Albuquerque as the trustee. Under the deed of trust, CIBC agreed to lend Copper Flat Partnership \$75 million in exchange for a promissory note, a security interest in all current and future property and mining interests, and a conveyance of legal title of the property to First National Bank of Albuquerque as trustee. The deed of trust conveyed title to all current and future real property to the trustee to be held for the benefit of CIBC. The deed of trust was to be delivered to CIBC in the event that Copper Flat Partnership defaulted. AR-17750.
16. In March 1982, Copper Flat Partnership began producing copper concentrate. AR-17753; Kuipers Test. Tr. vol. 3, p. 926, lines 4-5.
17. The 1982 Copper Flat Mine operation included several waste rock stockpiles, an open pit, a tailings storage facility, mineral processing facilities, impoundments, and associated infrastructure. Ranches Ex. 1 at p. 3.
18. The 1982 Copper Flat Mine operation excavated approximately three million tons of overburden and 1.2 million tons of metal ore. Ranches Ex. 1 at 3.
19. During the months of April, May, and June 1982, Copper Flat Partnership processed an average of 14,908, 15,981, and 14,014 tons per day, respectively, of copper ore. AR-17753.

20. The 1982 Copper Flat Mine operation disturbed approximately 689 acres of land; it created an open pit, which is partially filled by a pit lake having a surface area of 12.8 acres and a depth of 40 feet; it produced waste rock piles around the open pit; and it created a tailings impoundment containing approximately 1.2 million tons of mill tailings and covering 60 acres. AR-00042.
21. In July 1982, after three months of operation, Copper Flat Partnership ceased mining operations at the Copper Flat Mine. AR-17752; Kuipers Test. Tr. vol. 3, p. 926, lines 5-8.
22. Copper Flat Partnership ceased mining due to the combination of a fall in the price of copper and the partnership having a heavy debt load from constructing the mine facilities. AR-17753; Kuipers Test. Tr. vol. 3, p. 926, lines 15-20.
23. Between July 1982 and the end of 1983, Copper Flat Partnership hosted three or four potential investors or purchasers at the Copper Flat Mine. Ultimately, these efforts were not successful. AR-17755.
24. After it ceased mining operations, Copper Flat Partnership decided to remove the surface facilities and equipment. It sold the equipment to pay back some of the debt from the capital loan. Kuipers Test. Tr. vol. 3, p. 926, lines 22-25.
25. As of April 11, 1986, CIBC had sold all removable physical assets of Copper Flat Partnership to OK Tedi Mining Ltd., a company headquartered in Papua New Guinea. By December 31, 1986, all buildings and mining equipment were removed from Copper Flat Mine site. AR-17762.
26. On December 31, 1986, Copper Flat Partnership cancelled its lease interest in the Copper Flat Mine property, and the property reverted to Inspiration Development. AR-17765.

27. In February 1987, Copper Flat Partnership informed the Environmental Improvement Division of the New Mexico Health Department (Predecessor to the New Mexico Environment Department) that “the Copper Flat property is [p]ermanently [c]losed and will not be restarted.” AR-17765.
28. By February 5, 1987, Copper Flat Partnership completed reclamation of Copper Flat Mine facilities on land belonging to the U.S. Bureau of Land Management (BLM). AR-17765; Kuipers Test. Tr. vol. 3, p. 927, lines 1-2.
29. In 1987, Copper Flat Partnership abandoned its mining operations at the Copper Flat Mine. AR-17768; Kuipers Test. Tr. vol. 3, p. 927, lines 1-2.
30. For several years after 1987, there were no active operations or activities at the Copper Flat Mine. Several successive companies owned the mine property, but there was no mining, reclamation, maintenance, construction, or other activities at the mine site. Kuipers Test. Tr. vol. 3, p. 927, lines 3-7.
31. On November 16, 1989, Inspiration Development conveyed title to the Copper Flat Mine to Hydro Resources by quitclaim deed. AR-17773.
32. On July 25, 1989, Cobb Resources, Inc., which controlled Hydro Resources, entered into an agreement to sell the Copper Flat Mine property to the Copper Flat Mining Company, based in Denver, Colorado. Copper Flat Mining Co. planned to develop the Copper Flat Mine with prospective partners, but those plans never materialized. AR-17774.
33. On April 11, 1990, Copper Flat Mining Co. sold the Copper Flat Mine property to Gold Express Corporation. AR-17775.
34. On January 31, 1991, Gold Express Corp. submitted to the BLM a proposed plan of operations for the Copper Flat Mine. Gold Express Corp. proposed to “rebuild the entire Copper Flat

- mining facility as it existed in 1986.” Gold Express Corp. did not implement the plan. AR-17776. Kuipers Test. Tr. vol. 3, p. 927, lines 3-7.
35. On or about September 31, 1993, Gold Express Corp. extended an option to purchase the Copper Flat Mine property to Alta Gold Corporation, a publicly-traded company that engaged in gold, silver, lead, and zinc mining. Alta Gold Corp. exercised the option and purchased the mine property in 1994. AR-17776; Kuipers Test. Tr. vol. 3, p. 927, line 8.
36. Alta Gold Corp. planned to reopen the Copper Flat Mine for a cost of \$35 million. Alta Gold Corp.’s proposed operations at the Copper Flat Mine were very similar to those of Copper Flat Partnership, and Alta Gold Corp. planned to recover and reuse the salvageable infrastructure remaining from Copper Flat Partnership’s operations. Ultimately, however, Alta Gold Corp. never reopened the mine. AR-17777 to AR-17778.
37. In 1999, Alta Gold Corp. filed for bankruptcy in the United States Bankruptcy Court for the District of Nevada. AR-17778; Kuipers Test. Tr. vol. 3, p. 927, lines 17-18.
38. Alta Gold’s assets, including those associated with the Copper Flat Mine, were liquidated in an auction ordered by the bankruptcy court. AR-17778.
39. After the bankruptcy liquidation, the Copper Flat Mine property was again abandoned. Kuipers Test. Tr. vol. 3, p. 927, lines 24-25.
40. Max Yeh, a resident of Hillsboro, New Mexico, made between five and seven personal visits to the Copper Flat Mine site over the course of ten to fifteen years beginning in the early 1990s. He often hiked to the top of the hills overlooking the mine. On none of these occasions did Yeh see any mining operations or personnel at the Copper Flat Mine. He observed that there were no signs of the former buildings other than the imprints; that the open pit was ringed with light-

yellow crystals; and that the dam was overgrown with brush, weeds, and small shrubs. AR-17780 to AR-17781.

41. James Kuipers made a personal visit to the Copper Flat Mine site in 2003. He observed that the property had no signs and no security, and that it had every resemblance of an abandoned mine. Kuipers Test. Tr. vol. 3, p. 928, lines 2-6.

42. Kurt Vollbrecht, an employee of the New Mexico Environment Department, Water Quality Bureau, and James Hollen, an employee of the New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division, conducted an inspection of the Copper Flat Mine site on June 16, 2008. They observed that the site was unsecured, with no gates to restrict access; that some of the waste rock piles had not been reclaimed; and that significant sulfate precipitate had formed along the shoreline of the pit lake. They tested the pH of the pit lake at several locations using pH paper strips and found the pH to range between 4.0 and 4.5. AR-00002.

43. On July 23, 2009, Hydro Resources entered into an agreement with N.M. Copper Corp. extending to N.M. Copper Corp. an option to purchase the Copper Flat Mine and the associated mineral claims. AR-17781.

44. N.M. Copper Corp. acquired the Copper Flat Mine in 2011.

45. The water quality in the existing pit lake exceeded the surface water quality standards for cadmium, copper, manganese, and selenium during all baseline water sampling events during 2011 and 2012. The pit lake water also exceeded applicable surface water quality standards for aluminum, lead, and zinc in at least one of the baseline water quality samples collected from 2011 through 2012. Myers Test. Tr. vol. 3, p. 954, lines 10-20.

46. N.M. Copper Corp. submitted a Stage 1 abatement plan to the Environment Department in 2011 to address groundwater and surface water contamination at the Copper Flat Mine. The plan has been amended since then, and N.M. Copper has conducted investigations, but the Stage 1 abatement process is not yet complete. N.M. Copper Corp. has not yet submitted a final site investigation report in accordance with the abatement regulations. Reid Test. Tr. vol. 3, p. 694, line 8 to p. 697, line 13.

B. DISCHARGE PERMIT APPLICATION

47. The Environment Department issued a discharge permit for the Copper Flat Mine in the 1980s, DP-001.

48. In early 1995, Alta Gold Corp. submitted to the Environment Department an application for a modification of the existing groundwater discharge permit (DP-001) for the Copper Flat Mine. The application was suspended pending development of an abatement plan to address existing groundwater contamination. AR-01370.

49. On March 31, 2011, N.M. Copper Corp. submitted to the Environment Department an application for a modification of the existing groundwater discharge permit (DP-001) for the Copper Flat Mine. Smith Test. Tr. vol. 1, p. 47, lines 20-21; AR-00299 to AR-01709.

50. On May 13, 2011, the Environment Department notified N.M. Copper Corp. that the Department had determined that the permit application was administratively complete. AR-01711 to AR-01714.

51. On December 1, 2013, the New Mexico Water Quality Control Commission adopted the Copper Mine Rule, 20.6.7 NMAC.

52. On December 9, 2015, N.M. Copper Corp. submitted to the Environment Department an amended application for a modification of the existing groundwater discharge permit (DP-001)

for the Copper Flat Mine. The amended application superseded the March 31, 2011 application. AR-12354 to AR-13547.

53. On January 15, 2016, the Environment Department notified N.M. Copper Corp. that the Department had determined that the December 19, 2015 permit application was administratively complete. AR-13560 to AR-13561.
54. On January 15, 2016, the Environment Department published by posting on its website a public notice ("PN 1"), as required under section 20.6.2.3108.E NMAC, stating that the application had been received and was under review. The notice assigned the permit application the number DP-1840 rather than DP-001. AR-13567 to AR-13569.
55. On March 10, 2016, N.M. Copper Corp. sent to the Environment Department proof, as required under section 20.6.2.3108.D NMAC, that it had published a public notice, as required under section 20.6.2.3108.B NMAC. The notice contained some, but not all, of the items required under section 20.6.2.3108.F NMAC. AR-13631 to 13640.
56. On January 31, 2018, the Environment Department caused to be published in the *Truth or Consequences Herald*, and on February 2, 2018, it caused to be published in the *Albuquerque Journal*, a public notice ("PN 2"), as required under section 20.6.2.3108.H NMAC, stating that the Department proposed to approve the discharge permit for the Copper Flat Mine. The notice also stated that the Environment Department would receive public comment on the proposed discharge permit, and requests for a public hearing, for a period of thirty days. AR-17417 to AR-17420.
57. On February 2, 2016 the Environment Department notified N.M. Copper Corp. that the Department was proposing approval of the discharge permit for the Copper Flat Mine under section 20.6.2.3108.H NMAC. The Environment Department sent N.M. Copper Corp. a

proposed discharge permit, as required under section 20.6.2.3108.H NMAC. Smith Test. Tr. vol. 1, p. 52, lines 19-21; AR-17360 to AR-17407.

C. PROPOSED MINE FACILITIES

58. The proposed Mine Permit Area is a 2,190-acre parcel of property where mine facilities will be located and mining and milling operations will occur. AR-12377.
59. In the permit application, N.M. Copper Corp. proposes to enlarge the open pit over time to a diameter of approximately 2,800 feet, an area of approximately 161 acres, and a depth of approximately 900 feet beneath the original pre-mining ground surface, or approximately 4,650 feet above sea level. AR-12438.
60. In the permit application, N.M. Copper Corp. proposes to construct three new waste rock piles, designated WRSP-1, WRSP-2, WRSP-3. Combined, the three waste rock piles will contain approximately 45 million tons of rock, and they will cover approximately 210 acres.
61. In the permit application, N.M. Copper Corp. proposes to construct a primary crusher, a concentrator, and a mill to process copper ore.
62. In the permit application, N.M. Copper Corp. proposes to construct a tailings impoundment, the Tailings Storage Facility or TSF, to receive tailings from the milling operation. The Tailings Storage Facility will be designed to store 113 million tons of tailings produced over approximately 11 years. Tailings deposition will occur at a rate of approximately 32,000 tons per day. AR-12412.
63. In the permit application, N.M. Copper Corp. proposes to use, on average, approximately 13,000 gallons per minute (gpm) of water to operate the mine and mill facility. The sources of water, according to the permit application, will be 9,200 gpm of mine water recycled from the Tailings Storage Facility, and fresh water from an off-site well field. AR-12439.

64. Currently, N.M. Copper Corp. has water rights for just under 900 acre-feet per year of water but claims to need over 6,000 acre-feet per year of fresh water.

D. DISCHARGE PERMIT HEARING

65. The Environment Department received requests from Turner Ranch Properties and Hillsboro Pitchfork Ranch, the New Mexico Environmental Law Center, Amigos Bravos, Elephant Butte Irrigation District, and Gila Resources Information Project to extend the period for public comment. AR-17432 to AR-17437; AR-17439 to AR-17441; AR-17443 to AR-17444; AR-17474 to AR-17476. On or about March 3, 2018, the Environment Department extended the public comment period until May 5, 2018. AR-17486 to AR-17491.

66. On March 29, 2018, Environment Department staff from the Mining Environmental Compliance Section of the Ground Water Quality Bureau requested that the Secretary determine that there was significant public interest in the proposed discharge permit for the Copper Flat Mine, which would trigger a public hearing under section 20.6.2.3108.K NMAC. On March 30, 2018, the Environment Department Secretary approved the request. AR-17557 to AR-17558.

67. On May 4, 2018, the New Mexico Environmental Law Center, on behalf of Turner Ranch Properties and Hillsboro Pitchfork Ranch, submitted comments on the proposed discharge permit to the Environment Department. AR-17682 to AR-18150.

68. On June 7, 2018, the Environment Department Secretary docketed the matter for hearing and appointed a Hearing Officer. AR-18661 to AR-18662.

69. On August 10, 2018, the Environment Department sent to the applicant, N.M. Copper Corp., and other interested parties, a revised proposed groundwater discharge permit for the Copper

Flat Mine. The revisions reflected some of the public comments that had been submitted to the Department. Ranches Ex. 1.

70. On August 15, 2018, the Environment Department caused to be published in the *Truth or Consequences Herald* a public notice that a public hearing would be held on the proposed discharge permit for the Copper Flat Mine beginning on September 24, 2018 in Truth or Consequences, New Mexico. AR-18715 to AR-18722.
71. From September 24, 2018 through September 28, 2018, the Environment Department held a public hearing on the proposed discharge permit at the Ralph Edwards Auditorium in Truth or Consequences, New Mexico. Tr. vols. 1-5.
72. At the hearing, N.M. Copper Corp. presented the testimony of 6 technical witnesses; the Environment Department presented the testimony of 3 technical witnesses; the Ranches presented the testimony of 4 technical witnesses; and Elephant Butte Irrigation District presented the testimony of 4 technical witnesses. In addition, 48 members of the public made oral statements. Tr. vols. 1-5.

E. INTERESTS OF THE RANCHES

1. The Ladder Ranch

73. The Ladder Ranch is located immediately to the north, to the northeast, and, in part, to the east of the Mine Permit Area. Ranches Ex. 4.
74. The Ladder Ranch consists of 157,000 acres of private land, 100,600 acres of National Forest and wilderness lands, 20,079 acres of State lands, and 11,480 acres of Bureau of Land Management lands, totaling 289,159 acres, or 451.81 square miles. Dobrott Test. Tr. vol. 3, p. 787, lines 4-8.

75. Parts of the Ladder Ranch, particularly the Avant Pasture, are hydraulically downgradient of the Mine Permit Area. Myers Test. Tr. vol. 4, p. 1228, lines 4-11.

a. **Ranch Ecosystem**

76. The Ladder Ranch has excellent water resources, abundant wildlife, and a thriving ecosystem. Dobrott Test. Tr. vol. 3, p. 786, line 23 to p. 787, line 3.

77. The proximity of the Ladder Ranch to the Black Range watersheds, and elevations from 10,000 feet down to 4,500 feet, provide a suite of biological life zones unmatched on any one property in New Mexico. The biological diversity on the Ladder Ranch is remarkable, and it is highly regarded by biologists and ecologists. Dobrott Test. Tr. vol. 3, p. 788, lines 6-13.

i. **Water**

78. The Ladder Ranch property is incised by five semi-perennial creek systems that flow generally from west to east and drain into the Rio Grande Basin. They are, from north to south, Cuchillo Creek, Palomas Creek, Seco Creek, Cave Creek, and Las Animas Creek. Cave Creek is a tributary to Las Animas Creek. The five creeks contribute greatly to the biodiversity and biological richness of the ranch, but Las Animas is the most notable for its biodiversity. Dobrott Test. Tr. vol. 3, p. 789, lines 4-13, p. 791, lines 17-19; *see* Ranches Ex. 4.

79. Las Animas Creek is the stream system that runs through the ranch headquarters. Its surface and ground waters supply pristine dependable water for ranch operations including administration facilities, employee and guest housing, livestock, farm irrigation, and incidental benefits for wildlife and imperiled species. Dobrott Test. Tr. vol. 3, p. 789, lines 14-20.

80. Las Animas Creek has been nominated as one of New Mexico's Scenic Waterways. Its environmental importance has been documented in scientific publications and the book *River of Spirits*, a natural history of New Mexico's Las Animas Creek. This remarkable riparian

corridor has also been designated as an Important Bird Area by the Audubon Society. Among the creeks' most unique features are the ancient Arizona sycamore trees that occur only on this creek within the entire Rio Grande Basin. Tr. vol. 3, p. 789, line 22 to p. 790, line 8; *see* Ranches Ex. 4.

81. Las Animas Creek flows within 2 to 4 miles from the Copper Flat Mine. Dobrott Test. Tr. vol. 3, p. 789, lines 20-21.
82. Steven Dobrott, former manager of the Ladder Ranch, testified that the quality of water in both Cave Creek and Las Animas Creek is currently excellent and pristine. Dobrott Test. Tr. vol. 3, p. 791, lines 10-15.
83. Cave Creek and Las Animas Creek are used by ranch livestock for drinking. Steven Dobrott, former manager of the Ladder Ranch, has observed ranch livestock – bison – drinking from Cave Creek and Las Animas Creek many times. Dobrott Test. Tr. vol. 3, p. 791, line 21 to p. 792, line 1.
84. Cave Creek and Las Animas Creek are used by numerous types of wildlife for drinking. Steven Dobrott, former manager of the Ladder Ranch, has observed wildlife drinking from Cave Creek and Las Animas Creek. Dobrott Test. Tr. vol. 3, p. 792, lines 5-9.
85. Cave Creek and Las Animas Creek are used by birds for feeding and drinking. The creeks provide riparian habitat and food used by waterfowl and migrating, breeding bird populations unique to New Mexico. These riparian corridors connect migrating birds along the Rio Grande with the upper reaches of the Black Range. Food, cover, and good quality water along these creeks are used by many bird species, including the yellow-billed cuckoo which the Fish and Wildlife Service has listed as threatened. Steven Dobrott, former manager of the Ladder

- Ranch, has observed birds feeding and drinking from Cave Creek and Las Animas Creek. Dobrott Test. Tr. vol. 3, p. 792, lines 10-23.
86. Cave Creek and Las Animas Creek support populations of native Rio Grande chub, native Rio Grande sucker, native Rio Grande cutthroat trout, and non-native longfin dace. These species depend on pristine water for reproduction and production of macroinvertebrate food sources. Dobrott Test. Tr. vol. 3, p. 792, line 25 to p. 793, line 9.
87. Several springs feed into Las Animas Creek. Springs along the southern portion of Ladder Ranch are Warm Spring, Manager House Spring, Garden Tank Spring, and Myers Animas Spring, as well as several unnamed springs and seeps along Las Animas Creek. Dobrott Test. Tr. vol. 3, 793, lines 11-24.
88. Steven Dobrott, former manager of the Ladder Ranch, testified that the quality of water in the springs is currently excellent and pristine. Dobrott Test. Tr. vol. 3, p. 793, line 25 to p. 794, line 2.
89. The springs along Las Animas Creek are used by ranch livestock for drinking. Tr. vol. 3, p. 794, lines 3-8.
90. The springs along Las Animas Creek are used by wildlife for drinking. Dobrott Test. Tr. vol. 3, p. 794, lines 9-11.
91. Several groundwater wells have been installed in the southern portion of the Ladder Ranch, including livestock wells, irrigation wells, and domestic wells. The livestock wells are, from west to east, Myers Well, John Cross Well, Wanda Well, Evans Well, and Feedlot Well. The irrigation wells are, from west to east, Shipping Pens Well, Higgins Well, and Orchard Well. The domestic wells are three wells at the ranch headquarters. Dobrott Test. Tr. vol. 3, p. 795, lines 11-18; *see* Ranches Ex. 4.

92. The Feedlot Well is located in the Avant Pasture at the Ladder Ranch. Dobrott Test. Tr. Tr. vol. 3, p. 795, line 20 to p. 796, line 6.
93. The Feedlot Well, along with the Evans Well, is used to supply “drinkers” for quail and stock tanks used by bison and large game for drinking. It also provides water to two important conservation facilities, the endangered Bolson tortoise facility, where young tortoises are raised, and the Feedlot steel rim water storage tank that is used for maintaining threatened Chiricahua leopard frog. Dobrott Test. Tr. vol. 3, p. 796, lines 7-15.
94. Steven Dobrott, former manager of the Ladder Ranch, testified that the quality of water from the Feedlot Well is currently excellent. Dobrott Test. Tr. vol. 3, p. 796, line 25 to p. 797, line 2.

ii. **Flora and Fauna**

95. Fifty-seven species of mammals have been recorded at the Ladder Ranch, including healthy populations of elk, mule deer, Coues’ whitetail deer, pronghorn, javelina, black bear, and mountain lion. Ranches Ex. 4; Dobrott Test. Tr. vol. 3, p. 798, lines 20-24, p. 799, lines 4-5.
96. Over 250 species of birds have been recorded at the Ladder Ranch, including wild turkey, three species of quail – Gimbel’s quail, scaled quail, and Mearn’s quail – and threatened yellow-billed cuckoo. Ranches Ex. 4; Dobrott Test. Tr. vol. 3, p. 798, line 22 to p. 799, line 1, p. 799, lines 4-5.
97. Over 400 species of plants have been recorded at the Ladder Ranch. Ranches Ex. 4; Dobrott Test. Tr. vol. 3, p. 798, lines 2-3.
98. Wildlife, including elk, mule deer, pronghorn, javelina, mountain lion, turkey, and quail inhabit the Avant Pasture. Black bear pass through the Avant pasture. Dobrott Test. Tr. vol. 3, p. 799, lines 13-18.

99. The wildlife and plant life at the Ladder Ranch depend for their existence and survival on pristine water that flows in creeks and springs on the ranch. Dobrott Test. Tr. vol. 3, p. 799, lines 20-23.

iii. **Habitat Conservation Programs**

100. The non-profit Turner Endangered Species Fund works with the United States Fish and Wildlife Service and the New Mexico Game and Fish Department in projects to restore imperiled species. These restoration projects benefit the listed Chiricahua leopard frog, the Mexican grey wolf, the Bolson tortoise, and the yellow billed cuckoo. Dobrott Test. Tr. vol. 3, p. 800, lines 7-12.

101. The Turner Biodiversity Division is working to restore less imperiled species like the Rio Grande cutthroat trout and other native fish to Las Animas Creek. Dobrott Test. Tr. vol. 3, p. 800, lines 15-18.

102. These restoration projects depend on pristine water. Dobrott Test. Tr. vol. 3, p. 800, line 19 to p. 801, line 11.

b. **Ranch Business Interests**

103. The Ladder Ranch operates a ranching business, raising bison and selling bison meat in markets and restaurants. The Ladder Ranch bison herd averages approximately 1,000 head. Dobrott Test. Tr. vol. 3, p. 802, lines 2-4, p. 803, line 13-14.

104. Turner Ranch Outfitting organizes big game hunts on the Ladder Ranch for elk and mule deer. Dobrott Test. Tr. vol. 3, p. 802, lines 4-6.

105. Ted Turner Expeditions, which is based in Truth or Consequences, conducts ecotourism trips at the Ladder Ranch, including game viewing, bird watching, and mountain biking. Dobrott Test. Tr. vol. 3, p. 802, lines 7-11, p. 803, lines 3-5.

106. The big game hunting and ecotourism trips at the Ladder Ranch pursue game in the Avant Pasture. Dobrott Test. Tr. vol. 3, p. 802, line 22 to p. 803, line 5.
107. The Ladder Ranch employs between 15 and 20 people. The businesses of the Ladder Ranch contribute to the economy of Sierra County, through the payment of taxes and the purchase of goods and services. The businesses have been operated sustainably for 25 years. Dobrott Test. Tr. vol. 3, p. 802, lines 16-20, p. 803, lines 15-18.
108. The business enterprises at the Ladder Ranch depend on pristine water in the creeks, springs, and wells at the ranch. Dobrott Test. Tr. vol. 3, p. 803, lines 7-11.

2. The Hillsboro Pitchfork Ranch

109. The Hillsboro Pitchfork Ranch is located immediately to the west of and bordering the Mine Permit Area. Cunningham Test. Tr. vol. 3, p. 869, line 22 to p. 870, line 6.
110. The Hillsboro Pitchfork Ranch is hydraulically upgradient of the Copper Flat Mine. Cunningham Test. Tr. 881, lines 7-9
111. The Hillsboro Pitchfork Ranch is located within 1,680 feet of the open pit at the Copper Flat Mine. The open pit can be seen from the Hillsboro Pitchfork Ranch. Cunningham Test. Tr. vol. 3, p. 871, lines 2-23.

a. Ranch Ecosystem

112. The Hillsboro Pitchfork Ranch has excellent water resources, a varied natural ecosystem, and exceptional wildlife habitat. Cunningham Test. Tr. vol. 3, p. 878, line 22 to p. 879, line 23.

i. Water

113. Grayback Canyon has its headwaters on the Hillsboro Pitchfork Ranch, flows through the eastern portion of the ranch, and drains a large portion of the ranch property. Tr. vol. 3, p. 875, line 24 to p. 877, line 18; Ranches Ex. 6.
114. There are intermittent streams, springs, and seeps in Grayback Canyon. Cunningham Test. Tr. vol. 3, p. 878, lines 12-15.
115. The intermittent streams, springs, and seeps in Grayback Canyon support a varied natural ecosystem, habitat for wildlife, and a forage area for livestock. Cunningham Test. Tr. vol. 3, p. 878, lines 23-25.
116. The Hillsboro Pitchfork Ranch owns and operates two groundwater wells near the eastern boundary, the Rodgers Well and the Grayback Well. Cunningham Test. Tr. vol. 3, p. 873, lines 6-8.
117. The Rodgers Well, which is operated by an old windmill, is located on the eastern side of the Hillsboro Pitchfork Ranch approximately 3,270 feet from the open pit at the Copper Flat Mine. It is approximately 150 feet deep. Cunningham Test. Tr. vol. 3, p. 873, lines 11-18, p. 875, lines 8-19.
118. The Grayback Well, which is solar operated, is located on the eastern side of the Hillsboro Pitchfork Ranch approximately 8,070 to 8,080 feet from the open pit at the Copper Flat Mine. It is approximately 200 feet deep. Cunningham Test. Tr. vol. 3, p. 874, lines 2-5, p. 875, lines 8-15.
119. The Rodgers Well and the Grayback Well are used for drinking by livestock and wildlife. Cunningham Test. Tr. vol. 3, p. 873, lines 20-24, p. 874, lines 7-16.

ii. *Flora and Fauna*

120. Grayback Canyon has particularly good grasses, including side oats and black grama, and it has an abundance forbes, including Gambel oak and thick concentrations of mountain mahogany. Wildlife feed on the forbes. Mountain mahogany is a preferred feed for mule deer. Wildlife utilize the area year-round due to good forage, thermal cover, and access to water. Because the deep canyons make the area very secluded, and because the canyon has good feed and good water, the area has become premium mule deer habitat. Cunningham Test. Tr. vol. 3, p. 878, line 23 to p. 879, line 19.

121. Representatives of the New Mexico Department of Game and Fish sometimes refer to Grayback Canyon on the Hillsboro Pitchfork Ranch as a “nursery,” because a substantial number of mule deer doe live and fawn there. Cunningham Test. Tr. vol. 3, p. 879, line 20-23.

iii. **Habitat Conservation Programs**

122. For the last 11 years, the Pitchfork Ranch has collaborated with the New Mexico Department of Game and Fish in a program to improve mule deer habitat. Most of the habitat restoration has been conducted in Grayback Canyon. Cunningham Test. Tr. vol. 3, p. 879, line 23 to p. 880, line 2.

b. **Ranch Business Interests**

123. Cattle ranching is the primary business of the Hillsboro Pitchfork Ranch. The ranch has about 210 head of cattle – all cows and calves. Cunningham Test. Tr. vol. 3, p. 868, lines 8-19.

124. Hunting is also a primary business of the Hillsboro Pitchfork Ranch. Hunting species include mule deer, elk, dove, and two species of quail, Gimbel’s quail and Mearn’s quail. Cunningham Test. Tr. vol. 3, p. 868, line 25 to p. 869, line 5.

125. Beginning this year, the Hillsboro Pitchfork Ranch will host a Wounded Warrior hunt, donating a big game hunt to a service member who has suffered injury in the line of duty.

Cunningham Test. Tr. vol. 3, p. 869, lines 6-9.

126. The ranching and hunting businesses of the Hillsboro Pitchfork Ranch depend on fresh water. Cunningham Test. Tr. vol. 3, p. 869, lines 20-21.

F. EXPERT WITNESS QUALIFICATIONS

127. Turner Ranch Properties, L.P. and Hillsboro Pitchfork Ranch, LLC collectively put on four expert witnesses: Steven J. Dobrott, Robert Cunningham, James R. Kuipers, P.E., and Dr. Tom Myers.

1. Steven J. Dobrott

128. Steven J. Dobrott has a Bachelor of Sciences degree in wildlife biology from the University of Arizona, which he received in 1973. He also received specialized training from the U.S. Fish and Wildlife Service in refuge management, wildlife management, endangered species restoration and habitat management, biological statistics, and fire suppression and prescribed fire management. Ranches Ex. 3; Dobrott Test. Tr. vol. 3, p. 780, lines 6-13.

129. Mr. Dobrott worked for 5 years for the Victorio Company as a range and wildlife specialist on the 325,000-acre Gray Ranch in southeastern New Mexico. He conducted wildlife surveys, developed range management plans, recommended stock capacities, and organized big game hunting trips. Ranches Ex. 3; Dobrott Test. Tr. vol. 3, p. 780, line 16 to p. 781, line 5.

130. Mr. Dobrott worked for another 3 years for Gray Land and Cattle Company as a game manager and biologist, also on the Gray Ranch (under new ownership). He promoted and supervised big game hunting programs, planned and implemented game surveys, and

researched rare and endangered species on the ranch. Ranches Ex. 3; Dobrott Test. Tr. vol. 3, p. 781, lines 8-20.

131. Next, Mr. Dobrott worked for 6 years as a biologist for the United States Fish and Wildlife Service. He was responsible for the recovery of the endangered masked bobwhite on the Buenos Aires National Wildlife Refuge, in Arizona. He participated in the development of the Refuge Master Plan and the start-up of the new refuge. He also planned and implemented the reintroduction of pronghorn to the refuge. He was responsible for all the biological surveys on the refuge. He also planned and conducted biological surveys in Sonora, Mexico related to the recovery of the endangered masked bobwhite. Ranches Ex. 3; Dobrott Test. Tr. vol. 3, p. 781, line 21 to p. 782, line 12.

132. For the next 24 years, Mr. Dobrott was Manager of the Ladder Ranch in Sierra County, New Mexico, a 257,000-acre ranch for bison and wildlife with special emphasis on imperiled species. He was responsible for all aspects of managing the ranch including hiring employees, annual budgeting and administrative duties, raising bison for market, coordinating native species recovery programs, coordinating hunting programs, and coordinating eco-tours with other ranch operations. Ranches Ex. 3; Dobrott Test. Tr. vol. 3, p. 782, line 13 to p. 783, line 8.

133. Currently, Mr. Dobrott is Ambassador for Ted Turner Expeditions, a job he has had since March 2017. He promotes and participates in the eco-tourism business on Turner properties in New Mexico. He guides tours on Ladder Ranch and Armendaris Ranch. He also assists with the training of guides. Ranches Ex. 3; Dobrott Test. Tr. vol. 3, p. 783, line 9 to p. 784, line 1.

134. At the hearing, Mr. Dobrott was qualified as an expert in biology, ecology, and ranching, without objection. Tr. vol. 3, page 784, lines 12-19.

2. Robert Cunningham

135. Robert Cunningham has a Bachelor's degree in General Studies from the University of New Mexico. Ranches Ex. 5; Cunningham Test. Tr. vol. 3, p. 864, lines 8-9.

136. Mr. Cunningham worked for the United States Forest Service as a Supervisory Fire Management Technician for 34 years until September 18, 2007. Ranches Ex. 5; Cunningham Test. Tr. vol. 3, p. 864, line 19 to p. 865, line 3.

137. Mr. Cunningham's responsibilities at the Forest Service were varied. He worked in forest management, including NEPA planning and fuel management. He worked in fire management as a line firefighter, a Helitack and Hotshot crewmember, and a Smokejumper for 22 years. He also managed complex aviation operations, including the responses to over 80 large wildfire incidents in the United State; FEMA's response to the September 11, 2001 terrorist attacks on the World Trade Center in New York City; and FEMA's response to Hurricane Opal 1995, Hurricane Katrina in 2005, and Hurricane Rita also in 2005. He also managed an interagency wildland fire and Incident Command System (ICS) training program in the northwestern United States. He was responsible for a staff that developed and delivered wildland fire and ICS training to an interagency audience. Ranches Ex. 5; Cunningham Test. Tr. vol. 3, p. 865, line 7 to p. 866, line 6.

138. Mr. Cunningham grew up on his family's ranch, the Hillsboro Pitchfork Ranch. While working for the Forest Service, he returned to the ranch often to assist his father in running the ranch. Upon the death of his father in 2003, Mr. Cunningham and his sister became the owners and caretakers of the ranch. His responsibilities include business and financial management,

care and improvement of the land, cattle and game management, hunt guiding, wildlife habitat improvement, facilities management. Ranches Ex. 5; Cunningham Test. Tr. vol. 3, p. 866, lines 9-23.

139. At the hearing, Mr. Cunningham was qualified as an expert in ranch management, native game and wildlife and ecology, without objection. Tr. vol. 3, p. 867, line 25 to p. 868, line 1.

3. James R. Kuipers, P.E.

140. James R. Kuipers, P.E. has a Bachelor of Science degree in Mineral Process Engineering from Montana College of Mineral Science and Technology (now Montana Technological University or Montana Tech) in Butte. Ranches Exhibit 8; Kuipers Test. Tr. vol. 3, p. 902, lines 21-25.

141. Mr. Kuipers began working as a gopher in his grandfather's mine, Huckaba Construction Co., when he was 12 years old. He held summer jobs working in the mine throughout his teens, working as an underground and surface miner, millwright, mill operator, and fire assayer supervisor. Ranches Ex. 8, p. 7; Kuipers Test. Tr. vol. 3, p. 901, line 17 to p. 902, line 4.

142. Between his freshman and sophomore years in college, Mr. Kuiper built and operated a 25-ton per day mill, including grinding, crushing, flotation separation, and tailings disposal. Kuipers Test. Tr. vol. 3, p. 902, lines 8-20.

143. Mr. Kuipers spent 12 years working for the mining industry. In 1983 and 1984, Mr. Kuipers worked for Cumberland Mining Company as Mill Superintendent in Basin, Montana and Head Metallurgist in Virginia City, Montana. In 1984 and 1985 he worked for Canyonlands 21st Corporation as Director of Metallurgy in Blanding Utah and Project Manager in Jarbidge, Nevada. From 1986 to 1991, Mr. Kuipers held various positions for Western Gold Exploration and Mining Co., including Shift Foreman, Mill Superintendent,

Project Engineer, Project Manager, and Corporate Senior Metallurgist on several mining projects in the western United States, Ontario, Canada, and Johannesburg, South Africa. In 1991 and 1992, he worked for Western Minerals Corporation, where he held the positions of Corporate Senior Metallurgist in Wheat Ridge, Colorado, and Project Manager for the Northumberland Gold Mine in Round Mountain, Nevada. From 1993 to 1995, he worked for Denver Mineral Engineers, Inc., in Littleton, Colorado, where he was manager of the Mining and Wastewater Treatment Program, and then manager of the Process Engineering Department. Ranches Ex. 8, pp 5-6.

144. In 1996, Mr. Kuipers began working as a consultant on mining issues for environmental organizations and public interest groups, Indian tribes and First Nations in the United States and Canada, local, state, and federal government agencies, and groups of farmers and ranchers concerned about local mining operations. From 1996 until the present, Mr. Kuipers has been the head of the consulting firm of Kuipers & Associates LLC. In addition, from 1997 to 2005, Mr. Kuipers worked as a consulting engineer for the Center for Science in Public Participation, a non-profit organization in Bozeman, Montana, providing assistance on technical and environmental issues associated with hardrock mining. Ranches Ex. 8, pp. 1-5; Kuipers Test. Tr. vol. 3, p. 904, line 9 to p. 905, line 13.

145. Mr. Kuipers estimates that he has reviewed 30 or so discharge plans issued by the Environment Department over the past years. Kuipers Test. Tr. vol, 4, p. 1060, lines 2-4.

146. Mr. Kuipers has worked on the Questa Mine (formerly Molycorp) molybdenum mine near Questa, New Mexico; the Freeport McMoRan (formerly Phelps Dodge) Tyrone, Chino, and Cobre open pit copper mines in Grant County, New Mexico; and the Mount Taylor uranium

mine in McKinley County, New Mexico. Kuipers Test. Tr. vol. 3, p. 909, lines 7-11; p. 909, line 21 to p.910, p. line 25.

147. Mr. Kuipers has taken courses in mining economics. He worked as project manager and superintendent on several mines, where he was part of a team that looked at the economics of the operation on a daily basis. While working for Anglo American Corporation, he spent two years as part of the senior acquisitions team and was put in charge of doing all the engineering economics. Mine economics experience Kuipers Test. Tr. vol. 4, p. 1069, line 15 to p. 1070, line 15.

148. Mr. Kuipers estimates that he has probably reviewed 200 to 300 similar cost estimates over the last 10 years. Kuipers Test. Tr. vol. 3, p. 1053, lines 12-14.

149. Mr. Kuipers worked on the development of the Copper Mine Rule in New Mexico, serving on both the Technical Advisory Committee and the Citizens Advisory Committee. Kuipers Test. Tr. vol. 3, p. 909, lines 12-20.

150. Mr. Kuipers has given numerous formal presentations and has authored numerous publications in the fields of mining and mining reclamation. Ranches Ex. 8, pp. 7-11; Kuipers Test. Tr. vol. 3, p. 907, lines 6-12.

151. At the hearing, Mr. Kuipers was qualified as an expert in mining engineering, the effects of mining on the environment including water quality, mining remediation, financial responsibility for mines, and the New Mexico Copper Mine Rule, notwithstanding the objection of counsel for N.M. Copper Corp. as to Mr. Kuipers' qualifications as an expert in mining engineering. Kuipers Test. Tr. vol. 3, p. 921, lines 19-23.

152. Although Mr. Kuipers is not formally a geochemist, he has extensive practical experience in geochemistry. Kuipers Test. Tr. vol. 3, p. 912, line 22 to p. 914, line 16.

4. Dr. Tom Myers

153. Dr. Tom Myers has a Bachelor of Science degree in civil engineering from the University of Colorado in Boulder, a Master of Science degree in hydrology and hydrogeology from the University of Nevada in Reno, and a Ph.D. in hydrology and hydrogeology from the University of Nevada in Reno. Ranches Ex. 22; Myers Test. Tr. vol. 4, page 1160, lines 13-16.
154. From 1983 to 1988, Dr. Myers worked as a hydraulic engineer at the United States Bureau of Reclamation, where he performed hydrology planning studies on a range of topics including flood plains, water supply, flood control, salt balance, irrigation efficiencies, sediment transport, rainfall-runoff modeling, and groundwater balance. From 1988 to 1990, he was a research assistant at the University of Nevada in Reno, where he conducted research on aquatic habitat, stream morphology, and livestock management. From 1990 to 1992, he was a research and teaching assistant at the University of Arizona in Tucson. He conducted research on rainfall and runoff processes and climate models. He also taught the laboratory section for sophomore-level Principles of Hydrology course. From 1992 to 1997, he worked as a research assistant at the University of Nevada in Reno, conducting research on riparian area and watershed management, including stream morphology, aquatic habitat, cattle grazing, and low-flow and flood hydrology. Ranches Ex. 22; Myers Test. Tr. vol. 4, p. 1160, line 18 to p. 1161, line 6.
155. In 1993, Dr. Myers began consulting in the fields of hydrology and hydrogeology. From 1999 to 2004, Dr. Myers was Executive Director of Great Basin Mine Watch, a non-governmental organization comprised of environmental groups, Native Americans, and ranchers. He was responsible for reviewing and commenting on mining projects with a focus

on groundwater and surface water resources. Ranches Ex. 22; Myers Test. Tr. vol. 4, p. 1161, line 7 to p. 1162, line 4.

156. Dr. Myers has numerous peer-reviewed publications, including two published papers on contaminant transport. Ranches Ex. 22, p. 2; Myers Test. Tr. vol. 4, page 1162, lines 5-8.
157. At the hearing, Dr. Myers was qualified as an expert in hydrology and hydrogeology, without objection. Tr. vol. 4, page 1163, lines 3-9.

III. DEFICIENCIES IN THE PERMIT APPLICATION

158. The discharge permit application that N.M. Copper Corp. has submitted to the Environment Department is inadequate in several important respects, and these inadequacies need to be addressed. Kuipers Test. Tr. vol. 4, p. 1060, line 6 to p. 1061, line 9.

A. INADEQUATE EVALUATION OF ANDESITE BEDROCK

159. Andesite is extrusive igneous or volcanic rock that forms when magma reaches the ground surface and quickly crystalizes. Myers Test. Tr. vol. 4, p. 1168, lines 11-13.
160. Andesite bedrock underlies a large portion of the Mine Permit Area. AR-12473.
161. The andesite at the Copper Flat Mine site, as a volcanic rock, is typically fractured. AR-00543.
162. The discharge permit application that N.M. Copper Corp. has submitted states that the andesite bedrock underlying the proposed waste rock piles will serve as a “natural liner protective of groundwater,” and a “natural liner system.” AR-12433, AR-12434.
163. The discharge permit application is based on the assumption that the andesite bedrock has a very low permeability, less than 1×10^{-6} centimeters per second. AR-12433.
164. The authority for this conclusion is difficult to find in the record, and not definitive. Myers Test. Tr. vol. 4, p. 1168, line 22 to p. 1169, line 20.

165. The proposed waste rock piles designated as WRSP-2 and WRSP-3 will be constructed outside the so-called open pit surface drainage area. NMED Ex. 3, p. 12.
166. The discharge permit application that N.M. Copper Corp. has submitted does not include adequate evaluation of the andesite bedrock underlying portions of the mine area. N.M. Copper Corp. has not justified its assumption that the hydraulic conductivity of the andesite is 1×10^{-6} centimeters per second. Myers Test. Tr. vol. 4, p. 1181, line 15 to 1182, line 1.
167. The estimate of the hydraulic conductivity of the andesite bedrock is actually based on only three data points from two borings. The first is from well GWQ-5R, which was the subject of a pressure test. The second and third data points are from monitoring well GWQ96-22A and B (which are two screened intervals at different depths in the same well), which was the subject of a slug test. AR-02206; NMED Ex. 4, p. 5.
168. In its permit application, N.M. Copper Corp. cited data from another boring, GWQ96-23A and B, to support its estimate of the (low) permeability of the andesite. The Environment Department also identified this well for the same purpose. AR- ; NMED Ex. 4, p. 5.
169. However, GWQ96-23A and B was completed in quartz monzonite, not in andesite. It therefore reveals no data on the conductivity of the andesite. Marcoline Test. Tr. vol. 3, p. 710, line 5 to p. 713, line 4; Ranches Ex. 39.
170. The tests used to estimate the conductivity of the andesite were conducted deep in the bedrock formation. The pressure test performed on well GWQ-5R was conducted at a depth of between 64 and 100 feet below the ground surface. Monitoring well GWQ96-22 was completed at 174 to 244 (22A) and 340 to 380 (22B) feet below the ground surface. Myers Test. Tr. vol. 4, p. 1170, line 24 to p. 1171, line 1; AR-02201 (Table 2); AR-02206 (Table 4).

171. Hydraulic conductivity measured at depth is not representative of hydraulic conductivity near the ground surface due to weathering of the rock at the surface. Pollutants from the waste rock pile would infiltrate at the surface. Myers Test. Tr. vol. 4, p. 1173, line 23 to p. 1174, line 7.
172. The tests used to estimate the conductivity of the andesite do not account for fractures in the bedrock. Conductivity over a large area is an average for that area including both fractures and the unfractured media between the fractures. Although fractures may be only a small percentage of the overall rock unit, seepage from the waste rock piles is likely to infiltrate into the fractures. Ranches Ex. 23, pp. 6-7 (AR-17947 to AR-17948).
173. The hydraulic conductivity of the andesite might be 1×10^{-6} centimeters per second in some areas, but in other areas it might be much higher. Myers test. Tr. vol. 4, p. 1180, lines 16-20.
174. John Shomaker & Associates, in the Amendment to the Stage 1 Abatement Plan Proposal, states that the slug test analysis estimates an extremely low range of hydraulic conductivity for the “*unfractured andesite and quartz monzonite rocks.*” AR-02206 (emphasis added).
175. Preferential pathways, such as fractures in bedrock, are very important to understand. We have heard a lot about Darcy's law. Darcy's law does not account for preferential pathways. At many sites, preferential pathways have ultimately been the mechanism for pollution to travel great distances. Kuipers Test. Tr. vol. 3, p. 941, lines 4-9.
176. Calculations of the volume of water that flowed into the open pit during dewatering operations in 1982 indicate that the overall hydraulic conductivity of the andesite bedrock surrounding the open pit is in the range of 6.6×10^{-5} to 5.5×10^{-4} centimeters per second, which is much higher than the conductivity of 1×10^{-6} centimeters per second that N.M. Copper Corp. has assumed. Myers Test. Tr. vol. 4, p. 1174, line 22 to p. 1178, line 10.

177. Groundwater monitoring well GWQ96-22, which is completed in andesite, shows substantial variations in the concentrations of total dissolved solids and sulfate over time. This variation indicates that water is flowing through the andesite material, and the conductivity of the andesite is higher than N.M. Copper Corp. has assumed. Myers Test. Tr. vol. 4, p. 1247, line 16 to p. 1249, line 6; AR-07479; AR-02868.
178. John Shomaker & Associates, in the Amendment to the Stage 1 Abatement Plan Proposal, listed eight water supply wells that were completed in andesite. Those wells are identified by the names GWQ-4, GWQ-6(N); GWQ-6(S); Pague, Delores, Paxton, LRG-4156, and LRG-4159. This information indicates that the andesite has a higher hydraulic conductivity than that assumed by N.M. Copper Corp. AR-02201; Myers Test. Tr. vol. 4, p. 1249, lines 15-25.
179. The Environment Department would not necessarily object to additional evaluation of the andesite bedrock, and agreed that further evaluation would be useful if it makes the public more confident in the permit. Vollbrecht Test. Tr. vol, 2, p. 555, line 17 to p. 556, line 21.
180. The Ranches recommend that the andesite bedrock be more fully characterized and evaluated to determine its conductivity and the degree to which it may be fractured. If the evaluation shows that the andesite has a higher hydraulic conductivity than N.M. Copper Corp. has estimated, the Environment Department should require more stringent permit conditions to protect groundwater quality. Myers Test. Tr. vol. 4, p. 1181, line 19 to p. 1183, line 14; *see* Ranches Ex. 30.

B. INADEQUATE EVALUATION OF LEAKAGE FROM TAILINGS STORAGE FACILITY

181. The discharge permit application that N.M. Copper Corp. has submitted does not include adequate aquifer evaluation, as required by the Copper Mine Rule.

182. The discharge permit application is based on the assumption that the liner system underlying the proposed Tailings Storage Facility will not leak significantly. Ranches Ex. 23.
183. N.M. Copper Corp. estimated the leakage rate from the Tailings Storage Facility to be 0.5 gallons per minute. Finch Test. Tr. vol. 1, p. 178, lines 3-12.
184. A "liner system" is an engineered system for the containment, management, or storage of liquid material that has the potential to generate water contaminants. 20.6.7.7.B(34) NMAC. A "liner system" is a combination of liners and drainage layers in a containment facility. Ranches Ex. 11, p. 33.
185. Geomembrane liners typically leak, due to design defects, manufacturing defects, and improper installation. Ranches Ex. 11, pp. 56-66; Ranches Ex. 23, p. 4.
186. Even with excellent installation, a liner still leaks. A liner with merely good installation can have leakage rates six times higher than a liner with excellent installation. Ranches Ex. 23, p. 4.
187. Geosynthetic membranes, a component of a liner system, have very low hydraulic conductivity rates under ideal conditions. Kuipers Test. Tr. vol. 3, p. 981, lines 12-15.
188. However, estimated rates of permeation (i.e., hydraulic conductivity) through geomembranes can be several orders of magnitude less than the actual rates resulting from geomembrane defects. Typically, the actual rate of leaks or seepage through liners, is almost always orders of magnitude greater than the estimated rate. Kuipers Test. Tr. vol. 3, p. 981, lines 19-25; Ranches Ex. 9, p. 5 (AR-17965).
189. Liner systems do not prevent seepage of pollutants into groundwater, they only reduce it. In many cases, liner systems make the amount of water pollution manageable, but they do not

reduce seepage to a point where it no longer needs to be addressed. Kuipers Test. Tr. vol. 3, p. 942, lines 3-9.

190. Experience shows that when there is seepage through liner systems, it does not resemble the theoretical estimates, it is always orders of magnitude higher. So it's standard practice in the design of tailings impoundment liner systems to address both seepage resulting from permeation through the liner, and also leakage from liner defects. Kuipers Test. Tr. vol. 3, p. 979, lines 12-17.

191. It is very important that an aquifer evaluation be based not on desired outcomes, but rather be based on a robust sensitivity analysis that addresses not just what we would like to happen, but what we think could happen if our designs do not go as planned. Kuipers Test. Tr. vol. 3, p. 975, lines 19-24.

192. Neither the permit application nor the proposed permit identify or address the seepage that would be expected to occur from a lined tailings impoundment. They have provided a seepage estimate, but it is a best-case, ideal case estimate. It does not provide the robust approach that would be necessary. Kuipers Test. Tr. vol. 3, p. 986, lines 4-9; Myers Test. Tr. vol. 4, p. 1185, lines 5-8.

193. The Environment Department should require N.M. Copper Corp. to revise the permit application to include calculation of a more conservative, robust seepage estimate, consistent with current industry practice, as part of the aquifer analysis under the Copper Mine Rule. The analysis should include a sensitivity analysis. A sensitivity analysis needs to be formed around that 0.5 gallons per minute estimated seepage rate. Kuipers Test. Tr. vol. 3, p. 986, lines 17-23; Ranches Ex. 9, p. 6 (AR-17966).

C. INADEQUATE GROUNDWATER MONITORING

194. The permit application that N.M. Copper Corp. has submitted includes a groundwater monitoring proposal that is inadequate. Ranches Ex. 23, p. 15 (AR-17956).
195. The Environment Department has proposed two new groundwater monitoring wells in addition to the monitoring wells that N.M. Copper has proposed; however, the groundwater monitoring plan is still inadequate. Ranches Ex. 1, p. 22 (Condition C113.I).
196. Using an interpretive model, Dr. Tom Myers, a hydrologist-hydrogeologist, calculated the effects on groundwater of a 4-gallon per day leak from the Tailing Storage Facility into the Santa Fe Group aquifer formation; a 20-gallon per day leak from the Tailing Storage Facility into the Santa Fe Group aquifer formation; and a 4-gallon per day leak from the waste rock piles into the andesite formation. Each simulated leak was modeled to last for 15 years. Ranches Ex. 24, pp. 12-25; Myers Test. Tr. vol. 4, p. 1200, line 13 to p. 1203, line 22, p. 1207, line 10 to p. 1212, line 16.
197. Dr. Myers conservatively assumed a low hydraulic conductivity rate for the andesite in his interpretive model, 0.01 feet per day (3.53×10^{-6} centimeters per second). The model did not account for possible fractures in the andesite. Ranches Ex. 24, p. 12; Myers Test. Tr. vol. 4, p. 1223, lines 10-13.
198. If monitoring wells are spaced too widely, a plume of groundwater contamination might pass between the monitoring wells undetected. Myers Test. Tr. p. 1220, line 25 to p. 1221, line 1.
199. The simulated plumes of groundwater contamination (in the Santa Fe Group formation) from the Tailings Storage Facility produced by Dr. Myers' interpretive model are, in some cases, 500 to 700 feet wide. If monitoring wells are spaced at 1000-foot intervals, it is very

possible for such a contaminant plume to pass through undetected. Myers Test. Tr. vol. 4, p. 1221, lines 1-5.

200. Monitoring wells downgradient of the proposed Tailing Storage Facility need to be spaced approximately every 500 feet. That would require a total of about 18 monitoring wells along the downgradient perimeter of the Tailings Storage Facility. Ranches Ex. 24, p. 38; Myers Test. Tr. vol. 4, p. 1222, lines 9-16.

201. The simulated plumes of groundwater contamination (in the andesite) from the Waste Rock Piles produced by Dr. Myers' interpretive model are relatively wide, almost circular. But the plumes move slowly in the andesite. Monitoring wells need to be spaced sufficiently to detect the plume during mine operations. Ranches Ex. 24, pp. 38-39; Myers Test. Tr. vol. 4, p. 1222, lines 17-22.

202. Monitoring wells downgradient of the proposed Waste Rock Piles need to be spaced approximately every 500 feet, although somewhat wider spacing would be acceptable. That would require a total of approximately 10 monitoring wells along the downgradient perimeter of the Waste Rock Piles. Ranches Ex. 24, p. 39; Myers Test. Tr. vol. 4, p. 1222, line 23 to p. 1223, line 5.

203. The Environment Department would not oppose additional monitoring wells, and indicated that additional monitoring wells would be useful if it makes the public more confident in the permit. Vollbrecht Test. Tr. vol, 2, p. 556, line 10 to p. 557, line 9.

204. The Ranches recommend that the discharge permit be amended to require N.M. Copper Corp. to try to locate fractures in the andesite bedrock that could transport contaminants from the Waste Rock Piles. Additional monitoring wells should be installed in any fracture zones that are located. Ranches Ex. 24, p. 39; Myers test. Tr. vol. 4, p. 1223, lines 10-15.

205. The Ranches recommend that the discharge permit be amended to require N.M. Copper Corp. to install additional monitoring wells downgradient of the Tailings Storage Facility and downgradient of the waste Rock Piles spaced approximately 500 feet apart. Well spacing would be approximate and could vary based on field observations and professional judgment. Ranches Ex. 34; Myers Test. Tr. vol. 4, p. 1223, line 19 to p. 1224, line 16.

D. INADEQUATE FINANCIAL ASSURANCE PROPOSAL

206. Several companies have previously attempted to operate the Copper Flat Mine profitably, but have not been successful. *See* Proposed Findings of Fact #8 to #43.

207. In the United States, the Copper Flat Mine is well known as the only major mine that's gone into production and then within three months ceased production. Kuipers Test. Tr. vol. 3, p. 926, lines 5-8; AR-17753.

208. N.M. Copper is a wholly-owned subsidiary of THEMAC Resources Group Ltd., a Canadian company. Smith Test. Tr. vol. 1, p. 42, lines 6-8; AR-12376.

209. N.M. Copper Corp. does not hold any assets in New Mexico, or in any other state, other than the Copper Flat Mine. Smith Test. Tr. vol. 1, p. 63, lines 1-16.

210. According to James Kuipers, due to the mine's characteristics, there is a significant risk that the mine will fail at some point. Kuipers Test. Tr. vol. 3, p. 928, line 19 to p. 929, line 2.

211. According to James Kuipers, depending on the price of copper at the time, there is a substantial likelihood of N.M. Copper Corp. going out of business after 6 years of operation, at which time the mine will begin processing less profitable lower grade ore. Kuipers Test. Tr. vol. 4, p. 1070, line 20 to p. 1073, line 13.

212. On August 9, 2018, N.M. Copper Corp. submitted a preliminary financial assurance cost estimate ("Preliminary FA Proposal") to the Mining and Minerals Division (MMD) of the New

Mexico Energy, Minerals and Natural Resources Department. Smith Test. Tr. vol. 1, p. 55, lines 7-8; Kuipers Test. Tr. vol. 4, p. 1030, lines 2-3.

213. The Preliminary FA Proposal that N.M. Copper Corp. has submitted is not part of the administrative record for this groundwater discharge permit proceeding. *See* Notice of Filing of Administrative Record (July 10, 2018) (submitting records numbered AR-00001 to AR-18674; Notice of Supplementation of Administrative Record (Sept. 13, 2018) (submitting records numbered AR-18675 to 18733); Second Notice of Supplementation of Administrative Record (served Nov. 16, 2018) (submitting records numbered 18734 to 18798).

214. By letter dated August 15, 2018, MMD notified the Environment Department, Ground Water Quality Bureau, that MMD had received the Preliminary FA Proposal, noted that the proposal could be downloaded from the MMD website, and requested that the Environment Department comment on the proposal. AR-18731.

215. N.M. Copper Corp. has not, as of the close of the record in this proceeding, proposed the form that the financial assurance will take. Kuipers Test. Tr. vol. 4, p. 1059, lines 4-5; Vollbrecht Test. Tr. vol. 2, p. 554, lines 10-17.

216. N.M. Copper Corp. has not, as of the close of the record in this proceeding, proposed a discount rate or an escalation rate for the financial assurance. Vollbrecht Test. Tr. vol, 2, p. 549, lines 2-23.

217. The Preliminary FA Proposal estimates that closure of the Copper Flat Mine will cost a total of \$55,807,327. Smith Test. Tr. vol. 1, p. 54, line 25 to p. 55, line 5; Preliminary FA Proposal, Attachment A, p. 2.

218. The Preliminary FA Proposal estimates that direct costs for closure of the Copper Flat Mine will total \$44,291,529. Kuipers Test. Tr. vol. 4, p. 54, line 25 to p. 55, line 5; Preliminary FA Proposal, Attachment A, p. 2.
219. According to James Kuipers, direct costs for closure of the Copper Flat Mine should be closer to \$100,000,000. Kuipers Test. Tr. vol. 4, p. 453, lines 18-22.
220. The Preliminary FA Proposal is based on the assumption that all monitoring, maintenance, and water management at the Copper Flat Mine will cease after 25 years. Smith Test. Tr. p. 64, lines 9-16; Vollbrecht Test. Tr. vol. 2, p. 550, lines 11-18.
221. The Ground Water Quality Bureau of the Environment Department has concluded that the cost estimate for financial assurance for the Copper Flat Mine should be based on long-term monitoring and maintenance for a period of 100 years. Vollbrecht Test. Tr. vol. 2, p. 543, line 16 to p. 544, line 17.
222. The Preliminary FA Proposal is based on the assumption that the period of time that groundwater monitoring will be necessary at the Copper Flat Mine is 25 years. Smith Test. Tr. p. 65, lines 3-14; Vollbrecht Test. Tr. vol. 2, p. 551, lines 15-22; Preliminary FA Proposal, Attachment I.
223. It is likely that groundwater monitoring will be necessary beyond 25 years. Kuipers Test. Tr. vol. 2, p. 1042, line 24 to p. 1043, line 11; Vollbrecht Test. Tr. vol. 2, p. 551, line 24 to p. 552, line 3.
224. The Preliminary FA Proposal is based on the assumption that water will continue to drain from the Tailings Storage Facility for only 25 years. Smith Test. Tr. p. 64, lines 18-22; Vollbrecht Test. Tr. vol. 2, p. 550, line 25 to p. 551, line 7.

225. Water in the Tailings Storage Facility is likely to continue to drain down for more than 25 years.
226. Monitoring and maintenance activities will likely be necessary for much longer than 25 years, and in other jurisdictions monitoring and maintenance activities are generally projected to continue for 100 to 500 years. Current policy is to apply a 100 to 500-year monitoring and maintenance period. Kuipers Test. Tr. vol. 54, p. 1035, lines 3-12, p. 1046, lines 8-12.
227. The Preliminary FA Proposal does not include costs for monitoring of vegetation, which is necessary and standard procedure. Kuipers Test. Tr. vol. 2, p. 1047, line 21 to p. 1048, line 3; Preliminary FA Proposal, Attachment I.
228. The Preliminary FA Proposal does not include costs for monitoring of erosion, which is necessary and is standard procedure. Kuipers Test. Tr. vol. 3, p. 1048, lines 4-10; Preliminary FA Proposal, Attachment I.
229. The Preliminary FA Proposal does not include costs for monitoring of wildlife, which is very important. Kuipers Test. Tr. vol. 3, p. 1048, lines 11-20; Preliminary FA Proposal, Attachment I.
230. The Preliminary FA Proposal does not include costs for monitoring of the pit lake. Preliminary FA Proposal, Attachment I; Kuipers Test. Tr. vol. 3, p. 1048, lines 21-25.
231. The Preliminary FA Proposal does not include costs for monitoring of the Tailings Storage Facility for stability. Kuipers Test. Tr. vol. 3, p. 1049, lines 1-7.
232. The Preliminary FA Proposal includes only a one-time expenditure for post-mining maintenance in year 7 in the amount of \$686,791. Kuipers Test. Tr. vol. 4, p. 1050, lines 8-13, 22-23.

233. The Preliminary FA Proposal does not include costs for maintenance of roads. Kuipers Test. Tr. vol. 4, p. 1051, lines 10-22.
234. The Preliminary FA Proposal does not include costs for maintenance of stormwater control structures. Kuipers Test. Tr. vol. 4, p. 1051, line 23 to p. 1052, line 6.
235. The Preliminary FA Proposal does not include costs for maintenance of the pit lake. Kuipers Test. Tr. vol. 4, p. 1052, lines 11-17.
236. The Preliminary FA Proposal does not include costs for maintenance of the Tailings Storage Facility capture system. Kuipers Test. Tr. vol. 4, p. 1052, lines 11-13.
237. The Preliminary FA Proposal applies an indirect cost rate of 26 percent, which is substantially lower than MMD draft guidance would require (42 percent). Kuipers Test. Tr. vol. 4, p. 1058, lines 9-13; Ranches Ex. 20; *see also* Kuipers Test. Tr. vol. 4, p. 1153, line 10 to p. 1154, line 25 (draft guidance is commonly used as guidance).
238. If the cost estimate for financial assurance is too low, the State of New Mexico, and ultimately its taxpayers, will bear the additional costs of closure if the company is no longer financially viable. Vollbrecht Test. Tr. vol. 2, p. 548, line 9 to p. 549, line 1.
239. The Ranches recommend that the Preliminary FA Proposal be amended to address these issues.

IV. POTENTIAL FOR ADVERSE EFFECTS ON WATER RESOURCES

240. The discharge permit application that N.M. Copper Corp. has submitted to the Environment Department is likely to result in significant groundwater contamination.

A. POTENTIAL FOR LEAKS AND SPILLS

241. Copper porphyry mines, such as the Copper Flat Mine, are generally associated with water pollution from acid rock drainage, leaching of heavy metals, and releases of toxic substances. Ranches Ex. 16, p. 4; Kuipers Test. Tr. vol. 3, p. 999, line 23 to p. 1000, line 3.
242. There have been multiple leaks and spills from virtually all the copper porphyry mines in the United States. Ranches Ex. 16; Kuipers Test. Tr. vol. 3, p. 1000, lines 4-9.
243. There have been multiple leaks and spills from the Freeport-McMoRan Chino mine in Grant County, New Mexico, including a spill of 3.25 million gallons of tailings into Whitewater Creek in 1999. Kuipers Test. Tr. vol. 3, p. 1000, line 10 to p. 1002, line 16; Ranches Ex. 16, pp. 15-16.
244. There have been multiple leaks and spills from the Freeport-McMoRan Tyrone mine in Grant County, New Mexico, including a spill of 2.6 million cubic yards of tailings into the Mangas Valley. Kuipers Test. Tr. vol. 3, p. 1002, line 19 to p. 1006, line 22; Ranches Ex. 16, pp. 24-25.
245. There is a high likelihood, even a certainty, that leaks and spills from the Copper Flat Mine will occur. Kuipers Test. Tr. vol. 3, p. 1007, lines 5-7.
246. Geomembrane liners typically leak. *See Proposed Findings of Fact #165 to #170.*
247. Unlined stormwater channels, which will convey mine influenced stormwater from around the waste rock piles to the Impacted Stormwater Impoundment during operations, would be a potential source of leaks of mine influenced water. Myers Test. Tr. vol. 4, p. 1185, line 9 to p. 1186, line 9; Ranches Ex. 23, pp. 14-15 (AR-17955 to AR-17956).
248. In addition to routine leaks and spills at copper mines, tailing impoundments can be subject to catastrophic failure. Several such failures have occurred in the last few years. Kuipers Test. Tr. vol. 4, p. 1023, lines 20-24.

249. In August 2014, the tailings impoundment at the Mount Polley Mine, a copper mine in British Columbia, Canada, breached resulting in a catastrophic release of 17 million cubic meters of water and 8 million cubic meters of tailings into a drainage basin including two lakes. Ranches Ex. 9, pp. 20-23; Kuipers Test. Tr. vol. 4, p. 1025, line 20 to p. 1026, line 5.
250. On November 5, 2015, the Fundão tailings dam at the Samarco iron mine in Brazil, collapsed, releasing about 43 million cubic meters of tailings, causing damage to water courses 548 kilometers downstream. Ranches Ex. 9, pp. 23-24.
251. Catastrophic failures of tailings impoundments can have extreme adverse effects on surface water quality and lead to both short-term and long-term groundwater effects. Kuipers Test. Tr. vol. 4, p. 1025, lines 17-19.
252. The closure plan and the financial assurance for the mine need to address the potential for spills. Kuipers Test. Tr. vol. 3, p. 1007, lines 5-13.

B. POTENTIAL FOR MIGRATION OF GROUNDWATER CONTAMINATION

253. Groundwater contamination from Copper Flat Mine facilities have the potential to migrate off the Mine Permit Area. Ranches Ex. 4, p. Myers Test. Tr. vol. 4, p.
254. Using an interpretive model, Dr. Tom Myers, a hydrologist-hydrogeologist, calculated the effects on groundwater of a 4-gallon per day leak from the tailing storage facility into the Santa Fe Group aquifer formation; a 20-gallon per day leak from the tailing storage facility into the Santa Fe Group aquifer formation; and a 4-gallon per day leak from the waste rock piles into the andesite formation. Each simulated leak was modeled to last for 15 years. Ranches Ex. 24, pp. 12-25; Myers Test. Tr. vol. 4, p. 1200, line 13 to p. 1203, line 22, p. 1207, line 10 to p. 1212, line 16.

255. Dispersion of a groundwater plume causes the plume to expand in directions transverse to groundwater flow. Myers Test. Tr. vol. 4, p. 1208, line 24 to p. 1209, line 5.
256. Fractures in the bedrock have the potential to transport groundwater contaminants in unpredictable ways. A fracture zone that is transverse to the groundwater flow could intercept the groundwater and cause it to move along the fracture. Myers Test. Tr. vol. 4, p. 1224, line 21 to p. 1225, line 11.
257. Mounding of groundwater resulting from leakage from mine facilities, such as the waste rock piles, could cause the groundwater gradient to flow to the north. Myers Test. Tr. vol. 4, p.1284, line 12 to p. 1285, line 2.
258. Groundwater contaminants from the proposed Waste Rock Piles could easily move north or northeast to the southern part of the Ladder Ranch, including Avant Pasture, by dispersion. Myers Test. Tr. vol. 4, p. 1228, lines 4-17.
259. Groundwater contaminants could move north or northeast through fractures along the north-south trending fault on the east side of the proposed Tailings Storage Facility. Fracture zones are often associated with faults. Myers test. Tr. vol. 4, p. 1225, line 12 to p. 1226, line 6.

C. POTENTIAL FOR WATER DEPLETION FROM PIT DRAWDOWN

260. During proposed operation of the Copper Flat Mine, the open pit will be dewatered, expanded, and deepened. It will be enlarged to a diameter of approximately 2,800 feet, an area of approximately 161 acres, and a depth of approximately 900 feet beneath the original pre-mining ground surface, or approximately 4,650 feet above sea level. AR-12438.
261. Expanding and dewatering the open pit will draw groundwater from the surrounding area.

262. The open pit will affect groundwater much like a huge well, creating a cone of depression and drawing water into it. Vollbrecht Test. Tr. vol. 2, p. 566, lines 6-11.
263. The Water Quality Monitoring Plan for the Copper Flat Mine Discharge Permit, prepared by John Shomaker and Associates, includes a groundwater contour map of the open pit after the first 5 years of operation. The groundwater table will have been lowered substantially for a distance around the open pit. The lowered groundwater table extends beyond the Mine Permit Area to property of both the Ladder Ranch and the Hillsboro Pitchfork Ranch. AR-13543; AR-13811.
264. The pit lake will draw groundwater from the surrounding private land, including the Ladder Ranch and the Hillsboro Pitchfork Ranch. Myers Test. Tr. vol. 4, p. 1235, lines 10-12.
265. Post-mining, the pit lake will draw groundwater from the north beyond the Permit Area Boundary from beneath the Ladder Ranch property. Myers Test. Tr. vol. 4, p. 1235, lines 21-25.
266. Post-mining, the pit lake will draw groundwater from the southwest beyond the Permit Area Boundary from beneath the Hillsboro Pitchfork Ranch property. Myers Test. Tr. vol. 4, p. 1235, lines 13-20.
267. By drawing groundwater from areas to the north and southwest (and elsewhere), the open pit will lower the water table in those areas. Myers Test. Tr. vol. 4, p. 1237, line 7 to p. 1238, line 1.
268. The pit drawdown could reduce the flows of water in Las Animas Creek, Warm Spring, and Myers Animas Spring on the Ladder Ranch. Ranches Ex. 15, p. 22-23 and Exhibit A thereto, p. 3.

269. Given the groundwater gradient and given the proximity of the Hillsboro Pitchfork Ranch to the proposed open pit, groundwater from beneath the Grayback Canyon system will be drawn into the pit lake. The wells on the east side of the ranch, the Rodgers Well and the Grayback Well, may produce less water, or they may go dry. The intermittent streams and seeps in Grayback Canyon will most certainly be affected. Their flows will be reduced. They may dry up. Cunningham Test. Tr. vol. 3, p. 881, lines 10-17.

270. The open pit drawdown would pose a risk to the private property of the Ladder Ranch. See Dobrott Test. Tr. vol. 3, p. 803, line 23 to p. 804, line 21.

271. The open pit drawdown will pose a risk to the private property of the Hillsboro Pitchfork Ranch. Cunningham Test. Tr., vol. 3, p. 883, lines 6-24.

V. REGULATORY STATUS OF THE PIT LAKE

272. Upon closure of the Copper Flat Mine, the open pit will be filled with water. A large pit lake will form in the open pit.

A. ENCROACHMENT ON PUBLIC PROPERTY

273. The pit lake will likely encroach on public property. Myers Test. Tr. vol. 3, p. 1229, lines 14-15.

274. The Environment Department witness recognized that U.S. Bureau of Land Management (BLM) property was located very close to the pit lake as depicted by modeling. Vollbrecht Test. Tr. vol. 2, p. 562, lines 19-20.

275. The map that N.M. Copper Corp. has prepared depicting the projected pit lake shows that the edge of the pit lake will be within approximately 100 feet of the BLM property boundary. Ranches Ex. 36 (AR-15853).

276. The contour intervals on various maps seem to show the pit lake will actually be higher than depicted, and will encroach onto public property. Myers Test. Tr. vol. 3, p. 1231, line 18 to p. 1139, line 9; Ranches Ex. 36 (AR-15853).
277. Due to the shape of the proposed open pit, as the water level in the pit rises, the area of the pit lake will expand. Vollbrecht Test. Tr. vol. 2, p. 562, lines 11-14.
278. The pit lake water level will be subject to seasonal fluctuations. Myers Test. Tr. vol. 3, p. 1230, lines 5-11; Vollbrecht Test. Tr. vol. 2, p. 561, lines 8-12.
279. The pit lake water level will be subject to long-term fluctuations resulting from periods of drought and periods of unusually high precipitation. Myers Test. Tr. vol. 3, p. 1230, lines 12-18.
280. The Environment Department witness was not sure how the Department would regulate the pit lake if water levels fluctuated so that the lake encroached on public property during some periods but not others. Vollbrecht Test. Tr. vol. 2, p. 562, line 15 to p. 564, line 12.
281. Over time, the walls of the open pit will erode and collapse, causing rock material to slough off. Sloughing is particularly common at sites where pit lakes have formed because the rising water increases pore pressure in the rocks making them less stable. Kuipers Test. Tr. vol. 3, p. 1083, line 18 to p. 1084, line 4.
282. Sloughing of pit walls can change the configuration of the pit. Kuipers Test. Tr. vol. 3, p. 1083, lines 18-22.
283. Sloughing of rock material into the pit lake will also displace water and thus raise the pit lake water level. Kuipers Test. Tr. vol. 3, p. 1086, lines 10-15.

284. Illustrative examples of pit walls sloughing are the Berkeley Pit in Montana and the Bingham Canyon pit in Utah. Kuipers Test. Tr. vol. 3, p. 1084, line 7, p. 1084, line 21 to p. 1085, line 2, p. 1086, lines 19-24; Ranches Ex. 43.

B. COMBINES WITH OTHER WATERS

285. The pit lake will draw clean groundwater from the nearby private land, including the Ladder Ranch and the Hillsboro Pitchfork Ranch, and that water will mix with water in the pit lake. Myers Test. Tr. vol. 4, p. 1235, lines 10-25.

286. After closure of the mine, clean groundwater will flow into the open pit from off the mine site, and that clean groundwater drawn into the pit will combine with pit lake water. Some of the pit lake water will be mine influenced water. Vollbrecht Test. Tr. vol. 2, p. 565, line 16 to p. 567, line 15.

287. In October 2003, Marcy Leavitt testified under oath in a groundwater discharge permit hearing on the Environment Department's interpretation of private waters under the WQA. She testified that a water body on private land that mixes with clean water moving in from other areas is not a private water. Ms. Leavitt previously served as Chief of the Ground Water Quality Bureau, Chief of the Surface Water Quality Bureau, and Director of the Water and Waste Management Division (now Water Protection Division), which is above both those bureaus. The Environment Department witness stated that he would give Ms. Leavitt's interpretation of New Mexico water quality regulations a high degree of respect. Ranches Ex. 41; Vollbrecht Test. Tr. vol. 2, p. 567, line 17 to p. 571, line 18.

C. CONSTRUCTED IN GRAYBACK ARROYO

288. Grayback Arroyo is a tributary to the Rio Grande. Finch Test. Tr. vol. 1, p. 166, lines 21-23.

289. During its mining operation, Quintana Minerals Corp. diverted Grayback Arroyo around the open pit. Finch Test. Tr. vol. 1, p. 158, lines 6-14; AR-02202.
290. The open pit will be constructed in the original Grayback Arroyo channel. *Compare* AR-13302 (map of surface hydrology of Mine Permit Area pre-Quintana mining) *with* AR-13306 (map of surface hydrology of Mine Permit Area post-Quintana mining showing proposed open pit).
291. The Grayback Arroyo diversion structure consists of a cut in bedrock and, to the north, an earthen berm. Finch Test. Tr. vol. 1, p. 166, lines 2-8.
292. Culverts have been installed in Grayback Arroyo at road crossings within the Mine Permit Area. AR-13291.
293. Over time the Grayback Arroyo diversion is likely to fill up with sand or sediment, or the diversion could be compromised over time by repeated storm events. Kuipers Test. Tr. vol. 3, p. 1102, lines 10-17.
294. It is probable that over time the Grayback Arroyo diversion dyke will erode or be otherwise compromised, and the flow of Grayback Arroyo will return to its original channel towards the open pit. Kuipers Test. Tr. vol. 3, p. 1102, line 22 to p. 1103, line 1.
295. Although the Grayback Arroyo diversion structure may have been tested to withstand a 500-year storm event, it could nevertheless be compromised by multiple less severe storm events. Kuipers Test. Tr. vol. 3, p. 1103, line 10-23.

D. SUBJECT TO APPROPRIATION

296. N.M. Copper Corp. has claimed the open pit was a groundwater point of diversion with an attendant vested water right as declared by its predecessors. According to an order of the

New Mexico District Court, Third Judicial District, N.M. Copper Corp. owns water rights that have a point of diversion at the proposed open pit. Ranches Ex. 38.

E. PIT LAKE WATER QUALITY

297. According to modeling conducted for N.M. Copper Corp., the future pit lake is expected to exceed surface water quality standard for wildlife for mercury, the water quality standard for wildlife for selenium, and the surface water quality standard for livestock watering for vanadium. AR-07969 to AR-07970, AR-07976.

298. Modeling shows an exceedance of the aquatic wildlife surface water standard for selenium in the pit lake in year 25. Vollbrecht Test. Tr. vol. 2, p. 564, lines 14-19.

299. If no control measures are applied, such as rapid pit refill, the future pit lake is expected to exceed surface water quality standards for copper, lead, manganese, selenium, and zinc. Ranches Ex. 7, p. 3-32; Myers test. Tr. vol. 4, p. 1236, lines 12-20.

300. It is likely that water quality in the pit lake will deteriorate over time as the result of evapoconcentration. Vollbrecht Test. Tr. vol. 2, p. 564, lines 21-25.

301. Evapoconcentration occurs in an open pit water body as the water evaporates out of the pit, but the solvents, the various elements and minerals remain. The suspended solids, dissolved solids, they remain in the water body, and they become more concentrated over time. Vollbrecht Test. Tr. vol. 2, p. 565, lines 2-8.

PROPOSED CONCLUSIONS OF LAW

I. STATUTE AND REGULATIONS

A. THE WATER QUALITY ACT

1. The purpose of the WQA is “to abate and prevent water pollution.” *Bokum Resources Corp. v. N.M. Water Quality Control Comm’n*, 93 N.M. 546, 555, 603 P.2d 285, 294 (1979).

2. The Environment Department is an agency of the executive branch of the State of New Mexico, created pursuant to NMSA 1978, § 9-7A-6.B(3) (1991).
3. The Environment Department is a “constituent agency” under the WQA, having the authority to issue groundwater discharge permits.
4. The WQA authorizes the Water Quality Control Commission to adopt regulations requiring persons to obtain from the Environment Department a permit for the discharge of any water contaminant. NMSA 1978, § 74-6-5(A).
5. The WQA further authorizes the Water Quality Control Commission to adopt regulations “for the operation and maintenance of the permitted facility, including requirements, as may be necessary or desirable, that relate to continuity of operation, personnel training and financial responsibility, including financial responsibility for corrective action.” NMSA 1978, § 74-6-5(H).
6. The WQA authorizes the Water Quality Control Commission to adopt regulations that “impose reasonable conditions on permits” requiring permittees to conduct monitoring and sampling, to keep records, to provide information to the Environment Department, and to notify the Department of changes in the discharge. NMSA 1978, § 74-6-5(J).
7. As amended in 2009, the WQA requires the Water Quality Control Commission to adopt regulations specific to the copper industry. NMSA 1978, § 74-6-4(K).
8. The WQA requires public participation in permitting decisions, requiring the Water Quality Control Commission to adopt regulations notifying the public in detail of permit applications. NMSA 1978, § 74-6-5(F).
9. The WQA provides that no ruling can be made on any application for a permit without opportunity for a public hearing at which all interested persons shall be given a reasonable

chance to submit evidence, data, views[,] or arguments orally or in writing and to examine witnesses testifying at the hearing.” NMSA 1978, § 74-6-5(G).

B. THE WATER QUALITY REGULATIONS

10. The express purpose of the Water Quality Regulations is “to protect all ground water of the state of New Mexico which has an existing concentration of 10,000 milligrams per liter or less [total dissolve solids], for present and potential future use as domestic and agricultural water supply.” 20.6.2.3101.A NMAC.
11. The Water Quality Control Commission has adopted regulations for discharge permits. 20.6.2.3101-3114 NMAC.
12. The regulations provide that “no person shall cause or allow effluent or leachate to discharge so that it may move directly or indirectly into ground water unless he is discharging pursuant to a discharge plan approved by the [Department] secretary.” 20.6.2.3104 NMAC.
13. The Water Quality Control Commission has adopted regulations for public participation in discharge permit proceedings. 20.6.2.3108 NMAC.
14. The regulations require public notice of an initial permit application within 30 days after the application is administratively complete. 20.6.2.3108.B NMAC.
15. The regulations require a second public notice of the proposed approval or disapproval of the permit within 60 days after the application is administratively complete and all required technical information is available. 20.6.2.3108.H NMAC.
16. The regulations require a period of at least 30 days during which members of the public can submit comments and request a hearing. 20.6.2.3108.K NMAC.
17. The regulations also specify procedures for a public hearing. 20.6.2.3110 NMAC.

C. THE COPPER MINE REGULATIONS

18. The purpose of the Copper Mine Regulations is to supplement the water quality regulations to control discharges of water contaminants specific to copper mine facilities and their operations to prevent water pollution. 20.6.7.6 NMAC.
19. The Copper Mine Regulations provides that no person may discharge effluent or leachate from a copper mine facility so that it may move directly or indirectly into ground water without a discharging permit approved by the Environment Department. 20.6.2.7.8.A NMAC.
20. The regulations specify the procedures for a copper mine facility to submit an application to the Environment Department for a discharge permit. 20.6.7.10 NMAC.
21. The regulations specify the technical information that must be included in a permit application. 20.6.7.11 NMAC.
22. The regulations require that within 90 days after determining that a permit application is technically complete, the Environment Department is required to publish a public notice proposing either to approve a permit, and making the proposed permit available for public review and comment, or to deny the permit. 20.6.7.10.H NMAC.
23. The regulations provide that members of the public may comment on the proposed approval or denial, and may request a hearing. 20.6.7.10.H NMAC.
24. The regulations provide that the Environment Department must approve the discharge permit if “it poses neither a hazard to public health nor undue risk to property, “and if it meets the requirements of the Copper Mine Rule. 20.6.7.10.J NMAC.
25. The regulations include technical requirements for all major facilities at copper mines, including waste rock piles, 20.6.7.21 NMAC; copper ore crushing and milling facilities and

tailings impoundments, 20.6.7.22 NMAC; pipelines and tanks, 20.6.7.23 NMAC; open pits, 20.6.7.24 NMAC; and truck and equipment washing facilities, 20.6.7.22 NMAC.

26. The regulations include detailed requirements for groundwater and surface water monitoring. 20.6.7.28 NMAC.

27. The regulations include contingency requirements in the event that groundwater quality standards are exceeded, a spill or other unauthorized discharge of contaminants occurs, a tailings impoundment structure is compromised, or any of a variety of other things goes wrong. 20.6.7.30 NMAC.

28. The regulations include requirements for a closure plan, 20.6.7.33 NMAC; implementation of closure, 20.6.7.34 NMAC; and post closure care, 20.6.7.35 NMAC.

29. The regulations authorize the Environment Department to impose conditions on discharge permits according to the applicable substantive requirements of the regulations. 20.6.7.10.H NMAC.

30. The regulations authorize the Environment Department to impose additional conditions on permits that go beyond the substantive requirements of the regulations, provided the Department prepares a written explanation of the reasons for the conditions. 20.6.7.10.I NMAC.

III. STANDARD OF REVIEW

31. The Secretary must review the application for a discharge permit based on the information in the administrative record. 20.6.2.3109.A NMAC.

32. The Secretary must approve, approve with conditions, or disapprove the proposed discharge permit based on the administrative record. 20.6.2.3019.A NMAC.

33. The Department Secretary can approve a discharge permit for a copper mine only if the permit poses neither a hazard to public health nor undue risk to property. 20.6.7 .10.J NMAC.
34. The Secretary must deny a discharge permit if the discharge would cause or contribute to water contaminant levels in excess of any state or federal standard. NMSA 1978, § 74-6-5(E).
35. The applicant has the burden of proving that the permit should be approved. 20.1.4,400.A(1) NMAC.
36. The Environment Department has the burden of proving that a permit condition it has proposed, and that has been challenged, should be adopted. 20.1.4,400.A(1) NMAC.
37. Any person who contests a permit condition has the burden of proving that the condition is inadequate, improper, or invalid; and any person who proposes a permit condition has the burden of proving that the condition should be adopted. 20.1.4,400.A(1) NMAC.
38. The Environment Department has a duty to interpret the regulations liberally in order to realize the purposes of the Act. *Colonias Dev. Council v. Rhino Envtl. Servs.*, 2005-NMSC-024, ¶ 34, 138 N.M. 133, 142, 117 P.3d 939, 948.

IV. ARGUMENT

A. THE APPLICANT HAS NOT MET ITS BURDEN OF PROOF

1. Aquifer Evaluation Not Adequate – Andesite Characterization

39. The Copper Mine Regulations require that for new waste rock piles located outside the so-called open pit surface drainage area, an applicant must submit a design report that includes an aquifer evaluation to determine the potential nature and extent of impacts to ground water from the waste rock stockpile. 20.6.7.B(1)(d)(vii) NMAC.

40. Because N.M. Copper Corp. has not conducted a full evaluation of the andesite aquifer beneath the proposed waste rock piles, contrary to the Copper Mine Regulations, it has not met its burden of proving that the discharge permit should be approved. 20.1.4,400.A(1) NMAC.

41. The Ranches have demonstrated by a preponderance of the evidence that their proposed permit condition requiring additional evaluation and characterization of the andesite bedrock should be approved. Ranches Ex. 30. 20.1.4,400.A(1) NMAC.

2. Aquifer Evaluation Not Adequate – Leakage from Tailings Liner System

42. The Copper Mine Regulations require that an applicant must submit a design report for new tailings impoundments that includes an aquifer evaluation to determine the potential nature and extent of impacts on ground water from the tailings impoundment. 20.6.7.B(1)(d)(vii) NMAC.

43. Because N.M. Copper Corp. has not conducted a full evaluation of the andesite aquifer beneath the proposed waste rock piles, contrary to the Copper Mine Regulations, it has not met its burden of proving that the discharge permit should be approved. 20.1.4,400.A(1) NMAC.

3. Groundwater Monitoring Plan Not Adequate

44. The Copper Mine Regulations require an applicant for a discharge permit to submit to the Environment Department a groundwater monitoring plan showing the location of proposed monitoring wells. 20.6.7.28.A NMAC.

45. Monitoring wells must be spaced “as close as practicable around the perimeter and downgradient of” each specified mine facility, including open pits, waste rock piles, and tailings impoundments. 20.6.7.28.B NMAC.

46. Monitoring wells must be located to detect an exceedance or a trend towards exceedance of the applicable standards at the earliest possible occurrence, so that investigation of the extent of contamination and actions to address the source of contamination may be implemented as soon as possible. 20.6.7.28.B NMAC.
47. The Environment Department may require additional wells around the perimeter of mine units that are underlain by areas where ground water flow directions are uncertain, including fracture flow systems, and around copper mine units that have the potential to cause ground water mounding. 20.6.7.28.B NMAC.
48. Because the groundwater monitoring plan that N.M. Copper Corp. has proposed is inadequate, it has not met its burden of proving that the discharge permit should be approved. 20.1.4,400.A(1) NMAC.
49. The Ranches have demonstrated by a preponderance of the evidence that their proposed permit condition requiring additional monitoring wells should be approved. Ranches Ex. 34. 20.1.4,400.A(1) NMAC.

4. Financial Assurance Proposal Not Adequate

50. The WQA specifically authorizes the Water Quality Control Commission to adopt regulations, as may be necessary or desirable, that relate to continuity of operations . . . and financial responsibility. NMSA 1978, § 74-6-5(H).
51. The Copper Mine Regulations provide that a permit application must include a proposal for financial assurance for those portions of a copper mine facility to be reclaimed in accordance with a closure plan. 20.6.7.12.U NMAC.
52. Because the financial assurance proposal is inadequate, N.M. Copper Corp. has not met its burden of proving that the permit should be approved. 20.1.4,400.A(1) NMAC.

53. The public has not had a meaningful opportunity to review a complete and adequate financial assurance proposal, comment on the proposal, and present evidence, data, views, and arguments on the proposal in a public hearing, as required by the WQA and the regulations.

B. THE PERMIT WOULD POSE AN UNDUE RISK TO PROPERTY

54. The potential for groundwater contamination and offsite migration of groundwater contamination from the Copper Flat Mine poses an undue risk to property within the meaning of the Copper Mine Regulations. 20.6.7 NMAC.

55. The potential for lowering of the water table and depletion of water resources caused by drawdown from the open pit at the Copper Flat Mine poses an undue risk to property within the meaning of the Copper Mine Regulations. 20.6.7 NMAC.

56. The Environment Department cannot ignore concerns that relate to environmental protection simply because they are not mentioned in a technical regulation. *Colonias Dev. Council v. Rhino Env'tl. Servs.*, 2005-NMSC-024, ¶ 34, 138 N.M. 133, 142, 117 P.3d 939, 948.

C. THE PIT LAKE IS A SURFACE WATER OF THE STATE

57. "Surface waters of the state" includes rivers such as the Rio Grande. 20.6.4.7.R(5) NMAC.

58. "Surface waters of the state" includes tributaries to surface waters of the state. 20.6.4.7.R(5) NMAC.

59. "Surface waters of the state" includes streams, including intermittent streams. 20.6.4.7.R(5) NMAC.

60. Because Grayback Arroyo is a stream and is a tributary to the Rio Grande it is a "surface water of the state." *See* 20.6.4.7.R(5) NMAC.

61. A man-made body of water is a "surface water of the state" if it was created in a "surface water of the state."

62. Because the open pit was constructed in the natural channel of Grayback Arroyo, it is a “surface water of the state.” *See* 20.6.4.7.R(5) NMAC.
63. Because clean groundwater flows into the pit lake, the water in the pit lake combines with other waters, and it is a “surface water of the state.” *See* 20.6.4.7.R(5) NMAC.
64. The “private waters” exclusion is a very limited one. *Ranches Ex. 41*, p. 866.

D. GENERAL CONCLUSIONS

65. Under the rules of evidence, “[i]f scientific, technical[,] or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training[,] or education may testify thereto in the form of an opinion or otherwise.” Rule 11-702 NMRA; FED. R. EVID. 702.
66. Turner Ranch Properties L.P. is a person who participated in this permitting proceeding within the meaning of the WQA.
67. Hillsboro Pitchfork Ranch, LLC is a person who participated in this permitting proceeding within the meaning of the WQA.

November 19, 2018

Respectfully submitted,



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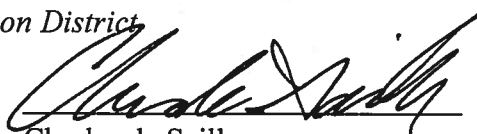
CERTIFICATE OF SERVICE

I hereby certify that on this 19th day of November 2018, a copy of the foregoing Joint Proposed Findings of Fact and Conclusions of Law by Turner Ranch Properties, L.P. and Hillsboro Pitchfork Ranch, LLC was sent by first class mail, postage prepaid, or electronic mail to:

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