STATE OF NEW MEXICO
Before the
SECRETARY OF THE ENVIRONMENT

In the matter of the	)	
RENEWAL AND MODIFICATION OF	)	GWB No. 09-35(P)
BARRICK GOLD *dba* HOMESTAKE MINING	)	
COMPANY DISCHARGE PERMIT, DP-725	)	March 8, 2010

BLUEWATER VALLEY DOWNSTREAM ALLIANCE
REQUESTED FINDINGS OF FACT, CONCLUSIONS OF LAW, RELIEF AND PROPOSED ORDER

I. REQUESTED FINDINGS OF FACT

A. HMC requested renewal of DP-725 in November 2000, and the permit was due to expire on March 25, 2001. The NMED Administrative Record Index indicates that NMED staff sent a letter to HMC, dated August 26, 2003, concerning "[d]raft discharge permit renewals for DP-725 and DP-200" (emphasis added). None of the subsequent entries in the Index indicate when DP-725 was modified and renewed, or whether NMED administratively extended the permit beyond its expiration date. The November 6, 2009, version of the Administrative Record Index shows a gap of three years between the August 26, 2003 entry and the next entry, dated August 30, 2006. Time is not of the essence in deciding DP-725.

1. The Homestake Mining Company ["HMC"] Uranium Mill Tailings Facility is located about five miles north of Milan, New Mexico, in Sections 23 and 26, T12N, R10W, Cibola County, New Mexico . BVDA (Prefiled) Testimony of W. Paul Robinson, Exhibit 2, "Summary and Review of Application for Modification and Renewal of NMED Discharge Permit DP-725, Effluent Disposal Facilities for the Groundwater Remediation System at the Homestake Mining Company, Grants Reclamation Project, Milan, N.M. (November 12, 2009) ["TASC Report"]" at 1 (admitted into evidence January 13, 2010) (henceforth "BVDA (Prefiled) Testimony of W. Paul Robinson, Exhibit 2 at __" or "TASC Report").

2. Two uranium processing plants, or mills, were operated at the site beginning in 1958. The second and larger of the two mills ended processing in 1990 and has been dismantled. *Id.*

3. Major features at the site today are a Large Tailings Pile (LTP) containing about 23 million tons of uranium mill tailings, a Small Tailings Pile (STP) containing about two

million tons of tailings, a Reverse Osmosis (RO) plant located on at the southwest corner of the LTP, an East Collection Pond (ECP) and a West Collection Pond (WCP) located immediately east of the RO plant, and two evaporation ponds, EP1, located on top of the STP, and EP2, located between EP1 and ECP. *Id.*

4. HMC proposes to construct a fifth pond, EP3, the subject of the instant permit, about 2,500 feet northwest of the LTP. *Id.*

5. Residential subdivisions comprised largely of single-family homes and small businesses are located south and southwest of the HMC facility; the nearest residence is approximately 2,200 feet (about 670 meters) southwest of the LTP. *Id.*

6. Three major permits are currently in effect for the HMC facility: NRC Source Material License SUA-1471, NMED Discharge Permit DP-200 and NMED Discharge Permit DP-725. A third NMED permit, DP-339, was approved in 1984 and incorporated into DP-725 in about 1991. *Id.* at 4.

7. HMC also has permits from the New Mexico Office of the State Engineer to use water rights, construct and maintain earthen dams, and drill, plug and abandon water wells associated with the facility's groundwater remediation system. *Id.*

8. The HMC facility is also a National Priorities List Superfund Site, designated in 1983 pursuant to the Comprehensive Environmental Response Compensation and Liability Act and administered by EPA Region 6 in Dallas, Texas. Mill decommissioning, site decontamination and tailings reclamation are authorized under SUA-1471. *Id.*

9. Groundwater remediation at the site, which began in 1977, is conducted under an NRC-approved Corrective Action Plan (CAP), NMED permit DP-200, and the EPA Superfund designation. Provisions of DP-725 regulate management and disposal of effluents and wastes generated by the groundwater remediation system. *Id.*

10. DP-725 was first approved by NMED in November 1990 and subsequently renewed in March 1996. The normal length of a discharge permit issued pursuant to the New Mexico Water Quality Act (74-6-5.H., NMSA, 1978, as amended) and the New Mexico Water Quality Control Commission Regulations is five years (20.6.2.3109.H., NMAC). *Id.*

11. HMC requested renewal of DP-725 in November 2000, and the permit was due to expire on March 25, 2001. *Id.*

12. The NMED Administrative Record Index indicates that NMED staff sent a letter to HMC, dated August 26, 2003, concerning "*[d]raft* discharge permit renewals for DP-725 and DP-200" (emphasis added). None of the subsequent entries in the Index indicate

when DP-725 was modified and renewed, or whether NMED administratively extended the permit beyond its expiration date. *Id.*

13. The November 6, 2009, version of the Administrative Record Index shows a gap of three years between the August 26, 2003 entry and the next entry, dated August 30, 2006. *Id.* at n2.

B. Description of the HMC Superfund Site System and Permits.

14. The original DP-725 (1990) and its 1996 renewal permitted the four existing collection and evaporation ponds, ECP, WCP, EP1 and EP2. The proposed modification and renewal would authorize continued operation and closure of the existing ponds; construction, operation, maintenance and closure of proposed EP3; and an increase of about 80,000 gallons per day (gpd) in waste water flows to all five ponds to a maximum discharge of 1,166,000 gpd, or 809.7 gallons per minute (gpm). *Id.* at 4.

15. The technical characteristics of the ponds at the HMC site are summarized below:

Table 1.
Characteristics of HMC's Existing and Proposed Collection and Evaporation Ponds

Pond	Year Built	Liner(s)	Leak Detec-tion?	Forced Spray Evap?	Area (acres)	Max. Vol. (af)	Effluent Sources	2008 average TDS (mg/l)
ECP	1986	Single (90 mil)	No	No	2.4	12	LTP dewatering effluent; RO brine; RO overflow	21,000
EP1	1990	Single (90 mil)	No	Yes	26.3	320.2	RO sludge; LTP dewatering effluent; LTP toe drain, collection sumps	82,000
EP2	1996	Double (60 mil over 40 mil)	Yes	Yes	17.5	317.4	Decant from ECP; LTP dewatering effluent; LTP toe drain, collection sumps	32,000
EP3	Pend -ing	Double (60 mil over 40 mil)	Yes	Yes	26.5	265.7	Decant from ECP; LTP dewatering effluent; LTP toe drain, collection sumps	pending
WCP	1986	Single (90 mil)	No	No	2.4	12	RO sludge, RO overflow	5,000
Total Pond Capacity = 75.1 acres and 927.3 af								
af = acre-feet; mg/l = milligrams per liter; TDS = Total Dissolved solids.								

Id. at 5

16. Sources of waste water to the collection and evaporation facilities are: effluent from dewatering of the LTP (a component of the groundwater remediation system), waste water collected from the LTP toe drains and sumps, brine waste water and overflow water from the RO plant, and concentrated sludge from the RO plant. Current water storage

capacity in the existing ponds is 661.6 acre-feet (af), or about 215.6 million gallons. Construction of EP3 would increase total water-storage capacity to 927.3 af, or about 302 million gallons. BVDA (Prefiled) Testimony of W. Paul Robinson, Exhibit 2 at 4-5 (admitted into evidence January 13, 2010).

17. Two other major effluent streams are *not* included in DP-725: (1) "Product water" from the "clean side" that is injected into a series of alluvial aquifer wells as part of the groundwater contamination remediation system permitted under DP-200; and (2) contaminated groundwater pumped from the alluvial aquifer that is discharged to a 100-acre irrigation plot located about two miles west of the LTP. *Id*. at 5 n3.

18. The proposed modification and renewal of DP-725 would authorize construction, operation and closure of EP3, in addition to continued operation and closure of the four existing collection and evaporation ponds. *Id.* at 5.

19. The United States Nuclear Regulatory Commission [NRC] separately authorized construction of EP3 in a license amendment granted August 7, 2008. *Id.*

20. The 26.5-acre EP3 would be constructed at a site north of County Road 63, northwest of the northwest corner of the LTP. *Id.*

21. The purpose of the new pond is to increase evaporative capacity and thereby increase the rate of disposal of contaminated groundwater collected from the remediation system. *Id.*

C. Evaporation Rate Data Is Unavailable Or Contradictory; Adequacy of Existing Ponds and Need For EP3 Cannot Be Ascertained.

22. HMC's groundwater remediation system relies largely on evaporation to collect, manage and dispose of much of the groundwater pumped from contaminated aquifers beneath and down-gradient of its two tailings piles, water pumped from sumps in the toe drain that surrounds the base of the LTP, and water flushed from the LTP. *Id.* at 6.

23. Accurate estimation of the evaporation rate for the HMC waste water collection and disposal system is critical to evaluating the adequacy of *existing* evaporative capacity and the need to construct the *new pond* (EP3). *Id.* (emphasis in original).

24. Evaporation rates are generally understood as the ratio of evaporation to precipitation. *Id.*

25. At arid and semi-arid region sites like the HMC tailings facility, evaporation rates exceed precipitation rates. *Id.*

26. The effective evaporation rate for open water, called "lake evaporation"

(applicable to facilities such as HMC's evaporation ponds) is typically about 30 percent less than the "pan evaporation," which is defined as the total evaporation for a location measured by the amount of water evaporated from an open metal pan using a standard method. *Id.*

27. Lake evaporation is typically about one-third less than pan evaporation due to the evaporative effect of the heating of the pan in the standard method. *Id.*

28. The difference between the pan evaporation and lake evaporation is called "pan coefficient." *Id.*

29. Establishment of a site-specific "pan coefficient" includes consideration of the shape and structure of the open water body, the *quality of the water* in a lake or pond, and climatic factors such as humidity and wind (because they influence effective evaporation rates). *Id.*

30. As a general rule, increasing salinity decreases the effective evaporation rate. *Id.*

31. Looking at HMC's selection of an appropriate evaporation rate for the Milan mill tailings sites, a wide range of rates are cited in various licensing, permitting, engineering and annual reports, e.g.:

> In its January 2007 Environmental Report submitted to NRC, HMC stated, "Annual evaporation for the area [is] estimated [as] *approximately 78 to 94 percent of the annual precipitation, or 9 to 11 inches per year*". This information, which was based on a 1982 environmental report in support of HMC's mill license renewal application, was referenced by NRC in its July 2008 EA for construction of EP3.
>
> In its December 2006 Corrective Action Plan (CAP) application to NRC, Homestake stated, "[t]he climate is typical of high desert, with *average precipitation of 10.4 inches and evaporation of 54.6 inches per year*".

Id. (citations omitted) (emphasis in TASC report).

32. Although the evaporation rate cited in the CAP appears to more accurately reflect conditions of the semi-arid environment of Milan, New Mexico, no technical basis is provided for the number used. *Id.* (emphasis added).

33. The CAP application is not clear if the evaporation rate cited is lake evaporation, pan evaporation, a calculated "pan coefficient," or a different rate calculated from direct measurements at the site. *Id.*

34. Small changes in the effective evaporation rate make a significant difference in the amount of water disposed by evaporation, whether in the proposed EP3 or the four existing ponds. *Id.*

35. A one-inch variation in the evaporation rate for the 26.5-acre EP3 is a difference of 719,585.4 gallons per year (gpy), which is equivalent to a flow of 1.37 gpm. Dividing 325,850 gallons/acre-foot by 12 inches/foot, multiplying by 26.5 acres in proposed EP3, and dividing by 525,600 minutes/yr produces this figure. *Id.* at 6 and n4.

36. For the existing ponds, which total 48.6 acres, each inch of evaporation is a difference of 1,319,693 gpy, or 2.51 gpm. *Id.* at 6-7.

37. HMC asserted in its comments on EPA's Remediation System Evaluation (RSE-I) (EPA, 2008) that the evaporation rate for the existing ponds and for EP3 is a little less than *40 inches per year*. Testimony of W. Paul Robinson, Exhibit 2 at 7 (admitted into evidence January 13, 2010) (emphasis in TASC report).

38. HMC in its RSE-I comments also stated that the *actual evaporation rate* for the existing ponds is 6,000 gallons per hour (gph), rather than 7,400 gph, as cited in RSE-I, and the evaporation rate for the proposed EP3 would be 3,300 gph, rather than 4,500 gph, as stated in RSE-I. Converting gallons per hour per acre of pond area to inches per year, HMC estimated that the annual evaporation rate would be 39.84 inches for both the existing ponds and for EP3. *Id.*

39. Evaporation rates used in the RSE-I are 49.15 inches per year for the existing ponds and 54.81 inches per year for the proposed EP3. *Id.*

40. Evaporation rates cited in RSE-I are much closer to the evaporation rates identified by HMC in its CAP Application. *Id.*

41. HMC stated in its 2008 Annual Report that evaporation was about *67.34 inches in 2008* and *75.32 inches in 2007*. *Id.* (emphasis in TASC report).

42. HMC use rates derived from data in the *2008 Annual Report.* The *Annual Report* stated "net evaporation" from the existing ponds as 169 gpm in 2008 and 186 gpm in 2007. They are substantially higher than those stated in HMC's 1982 and 2007 Environmental Reports, in its CAP application, and in its RSE-I comments. Even excluding the 1982/2007 evaporation rate of 9 to 11 inches per year as outdated or unsubstantiated, HMC's data show a variation of 35 inches per year in calculated evaporation rates (i.e., from 38.84 inches per year to 75.32 inches per year). *Id.*

43. Evaporation resulting from the forced spray operations was calculated in the RSE-I as 33 gpm, or about 13.2 inches per year. *Id.*

44. Actual evaporation from spraying on EP1 and EP2 is not explicitly discussed in the 2008 Annual Report or the HMC RSE-I comments. *Id.*

45. There is wide variation in the evaporation rates relied upon to justify the need for EP3, viz., if the evaporation rate of 39.84 inches per year cited in HMC's RSE-I comments is used, then the spray evaporation accounted for between 27.56 inches of the 67.34 inches of evaporation in 2008 and 35.48 inches of the 75.32 inches of evaporation in 2007, as reported in the 2008 Annual Report. If HMC's CAP application evaporation rate of 54.6 inches were considered as effective evaporation, then evaporation from spraying would account for 12.74 inches of the 67.34 inches of evaporation in 2008 and 20.72 inches of the 75.32 inches of evaporation in 2007, in which case, spray evaporation rates more in line with the RSE-I estimate. *Id.*

46. The wide variation in evaporation rates confounds evaluation of the adequacy of existing pond capacity and the need for EP3. *Id.* (emphasis added).

47. HMC does not indicate what proportion of the total disposal of wastewater by evaporation is attributable to enhanced evaporation through the forced spraying on EP1 and EP2. *Id.*

48. If the actual evaporate rate is on the low end of the range, less waste water is disposed by evaporation and more capacity is needed; if, however, the actual rate is at the upper end of the range, more waste water is disposed by evaporation and less capacity is needed. *Id.*

49. No evidence was adduced at hearing by the applicant or the New Mexico Environment Department to clarify the lack of justification for the construction of EP3 based upon an alleged need for additional evaporative capacity. *See generally*, Transcript of Hearing on DP-725 (January 12-13, 2010) and the prefiled testimony admitted into the record.

D. No Data Exist on Chemistry and Total Volume of Sludge In Existing Ponds Or That Which Is Anticipated To Be In EP3.

50. "Total dissolved solids" is the sum of all dissolved chemical elements and compounds that are present in water, or in the present case, in waste waters discharged to the Homestake evaporation ponds. Testimony of W. Paul Robinson, Exhibit 2 at 8 (admitted into evidence January 13, 2010).

51. Dissolved elements include uranium, selenium and molybdenum; dissolved compounds include sulfate (SO_4^{-2}) and salts containing chloride (like sodium chloride, or NaCl). *Id.*

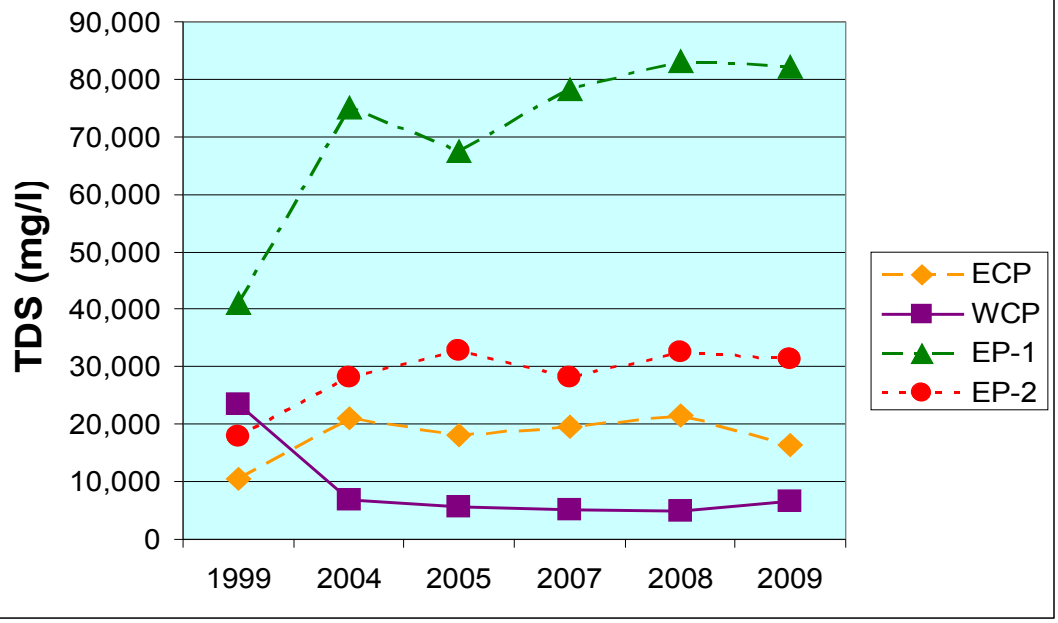
52. As a result of the specific chemical conditions in the ponds, a portion of the solids in the ponds are dissolved into pond fluids, a portion are suspended, but not dissolved in, pond fluid, and a portion have settled on the bottom and sides of the ponds. *Id.*

53. A TDS concentration of 100,000 mg/l means that 10 percent of the volume of the fluid in EP1 is composed of solids. *Id.*

54. An unquantified portion of HMC pond capacity is filled by the portion of the solids from the residues from the RO plant that have accumulated on the bottom of the ponds and the portion of the solids that are suspended, but not dissolved in the pond fluids. *Id.*

55. High-TDS water is also present in ECP and EP2, as shown in **Table 1** (above) and **Figure 2**. **Figure 2** (next page) further suggests that TDS concentrations increased substantially between 1999 and 2004 in ECP, EP1 and EP2. Conversely, a substantial decrease in TDS concentrations was observed in fluids in WCP between 1999 and 2004.

Figure 2. Total Dissolved Solids Concentrations (mg/l) in Fluids in HMC Collection and Evaporation Ponds



Id. at 8-9.

56. Concentrations of heavy metals, including uranium, in wastewaters stored in the existing ponds have generally increased over time. *Id.* at 8.

57. The average uranium concentration in fluids in EP1 in the first three quarters of 2009 was 514.8 mg/l, a level that is roughly equivalent to the upper end of concentrations of uranium in solutions produced by *in situ* leach (ISL) extraction operations. *Id.*

58. Average annual uranium concentrations in EP1 fluids increased about fivefold between 1999 and 2008 (87.5 mg/l to 445.4 mg/l), and nearly doubled in EP2 and ECP (69.9 mg/l and 43.5 mg/l in 2008, respectively) over that same period. *Id.* at 9

59. The average uranium levels that HMC said were "collected" from the groundwater, tailings toe drain sumps, and tailings collection wells in 2008: 11.5 mg/l, 31.6 mg/l and 16 mg/l, respectively. *Id.*

60. Contaminated water collected from the tailings drains and sumps and tailings flushing system is treated at the RO facility. Id. at 9

61. The RO unit produces "treated water" which is called "product water" or "good side water." *Id.*

62. The RO unit also produces "residues" which are called "sludge," "blow down," "brine" and "overflow." *Id.*

63. Uranium and other contaminants are separated from the good-side water in the RO unit and are concentrated in the RO residues placed in the existing ponds, principally the WCP, and from there to EP1. *Id.*

64. Sludge also accumulates in ECP and EP2 from evaporation of high-dissolved solids wastewater discharged from the RO plant and from the LTP toe drain collection sumps and dewatering operations. *Id.*

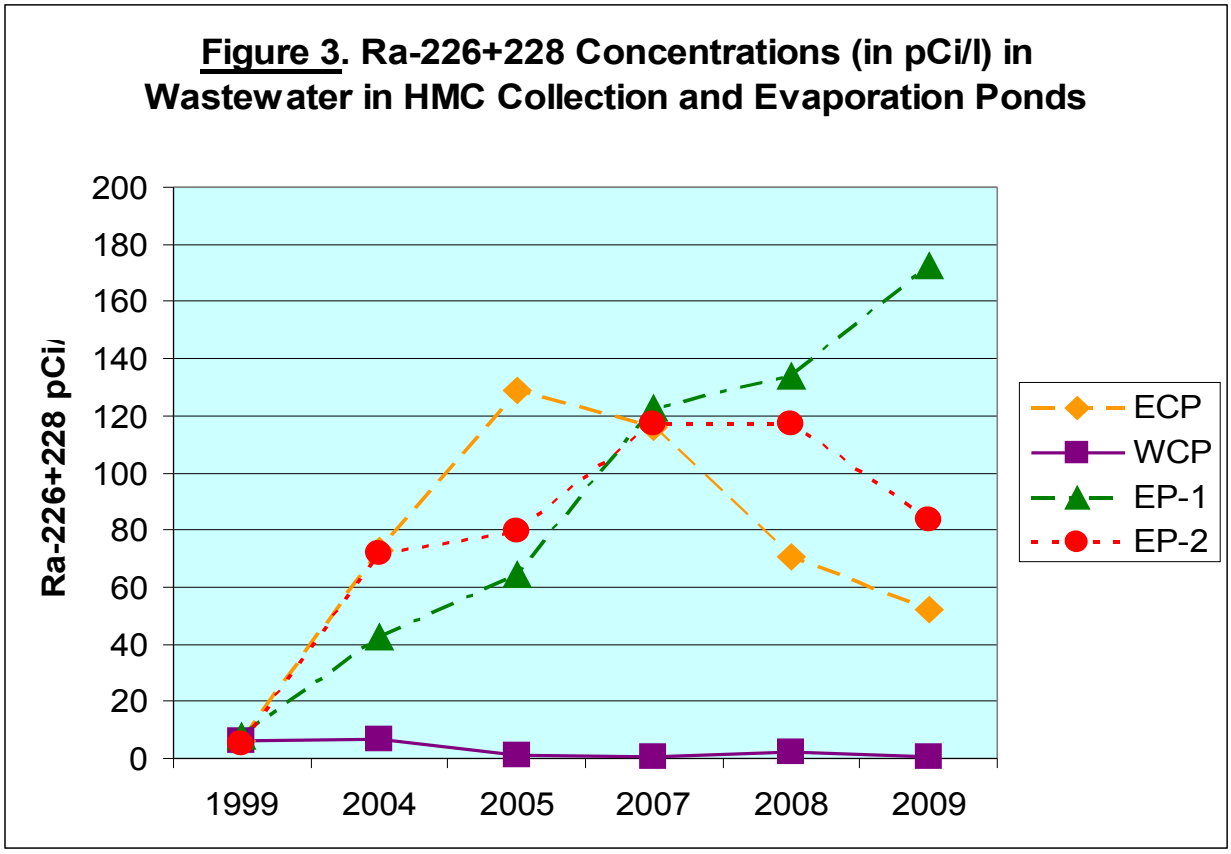
65. No data on the chemical characteristics and volumes of sludge in the ponds is available in the record of this proceeding, nor was such information found in any of the documents reviewed for preparation of the TASC report. *Id. and see generally* Transcript of Hearing testimony and documents filed as exhibits (January 12-13, 2010).

66. No data on the anticipated volume and chemistry of sediments that will accumulate in EP3 is available in the record of this proceeding, nor was such information found in any of the documents reviewed for preparation of the TASC report. *Id.*

67. The New Mexico Environment Department cannot make an informed decision on whether to approve the permit modifications in DP-725 absent the data described in ¶¶65-66 above. This data is essential for addressing several issues, including: (1) whether the existing ponds and proposed pond will have sufficient capacity to manage the planned flow-through rate of nearly 810 gpm, (2) the degree to which liners in the existing ponds have been degraded over time, and (3) whether cost estimates have taken into account disposal of an appropriate volume of high-salinity solids contained in the ponds. *Id.* at 10.

E. **High Radium Concentrations In Effluent Stored In Collection And Evaporation Ponds Suggest Radium Levels Are Likely Elevated In Sediments Accumulating In The Ponds.**

68. As shown in **Figure 3** (below), average annual total radium (i.e., Ra-226+Ra-228) concentrations increased from single-digit levels in 1999 (average concentration of 5.4 picoCuries per liter [pCi/l] for fluids in all four ponds) to about 100 pCi/l for fluids in EP1, EP2 and ECP combined in 2009. Total radium levels have increased in fluids in EP1 in each of the six years represented in **Figure 3**. *Id.*



Id. at 11.

69. While total radium levels in fluids EP2 and ECP have declined over the past three years (57 pCi/l and 82 pCi/l in 2009, respectively), they remain elevated compared with the NMWQCC groundwater protection standard of 30 pCi/l (20.6.2.3103.A., NMAC) and EPA national primary drinking water standard of 5 pCi/l (40 CFR 141.55). *Id.* at 10.

70. Although average annual total radium concentrations of fluids in WCP have remained low compared to average concentrations in the other three ponds since 1999, significantly, the average total radium level in WCP has more than tripled to 12.6 pCi/l in the first three quarters of 2009. *Id.* (emphasis added).

71. The high radium concentrations in the effluent stored in the collection and evaporation ponds suggest that radium levels are also likely to be elevated in the sediments accumulating in these ponds. *Id.* (emphasis added).

72. Sludge from the RO would be expected to be enriched in total radium because reverse osmosis is generally regarded as the preferred treatment method to remove or substantially reduce radium in water. *Id.*

73. Since radium is the source term for radon and its radioactive decay products (called "daughters" or "progeny") the ponds would be a logical source of airborne radon near the ponds and around the entire HMC facility. Id. at 10.

74. No credible scientific evidence was provided in this proceeding by way of testimony or exhibits that refutes the assertions in ¶¶68-73. *See generally* Transcript of DP-725 Hearing and Exhibits filed therein (January 12-13, 2010).

F. Volume And Chemistry Of Pond Sediments Is Undocumented.

75. According to the Homestake 2008 Annual Report (Table 2.1-1 at 2-16), more than 187 million pounds of chemicals have been collected since 1978. BVDA (Prefiled) Testimony of W. Paul Robinson, Exhibit 2 at 11 (admitted into evidence January 13, 2010).

76. The mass described in ¶75 consists of 184.6 million pounds of sulfate, 1.44 million pounds of molybdenum, 1.1 million pounds of uranium, and 62,651 pounds of selenium. *Id.*

77. Virtually all of the mass of chemicals described in ¶¶75-76 is stored in the four existing ponds. *Id.*

78. Another chemical constituent highly concentrated in sludge and wastewaters is chloride, and it is likely present in pond sediments or occurring as precipitates on pond embankments. *Id.*

79. HMC's documentation of the waste streams entering the ponds does not contain an inventory of the volume and chemical characteristics of sediments stored in the ponds. *Id.*

80. The New Mexico Environment Department cannot make an informed decision about issuing the modified permit DP-725 in this case absent the missing information described in ¶79.

G. Uranium Concentration In Waste Water Is Increasing As Uranium Collection Has Decreased--Hence, Flushing Is Not Remediating The Site.

81. HMC's *2008 Annual Report* (Table 2.1-1, p. 2.1-16) states that 1,060,971 pounds of uranium had been collected from the groundwater remediation system through 2008. This material, derived from tailings flushing, toe drain sumps, and RO discharges, is currently managed in the ponds. *Id.* at 12

82. The amount of uranium collected from the system has been *decreasing* in recent years, while the concentration of uranium in wastewater discharged to the evaporation ponds has been *increasing*. *Id.*

83. The amount of uranium that still exists in the LTP was calculated, based upon ore grades and mill recovery rates for the Homestake-New Mexico Partners and Homestake-Sapin Partners mills stated in a 1962 report by the U.S. Public Health Service (USPHS, 1962, pp. 55 and 73). The average ore grade was 0.15 percent (or three pounds of uranium per ton of ore) to 0.2 percent (or four pounds of uranium per ton of ore). The average uranium recovery rate was 90 percent; this means that 10 percent of the uranium in the ore was not recovered. As such, from 0.3 pound to 0.4 pound of uranium was disposed in the tailings pile for every ton of ore processed. *Id.*

84. Based upon the calculations cited in ¶83, the 23 million tons of tailings in the Large Tailing Pond ("LTP") would contain anywhere from 6.9 million pounds to 9.2 million pounds of uranium if none had been removed. *Id.*

85. HMC states it has collected 1.1 million pounds of uranium from the tailings and groundwater over 30 years of remediation. *Id. and citations therein.*

86. The collection of 1.1 million pounds of uranium referenced in ¶85 represent only 11.9% to 15.9% of the uranium in the LTP. *Id.*

87. The result cited above in ¶86 means that only a small fraction of the total amount of uranium remaining in the LTP has been removed. *Id.*

88. Given that according to the cited calculations in ¶¶83-86 HMC's uranium recovery has been small compared with the total amount of uranium in the LTP, it follows that one may reasonably expect that HMC's removal of other contaminants has also been small compared with the total burden of all contaminants in the tailings pile and aquifers. *Id.*

H. There Is No RO Efficiency Data To Support The Need For EP3.

89. The RO plant consists of two reverse osmosis units, each having a 300-gpm

capacity, for a maximum design capacity of 600 gpm. *Id.*

90. According to HMC's reports, between 2000 and 2008, the highest annual flow-through for the RO. system was 388 gpm, achieved in 2002. *Id.*

91. Over the past four years, annual RO performance has averaged about 250 gpm or about 42 percent of design capacity. *Id.*

92. Although maximum capacity is reduced by shutdowns for routine operation and maintenance and for plant upsets, HMC's documentation--upon which NMED relies for decision-making in this case, does not identify the amount of down-time the RO facility has experienced since it was installed in 1999. *Id.* at 13

93. NMED does not have the necessary data to evaluate the efficiency of the RO in relation to the system as a whole, hence, does not have the data necessary to evaluate the need for EP3. *Id.* at 12-13 (emphasis added).

I. NMED Needs To Evaluate Effects Of Weathering And Effluent Chemistry On Evaporation Pond Liners And Consider Those Effects In The Closure Plan and On The Adequacy Of Financial Assurance.

94. EPA's Remediation System Evaluation [RSE] team reported observing cracks in the liner of EP1 "due to exposure to the sun," and took pictures of those cracks during a site visit in June 2008. *Id.* at 13.

95. The RSE report also notes pond residues were observed "caking the liner," and that HMC's spray evaporation practices released salts and other contaminants into soil outside the ponds. *Id.*

96. Observations of white coating on the liner, piping and berm soils indicate that age, weathering and exposure to waste materials may be adversely affecting the integrity of pond liners, especially the single liner in EP1. *Id.*

97. EP1 is a particularly important facility for long-term waste management practices at the Homestake site because, upon closure of the facility, all residues and liners from WCP, ECP, EP2 and EP3 are to be permanently "encapsulated" in EP1, which is built on top of the Small Tailings Pile ["STP"]. *Id.* at 14.

98. EP1 will be closed with a compacted radon cover, re-sloped to prevent ponding, and armored with a rock layer to prevent erosion for up to 1,000 years, but in no case less than 200 years (10 CFR 40, Appendix A, Criterion 6(1)(i)). *Id.*

99. However, despite the requirements of 10 CFR 40, Appendix A cited in ¶98, the

HMC closure plan anticipates continued use of the single, 90-mil liner install in 1996.
100. The proposed closure plan does not appear to require retrofitting of EP1 with a new liner if the existing liner has been damaged or if conditions on final closure warrant upgrading the final disposal cell with a more protective multiple-liner system as is incorporated in the design of EP3. *Id.*

101. There is no indication in the NRC's approval process for EP3 and the closure plan to indicate that the NRC considered the need to replace or retrofit the EP1 liner in the reclamation cost estimates HMC submitted to NRC and that the agency approved pursuant to the financial assurance requirements of 10 CFR 40, Appendix A, Criterion 9. *Id.*

102. None of the documents supporting HMC's discharge permit renewal application assess the effects of continued discharge of high-salinity waste water on the integrity of the single liners that are now nearly 20 to 25 years old. *Id.* at 13-14 (emphasis added).

103. Neither HMC documents nor testimony and exhibits in this case provided information as to the effective warranty or guarantee period for the liners in the current or proposed evaporation ponds. *Id.* at 14 (emphasis added).

J. HMC Must Provide Better Radiological Monitoring and Data.

104. HMC reported in February 2009 that the total effective dose equivalent (TEDE) to the nearest resident was 73.6 millirems per year (mrem/y) in the last six months of 2008, or about 74 percent of NRC's annual dose limit of 100 mrem (10 CFR 20.1301(a)(1)). *Id.* at 15.

105. In February 2008, HMC reported that the TEDE was 81.9 mrem/y, or nearly 82 percent of the NRC limit. *Id.*

106. Because the doses cited in ¶¶104-105 are near the NRC limit, NMED requested in a February 20, 2009 letter to HMC that the issue had to be resolved before NMED could approve modification and renewal of DP-725. *Id. and sources cited therein.*
107. The vast majority of the TEDE is from exposure to airborne radon; levels of radioactive air particulates and direct gamma radiation make up only small fractions of the total dose. *Id.*

108. Because the dose from each contributor listed in ¶107 is *reduced* by the background level for each exposure category when calculating TEDE, the TEDE calculation is very sensitive to assumed background levels of radon, i.e., the higher the background level of radon, the lower the calculated TEDE. *Id.*

109. Based upon the information cited in ¶¶107-108, the choice of a monitoring

location or locations that reflect actual background levels is crucial to an accurate estimate of doses to the nearest resident from HMC site activities. *Id.*

110. HMC monitors radiation at eight stations on the facility's licensed boundary. *Id.*

111. HMC's "background" monitoring station for radon, HMC-16, is located about 5,000 feet northwest of the northwest corner of the LTP. *Id.*

112. HMC reported the 2008 annual average radon level at HMC-16 as 1.3 pCi/l-air. *Id.*

113. HMC's monitoring stations located at the nearest residences, HMC-4 and HMC-5, are approximately 3,500 feet and 2,500 feet, respectively, south and southwest of EP1 and ECP. *Id.*

114. In 2008, HMC reported the average annual radon concentrations at HMC-4 and HMC-5 as 1.8 pCi/l-air and 2.2 pCi/l-air, respectively which is approximately 59 percent *higher* than the background station. *Id.*

115. When HMC calculated the TEDE for the nearest residences, the annual radon levels at HMC-4 and HMC-5 were reduced by background concentration, an occupancy factor of 75%, and by an equilibrium factor of 20%--and on that basis the maximum dose (73.6 mrem/y) at HMC-5 did not exceed the NRC's 100-mrem/y limit. *Id.*

116. However, the use of HMC-16 as the basis for obtaining "background" is suspect. *Id.* at 15-16.

117. Prior state agency and other studies have demonstrated that natural background, prior to HMC's milling and tailings storage activities, was 0.15 pCi/l to 0.57 pCi/l, i.e., approximately one-twentieth to one-quarter of the radon levels recorded at the two HMC residential monitors in 2008. *Id.*

118. Neither HMC nor NMED have produced any data that explains why the two HMC residential monitors recorded such high levels compared with background. *Id. and see generally,* Transcript of Hearing (January 12-13, 2010), filed exhibits and Administrative Record in this case.

119. No natural sources of radon above the background range, such as uranium-bearing rock outcrops, are known to exist at the land surface in the residential areas. BVDA (Prefiled) Testimony of W. Paul Robinson, Exhibit 2 at 16.

120. The sole sources of radon above background in the immediate area of Homestake are HMC facilities: two tailings piles, four evaporation ponds, an RO plant and two land application sites. *Id.*

121. Using a lower value for the background radon level, when all other factors are the same as used by Homestake, increases the annual dose to the nearest resident, as shown in Table 2 below:

Table 2
Effect of Using Different Background Radon Levels to Calculate the Total Effective Dose Equivalent (TEDE) from the HMC Mill Tailings Facility
(doses in boldface italic exceed NRC's 100-mrem/y limit)

Background Station	Background Radon Level in pCi/l-air	TEDE at HMC #4 (Residential Location) in mrem/y	TEDE at HMC #5 (Residential Location) in mrem/y
HMC #16, 2008	1.3	43.6	73.6
NMEID #201, 1979	1.12	56.6	86.6
NMED #201, 1980	0.81	79.9	***109.9***
NMEID 1980 Ambrosia Lake average	0.5	***103.1***	***131.1***
NMEID 1980 Crownpoint average	0.15	***129.4***	***159.4***

Id. at 16-17.

122. If, referring to Table 2 above. the second-year (i.e., 1980) radon level of 0.81 pCi/l-air at NMEID Station 201 is substituted for the annual average radon level at HMC-16 (i.e., 1.3 pCi/l-air), the TEDE exceeds 100 mrem/y at HMC-5 (109.9 mrem/y). If the 1980 average annual radon level for the region (0.50 pCi/l-air) is used as background, then the TEDE exceeds 100 mrem/y at both residential locations: 103.1 mrem/y at HMC-4 and 131.1 mrem/y at HMC-5. Using the most conservative value for background radon (0.15 pCi/l-air in Crownpoint in 1980) yields even larger doses of 129.4 mrem/y at HMC-4 and 159.4 mrem/y at HMC-5, both of which exceed the NRC limit. Id. at 16 (emphasis added).

123. By failing to require HMC to utilize appropriately conservative "natural" background radiation in calculating TEDE to the nearest affected persons outside the HMC site, NMED is neither assuring nor safeguarding public health from radon exposure dues to the HMC site.

124. The dose calculations referenced above in ¶¶121-122 utilize HMC's assumptions that (1) Radon-222 is not in 100 percent equilibrium with its daughter products (as is assumed by NRC), but is at only 20 percent equilibrium, and (2) nearby residents spend 75 percent of their time at their homes (called an occupancy factor). *Id.* at 16.

125. HMC's reliance upon a 20% equilibrium for radon is also suspect because the lower the equilibrium value, the lower the dose from a given exposure level. *Id.*

126. The sole basis that HMC cites for using a 20% equilibrium factor is that the nearest residence "is within a few hundred feet of the site perimeter and within 3500 feet of the major source of radon." *Id.*

127. NRC's maximum radiation standards for licensed facilities assume, however, that Rn-222 is in full equilibrium with its daughters and that an ambient level of 0.2 pCi/l produces a dose of 100 mrem/y. *Id.*

128. At the 20 percent equilibrium level, 1 pCi/l-air gives an annual dose of 100 mrem/y; at 100 percent equilibrium, a 100-mrem/y dose is given by an average annual Rn concentration of 0.2 pCi/l, which is NRC's limit for radon emissions from licensed operations under 10 CFR 20, Appendix B, Table 2. *Id.* at n5.

129. If a higher equilibrium factor is used, e.g., 50%, then the 100-mrem/y limit is exceeded at both residential monitor stations even when using the higher 1979 background radon level of 1.12 pCi/l-air at Station 201. *Id.*

130. When a 50% equilibrium factor is used in calculating TEDE for the nearest exposed individual, doses range from 133 to 208 mrem/y at HMC-4 and HMC-5. *Id.*

131. Significantly, NMED has accepted radon data HMC has provided to the agency, including HMC assertion that radon releases from the LTP, STP and collection and evaporation ponds do not generate doses that exceed the NRC's limit, HMC does not monitor radon at those sources. *Id.* at 17 (emphasis added).

132. None of HMC's eight radiation monitoring stations are located next to or on the berms of the evaporation ponds. *Id.*

133. An interim soil cover was placed on top of the LTP in 1999 at the same time that a radon barrier was applied to the sides of the pile, thereby reducing radon emissions from the LTP. BVDA Prefiled Testimony of W. Paul Robinson, Exhibit 2 at 17.

134. The surface area of the LTP is about three times larger than surface areas of the four existing ponds combined--but the ponds are open. *Id.*

135. Despite the above described differences in the ability of the piles and the ponds to emit radon, Homestake asserts that the LTP accounts for 84.5 percent of radon emissions from the licensed area and that the evaporation ponds collectively account for only 1.4 percent, with the STP accounting for the remaining 14.1%--yet, HMC has not provided a technical bases for this allocation of radon emission sources. *Id.*

136. Mr. Robinson explained in his pre-filed testimony that NMED staff raised concerns that HMC's evaporation ponds may be the source of radiation doses approaching and possibly exceeding the Nuclear Regulatory Commission's dose limit to

members of the public at air monitoring stations closest to the nearest residence. BVDA Prefiled Testimony of W. Paul Robinson at 18:7-13; *see also* NMED Ex. 4 at 9 and Administrative Record Document No. NMED-C123.

137. Mr. Robinson stated that none of HMC's eight radon monitoring stations are located on berms or adjacent to any of the existing evaporation and collection ponds. BVDA Prefiled Testimony of W. Paul Robinson at 22:5-8.

138. The locations of the eight monitoring stations are shown on several maps in the record of this proceeding. *See, e.g.,* id. Ex. 2 at 15-16 and Ex. 8; HMC Ex. 36c. None of these maps show a radon monitoring station at the edge of or on the berms of any of the existing evaporation and collection ponds. *Id.*

139. Mr. Robinson noted that "high ambient concentrations of radon [were recorded] at monitor stations located near residences" that are located within one (1) mile of the HMC evaporation ponds and tailings pile. BVDA Prefiled Testimony of W. Paul Robinson at 23:1.

140. The levels Mr. Robinson noted are volumetric concentrations measured in picocuries of radioactivity per liter of air. *Id*., Ex. 2 at 15-16 and Appendix B .

141. Mr. Robinson further testified that HMC has provided no technical basis or calculations to support its assertions that the evaporation ponds contribute only 1.4 percent of the total amount of radon released from the facility. *Id.* at 19:4-12 and 20:6-10.

142. Dr. Baker testified for HMC that he had measured *radon flux* from the HMC ponds using mathematical modeling and conducting a field study using measuring devices located on top of the water in the ponds. HMC Ex. 33 at 3.

143. Dr. Baker's testimony states that "radon flux" as an emission rate, and the units of flux — radioactivity emitted from a given area of the surface over a specified time period — are a different measurement than radon concentrations in the air at the facility boundary. Tr. at 220:2-8.

144. Dr. Baker also testified that he prepared the pie chart shown in HMC Ex. 36a which apportions 1.4% of the "Radon Source Term" to a category including "Evaporation Ponds, Flux & Sprayers, RO Building," but he did not provide calculations to show how he derived the percentages shown in the pie chart. Tr. at 219:3-6.

145. Dr. Baker further testified that the radon *concentrations* detected at the monitoring stations located closest to the nearest residents "reflect impacts from the site as well as background." Tr. at 244:24-25 and 245:1.

146. Subsequent to the hearing, in response to BVDA counsel's information request (Tr. 553:20-23), HMC provided a document titled "Radon Flux from Evaporation Ponds, M.H. Simonds, M.J.Schierman, and K.B. Baker" that is marked "DRAFT" and is undated. The document appears to have been generated after August 2009. The document, which is attached hereto as BVDA Requested Findings Exhibit 'A', provides information on the mathematical model and the on-site radon flux experiment described by Dr. Baker. *See id.*

147. Although the draft paper substantiates Dr. Baker's testimony that he detected an average radon flux rate of about 1.13 picoCuries per square meter per second (Tr. at 221:25), the paper does not provide an explanation or calculations to substantiate the Radon Source Term percentages contained in Dr. Baker's pie chart. *Compare* HMC Ex. 36a and BVDA Requested Findings Ex. 'A'.

148. Dr. Douglas Chambers's paper, which Mr. Robinson discusses in his prefiled testimony, states that radon emissions from uranium mill tailings evaporation ponds approach 0.1 picoCurie per square meter per second for ponds having an effluent radium concentration of 100 picoCuries per liter. *Compare* NMED Ex. 4 at 9, Document No. NMED-C127 (Champbers's paper) *and* BVDA Prefiled Testimony of W. Paul Robinson at 20:6-20 and 21:1-5.

149. Average radium concentrations in fluids in EP1 approached 180 picoCuries per liter in 2009. BVDA Prefiled Testimony of W. Paul Robinson, Ex. 2 at 11.

150. No evidence has been presented that accurately attributes radon released from HMC's operations to any of the waste management units, including the evaporation ponds permitted under DP-725. *See generally* Hearing Transcript, Exhibits, Administrative Record.

151. The evidence does show that radon emissions from evaporation ponds are not zero and that some portion of the high radon concentrations detected at stations located closest to the nearest residence are from releases from Homestake's operations, including those covered by DP-725. *See generally* Hearing Transcript, Exhibits, Administrative Record.

152. Based upon the lack of definitive scientific evidence ruling out a substantial contribution to radon (Rn} emissions from the evaporation ponds, reasonable caution dictates, and BVDA recommends, ambient radon (Rn) monitoring (in volumetric concentrations) on the berms or next to the East Collection Pond, at EP1, and at a location or locations half-way between the tailings facilities and the nearest residence fenceline monitors (HMC-4 and HMC-5). ¶¶104-151 and references cited therein.

K. High-Salinity Spray May Pose An Inhalation Risk.

152. Effluents stored in the ponds are known to have high concentrations of dissolved solids. *Id*. at 18.

153. Exposure to the high-salinity sprays could present a human inhalation risk--a concern identified by local residents and the EPA's 2008 RSE report. *Id.*

154. In written comments on DP-725, Milton Head, then-president of the Bluewater Valley Downstream Alliance, whose home is located about 300 feet west of HMC-5 and about 3,500 feet west of EP1, observed that the sprays are "picked up by the wind[,] spread beyond the pond berms and deposited on the soils wherever the winds blow them. [M]ists from the sprays are depositing residue in the neighboring residential areas." *Id.* Figure 4, a photograph taken from east of EP1 looking southwest toward the Zuni Mountains on April 27, 2009, depicts how winds can direct sprays toward the residential areas located south of HMC and west of EP1:

Figure 4: Spraying Effluent above EP1 in April 2009

Id. at 18.

155. In 2008, EPA's RSI contractor recommended elimination of spraying, noting that "no information was available to the RSE Team to evaluate the spray evaporation system or solids from the collection ponds for protectiveness of human health and the environment." *Id.*

156. To protect public health, NMED should require HMC to cease spraying operations.

L. Improved Monitoring And Leak Detection At EP1, ECP And WCP.

157. The East and West Collection ponds and EP1 on top of the Small Tailings Pile have single liners and no leak detection systems. NMED Ex. 1 at 2; Robinson Prefiled Testimony at 28:5-13; *see also* Ex. 2 at 5.

158. Only one monitoring well, Well X, serves as a point of compliance well for monitoring groundwater under all four ponds. Hoffman Cross-examination, Tr. at 408:4-6; Schoeppner Cross-examination, Tr. at 440:17-20.

159. Mr. Cox testified that this monitor well may be influenced by injection of clean water in wells located around the STP and EP1. Tr. at 93:1-4; HMC Ex. 18, Figure 2.1-1; HMC Ex. 37b.

160. Mr. Schoeppner agreed that Well X is "influenced by injection of . . . clean water" and that "[i]t's compromised" as a monitoring well for detecting potential impacts to the groundwater of seepage from EP1. Tr. at 445:25-446:1-4.

161. Mr. Robinson recommended that all four existing ponds should have compliance monitor wells installed at their toes, in the downgradient direction of alluvial groundwater flow. Tr. at 545:21-26 and 546:1-11.

162. Directional, or incline drilling, is a feasible technique for installing new compliance monitor wells to monitor the soil column (or vadose zone) under the ponds and above the alluvial water table. Tr. at 96:3-4 and 546:19-23.[1]

M. HMC Needs Improved Monitoring And Leak Detection At EP2.

163. Mr. Robinson's pre-filed direct testimony documented leakage from EP2 within two years of its initial operation and in 15 of 18 quarterly monitoring reports between July 1998 and October 2003. Robinson Prefiled Testimony at 28:16-20 and 29:1-4; *see also*, Hearing Record at GW-2, and GW-5 through GW-23.

164. HMC witness Dr. Alan Kuhn acknowledged that fluid had been detected in the EP2 leak detection system. Tr. at 156:13-25 and 157:1-7.

165. Dr. Kuhn also acknowledged that HMC stopped reporting quantities of seepage detected in the EP2 leak detection system in October 2004. Tr. at 158:3-6.

166. Dr. Kuhn further testified that records of the volumes of fluids detected in the system are "kept at Homestake's office." Tr. 158:11.

167. In each quarterly monitoring report for the duration of the permit HMC should be required to provide NMED all existing data on the volume of leakage detected at EP2 and all existing data on the volume of all fluids found in the EP2 leak detection system.

[1] " Sandia National Laboratory has developed technologies to measure contaminant levels while conducting directional or incline drilling. Such "Environmental Measurement-While-Drilling" systems are described at: http://www.sandia.gov/Subsurface/factshts/ert/emwd.pdf

¶¶147-150.

N. HMC Needs To Provide Better Meteorological Data.

168. Dr. Kenneth Baker stated that a new meteorological station was installed at the site in 2008 "to better support the air monitoring program." HMC Ex. 33 at 3.

169. Dr. Baker stated a wind frequency diagram, identified as Homestake Exhibit 36b, was derived from data collected by on-site meteorological station. HMC Ex. 33 at 3-4.

170. Neither Dr. Baker nor any other HMC testimony or exhibits provides the location of the meteorological station. *Compare* HMC Ex. 33 *and* HMC Ex. 36a through 36d *and, generally*, Hearing Transcript and Exhibits.

171. Mr. Robinson stated in his pre-filed direct testimony that "conflicting information" exists on wind directions at the Homestake site, and quoted from the Nuclear Regulatory Commission's Environmental Assessment for EP3 to demonstrate that the only local wind data was from the Grants airport located 10 miles southeast of the Homestake facility and from the Anaconda Bluewater uranium mill tailings facility located 6 miles west of the Homestake site. Robinson Prefiled Testimony at 23:9-20.

172. HMC should be required to provide NMED with a map showing the location of the on-site meteorological station; prepare and submit for NMED approval a work plan describing all meteorological data to be gathered at the on-site station, including but not limited to hourly temperature and pressure, wind speed and direction, wind stability class, and evidence of temperature inversions; prepare and submit all existing monitoring data from the on-site meteorological station; and incorporate meteorological data generated from the on-site meteorological station into all future quarterly environmental monitoring reports. ¶¶152-155.

O. NMED's Proposed Permit Amendment Does Not Provide Adequate Data Collection or Environmental Protection and Requires Modification.

173. NMED's proposed additional permit Condition 33, supplementing the closure portion of the permit, yet, as written, would result in an unspecified volume of pond sludges - ["residual sediment" in the language of the conditions] - of unspecified chemical characteristics accumulating in the ponds on site at the end of the remediation program prior to the sludge being consolidated in EP-1 as proposed, despite its sampling requirements. *See generally,* NMED, Stipulated Order To Include An Additional Permit Condtion (January 11, 2010).

174. Per ¶¶50-67, 75-80, 81-88 herein above, Condition 33 must include: (1) a description of a sampling plan to provide a representative distribution of samples from all

solids and residues containing contaminants that HMC's groundwater remediation system removed, (2) a description of how the materials will be identified and sampled, and (3) a requirement for including in the sampling process the water chemistry, volume, pH, and solubility characteristics of the samples.

175. Per ¶¶50-67, 75-80, 81-88 herein above, in addition to modifying Condition 33, conditions 15, 19 and 20 should be modified to require: (1) representative sampling of pond residues throughout the life of the remediation project, including, but not limited to, (2) sampling pond sludge from the bottom of each pond, sampling residues on the pond liners and land surface that the resides from sprayed fluids have affected for the time period up to and including final demolition of the ponds, (3) Condition 15, which addresses sampling of pond water should be modified to require that monitoring data generated include at least quarterly sampling (for volume and the suite of chemical characteristics used in liquid sampling) of the full range of solids associated with the discharges to the ponds, including residues in the ponds, on the liners and on the ground to the furthest extent of visible deposition; (4) Condition 19, which addresses RO wastewater volumes, should be modified to include quarterly sampling of all RO effluent streams for volume and all chemical characteristics; and (5) Condition 20, which addresses "process inflows" (discharges) to the ponds should require that the monitoring data generated include quarterly reports of sampling of all pond inflows--including RO residue streams (not just "treated water")--for volume and chemical characteristics.

176. NMED's use of "encapsulation" in Condition 33 needs to be clarified, as encapsulation within EP-1 implies that the material is completely surrounded, and NMED has not required an assessment of the condition of the EP-1 liner and a determination that the existing EP-1 single, non-leak detection liner is adequate for encapsulation of the contaminants HMC's remediation system will have removed at facility end-of-life. *Compare Condition 33,* NMED, Stipulated Order To Include An Additional Permit Condtion (January 11, 2010), *and generally* Hearing Transcript and exhibits (no evidence provided that EP-1--an already aged, non-leak detection single-liner pond located in the FEMA flood plain--can provide "encapsulation" of all residual end-of-life residues and contaminated materials sufficient to have adequate assurance of public health and safety).

P. HMC Needs to Evaluate The Proposed Location of EP3 In Relation To The San Mateo Creek Floodplain.

177. Although Dr. Kuhn testified concerning the relationship between the proposed site of EP3 and the floodplain, it was clear from cross-examination that he was not certain about where the FEMA floodplain is located. *Compare* Tr. at 119:25-124:1 *and* 138:14-143:5; *see also* Larry Carver, Written Statement and historic photographs of flooding from the HMC site that Mr. Carver provided with his testimony (January 12, 2010); and Arthur Gebeau, Written Statement at 2-3 (January 12, 2010) (BVDA concerns regarding floodplain in relation to the HMC site).

178. Mr. Carver's Written Statement is particularly instructive, as has served on the Rio San Jose Flood Control District since 2000 and is in his second term on its Board of Directors since his election in 2002. Larry Carver, Written Statement at 1. Mr. Carver describes the floodplain history and issues as follows:

> I recall that 1972 was wet all year long for the Rio San Jose water shed, which includes our community and the Homestake facility. This wet year caused several floods throughout the Bluewater Valley. One event was the October 1972 flood in Murray Acres community, which I witnessed. I remember that runoff from the storm filled San Mateo Creek north of the Homestake tailings pile and flowed west and then south around the western side of the tailings pile.
>
> I have made a map showing the path of the flood waters, using 1984 FEMA floodplain maps. It is attached as Carver Attachment 1. This is the same flood plain map that Homestake included in its renewal application for DP-725. The FEMA floodplain base map did not show the location of Homestake's tailings piles and four existing ponds; I drew them onto the map I made.
>
> I have several photographs of this flood that I'd like to share. First, let me explain that these photos were taken by Mrs. Gladys Chapman, who lived on Ridgerunner Road in Murray Acres resident at the time of the October 1972 flood. Many years ago, Mrs. Chapman turned over her photos to me because of my involvement with the Flood Control District, and I have kept and preserved them. Because of her age and health, she is not able to attend today's hearing. But she has provided an affidavit attesting to having taken these photographs. That affidavit is attached to my statement as Carver Attachment 2. I have provided color copies of these photos in Carver Attachment 3. I'd like to describe each photo and discuss its importance for this hearing. I will also point out the locations of these photos on the map I made.
>
> Photo 1 is looking east on Sundowner Road, at corner with Thunderbird Road, by the Pitmans' trailer, in Broadview Acres. This location is about 1 mile south of the Large Tailings Pile. As you can see, flood waters covered the street.
>
> Photo 2 shows flood waters covering the Anaconda-Homestake Road, looking east. The Large Tailings Pile is on the upper right corner. This road is now called County Road 63, and it parallels the north side of the Large Tailings Pile. The location of this photo is about 2,500 feet south of

the planned location of Evaporation Pond #3. As you can see, the entire road was flooded and runoff was coming over the land to the north (on the left side of the photo).

Photo 3 is looking north on Thunderbird Road between Broadview and Murray Acres. The tailings pile is in the upper right of the photo. The water was flowing south on Thunderbird, or toward the camera. This shows how the flood waters traveled around the northwestern corner of the tailings pile and came into our community.

Photo 4 is also looking north from the Pitmans' property at the corner of Sundowner and Thunderbird between Broadview and Murray Acres.

Photo 5 shows flood waters standing on the street in front of Mrs. Chapman's home on Ridgerunner. This is the current home of BVDA members Milton and Jonnie Head.

Photo 6 shows that the Chapmans' north pasture was inundated by this flood. Here, we are west toward the Blevins Sawmill from Anaconda-Homestake Road (again, now called CR 63).

Photo 7 shows another view of Sundowner Road, looking east.

Photo 8 is looking east on Wagonwheel Road in Broadview Acres, one block south of Sundowner Road. Flood waters spread southward along Thunderbird Road, moved approximately 1,500 feet west of Thunderbird in Murray Acres area and flowed about 2,000 feet east on Homestake property and through Broadview Acres. I recall the flow lasting about 24 hours. There was some flooding farther south in the Village of Milan and city of Grants.

Finally, Photos 9 and 10 show sheet runoff coming across land on the north side of the Anaconda-Homestake Road, or CR 63, shown here on my map. At the time, this land was owned by the Roundy family, and since then has been bought by Homestake. The flat land shown in Photo 9 is looking north toward the location of planned EP3.

The second flood I want to talk about briefly occurred in mid-January 1979. The Ambrosia Lake and San Mateo Village areas north of 12 to 15 miles north of our community received heavy snowfall in November and December 1978. A very fast warm-up in January caused the snow to melt rapidly, sending runoff into San Mateo Creek. This flood was not as large as the October 1972 flood, but it did cause damage due to its timing.

I took three pictures of the flood waters at a location in San Mateo Creek called the Sand Curve. It's located at Cibola County Line, Mile Marker 9, Highway 605 (also known as the northeast corner of section 1, T12N, R10W). It's at the very top of my map. These photos are included in Carver Attachment 4.

In Photo A, at the top of the sheet, you're looking east at State Highway 605, near Mile Marker 9. Photo B at the bottom left corner of the sheet is looking west from Highway 605 at flows in the creek just north of the actual Sand Curve. And Photo C, in the bottom right corner of Attachment 4, shows runoff waters in the creek. From this point, the floods traveled about 4.5 mile downstream to the County Road 63 to the area north of the Large Tailings Pile. The flood waters traveled west from there.

About a month later, more runoff was ponding south of the Large Tailings Pile in an area that is now the site of the Reverse Osmosis Plant, the East and West Collection Ponds, and Evaporation Pond #2. Homestake had built an east-west berm across this area in 1978 to capture any future tailings effluent spills, like the spill that occurred on February 5, 1977, in which 2 million to 8 million gallons were released from a break in a tailings slurry pipeline on top of the LTP.

On February 16, 1979, Homestake opened a hole in the berm to allow the runoff to flow south across its property just east of Thunderbird Road. Late that afternoon, I took a few pictures of this flood, which I have copied and included in Attachment 5 to my statement. Photo 5A shows fluids pouring from the breach in the holding berm. Photos 5B and 5C show the fluids flowing south on Thunderbird Road toward the corner of Wagonwheel Road in the direction of the Village of Milan. These locations are outside, or off, of Homestake's property.

I also have photos of the runoff taken by Murray Acres resident, John Morrows. Photos 5D through 5J all show standing water on Thunderbird Road and on its side streets: Sundowner, Wagonwheel and El Malpais — locations 1.5 to 2 miles south of Homestake and outside of its property boundaries. You can see water standing around the Pitmans' trailer.

Several years later, I obtained an aerial photo of the Homestake area, taken by U.S. Army Corps of Engineers personnel on March 12, 1979. This photo is labeled 5K. Lands affected by the runoff from the Janurary and February flood events are seen as the lighter shaded areas south of the tailings pile and paralleling Thunderbird Road.

> While we cannot predict floods, the fact remains that they have previously occurred and can happen again. An undated paper written many years ago by a local range conservationist, R. A. Abercrombie, stated that the last large flood in the Bluewater Valley occurred in 1904 and 1909 — more than 100 years ago! Are we due for a 100-year flood, or a flood of even bigger magnitude, in the near future?
>
> I remind you that the FEMA floodplain map does not consider Homestake's large tailings pile in the middle of the floodplain. As the photos I've shown have indicated, water is forced to move around the west end of the tailings pile and close to the location of the new evaporation pond. If the location of EP3 is not in the floodplain, it is very close. For these reasons, I recommend that Homestake study moving the site of the new pond to the northwest, away from the floodplain and farther from our community.

Id. at 1-3 (emphasis added).

179. Dr. Kuhn's testimony also raises a serious question as to how the direction of floodwaters, rather than just escapement of the liquid in proposed EP3, would be affected by the dike system and EP3--and his testimony only indicates that modeling was conducted for the escapement of the liquids in proposed EP3. *Compare* Tr. at 119:25-124:1 *and* 138:14-143:5.

180. In order to assure public health and safety in the event of a flood through the San Mateo Creek Floodplain, NMED needs to obtain a complete analysis of potential flood pathways in relation to the proposed EP3 site. ¶¶177-178.

Q. NMED Should Take Note Of The Historic Failure of The Current Remediation Experiment And Hold Issuance Of DP=725 Until The Army Corp of Engineers Final RSE Report Is Issued And The Recommendations Contained Therein Adequately Vetted And Factored Into Modification Of DP-725 And DP-200.

181. In Public Testimony and Comment, BVDA's President related the history of environmental pollution and attempted remediation at the HMC site:

Bluewater Valley Downstream Alliance (BVDA) Compilation of Historic Activities at the Homestake Mining Co./ Barrick Gold Corp. uranium mill tailings facility, Milan, N.M., 2009

HISTORY OF THE CONTAMINATION

- **1958**, Homestake Mining (now Barrick Gold) located uranium mill tailings facility less than ½ mile NE of Murray Acres—part of our community.

- Purpose:
    * Process uranium ore—provide profit for company
    * Provide tax dollars for Cibola County (formerly Valencia County)
- Unlined tailings pond seepage
- Uncovered windblown tailings
- **1961**—Homestake (now Barrick Gold) & Anaconda (ARCO notified by New Mexico Public Health Service of a serious health risk due to pollution of alluvial aquifers
- **1975**—NMED/USEPA find drinking water unsafe
- Homestake/now Barrick Gold provides bottled water for residents
- **1983**—Group of Murray Acres residents file suit against Homestake/now Barrick Gold for contamination of the Alluvial aquifer
- **1985** Lawsuit settled with provisions:
    * Homestake/Barrick Gold provides municipal water to residents and pays residential water bill for 10 years
    * Promises by Homestake/Barrick Gold (verbally) to fully restore clean water within 10 years
- Site is simultaneously listed as a federal EPA Superfund site
- Residents believed EPA would successfully regulate Homestake/Barrick's remediation efforts
- Residents assured only alluvial aquifer had been affected, no other aquifers in danger.

CLEANUP DATE PASSES

- **1995** – Homestake/Barrick Gold's remediation fails--
- Residents' wells still unusable
- Property devalued due to publicity from the lawsuit and local knowledge of contamination

CONTAMINATION WORSENS

- Homestake/Barrick, knowing it cannot meet earlier promises, asks for a more lenient cleanup standard far exceeding clean water drinking standards
- Not only alluvial Aquifer, but also Upper, Middle, and Lower Chinle Aquifers contaminated. Now affecting 9 sections of land downstream of site
- Possible contamination of San Andres Aquifer, the water supply for Milan, NM—a village of approximately 4,000 residents (plume ½ mile inside Village limits and advancing)

- **2006**--Review of the Second Five-Year Report for Homestake Mining Company Superfund Site, Grants, NM. NMED DP-200, NRC License SUA-1471and Discharge Permit App. DP-725

Arthur Gebeau, Written Statement, Attachment 'A' (January 12, 2010).

182. Mr. Gebeau's comments are also instructive on the issue of deferring final decision on DP-725 until after the Army Corp of Engineers' RSE review of the HMC site is released to the public in the next couple of months, as well as his, and the organization's considered opinions on aspects of site remediation that NMED needs to focus on:

> My name is Arthur Gebeau, and my mailing address is P.O. Box 3227, Milan, N.M., 87021. I live at 1986 Ralph Card Road, Milan, N.M. My home is located approximately 1.5 miles southwest of the Large Tailings Pile at the Homestake Mining Company uranium mill tailings facility, which is the subject of today's hearing.
>
> I am a member and currently the president of Bluewater Valley Downstream Alliance, or BVDA, and I have been a resident of the area near the Homestake Superfund Site for 31 years. I worked in the uranium mining/milling industry in the Grants-Gallup area for 37 years and in numerous positions, including General Manager of New Mexico Operations for Kerr-McGee Nuclear Corporation/Quivira Mining Company from 1979 until shutdown of operations with continuing responsibility in reclamation activities until 1993. In these managerial positions, I dealt with many of the same kinds of issues as are involved in the DP-725 activities.
>
> BVDA was founded in 2006 by a group of citizens living in the vicinity of the Homestake uranium milling operations north of Milan, N.M. The mission of BVDA is to promote rational activities to effect cleanup of the groundwater and air in the communities around the HMC Superfund Site in a reasonable time period. Our goal is to see these results achieved by working with and monitoring the activities of the various federal and State regulatory agencies and HMC/Barrick Gold, the operator/owner of the site. We have described the local and regional impacts of past uranium mining and milling discharges on groundwater quality, including those at the Homestake site, for many years. Documentation of our involvement in these issues will be addressed by some of the other BVDA members who are also giving comments.
>
> Fundamentally, our principal concern is the restoration of our groundwater. Similarly, the principal reason for issuing discharge permits under the state's Water Quality Act is to protect groundwater quality. And the groundwater has to be protected at a point of current or reasonably

foreseeable future use. The groundwater under our community is that point of current use: it *has been used* and would be *currently used* if it had not been contaminated by leakage from the Homestake tailings facility. As a community member, and speaking on behalf of members of BVDA, my use of the groundwater and my neighbors' uses of the groundwater have been precluded by that contamination.

BVDA members have many reasons to be suspicious of HMC's promises that it will design and operate a state-of-the-art evaporation pond or finish cleaning up the groundwater by 2017. We prepared a chronology of the history of HMC operations, which is on our website and is appended to my written statement as an ATTACHMENT A [reproduced hereinabove] to show some of our concerns.

In 1975, when residents were first told about the groundwater contamination, Homestake assured them it would be cleaned up in 10 years. Then, in 1985, many of the residents sued HMC to be hooked up to Milan's water system as their wells were polluted and the groundwater had not been cleaned up. Those hookups were installed and HMC agreed to pay for the water use, with limitations, for 10 years at which time the groundwater would be cleaned up to usable levels, as promised by HMC.

In 1995, the groundwater was still contaminated, but HMC stopped paying for the residents' water usage. Between 2005 and 2007, those wells were still contaminated and, in addition, the contamination had spread to many other residents' wells. The Milan water supply was extended through a federal grant and some other residents hooked up and ceased using their private wells.

In January 2009, NMED entered into an agreement with Homestake for the company to pay for hooking up more residents who were using polluted private wells unknowingly. After 35 years, we are still left with polluted water, private wells that are unusable, property values that are greatly depressed due to this pollution, health problems among community members, high levels of radon in our air and what we would call "Current Traumatic Stress Disorder" from living in the shadow of this contaminated site.

Homestake's decision to inject fresh water into the Large Tailings Pile continues to drive contamination into the groundwater. I know of no other uranium mill tailings facility that uses this method for "groundwater remediation". At the other tailings piles that I am acquainted with, the piles were capped with materials to prevent influx

of moisture – exactly the opposite of this practice.

On a teleconference last week, I heard members of the U.S. Army Corps of Engineers team working on the EPA's Remedial System Evaluation say they think this "flushing" is probably a bad idea as it keeps the pile wet, drives contaminants into the groundwater and creates an artificial need for more evaporation capacity. They raised the question of whether or not an additional pond would be needed if this program and some other additional ineffective recirculation of injection/extraction volumes would be curtailed. Therefore, BVDA strongly recommends that the Hearing Officer and Secretary defer making a decision on renewal of DP-725 until the Corp's report is received, reviewed and evaluated by all involved parties. This quite possibly could have an impact on the final decision on this matter. For the record, I wish to note that BVDA made this same recommendation in its October 19, 2009 letter to the Secretary requesting a deferral of this Hearing until the RSE study was completed. I believe this latest information validates that position.

BVDA has concerns about the proposed location of EP3 that was approved by the NRC last year. First, we feel that the pond location could very possibly be in the floodplain. The presence of the Large Tailings Pile in the middle of the floodplain is like that of a dam, which forces flood waters further west, potentially if not actually impacting on the planned pond location. Later, BVDA member Larry Carver will provide you with photographic evidence of past floods that behaved in just this manner. Based on the potential for future flooding in the area of the new pond, we recommend the permit be conditioned to require assessment of this location again and assessment of alternative sites for the proposed pond. These alternative locations could be east of State Route 605 or further northwest of the present proposed site.

Second, locating the proposed pond farther from the community could lessen the potential health impacts on local residents. A location farther to the northwest of the Large Tailings Pile or at a site east of State Route 605 should not pose any great construction or operational problems for Homestake. This very sort of thing was done at Kerr-McGee's uranium mill in Ambrosia Lake where some 400 acres of evaporation ponds were constructed about two miles from the main mill tailings operation.

BVDA also has concerns about the design, operation and impacts of the four existing ponds that are covered by BVDA.

As Mr. Robinson has explained, the existing collection ponds were built in

the mid-1980's for the purpose of storing tailings fluids. Since 1990, they have been utilized for storing sludges and highly saline wastewater from the RO plant, the tailings flushing operation, and toe-drain extraction system. In 1990-1991, HMC built Evaporation Pond 1 on top of the Small Tailings Pile using an asphalt emulsion over a layer of fabric. No leak detection system was installed in EP1. Based on my knowledge of the uranium industry at that time, a pond with a single liner without leak detection was not state-of-the-art then, and certainly is not acceptable today.

I and other members of BVDA cannot understand why the NRC or NMED would approve HMC's plan to use EP1 as the permanent disposal location for all sludges and wastes from the groundwater remediation system, not only because its outdated design, but also because of the fact that it sits in the middle of the floodplain. In the teleconference last week, two NMED staff members raised this issue and the USACE agreed they need to examine it. We have to ask, how can a single-lined pond with no leak detection that is located in a floodplain be considered adequate "methods or techniques" to ensure protection of groundwater as required by the state's regulations?

BVDA also believes that the existing evaporation ponds, along with emissions from the Reverse Osmosis plant and sprayers on EP1 and EP2, are the sources of elevated radon levels detected near our homes, and that these high radon levels are harming our health. The high radon levels that Homestake has detected in its reports and that Mr. Robinson discussed in his testimony cannot be attributed to "natural" soil radon, or solely to the Large Tailings Pile, which is mostly covered by a radon cap. The typical low-velocity downslope wind patterns that we who live here observe at night and early morning bring airborne contaminants into the residential areas south and southwest of the HMC facilities.

Based on these concerns, BVDA recommends, that EP1 and the east and west collection ponds be phased out over the next five years. DP-725 should be conditioned to require this phase out. In addition, the closure plan should be amended to define a different, more suitable site for permanent disposal of remediation system wastes. Phasing out waste management activities on the south side of the Large Tailings Pile should have the added benefit of reducing radon levels in the adjacent communities.

There remains a need for a comprehensive solution to the groundwater and air contamination that has gone on unabated for some 40-50 years in the

residential areas around this site. In addition, our communities sit in the pathway of historic uranium contamination from other sites to the north and to the northwest. The most appropriate long-term solution to these issues is to remove the tailings and associated contaminated materials to a better site for proper disposal in accordance with today's best technology. If the Federal Government can move tailings piles located in or near communities and rivers in Durango, Grand Junction, Gunnison and Rifle, Colorado, and Moab, Utah, it can do so here in Milan, New Mexico.

To summarize, BVDA makes the following recommendations:

1. Defer decision on modification and renewal of DP-725 until after the USACE's RSE report is issued, reviewed and made subject to further public hearings.
2. Condition DP-725 to require HMC to evaluate alternative sites for construction of a new evaporation pond, if indeed one is even needed.
3. Condition DP-725 to require the phase out of existing ponds located south of the LTP over the next five years.
4. Condition DP-725 to require additional monitoring of radon levels next to the ponds.
5. Lastly, we beseech our political leaders and regulatory agencies to work with our community and with Homestake/Barrick Resources to begin the process of finding a suitable site for the permanent disposal of the Homestake uranium mill tailings and associated contaminated materials.

Id. (emphasis added).

181. Based upon the above history, BVDA made the following findings: (1) Chinle aquifers inadequately regulated; (2) Mist from evaporation jets extending beyond site berms; (3) Unknown effects of potential radon exposure from windblown tailings; (4) Undetermined extent of structural damage to houses in nearby communities from injection wells and concomitant changes in local geohydrology; (5) Contamination from Homestake/Barrick Gold now mixing with DOE-controlled Anaconda (now Atlantic Richfield Oil—ARCO and polluting additional communities; (6) Just notified the deepest aquifer is also contaminated and this is our main irrigation aquifer; (7) Still no background monitoring wells ahead of plume. *Id.* These findings, which are reflected in the requested findings above in ¶¶1-180, are reasonable in the light of the evidence before the Secretary of the Environment in this case.

182. Another BVDA member and thirty-five (35) year resident of the community adjacent to the HMC site made some compelling observations of the above history and its effects upon her and her family:

My name is Jonnie Head. I have lived in the Murray Acres subdivision since 1975. My husband is Milton Head. Milton and I were raised in a rural community. After 25 years of marriage, we were financially able to buy our little 10 acres in a rural area—plenty of elbow room, fresh air, and clean water.

One year later, we received notice we should no longer drink our well water. Homestake began delivering 10 gallon plastic water jugs to our home. After realizing we could go on forever with that situation and could no longer use our wells, our community decided to file suit for damages. The result was a water line from the Village of Milan and a monetary settlement for damages. We were misled by our attorney and signed an agreement to never sue the company again. We were verbally assured by Homestake that our wells would be clean in 10 years. Thirty years later, the contamination has spread much further, we still cannot use our wells and now we pay city water rates to raise a garden.

We have watched Homestake/Barrick Gold add more evaporation ponds and a reverse osmosis plant and spray plumes of water above the ponds with moisture drifting toward us. We have seen them buy lots and houses within our subdivision, and bury the existing houses. We now have pipes running in every direction and experimental irrigations plots with failed crops, using contaminated water.

I believe Homestake/Barrick Gold has no solution to this problem and is continuing to experiment at our peril.

We have our life and our savings invested here. Our friends live here—our grandchildren have lived here and we continue to be exposed to a failed remediation system, bad water, and radon. This new pond needs to be considered more carefully to keep it from being another failed experiment.

We stupidly thought there were government agencies looking out for our best interest. No so. There is a large pile of contaminated material that continues to leak into the aquifer about a half mile from my home. I do not believe you can herd water with water. They are only diluting it.

I believe the only real long-term solution is to move all the waste to a safe, permanent location far from a flood plain and not above an underground aquifer.

I sold real estate for 21 years and have had people new to the area say, “Oh no, I don’t want to look out there [in my community]; I’ve heard about that mess.” I have affidavits from local realtors who have had the same experiences.

We worked hard for 50 years and today have a worthless, unhealthy piece of property to show for it.

> Please don't add to the mess until we hear from the U.S. Army Corps of Engineers. They may have a better solution.

Comments of Jonnie Head at 1-2 (January12, 2010) (emphasis added).

183. Jonnie Head's daughter also raised significant issues based on her nearly life-long residence in the vicinity of the HMC site:

> I moved to Murray Acres in 1975 and lived in a home less than a mile from the Homestake/Barrick Gold Superfund site. I lived in the community for two years, moved away, and then moved back with my husband and two young children in 1987, again residing less than a mile from the site. I am currently a reading teacher with Bernalillo Public Schools, finishing a doctoral dissertation in educational leadership from Penn State. I am a member of the Bluewater Valley Downstream Alliance (BVDA).
>
> The history of the Homestake/Barrick Gold Uranium Mill Tailings Superfund Site is an object lesson in regulatory agency failure. The Nuclear Regulatory Commission (NRC), the United States Environmental Protection Agency (USEPA), and the New Mexico Environment Department (NMED) have never adequately responded to the massive contamination that has destroyed my community's groundwater and may have affected my family's health and the health of my neighbors. These agencies bow to political pressure and that is why we are here today. This permit has been on hold for two years. In a month or so, the United States Army Corps of Engineers (ACE) will complete a Remedial System Evaluation (RSE) for the USEPA. But rather than wait for the USEPA's Remedial System Evaluation to provide a more thorough consideration of potential solutions to this environmental nightmare, NMED brings this discharge permit to hearing. I strongly believe this rush to permit is based, not on sound technical review, but on political expediency. Some New Mexico state politicians want new uranium mining and our community's contamination has become an embarrassment to the NMED and an inconvenience for those who would portray mining as safe for workers and the environment.
>
> Waiting even three months would provide more information from the RSE on which to base NMED Discharge Permit 725 (DP-725). However, if DP-725 is approved now, the RSE findings will be moot. Once more, Homestake/Barrick Gold, with the full cooperation of regulatory agencies, will be committed to a course of action which may not improve groundwater quality, and which definitely will not protect the community's health. After 30 years of failed remediation at the Homestake/Barrick Gold site, it only makes sense to wait until the USEPA's Remedial System Evaluation is complete, consider the ACE's findings, and then permit the

entire discharge system in one hearing that takes into account all of these complicated and, to date, ineffective processes. It may make sense politically to separate Homestake/Barick Gold's discharges into separate permits, but scientifically, this practice is unsound and leads to fragmented oversight.

From our community's experience with the current site and from the technical information we have reviewed, BVDA believes, and I agree, that the proposed evaporation pond is too small and the proposed site too close to our community, which has suffered long enough from this multi-billion dollar company's unwillingness to commit the resources needed to solve this problem. With gold near $1,000 per ounce, it is time to ask Homestake/Barrick Gold for a permanent solution. This evaporation pond is another attempt to cut corners and save the company money.

To make our community whole, all the tailings must be relocated to an appropriate site for safe and permanent storage. When that is accomplished, then we will have a chance to restore lost groundwater. Otherwise, the Large Tailings Pile (LTP) continues to leak into our groundwater, and nearby residents are continuously exposed to dangerous radon. Without removing the existing waste piles to safe and permanent long-term storage, NMED and Homestake/Barrick Gold are subjecting our community to radon that may eventually kill us. We believe this radon exposure has already caused serious health problems for adjacent residents.

Last year, my mother, JoAnn Strickland, Sandy Brewer and I conducted a community survey. We talked with 71 families and were surprised by the number of people in the community who reported serious health issues, from thyroid and lung disease to various forms of cancer. This preliminary information suggests the community needs a rigorous epidemiology study. Since no official health survey has been conducted, despite more than 30 years of exposure for some residents, there is no way to know for sure what the health effects have been. Without further study, we cannot ascertain how another evaporation pond near these communities might affect residents.

We also have no information about the amount of radon coming directly from existing tailings ponds because there are no air monitors on those ponds. Current air monitoring at the site is inadequate in other ways as well. In the same way they have failed to set appropriate groundwater backgrounds, NMED and the other regulatory agencies are also allowing Homestake/Barrick Gold to use inappropriate background levels for air monitoring, even though NMED established radon background for our area in 1979 and 1980.[2] Natural background in the community has not changed

[2] BVDA contends that at least one monitoring station the NMED used in 1979 and 1980

in the ensuing years. The only thing that has changed has been the addition of evaporation ponds, and more contamination deposited above ground.

This time, NMED's failure to set adequate background cannot be blamed on upstream polluters. Air sampling in 1979 and 1980 by NMED (previously the NMEID) established radon levels to the west of the site that should be used as background. Only political pressure or a blatant disregard for the community's health would support using the background Homestake/Barrick Gold currently uses and proposes to continue using. When the correct background radon levels are applied, it becomes clear that our community has been dosed with radon levels that exceed both USEPA and NRC standards. To ignore appropriate background levels allows NMED to ignore—or pretend to have no evidence—that people in our community may be affected by past and continuing radon exposure.

Not only are background levels inadequate, Homestake/Barrick Gold's use of a 75% occupancy rate is out of bounds for many residents during many months of the year. The occupancy factor was taken from an NRC contractor report (NUREG/CR-5521) that assumed that the average person spends about 200 days in their home, another 71 days outdoors, and presumably the rest of the year (94 days) away from home. For many people in our semi-rural community, their home and land is their work place. For instance, my mother and I spend at least 60% to 65% of our time outside during warm months (May through August) tending our horses, gardens and land. That's 14 to 15 hours per day, or the equivalent of about 78 days; and that doesn't count the time we spend outdoors around our homes and land in the other eight months of the year. We live less than a mile from the current evaporation ponds and tailings piles, and we would be about that distance from the proposed pond.

To add further injury, Homestake/Barrick Gold proposes a double liner with leak detection "ports" which could miss leaks and does not provide adequate leak monitoring. We have been told before that Homestake/Barrick Gold was using "industry standards," and have been bitterly disappointed by the results of those standards. Better liner systems are available and our community understands now how important it is to demand better protections. As is the case with all the Homestake/Barrick Gold ponds, the current proposal for leak detection is inadequate.

In addition, soils in the community need to be sampled to see what deposits

—the one north of the Large Tailings Pile—was set in an area already influenced by radon emanating from the LTP. These background levels are found in a report by Buhl, T., Millard, J., Baggett, D. and Trevathan, S. (1985). *Radon and Radon Decay Product Concentrations in New Mexico's Uranium Mining and Milling District.* Santa Fe: New Mexico Environmental Improvement Division.

have been left from windblown tailings and evaporation spray mists, and from the tailings pile breach that crossed Thunderbird Road into Murray Acres and Broadview Acres.

If DP-725 is approved as proposed, it will be another example of negligent regulatory oversight, with possibly disastrous health effects that will ruin more lives, destroy families, and heap further embarrassment on a regulatory system that should be ashamed of how it has dealt with our community.

A better location for the evaporation pond is required. The Nuclear Regulatory Commission conducted an inadequate environmental assessment. Local stakeholders were not allowed to participate meaningfully in their final decision in spite of protest by BVDA, the Multicultural Alliance for a Safe Environment, and questions by Senator Bingaman.

I believe Homestake/Barrick Gold plans to spend as little money as possible on this remediation effort and wait until our community dies off or until we are left with property so valueless we will not have the resources to oppose them. Far from protecting our community's health and environment, approving proposals such as DP-725 places the NMED squarely in the company's corner and clearly opposed to a thoughtful, scientifically engineered solution to this environmental nightmare.

With the federal government paying for half this remediation effort and Homestake/Barrick Gold reaping record profits, now is the time to devise a solution that will work and will provide some future relief, even if it cannot give residents back their health and the property they have lost.

I urge the hearing officer to place this permit on hold until the RSE is completed and then consider all discharges in one permitting process; to demand better air monitoring with appropriate background so we know exactly where and how radon is currently emitted from the site and how a new pond might affect those totals; and to force this multi-billion dollar company to devise a plan that places all of their waste in safe, permanent storage so they can finally restore our groundwater without endangering our lives in the process. You have the power to force a better solution. Please help us.

Candace Head-Dylla, Written Comments at 1-5 (January 12, 2010) (emphasis added).

184. Milton Head, former BVDA president, who, like Arthur Gebeau, worked for the uranium mining industry since the 1950s, made a number of significant observations about the spread of contamination from the HMC site and how DP=725 could be modified to begin to address some of these issues:

My name is Milton Head and I have lived in Murray Acres since 1975. As a child, I prospected for uranium and dug mining discovery pits. I worked in the Anaconda Mill and as an underground uranium miner in the 1950s. In the 1960s, I began supervising underground and open pit operations, and in 1976 became the Project Director for Conoco, planning and developing an underground uranium mine at Crownpoint, NM. During the 1980s, I worked as a consultant for large tunneling projects in the U.S., Egypt, New Guinea, and other locations worldwide.

First, there are a number of basic issues that are still not addressed in this permit. New Mexico Environment Department (NMED) does not know how much water comes from past mining and milling in the Ambrosia Lake region into the site. How long has it flowed; where does it travel underground; how is it affecting the remediation?

NMED continues to disregard my calls for establishing baseline water quality levels in front of the contamination plumes. Current monitoring is also inadequate. With no baseline information, inadequate monitoring and inappropriate background levels, the goals for the proposed evaporation pond are also inappropriate and there are no historical data to determine if this proposal is valid. NMED may want to play games with background data and levels by separating DP-725 from DP-200, but the truth is the two permits are inextricably intertwined. While it is possible to separate them legally, it violates engineering principles and makes it possible for Homestake/Barrick Gold to continue their ineffective remediation practices. There are continued factual errors in Homestake/Barrick Gold's testimony. For instance, the upper Chinle does not flow from the northeast to the southwest—even in the fault zone. These hydrological formations have not been adequately characterized and we have nothing but Homestake/Barrick Gold's conceptualizations to suggest this is true.

BVDA has not had exchanges with NMED about this permit that would allow the Department to understand BVDA's position and us to understand theirs. This is not the reaction we would expect from a department that claims to be committed to early and meaningful stakeholder participation.
The draft permit furnished does not adequately address a number of important issues.

Permit condition 11:
One monitoring well for four evaporation ponds is inadequate. Two monitoring wells for the proposed pond would be, likewise, inadequate. This may fulfill the letter of the law, but those with experience know this system is likely to miss many leaks. Once again, the NMED's willingness

to let Homestake/Barrick Gold pass with minimal rather than truly protective measures is evident.

Permit condition 3:
Homestake/Barrick Gold's proposed liner is not state-of-the-art and therefore inadequate for a waste storage site designed for such dangerous waste. In addition, the proposed pond requires
a truly protective leak collection and detection system. It should be designed so that one corner is downgradient of the rest of the pond to collect in a French drain across the bottom of the lower end of the ponds that drains into a concrete pit, so any leaks would be collected in the pit. The first liner should be installed over carefully graded contours so that any leaks are captured at a single point. Next, sand would be compacted over the first liner and the second liner installed. Leak detection monitors would be inserted in the sand between the two liners. Additional monitors should be set around the pond.

Permit condition 8:
Forced evaporation must not be allowed. Spraying will disperse contamination no matter what controls are instituted and the proximity of the proposed site to our community means this practice is unacceptably hazardous. Homestake/Barrick Gold currently uses forced evaporation, but wind/weather conditions often prevent sprayer use during colder months or in windy conditions on many days during warmer months. Pond capacity should be adequate to accommodate needed evaporation without sprayers.

Finally, from a precursor study[3] that prompted the USEPA's current Remedial System Evaluation, I calculated that only about 6.81% of the total 2,496 gpm water used in Homestake Barrick Gold's remediation system is actually applied into the evaporation ponds. Clearly, the contaminated water is being shuffled around, but not treated. That is why the current proposal is for such a small evaporation pond. To actually solve this groundwater contamination problem, much more water should be treated, possibly requiring substantially more evaporation capacity. To permit this small pond, so close to residences, thereby exposing the community to even more radon hazards for so little groundwater remediation gain is clearly a company and regulatory agency pretending to fix a problem but not seriously addressing either the real problem or caring what happens to local residents as a result.

[3] From *Response to Comments: Milton Head's Comments on Draft Final Remediation System Evaluation, Homestake Mining Company,* April 16, 2009. Prepared for the United States Environmental Protection Agency.

Milton Head, Statement at 1-2 (January 2010).

183. The observations, analysis and conclusions of BVDA members was echoed by a representative of the Multi-cultural Alliance for a Safe Environment:

> My name is Nadine Padilla, and I'm a resident of Grants, New Mexico. I am here on behalf of the Multicultural Alliance for a Safe Environment, a coalition of grassroots, community-based organizations that are working to address the existing uranium contamination in the Grants mineral belt. Our communities for far too long have been exposed to the hazards of uranium mining, milling and its resulting contamination of our air, land and water. Based on these experiences, our coalition is in complete support of the Bluewater Valley Downstream Alliance's efforts to achieve a permanent and just remedy for 50 years of pollution at the Homestake uranium mill tailings site.
>
> The US Army Corps of Engineers is expected to issue a draft of its remedial system evaluation report for the Homestake groundwater remediation system in mid-February. The RSE has been commissioned by the USEPA at the request of NMED and is the first independent assessment of Homestake's 30-year-old groundwater remediation and waste management system. The report's findings and recommendations could determine if a new evaporation pond for Homestake's tailings-flushing program is needed and whether the flushing program itself helps or hinders long-term remediation of contamination from Homestake's unlined tailings ponds.
>
> We support BVDA's call for a deferral of a decision on DP-725 until after the RSE report has been issued and the public has had time to review and comment on it.
>
> BVDA feels that the proposed location for this site is too close to existing residences and the San Mateo Creek floodplain. We support BVDA's recommendation that NMED include a condition in DP-725 to require Homestake to investigate a different location that protects residents from radon exposures and uses natural topography to protect against flooding and groundwater contamination.
>
> The high levels of radon that have persisted in the communities near Homestake is very alarming and very disturbing. We support BVDA's recommendation that NMED include a condition on DP-725 that requires Homestake to phase out the use of the existing ponds over the next five years in order to reduce radon levels in neighboring communities and to provide a better location for final disposal wastes outside the San Mateo

> Creek floodplain.
>
> We support BVDA's long-term goal of ensuringt hat groundwater is cleaned and that the communities are finally protected by eventual removal of all uranium milling and remediation of wastes to a safe, permanent disposal site that is far removed from people, isolated from area groundwater and floodplains and naturally armored to provide containment for these wastes
>
> .
>
> We strongly urge you to support and respect the wishes of the communities that are most deeply and devastatingly impacted by the contamination left by Homestake and to wait until the RSE -- RSE by the Army Corps of Engineers has been released before deciding on this permit application.

Tr. at 327:10-329:20 (emphasis added).

184. Significantly, BVDA, supported by MASE, ask that the approval process of DP-725 be postponed until the Army Corp of Engineers issues a final RSE that can be utilized in the decision-making process on this permit. It is ironic that NMED, HMC and BVDA all have access to the draft report but, due to the lack of public release until a final report is issued, cannot make its content a part of this proceeding. Plainly, as Candace Head-Dylla set forth in the Comments, failing to wait for the Army Corp's public findings--where the applicant and agency have already waiting nearly a decade to issue the permit--is not a rational decision, given the potential commitment of scarce public financial resources that will be invested in EP-3. Therefore, BVDA seeks a factual finding that (1) the permit can reasonably be "held" until the final RSE is issued in the next few months; (2) that NMED will allow sufficient time to fully evaluate the Army Corp's findings and recommendations; and (3) that an additional public hearing will be held to discuss the RSE findings and take comments on the implementation of those findings.

185. BVDA and its members have also formulated a set of recommended findings that apply to the HMC remediation: (1) USEPA should expand the Superfund District to include Anaconda (ARCO) mill site and Ambrosia Lake area mining and milling discharges; (2) USEPA Region 6 should extend Superfund designation and enacts cost recovery mechanisms; (3) the U.S. Congress should revise current Atomic Energy Act of 1954 to include mill tailings and water discharges as *pollutants* rather than the current *byproduct materials*; (4) NRC and DOE should participate in remediation of former Anaconda/ARCO mill tailings & find additional water sources for Grants/Milan; (5) Tailings should be removed for permanent storage; (6) If cleanup considered unlikely, US Congressional delegation works with responsible parties and US government to compensate community. These are all proposals that the NMED could advocate in order to alleviate the burden on the state of New Mexico for monitoring and remediating waste

sites such as HMC.

II. LEGAL BASIS SUPPORTING REQUESTED FINDINGS.

BVDA contents that the New Mexico Water Quality Act [WQA} support the NMED taking action under regulation consistent with the charge to the Water Quality Commission to set standards that shall, "at a minimum protect public health or welfare, enhance the quality of water and serve the purposes of the Water Quality Act." NMAC §74-6-4.D. The task of putting such regulations into effect is assigned to NMED, *id.* at F, and DP-725 is issued pursuant to WQA, NMSA 1978 §§74-6-1 through 74-6-17, and WQCC Regulations at 20.6.2 NMAC.

The NMED "is directed to deny an application for a discharge permit if, inter alis, (1) the discharge would not meet applicable effluent regulations, standards of performance or limitations; (2) if any provision of the WQA would be violated, or, (3) 'the discharge would casue or contribute to water contamination levels in excess of any state or federal standard'." *In The Matter Of The Petition To Amend Ground Water Quality Standards v. New Mexico Environment Department*, 141 N.M. 41, 44 (Ct.App.2006); *see also* NMAC §§20.6.2.3101(A)(1)-(2); 20.6.2.3107(A)(11); 20.6.2.3109(C)(2); 20.6.2.3109(E); 20.6.2.3109(F) (as cited therein); and 20.6.2.4101(A)(1) ('purpose of abatement regulations is protection of all groundwater for use as domestic and agricultural water supply'). This last statement flies in the face of the life-experience set forth in the comments and statements reproduced above--as any of those community members may well asks of NMED--how is it we still do not have decent domestic and agricultural water from our own wells after all of the years you have been

"working with" HMC on remediation of the groundwater--particularly as the NMED is required under the WQA and Commission regulations to "deny an application for a permit if the discharge's effect on groundwater 'measured at any place of withdrawal of water for present or reasonably foreseeable future use,' would result in water contamination levels in excess of a federal or state standard." *In The Matter Of The Petition To Amend Ground Water Quality Standards v. New Mexico Environment Department*, 141 N.M. 4, 47-48 (quoting WQA §74-6-5(E)); *see also* NMAC §§20.6.2.7(AA), 20.6.2.4.4103(B).

BVDA contends that after 35 years, NMED owes the community a thorough vetting of the Army Corp's RSE *before* making a decision on the efficacy of continued "flushing" if the tailings pile. BVDA contends that not only the WQA and regulations promulgated thereunder require the Secretary (and NMED) to undertake such a cautious approach to appriving DP-725--but that common sense and prudence also dictate such a path. BVDA requests that the Hearing Officer find that the WQA and applicable portions of the NMAC required, as applied to the requested facts, that the relief below be granted.

III. BVDA's REQUESTED RELIEF.

(1) That consideration of DP-725 be suspended until there is a thorough vetting of the analysis, conclusions and recommendations contained in the Army Corp of Engineer's RSE on the HMC site;

(2) That DP-725 be modified to require the following conditions:

(a) That Within 30 days of approval of DP-725, HMC shall provide NMED and BVDA with a map showing the location of the on-site meteorological station;

prepare and submit for NMED approval a work plan describing all meteorological data to be gathered at the on-site station, including but not limited to hourly temperature and pressure, wind speed and direction, wind stability class, and evidence of temperature inversions; prepare and submit all existing monitoring data from the on-site meteorological station; HMC shall incorporate meteorological data generated from the on-site meteorological station into all future quarterly environmental monitoring reports and create a web-based real-time reporting from the weather station to a publicly accessible web location;

(b) That within 30 days of the approval of DP-725, upon consultaion with Mr. Chris Shuey, MPH, of Southwest Research and Information Center (SRIC), HMC shall set up additional radiological monitoring stations designed to intercept radon emissions that may be having an impact upon the community adjacent to the HMC site; these shall include ambient radon (Rn) monitoring (in volumetric concentrations) on the berms or next to the East Collection Pond, at EP1, and at a location or locations half-way between the tailings facilities and the nearest residence fenceline monitors (HMC-4 and HMC-5); furthermore, that the radiological monitoring data shall be made avaialble on a continuous, real-time, public access web location.

(c) That NMED contact the New Mexico Department of Health and epidemiology Department of UNM to request that they cooperatively undertake a full-scale health study of the community living in the vicinity of the HMC site.

(d) That within 30 days of the approval of DP-725, the HMC shall submit to NMED for approval a plan to install an additional monitoring well (or wells) adequate

to monitor leakage from EP1, and the East and West Collection ponds including but not limited to installing new point of compliance monitor wells in the downgradient direction of alluvial groundwater flow in close proximity to and/or inclined beneath each of these ponds, and alternative non-intrusive method of detecting soil moisture and contaminant concentrations beneath the ponds. Permit Condition 11 is modified to include a replacement well, XX, for the currently unreliable data point Well X. BVDA recommends, in addition, that NMED also require HMC to use a device such as the "Environmental Measurement-While-Drilling" equipment described in footnote 1 above and the cited web document in order to ascertain the existence of leaks under each of the ponds.

(e) That within 30 days of the approval of DP-725, the HMC shall provide to NMED all existing data on the volume of leakage detected at EP2 and shall include data on the volume of all fluid found in the EP2 leak detection system in each quarterly monitoring report for the duration of the permit.

(f) That within 30 days of the approval of DP-725, the HMC shall commence sampling of sludges with a quarterly reporting requirement as described hereinabove at ¶¶68-78.

(g) That within 30 days of the approval of DP-725, HMC shall provide accurate evaporation rates for the HMC site ponds.

(h) That within 30 days of the approval of DP-725, HMC shall provide NMED with the necessary data to evaluate the RO efficiency which lack of data is described in ¶¶89-92 hereinabove.

(i) That within 30 days of the approval of DP-725, HMC shall undertake, in

cooperation with FEMA, the New Mexico Emergency Management Agency and the Rio San Jose Flood Control District, a study of the floodplain and historic flood paths within and in the vicinity of the HMC site in order to conclusively determine the potential flood pathways through and around the HMC site.

(j) That, effective immediately, water utilized in spraying under Permit Condition 8 must meet state drinking water standards.

(k) That conditions 15, 19, 20 and 33 should be modified to require: (1) representative sampling of pond residues throughout the life of the remediation project, including, but not limited to, (2) sampling pond sludge from the bottom of each pond, sampling residues on the pond liners and land surface that the resides from sprayed fluids have affected for the time period up to and including final demolition of the ponds, (3) Condition 15, which addresses sampling of pond water should be modified to require that monitoring data generated include at least quarterly sampling (for volume and the suite of chemical characteristics used in liquid sampling) of the full range of solids associated with the discharges to the ponds, including residues in the ponds, on the liners and on the ground to the furthest extent of visible deposition; (4) Condition 19, which addresses RO wastewater volumes, should be modified to include quarterly sampling of all RO effluent streams for volume and all chemical characteristics; (5) Condition 20, which addresses "process inflows" (discharges) to the ponds should require that the monitoring data generated include quarterly reports of sampling of all pond inflows--including RO residue streams (not just "treated water")--for volume and chemical characteristics; and (6) Condition 33 b and c be modified to read, in place of EP-1, into a disposal location

comprised of a former pond that is outside the FEMA floodplain and contains at least a double layer liner and leak detection system.

IV. CONCLUSION

Based upon the facts and law set forth hereinabove, BVDA requests that the Hearing Officer recommend to the New Mexico Secretary of the Environment that the above requested relief be granted and the attached proposed Order issued in this case.

Respectfully submitted:

BLUEWATER VALLEY DOWNSTREAM ALLIANCE

BY:_____

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CERTIFICATION OF SERVICE

I hereby certify that the foregoing Requested Findings of Fact, Conclusions of Law, Requested Relief and attached Proposed Order were served upon the Hearing Officer and parties by hand delivery on this 8th day of March 2010.

_____
Jonathan M. Block