

HB2213 Gold Mining Study
Meeting of State Agency Component of Work Group
November 3, 2022
Buckingham, VA

AGENDA

9:00-9:15	Welcome and Introductions	Skiffington/Workgroup
9:15-10:15	Presentation and Q&A on NASEM Report	NASEM/Workgroup
10:15-11:30	Discussion of NAS Report	Workgroup
11:30-11:45	Break/Prepare for Lunch	Workgroup
11:45-2:30	Discussion of Draft State Agency Report	Workgroup
2:30-3:00	Public Comment	
3:00	Adjourn	

1 **Outline of State Agency Committee Report**

2
3 **Table of Contents**

4 Sections and subsections

5 Appendices (glossary, NASEM report, public comments, other cited materials)

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7 **Introduction/Executive Summary**

8 History of Gold Mining in Virginia/Background

9 Reason for the study, structure of study, parties involved and their roles

10 Current state of gold mining in VA, description of potential future gold mining

11
12 **Environmental justice concerns of potentially impacted (including downstream) communities**

13 EJ definition

14 Fair Treatment

15 Meaningful Involvement

16 EJ Policy in VA

17 How DEQ/VE Carry Out Policy

18 EJ concerns specific to this issue/how this issue specifically impacts EJ communities

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20 **Environmental, ecological & human health concerns of potentially impacted (inc. downstream) comm.**

21 Cyanide Leaching

22 Tailings Management

23 Groundwater usage

24 Other Potential Downstream Risks

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26
27 **Reviewing existing state permitting processes related to the mining and processing of gold**

28 Virginia Energy permitting process

29 DEQ permitting process

30 General reference to VDH authority

31 State Agency Committee's perspective regarding NAS evaluation of regulations

32
33 **Detailing local land use/zoning procedures/requirements (special or conditional use permits)**

34 Zoning is local responsibility in VA

35 How localities handle mining/industrial permits generally and the interplay with state regulations

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37 **Potential Response to NASEM Report**

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39 **Summary of Public Comments Received**

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41 **Table of Contents**

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44

45 **Introduction/Executive Summary**

46 To be drafted by Virginia Energy

47

48 **Environmental justice concerns of potentially impacted (including downstream) communities**

49

50

51 **I. Environmental Justice Statutory Framework**

52

53 The Virginia Environmental Justice Act (“VEJA”) established that “[i]t is the policy of the
54 Commonwealth to promote environmental justice and ensure that it is carried out throughout the
55 Commonwealth, with a focus on environmental justice communities (“EJ communities”) and fenceline
56 communities.”¹ The VEJA defines environmental justice as “the fair treatment and meaningful
57 involvement of every person . . . regarding the development, implementation, or enforcement of any
58 environmental law, regulation, or policy.”² The VEJA goes on to define fair treatment as “the equitable
59 consideration of all people whereby no group of people bears a disproportionate share of any negative
60 environmental consequence resulting from an industrial, governmental, or commercial operation,
61 program, or policy.”³ The VEJA defines an EJ community as “any low-income community or
62 community of color.”⁴ The VEJA further defines a low-income community as one in which at least 30
63 percent of the population is classified as low income.⁵ In addition to the VEJA, the Virginia Department
64 of Environmental Quality’s (“DEQ”) policy statement includes a commitment to furthering
65 environmental justice “in the regulatory and permitting process.”⁶

66

67 Beyond the VEJA and DEQ’s policy statement, HB2213 also requires the work group to
68 consider whether existing air and water quality regulations are sufficient to protect air and water quality
69 from gold mining and processing. This component of the study also has environmental justice
70 implications. Air and water quality regulations are promulgated to protect human health and the
71 environment and while these regulations are generally meant to protect all populations from pollution,
72 we know there are certain pollutants for which no level of exposure is safe and that certain
73 communities, including many EJ communities, have existing health concerns that may necessitate more
74 stringent pollution controls. Courts evaluating environmental justice considerations and the
75 protectiveness of National Ambient Air Quality Standards (“NAAQS”) have determined that simply
76 relying on NAAQS to conclude there are no disproportionate impacts where a proposed air pollution

¹ Va. Code § 2.2-235.

² Va. Code § 2.2-234.

³ *Id.*

⁴ Va. Code § 2.2-234.

⁵ *Id.*

⁶ Va. Code § 10.1-1183 (B)(4).

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77 source will affect an EJ Community is insufficient.⁷ Rather, an assessment of potential impacts to
78 surrounding communities must consider the risks of pollutant exposure faced by the community in
79 question.⁸ As the work group considers this aspect of HB2213, it must ensure that granular analyses
80 are undertaken to determine the on the ground impacts of proposed extraction activities.

81 **II. Virginia Lacks an Environmental Justice Regulatory Framework**

82 While Virginia is fortunate to have the policy guidance and definitions provided by the VEJA,
83 there is currently no regulatory framework to implement the requirements of the Act in any agency
84 relevant to potential gold mining in the Commonwealth. In December 2021, the Virginia Attorney
85 General issued an opinion stating that the VEJA is self-executing and noting that, under it, agencies
86 are required to consider environmental justice in permitting actions.⁹ Without a systematic process for
87 agencies to incorporate meaningful involvement of EJ communities in decision making processes, and
88 without clear guidance for evaluating whether pollution authorized under a permit will cause
89 disproportionate impacts, the VEJA alone does not provide sufficient protection to EJ communities.
90 The current regulatory void is a clear area that must be addressed if Virginia were to choose to allow
91 gold mining and processing to occur.

92 While some state agencies, including DEQ, have stated goals of incorporating the requirements
93 of the VEJA into their regulatory programs, no state agency that may regulate potential gold mining
94 operations and processing has a currently formal structure for implementing the VEJA. To be sure,
95 DEQ has considered environmental justice in certain specific permitting contexts, but it still lacks any
96 regulatory framework for considering environmental justice for each of its regulatory and permitting
97 programs. DEQ has created an Office of Environmental Justice tasked with ensuring “the fair and
98 meaningful involvement of all people into the development, implementation and enforcement of
99 environmental laws, regulations and policies across all DEQ programs.”¹⁰ DEQ’s EJ Office has also
100 recently hired outreach staff for its regional offices, although the Office Director recently resigned and
101 it is unclear whether, and when, a new Director will be in place. DEQ’s effort in creating and staffing
102 its Office of Environmental Justice is a step in the right direction, but it still falls short of imposing any
103 concrete protections for vulnerable communities. There are currently no state regulations that provide
104 specific and concrete protections for EJ communities.

105 **III. EJ Considerations in Buckingham County**

⁷ See e.g. National Ambient Air Quality Standards for Particulate Matter, 78 Fed. Reg. 3,086, 3110, 3160 (Jan. 15, 2013) (to be codified at 40 C.F.R. pts. 50, 51, 52, 53 & 58) (indicating that the particulate matter 2.5 (PM2.5) primary health-based standards for fossil fuel combustion may not be fully protective given that research suggested that there is no threshold at which harm would not occur.).

⁸ *Friends of Buckingham v. State Air Pollution Control Board*, 947 F.3d 68, 92 (2020) (“The Board rejected the idea of disproportionate impact on the basis that air quality standards were met. But environmental justice is not merely a box to be checked, and the Board’s failure to consider the disproportionate impact on those closest to the Compressor Station resulted in a flawed analysis.”)

⁹ Applicability of Va. Code §§ 2.2-234–235, Op. Att’y Gen. 20-064 (2021).

¹⁰ *Environmental Justice*, DEQ, <https://www.deq.virginia.gov/get-involved/environmental-justice> (last visited September 16, 2022).

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110 Current gold prospecting is occurring in Buckingham County, an area that is home to several
111 EJ communities. EPA’s EJScreen tool shows that no portion of Buckingham County falls outside of
112 the low-income classification.¹¹ In fact, some portions of Buckingham County are classified in the 93rd
113 percentile of low-income for Virginia.¹² Given that ongoing gold prospecting is already happening in
114 an EJ community, Virginia must recognize that the need to evaluate public health protections and the
115 sufficiency of Virginia’s air and water regulations is more than just a hypothetical exercise. Any open-
116 pit gold mining project would pose a serious threat to the Buckingham community and other localities
117 in the state. Science has proven time and time again that an open-pit mine pollutes nearby rivers even
118 when there is no accidental release of toxic mine waste¹³. This should be extremely alarming because
119 the James River is only two miles away from the site where gold prospecting is currently occurring and
120 serves nearly 2.7 million Virginians.¹⁴ There is an imminent threat to the public health of those living
121 in Buckingham County as well as those residents living in other geographical regions in the state if
122 mining were to occur and the protection systems fail. This could release poisonous chemicals and by-
123 products from mining activities into the James River.

124 With modern technology, gold mining involves drilling deep into the Earth, producing
125 massive amounts of waste rock, tainted with dozens of compounds that, when exposed to the
126 elements, can easily leach into the water table, streams and rivers. The waste may contain as many as
127 three dozen toxins including mercury, arsenic, cyanide, lead, acids and petroleum by-
128 products. Introduction of these chemicals into the environment may force EJ communities to
129 consider relocation, which they cannot afford, and would endanger livestock, harm drinking water
130 supplies, and continue the encroachment of further injustice on black and brown communities that
131 threaten the enjoyment and ownership of their land. Further potential impacts and concerns relating
132 to an open-pit mine on EJ communities include:

- 133
- 134 • Air pollution
 - 135 • Continuous contamination and destruction of water, and the food chain
 - 136 • Depletion of well water
 - 137 • Toxic leaching into water sources, including streams, rivers and lakes
 - 138 • Community exposure to heavy metals like lead, mercury and cyanide (Virginia currently has
139 no regulations on waste caused by the use of cyanide in mining activities)
 - 140 • Climate instability increasing potential hazards

¹¹ EPA’s *Environmental Justice Screening and Mapping Tool (Version 2.0)*, EPA,
<https://ejscreen.epa.gov/mapper/> (last visited September 16, 2022).

¹² *Id.*

¹³ See e.g. South Carolina Department of Health and Environment Control’s Board of Health and Environmental Control Enforcement Report (Nov. 10, 2021) (citing the Haile Gold Mine, Inc. for unpermitted discharges of free cyanide (CN) and total cadmium (Cd)) available at:

https://scdhec.gov/sites/default/files/media/document/EA_EnforcementReport_November2021.pdf

¹⁴ <https://www.friendsofbuckinghamva.org/friends/press-release-gold-mining-pollution-threatens-buckingham-county/>

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- 141 • Destruction of hundreds of acres of land including farmlands that could be better utilized for
142 food sovereignty or other suitable uses.
- 143 • Unequal share of the burden on impacted communities: EJ communities bear the brunt of
144 negative environmental consequence including loss of life, while reaping very little benefits
145 either financial or increase in quality of life. There is a forever burden due to forever toxics
146 caused by metallic mining. Virginia communities must be protected from toxic trespass.

147 While gold prospecting is currently occurring in Buckingham County, the Gold-Pyrite belt has
148 a Broad geographic range in Virginia, including crossing or being upstream from many Virginia EJ
149 communities. Therefore, there is a potential for gold mining and processing sites to intersect with and
150 potentially affect many EJ communities throughout the Commonwealth. In order to meet their
151 statutory obligations under the VEJA, state agencies must incorporate EJ considerations into their
152 regulatory programs to regulate gold mining. The current regulatory framework for all state agencies
153 is insufficient to guarantee EJ communities like Buckingham County meaningful involvement and
154 protection from disproportionate impacts of pollution from gold mining and processing. If the
155 Commonwealth were to allow gold mining and processing to occur, a robust regulatory framework to
156 implement the VEJA would be a necessary prerequisite.

157

158 **Environmental, ecological & human health concerns of potentially impacted (inc.**
159 **downstream) communities**

160

161 **Section 3: Environmental and Human Health Concerns Inherent to Industrial**
162 **Gold Mining**

163

164 Risks to the environment and to human health occur at every stage of metal mining¹⁵ and
165 cannot be considered individually, as these risks often compound each other. Therefore, while this
166 section will list various and separate risks that may occur during an industrial gold mining operation,
167 it should be understood that any such operation may simultaneously produce multiple, or even all of
168 the risks discussed.

169

170 **3.1 Climate**

171 Virginia's climate is significantly different from that of many Western states with active gold
172 mining industries.¹⁶ Virginia receives substantially more annual rainfall than many of these states,
173 and climate change is expected to increase intensity, frequency, and duration of precipitation, among

¹⁵ ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 4 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia).

¹⁶ *Id.* at 14–15.

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174 other things, in the Southeast.¹⁷ Best practices that are utilized in Western states, such as the
175 standards developed by the Initiative for Responsible Mining Assurance (IRMA), should not be
176 assumed to be safe in Virginia given these differences. Additionally, increased precipitation in areas
177 with historic metal mining has been shown to increase the mobility of legacy contaminants, like lead,
178 as floodwaters take-up and transport toxins,¹⁸ and preliminary research shows a connection between
179 extreme storm events and increases in concentrated releases of acidic drainage produced by mines
180 (also known as acid mine drainage, or AMD).¹⁹

181
182 Failure to account for climatic conditions at a mining site and to adequately plan for
183 vulnerabilities to, and changes in, extreme precipitation, drought, and temperature that are associated
184 with climate change presents a significant risk to gold mining operations and the health of
185 surrounding communities and ecosystems.

186 **3.2 Water Contamination and Usage**

187 Mine drainage often contains toxic materials, and releases from mining operations can
188 contaminate the surrounding environment. Contamination of mine drainage occurs due to the
189 attributes of the mineral deposits and surrounding geology, as well as from the use of chemicals
190 during mining operations.²⁰ Many of the mineral deposit types present in Virginia can result in AMD,
191 and AMD has already occurred at previous mine sites in the state.²¹

192 AMD can also be accompanied by leaching of metals and other mine-related contaminants.
193 Lead is a contaminant of potential concern based on the gold deposits likely to be found in Virginia.²²
194 While mercury is not generally used in modern gold mining operations, naturally occurring mercury

¹⁷ For a summary of impacts especially relevant in the Southeast, see LYNNE CARTER ET AL., IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, VOL. II, 245–808 (Reidmiller et al., eds. 2019).

¹⁸ S. Foulds et al., *Flood-Related Contamination in Catchments Affected by Historical Metal Mining: An Unexpected and Emerging Hazard of Climate Change*, 165 SCI. TOTAL ENV'T 476–77 (2014).

¹⁹ Krik Nordstrom, *Acid Rock Drainage and Climate Change*, 100 J. OF GEOCHEMICAL EXPLORATION 97 (2009).

²⁰ See ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 22–23 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia), for contaminants of potential concern for gold and base metal deposits in Virginia.

²¹ See e.g., Hammarstrom et al., *Geochemical and Mineralogical Characterization of the Abandoned Valzinco (Lead-Zinc) and Mitchell (Gold) Mine States Prior to Reclamation*, U.S. Geological Survey Scientific Investigations Report (2006).

²² ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 23 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia).

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195 may become remobilized through mining activities.²³ Mine drainage in Virginia may also contain
196 naturally occurring uranium.²⁴

197 Other constituents may be introduced into mine drainage through mining operations. Blasting,
198 which is required at almost all gold mining operations, may introduce ammonium nitrate-fuel oil into
199 the environment.²⁵

200 Contaminated mine drainage is known to have adverse effects on human health and the
201 environment, and mining operations and associated drainage can have widespread impacts on
202 ecosystems. [*List the adverse effects*].

203 The hydrologic characteristics of Virginia mean that gold mining activities are very likely to
204 occur close to both groundwater and surface water resources, increasing the possibility of
205 contamination. Drinking water intakes located downstream of Virginia's Gold-Pyrite Belt serve over
206 3.5 million Virginians,²⁶ and over 700,000 Virginia residences rely on drinking water from private
207 wells that are not subject to drinking water testing or standards.²⁷ While some of the pollutants
208 associated with gold mining have drinking water standards, some of these standards are secondary
209 drinking water standards, including for sulfate, meaning they are non-enforceable guidelines.²⁸

210 AMD requires long-term wastewater treatment, and the most common type of water treatment
211 used at mines with AMD is lime precipitation.²⁹ Lime precipitation, however, does not effectively
212 remove many of the contaminants of concern associated with gold mining, including sulfate, nitrate,
213 or ammonia; as a result, additional water treatment circuits would be required to remove uranium,
214 selenium, and mercury.³⁰ In particular, Virginia's sulfate groundwater criteria may be difficult to
215 maintain if sulfate ore containing gold is processed at an industrial scale in Virginia and adequate

²³ State Agency Committee Meeting 2, Erica Schoenberger Presentation (Mar. 25, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>; State Agency Committee Meeting 4, Steven Emerman Presentation (May 16, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>; ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 18, 22–23 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia).

²⁴ ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 17 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia); State Agency Committee Meeting 5, Ann Maest Presentation (June 23, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>.

²⁵ ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 8–9 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia); State Agency Committee Meeting 5, Ann Maest Presentation (June 23, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>.

²⁶ *Id.* at fig. 6; *id.* at tbl. 2.

²⁷ State Agency Committee Meeting 3, Lance Gregory Presentation (Apr. 22, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>.

²⁸ EPA, *Drinking Water Regulations and Contaminants* (Feb. 17, 2022), <https://www.epa.gov/sdwa/drinking-water-regulations-and-contaminants>.

²⁹ ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 23 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia).

³⁰ *Id.*

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216 water treatment techniques are not employed. Long-term, if not perpetual, water treatment may be
217 required when mined materials have moderate or high acid drainage and leaching potential, when
218 there is a hydrological connection between mine water (for example, in pits or underground) and
219 surrounding water resources, when there are waste rock seeps, or when there are draining cyanide and
220 acid heaps.³¹

221 Gold mines are often large water users,³² and there is limited oversight of well drilling and
222 groundwater withdrawal in Virginia. Currently, a state groundwater withdrawal permit is only
223 required in Eastern Virginia or Eastern Shore Groundwater Management Areas of Virginia for new
224 groundwater withdrawals exceeding 300,000 gallons per month.³³ The Gold-Pyrite belt in Virginia
225 does not intersect these Groundwater Management Areas, meaning groundwater withdrawals
226 associated with gold mining would likely be unregulated. Surface water withdrawals are regulated by
227 DEQ under its Virginia Water Protection Permitting Program.³⁴ However, the program includes a
228 number of permitting exclusions. Changes in water flows due to gold mining-related withdrawals
229 would most likely affect drinking water intakes downstream of mining operations.

230 Virginia’s mineral mining regulations require that mining activities “be conducted so that the
231 impacts on water quality and quantity are minimized,” but they lack any baseline monitoring and
232 sampling provisions that would enable detection of changes to water quality and quantity.³⁵

233 **3.2 Cyanide Usage**

234 Cyanide is likely to be used for beneficiation (removing gold from ore) by gold mining
235 operations in Virginia due to the presence of oxidized and sulfide-rich gold ores in the
236 Commonwealth.³⁶ Cyanide solutions can have extremely high mercury concentrations, and cyanide
237 concentrations may persist for at least a century in some media.³⁷ Uncontrolled cyanide releases have
238 caused fish kills and contaminated downgradient groundwater near gold mining sites.³⁸

239 In one study of a community living near a gold mine, researchers found a higher prevalence of
240 headaches, dizziness, skin irritation and eye irritation among those exposed to environmental cyanide.

³¹ *Id.* at 31.

³² Initiative for Responsible Mining Assurance, IRMA Standard for Responsible Mining, IRMA-STF-001, 69–76 (June 2018).

³³ 9 VAC 25-610-50(1).

³⁴ 9 VAC 25-210-300 et seq.

³⁵ 4 VAC 25-31-360.

³⁶ ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 7 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia); State Agency Committee Meeting 5, Ann Maest Presentation (June 23, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>.

³⁷ ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 7–8 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia).

³⁸ *Id.*

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241 ³⁹ Moreover there are additional risks from exposures to copper, arsenic, mercury and lead that may
242 also be mobilized in the processing of gold.

243 Virginia currently does not regulate many of the chemicals used in gold mining operations, including
244 cyanide⁴⁰. Montana and Wisconsin have banned the use of cyanide heap leaching in gold mining
245 operations.

246 **3.3 Impoundments**

247 Gold mining operations produce large amounts of waste—on average, almost three tons of
248 waste rock is produced for every ton of gold ore recovered.⁴¹ Large-scale surface impoundments are
249 used to store mining waste, and many are constructed from low-grade materials, including waste
250 materials.⁴² The saturated nature of the wastes held in many gold mine impoundments means they are
251 similar to coal ash impoundments.⁴³ These impoundments are generally permanent facilities that
252 require inspection, monitoring, and maintenance in perpetuity.⁴⁴ There is a risk of leakage,
253 overtopping, and failure at gold mine impoundments given the long timescale over which they
254 operate, and this may lead to catastrophic impacts to downstream and downgradient communities.⁴⁵
255 Studies have shown that leaks from impoundments can contaminate surrounding groundwater and
256 surface water regardless of whether the facilities is lined or unlined,⁴⁶ and overtopping of
257 impoundments may become more frequent as precipitation increases due to climate change.
258 Furthermore, 75 percent of mining disasters are due to catastrophic tailings dam failure.⁴⁷
259

260 Risks to human health from impoundment failure are similar to those discussed in Section 3.1,
261 with the added concern that past impoundment failures have killed hundreds of people by burying
262 them under the waste the impoundments were meant to hold back.[*CITATION Brumadinho (and*
263 *others?)*] In those instances, the impacts to ecosystems [*fill in here and cite*].

³⁹ Hassan, N.A., Sahani, M., et. al., *A Study on Exposure to Cyanide Among a Community Living Near a Gold Mine in Malaysia*, Journal of Environmental Health, 2015 Jan-Feb;77(6):42-8.

⁴⁰ NASEM Open Session One, James Golden (December 15, 2021), <https://www.nationalacademies.org/event/12-15-2021/potential-impacts-of-gold-mining-in-virginia-open-session-1>

⁴¹ State Agency Committee Meeting 4, Steven Emerman Presentation (May 16, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>.

⁴² Zongjie Lyu, *A Comprehensive Review on Reasons for Tailings Dam Failures Based on Case History*, 2019 ADV. CIV. ENG'G art. No. 4159306, 2 (2019).

⁴³ ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 7 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia).

⁴⁴ State Agency Committee Meeting 4, Steven Emerman Presentation (May 16, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>.

⁴⁵ ANN S. MAEST, THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH EFFECTS OF GOLD MINING IN VIRGINIA 7 (June 24, 2022) (submitted to the NASEM Committee on the Potential Impacts of Gold Mining in Virginia).

⁴⁶ *Id.*

⁴⁷ State Agency Committee Meeting 2, Erica Schoenberger Presentation (Mar. 25, 2022), <https://energy.virginia.gov/mineral-mining/GoldMiningStudy.shtml>.

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264 **3.4 Community Impacts**

265 Although gold mining could potentially occur in any area of the Commonwealth, Virginia's
266 Gold-Pyrite Belt and other gold ore deposits are generally located in the Piedmont region. Many of
267 the communities in this area are rural and agricultural in character. In addition to the direct effects of
268 mining exploration and operations on human health, air, water, and environmental quality, industrial
269 gold mining could affect nearby communities' health and character through indirect and cumulative
270 impacts.⁴⁸ Industrial gold mining will disturb the rural characteristics of an area through increased
271 noise and light pollution, large-scale removal of vegetation and habitat degradation, and higher
272 amounts of traffic.⁴⁹ Property values may decrease, in turn decreasing property taxes.⁵⁰ Other
273 industries, including agriculture, and businesses in communities may also be negatively impacted by
274 the environmental consequences of chemical contaminants and waste.
275

276 The boom-bust cycle of mining may exacerbate gold mining's impacts on local
277 communities.⁵¹ Advertised employment opportunities may be overestimated in mining proposals due
278 to uncertainties of operations, as the number of workers required for a project depends on the size of
279 the mineral reserve, the future of mineral pricing, and the total costs of mining.⁵² Furthermore,
280 mining jobs for these types of operations often require highly specialized technical skills that many
281 local community members will not have, meaning the jobs may be given to workers coming from
282 outside the host community.⁵³ While there is a possibility the community may receive short-term
283 economic benefits from the flow of disposable income from these workers, many mineral mines are
284 in isolated areas with sparse commercial development; therefore, there may be limited opportunities
285 for these communities to convert this short-term cash flow into longer term benefits.⁵⁴ Furthermore,
286 the high costs of environmental remediation have the possibility to completely offset any short-term,
287 localized economic benefits from disposable income flows.⁵⁵
288

289 Given the legacy of contamination from abandoned gold mines in Virginia, as mentioned in
290 Section One of this report, it is clear that the environmental and societal costs of mining often
291 materialize after mining stops. The boom-bust cycle of the gold mining industry means mining
292 operators may cease to exist over the period necessary to fully implement closure, reclamation, and
293 post-closure management of a mining site. Further, the long-term commitments and contingencies
294 needed to remediate these sites—often in the face of unexpected environmental impacts—means
295 reclamation and post-closure care can be extremely expensive and time intensive. Without adequate

⁴⁸ See THOMAS MICHAEL POWER, LOST LANDSCAPES AND FAILED ECONOMIES: THE SEARCH FOR A VALUE OF PLACE ch. 4 (1996).

⁴⁹ See *id.* at 112.

⁵⁰ See *id.*

⁵¹ See *id.* at 102–11 (1996).

⁵² *Id.* at 107.

⁵³ *Id.* at 108.

⁵⁴ *Id.* at 108–09.

⁵⁵ *Id.* at 112.

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296 closure, reclamation, and post-closure management requirements and sufficient financial assurances,
297 these costs will be borne by the public instead of mine operators.

298 **3.5 Voices of Virginia**

299 The issues most frequently raised by committee members and members of the public related
300 to impacts on water quality and quantity from gold mining activities. During meetings, over 35
301 comments were made that related to mine drainage and water impacts. As of September 23, 2022, at
302 least 68% of Town Hall comments (58 individuals) referenced impacts to water resources. In addition
303 to water quality concerns, commenters also expressed concerns about water usage by gold mining
304 operations.

305 Several state agency committee members and members of the public raised concerns about
306 the long-term storage of mining waste and the leakage or failure of tailings dams. A few commenters
307 raised the issue of air pollution from blasting activities during meetings, with at least one raising
308 concerns about particulate matter. Concerns raised about the health and safety of mine workers, as
309 well as residents, pets, and livestock near the mine included concerns about particulate pollution from
310 mining operations. These concerns are echoed in written submissions on Town Hall; at least 11
311 comments were concerned about public health, 9 comments were concerned about air pollution
312 effects, and 3 comments concerned about worker safety.

313 Six commenters during meetings raised concerns that increased precipitation rates in Virginia
314 will elevate the risk of toxic releases and other environmental impacts from gold mining operations in
315 the state and that concern is echoed in Town Hall comment submissions as well.

316 Commenters raised a variety of concerns about impacts of a gold mining operation on nearby
317 communities, including lack of public notice or participation in the permitting process; changes to the
318 rural character and bucolic nature of communities; increases in community infrastructure costs,
319 including increases in traffic; decreases in property value; issues of mine worker safety; and
320 economic volatility or job loss once mining operations close due to the boom-bust cycle of the
321 extraction industry. Some commenters connected community impacts to concerns that bonding will
322 be insufficient to protect communities, that fines and penalties for violations should be increased,
323 and/or that there may be enforcement issues related to limited staffing capacity or agency resources.

324 Fifteen commenters raised concerns during meetings associated with the closure and reclamation of
325 mining sites, as well as the adequacy of Virginia's current financial assurance requirements for
326 mineral mine operators. An equal number of written comments on Town Hall did as well.

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327

328 **Existing State Permitting Processes Relating to the Mining and Processing of Gold**

329

330 The Virginia Department of Energy (Virginia Energy)

331

332 Virginia Energy's Mineral Mining program's goal is to provide for the safe and environmentally sound
333 production of Virginia's non-fuel minerals.

334

335 The General Assembly enacted the first mine safety and reclamation laws in 1969. In 1985, the
336 Department of Mines, Minerals and Energy (DMME) was formed as the result of a state government
337 reorganization. The Division of Mineral Mining was located within DMME until the agency changed
338 its name in 2021. The Mineral Mining program within Virginia Energy currently administers and
339 enforces the [Mineral Mine Safety Act](#) and the [Mineral Mine Reclamation Law](#) under [Title 45.2](#) of the
340 Code of Virginia. As discussed in the introduction, large scale gold mining has not taken place since
341 the 1940s. As such, existing mineral mine regulations were not drafted with gold mining in mind.

342

343 Some of the other state and federal regulatory agencies that oversee the development and operation of
344 mineral mines are the Department of Environmental Quality (discussed below), the Virginia
345 Department of Transportation, the Virginia Marine Resources Commission, the United States Army
346 Corps of Engineers and the federal Mine Safety and Health Administration.

347

348 Statewide, there are currently 427 mineral mines covering about 76,000 acres. These include mines
349 producing construction materials, industrial minerals, and other products. A large portion of the
350 minerals mined in Virginia are extracted for the construction of roads and commercial and residential
351 buildings. However, other minerals are produced for use in manufacturing, agriculture, industrial
352 applications, food production, landscaping and jewelry. In 2021, over 72 million tons of non-fuel
353 minerals in Virginia and contributed approximately \$1.6 billion to the economy while providing over
354 6,600 direct jobs in the Commonwealth.⁵⁶

355

356 The Mineral Mining program issues mining licenses and permits, and conducts regular environmental
357 and safety inspections. If complaints or serious accidents occur at a mineral mine, Virginia Energy
358 inspectors will conduct investigations to determine what happened and what can be done to prevent a
359 reoccurrence of the problem. The agency also provides safety training and other assistance to mine
360 operators, contractors, and stakeholders.

361

362 Before a mine license and permit are issued, applicants must provide suitable operations plans, drainage
363 and sediment control plans, groundwater impact assessments, and reclamation plans for the proposed
364 mine operation.

365

366 Operations plans must describe how the mineral will be mined and processed, and how waste will be
367 disposed of while minimizing the effect on the surrounding environment. Regulations require the
368 operations plan to facilitate integration of reclamation with mining operations according to the special

⁵⁶ <https://energy.virginia.gov/geology/MineralResources.shtml>

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369 requirements of individual mineral types. Operators are required to conduct mining such that the
370 amount of disturbed acres are minimized, and reclamation is to be conducted simultaneously with
371 mining to the extent feasible. Regulations further require that mining activities must minimize the
372 impact on water quality and quantity.

373
374 The operations plan shall include a description of the proposed method of mining and processing; the
375 location of top soil storage areas; overburden, refuse, and waste disposal areas; stockpiles, equipment
376 storage, and maintenance areas; cut and fill slopes; and roadways. The operation plan shall address
377 plans for the storage and disposal of scrap metal, scrap tires, used lubricants, coolants, and other
378 equipment service products, batteries, process chemicals, trash, debris, and other hazardous materials.
379 The operation plan shall also include all related design and construction data.

380
381 The drainage plan shall consist of a description of the drainage system to be constructed before, during,
382 and after mining; a map or overlay showing the natural drainage system; and all sediment and drainage
383 control structures to be installed along with all related design and construction data.

384
385 The reclamation plan shall include a statement of the planned land use to which the disturbed land will
386 be returned through reclamation, the proposed actions to assure suitable reclamation, and a time
387 schedule for reclamation. The method of grading; removal of metal, lumber, and debris, including
388 processing equipment; buildings; and other equipment relative to the mining operation and revegetation
389 of the disturbed area shall be specified. Reclamation plans for underground mines shall include plans
390 for closing or securing all entrances to underground workings.

391
392 In addition to these plans, a permit application must also contain a map. The map must show required
393 features on the mine site, and sensitive features within 500 feet of the permit boundary. Sensitive
394 features include state waters, cemeteries, oil and gas wells, underground mine workings, public utilities
395 and utility lines, buildings, roads, schools, churches, and occupied dwellings.

396 The initial permit application requires that all property owners within 1,000 feet of the permit boundary
397 be notified that a mine license has been requested. Those persons may request a public hearing as part
398 of the permit review process.

399
400 Adjacent property owners often ask about screening and set-backs. Screening is required to improve
401 the appearance of the mine site from public roads, public buildings, and occupied dwellings. Screening
402 also helps to reduce the effects of noise and dust. Screening may be provided by earthen berms, walls,
403 fences, planted barriers, or undisturbed forest. In addition, no cut or fill slopes are allowed within 25
404 feet of an adjacent property boundary without the written permission of the property owner and no
405 disturbance of any kind is allowed within 5 feet of an adjacent property owner.

406
407 Upon review and approval of the mine operations plan, a performance bond must be furnished by the
408 permittee to insure final reclamation of the mine site. The required bond is \$3000 per disturbed acre.
409 Bond must be posted before acreage is disturbed and will not be refunded until reclamation meets the
410 approved post mining land use.

411

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412 Drainage and sediment controls must be installed before any other land disturbing activities. Internal
413 roads and yards must be maintained to control dust and prevent tracking onto state roads. Blasting
414 must be designed to prevent dangerous off-site effects, supervised by certified persons, and monitored
415 with seismographs.

416
417 After permitting, the site is inspected for compliance with the approved mine operations plan and the
418 mineral mining laws and regulations. In most cases, two inspections are made each year for safety and
419 health and environmental compliance.

420
421 The Mineral Mining program has:

- 422 • the right to access a mine for unannounced inspections,
- 423 • the ability to take enforcement actions to require compliance with the law and regulations, and
- 424 • the authority to revoke a permit and forfeit bond, if necessary.

425
426 Mine employees and stakeholders have the right to contact the Mineral Mining program with safety or
427 environmental complaints. Complaints must be kept confidential to protect the individuals making
428 them. All complaints require an investigation by mine inspectors.

429
430 State laws and regulations allow Virginia Energy to oversee most of what takes place on a mine site,
431 but they do not address things such as:

- 432 • Land use or zoning.
- 433 • Hours of operation.
- 434 • Offsite noise levels.
- 435 • Traffic on public roads.

436
437
438 These topics are generally regulated by the locality in which the mine is located.

439
440 Department of Environmental Quality (DEQ)

441
442 DEQ administers many of Virginia's environmental permitting programs. This includes programs
443 under the Clean Air Act (CAA), Clean Water Act (CWA) and the Resource Conservation and
444 Recovery Act (RCRA) which have been delegated to DEQ by the Environmental Protection Agency
445 (EPA) and include essentially the same environmental requirements for regulated activities. These
446 major delegated programs would address any regulated air emissions, point source
447 (wastewater/stormwater) discharges to state waters, and solid and hazardous waste management,
448 storage and disposal requirements. In addition to the federally delegated programs, DEQ also
449 administers several state only permitting programs including the Virginia Water Protection Program
450 (wetlands), Groundwater Withdrawal, and Virginia Pollution Abatement (VPA).

451
452 A specific gold mining project proposal and permit applications would be needed to accurately
453 identify all required permits. Some likely permit programs that could apply to mining activity
454 includes:

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- 455 ● Virginia Pollutant Discharge Elimination Program (VPDES) permit for any process or
456 stormwater point source discharges to state waters. This permit process includes evaluation
457 of proposed effluent pollutant concentrations, discharge volumes and treatment systems, and
458 the proposed receiving stream conditions to develop protective permit limitations. These
459 limitations can include technology based, industrial sector, best management practices and
460 water quality based requirements to ensure protection of state waters.
- 461 ● New Source Review (NSR) permit for any stationary sources emitting regulated air pollutants
462 in quantities requiring permit coverage. This permit may contain requirements to control
463 criteria, hazardous or toxic air pollutants as well as best management practices and
464 operational controls. All NSR permits require stationary sources to utilize the best available
465 control technology (BACT) for any regulated air pollutants.
- 466 ● Virginia Water Protection Program (VWP) permit may be required depending on the location
467 of a proposed operation and water use needs. If wetland areas are impacted, a permit is
468 required to avoid and minimize impacts to the extent practicable and provide compensation
469 for any wetland impacts. A permit may also be required if the operation proposes to withdraw
470 surface water in volumes large enough to require regulation.
- 471 ● Groundwater Withdrawal permit may be needed if an operation is located in the Groundwater
472 Management Area (basically east I95) and proposes to withdraw groundwater in sufficient
473 quantity to be regulated.
- 474 ● RCRA requirements (subtitle I) may apply for petroleum products stored in sufficient
475 quantities in tanks above or below ground. Additionally, any hazardous or solid wastes,
476 depending on the use or management of the materials may require regulation under subtitle C
477 or D).
- 478 ● Virginia Pollution Abatement (VPA) permits may be utilized to authorize pollutant
479 management activities including, but not limited to, animal feeding operations, storage or land
480 application of sewage, sludge, biosolids, industrial waste or other waste; or the complete reuse
481 or recycle of wastewater. These permits do not authorize any point source discharge of
482 pollutants to state waters.

483 DEQ regulatory requirements for any proposed mining operation are at least as stringent as federal
484 requirements and would include the applicability of any additional state environmental program
485 requirements.

487 The Virginia Department of Health (VDH)

489 **Waterworks**

490
491 VDH's Office of Drinking Water (ODW) implements the federal Safe Drinking Water Act (SDWA),
492 42 U.S.C. Section 300f et. seq, through the Virginia Waterworks Regulations (12VAC5-590). ODW
493 provides regulatory oversight for public water systems (waterworks), which are defined as serving
494 water to at least 25 persons 60 days out of the year. When this threshold determination is met, there
495 are sampling, monitoring, and reporting requirements for certain drinking water contaminants.

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496 The State Health Commissioner has authority to issue an emergency order to protect public health
497 from imminent dangers. In most cases, emergency responses are left up to the waterworks owners
498 and operators most familiar with the waterworks' design and operation, condition of infrastructure,
499 system capabilities, and governing resources. ODW typically provides a supporting role by
500 providing technical assistance, information to various entities and waterworks, and other compliance
501 assistance as needed. Most incidents involve water main breaks, equipment failures, pressure loss, or
502 boil water notices.

503

504 **Private Wells, Springs, and Cisterns**

505

506 Private water supplies serve a single user or occasionally a small group of users that do not qualify as
507 a waterworks, and can be for either potable or non-potable uses. Private water supplies include
508 residential water wells, agricultural wells, industrial wells, and geothermal wells. Developed springs
509 and cisterns are also private water supplies but are not used as frequently in the Commonwealth.

510

511 The Office of Environmental Health Services (OEHS) and local health departments regulate private
512 water wells under the provision of the Private Well Regulations (12 VAC 5-630-10 et seq.). Prior to
513 1982 there were no regulations for construction or location of private wells. From 1982 to 1990
514 VDH regulated the construction and location of private wells when installed in conjunction with an
515 onsite sewage system. In 1990, the Board of Health promulgated the Private Well Regulations in
516 response to amendments to 32.1-176.2 and 32.1-176.4 of the Code of Virginia. These regulations set
517 minimum construction standards and horizontal setbacks from potential sources of contamination for
518 all private water wells. Additionally, they require bacteriological testing of the water at the time of
519 initial construction or rework for all private residential drinking water wells (Class III wells).
520 Revisions adopted in 2012 include minimum storage capacity and yield requirements for residential
521 drinking water wells.

522 VDH estimates there to be more than 700,000 private wells in the Commonwealth. VDH does not
523 have a reliable inventory of all private water supplies because the construction of many private water
524 wells predated the Board of Health's regulatory program.

525

526 The Private Well Regulations do not address the chemical or radiological quality of the water from
527 private water wells or mandate periodic on-going testing of the water from private wells. The only
528 water quality standard for private water wells in Virginia is the requirement that private drinking
529 water wells are free of bacteriological contamination at the time they are approved for use.

530 Bacteriological requirements do not apply to non-potable private wells such as agricultural wells.

531 VDH does not have the authority to implement additional water quality standards for private water
532 supplies.

533

534 Developed springs and cisterns should only be considered when no other source of potable water is
535 feasible. The VDH Sewage Handling and Disposal Regulations provide minimum separation
536 distances between onsite sewage disposal systems and developed springs or cisterns. Minimum
537 construction standards are meant to mitigate the risk of pollution in developed springs and cisterns.

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538 However, VDH does not have the authority to implement water quality standards, including
539 bacteriological contamination, for developed springs and cisterns.

540

541

DRAFT

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542 **Detailing local land use/zoning procedures/requirements (special or conditional use permits)**

543
544 Virginia is known as a Dillon’s Rule state. The Virginia Supreme Court has held that Dillon’s Rule
545 “provides that municipal corporations possess and can exercise only those powers expressly granted
546 by the General Assembly, those necessarily or fairly implied therefrom, and those that are essential and
547 indispensable.⁵⁷ Counties, cities and towns are authorized to adopt such measures as it deems expedient
548 to secure and promote the health, safety and general welfare of its inhabitants which are not inconsistent
549 with the general laws of the Commonwealth.⁵⁸

550
551 Traditionally, zoning authority has been left to localities in the Commonwealth. Localities typically
552 utilize this authority by enacting zoning ordinances. In its declaration of legislative intent regarding
553 zoning ordinances, the General Assembly “...intended to encourage localities to improve the public
554 health, safety, convenience, and welfare of their citizens and to plan for the future development of
555 communities to the end....that the need for (interacting with) mineral resources and the needs of
556 agriculture, industry and business be recognized in future growth.”⁵⁹ The General Assembly further
557 established that zoning ordinances “...shall be for the general purpose of promoting the health, safety
558 or general welfare of the public...”⁶⁰

559
560 With respect to mining, the General Assembly granted the localities the ability to “...regulate, restrict,
561 permit, prohibit, and determine....[t]he excavation or mining of soil or other natural resources.”⁶¹

562
563 In addition to federal and state requirements related to regulating mining operations, local authorities in Virginia have the power to restrict or prohibit
564 mining, or any other use or activity, through their zoning ordinance’s legislative authority by an affirmative vote. In the case of zoning, including with
565 respect to mining, authority has been expressly granted to localities by statute: Any locality may, by ordinance, classify the territory under its jurisdiction
566 or any substantial portion thereof into districts of such number, shape and size as it may deem best suited to carry out the purposes of this article, and in
567 each district it may regulate, restrict, permit, prohibit, and determine the . . . excavation or mining of soil or other natural resources. (Va. Code § 15.2-
568 2280(4).)

569 In addition, the Code of Virginia calls for each locality to adopt, following preparation by a Planning
570 Commission, a Comprehensive Plan⁶².

571
572 The locality’s comprehensive plan dictates how the content of a locality’s Zoning Ordinance is
573 composed and amended, and the same applies to other ordinances that affect the objectives of the
574 Zoning Ordinance (Subdivision Ordinance, Health and Safety Ordinance, Noise Ordinance, etc.).
575

⁵⁷ See *City of Richmond v. Confrere Club*, 387 SE 2d 471, (1980).

⁵⁸ See § [15.2-1200](#) of the Code of Virginia.

⁵⁹ See § [15.2-2200](#) of the Code of Virginia.

⁶⁰ See § [15.2-2283](#) of the Code of Virginia.

⁶¹ See § [15.2-2280](#) of the Code of Virginia.

⁶² § 15.2-2223. Comprehensive plan to be prepared and adopted; scope and purpose.

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576 The Code of Virginia states that, “In the preparation of a comprehensive plan, the (planning)
577 commission shall make careful and comprehensive surveys and studies of the existing conditions and
578 trends of growth, and of the probable future requirements of its territory and inhabitants. The
579 comprehensive plan shall be made with the purpose of guiding and accomplishing a coordinated,
580 adjusted and harmonious development of the territory which will, in accordance with present and
581 probable future needs and resources, best promote the health, safety, morals, order, convenience,
582 prosperity and general welfare of the inhabitants, including the elderly and persons with disabilities.
583 The comprehensive plan shall be general in nature, in that it shall designate the general or approximate
584 location, character, and extent of each feature, including any road improvement and any transportation
585 improvement, shown on the plan and shall indicate where existing lands or facilities are proposed to
586 be extended, widened, removed, relocated, vacated, narrowed, abandoned, or changed in use as the
587 case may be.”
588

589 The Zoning Ordinance is a vehicle by which the Comprehensive Plan’s goals are carried out. This is
590 done by designating certain portions of the geographic boundaries of the locality per their intended use
591 in tandem with intentions with the Code of Virginia. Common zones or zoning districts defined in
592 Zoning Ordinances are “agricultural,” “industrial,” “residential,” or “commercial.” Within each zone
593 or district, there are various stages of intensity, and use.
594

595 Each zoning district has specific allowable uses, or “by right” uses. Some allow for accessory uses, i.e.
596 core sampling. Others have uses that are allowable by conditional or special use permit, which require
597 consideration by a Planning Commission and Board of Supervisors.
598

599 According to the Code of Virginia and practice and procedure thereto for localities, Boards of
600 Supervisors may prohibit uses such as mining or gold in certain zones or zoning districts. (Citation:
601 Virginia Association of Counties interpretation of the Code of Virginia specific to zoning).
602

603 Mining is generally considered an industrial use in most localities. Localities may grant special or
604 conditional use permits in order to enforce things like noise, traffic, and highway entrances. Special
605 or conditional use permits contain “conditions” or stipulations regarding traffic, noise, sounds, etc.
606

607 Localities have the authority to restrict or prohibit mining in the absence of a more specific statute
608 preempting that authority. And the Code of Virginia contains a clause that makes it clear that the state
609 mining statute neither occupies the field nor conflicts with local ordinances that are at least as stringent
610 as the state requirements with respect to non-coal mining permitting and reclamation. In this way, the
611 General Assembly provided for a cooperative approach to mining rather than a displacement of local
612 authority.
613

614 Most, if not all rural localities, and some suburban localities, do not have the staff to ensure that set
615 conditions, permits, inspections, stormwater and sediment control plans, groundwater monitoring and
616 other local, state, and federal regulations are all adhered to per the special use or condition use permit
617 with regard to a gold mine.
618

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619 The same applies to local Departments of Health in rural localities, which monitor waters of the state.
620 For large-scale projects, often counties will contract with outside agencies, such a soil and water
621 conservation district office, or a private firm operating in the Commonwealth, for stormwater
622 management and erosion and sediment control plans and inspection thereto. These entities do not have
623 the expertise that would be needed to correctly protect the environment surrounding a gold mine.

624
625 local approvals are separate and distinct from permits which may be required from state or federal
626 agencies. In a mining context, prospective operators typically pursue available local approvals before
627 seeking state permits, though no requirements exist directing the order in which these approvals are
628 sought.

629

