



**BY CERTIFIED AND ELECTRONIC MAIL**

20 August 2019

Misael Cabrera, P.E., Director  
Trevor Baggiore, Water Quality Division Director  
Arizona Department of Environmental Quality  
1110 West Washington Street  
Phoenix, AZ 85007  
Submitted via email to [cabrera.misael@azdeq.gov](mailto:cabrera.misael@azdeq.gov), [baggiore.trevor@azdeq.gov](mailto:baggiore.trevor@azdeq.gov)

**RE: CANYON MINE CLOSURE AND AQUIFER PROTECTION PERMIT**

Dear Mr. Cabrera and Mr. Baggiore:

Sierra Club's Grand Canyon Chapter, Center for Biological Diversity, Grand Canyon Trust, and Wild Arizona (the "Conservation Groups") provide the following comments in response to ADEQ's proposed renewal of the Aquifer Protection Permit for the Non-Stormwater Impoundment for Canyon Mine under a general permit (Currently a Type 3.04 General Aquifer Protection Permit with Inventory No. 100333, LTF No. 60849, USAS No. 030032-02; expiration date August 31, 2019). These comments supplement our August 2<sup>nd</sup> letter requesting public hearings and a comment period in advance of the permit approval.

Groundwater flooding at the Canyon Mine is now severe and ongoing. Nearly 10 million gallons of groundwater inundated the mine in 2018. That's up from nearly 9 million gallons in 2017. Pollution in that water consistently exceeds water quality standards for dissolved uranium toxicity levels. Importantly, these extraordinary conditions belie assumptions upon which the U.S. Forest Service and ADEQ predicated approvals of mining operations. These conditions—and those decisions—now threaten irretrievable harm to perched and deep aquifers and their associated human and environmental values. These circumstances preclude coverage under a general permit.

In in order to comply with its core statutory duty to “protect the environment” under A.R.S. 49-104 (A)1, we call on ADEQ to:

- Require immediate abatement of all groundwater flooding the mine;
- Require a fully-bonded closure and post-closure monitoring and maintenance plan; and,
- Require an individual Aquifer Protection Permit (APP) issued *not* for mining, but for the immediate closure, remediation, mitigation, monitoring, and post-closure maintenance activities.

## **Background**

The U.S. Forest Service and ADEQ have for decades assumed that Canyon Mine poses no significant risk to groundwater. Groundwater flooding at the mine, which is ongoing, now belies that assumption and ADEQ’s coverage of the Canyon Mine under a general APP.

In August of 1986, the Forest Service issued a Final Environmental Impact Statement for the Canyon Mine, concluding that:

“The possibility of significant ground water contamination is remote. Ground water flows, if they exist, are likely to be at least 1,000 feet below the lower extremities of the mine,” and that “the low potential for encountering groundwater in the mine effectively eliminates the possibility of contaminating the Redwall-Muav aquifer.”<sup>1</sup>

FEIS at vii. A Record of Decision on September 26<sup>th</sup>, 1986 approved mining.

One month later, on October 29, Gary Ullinsky, a water quality specialist, sent an internal memo to his supervisor Chuck Anders, director of the Waste and Water Quality Management division at the AZ Department of Health Services. The memo summarized “activity associated with the proposal to mine uranium near the south rim of the Grand

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<sup>1</sup> Kaibab National Forest. 1986. Final Environmental Impact Statement Canyon Uranium Mine. At vii. *See*: [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5346657.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5346657.pdf)

Canyon by Energy Fuels Nuclear (EFN).” The Arizona Department of Health Services regulator had concerns about the mine’s potential to pollute groundwater.

EFN had submitted a Notice of Disposal (NOD) to the Water Permits Unit, stating “... that the proposed mine workings, to a depth of 1400 feet, would not encounter water...”<sup>2</sup> During a follow-up meeting between Ullinsky and EFN representatives, EFN’s president reasserted that “... the mining zone is dry and that their exploratory drilling showed it.”

Mr. Ullinsky’s memo said, “I expressed my concerns about the potential for radioactive contamination of the underlying aquifer ... [noting that] Usable quantities of water have been found in the area at depths of less than 150 feet.” He asked for EFN’s records of bore hole testing to verify the company’s claim that the mining zone was dry to a depth of 1400 feet. Ullinsky’s review found that more than half of the 18 exploration bores “encountered saturated zones,” indicating the presence of perched aquifers located above and within what would become the inner workings of the uranium mine’s network of test holes, ore cavities, vertical shafts, and lateral excavations. Conservation groups note that these saturated zones clearly have the potential to drain water into the mine and to then discharge contaminated water into the Redwall-Muav aquifer.

“Based on this information, and a recently published DWR study<sup>3</sup> of the southern Coconino Plateau,” Ullinsky “determined that there was a potential for pollutant discharge” that would require a state permit. In addition, he said: “I have developed a mistrust of the accuracy of information supplied by EFN.”

More than a decade passed before the state issued an APP for Canyon Mine. Unfortunately, presuming EFN’s misinformation to be accurate, the U.S. Forest Service moved forward in permitting EFN to proceed in clearing a 17-acre mine site on the Kaibab National Forest and drilling the mine shaft to a depth of 50 feet. In 1992, mining operations halted for 20 years due to a precipitous drop in the price of uranium.

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<sup>2</sup> Arizona Department of Health Services. 1986. Letter dated October 29, signed by Gary Ullinsky. See: [https://www.grandcanyontrust.org/sites/default/files/documents/Canyon\\_Mine\\_Groundwater\\_Memo\\_1986.pdf](https://www.grandcanyontrust.org/sites/default/files/documents/Canyon_Mine_Groundwater_Memo_1986.pdf)

<sup>3</sup> USGS. 1986. Water resources of southern Coconino County, Arizona. See: <https://azmemory.azlibrary.gov/digital/collection/statepubs/id/29091/>

Recent events have affirmed Gary Ullinsky’s concerns; the assumptions of state and federal agencies have proven false. Predicated on false assumptions, the resulting decisions approving mining now risk irreversible harm to Grand Canyon’s aquifers and all living beings that depend on them.

A chronology of recent events shows the problems that necessitate nonrenewal of coverage of the Canyon Mine under a general permit:

- In 2013, 296,994 gallons of groundwater were pumped from the mine.<sup>4</sup> Following a rise in uranium prices in 2007, miners resumed sinking Canyon Mine’s shaft to a depth of 300 feet in 2013.
- In 2016, 985,636 gallons of groundwater were pumped from the mine after mine shaft excavation reached a depth of approximately 1,400. Dissolved uranium jumped from 5.4 parts per billion (ppb) in September to 130 ppb in November. Uranium contamination has exceeded 30 ppb (considered the safe drinking water standard and aquifer water quality standard) ever since.
- In 2017, nearly nine million gallons of groundwater were pumped from Canyon Mine<sup>5</sup>. The volume of contaminated groundwater water pumped from the mine began exceeding the failsafe capacity of the containment pond; contaminated water was sprayed onto adjacent national forest land and unlawfully trucked out of state.
- In 2018, nearly 10 million gallons of groundwater were pumped from the mine.<sup>6</sup>

As Ullinsky and hydrogeologists have since warned, excavation of the Canyon Mine shaft *did* pierce perched aquifers. Groundwater flooding into the mine is now severe and ongoing. When pumped from the mine, that water—to which wildlife are regularly exposed—contains uranium and arsenic in concentrations consistently exceeding federal and state aquifer water quality standards. “Concerns about the potential for radioactive contamination of the underlying aquifer,” as Ullinsky stated decades ago, are now urgent.

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<sup>4</sup> Canyon Mine Annual Report, 2013. *See:* [https://www.grandcanyontrust.org/sites/default/files/documents/Canyon\\_Mine\\_APP\\_Annual\\_Report\\_2013.pdf](https://www.grandcanyontrust.org/sites/default/files/documents/Canyon_Mine_APP_Annual_Report_2013.pdf)

<sup>5</sup> Canyon Mine Annual Report, 2017. *See:* [https://www.grandcanyontrust.org/sites/default/files/documents/Canyon\\_Mine\\_APP\\_Annual\\_Report\\_2017.pdf](https://www.grandcanyontrust.org/sites/default/files/documents/Canyon_Mine_APP_Annual_Report_2017.pdf)

<sup>6</sup> Canyon Mine Annual Report, 2018. *See:* [https://www.grandcanyontrust.org/sites/default/files/documents/Canyon\\_Mine\\_APP\\_Report\\_2018.pdf](https://www.grandcanyontrust.org/sites/default/files/documents/Canyon_Mine_APP_Report_2018.pdf)

The Canyon uranium mine has become a perpetual water pollution problem, even before one ounce of uranium ore has been sold from its water-saturated shaft. Long after mine operations have ceased, perched aquifers will continue to discharge into mine workings, depleting connected springs and threatening contamination of the Redwall-Muav aquifer below. That contamination, which would be impossible to clean up, could render regional wells and Grand Canyon's springs dangerous for people and wildlife. Whether such contamination has occurred, or is occurring now, is unknowable because ADEQ has stubbornly refused to require an individual APP and requisite multi-point downgradient water quality monitoring in the Redwall-Muav Aquifer.

Today's circumstances—with nearly 10 million gallons of groundwater inundating the Canyon Mine annually—lay bare the false information and assumption upon which both ADEQ and the U.S. Forest Service predicated decisions approving mine operations. Those decisions now threaten irretrievable harm to the environment. ADEQ must now fulfill its legal obligation to “protect the environment” and require immediate abatement of groundwater flooding at the mine, and a fully bonded mine closure plan in the context of an individual aquifer protection permit *not* for mining, but for the closure, remediation, monitoring, and long-term maintenance of the Canyon Mine.

### **1. The Conservation Groups**

The Sierra Club is America's oldest, largest, and most influential grassroots environmental organization. Inspired by nature, the Sierra Club's more than 3 million members and supporters nationwide – including over 60,000 in Arizona as part of the Grand Canyon Chapter – work together to protect our communities and the planet. The Sierra Club has been involved for many years in working to protect Grand Canyon and its resources as well as the surrounding public lands. We have also long been involved in protecting the air and water resources of this state. Many of our members enjoy hiking, backpacking, wildlife and scenery viewing, and educational opportunities throughout the greater Grand Canyon area, including on the public lands in the areas for which these permits are proposed.

The Center for Biological Diversity (the “Center”) is a non-profit 501(c)(3) corporation with offices in Arizona, New Mexico, California, Colorado, Nevada, Oregon, Alaska, Illinois, Minnesota, Vermont, Florida, Washington, D.C., and Baja California Sur,

Mexico. The Center works through science, law, and policy to secure a future for all species, great or small, hovering on the brink of extinction. The Center has more than 1.6 million members and online activists. The Center, its employees, and its members use the public lands and waters subject to the proposed uranium mining for recreational, scientific, educational and aesthetic purposes. The Center and its members have long engaged federal and state agency decision-making to ensure that uranium mining and milling in the Four Corners region does not further harm people and the environment.

The mission of the Grand Canyon Trust is to safeguard the wonders of the Grand Canyon and the Colorado Plateau, while supporting the rights of its Native peoples. The Trust was established in 1985 and has over 4,000 members. It is a regional conservation organization headquartered in Flagstaff, AZ with satellite offices in Durango and Denver, CO, and Salt Lake City and Moab, UT.

Wild Arizona's mission is to protect, link, and restore wild lands and waters across Arizona and beyond, for the enrichment and health of all generations, and to ensure Arizona's native plants and animals a lasting home in wild nature. Since its origins in 1979, Wild Arizona has worked to defend and protect Arizona's outstanding landscapes, including Grand Canyon and its rimlands, through citizen outreach and advocacy, wilderness stewardship volunteerism, and field-based science and inventory, engaging nearly 3,000 members and supporters. Wild Arizona also partnered with the National Park Service and other land and wildlife agencies in extensive volunteer-supported inventories and assessments of over 100 springs across the Arizona Strip and the south rim of Grand Canyon.

## **2. Written Response to Comments**

Conservation groups request from ADEQ a written response to each of the following comment sections and subsections. That response can be provided to Conservation Groups at the contact information listed in signature blocks below.

### **3. The Potential for Damage to the Redwall-Muav Aquifer is Overwhelming.**

#### **a. Three Decades of Information Has Warned Regulators of Mine Flooding and Aquifer and Spring Depletion and Pollution.**

Since as early as the 1980s, regulators and miners have had access to and knowledge of data showing abundant groundwater 1,100 feet below the surface of Canyon Mine. Despite this, permit applications since 2007 have omitted this information,<sup>7</sup> and permissive federal and state agency decisions have allowed mine shaft excavation where it was known to be subject to imminent flooding, putting groundwater at risk, contrary to the purpose of the aquifer protection permit program.

One year before the establishment of ADEQ in 1987, Canyon Mine's Record of Decision was signed by the Forest Service. The Arizona Department of Health Services then contacted the owner of Canyon Mine to say that a permit would only be granted "if the applicant demonstrates that no wastes or pollutants will enter an aquifer in sufficient quantities to violate adopted groundwater quality standards" because:

"The Department disagrees that the drill logs (actually bore-hole logs) verify your position. The logs indicate that the boring encountered saturated zones and that mining operations may therefore contribute to the discharge of a pollutant to the vadose zone or to an aquifer."<sup>8</sup>

A letter dated October 29, 1986 points out that a hydrogeologic report of the area "indicated that the project vicinity was a groundwater recharge area and that generally the flow of groundwater was downward while some strata impeded the downward flow. It also indicated the presence of perched aquifers...."<sup>9</sup> Another memorandum from 1987 states "a long-term, post-closure sampling program should be implemented. This sampling program should last 15 years with semi-annual sampling of the on-site water supply/monitor well, and

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<sup>7</sup> See highlighted sections in: <https://drive.google.com/file/d/1T0opxBeXp4c9JQPFgk1nnQyIU-WhjQl/view?usp=sharing> Water was found in all the test holes that were drilled, and when drilling the well. It was known that the Coconino aquifer near Grand Canyon was likely to have water. Then, suddenly, starting in 2007, references were made only to "isolated, discontinuous zones" of water, even though hydrologists think they should have known there would be abundant water in the C aquifer near Canyon Mine. After 2007, only the R-M is identified as having "significant" water.

<sup>8</sup> Arizona Department of Health Services. 1986. Letter dated November 6, signed by Gary M. Ullinskey, Water Permits Unit, Office of Waste and Water Quality Management. See: [https://www.grandcanyontrust.org/sites/default/files/documents/ADEQ\\_letter\\_EFN\\_11.6.86.pdf](https://www.grandcanyontrust.org/sites/default/files/documents/ADEQ_letter_EFN_11.6.86.pdf)

<sup>9</sup> Arizona Department of Health Services. 1986. Letter dated October 29, signed by Gary Ullinskey. See: [https://www.grandcanyontrust.org/sites/default/files/documents/Canyon\\_Mine\\_Groundwater\\_Memo\\_1986.pdf](https://www.grandcanyontrust.org/sites/default/files/documents/Canyon_Mine_Groundwater_Memo_1986.pdf)

the springs at Havasu Springs, Indian Garden Springs, and Blue Springs.”<sup>10</sup> An Environmental Protection Agency (EPA) report “Ground-Water Monitoring in Karst Terrains” that was found in ADEQ’s files gives the following recommendations for monitoring in karst areas such as the Canyon Mine area:

“The easiest and most reliable sites at which to monitor ground-water quality in a karst terrane [sic] are springs and directly accessible cave streams shown by dye-tracing to drain from the facility being evaluated (Quinlan & Ewers, 1985). The preferred alternative to the use of springs as monitoring sites is a suite of wells that intercept cave streams shown by tracing to flow from the facility.”<sup>11</sup>

As provided to ADEQ by Conservation Groups in 2009 APP comments, hydrogeologists have more recently warned that mining operations would pierce and deplete perched aquifers, and that downward movement of groundwater could interact with mined areas, potentially contaminating the Redwall-Muav Aquifer and its associated wells and springs.

Dr. David Kreamer, Professor, Department of Geoscience, University of Nevada, Las Vegas, has done extensive research on the water quality in springs throughout the greater Grand Canyon area since the 1980s. His research has focused on the connections between ground and surface water. Kreamer stated:

“[T]he deep, drilled wells associated with projected mining operations throughout the Grand Canyon region, and the **mine shafts themselves, have the potential to pierce smaller perched aquifers in the overlying Coconino Sandstone (approximately one-quarter of the way down the Canyon vertically)**, which supplies water to springs higher up on the wall of the Canyon. In one uranium mine in the Grand Canyon region, a perched aquifer was encountered during exploratory drilling operations. Long-term downward drainage and water disruption potential of the mining operation was estimated to be over 1.3 million gallons per year (Canyon Uranium Mine EIS, 1986). Piercing a perched aquifer would have the effect of

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<sup>10</sup> Environmental Protection Agency. 1991. Ground-Water Monitoring in Karst Terranes Recommended Protocols & Implicit Assumptions. At 8.



draining the perched aquifer, and disrupting flow to springs issuing from the Coconino Sandstone-Hermit Shale contact and the underlying Supai Group.

...Scientific evidence suggests that the exploitation of uranium resources near the Grand Canyon will be intimately connected with the groundwater aquifers and springs in the region. The hydrologic impacts have a great potential to be negative to people and biotic systems. I believe that an assumption that uranium mining will have minimal impact on springs, people and ecosystems in the Grand Canyon I unreasonable, and is not supported by past investigations, research, and data.”

Dr. Abe Springer, Professor of Hydrogeology at Northern Arizona University, also provided congressional testimony discussing the potential connections between uranium mining operations and deep aquifers. Springer stated:

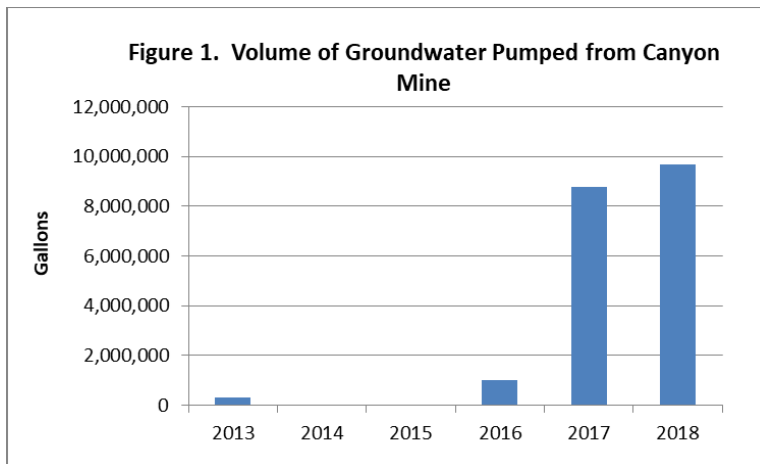
“Although there are multiple and very deep (over 3,000 foot deep) aquifers in the vicinity of the Grand Canyon, recharge to these aquifers tends to be mostly focused and very rapid through faults, fractures, and sinkholes. Recharge to these deep aquifers can be on the order of hours and days, not weeks or years. The faults, fractures, and sinkholes can be pervasive and any enhancement of them can lead to enhanced recharge to the aquifer... Although there is a lot of uncertainty in our understanding of flow in the regional aquifers and how it is connected to mineralization in these breccias pipes, what we do know should lead us to exercise the precautionary principle of doing no additional harm”

Dr. Larry Stevens, Curator of Ecology at the Museum of Northern Arizona, warned in congressional testimony of potential long-term damage that uranium mining could pose to the region’s groundwater and springs:

“Mining activities are likely to contaminate groundwater or create surface pollution that may be transferred into these groundwater aquifers. Such contamination may affect water quality in springs that are essential resources for fish and wildlife, backpackers, and water quality in the Colorado River, and the impacts of uranium mining on the region’s groundwater and springs may persist for thousands of years.”

**b. Ongoing Groundwater Flooding At the Canyon Mine Threatens Aquifers and Springs Undermines Assumptions of Past Canyon Mine Approvals**

Just as regulators had been warned, construction of the mine shaft at Canyon Mine in 2016 and 2017 pierced perched aquifers associated with the Coconino Formation, causing ongoing severe flooding of the mine with groundwater. According to reports submitted to ADEQ by Energy Fuels, groundwater flooding increased from more than 900,000 gallons in 2016 to more than 8 million gallons in 2017<sup>12</sup> and nearly 10 million gallons in 2018 (Figure 1).



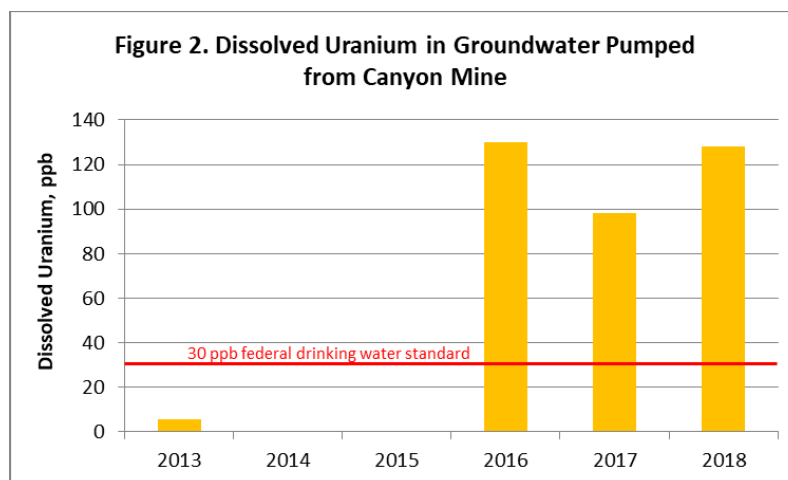
Groundwater flooding now occurring at the Canyon Mine undermines key assumptions upon which the Canyon Mine was designed, per the Plan of Operations, and it undermines key assumptions on which the Canyon Mine Final Environmental Impact Statement (FEIS) and Record of Decision rely. The FEIS, which approves the mining according to the Plan of Operations, concludes that the “low potential for encountering groundwater” “effectively eliminates the possibility of contaminating the Redwall-Muav aquifer.” FEIS at 26. It states:

“The possibility of significant ground water contamination from the mine is remote. Ground water flows, if they exist, are likely to be at least 1,000 feet below the lower extremities of the mine. This, plus the low potential for encountering groundwater in

<sup>12</sup> Further evidence of groundwater flooding is shown in a Canyon Mine accident report in ADEQ’s files. On Feb 6<sup>th</sup>, 2017, “While drilling a face round with a jack leg drill, miner drilled into a vertical exploration hole from the surface, the hole was full of water and the pressure of 1300’ of water forced the drill back into the miner chipping tooth.” This indicates that bore holes are filled with water, and likely have been since test drilling began in the late 1970s.

the mine, effectively eliminates the possibility of contaminating the Redwall-Muav aquifer.”

*Id.* Thus, the FEIS relied on false assumptions about the depth and presence of significant groundwater to conclude that risks of groundwater contamination at Canyon Mine are “remote.” In fact, the inverse is true: With nearly 10 million gallons of groundwater inundating the mine annually, the risk of that contamination is acute, immediate, and worsened by high concentrations of dissolved uranium (and other pollutants) measured in that groundwater, as reported by Energy Fuels to ADEQ in (Figure 2).



Importantly, there are no reliable data on whether contamination of the Redwall-Muav aquifer has occurred, or is occurring now, because ADEQ has refused to require an individual APP and sufficient (multi-point) downgradient aquifer water quality monitoring. Nor are there monitoring mechanisms to verify that some groundwater now flooding the mine is not reaching the Redwall-Muav aquifer. Importantly, as ADEQ staff acknowledged in a public meeting in Flagstaff in 2009, contamination of the Redwall-Muav aquifer, if it were to happen, may be impossible to clean up.

These risks are exacerbated by the fact that movement of water in and between Grand Canyon’s regional aquifers is poorly understood; the deep Redwall-Muav aquifer supplies essential springs in Grand Canyon National Park and the Havasupai Reservation, and drinking water wells at Tusayan and Valle. Experimental dye trace studies performed by the National Park Service north of Grand Canyon revealed that one tracer travelled 6,000 vertical feet and

26 linear miles in less than a month<sup>13</sup>. Similar studies have never been performed south of Grand Canyon to determine if similar conditions exist.

Taken together, state and federal regulators' failure to adequately predict, plan for, monitor or severe groundwater flooding now occurring at the Canyon Mine shows regulatory malfeasance, and leaves Northern Arizona's communities and environment at risk of irretrievable harm.

#### **4. ADEQ Must Undertake Application Review and Permit Issuance *De Novo*.**

Conservation Groups provide these comments and all supporting evidence explicitly for consideration by ADEQ in the context of Arizona's Administrative Review Act, as amended.

The Administrative Review Act holds that an agency action is unlawful if it is found to be contrary to law, is not supported by substantial evidence, is arbitrary and capricious, or is an abuse of discretion. A.R.S. § 12-910(E).

On April 11, 2018, the Arizona Legislature passed H.B. 2238, amending A.R.S. § 12-910 sub-section E, such that courts reviewing agency decisions:

“shall decide all questions of law, including the interpretation of a constitutional or statutory provision or a rule adopted by an agency, without deference to any previous determination that may have been made on the question by the agency.”

ADEQ cannot simply rely on previous determinations to allow coverage under a general permit for the Canyon Mine. Instead, ADEQ must undertake a fresh review of the application *de novo*, considering any and all relevant new and past information, including but not limited to that which is cited in this document.

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<sup>13</sup> Jones, C.J.R., A.E. Springer, B.W. Tobin, S.J. Zappitello, and N.A. Jones. 2017. Characterization and hydraulic behavior of the complex karst of the Kaibab Plateau and Grand Canyon National Park, USA. *From*: PARISE, M., GABROVSEK, F., KAUFMANN, G. & RAVBAR, N. (eds) *Advances in Karst Research Theory, Fieldwork and Applications*. Geological Society, London, Special Publications, 466 <https://doi.org/10.1144/SP466.5>. *See*: <http://sp.lyellcollection.org/content/early/2017/11/03/SP466.5>, accessed 5/2/18.

Federal and state agencies' failure to predict in previous environmental review the severe groundwater flooding now occurring at the Canyon Mine heightens the imperative for de novo review.

**5. ADEQ Must "Protect the Environment."**

The ADEQ's core statutory duty is to protect the environment; ADEQ must implement its policies, plans, and programs in a way that protects the environment:

Formulate policies, plans and programs to implement this title to protect the environment.

A.R.S. § 49-104(A)(1). To that end, ADEQ must "[p]romote and coordinate the protection and enhancement of the quality of water resources consistent with the environmental policy of this state" A.R.S. § 49-104(A)(7) and "prevent and abate water pollution." A.R.S. § 49-104(A)(10).

A preponderance of information shows ongoing depletion of perched aquifers, severe and worsening mine flooding, and a high potential for irretrievable harm to the Redwall-Muav aquifer. In the face of these extraordinary new circumstances, ADEQ must undertake the following actions to "protect the environment":

**a. ADEQ Must Immediately Require Plugging of All Groundwater Sources Now Flooding the Canyon Mine in Order to "Protect the Environment."**

ADEQ must immediately require Energy Fuels Resources to abate groundwater flooding of the Canyon Mine. ADEQ must require Energy Fuels Resources to identify all sources of inflow and formulate and implement plans to permanently plug those sources of flooding. Those plans should be subject to public review and independent peer review by hydrologists and engineers. Monitoring systems, bonding, and remediation plans should be required in order to ensure the long-term effectiveness of abatement strategies.

**b. ADEQ Must Immediately Require a Fully Bonded Mine Closure Plan, Complete with Monitoring, Post-closure Maintenance, Contingency Plans, to “Protect the Environment” and Avoid a Decision that is Arbitrary, Capricious and an Abuse of Discretion.**

Taken together, the severity of groundwater flooding occurring at the Canyon Mine, the potential perpetuity of that flooding, and the precariousness of global uranium markets create a situation where Energy Fuels Resources, were it to abandon its pursuit of mining at the Canyon Mine, could lack the technical, operational, and financial capability to undertake mine closure, monitoring, and post-closure maintenance procedures that are necessary to “protect the environment.” As such, in order to “protect the environment,” ADEQ must immediately require a mine closure plan and an individual APP for this closure. The mine closure plan must include terms and conditions for closure and post-closure maintenance to prevent (1) discharge into and pollution of the Redwall-Muav aquifer from mine workings, (2) depletion of perched aquifers, and (3) discharge from perched aquifers into mine workings. It must also include water quality and quantity monitoring of perched aquifers and the Redwall-Muav aquifer to ensure effectiveness of closure and post-closure maintenance procedures. A closure plan should additionally include contingency procedures for remediating water quantity and/or quality declines in perched aquifers, the Redwall-Muav aquifer, and connected wells and springs, if and when detected under monitoring procedures. Finally, ADEQ must require that Energy Fuels Resources demonstrate the technical, operational, and financial capacity to enact all closure and post-closure maintenance, monitoring, and contingency procedures set forth in a closure plan. ADEQ should require that Energy Fuels Resources demonstrate its financial capability in the form of a bond that covers the full costs of closure and post-closure maintenance, including contingency plans. To ensure implementation, ADEQ should require the completion of a closure plan and all necessary bonding as a necessary prerequisite to its consideration of issuing an individual APP.

**c. Coverage of Canyon Mine Under a General APP is Arbitrary, Capricious, and an Abuse of Discretion. ADEQ Must Issue an Individual Permit Limited to Mine Closure and Post-closure Activities to “Protect the Environment”**

According to ADEQ, “facilities and sources whose emissions and discharges could have a significant environmental impact are not eligible to operate under a general permit.”<sup>14</sup> The Canyon Mine is not eligible for a general permit because, as explained below, its emission and discharges could have a significant impact on the environment.

With nearly 10 million gallons of groundwater now inundating the Canyon Mine annually, the risk of contaminating the Redwall-Muav aquifer and its associated wells and springs is acute. The environmental impacts associated with that contamination could be significant, including but not limited to harm to the availability of municipal, agricultural, and recreational water; harm to public health; harm to species and ecosystems associated with springs at which Redwall-Muav aquifer water discharges, including harm to federally protected endangered species.

ADEQ cannot allow coverage under a general permit for the Canyon Mine because the Canyon Mine does not qualify for the conditions for which a general permit may be issued pursuant to A.R.S. 49-245, where ADEQ may issue by rule a general permit for a defined class of facilities only if all of the following apply:

1. *The cost of issuing individual permits cannot be justified by any environmental or public health benefit that may be gained from issuing individual permits.* A.R.S. 49-245 (A)1.

A.R.S. 49-245 (A)1 does not apply. Here, the cost of issuing an individual permit *can be justified* because the environmental and public health benefits of preventing or reducing contamination of the Redwall-Muav aquifer *far outweigh* the costs of issuing an individual permit. The aquifer provides municipal, recreational, economic, agricultural, and biological benefits throughout Northern Arizona, on the Havasupai Indian Reservation, and in Grand Canyon National Park. Preventing irretrievable contamination of the

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<sup>14</sup> ADEQ website: General Permits and How They Protect the Environment. Accessed August 2019 at: <https://legacy.azdeq.gov/function/permits/general.html>

Redwall-Aquifer avoids immeasurably high costs that would be associated with the impossible and task of attempting to remediate contaminated water quality at wells, springs, or possibly *in situ*, thousands of feet underground. In any of these cases, the cost of requiring an individual permit is far outweighed by the benefit of avoiding the costs of (1) water remediation, or, worse or additionally, the cost of water users and/or municipalities procuring alternative water sources, (2) loss of agricultural production resulting from well abandonment, (3) loss of recreational and tribal revenue resulting from contamination of Havasu Springs, or (4) medical care for public health conditions resulting from water users ingesting contaminated well, spring, or stream water.

2. *The facilities, activities or practices in the class are substantially similar in nature.* ARS 49-245 (A)2.

ARS 49-245 (A)2 does not apply. Here, the development of severe and ongoing groundwater flooding at the Canyon Mine substantially distinguishes the Canyon Mine's activities and practices from other mines'. The Canyon Mine, like other breccia pipe mines in the region, was not designed to accommodate nearly 10 million gallons of groundwater inundation annually. Because none of the breccia pipe mines in the region for which ADEQ has previously issued a general permit have caused groundwater flooding at the magnitude now ongoing at the Canyon Mine, activities and practices at Canyon Mine are substantially *different* in these ways: (1) unforeseen exceedance of surface water storage capacity by contaminated mine water volumes; (2) unlawful offsite transport of contaminated mine water; (3) use of industrial water cannons to spray contaminated mine water into the air and offsite into the national forest; (4) accidents and physical injury to mine workers from groundwater unexpectedly bursting into underground mine workings; (5) regular, ongoing storage of contaminated mine water above ground, resulting in regular, and ongoing exposure of wildlife to that contaminated water.



3. *The director is satisfied that appropriate conditions under a general permit for operating the facilities or conducting the activity will meet the applicable requirements in section 49-243 or, as to facilities for which the director has established best management practices. ARS 49-246.*

ARS 49-245 (A)2 does not apply. There is nothing in the record to support a decision by the director to assert that the facility will meet the applicable requirement in A.R.S. 49-243. For example, given groundwater flooding at the Canyon Mine, the director cannot assure the public “[t]hat pollutants discharged will in no event cause or contribute to a violation of aquifer water quality standards at the applicable point of compliance for the facility.”

A.R.S. 49-243 (B) 2. Similarly, the director has not determined that the applicant has met the financial assurance requirements. The statutes require “... the applicant or permittee shall demonstrate financial responsibility to cover the estimated costs to close the facility and, if necessary, to conduct postclosure monitoring and maintenance . . . .” A.R.S. 49-243 (N) 3. In fact, the administrative record supports few if any of the requirements in A.R.S. 49-243. Allowing coverage of Canyon Mine under a general APP without establishing how the Canyon Mine and the mine operator will meet those requirements is an abuse of discretion by the director.

Because the Canyon Mine cannot meet any of the required conditions of A.R.S. 49-245, approval of coverage under a general permit for the Canyon Mine would violate A.R.S. 49-245 and ADEQ’s core duty “to protect the environment” under A.R.S. 49-104(A)(1); issuance of a general permit, in light of violations of the A.R.S. and the severe groundwater flooding now ongoing at the mine, would be arbitrary, capricious, and an abuse of discretion.

The Arizona Administrative Code R18-9-A307(B) provides that the director may revoke coverage under a general permit for any or all facilities within a specific geographic area if, due to geologic or hydrologic conditions, the cumulative discharges of the facilities has violated or *will violate* an Aquifer Water Quality Standard established under Arizona Revised Statutes §§ 49-221 and 49-223. Here, the unique hydrological conditions of the area support such action. Specifically, the aquifer in the Grand Canyon area is unique in that the water from these aquifers discharge into seeps, springs, and streams in the area and are critical

to people and wildlife and that also help to feed the Colorado River, an important drinking water source for millions of people.

Notably, ADEQ earlier insisted on individual APPs for Canyon Mine and, in fact, denied coverage for it under the general APPs. On April 12, 2001, ADEQ issued a “Notification of the Final Decision to Deny Aquifer Protection Permit (APP) Applications” for Kanab North, Pinenut, and Canyon Mines.<sup>15</sup> In 2002, ADEQ issued a “Denial of an Individual Aquifer Protection Permit Application” for Canyon Mine, saying that “the facility and its operation cannot comply with the requirements of A.R.S. 49-243 and R 18-9-A202.”<sup>16</sup> This was followed by a Legal Notice in the *Arizona Daily Sun* that “Arizona Department of Environmental Quality intends to deny an application for a [sic] Aquifer Protection Permit” for Kanab North Mine, Pinenut Mine, and Canyon Mine.<sup>17</sup> Early versions of draft permits required, “Contingency plans, a closure plan, and a groundwater monitoring plan, which includes mine seepage monitoring, an on-site monitoring well, and monitoring of Blue Springs, Havasu Springs, and Indian Garden Springs....”<sup>18</sup>

Given the extensive record of previous support within ADEQ for an individual permit, ADEQ must require an individual permit for the Canyon Mine pursuant to A.R.S. 49-243. In light of new extraordinary threats posed to the environment by ongoing groundwater flooding at the mine, in order to “protect the environment” ADEQ should limit activities authorized in the individual permit to mine closure, post-closure maintenance, and monitoring activities, as follows:

**i. ADEQ Must Require Hydrogeologic Study of the Vadose Zone, Perched Aquifers and Redwall-Muav Aquifer and Springs in Order to “Protect the Environment” and Avoid a Decision that is Arbitrary, Capricious, and an Abuse of Discretion.**

Given severe groundwater flooding that is now occurring at the Canyon Mine, whose possibility federal and state agencies dismissed as remote in their approvals for the Canyon

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<sup>15</sup> ADEQ Letter Dated April 12, 2001, signed by Dorothy McKee, Project Manager, Mining Unit, Water Permits Section.

<sup>16</sup> ADEQ 2002. Denial of an Individual Aquifer Protection Permit Application Inventory Number 100333, signed by Karen L. Smith, Director, Water Quality Division, Arizona Department of Environmental Quality.

<sup>17</sup> Public Notice No. 09-02APP published on or about January 30, 2002 in the *Arizona Daily Sun*, “Notice of the Preliminary Decision to Deny an Application for an Individual Aquifer Protection Permit.”

<sup>18</sup> Inter-Office Memorandum dated February 17, 1987 RE: Canyon Mine, File Review No. 85-134, Draft Goundwater Quality Protection Permit No. G-0004-03, from Gary M. Ullinsky.

Mine, ADEQ must require a new hydrogeologic study for the Canyon Mine pursuant to A.R.S. 49-243.A.4. This study should employ dye tracers to determine flow rates, paths, and connectivity between perched and deep aquifers, and between those aquifers and regional wells and springs. Understanding flow rates, paths, and connectivity is a necessary prerequisite to designing monitoring that can detect downgradient water pollution and depletion impacts of mining.

**ii. ADEQ Must Require Downgradient Monitoring of the Redwall-Muav Aquifer and Perched Aquifers, and Connected Wells and Springs, In Order to “Protect the Environment” and Avoid a Decision that is Arbitrary, Capricious and an Abuse of Discretion.**

A.R.S. 49-243.K authorizes ADEQ to consider and prescribe terms and conditions to individual permits. Given the heightened contamination risk now posed to the Redwall-Muav aquifer by ongoing groundwater flooding at the mine, ADEQ must require expanded monitoring and reporting requirements in order to ensure that its implementation of policies and programs “protect the environment” pursuant to A.R.S. 49-104.A.1. Pursuant to A.R.S. 49-243.K.1, ADEQ must (1) make mandatory water quality and quantity monitoring that is now voluntary at the Canyon Mine, and (2) require water quality monitoring of the Redwall-Muav Aquifer at multiple downgradient locations and perched aquifers, and water quality and quantity monitoring at wells and springs connected to those aquifers. Pursuant to A.R.S. 49-243.K.2., ADEQ should additionally require monitoring data be reported weekly on a publicly-available website. Monitoring should be required on an ongoing basis following mine closure, and should be included in a mine closure plan with sufficient bonding.

**iii. ADEQ Must Require a Mine Closure Plan to “Protect the Environment” and Avoid a Decision that is Arbitrary, Capricious, and an Abuse of Discretion.**

The potential for perched aquifer depletion and discharge into and pollution of the Redwall-Muav aquifer from the Canyon Mine will persist beyond mine closure. As such, in order “protect the environment,” ADEQ must require a mine closure plan. The mine closure plan must include terms and conditions for closure and post-closure maintenance to prevent: (1) discharge into and pollution of the Redwall-Muav aquifer from mine workings; (2)

depletion of perched aquifers; and, (3) discharge from perched aquifers into mine workings. It must also include water quality and quantity monitoring of perched aquifers and the Redwall-Muav aquifer to ensure effectiveness of closure post-closure maintenance procedures. A closure plan should additionally include contingency procedures for remediating water quantity or quality declines in perched aquifers, the Redwall-Muav aquifer, and connected wells and springs, if and when detected under monitoring procedures. Finally, ADEQ must require that Energy Fuels Resources demonstrate the technical, operational, and financial capacity to enact all closure and post-closure maintenance, monitoring, and contingency procedures set forth in a closure plan. ADEQ should require that Energy Fuels Resources demonstrate its financial capability in the form of a bond that covers the full costs of closure and post-closure maintenance, including contingency plans. ADEQ should require the completion of a closure plan and all necessary bonding to ensure its full implementation as a necessary prerequisite to its consideration of issuing a new permit.

### **1. ADEQ Must Prohibit Radioactive Waste Disposal in the Mine Closure Plan.**

Upon closure, the Canyon Mine plan of operations (PoO) allows for dumping radioactive waste and post-mining industrial garbage into the mine. It states:

“The mine yard will be radiometrically surveyed and any material found which exceeds radiation regulations will be removed from the area, backfilled into the shaft or hauled from the Project Area. In the event treatment of water from the underground working is needed during mining operations, sediments resulting from this will be scalped from the ponds and either hauled from the project Area or disposed of underground in the mined-out workings.

All concrete slabs and around shafts will be excavated, mine yard or backfilled into the footings other than those broken and buried in the shafts. Minor amounts of other debris will be handled similarly.”

PoO at 22. ADEQ should prohibit disposal of “material which exceeds radiation regulations” into the mine shaft.

**d. Issuance of an Individual Permit Must be Subject to Applicant's Demonstrated Technical, Operational, and Financial Ability to Carry Out All Terms, Conditions, Monitoring, and Other Permit Requirements Necessary to "Protect the Environment" and to Prevent Discharge into the Redwall-Muav Aquifer.**

A.R.S. 49-243.N. authorizes ADEQ to deny a permit for a facility if the applicant is incapable of fully carrying out the terms and conditions of the permit, as is necessary to "protect the environment" pursuant to A.R.S. 49-104.A.1. A.R.S. 49-243.N.1 further authorizes ADEQ to require the applicant to furnish information, such as past performance, including compliance with or violations of similar laws or rules, and technical and financial competence, relevant to its capability to comply with the permit terms and conditions.

Given the heightened contamination risk now posed to the Redwall-Muav aquifer by severe, ongoing groundwater flooding at the mine, ADEQ must, in order to protect the environment, require that Energy Fuels Resources demonstrate its technical and financial capability to comply with all of the afore mentioned terms and conditions, in comment section 5 B, or that are or would be required under the statutes in order to "protect the environment."

Thank you for considering our comments. As mentioned above, we request a written response to the comments. Please keep us informed of any other developments relative to these issues.

Sincerely,



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