



GRAND CANYON  
TRUST



August 15, 2016

Balaji Vaidyanathan  
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Arizona Department of Environmental Quality  
1110 West Washington Street, 3415A-1  
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Submitted via email to [tb4@azdeq.gov](mailto:tb4@azdeq.gov)

**Re: AIR QUALITY CLASS II SYNTHETIC MINOR PERMIT: Canyon Mine PERMIT 62877; EZ Mine PERMIT 62878; Arizona 1 Mine PERMIT 63895**

Dear Mr. Vaidyanathan:

Please accept these comments from the Grand Canyon Trust, the Center for Biological Diversity, and Sierra Club's Grand Canyon Chapter regarding the Air Quality Control Permits for the Canyon, Arizona 1; and EZ mines.

In addition, we request that the Arizona Department of Environmental Quality (ADEQ) require the renewal the Air Quality Control Permit for Pinenut mine (PERMIT #62876) until comprehensive monitoring confirms that all radioactive material has been removed and that dust and other fugitive air emissions are no longer detected from the site for at least a year after it has been fully reclaimed.

Grand Canyon Trust has long advocated for protecting air quality in both the urban and rural environment. 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 mission of the Grand Canyon Trust is to protect and restore the Colorado Plateau—its spectacular landscapes, flowing rivers, clean air, diversity of plants and animals, and areas of beauty and solitude. The Trust was established in 1985 and has 4,000 members. It is a regional conservation organization with offices in Flagstaff, AZ and Moab, UT.

The Center for Biological Diversity (the "Center") is a non-profit 501(c)(3) corporation with offices across the nation. 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 over 1.1 million members and online activists throughout the United States and the world. The Center is actively involved in species and habitat protection issues worldwide, including throughout the western United States. The Center, its employees, and its members use the public lands subject to the proposed uranium mining for recreational, scientific, aesthetic, and commercial purposes. They also derive recreational, scientific, aesthetic, and commercial benefits from the public lands through wildlife observation, study, and photography. The Center and its members have an interest in preserving the possibility of such activities in the future. As such, the Center and its members have an interest in helping to ensure the continued use and enjoyment of these lands.

The Sierra Club is a grassroots environmental organization with more than 2.4 million members and supporters nationwide, 40,000 of whom reside in Arizona. The Sierra Club mission is “to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth’s ecosystems and resources; and to educate and enlist humanity to protect and restore the quality of the natural and human environments.” Sierra Club has a strong interest in public lands, waters, and wildlife in Arizona and has long advocated for protection and management that sustains their ecological integrity.

## **INTRODUCTION**

We are adamantly opposed to the operation of these four uranium mines, all of which are located within watersheds (surface and ground) that drain directly into Grand Canyon National Park and all of which threaten water, air, and other important resources of the greater Grand Canyon ecoregion, including soil, wildlife, sacred Native American sites, and the health of the people who are exposed to the heavy metals and radiation associated with these mines.

For more than a half-century, uranium mining has permanently polluted our land, air, and water. Its deadly legacy is well documented and yet state and federal agencies are still permitting new mines to open.

In 2010, our organizations, Coconino County Supervisor Carl Taylor, and hundreds of citizens objected to issuing air permits for these mines because they impose unacceptable risks to residents and visitors to the Grand Canyon region. ADEQ has yet to address substantive issues that we raised six years ago.

The Arizona Department of Environmental Quality (ADEQ) has a responsibility, pursuant to A.R.S. § 49-104 relating to the powers and duties of the department and director, to ensure that it develops policies, plans, and programs “to protect the environment” [A.R.S. § 49-104(A)(1)] and also to “[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)]. Furthermore, the statute requires that the agency prevent and abate water pollution [A.R.S. § 49-104(A)(10)]. ADEQ also has delegated authority relative to the federal Clean Air Act. Pursuant to A.R.S. § 49-401(A), “The legislature by this act intends to exercise the police power of this state in a coordinated state-wide program to control present and future sources of emission of air contaminants to the end that air polluting activities of every type shall be regulated in a manner that insures the health, safety and general welfare of all the citizens of the state; protects property values and protects plant and animal life.” Subsection B states, “. . . the policy of this state that

no further degradation of the air in the state of Arizona by any industrial polluters shall be tolerated.” It is within this context that ADEQ should examine these permit applications and deny approval of any permits that allow for continued operations, but to move forward with permitting and monitoring of required reclamation at Pinenut. ADEQ cannot fulfill its responsibility to protect the environment, the plants and animals, and the health of the people of Arizona and permit these mines.

### **Changed Circumstances Since ADEQ’s Last Issuance of the Air Quality Permits**

Uranium mining does not occur in a static environment. In the six years since ADEQ last issued these air quality permits, information has emerged demonstrating the extreme threat uranium mining poses to the Grand Canyon region. For example, studies in the Four Corners region, where most American uranium mines are located indicate new information about harms from uranium mining that ADEQ should consider prior to the issuance of these permits.<sup>1</sup> Chief among the new studies is the 2011 Northern Arizona Withdrawal Final Environmental Impact Statement (EIS), which combined pre-existing information with extensive new surveys and analyses.<sup>2</sup> Among other things, the EIS and other studies have shown that: (1) radon gas, a uranium decay product, delivers almost twice the radiation dose to humans as previously thought, meaning that previous dose estimates for miners need to be doubled to accurately reflect lung cancer risk;<sup>3</sup> (2) “long term ingestion of uranium by humans may produce interference with kidney function at the elevated levels of uranium found in some groundwater supplies;”<sup>4</sup> (3) bone is a likely target of uranium toxicity in humans, and even low uranium concentrations in drinking water can cause toxic effects on the kidneys;<sup>5</sup> (4) chromosomal abnormalities in babies born within the vicinity of uranium mining operations;<sup>6</sup> (5) babies born from mothers who lived near a uranium tailings dump exhibited abnormally high rates of birth defects;<sup>7</sup> (6) a link between high rates of systemic lupus to living near a uranium processing facility;<sup>8</sup> (7) soil properties affect uranium mobility

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<sup>1</sup> U.S. EPA, Radiation Protection: Uranium Mining Wastes, *available at* <http://www.epa.gov/radiation/tenorm/uranium.html>.

<sup>2</sup> See generally 2012 Withdrawal FEIS at Chapters 3-4; see, e.g., *id.* at 3-41 to 3-42, 3-99 (describing updated hydrological studies and soil surveys).

<sup>3</sup> R. Taubenfeld, et al., High Risk – Low Return: The Case Against Uranium Mining in Queensland, 12 (Mar. 2013), *available at* <http://qnfa.files.wordpress.com/2013/03/180313highcost-lowreturn-uinqld.pdf>.

<sup>4</sup> M. L. Zamora, et al, *Chronic Ingestion of Uranium in Drinking Water: A Study of Kidney Bioeffects in Humans*, 43 *Toxicological Sciences*, 68-77 (1998)

<sup>5</sup> P. Kurttio, et al., *Bone as a Possible Target of Chemical Toxicity of Natural Uranium in Drinking Water*, *Environmental Health Perspectives*, 72 (Jan. 2005), *available at*

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1253712/>; P. Kurttio, et al., *Renal Effects of Drinking Water in Uranium*, *Environmental Health Perspectives*, 337-42 (Apr. 2002), *available at* <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240795/pdf/ehp0110-000337.pdf>.

<sup>6</sup> W. Au, et al., *Biomarker Monitoring of a Population Residing near Uranium Mining Activities*, 103 *Environmental Health Perspectives*, 466-70 (May 1995), *available at* <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1523284/pdf/envhper00354-0058.pdf>.

<sup>7</sup> L. M. Shields, et al., *Navajo Birth Outcomes in the Shiprock Uranium Mining Area*, 63 *Health Physics* 542-51 (Nov. 1992), *available at* <http://www.ncbi.nlm.nih.gov/pubmed/1399640>.

<sup>8</sup> American College of Rheumatology, *Uranium Exposure Linked to High Lupus Rates in Community Living Near a Former Refinery* (Nov. 10, 2012), *ScienceDaily*, *available at* <http://www.sciencedaily.com/releases/2012/11/121110155813.htm>.

and uptake by plants and animals;<sup>9</sup> and (8) uranium decay products bioaccumulate.<sup>10</sup> Reflecting our better understanding of these and other adverse effects, EPA in 2000 set new (and more stringent) drinking water standards for uranium.<sup>11</sup>

Additionally, we have seen that uranium mines are often harder and costlier to clean up than anyone expected. A 2012 report issued by the U.S. Government Accountability Office (“GAO”) found that BLM and the Forest Service “do not have reliable data on the number and location of abandoned uranium mine sites on federal land or a definitive cost for their cleanup.”<sup>12</sup> The GAO separately identified a \$60.6 million gap between the amount BLM estimated for financial assurance requirements and the actual value in place in plans of operations at abandoned hardrock mines.<sup>13</sup> A recent survey in New Mexico identified 259 abandoned mines, 139 of which had no record of reclamation.<sup>14</sup> A 1999 Energy Information Agency report indicated that DOE had spent \$1.5 *billion* on remediation of uranium mill sites.<sup>15</sup> In August 2014, the Department of Energy issued a report to Congress regarding defense-related abandoned uranium mines that identified their location, impacts, and remediation feasibility and cost.<sup>16</sup>

### **Canyon Mine**

Operations at Canyon Mine resumed in the fall of 2015, after the site had been partially developed and shuttered in 1991. The mine is located in the Kaibab National Forest, about six miles south of the Grand Canyon National Park boundary. Uranium at the mine is found between 900 and 1400 feet deep, in a “breccia” formation, a cylindrical pipe that extends deep into the earth. In 1986, the Forest Service prepared an EIS and approved a plan of operations that allowed 17 acres of surface disturbance and onsite stockpiling of waste rock (in perpetuity), and required \$100,000 in reclamation and mitigation and monitoring plans. However, when the price of uranium dropped in the early 1990s, the operator closed Canyon Mine without informing the Forest Service. The mineshaft had not been dug at the time of the closure. In 1997, a new operator acquired the mine and told the Forest Service that the mine was on “standby status.”

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<sup>9</sup> Canadian Council of Ministers of the Environment, *Canadian Soil Quality Guidelines for Uranium: Environmental and Human Health*, 22-23, 25, 28 (2007), available at [http://www.ccme.ca/assets/pdf/uranium\\_ssd\\_soil\\_1.2.pdf](http://www.ccme.ca/assets/pdf/uranium_ssd_soil_1.2.pdf).

<sup>10</sup> National Research Council, *Uranium Mining in Virginia*, at 210 (citing C.I.E. Wiramanaden, et al., *Selenium distribution in a lake system receiving effluent from a metal mining and milling operation in Northern Saskatchewan, Canada*, 29 ENVTL TOXICOLOGY & CHEMISTRY 488, 606-616 (2010), available at <http://onlinelibrary.wiley.com/doi/10.1002/etc.63/pdf>).

<sup>11</sup> U.S. EPA, *Basic Information about Radionuclides in Drinking Water*, available at <http://water.epa.gov/drink/contaminants/basicinformation/radionuclides.cfm>.

<sup>12</sup> GAO-12-544 at 30.

<sup>13</sup> *Information on Abandoned Mines and Value and Coverage of Financial Assurances on BLM Land: Oversight Hearings on Hardrock Mining Before the S. Comm. on Energy and Natural Resources*, 110th Cong. 29 (2008) (statement of Robin M. Nazzaro, Director, Natural Resources and Environment, GAO).

<sup>14</sup> New Mexico Senate Joint Memorial 15, *Urging Congress to Appropriate Funds for the Cleanup of Abandoned Uranium Mines Opened and Operated for the Benefit of the Federal Government* (Mar. 17, 2009), available at <http://www.nmlegis.gov/Sessions/09%20Regular/final/SJM015.pdf>.

<sup>15</sup> U.S. EIA, *Remediation of UMTRCA Title I Uranium Mill Sites under the UMTRCA Project Summary Table: Uranium Ore Processed, Disposal Cell Material, and Cost for Remediation as of December 31, 1999* (1999), available at <http://www.eia.gov/nuclear/umtra/>.

<sup>16</sup> See U.S. DOE, Office of Legacy Management, *Abandoned Uranium Mines Report to Congress* (2014), available at <http://www.lm.doe.gov/aum/>.

Many things changed in the years after the Forest Service approved the plan of operations, during the “standby” period. In 1989, EPA promulgated new Clean Air Act regulations to regulate certain underground uranium mining operations.<sup>17</sup> Among other things, the regulations require operators to comply with specific standards for radon emissions and obtain a permit from EPA.<sup>18</sup> In 1996, the U.S. Fish and Wildlife Service reintroduced the endangered California condor to northern Arizona. The condor is attracted to mining structures and water pits that are typically part of mining operations like the Canyon Mine. Condors are known to visit the Canyon Mine and its surrounding area, and that site is within a designated condor management area.<sup>19</sup>

In 2005, the USGS completed a study of the Redwall-Muav Aquifer (“R-Aquifer”) underlying the Coconino Plateau, where the Canyon Mine is located.<sup>20</sup> Before the study, little was known about the regional ground-water flow systems of the study area. The study demonstrated that the R-aquifer is recharged by faults, fissures, fractures and other geologic formations in the subsurface, including via perched smaller aquifers that lie above the R-aquifer.<sup>21</sup> The study also showed elevated levels of uranium contamination—radioactive constituents and alpha particles—in creeks, seeps and springs near former mine sites.<sup>22</sup> In 2008, the Forest Service reviewed water resources on the Coconino Plateau, including groundwater.<sup>23</sup> The Forest Service determined that fractured bedrock provides conduits for downward movement of water and groundwater recharge.<sup>24</sup> The agency’s review also determined that local communities depend more on groundwater as their water sources than they did in the 1980s.<sup>25</sup> In 2010, the USGS reported that uranium and arsenic were consistently detected above background levels in the areas disturbed by uranium mining in northern Arizona.<sup>26</sup> Samples from 15 springs and five wells in the region contained dissolved uranium concentrations greater than EPA’s maximum allowed contaminants for drinking water.<sup>27</sup> Of particular note, there were elevated uranium concentrations within the Canyon Mine monitoring and water well.<sup>28</sup>

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<sup>17</sup> EPA, National Emission Standards for Hazardous Air Pollutants; Radionuclides, 54 Fed. Reg. 51,654 (Dec. 15, 1989), as amended, 65 Fed. Reg. 62,151 (Oct. 17, 2000) (codified at 40 C.F.R. Part 61).

<sup>18</sup> See generally 40 C.F.R. § 61, Subpts. A-B.

<sup>19</sup> Letter, Steven L. Spangle, Field Supervisor, Arizona Ecological Services Office, U.S. Fish & Wildlife Service, to Michael R. Williams, Forest Supervisor, Kaibab National Forest, 2-3 (Feb. 9, 2012); *Center for Biological Diversity v. Salazar*, No. 3:09-cv-08207-DGC, Docket No. 38, Ex. 24 at 1.

<sup>20</sup> USGS, *Scientific Investigations Report 2005-5222: Hydrogeology of the Coconino Plateau and Adjacent Areas, Coconino and Yavapai Counties, Arizona* (2005), available at [http://pubs.usgs.gov/sir/2005/5222/sir2005-5222\\_text.pdf](http://pubs.usgs.gov/sir/2005/5222/sir2005-5222_text.pdf).

<sup>21</sup> *Id.* at 42-43.

<sup>22</sup> *Id.* at 51-52.

<sup>23</sup> U.S. Forest Service, Southwestern Region, Kaibab National Forest, Canyon Uranium Mine Review: Review of the Canyon Mine Plan of Operations and Associated Documentation in Anticipation of Resumption of Operations, 31 (June 25, 2012), available at [https://fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5376042.pdf](https://fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5376042.pdf) (hereinafter “Canyon Uranium Mine Review”).

<sup>24</sup> U.S. Forest Service Kaibab National Forest: Ecological Sustainability Report, 52 (Dec. 19, 2008), available at [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fsm91\\_050014.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm91_050014.pdf).

<sup>25</sup> *Id.*

<sup>26</sup> See U.S. Department of the Interior & USGS, *Scientific Investigations Report No. 2010-5025: Hydrological, Geological, and Biological Site Characterization of Breccia Pipe Uranium Deposits in Northern Arizona* (2010), available at <http://pubs.usgs.gov/sir/2010/5025/pdf/sir2010-5025.pdf>.

<sup>27</sup> See generally *id.* at 43-338.

<sup>28</sup> *Id.* at 118.

Also in 2010, the Forest Service determined that Red Butte, a mountain four miles south of the Canyon Mine, warranted designation as a Traditional Cultural Property.<sup>29</sup> Red Butte is one of the most important sites in the religious and cultural tradition of the Havasupai Tribe, and it holds major religious significance for the Hopi, Navajo, Zuni and Hualapai Tribes.<sup>30</sup> The Havasupai refer to Red Butte as “the Landmark,” and it plays a central part in their origin story.<sup>31</sup> In addition, the Havasupai consider the meadow where the Canyon Mine is located to be sacred and spiritually tied to Red Butte.<sup>32</sup> Designation of Red Butte as a Traditional Cultural Property made it eligible for listing on the National Register of Historic Places.<sup>33</sup>

Meanwhile, between 2008 and 2012, Congress and the Department of the Interior were evaluating whether to withdraw the lands surrounding Grand Canyon National Park from mining and other uses. In response to direction from Congress in 2009 the Department issued a proposed withdrawal of one million acres, including the land where the Canyon Mine is located, to “ensure we are developing our nation’s resources in a way that protects local communities, treasured landscapes, and our watersheds [.]”<sup>34</sup> In October 2011, the Bureau of Land Management (BLM) issued the Final EIS for the 2012 Withdrawal, and, on January 9, 2012, the Secretary of the Interior issued the 2012 Withdrawal.<sup>35</sup> While the Secretary reasoned that further investigation of the impacts of uranium mining on air, water, and other resources was necessary, those impacts could be “significant.” In addition, in April 2012, the Forest Service issued a draft revised Forest Plan for the Kaibab National Forest, which contained various new guidelines to protect tribal resources, including Red Butte.<sup>36</sup>

Despite all this new information and change, in June 2012 the Forest Service allowed operations to resume at the Canyon Mine. This action was based on the plan of operations and EIS approved 26 years earlier, without detailed monitoring or inspections in the meantime. As part of the 2012 action, the Forest Service prepared a “Mine Review,” as well as an assessment of the operators’ “valid existing right” and a review under the Endangered Species Act. The Forest Service did not: allow the public to comment during the review process; adopt the conservation measures proposed by the U.S. Fish and Wildlife Service to protect the California condor; prepare a supplemental National Environmental Policy Act (NEPA) review; or *amend the 1984 plan of operations in any way*. The Forest Service also did not prepare an updated historical and cultural review under the National Historic Preservation Act, despite the designation of Red Butte as a

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<sup>29</sup> U.S. Forest Service, Canyon Uranium Mine Review at 9-10.

<sup>30</sup> *Id.* at 10-15, 23.

<sup>31</sup> Stephen Hirst, *I Am the Grand Canyon: The Story of the Havasupai People*, 84 (2006); Christina Aanestad, “Havasupai Rally to Stop Uranium Mining at Grand Canyon, AZ,” *Indy Bay*, 1 (Tues., Aug. 4, 2009), available at [http://www.biologicaldiversity.org/news/media-archive/UraniumMining\\_IndyBay\\_8-4-09.pdf](http://www.biologicaldiversity.org/news/media-archive/UraniumMining_IndyBay_8-4-09.pdf).

<sup>32</sup> U.S. Forest Service, Canyon Uranium Mine Review at 13-14.

<sup>33</sup> *Id.* at 9-10, 15.

<sup>34</sup> BLM, Notice of Proposed Withdrawal and Opportunity for Public Meeting; Arizona, 74 Fed. Reg. 35,887 (July 21, 2009); BLM, News Release, “Salazar Calls Two-Year ‘Time-Out’ from New Mining Claims on Arizona Strip Watershed near Grand Canyon National Park,” (July 20, 2009), available at [http://www.blm.gov/wo/st/en/info/newsroom/2009/july/NR\\_0720\\_2009.html](http://www.blm.gov/wo/st/en/info/newsroom/2009/july/NR_0720_2009.html) (quoting Secretary of the Interior Kenneth Salazar).

<sup>35</sup> See generally 2012 Withdrawal ROD.

<sup>36</sup> See U.S. Forest Service, Draft Land and Resource Management Plan for the Kaibab National Forest; Coconino, Yavapai, and Mojave Counties, Arizona (April 2012), available at <http://www.fs.usda.gov/detail/kaibab/landmanagement/planning/?cid=stelprdb5106605>. The Forest Service issued a final revised plan in February 2014.

Traditional Cultural Property and despite objections from the Advisory Council on Historic Preservation and the Arizona State Historic Preservation Officer. The result was that the mining operator could resume operations based on decades-old reviews and approvals.

Given the federal government's refusal to properly regulate the Canyon Mine, it is incumbent on ADEQ to protect the Grand Canyon region by requiring the most rigorous air quality standards within its discretion. We are all aware of the disaster still unfolding on the Navajo Nation due to inadequate regulation and irresponsible industry operation. The Grand Canyon State can ill afford to see its lands, waters, and economic driver – the Grand Canyon – contaminated with uranium. We urge ADEQ to implement the changes to the permitting process suggested in the comments below.

**Air Quality Permits Canyon Mine PERMIT 62877; EZ Mine PERMIT 62878;  
Arizona 1 Mine PERMIT 63895; Pinenut Mine PERMIT 62876**

Energy Fuels proposes to operate the Canyon Mine near Tusayan and the South Rim of Grand Canyon, and produce approximately 109,500 tons of uranium ore per year. The ore will be hauled off-site to the Blanding, Utah mill and at times it cannot be hauled, Energy Fuels will stockpile up to 13,100 tons on site.

Energy Fuels plans to open the proposed EZ Mine and produce approximately 146,500 tons of ore per year. The EZ Mine has not undergone federal review under either the National Environmental Policy Act, the Endangered Species Act, or the National Historic Preservation Act. It does not have a plan of operations at the time of this comment period. There is no guarantee that this mine will ever open. If it does open, the ore will be stockpiled when it cannot be hauled to the processing mill in Blanding, Utah. According to the permit, Energy Fuels will store up to 169,400 tons of ore in the ore stockpile area. We encourage ADEQ to wait to issue an air quality permit until it has a chance to review Energy Fuels' plan of operations, mining protocol, and proposed location of radon vents as described in the future Plan of Operations. This would also allow ADEQ to benefit from the full NEPA review undertaken as part of the EIS process. We also encourage ADEQ to note in the permit that the EZ mine will be a new uranium mine– not a reactivated mine as currently stated.

Energy Fuels stopped ore extraction at the Arizona 1 mine in 2015. The company may decide to reopen it at some indeterminate time in the future. Or, as occurred at Kanab North mine, it may allow dust from the industrial site to contaminate the surrounding public lands for decades, before initiating reclamation operations.

In addition, ADEQ should require the renewal of Pinenut mine's air permit. When operating, the mine had a production rate of 109,500 tons per year of uranium ore. The company shipped ore to the White Mesa Mill near Blanding, Utah, and stockpiled the ore on-site when it could not be shipped. The Ore Stockpile Area, which accommodated up to 67,230 tons of ore, the entire mine site, and dirt roads where ore was transported are contaminated. ADEQ should require systematic monitoring of these areas until sustained monitoring demonstrates the absence of contamination.

**ADEQ Must Take Utmost Caution in Permitting Mines Because They Are Grand Canyon**

## **National Park's Class I Attainment Area Under The Federal Clean Air Act**

Grand Canyon National Park is a Class I Attainment area. R18-217(B)(4) says all national parks that exceed 6,000 acres in size and were designated as a national park before 1977 shall be classified as Class I Attainment areas. Grand Canyon National Park is over one million acres in size and was designated as a national park in 1919; therefore, it is a Class I Attainment area. R18-217(B)(4) of the A.A.C. implements Title I Part C of the Federal Clean Air Act (CAA). The primary function of that part of the CAA is to “preserve, protect, and enhance the air quality of national parks...and other areas of special national or regional natural, recreational, scenic, or historic value.” In order to achieve that purpose, the CAA also states that all decisions to increase air pollution in any area where Title I Part C applies will be made only after “careful evaluation of all the consequences of such a decision...”

Arizona 1, Canyon, Pinenut, and EZ mines are located less than 20 miles from Grand Canyon National Park. Therefore, ADEQ should accord heightened care to the decision of whether to permit these facilities. Indeed, the fact that the air emissions for these facilities are below major source thresholds is obviated by the fact that the cumulative effect from each uranium mine threatens Grand Canyon National Park's Class 1 Attainment Area. See Arizona Administrative Code (A.A.C.) R18-2-302.B.2.a.ii.

While modeling was conducted for each of these mines and according to ADEQ “. . . will not adversely impact visibility in the Grand Canyon National Park,” we have some significant concerns that the modeling does not adequately address the fugitive dust issues.

ADEQ has the responsibility to preserve and enhance the air quality of Grand Canyon National Park. It began issuing permits for three of these mines in the 1980s and, in the case of EZ Mine, is issuing a permit before its Plan of Operations has been approved. Given ADEQ's duty to carefully evaluate all the consequences of the decisions to operate uranium mines, it should conduct new studies that take into consideration any changes in conditions and information that have occurred during the past 20 years. For example, drought-induced plant mortality, off-road vehicle-caused soil degradation, and increasing mobility of soil throughout the region due to grazing and other factors. People are recreating on public lands in increased numbers, and cumulative dust impacts, as well as risks to visitors from dust originating at southwestern uranium mines, must be considered.<sup>37</sup>

The proposed permits also offer little assurance that they will successfully implement control measures designed to limit major emissions. For example, each of the proposed permits relies on standby generators being limited to 120 hours of operation per year without any indication as to how those limitations will be enforced. ADEQ must carefully evaluate the consequences of operate these mines and failure to do so would violate its federally required duties under the Clean Air Act.

Energy Fuels has dozens of citations for violations in the mines it operates in the United

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<sup>37</sup> Beisner, K.R., T.M. Marston, and D.L. Naftz. 2010. Assessment of nonpoint source chemical loading potential to watersheds containing uranium waste dumps and human health hazards associated with uranium exploration and mining, Red, White, and Fry Canyons, Southeastern Utah, 2007. USGS and BLM SIR 2010-5108.



States, including in the Grand Canyon region. According to the U.S. Department of Labor Mine Safety and Health Administration, Energy Fuels mines have several violations for the Pinenut Mine issued on June 22, 2009, August 11, 2009, and September 19, 2010. Energy Fuels failed to notify the agency that they were commencing operations (30CFR§56.1000), failed to prepare and submit a form on quarterly employment (30CFR§50.30), failed to provide safety device, provisions and procedures for roadways, railroads, and loading and dumping sites (30CFR§57.9300), and improperly stored combustible materials (30CFR§57.4130).

It also received numerous safety citations at its White Mesa Mill Mine in Utah and the Arizona I Mine in Arizona. Energy Fuels has also repeatedly violated Environmental Protection Agency (EPA) reporting requirements, and failed to comply with emissions standards at the mines it now operates in Arizona and Utah. The Pandora and Beaver Shaft mines in La Sal, Utah exceeded allowable levels of release for the toxic gas radon, which is regulated by EPA, and did not test all of its vents for emissions.<sup>38</sup> After that, the company was required to begin submitting monthly reports, but failed to submit them for several months in 2010. In May, 2010, EPA issued a notice of violation to Energy Fuels for failing to properly monitor radon emissions at its Arizona I location.<sup>39</sup> Conservation groups and tribes are suing the Bureau of Land Management in federal court for allowing Energy Fuels to open the Canyon Mine without updating 1980s-era mining plans and environmental reviews.

These citations demonstrate that the company is in need of closer scrutiny and attention and should be required to do additional site characterization, monitoring, and sampling.

### **ADEQ Must Protect the Public and Environment by Requiring Fine Particulate Monitoring (PM 2.5) and Mitigation**

In order to regulate air emissions in a way that insures the health, safety and general welfare of citizens, and in a way that protects animal and plant life, the ADEQ must monitor and impose measures to prevent dispersion of fine particulate matter known to cause severe health effects. Ore and waste rock piles at uranium mines in northern Arizona can be sources for airborne fine particulate matter. For example, the United States Geological Survey (USGS) just completed a fairly detailed site assessment of surface contamination at mines on the Arizona Strip.<sup>40</sup> At the Kanab North mine near Kanab Creek it found an extensive downwind uranium delta believed to be the result of wind-dispersed fine particulate uranium dust:

“Kanab North Mine: Mined waste rock, uranium ore, pond sludge, and local wind- and water dispersed fine particles on the unreclaimed mine site (all of which contained high concentrations of uranium and other trace element constituents such as arsenic) were exposed to the ambient environment for about 20 years at the Kanab North partially mined site. Offsite, only one soil sample approximated background uranium concentrations, suggesting that dispersion extends beyond the limit of sampling, about

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<sup>38</sup> The Moab Times-Independent, [http://www.moabtimes.com/view/full\\_story/9817599/article-Irresponsibleindustry%E2%80%A6](http://www.moabtimes.com/view/full_story/9817599/article-Irresponsibleindustry%E2%80%A6) Accessed 08/12/2016

<sup>39</sup> [http://www.grandcanyontrust.org/news/wp-content/uploads/2010/05/uranium-denison-violation-5\\_4\\_10-fov0001.pdf](http://www.grandcanyontrust.org/news/wp-content/uploads/2010/05/uranium-denison-violation-5_4_10-fov0001.pdf) Accessed 08/12/2016

<sup>40</sup> Otton, J.K., T.J. Gallegos, B.S. Van Gosen, R. H. Johnson, R.A. Zielinski, S.M. Hall, R. Arnold, and D.B. Yager. 2010. Effects of 1980s uranium mining in the Kanab Creek area of Northern Arizona. USGS SIR 2010-5025.

420 feet. Soil samples (n=20) collected within about 420 feet outside of the fenced mine site had an average uranium concentration of 27.8 parts per million (more than 10 times background concentration) and arsenic concentration of 12 parts per million. Wind appears to be the dominant process dispersing material offsite” (page 49).

Tailings piles, truck loading areas, and roadways should be monitored for fine dust particles smaller than 2.5 microns. Currently, only particles smaller than 10 microns are being monitored. Without monitoring fine particulate matter, and without imposing measures that prevent fine particulate dispersion from uranium mining facilities, the ADEQ cannot insure that air polluting activities of uranium mines are being “regulated in a manner that insures the health, safety and general welfare of all the citizens of the state; protects property values and protects plant and animal life.” Fine particulate matter is difficult to contain, readily inhaled, readily suspended and transported by wind, and can contain many heavy metals as well as uranium. Dust associated with uranium mining has been found to carry arsenic, lead, copper, cadmium, nickel, strontium, and cobalt, as well as uranium. Fine particulate matter is of concern because it is small enough to enter the blood stream when inhaled and has been linked to cancer, neurotoxicity, immunotoxicity, cardiotoxicity, and increased morbidity/mortality.<sup>41</sup> Fine particulate uranium dust is of particular concern because if inhaled and absorbed into the blood stream, sensitive living tissue can be exposed to alpha radiation. The resulting biological damage increases the risk of cancer; in particular, alpha radiation is known to cause lung cancer in humans when alpha emitters are inhaled.<sup>42</sup>

The ADEQ cannot rely on Energy Fuel’s use of AERMOD to model dust dispersion because AERMOD is designed to model plume dispersion, not fugitive dust dispersion. AERMOD is “a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.”<sup>43</sup> Gaseous plumes behave very differently than airborne fugitive dust, and plume modeling does not accurately depict the dispersion of different fugitive dust particle sizes across different wind speed thresholds. In order to be useful in the context of proposed uranium mining, fugitive dust modeling must be capable of estimating wind speed thresholds for dust mobilization, suspension, transport and deposition across a range of dust particle sizes (including fine particulates). For starters, we recommend using HYSPLIT trajectories or Windrose diagrams to determine wind velocity from which transport determinations based on particle size and threshold wind velocities can then be derived. We strongly encourage ADEQ to confer with independent scientists (non-agency, non-industry) with experience in uranium dust and alpha emitter effects to develop an adequate modeling system for fine particulates.

Prior to issuing any permits the ADEQ should conduct its own modeling for PM10 and PM2.5 rather than relying on Energy Fuel’s modeling. ADEQ should subject its modeling assumptions and results to independent science peer review; it should make that modeling, its results, and peer review thereof available for public review on the ADEQ website prior to permit issuance.

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<sup>41</sup>See, for example: <https://www.epa.gov/radiation/radiation-health-effects#tab-3>

<sup>42</sup> See, for example: <http://www.epa.gov/radiation/understand/alpha.html> Accessed 12/10/15, Also, Jonathan M. Samet, M.D., M.S., Daniel M. Kutvirt, B.A., Richard J. Waxweiler, Ph.D., and Charles R. Key, M.D., Ph.D. *N Engl J Med* 1984; 310:1481-1484 June 7, 1984 DOI: 10.1056/NEJM198406073102301

<sup>43</sup> See: [http://www.epa.gov/ttn/scram/dispersion\\_prefrec.htm#aermod](http://www.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod) Accessed 01/14/2011

Prior to issuing any permits, the ADEQ must develop and require a fine particulate monitoring system whose spatiotemporal extents, frequencies, exceedance triggers and mitigation measures are sufficient to insure against mine-related dust dispersion under the range of high-wind events that can occur at mining sites. We strongly encourage ADEQ to confer with independent scientists (non-agency, non-industry) with experience in uranium dust and alpha emitter effects to develop an adequate monitoring system for fine particulates.

Because Energy Fuels has a clear financial conflict of interest erring against costs associated with sufficiently extensive, frequent, and transparent monitoring, the ADEQ should conduct monitoring itself. Monitoring systems must include a system whereby air quality exceedances, if and when detected, trigger additional dust mitigation measures. Those triggers and measures should be vetted publically and with independent (non-agency, non-industry) scientists prior to permit issuance. The ADEQ should further require that bonding, dust mitigation plans, and all resources necessary to implement those plans be in-place prior to issuing permits. The scope of bonding and mitigation plans should include cleanup of off-site pollution in addition to the prevention of initial dust suspension on site. The monitoring plan should include a measurable, quantitative trigger for mine shut down if mitigation fails to curtail exceedances. In its permits, ADEQ should commit to making all monitoring results, including exceedances, publically available on its website in real time or near real time.

### **ADEQ Must Monitor and Regulate Transportation-related Dust**

The 2010 USGS report also found contamination around the closed and reclaimed Pigeon and Hermit mines, north of the Grand Canyon, and found elevated levels of uranium in soils near roads that likely originated from ore trucks. The Pigeon Mine operated from 1984-1989 and the Hermit Mine operated for less than a year in 1989. Similarly, testing near the 1979 Church Rock, New Mexico mining disaster, revealed elevated uranium in soils near haul roads.<sup>44</sup> Roads where trucks travelled 20 years ago still have uranium dust contamination along them. The mining is supposedly safer now, yet the operating procedures are the same as those from 20 years ago. The hazards of uranium exposure are most serious when the dust is ingested or inhaled, or when it is consumed in water. Trucks will pass through many communities, and should not leave the mine site without being completely sealed. Trucks should be required to contain dust more securely than with tarps. Energy Fuels stated that more secure trucks would be "extremely expensive." What would it cost to clean up a mess or compensate an exposed population? This ore should be treated like contaminated soils from a Superfund site, or at least, covered with a solid lid that has extra protection along seams.

The Canyon Mine Environmental Impact Statement from 1986 indicates that there will be 10 trucks per day leaving the mine<sup>45</sup>, which means there will be 20 truck trips with empty trucks returning. In the fact sheet provided by the Arizona Department of Environmental Quality, it indicates that “. . . there will be approximately 12 trucks per day from each of the mines traveling to the processing mill in Utah.” Either way, there will be numerous truck trips traveling from the mine on 4.7 miles of unpaved Forest Service Road to US 180, then south 44.3 miles on US

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<sup>44</sup> Statement of Chris Shuey before the Subcommittee on National Parks, Forests, and Public Lands, Natural Resources Committee, U.S. House of Representatives, March 28, 2008

<sup>45</sup> Final Environmental Impact Statement Canyon Uranium Mine, August 1986. pp. iv, vii, 2.16, 4.19, 4.42, 4.43.

180/SR 64 to Williams, then the trucks would head east on Interstate 40 for 37.5 miles to Flagstaff. The trucks will travel through Flagstaff and then north on US 89 for 62.3 miles, and through the Navajo Nation lands.

From the EZ Mine, haul trucks will travel an unpaved road 7.3 miles to the Mount Trumbull Road, then 20.1 miles to a paved highway, State Route (SR) 389. Trucks would then travel 6.8 miles on SR 389 to U.S. Route (US) 89, then 74.8 miles through Fredonia, Arizona and Kanab, Utah to SR 98 near Page, Arizona. The trucks then travel 75.5 miles to US 160, then 26.4 miles to US 191 and north into Blanding, Utah.

There is a history of truck accidents related to previous uranium mining activities in the area. According to a May 14, 1986 article in *The Arizona Republic* about a uranium ore spill, “[Tribal environmental specialist Levon] Benally said that when tribal officials arrived on the scene on the day after the accident, crews were removing the truck and spreading sand over the uranium ore to hide it. The company has had an agreement for the past several years with the tribe to transport uranium ore across the reservation.”<sup>46</sup> The Church Rock Uranium Monitoring Project (CRUMP) Report for June 2003 to May 2007 conducted field investigations and data analysis in an area where past uranium mining was concentrated and found gamma radiation rates were significantly elevated over background along public highways and roads, on Navajo grazing lands, and in certain residential areas in close proximity to three abandoned uranium mines and a closed uranium mill and tailings disposal facility that is a federal Superfund site, even though mining and milling had ceased twenty years ago. This finding suggests that the residual effects of deposition of uranium ore from haul trucks operating at the site in the 1960s, ’70s and early 80s can still be observed in the environment more than 20 years later.

“Surveys conducted with hand-held instruments confirmed the presence of elevated gamma radiation along the highways and roads. The use of mechanized and hand-held detectors in tandem generated evidence of long-term radiological contamination of publicly accessible areas along highways and roads and next to occupied residences, especially those in the Red Water Pond Road area (Study Area A-1).”

The principal source of the high gamma rates detected along State Route 566 in the vicinity of the Old Churchrock Mine was likely uranium ore hauled in trucks from the mine to the UNC mill from the mid-1970s through the early-1980s.” (Report of the Church Rock Uranium Monitoring Project (CRUMP) 2003-2007, p.37).

The CRUMP study was conducted to address Navajo community concerns about possible long-term environmental impacts of past uranium mining and processing in residential areas and along major highways and roads in the Church Rock Mining District. The CRUMP investigation was a collaborative effort by community, local, state, federal and private entities. Considering that the trucks will be traveling through tribal lands, several communities and in places where emergency response may take some time, ADEQ and the Department of Transportation should require that the trucks provide something more than a tarp, considering the potential risk to these communities if an accident occurs.

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<sup>46</sup> Navajo officials concerned about spill of uranium ore” *The Arizona Republic*, 1986.

## Environmental Justice

The permits for these mines have serious environmental justice implications relative to Native American Tribes including the Kaibab-Paiute, Havasupai, Hualapai, Hopi, and Navajo Nation, among others. Issuing these permits will violate many of the tenets of Environmental Justice including: “demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias”; and “mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.”<sup>47</sup>

There is a legacy of contamination from uranium mining in the Southwest including 520 abandoned uranium mines throughout the Navajo Nation. The mines expose Navajo Nation residents to uranium through airborne dust and contaminated drinking water. The draft permits associated with the Canyon, EZ and Arizona 1 mines will impact the aboriginal land for several tribes including aboriginal land associated with the Canyon Mine site near Red Butte, as well as the land of the Navajo and Kaibab-Paiute as trucks pass through their reservations. ADEQ should require additional protections and should engage in additional analysis to evaluate the environmental justice implications of these mines and must ensure significant consultation with the affected tribes.

In light of these innumerable concerns and deficiencies, ADEQ should examine the air permit renewals and deny approval of all of three of them. ADEQ cannot fulfill its responsibility to protect the environment, the plants and animals, and the health of the people of Arizona if it continues to permit these mines to pollute the Grand Canyon region.

Thank you for your timely and careful consideration of our comments.

Sincerely,



Roger Clark  
Grand Canyon Program Director, Grand Canyon Trust



Sandy Bahr  
Chapter Director, Sierra Club – Grand Canyon Chapter



Katherine Davis  
Public Lands Campaigner, Center for Biological Diversity

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<sup>47</sup> <http://www.ejnet.org/ej/principles.html> Accessed 11/10/15