

**DENISON MINES (USA) CORP**  
**CLASS II AIR QUALITY PERMIT # 46700 FOR THE ARIZONA I MINE**  
**AND**  
**GENERAL AQUIFER PROTECTION PERMITS FOR THE PINENUT AND CANYON MINES**  
**RESPONSIVENESS SUMMARY TO PUBLIC COMMENTS**

**INTRODUCTION**

Class II Air Quality Permit No. 46700, issued to Denison Mines (USA) Corp, is for the underground mining of uranium ore at the Arizona I Mine. The Arizona I Mine is located on the Kanab Plateau in Mohave County, Arizona, approximately 35 miles southwest of Fredonia. No ore processing will be conducted on-site. The ore will be shipped to an off-site processing mill. If the ore cannot be shipped immediately to the mill, it will be placed in nearby stock piles. Emission sources at the facility include: mine vent shafts, emergency generator, and fugitive dust emissions from storage piles and haul trucks. The mine vents are subject to federal limits for radiation exposure from radon and the emergency generator is subject to a 120 hours per year limit. Fugitive emissions from the storage piles will be controlled by covering or stabilization. Dust emissions from haul trucks will be controlled by covering the loads and limiting the speed of the trucks on unpaved roads

The Type 3.04 General Aquifer Protection Permits for Canyon and Pinenut Mines, Permit Nos. 100333 and 100300, respectively, issued to Denison Mines (USA) Corp, are for non-stormwater impoundments. The Canyon Mine is located on the Coconino Plateau, approximately 6 miles southeast of the village of Tusayan in Coconino County, Arizona. The Pinenut Mine is located on the Kanab Plateau, approximately 4 miles east of the Arizona I Mine, in Mohave County. No ore processing will be conducted at either of these facilities. The ore will be shipped to an off-site processing mill in Utah.

**PUBLIC PARTICIPATION PROCESS**

A public notice for the Air Quality and Aquifer Protection Permits was published in the Kingman Daily Miner, the Arizona Daily Sun in Flagstaff, and the state wide edition of the Arizona Republic on June 19, 2009, and June 26, 2009 and a public notice was posted on ADEQ's public calendar and pending permit sections of the ADEQ webpage on June 18, 2009. A public meeting and hearing was held on July 22, 2009, at 6:00 PM at the Fredonia High School Gymnasium at 221 E. Hott, Fredonia, AZ 86022. Written comments were also received during the public comment period and at the public hearing. This summary presents the Department's responses to the issues raised by comments received during the public comment period.

***GENERAL COMMENTS:***

***Comments received on the official record through written comments or oral comments offered in the Public Hearing held on July 22, 2009 in the Fredonia High School.***

- 1. A number of commenters expressed support for issuance of the Air Quality and Aquifer Protection Permits for the Denison Mines.**

These comments are acknowledged.

- 2. Comments were received questioning the appropriateness of permitting uranium mines near the Grand Canyon.**

*Commenters: Matthew Stuckey, Ann McDermont, Rick Wellbrook, James P. Davis, Jim Jochim, Sylvan Grey, Sharise Waddell, Corrie Griffith, Vivienne Jake (Paiute Kaibab Tribe), Clarence Raphael, Angie Tucker, Haven Jo, William K. Verburg, Christine E. Mills, Stuart Chavez, Rena Uqualla, Linda M, Paulette Watahomigie, Lefi Jones, Hertha Woody, Jackson Brownfield, Yvonne Jones, Kovah Kaska, Kynah Kaska, Ayla Jones, Rumel Blackwolf, Raphael Jones,*

The Department's responsibility is to protect human health and the environment. The Air Quality and Aquifer Protection Permits will ensure that the air near the Canyon is safe to breathe and the water is safe to drink. State law does not allow the Department to dictate the location of any facilities seeking permits, including uranium mines, as long as the company can demonstrate that all air and water quality regulations will be met.

The federal land managers have previously authorized mining activities at these sites.

**3. Several commenters asked how the decision by the Secretary of the Interior to suspend new uranium claims would impact the permitting of the Canyon, Pinenut and Arizona I Mines.**

*Commenters: Sarah Burger (Kaibab Band of Paiute Indians), The Forgotten People (Don Yellowman, President), Wilfred Whatoname (Sr. Chairman, Hualapai Tribe)*

The decision by the Secretary of the Interior to suspend new mining claims near the Grand Canyon does not apply to existing claims. Arizona I, Pinenut, and Canyon Mines are all existing claims.

**4. Several commenters expressed concerns that the General Mining Act of 1872 is antiquated.**

*Commenters: Marsha Moneskersky, James Matthews, Vivienne Jake (Paiute Kaibab Tribe), Lawrence E. Stevens, PhD (Senior Ecologist Grand Canyon Wildlands Council, Inc.), Stacy Hamburg (Sierra Club), Roger Clark (Grand Canyon Trust), The Forgotten People (Don Yellowman, President)*

The General Mining Act of 1872 is a federal law that authorizes and governs mining for minerals, such as gold, platinum, silver, and uranium on federal public lands. State law does not authorize the consideration of the federal mining act in granting or denial of the Air Quality and Aquifer Protection Permits.

**5. Many commenters stated that uranium mine operators should be held to the highest environmental protection standards.**

*Commenter: James Matthews*

The Air Quality and Aquifer Protection Permits contain strict requirements to ensure that all applicable regulations are met and public health and the environment are protected. The company is required to conduct water and air monitoring and recordkeeping to document compliance with those requirements. In addition the Department will ensure compliance with the permits by conducting unannounced inspections of the Mines.

**6. A number of commenters suggested that the public notice period was inadequate with regards to the length of the notice and the combining of air and water permits in the same notice. In addition, it was suggested that the Department hold additional public hearings in Flagstaff, Phoenix, or on nearby Indian Reservations.**

*Commenters: Martha McCoy, Chris Shuey (Southwest Research and Information Center), Richard Moore (Director, Southwest Network for Environmental and Economic Justice (SNEEJ)), Corrie Griffith, Carletta Tilousi, Stacy Hamburg (Sierra Club), Sheila Scanlan, Janet Valder, Corrie Griffith, Carol Masuda, Matthew Putesoy (Sr. Vice Chairman, Havasupai Tribe), James Matthews*

State law provides for a 30-day public comment period on the air quality permit for the Arizona I Mine. Although State law does not require public comment on the general aquifer protection permits, the Department was aware of the significant amount of interest in the aquifer protection permits for the Pinenut and Canyon mines, and as a result, the general permits were included in the public notice for the Arizona I Mine to provide the public an opportunity to comment on these permits. Since the Pinenut and Canyon mines will also require subsequent air quality permits, and may require additional aquifer protection permits, there will be additional opportunities for comment on permits for those mines.

With regards to the location of the hearing, the Department held the public meeting and the public comment hearing with a verbatim record immediately afterwards in Fredonia because it is the community closest to, and that would be most affected by, the issuance of the air quality permit for the Arizona I Mine, and the aquifer protection permit at the Pinenut Mine—which are both North of the Grand Canyon. Additionally, Supervisor Gary Watson of the Mohave County Board of Supervisors requested that ADEQ hold the hearing in Fredonia.

Attendance at the meeting or hearing was not necessary in order to submit comments on the record. The Air and Water Quality Divisions review and consider all comments about these proposed permits, regardless of whether the concerns are received by mail, e-mail, or fax. Written comments submitted on proposed permits receive the same consideration as those presented orally at the public meeting and hearing.

**7. A comment was received indicating that the Department should include a start date of the public notice period in the legal notice published in the newspapers and on the Web.**

*Commenter: Chris Shuey (Southwest Research and Information Center),*

The Department appreciates this comment and commits to including the start date of the public comment period in future public notices. The public notice on the ADEQ webpage published on June 19, 2009 stated that June 19 was the “Start of public comment period” and is reprinted below:

*June 19, 2009*

*PUBLIC NOTICE: Air and Water Quality: Denison Mines Corp.; Air Quality Permit No. 46700 for the Arizona I mine; Water Quality General Aquifer Protection Permits for the Canyon and Pinenut mines  
Start of public comment period. Comment period ends July 22, 2009.*

The entire posting to the ADEQ Notices Web page stated:

*June 19, 2009*

*PUBLIC NOTICE: Air and Water Quality: Denison Mines Corp.; Air Quality*

*Permit No. 46700 for the Arizona I mine; Water Quality General Aquifer Protection Permits for the Canyon and Pinenut mines*  
*Start of public comment period. Comment period ends July 22, 2009.*  
*Draft Air Permit # 46700 for the Arizona I Mine*  
*Draft Air Permit Technical Support Document for the Arizona I Mine*  
*Air and Water Permits Fact Sheet*  
*Water Quality Fact Sheet for the Canyon Mine*  
*Draft Discharge Authorization for 3.04 General APP for the Canyon Mine*  
*Water Quality Fact Sheet for the Pinenut Mine*  
*Draft Discharge Authorization for 3.04 General APP for the Pinenut Mine*

*July 22, 2009*

*PUBLIC MEETING AND HEARING: Air and Water Quality: Denison Mines Corp.;*  
*Air Quality Permit No. 46700 for the Arizona I mine; Water Quality Permits for the Canyon and Pinenut mines*  
*6:00 p.m.*  
*Gymnasium at the Fredonia Elementary School*  
*221 East Hortt, Fredonia, Arizona 86022*  
*Trevor Baggiore, (602) 771-2321*

The newspaper notices published on June 19, 2009 and June 26, 2009 stated that comments must be received by July 22, 2009.

- 8. A commenter had concerns that the applications for the Air Quality and Aquifer Protection Permits were not easily accessible for review, specifically that they were not on the ADEQ Web site.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

The Department provided copies of the permit related material, including the permit applications, to locations in Fredonia, Flagstaff, Kingman, and Phoenix to ensure that they would be available for review during the public comment period. The public notice listed the addresses for each location where the permit could be reviewed. In addition, the public notice provided the contact information of Department staff that could be contacted for additional information.

The complete permit applications are considered public record and have been available for review in the Department's record center since receipt by the Department (January 31, 2008).

The Department will consider posting applications and other background documents on the ADEQ Web site in the future.

- 9. Several commenters stated that tribal communities potentially affected by these facilities are environmental justice populations.**

*Commenters: The Forgotten People (Don Yellowman, President), Richard Moore (Director, Southwest Network for Environmental and Economic Justice (SNEEJ)), Marsha Moneskersky*

The Department acknowledges the environmental justice concerns that have been raised. The Department investigated and analyzed these concerns in order to ensure that no communities are

disproportionately affected by these Mines. ADEQ's Environmental Justice Assessments for all three mines are attached and are incorporated into this responsiveness summary.

- 10. A concern was raised that the Department relied upon outdated information and documentation in considering the permit applications. The early analysis to estimate radiation associated with traffic on haul roads was based on faulty data.**

*Commenters: Chris Shuey (Southwest Research and Information Center), Stacy Hamburg (Sierra Club), Carletta Tilousi, Vivienne Jake (Paiute Kaibab Tribe)*

The Department recognizes that several documents from the 1980s and 1990s are available as background information for the Mines; however, the Department did not rely upon any of these documents in drafting the Air Quality and Aquifer Protection Permits. State law governing the Air Quality and Aquifer Protection Permits required Denison to submit complete applications for these permits, containing all of the information ADEQ needed to evaluate whether the Mines could be operated in compliance with all applicable environmental laws to keep the air safe to breathe and the water safe to drink.

- 11. Comments were received regarding the protection of sacred Native American cultural resources and traditional cultural properties. Specifically, it was suggested that the Department include all applicable state requirements for protecting these resources and properties in the permits.**

*Commenters: Chris Shuey (Southwest Research and Information Center), Marsha Moneskersky*

The Department's responsibility is to protect human health and the environment. The Air Quality and Aquifer Protection Permits will ensure that the air is safe to breathe and the water is safe to drink. State law does not allow the Department to include non-air and water quality requirements in the Air Quality and Aquifer Protection Permits; however, Denison Mines is required to meet any and all other applicable state and federal requirements for protecting these resources and properties.

- 12. Comments were received recommending that these Permits should not be issued due to the current market conditions for uranium. It was suggested that the Permits should not be issued until Denison Mines indicates that they intend to initiate site development.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

State law does not allow the consideration of market conditions in the granting or denial of Air Quality and Aquifer Protection Permits. In addition, Denison Mines has indicated that they intend to initiate site development at the Arizona I mine upon issuance of the air quality permit.

- 13. A comment was received that the Bureau of Land Management approved the mining of uranium at these locations in violation of House Committee on Natural Resources (HCNR) resolution H.R. 5583 passed on June 20, 2008.**

*Commenters: The Forgotten People (Don Yellowman, President)*

The resolution by the HCNR applied only to new mining claims. The Arizona I, Pinenut, and Canyon mines are existing claims.

**14. Several commenters expressed concerns with Denison Mine’s history of worker safety violations.**

*Commenters: Martha McCoy, Sheila Scanlan, Corrie Griffith, Sandy Bahr (Sierra Club)*

Worker safety at these mines is under the jurisdiction of the U.S. Department of Labor through the Mine Safety and Health Administration (MSHA), the Arizona Mine Inspector, and the Arizona Industrial Commission through the Arizona Division of Occupational Safety and Health (ADOSH). ADEQ does not have authority over worker safety.

Nevertheless, ADEQ has asked Denison Mines for a formal response to the recent citations issued by MSHA (including violations during ownership of the Arizona I Mine by JS Redpath Corp.), and is in communication with MSHA regarding these citations. MSHA advises ADEQ that all of the JS Redpath Corp. violations have been “closed”.

At this time the citations do not reflect on the fitness of Denison to comply with the permits or Arizona environmental laws. ADEQ will remain in close communication with MSHA as to the open citations issued by MSHA at Denison facilities, and ADEQ will take action if necessary to ensure Denison complies with all ADEQ permits.

State law does not allow the consideration of worker safety in the granting or denial of Air Quality and Aquifer Protection Permits; however, when ADEQ inspectors observe what appear to be unsafe working conditions, they routinely provide that information to the appropriate State or federal agencies.

**15. A commenter questioned whether ADEQ’s technical capability and rules were adequate to protect air and water quality at uranium mining operations.**

*Commenter: Christopher Brown (Paiute Kaibab Tribe)*

The Department has regulated various types of mining operations during the over 20 years of its existence. While uranium mines have unique considerations, the Department has the staff and technical expertise to effectively regulate uranium mines. The Air Quality and Aquifer Protection Permits include all applicable federal and State requirements to ensure that the air is safe to breathe and the water is safe to drink. ADEQ will enforce its rules by conducting unannounced inspections of the Mines and will review Denison’s on-site records and the compliance documentation submitted to ADEQ. If ADEQ has reason to believe that conditions in the Permits are or have been violated, ADEQ will take action, as provided in the Department’s Compliance and Enforcement Handbook. The Handbook is available on the Web at <http://www.azdeq.gov/function/forms/docs.html#hand>.

**16. Several commenters raised concerns about foreign companies operating uranium mines.**

*Commenter: Vivienne Jake (Paiute Kaibab Tribe)*

State law does not allow the Department to deny a permit application based on the nationality of the applicant. The Department issues permits only to companies that are legally registered to do business in Arizona. Denison Mines is registered with the Arizona Corporation Commission to do business in Arizona.

17. **A commenter expressed concern that the mined uranium would be exported and not used for domestic purposes.**

*Commenter: Marsha Moneskersky*

State law does not allow the consideration of the end use of products in the granting or denial of Air Quality and Aquifer Protection Permits.

18. **A commenter expressed concern that the planned mine life may be longer than indicated by Denison Mines in the permit applications.**

*Commenters: Rothstein, Donatelli, Hughes, Dahlstrom & Schoenburg, LLP*

The Department has written the Air Quality and Aquifer Protection Permits to ensure that public health and the environment will be protected for the entire life of each of the Mines. State law does not allow the Department to impose limits on the life of permitted facilities.

The Air Quality and Aquifer Protection Permits must be renewed after 5 years for continuing operations. The Air Quality Renewal Permit will be subject to a public notice and comment period including a public hearing.

19. **Several commenters are requesting formal consultation with the Hualapai tribal council, consistent with your agency's tribal policy, regarding potential impacts to Hualapai federal trust resources from proposed mining activities and request that these permits not be approved ever, or at least until the consultation has occurred.**

*Commenter: Wilfred Whatoname, Sr., Hualapai Tribal Chairman*

ADEQ conducted a consultation with the Hualapai Tribe leadership and Members in Peach Springs at the Tribal Council meeting room on August 10, 2009, and the consultation is summarized in ADEQ's Environmental Justice Assessment which is incorporated into this Responsiveness Summary.

ADEQ conducted a consultation with the Havasupai Tribe leadership and Members in Supai Village in the Supai Canyon on August 20, 2009. The consultation began at about 11 am with a 15 minute presentation, and the ADEQ Tribal Liaison and Director of the Water Quality Division answered questions and received comments from tribal members until about 5pm that day. The consultation is summarized in ADEQ's Environmental Justice Assessment which is incorporated into this Responsiveness Summary.

ADEQ conducted a consultation with the Kaibab Paiute Tribe leadership and Members at the Tribe's Reservation west of Fredonia, Arizona on August 27, 2009. The consultation is summarized in ADEQ's Environmental Justice Assessment which is incorporated into this Responsiveness Summary.

*Comments received during the Question and Answer portion of the public meeting*

20. **How long is the life of mine?**

Denison has informed ADEQ that each mine is not anticipated to operate for more than 5 to 8 years.

- 21. A tribal elder, Vivienne Jake of the Paiute Kaibab Tribe, stated she had serious concerns about the health, air, water, and cultural concerns about uranium mining in Northern Arizona; why are other countries allowed to mine within the US; this will greatly impact our culture; the 1872 Mining Law is outdated; this will impact one of the seven wonders of the world.**

ADEQ acknowledges these issues and concerns. ADEQ believes that the Air Quality and Aquifer Protection Permits conditions will protect public health of residents and visitors to the mining areas, and that the air will be safe to breathe and the water safe to drink.

Some of these comments were also included in the official public record. Please see responses to issues 2, 4, 11, and 16, above.

- 22. What is the cost of uranium and how much profit is Denison making?**

This question was fielded by the Denison CEO and President. He stated the current price of uranium ranged from the high \$40s to low \$50s per pound. He directed the commenter to the company's financial documents for information regarding expected profits.

- 23. How many mines are in boundaries of the Grand Canyon National Park?**

The Department is not aware of any active uranium mines within the Grand Canyon National Park. The Arizona I, Pinenut, and Canyon Mines are not within the Park.

- 24. What additional permits are required?**

With the granting of the air quality permit for the Arizona I Mine, Denison has all the necessary environmental permits to begin operations.

The Canyon and Pinenut mines both will require Air Quality and will likely require additional Aquifer Protection Permits before they will be allowed to operate.

- 25. ADEQ should have held a public meeting, with a question and answer session prior to the day that comments are due.**

ADEQ combined the public meetings and hearings in order to meet the deadline for acting on the Aquifer Protection Permits by August 11, 2009, and the Air Quality Permit by September 1, 2009, as required under the Licensing Timeframe Law, A.R.S. 41-1073.

Arizona law does not require a public hearing before issuing a general permit under the Aquifer Protection Program, but ADEQ decided to hold a public meeting with questions by citizens and answers from ADEQ and the permit applicant, a written public comment period with this written responsiveness summary, and a public hearing on the air quality permit with verbatim record to accept oral comments from citizens who chose to make them. ADEQ has also conducted an Environmental Justice Assessment and is conducting in-person consultation with tribal members who have raised environmental justice and other concerns.

- 26. Summarize the Mining Operation.**

The mining operation at underground uranium mines typically begins by digging a vertical shaft into a uranium-bearing breccia pipe. A vertical shaft is similar to an elevator shaft in a large building, with various levels and elevators to raise and lower workers, materials, and to remove development rock and ore from the mine and also to provide ventilation for work underground. Horizontal tunnels are driven into the rock to access the deposits.

The equipment used in underground mines depends on the size of the deposit and the mining method. Breccia pipe deposits are small and therefore the mines use equipment that is generally smaller than equipment used in large metal mines or most coal mines. Equipment used in breccia pipe mines is similar to small equipment that one might see on a surface construction site. This includes small drills, loaders, and trucks.

Mine workers drill holes into the mine faces (or walls) and utilize explosives to selectively break the rock. After blasting, ground support is installed to make certain workers are protected from any loose rock. After the rock is broken, the loaders and trucks haul it to the vertical shaft. Here the rock is loaded into elevators specifically for raising the rock to the surface. On the surface the development and mineralized rock are segregated into separate stockpiles. The mineralized rock is then transported in covered haul trucks to the ore processing mill, located south of Blanding, UT.

**27. Were there any past problems at the mines?**

The Department does not have any information regarding past environmental problems at the Arizona I, Pinenut, or Canyon Mines.

The Department conducted additional research regarding this issue after the public meeting and has become aware of MSHA violations at the Arizona I and Pinenut Mines. These violations are not related to environmental concerns of issue with these permits.

Nevertheless, ADEQ has asked Denison Mines for a formal response to the recent citations issued by MSHA, and is in communication with MSHA regarding these citations. At this time the citations do not reflect on the fitness of Denison to comply with the permits or Arizona environmental laws.

**28. What are the haul routes?**

From the Arizona I Mine, haul trucks will travel a short un-named unpaved road for about 6.25 miles until they reach the un-paved Mount Trumbull Road. Haul trucks travel this road for approximately 29.1 miles until they reach State Highway 389. From State Highway 389 the trucks travel approximately 6.8 miles to US Highway 89. From US Highway 89 the haul trucks travel approximately 74.8 miles, through Fredonia and Kanab until they reach State Highway 98 near Page. The haul trucks then travel approximately 75.5 miles until they reach U.S. Highway 160. From U.S. Highway 160, the haul trucks travel 26.4 miles until they reach U.S. Highway 191 crossing into Utah. The haul trucks continue traveling on U.S. Highway 191 until they reach Blanding, Utah.

**29. How many people have gotten sick in the mines?**

The Department does not have any information regarding health effects from occupational exposure at the mines when they were originally operated.

**30. Will haul trucks travel on any roads that are not public roads?**

According to the information provided by Denison Mines, all haul truck travel will be on public roadways.

**31. What would the mines mean economically in the area?**

Denison Mines has estimated that the economic impact would bring \$10 - \$12 million per year (per mine) to the local area. This would be seen through employment, purchasing of mine supplies, and the spin-off of employee and family spending in the local community.

**32. How often will someone be there to monitor these mines? What about water and air quality impact from radiation from haul trucks?**

The Air Quality Permit for the Arizona I Mine requires Denison Mines to keep records of all emission related activities. The Permit requires Denison Mines to submit for approval a dust control plan that will require them to monitor and track ongoing implementation of dust control measures. The Permit also requires that all haul trucks be covered to minimize dust. Additionally, radon emissions from the vent shaft must be monitored and the results sent to the Department for review. The Department will also conduct unannounced inspections of the mine site and verify that all air quality permits requirements are being met.

The general Aquifer Protection Permits require that the discharge to the impoundments at Canyon and Pinenut Mines be sampled quarterly upon initial discharge. The general permits also have three voluntary and enforceable conditions which require: 1) monitoring of the volume and quality of water pumped from the mine shafts including the mine workings, working shaft sumps, and final shaft and vent sumps to the surface impoundment with reporting to ADEQ of results no later than 30 days after receipt by Denison. This includes conducting a permeability test on rock samples taken from the bottom of the final shaft and the vent sumps, along with a survey of the sumps to identify any features (i.e., fractures, joints, faults, or bedding planes) which may convey fluids out of sumps, prior to use, and lining with bentonite clay or seal any identified feature that may convey fluids out of the mine. 2) financial assurance for closure and post-closure work when the impoundment is closed, and 3) a complete public process prior to issuing the general permits.

The Arizona I Mine Individual Aquifer Protection Permit requires sampling of the mine shaft sump quarterly for the first year of operation, then annually thereafter. In addition, the volume pumped from the mine shaft sump is required to be measured monthly and reported quarterly for the first year, and annually thereafter. This permit also requires monitoring of the liner leakage detection system bi-weekly.

***AIR QUALITY COMMENTS:***

***Comments received on the official record through written comments or oral comments offered in the Public Hearing held on July 22, 2009 in the Fredonia High School.***

**AQ1. A comment was received noting that the Air Quality Permit and the Technical Support Document list different ore and development rock tonnages.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

The Department has determined that the technical support document contained a typographical error with regard to the development rock tonnage. The correct amount of development rock is 54,750 tons and the amount of ore is 109,500 tons. The total ore and development rock listed in the technical support document is correctly listed as 164,250 tons.

- AQ2. A concern was expressed that the supporting calculations of radon emissions were not provided and that the emissions of radon from the Arizona I Mine and the Pinenut Mine should be considered cumulatively.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

Potential radionuclide emissions (including radon) from the Arizona I Mine were calculated by Denison Mines and reviewed by the Department. Total radionuclide emissions from the Arizona I Mine are 15.08 pounds per year of which 0.0000332 pounds per year are radon.

The permit contains a federal requirement that prohibits the emissions of radon from the underground mine in excess of those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 millirem per year (mrem/yr). The exposure of 10 mrem/yr can be put in perspective by comparing it to radiation exposure to common activities. According to EPA's radiation protection Web site (<http://www.epa.gov/radiation/understand/calculate.html>), X-rays for example give an average dose of 40 mrem per X-ray. Denison Mines must use the Environmental Protection Agency's COMPLY-R mathematical model (or equivalent) to demonstrate compliance with the 10 mrem/yr federal limit.

The Department will determine the appropriateness of considering the cumulative radon emissions from the Arizona I Mine and the Pinenut Mine if and when an air quality permit application for Pinenut is submitted by Denison Mines.

- AQ3. A concern was raised regarding the potentially intermittent operations of the facility and the potential for long-term storage of radioactive materials. The commenter suggested that the air permit include a limit on the amount of material that can be stored on-site, above ground.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

The air quality permit requires Denison Mines to cover or stabilize all storage piles at the Arizona I Mine, including potentially radioactive ore piles and to minimize dust emissions when the piles are not actively being worked. Denison Mines is required to comply with all conditions of the air quality permit whether or not the mine is in operation.

- AQ4. A commenter suggested that the Department should require a Class I air quality permit instead of a Class II permit for the Arizona I mine.**

*Commenter: Sandy Bahr (Sierra Club)*

First, a Class I permit for the Arizona I Mine would not be any more stringent than the Class II permit issued to Denison Mines. Second, Arizona Administrative Code Title 18, Chapter 2, Article 3, Section 302 (R18-2-302) clearly defines which sources require Class I and Class II permits, and the emissions from the Arizona I Mine are well below the levels that would require a Class I permit.

- AQ5. A commenter suggested that the Department more carefully evaluate the impacts of the mine on the Grand Canyon due to the Canyon’s status as a Class I area.**

*Commenter: Sandy Bahr (Sierra Club)*

The Department did require Denison to conduct extensive analyses to ensure that the Arizona I Mine would not cause a reduction in visibility at the Grand Canyon. The Department required these analyses even though such analyses are not required for Class II sources. The Department also required Denison Mines to include the unpaved road travel by the haul trucks in these analyses even though these roads are also available for general public use. These two requirements are more protective than required by law and also are part of ADEQ’s Environmental Justice Assessment.

- AQ6. A commenter expressed concern with the enforceability of the hours limitation on the emergency generator.**

*Commenter: Sandy Bahr (Sierra Club)*

Condition IV.A.3 of Attachment “B” requires the company to keep monthly records of hours of operation of the generator to demonstrate compliance with the hours limitation. The generator is for emergency purposes only and will not be used to provide power to the mine except in such emergency situations. The Permit includes a limit of 120 hours per year of operation is for maintenance and readiness testing. Based on this comment, the Department has added a requirement to the permit to install a non-resettable hours meter.

- AQ7. A commenter expressed concern with radioactive dust and radon from excess emission events.**

*Commenter: Patricia M. Ellsworth*

The air permit requires Denison Mines to proactively control dust from mine operations. If an excess emission event occurs Denison Mines is require to notify the Department of the event within 24 hours and to take corrective action. A full report, including the quantity of excess emissions and action taken to eliminate the excess emissions, is required within 72 hours of the event.

- AQ8. A comment was received regarding the appropriate permitting process for a facility change that would increase emissions more than 10% of the major source threshold.**

*Commenter: Patricia M. Ellsworth*

The commenter is referring to Arizona Administrative Code (A.A.C.), Title 18, Chapter 2, Article 3, Paragraph 317.02.C (R18-2-317.02.C), which states that a seven-day notice is required for a “physical change or change in the method of operation that increases actual emissions more than 10% of the major source threshold for any conventional pollutant *but does not require a permit revision.* (emphasis added)” This does not mean that any facility change that increases emissions more than 10% of the applicable major source threshold does not require a permit revision. A.A.C. R18-2-319.B.4 requires a minor permit revision for changes that result in emissions for which there are not adequate monitoring, recordkeeping or reporting requirements already in the permit. In addition, any change that results in an emissions increase above the significance thresholds listed in A.A.C. R18-2-101.106.a is required to obtain a significant permit revision

under A.A.C. R18-2-320.B.3. Some of those significance thresholds include PM<sub>10</sub> (particulate matter smaller than 10 microns), and a significant permit revision means a complete public process with written and oral public comment and a public hearing.

**AQ9. A commenter expressed concerns regarding the potential air and radiation impacts to humans and wildlife.**

*Commenter: Patricia M. Ellsworth*

First, the Air Quality Permit contains strict requirements to ensure that any dust that may contain radioactive materials is prevented from becoming airborne.

Second, as part of the permit application process, Denison Mines was required to conduct an ambient air dispersion model to ensure that emissions from the Arizona I Mine would not cause or contribute to an exceedance of the federal National Ambient Air Quality Standards. These standards are protective of the health of humans and wildlife.

Third, the Air Quality Permit contains a federal requirement that prohibits the emissions of radon from the underground mine in excess of those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 millirem per year (mrem/yr). The exposure of 10 mrem/yr can be put in perspective by comparing it to radiation exposure to common activities. According to EPA's radiation protection Web site (<http://www.epa.gov/radiation/understand/calculate.html>), X-rays for example give an average dose of 40 mrem per X-ray. Denison Mines must use the Environmental Protection Agency's COMPLY-R mathematical model (or equivalent) to demonstrate compliance with this limit.

**AQ10. A commenter suggested that the opacity limit for the emergency generator should be reduced to 30% from 40%.**

*Commenter: Patricia M. Ellsworth*

Arizona Administrative Code (A.A.C.) Title 18, Chapter 2, Article 7, Section 719 (R18-2-719) is the applicable requirement for the emergency generator. That rule specifies a 40% opacity limit.

**AQ11. A commenter suggested that the opacity limit for fugitive dust be reduced from 40% to 20%.**

*Commenter: Patricia M. Ellsworth*

Arizona Administrative Code Title 18, Chapter 2, Article 6, Section 614 (R18-2-614) is the applicable requirement for the nonpoint sources of fugitive dust. That rule specifies a 40% opacity limit. It should be noted that the permit requires the stabilization of potential fugitive dust sources to prevent dust from becoming airborne.

**AQ12. A commenter asked how earth or other materials will be removed from paved streets.**

*Commenter: Patricia M. Ellsworth*

Earth and other materials may be tracked onto State Highway 389 by both haul trucks and private passenger vehicles using the Mount Trumbull Road. Haul truck will travel approximately 37

miles on unpaved roads between the Arizona I Mine and Highway 389. Highway 389 is maintained by the Arizona Department of Transportation.

**AQ13. A commenter suggested that the Department should require Denison Mines to install a newer model generator with lower emissions.**

*Commenter: Patricia M. Ellsworth*

State law does not allow the Department to specify what model year of emergency generator Denison Mines can install. The Department has determined that the proposed generator can meet the requirements in A.A.C. R18-2-719.

**AQ14. A commenter expressed concerns that the Kaibab Paiute Tribe is downwind of the proposed mines and will be adversely affected by dust from the facilities.**

*Commenter: Tony Phillippe (Tribal Administrator for the Kaibab Piute Tribe)*

As part of the permit application process, Denison Mines was required to conduct an ambient air dispersion model to ensure that emissions from the Arizona I Mine would not cause or contribute to an exceedance of the federal National Ambient Air Quality Standards for particulate matter. These standards are protective of the health of humans and wildlife. It should be noted that the Department required Denison to include the 37 miles of unpaved road used by the haul trucks in the dispersion analysis even though these roads are also available for general public use and are not part of the mine operational area or owned by Denison Mines. This requirement is more protective than required by law and is also part of ADEQ's Environmental Justice Assessment.

**AQ15. A comment was received regarding the sulfur oxides from the emergency generator reducing the visibility at the Grand Canyon.**

*Commenter: Steve Martin (Superintendent, National Park Service, Grand Canyon National Park)*

The emergency generator is limited to 120 hours of operation per year, which results in 0.08 tons (160 pounds) per year of SO<sub>2</sub> emissions. The Department has determined that this level of emissions will not result in adverse effects on visibility at the Grand Canyon.

**AQ16. A commenter suggested that the air permit require Denison Mines to use low-sulfur diesel fuel in the emergency generator.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

Condition IV.D.1.a of Attachment "B" of the permit prohibits the use of high-sulfur fuel in the emergency generator. Denison Mines is required to keep records of the sulfur content from the fuel supplier to demonstrate compliance with this condition.

**AQ17. A commenter asked if the calculated particulate emissions of the haul trucks traveling on unpaved roads included haul trucks from the Pinenut Mine.**

*Commenter: Steve Martin (Superintendent, National Park Service, Grand Canyon National Park)*

The particulate emissions from the haul truck traveling on unpaved roads did not include haul trucks from the Pinenut Mine. The emissions from haul truck traffic related to the Pinenut Mine will be evaluated if and when an air quality permit application is submitted by Denison Mines.

**AQ18. A commenter suggested that the air permit include dust mitigation measures for trucks traveling on unpaved roads.**

*Commenter: Steve Martin (Superintendent, National Park Service, Grand Canyon National Park)*

The dust emission estimates for trucks traveling on unpaved roads were based on the size of the trucks and a speed of 25 miles per hour. Condition VII.B.1.a.iv limits the speed of the trucks to 25 miles per hour. The company is required to install electronic speed tracking devices on their trucks and record odometer mileage and time to demonstrate compliance with the speed limit.

**AQ19. A concern was expressed that if the pond is allowed to dry out that potentially contaminated dust could be transported into local drainages or further locations. It was suggested that requirements be included in the permit to prevent such transport.**

*Commenter: Steve Martin (Superintendent, National Park Service, Grand Canyon National Park)*

The Department agrees with this comment and has added Condition VII.B.1.b.ii to Attachment "B". This condition requires the company either to maintain water in the pond, stabilize the pond area, or remove all sediment in the pond to minimize fugitive dust emissions.

**AQ20. A commenter suggested that a sampling program be developed to monitor transport of pond dust by the wind.**

*Commenter: Steve Martin (Superintendent, National Park Service, Grand Canyon National Park)*

Due to the addition of Condition VII.B.1.b.ii, the Department does not anticipate any pond dust being entrained by the wind.

***Comments received during the Question and Answer portion of the public meeting***

**AQ21. How do you monitor the Air Quality?**

As part of the permit application process, Denison Mines was required to conduct an ambient air dispersion model to ensure that emissions from the Arizona I Mine would not cause or contribute to an exceedance of the federal National Ambient Air Quality Standards for particulate matter. These standards are protective of the health of humans and wildlife. The Department required Denison to include the 37 miles of unpaved road used by the haul trucks in the analysis.

The Air Quality Permit requires Denison Mines to keep records of all emission related activities. The permit requires Denison Mines to submit for approval a dust control plan that will require them to monitor and track ongoing implementation of dust control measures. Additionally, radon emissions from the vent shaft must be monitored and the results sent to the Department for review. The Department will also conduct unannounced inspections of the mine site and verify that all air quality permits requirements are being met.

The Air Quality Permit requires Denison Mines to monitor for radon and fugitive dust. The company is required to report the results of this monitoring to ADEQ semi-annually. The

Department will also conduct periodic inspections of the facility which includes a review of monitoring records.

**AQ22. How does evaporated water from the pond affect air quality?**

Water that evaporates from the pond will not affect air quality. Only water will evaporate from the pond. Any residual uranium and other minerals in the water will remain in the pond.

**AQ23. Dust control failures at the Today mine, and exceedances from the Pandora mine provide sufficient evidence that ADEQ should require Denison to obtain a Class I Permit.**

The Air Quality Permit requires Denison Mines to proactively control dust at the facility. Monitoring, recordkeeping, and reporting requirements, along with periodic unannounced inspections by the Department will ensure that the company is properly controlling dust.

The question regarding Class I versus Class II permits was also asked on the record. Please see issue AQ4 above.

**AQ24. How many reservations will the haul route go through?**

Based on the information provided by the company, the haul route will pass through three reservations: Navajo Indian Reservation, Kaibab Paiute Indian Reservation, and Ute Indian Reservations

***WATER QUALITY COMMENTS:***

***Comments received on the official record through written comments or oral comments offered in the Public Hearing held on July 22, 2009 in the Fredonia High School.***

**WQ1: A commenter suggested that the proponents have not demonstrated adequate protection of surface water and groundwater.**

*Commenter: Sarah Burger (Kaibab Band of Paiute Indians)*

The general permits require liners to protect groundwater quality. Additionally, the ponds are designed to hold all the water produced in the mine shaft, rainfall from a 100-year, 24-hour storm event, plus 2 feet of extra capacity (called freeboard because it is space above the water surface) to prevent any surface water impact.

**WQ2: Several commenters questioned if the amount estimated for the closure and post-closure costs were sufficient.**

*Commenter: Sarah Burger (Kaibab Band of Paiute Indians)*

The Canyon and Pinenut permits only apply to the non-stormwater impoundments. Both of these mines will require additional permits (air and water) to be able to operate and additional financial assurance will also be required.

**WQ3: A commenter asked if general permits were denied last year, why are they being reconsidered at this point.**

*Commenter: Carol Masuda*

The original general permit applications included eight facilities (four at each mine) and relied on 20-year-old liners that did not meet the requirements of the rule. The applications we have currently include only one impoundment at each mine. New liners will be installed over the existing liners. The upgraded design now meets the rule requirements.

**WQ4: A commenter suggested that ADEQ partner with the mining companies to clean up the abandoned mines that leach radioactive waste before granting any more permits for uranium mining.**

*Commenter: Linda Mardel*

Abandoned mines are a national problem with no simple solution. ADEQ's Aquifer Protection Permit Program requires individual permits for new mines to have financial assurance in place to cover the closure and post-closure costs of mines to ensure this is not a continued problem.

**WQ5: With regard to the permits, the draft permits do not provide enough information or assurances that local groundwater will not be affected. Additional monitoring and sampling off site should be required to detect any possible contamination.**

*Commenter: Steve Martin, Superintendent, US Dept. of Interior Grand Canyon National Park Service*

The water permit applications address only non-stormwater impoundments, which require liners to prevent groundwater contamination. The mines will need additional water permits before they can commence operation.

**WQ6: A commenter suggested that ADEQ require individual permits from each of the mines with guidelines tailored to the issues at each location.**

*Commenter: Sandy Bahr (Sierra Club)*

ADEQ does not have the legal authority to compel an individual permit at this time. Denison submitted applications for general permit coverage for non-stormwater impoundments. The proposed design is consistent with the general permit requirements in rule. An individual permit would be required if the general permit applications failed to meet the general permit rule requirements. In addition to meeting the requirements set forth in rule for obtaining a general permit, Denison has agreed to voluntary, yet enforceable conditions which require groundwater protections at the bottom of the shaft, monitoring of water pumped from the shaft, posting of a financial capability to close the impoundments and conduct post-closure testing in the event of the applicant's inability to do so, and a public process including a public meeting with questions by citizens and answers from ADEQ and the permit applicant, a written public comment period with this written responsiveness summary, and a public hearing with verbatim record to accept oral comments from citizens who chose to make them orally.

**WQ7: With the ongoing history of hundreds of abandoned mines in the Southwest that still pose a threat, leaking radioactive waste into our water supply, requiring millions of clean up dollars, it would be wise of the ADEQ to prioritize strict standards before the permits are granted to ensure these mines are not just more of the same.**

*Commenter: Sandy Bahr (Sierra Club)*

ADEQ's Aquifer Protection Permit Program is intended to protect groundwater for drinking water use through permit requirements. Additionally, all mine permits require financial assurance to cover the closure and post-closure costs of mines to ensure this is not a continued problem.

**WQ8: A commenter suggested that sampling of the production well would be more effective than sampling the discharge to the impoundment.**

*Commenter: Sheila M. Scanlan*

The general permit for surface impoundments does not require groundwater sampling because it requires that liners be constructed, operated, and maintained so as not to leak. Nevertheless, Denison has agreed to perform monitoring of the discharge to the impoundment which will provide ADEQ with data to be used in determining whether additional monitoring is necessary. The only applications before ADEQ are for non-stormwater impoundments. The rest of the mining operations at Canyon and Pinenut are not being permitted at this time. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine whether additional monitoring should be required.

The general permit for surface impoundments does require monitoring of water quantity and quality pumped from the working shafts of the mines at the point the water enters the permitted surface impoundment. This monitoring of water quantity and quality from the working shafts of the mine is far more effective in assessing whether groundwater is likely to be contaminated by the mine operations rather than sampling the quality of groundwater in the production well nearby.

**WQ9: Several commenters stated that impoundments are well renowned for failing. The Grand Canyon is riddled with faults, fractures, joints and karst conduits that may allow water to infiltrate at much greater rates because of the preferential flow pathways. If the non-stormwater impoundment fails at Canyon Mine, the water and any contaminants would be discharged into Red Horse Wash, which is a tributary of Havasu Canyon. While it may not make its way into Grand Canyon National Park directly, it could contaminate perched groundwater. The aquifer permits are going to be issued based on an old Environmental Impact Statement (EIS) that was conducted 20 years ago. Within that EIS, it says that there will be no such thing as a 500-year flood. Well, 20 years later we did experience a very strong flood. And that's what we fear.**

*Commenter: Christopher Brown (Paiute Kaibab Tribe), Stacey Hamburg*

The purpose of an Aquifer Protection Permit is to protect groundwater quality. Both sites include sub-grade impoundments, meaning there are no berms/dams to fail. The design requires new liners to be installed in each impoundment to minimize the risk of leakage. Further, the updated design includes an expansion of both impoundments to accommodate additional storm water runoff. Should the water in the impoundments exceed the minimum 2-foot freeboard requirement, the mines must initiate contingency measures to ensure no overtopping of the impoundments occurs.

**WQ10: One commenter suggested there should be a mitigation plan for different scenarios involving contaminated water, i.e. an onsite impoundment leak; water from South Rim**

**springs showing elevated or harmful levels of uranium after mining operations have begun; reclamation of the fragile spring ecosystems below the rim if contamination occurs; etc**

*Commenter: Christopher Brown (Paiute Kaibab Tribe)*

The general permits require regular inspection of the liner integrity and implementation of contingency actions in the event cracks, tears, or perforations in the liner are observed.

**WQ11: What is the current reclamation for the proposed mining sites?**

*Commenter: Christopher Brown (Paiute Kaibab Tribe)*

The general permit specifies closure of each impoundment, which includes removal of liquids and any solid residues, inspection of the liner for evidence of leaks, and investigation of potential soil impacts, if a leak is suspected. If no evidence of leaks is observed, the liner can be covered in place or removed and the impoundment must be filled to grade to prevent collection of future storm water.

**WQ12: The draft permits themselves do not mandate compliance with Arizona groundwater protection standards, or with requirements for the use of Best Available Demonstrated Control Technology (BADCT).**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

The general permits were adopted in rule to address both BADCT and protection of aquifer water quality. The design, construction and installation requirements of the Type 3.04 general permit for the non-stormwater impoundments meet BADCT under A.A.C. R18-9-D304.C and provide assurance that groundwater quality will be protected for drinking water use.

**WQ13: One commenter suggested that neither the permits nor the fact sheets say how compliance will be achieved, or even if ADEQ has determined that the aquifers to be protected are sources of drinking water to which the numerical standards of R18-11-406 apply.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

By law, all aquifers in Arizona are classified for drinking water use, unless reclassified (which has never been done). Therefore, the numerical standards of R18-11-406 apply.

**WQ14: Several commenters are concerned with the fact that no groundwater monitoring is required under a general permit. “If the sampling results suggest that aquifer water quality standards could be exceeded in groundwater, Denison will voluntarily increase the frequency of pumping to mitigate any risk to groundwater.” An increase in sampling frequency does not protect groundwater quality. Groundwater must be monitored to determine pre-operational water quality parameters (i.e., “background”) and monitored during operations to detect changes in water quality.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

At this point, ADEQ has no reason to believe that the surface impoundments authorized by the general permit will cause or contribute to groundwater contamination because they must be

constructed, operated and maintained so as not to leak. If at any point ADEQ has reason to believe that aquifer water quality standards could be exceeded in groundwater, ADEQ will require an individual APP under A.R.S. § 49-241.A, with all the related conditions including installation of a point of compliance well.

**WQ15: Several commenters suggest that at a minimum, the general permits should be conditioned to require pre-mining water quality surveillance of both perched and bedrock aquifers underlying the mine sites, and groundwater monitoring during operations to detect increases in contaminant levels.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

At this point, ADEQ is only permitting the non-stormwater impoundments at the Canyon and Pinenut Mines. ADEQ has not yet received an application for the rest of the mining operations. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine the appropriate monitoring requirements

**WQ16: A commenter stated that R18-11-406 does not contain a standard for uranium in drinking water aquifers. A compliance level for uranium in groundwater is needed because of the well-documented mobility of U+6 in oxygenated soils and groundwaters. A standard is also needed to determine if mine releases are impacting the dozens of springs and seeps from the Redwall-Muav aquifers on the South Rim of the Grand Canyon.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

Although ADEQ has adopted the federal drinking water maximum contaminant level or MCL for uranium in drinking water—which is 30 parts per million, it has not yet adopted a numeric aquifer water quality standard for uranium for groundwater. Nevertheless, the water permits being issued by ADEQ are intended to ensure that no uranium reaches the aquifer from the impoundments subject to the permits. ADEQ has underway an analysis of various environmental and public health rules that will proceed forward to formal rule making under the Governor’s Regulatory Moratorium provisions that authorize rules protecting public health to move forward to promulgation.

**WQ17: A commenter made the following statement: Numerous studies, including those conducted for EFNI during the original permitting for the Canyon Mine in the mid-1980s, demonstrated that naturally occurring uranium concentrations in Grand Canyon springs average less than 10 micrograms per liter (µg/l) (or 0.01 milligrams per liter [mg/l]), and where they do not, an anthropogenic source is often present.**

*Commenter: Chris Shuey (Southwest Research and Information Center)*

This comment is acknowledged.

**WQ18: Several commenters suggested that the liners are more than 20 years old and that there is concern that structural integrity and leak detection capabilities do not meet current requirements to assure groundwater protection. Why were the general permits denied last year and acceptable this year?**

*Commenter: Sandy Bahr (Sierra Club)*

The existing liners are more than 20 years old, which is the reason ADEQ denied the permit applications in 2008. The current design has been upgraded to include new 60-mil HDPE liners in each non-stormwater impoundment.

**WQ19: A commenter suggested the Director should revoke the option of general permits for all uranium mines in the area given the severity of the threat of groundwater pollution presented by uranium mining in such close proximity to the Colorado River. R18-9-A307(B) of the Arizona Administrative Code 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 would support such action.**

*Commenter: Sandy Bahr (Sierra Club)*

ADEQ has no reason to believe that the general permits being issued for the surface impoundments will violate Aquifer Water Quality Standards. These general permits include requirements to prevent the migration of contaminants from the impoundments. The provisions of R18-9-A307(B) of the Arizona Administrative Code providing for revocation of coverage under a general permit may apply to general permits already approved and not authorize disapproval of initial applications to discharge under a general permit. ADEQ will leave that issue for resolution at another time because of the voluntary and protective permit conditions negotiated in this case.

**WQ20: Canyon Mine and Pinenut Mine do not qualify for general permits and Denison should be required to apply for individual permits. Individual permits would allow ADEQ to require more stringent monitoring requirements, again to ensure that the groundwater is not contaminated. The Arizona I Mine was required to obtain an individual permit. The monitoring requirements imposed by the general permit are all voluntary with little to ensure that the monitoring is conducted properly or at all. On the other hand, requirements imposed by Arizona I's individual APP require that monitoring be conducted in accordance with currently accepted standards of professional practice and require chain of custody procedures be followed for samples. The individual permit includes specific parameters for mine shaft sump monitoring, whereas the general permit has none. Moreover, the individual permit requires monthly reporting of all the parameters for the first year and monthly reporting for volume pumped for the life of the facility; the general permit only requires quarterly reports. Additionally, the individual permit actually has a compliance schedule following the issuance of the permit; the general permit has no such compliance schedule.**

*Commenter: Sandy Bahr (Sierra Club)*

The Arizona I individual APP was issued prior to the adoption of general permits for surface impoundments. Furthermore, the Arizona I APP authorizes the operation of more than just surface impoundments. The general permit applications received by ADEQ for the surface impoundments meet all the requirements needed for issuance of the permit. Prior to operation of the mine, Denison will be required to obtain additional APP's for the other discharging facilities.

The monitoring requirements in the general permit are voluntary but enforceable permit conditions and Denison will be held to the same accepted standards for sampling protocols as any permittee, regardless of the type of APP.

**WQ21: A commenter suggested that Canyon and Pinenut mines should be required to closely monitor impacts to the aquifer and have a closure plan.**

*Commenter: Sandy Bahr (Sierra Club)*

Water permitting for Canyon and Pinenut mines is not complete with these general permits. The general permits specify closure requirements for the impoundments. The cost of implementing these closure activities is covered by the financial assurance for the impoundments under these general permits. Any additional closure will be required under future water permits.

**WQ22: There is a history of contamination of the Grand Canyon's streams. The Orphan Mine in Grand Canyon National Park has surface and groundwater contamination associated with it. Horn Creek, a stream that feeds the Colorado River, has high levels of radiation – hikers are warned not to drink its water.**

*Commenter: Sandy Bahr (Sierra Club)*

ADEQ is aware of the impacts of historic uranium mining operations. The Orphan Mine was operated long before current environmental regulations, including the APP Program. The purpose of the APP program is to prevent groundwater contamination.

**WQ23: Is there perched groundwater in the area of the proposed mines? If so, what is the extent of it?**

*Commenter: Sandy Bahr (Sierra Club)*

During drilling of the production well at Canyon Mine in 1986, perched groundwater in the Coconino Sandstone was encountered. The reported flow was 5 gallons per minute or less. An even smaller volume of flow was encountered from the Coconino during the mine shaft excavation at Pinenut Mine.

**WQ24: Several commenters suggest that according to research conducted by the United States Geological Survey, the alignment of breccia pipes can be associated with regional joint and fracture networks related to large faults and these faults are significant flow paths for groundwater. This means our aquifers are at risk from these proposed mines.**

*Commenter: Sandy Bahr (Sierra Club)*

There is some evidence to suggest that breccia pipes form along joint or fracture networks and that joints and fractures can enhance the movement of groundwater through hard rocks. These factors will be considered if and when additional permit applications are submitted for Pinenut and Canyon Mines. This information is not relevant to the permitting of surface impoundments because the general permit requires the liners to be constructed, operated, and maintained so as to not leak.

Nevertheless, these general permits include voluntary, enforceable permit conditions which require rock and soil permeability testing at the bottom of the shafts and sumps, along with protections if appropriate, to prevent the migration of pollutants. Furthermore, the permits also require Denison to monitor the volume of water pumped from the mine to the surface impoundments to determine if groundwater has been encountered. The general permit for surface impoundments requires monitoring of water quantity and quality pumped from the working shafts and sumps of the mines at the point the water enters the permitted surface impoundment. The definition of mine water control has been expanded to include all the mine workings in addition to the shafts and sumps. Finally, the general permits contain voluntary, yet enforceable conditions which require groundwater protections at the bottom of the shaft including permeability testing of the rock and soil to ensure the applicant and ADEQ are aware of any conditions which will facilitate migration of pollutants toward groundwater.

**WQ25: 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. Doing no harm would, at a minimum, warrant individual APPs for these mines.**

*Commenter: Sandy Bahr (Sierra Club)*

As stated earlier, ADEQ does not have the legal authority to compel an individual permit at this time. Denison submitted applications for general permit coverage for non-stormwater impoundments. The proposed design is consistent with the general permit requirements in rule. The general permit for surface impoundments requires that liners be constructed, operated, and maintained so as not to leak. The rest of the mining operations at Canyon and Pinenut are not being permitted at this time. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine whether additional monitoring should be required.

**WQ26: In the immediate vicinity of mineralized breccia pipes, acid drainage and toxic metals including lead, arsenic, and zinc can be a problem when the pipes are dissected and exposed to flooding. Why are these permits not addressing the mine water discharge from the mine shafts into the breccias pipes and groundwater? The general permits apply to the ponds. The water in the mine shaft appears as the most likely avenue for contamination of the aquifer. Will these mines require additional APPs?**

*Commenter: Sandy Bahr (Sierra Club)*

Information collected for Energy Fuels Nuclear, Inc. at the Arizona I Mine seems to indicate that the breccia materials are relatively impermeable to water. Under the additional conditions of the general permit, monitoring of the quantity and quality of water pumped from the working shafts of the mines is required. The mine water control requirement has been expanded also to include all the mine workings. This monitoring will be used to assess what potential threat the mining operations may pose to groundwater quality if other data indicate fractures may provide an avenue for contaminant movement.

Denison submitted applications for general permit coverage for non-stormwater impoundments. The rest of the mining operations at Canyon and Pinenut are not being permitted at this time. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine whether additional monitoring should be required.

**WQ27: Is the company applying for general permits for various aspects of the mines in a piecemeal fashion in order to avoid triggering an individual APP requirement? ADEQ should take a hard look at this and require an individual APP up front for all of the discharge activities related to these mines.**

*Commenter: Sandy Bahr (Sierra Club)*

As stated earlier, ADEQ does not have the legal authority to compel an individual permit at this time. Denison submitted applications for general permit coverage for non-stormwater impoundments. The rest of the mining operations at Canyon and Pinenut are not being permitted at this time. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine whether additional monitoring should be required.

**WQ28: As part of any APP for each of these mines, ADEQ should require monitoring wells around the perimeter of the mines in order to better determine the hydraulic gradient of the regional and perched groundwater. These monitoring wells are needed to determine if any contamination is leaving the mine site area. To ensure protection of water supply wells in the Tusayan area as well as to protect springs, it is imperative that contamination be discovered at a point where the contamination might be addressed without putting the public and the environment at risk.**

*Commenter: Sandy Bahr (Sierra Club)*

At this point, ADEQ has no reason to believe that the surface impoundments authorized by the general permit will cause or contribute to groundwater contamination because they must be constructed, operated and maintained so as not to leak. If at any point ADEQ has reason to believe that aquifer water quality standards could be exceeded in groundwater, ADEQ will require an individual APP under A.R.S. § 49-241.A, with all the related conditions including installation of a point of compliance well.

**WQ29: The permit should require both onsite and offsite sampling – just sampling the water that is pumped from the mine is not adequate. It should also require baseline sampling of springs in the area including at Kanab Springs, Indian Garden Springs, and the springs in Hack Canyon, among others.**

*Commenter: Sandy Bahr (Sierra Club)*

The provisions of a general permit for surface impoundments do not require groundwater or surface water sampling because they require that the impoundments be constructed, operated and maintained so as not to leak.

Sampling of Havasu Spring, Indian Garden Spring and Blue Spring was performed by Errol L. Montgomery & Associates, Inc. for Energy Fuels Nuclear, Inc. from 1985 to 1992. The laboratory analytical results showed no exceedance of aquifer water quality standards at the springs.

**WQ30: How will the sediment in the ponds be handled? Will it be sampled? How will the company address the dust that can be transported to other areas when the ponds' water evaporates and the sediment is dry?**

*Commenter: Sandy Bahr (Sierra Club)*

The general permit specifies closure of each impoundment, which includes removal of liquids and any solid residues, inspection of the liner for evidence of leaks, and investigation of potential soil impacts, if a leak is suspected. While operational, the air quality permit requires the company to either maintain water in the pond or to stabilize the pond area to minimize fugitive dust emissions.

**WQ31: How did ADEQ arrive at the dollar figures associated with financial capability relative to the Pinenut and Canyon mines? Because there is no individual APP for these two mines, again, we do not have a closure plan or any real estimate on how the dollar figures in the draft permits were determined, other than some limited numbers provided by the company.**

*Commenter: Sandy Bahr (Sierra Club)*

The proposed closure costs for the impoundments were submitted by Denison and approved by ADEQ as a voluntary and enforceable condition not normally required by a general permit for surface impoundments. The costs are based on what a third party would charge to perform the closure activities specified in the general permit including removal of liquids and any solid residues, inspection of the liner for evidence of leaks, and investigation of potential soil impacts, if a leak is suspected..

**WQ32: Denison has already started some work at the Pinenut and Arizona I mines and has been cited for violations at both of these mines. (Note: most of the violations at Arizona I occurred when it was owned by J.S. Redpath Corporation.) It has also started work at the Canyon Mine, but no inspection has yet occurred there. 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, including off-site, in order to ensure protection of the aquifers in these areas. These are all issues that would be included with an individual APP.**

*Commenter: Sandy Bahr (Sierra Club)*

Worker safety at these mines is under the jurisdiction of the U.S. Department of Labor through the Mine Safety and Health Administration (MSHA), the Arizona Mine Inspector, and the Arizona Industrial Commission through the Arizona Division of Occupational Safety and Health (ADOSH). ADEQ does not have authority over worker safety.

Nevertheless, ADEQ has asked Denison Mines for a formal response to the recent citations issued by MSHA, and is in communication with MSHA regarding these citations. MSHA advises ADEQ that all of the JS Redpath Corp. violations alluded to by the Commenter have been "closed".

At this time the citations do not reflect on the fitness of Denison to comply with the permits or Arizona environmental laws. ADEQ will remain in close communication with MSHA as to the

open citations issued by MSHA at Denison facilities, and ADEQ will take action if necessary to ensure Denison complies with all ADEQ permits.

Canyon and Pinenut Mines will require additional permits prior to operation. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine whether additional monitoring should be required.

**WQ33: ADEQ’s reliance upon outdated environmental analyses in authorizing the general permit is an abuse of discretion. ADEQ relies upon Environmental Assessments (EAs), Environmental Impacts Statements (EISs) and Findings of No Significant Impacts prepared by the federal government in 1986. The assumption that the environmental impact of a project is the same today as it was more than 20 years ago is, frankly, absurd. The area, the information about the area, studies on the hydrology, studies on the unique seeps and springs, our knowledge about the negative impacts of past uranium mining activities, and many other issues have changed dramatically since 1986. The population and development in the area have increased, resulting in a greater demand on water resources and greater discharge into aquifers. Thus, any cumulative impacts analyses in those studies are outdated and erroneous. Moreover, one of the fundamental purposes of an EIS or an EA is to ensure that alternative methods, operations, and plans are considered at the outset of a project; it is obvious that the alternatives available today are significantly different from what was considered in 1986. Finally, any environmental analysis conducted today would be required to consider “reasonably foreseeable” impacts. This requirement would necessarily include consideration of the impacts of climate change. Unfortunately, that important analysis is completely omitted from ADEQ’s proposed action. Even if these outdated reports are not being relied upon or are not needed to reopen the mining operations at the Canyon and Pinenut sites, it is misleading to include them in the fact sheet issued to the public.**

*Commenter: Sandy Bahr (Sierra Club)*

ADEQ did not rely on the EISs in developing the proposed discharge authorizations. The approval of these general permits for surface impoundments was based upon the up to date information received in the applications for the surface impoundments and a review of the Arizona I mine APP.

**WQ34: A commenter stated that the draft general APP for the Canyon Mine non-stormwater impoundment conditions will not prevent the contamination of aquifers by this uranium mining operation. The APP relies on monitoring and mitigation to prevent the contamination -- that is contrary to the Aquifer Protection Program, which is geared toward prevention prior to the need for any mitigation.**

*Commenter: Sandy Bahr (Sierra Club)*

The general permit for surface impoundment requires that liners be constructed, operated, and maintained so as not to leak. This requirement is intended to prevent groundwater contamination from occurring as a result of discharges to the impoundments. The monitoring that Denison has agreed to perform of the discharge to the impoundment will provide ADEQ with data to be used in determining whether additional monitoring is necessary. The monitoring is in addition to, not replacement for the requirement to prevent discharges to the subsurface.

**WQ35: A commenter stated that there is no requirement for any offsite water monitoring associated with this mine. That is irresponsible. Even Energy Fuels Nuclear established a monitoring program and sampling offsite back when this mine was first considered in the mid 1980s. Again, sampling and monitoring at Indian Garden and Havasu springs should be included.**

*Commenter: Sandy Bahr (Sierra Club)*

The general permit for surface impoundments does not require groundwater sampling because it requires that liners be constructed, operated, and maintained so as not to leak. Nevertheless, Denison has agreed to perform monitoring of the discharge to the impoundment which will provide ADEQ with data to be used in determining whether additional monitoring is necessary. The only applications before ADEQ are for non-stormwater impoundments. The rest of the mining operations at Canyon and Pinenut are not being permitted at this time. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine whether additional monitoring should be required.

**WQ36: A commenter stated that the permit requires quarterly sampling of the water discharged from the mine. Considering the nature of this mining operation and the possibility of contaminating the groundwater for generations, this frequency is simply inadequate. Under a worst case scenario, contamination plumes could go entirely undetected. Even with adequate monitoring well numbers and locations, quarterly monitoring could result in a contamination plume spreading for three months before being detected and initiation of mitigation measures. In order to immediately detect aquifer contamination, an adequate number and location of monitoring wells should be included and monitored on a daily or weekly basis.**

*Commenter: Sandy Bahr (Sierra Club)*

The only applications before ADEQ are for non-stormwater impoundments. The rest of the mining operations at Canyon and Pinenut are not being permitted at this time. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine whether additional monitoring should be required.

**WQ37: A commenter suggested sampling of the water from the mine sump should occur much more frequently. Monitoring must include concurrent sample collection, analysis, and reporting at a publicly accessible web site.**

*Commenter: Sandy Bahr (Sierra Club)*

ADEQ has taken under consideration the future posting of data associated with the water quality monitoring at these mines on the Web site.

**WQ38: A commenter stated that water from the Pinenut Mine site drains toward the north and eventually into Kanab Creek. While this is a fair distance, there is concern about the potential underground pathway and its proximity to Kanab Springs. What kind of monitoring will be required? We see no mention of monitoring wells and, without them, it will be difficult to determine if contamination is leaving the site via underground pathways.**

*Commenter: Sandy Bahr (Sierra Club)*

The general permit for surface impoundments does not require groundwater sampling because it requires that liners be constructed, operated, and maintained so as not to leak. Nevertheless, Denison has agreed to perform monitoring of the discharge to the impoundment which will provide ADEQ with data to be used in determining whether additional monitoring is necessary. At this time, the only applications before ADEQ are for non-stormwater impoundments. The rest of the mining operations at Canyon and Pinenut are not being permitted at this time. When applications for additional discharging facilities at these mine sites are received, ADEQ will review those applications to determine whether additional monitoring should be required.

**WQ39: A commenter stated that with respect to the Arizona I Individual APP, there is concern that there was no attempt to notify the public or seek public comment on the proposed revisions to this old individual APP. We ask that ADEQ allow for public comment on this permit as the knowledge and conditions in the area have changed since 1994 and this mine is the subject of significant controversy.**

*Commenter: Sandy Bahr (Sierra Club)*

There is no requirement for a public comment period following issuance of a permit. The original permit was issued in 1994 and addressed public comments submitted at that time. The most recent modification to this permit was an Other Amendment to transfer ownership of the mine to Denison, which does not require public participation.

**WQ40: A commenter stated that the Havasupai Tribe would no longer allow permits to be given to any conventional mining operations on the reservations. And that they will continue to look for recourses to defend and protect the aquifer, and the aqueducts that feed into our homes.**

*Commenter: Supai Waters*

ADEQ acknowledges this comment.

**WQ41: A commenter stated that as of yet, there has not been one holding pond that has ever been able to withhold all the discharge from mining operations. Every one has failed.**

*Commenter: Tony Phillippe (Tribal Administrator for the Kaibab Piute Tribe)*

ADEQ has permitted a number of impoundments at mining sites with success. While some ponds have experienced leaks, they have been repaired in compliance with APP requirements. The APP program requires that ponds be appropriately sized to provide adequate capacity for the intended use, including accommodation of rainfall and additional capacity to add a margin for safety to prevent spills and failures.

**WQ42: One commenter stated that although the State and the mining company reassure us there will not be any groundwater contamination (and the bases on that is false). We believe that Canyon Mine is directly on top of the Muav Aquifer and it will deeply seep quickly into the aquifer and contaminate our water source.**

*Commenter: Carletta Tilousi, Havasupai Tribe*

ADEQ acknowledges this comment and believes reprinting our response to WQ24 here is appropriate because so many citizens expressed this concern or one very much like it:

There is some evidence to suggest that breccia pipes form along joint or fracture networks and that joints and fractures can enhance the movement of groundwater through hard rocks. These factors will be considered if and when additional permit applications are submitted for Pinenut and Canyon Mines. This information is not relevant to the permitting of surface impoundments because the general permit requires the liners to be constructed, operated, and maintained so as to not leak.

Nevertheless, these general permits include voluntary, enforceable permit conditions which require rock and soil permeability testing at the bottom of the shafts and sumps, along with protections if appropriate, to prevent the migration of pollutants. Furthermore, the permits also require Denison to monitor the volume of water pumped from the mine to the surface impoundments to determine if groundwater has been encountered. The general permit for surface impoundments requires monitoring of water quantity and quality pumped from the mine workings, working shafts and sumps of the mine at the point the water enters the permitted surface impoundment. Finally, the general permits contain voluntary, yet enforceable conditions which require groundwater protections at the bottom of the shaft including permeability testing of the rock and soil to ensure the applicant and ADEQ are aware of any conditions which will facilitate migration of pollutants toward groundwater.

**WQ43: A commenter stated that back in 2002, there were denials for individual permits. I guess, at least, that recognized that an individual permit was needed. But the previous owner, which actually is part of Denison now, International Uranium Corporation, is, was denied an individual permit for not providing enough information.**

*Commenter: Sandy Bahr (Sierra Club)*

ADEQ denied the previous permit applications for failure to provide information needed to develop the permits. The previous owner decided not to pursue the permits.

**WQ44: The commenter stated that impacts to the only source of drinking water for many people and animals could potentially be impacted from this mining activity.**

*Commenter: Sandy Bahr (Sierra Club), Carletta Tilousi, Havasupai Tribe*

The purpose of the APP program is to protect groundwater for drinking water use. The general permit requirements for surface impoundments are intended to meet that purpose.

**WQ45: If these companies don't have bonds. That means they will never do anything where ever they go. It's just for their advantage.**

*Commenter: Jon Benaly*

Denison has voluntarily agreed to provide a surety bond to cover the cost of closure of the non-stormwater impoundments.

**WQ46: Vanadium must be added to the list of analytes for discharge monitoring. It is generally associated with uranium deposits in the region and may assist in analyses.**

*Commenter: Steve Martin, Superintendent, US Dept. of Interior Grand Canyon National Park Service*

ADEQ agrees and has added vanadium to the list of analytes for monitoring in the general permits.

***Water Quality Comments from the Question and Answer Portion of the Meeting:***

**WQ47: How deep is the aquifer at the mine site?**

The Redwall-Muav Aquifer is approximately 2,547 feet below ground surface at the Pinenut Mine, and approximately 3000 feet below the ground surface at the Arizona I Mine based on information provided by Denison Mines (USA) Corp. The Redwall-Muav aquifer was encountered at 2,242 feet below ground surface in the production well at Canyon Mine as reported by Errol L. Montgomery & Associates, Inc. for Energy Fuels Nuclear, Inc.

**WQ48: How deep is the mine?**

The shaft is 1,360 feet below ground surface at Pinenut Mine, the shaft at Canyon Mine is expected to reach approximately 2,000 feet below ground surface, and the shaft at the Arizona I Mine is expected to reach approximately 1470 feet below ground surface.

**WQ49: From 1980 spring sampling – did any of the results show contamination?**

ADEQ has looked into this question since the meeting. Sampling of Havasu Spring, Indian Garden Spring and Blue Spring was performed by Errol L. Montgomery & Associates, Inc. for Energy Fuels Nuclear, Inc. from 1985 to 1992. The laboratory analytical results showed no exceedance of aquifer water quality standards at the springs.

**WQ50: How often is water quality monitored?**

Once the mines are in operation, the discharge to the impoundments will be monitored quarterly.

**WQ51: What happens to water collected in pond?**

It evaporates.

**WQ52: Are there any requirements for independent pond monitoring?**

No, it is not required. The laboratory is independent and must be licensed by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification. ADEQ reserves the right to inspect the site, observe the sampling or collect a sample for independent analysis.

**WQ53: Does the lab collect water quality samples?**

Usually, the lab only performs the analyses; however, some labs may provide sampling services.

**WQ54: Why sample ponds if water evaporates?**

Because there exists the potential for the sediment left behind to contain contaminants. It also gives the agency important information about the operations inside the mine and to determine whether additional sampling should be required. The sediments will be addressed at the time of closure.

**WQ55: What is the annual precipitation and evaporation at the sites?**

The evaporation rate is between 70 to 80 inches per year and the precipitation is about 13 to 15 inches per year.

**WQ56: How far down is water? Is this an estimate and how old are the estimates (late 80's)?**

In measurements taken between September 1987 and May 1993 by Errol L. Montgomery & Associates, Inc. for Energy Fuels Nuclear, Inc. the depth to water averaged approximately 2500 feet below ground surface in the production well at the Canyon Mine site. ADEQ does not have water level information for the other mines.

**WQ57: Ponds fail – Do we have on record where holding ponds have worked?**

Yes, we have numerous impoundments that have been permitted and successfully achieved clean closure. The condition of the liner was assessed and soil sampling under the ponds indicated that there was no contamination due to leakage.

**WQ58: How fast would a leak in a pond need to be responded to before it would get to groundwater?**

The purpose of the permits is to make sure that such a leak will never occur. However unlikely, if a leak occurred it could take 10's to 1000's of years for a leak in the pond to reach groundwater based on the limited permeability of the rock units. Fluids that enter fractures would be expected to move more quickly but a large volume of water would be required in order to travel the large distances from the land surface to the aquifer. The permit requires Denison to take contingency actions as soon as practical should a leak be discovered to prevent such an occurrence.

**WQ59: Where do clean out sediments from pond go?**

The sediments will be transported offsite and disposed of properly (landfilled).

**WQ60: Why did ADEQ deny general permit and now accepting general permit?**

The original general permit applications included eight facilities (four at each mine) and relied on 20-year-old liners that did not meet the requirements of the rule. The applications we have currently include only one impoundment at each mine. New liners will be installed over the existing liners. The upgraded design now meets the rule requirements, and the voluntary and enforceable permit conditions protect groundwater, ensure public participation and provide financial assurance should Denison Mines not be able to perform their closure and post closure obligations.

**WQ61: Any residence time of surface water to groundwater intervals to use in general permit decision?**

No, this information was not considered because the general permit requires a liner that is designed not to leak.

**WQ62: General Permit – Why does AZ1 Individual APP financial assurance equal \$250,000 and Denison’s Canyon and Pinenut has \$20,000 - \$30,000 in financial coverage?**

The Canyon and Pinenut permits and the financial assurance coverage only apply to the non-stormwater impoundments. Both of these mines will require additional permits (air and water) to be able to operate and additional financial assurance will also be required. The Arizona I Mine financial assurance amount covers the ore and waste stockpiles, in addition to the non-stormwater impoundment.

**WQ63: Are the ponds in the ground?**

Yes, both sites include sub-grade surface impoundments (meaning no berms/dams to hold water volume). This means more stability.

**WQ64: Can pond water be used back in mines?**

No, that is not the intention of the permit.

**WQ65: What size storm event?**

The general permit for surface impoundments calls for the design to include the anticipated discharge plus a 100-year, 24 hour storm event, additional capacity known as freeboard allows for unanticipated events.

**WQ66: What happens to water at bottom of shaft? Can it reach groundwater? What happens if shaft intercepts perched aquifer?**

Typically, mines do not like water accumulation in the shaft. Water will be pumped from the shaft sump and discharged to the impoundments. If water is intercepted during shaft development, it will accumulate in the sump and be pumped to the impoundment authorized under the general permit. The voluntary conditions added to the general permits also require Denison to assess the conditions in the bottom of the sump, and take protective measures if necessary to ensure that water will not infiltrate through the bottom.

**WQ67: If uranium has been there, why does water hurt to seep down?**

There is naturally occurring water impact from uranium. This will occur with or without mining.

**WQ68: Potential of leakage to perched aquifer after mines are closed? Creek leading to Colorado River is contaminated (Horn Creek)?**

Any water that may be intercepted from a perched aquifer during shaft development will accumulate in the sump and be pumped to the impoundment authorized under the general permit. The voluntary conditions added to the general permits also require Denison to assess the conditions in the bottom of the sump, control water in the mine workings, and take protective measures if necessary to ensure that water will not infiltrate through the bottom.

There is no planned discharge to surface water like creeks, and no permit to allow such a discharge is being issued by ADEQ.

**WQ69: How do we know statements made about closed mine contaminations are valid? Please qualify.**

This statement was made by one of the miners to the tribes that made various claims of past contamination from mining activities. He wanted all their claims to be qualified.

**WQ70: Any water quality data on drinking water aquifer at the point of use?**

ADEQ reviewed water quality data that was provided from the production well at Canyon Mine in the 1995 APP application. No aquifer water quality standards were exceeded in the data for the period 1986 to 1992. Groundwater data collected for the production well prior to mining operations at Pinenut Mine appear to indicate that gross alpha radiation, Radium 226 and cadmium exceeded the aquifer water quality standards for those parameters.

**WQ71: Do the Breccia pipes continue to the drinking water aquifer as to cause adverse impacts?**

The formation of breccia pipes results from collapse of overlying rock formations into caverns in the Redwall-Muav formations. Exploratory drilling at the mine sites indicates that the breccia pipe itself does not penetrate the groundwater level. Testing of the rock properties from cores taken in the breccia materials performed by CanonieEnvironmental for Energy Fuels Nuclear, Inc. and reported in 1988 indicate liquid permeability ranging from  $10^{-8}$  to  $10^{-10}$  cm/sec in the breccia pipe below the ore zone. Materials with these properties are considered to be impermeable. Therefore, it is not expected that the breccia pipes would act as a conduit for contaminants to migrate downward into the drinking water aquifer. The properties of the breccia pipes and surrounding formations will be considered if and when additional permit applications are submitted for Pinenut and Canyon Mines.

**WQ72: Can ADEQ guarantee no groundwater contamination?**

The purpose of ADEQ is to protect and enhance the human health, welfare and the environment, and these permits are intended to protect groundwater quality.

**WQ73: Was Hack Canyon contaminated?**

In 1984, a tailings pile failure at Hack Canyon contaminated tributaries of the Colorado River. ADEQ and the majority of the regulations it is responsible for implementing, including the APP program, were adopted in 1986. These current environmental regulations are in place to prevent accidents like this from occurring again.

The current permit applications before ADEQ do not authorize any milling to be conducted, or tailings to be placed, at these three mines - Arizona I, Pinenut and Canyon.

**WQ74: Where does the water from the mine come from?**

There will be a production well at each mine, and Denison may have to haul water to the mines according to their statements to ADEQ.

**WQ75: How far are the wells from the mine?**

The production well will be on or near the site.

**WQ76: How much water will the mine use?**

This question was fielded by Denison representatives who estimated average water use at 5 to 10 gallons per minute.

**WQ77: What is acceptable for water contamination?**

There is no acceptable level of water contamination allowed under the general permits for these impoundments. The general permits require that these impoundments be constructed, operated and maintained so as not to leak.

**WQ78: Who drinks from these aquifers?**

Groundwater from beneath these mines provides drinking water to residents and visitors of the Colorado Plateau.

**WQ79: Is there any monitoring after closure?**

No monitoring is currently anticipated to be necessary following closure of the non-storm water impoundment at Pinenut and Canyon Mines, because according to the permit they must be closed so there will be no possibility of pollutant migration after closure. There could be a requirement for additional monitoring and cleanup though, if assessment of the liner at the time of closure indicated that leaks may have occurred.

***Additional water quality comments from the Red Butte Meeting which were sent to ADEQ in writing or on CD after the close of the comment period, but in time for ADEQ to respond:***

**WQ80: Denison claims that they will just use water for extracting, flooding and evaporation but the mechanism they use is called the leach method. The water from the aquifer is concentrated with cyanide and mercury. The cyanide and mercury are able to extract the high-grade uranium from the raw ores.**

*Commenter: Havasupai Waters*

There is no leaching proposed or authorized under the Arizona I individual APP or the Aquifer Protection Permits for Canyon and Pinenut Mines. The groundwater quality information reviewed by ADEQ does not show elevated concentrations of mercury in groundwater near the mines. No analytical data for cyanide has been provided by the comments and none is known to ADEQ at this date; however, there is no reason to believe that cyanide would be present in groundwater at these sites. Nevertheless, the water quality monitoring required by the Arizona I APP, and additional voluntary conditions in the general permits, will provide ADEQ with water quantity and quality data to determine whether additional protections are necessary.

**WQ 81: The EIS for the Denison Mines was performed in the 80's and is outdated. Wildlife on the endangered species list will be affected by the mines that were not present considered in the EIS from the 80's (CA Condor for example). Groundwater and flow needs re-evaluation under new EIS.**

*Commenter: Roger Clark (Grand Canyon Trust)*

The Environmental Impact Statements were performed under the federal requirements of the National Environmental Policy Act (NEPA). Questions about the validity of the EIS should be directed to the U.S. Forest Service and Bureau of Land Management. ADEQ did not rely upon this EA or EIS information in reviewing the water permits. ADEQ relied on the three current applications and the Individual APP issued for the Arizona I Mine.

**WQ82: The mine shaft goes through the Coconino Aquifer and the Redwall-Muav Aquifer which is depended upon for drinking. This happened with the Orphan Mine (Cu then Ur) on South Rim within Grand Canyon National Park. Horn Creek Spring monitoring is 3 to 4 times above the safe drinking water level. The mining company walked away and the federal gov't is paying for the surface. No way to get to or tell about groundwater contamination.**

*Commenter: Roger Clark (Grand Canyon Trust)*

The Orphan Mine operated in the 1950's and 60's prior to the current environmental regulations. The National Park Service is remediating the Orphan Mine and ADEQ is in close contact with the Service regarding progress and lessons learned at that mine. The Aquifer Protection Permit program was adopted in 1986 to protect aquifers for drinking water use. The general permits for Canyon and Pinenut Mines are solely for the non-stormwater impoundments. The liner requirements are established to protect groundwater.

Nevertheless ADEQ acknowledges this comment and believes reprinting our response to WQ 24 here is appropriate because so many citizens expressed this concern about the Coconino Aquifer and the Redwall-Muav Aquifers being depended upon for drinking water, or a concern very much like the one articulated in this comment. We believe it is appropriate to reprint our Response to WQ 24 which provides the outlines of the groundwater protections found in the general permits for the surface impoundments:

There is some evidence to suggest that breccia pipes form along joint or fracture networks and that joints and fractures can enhance the movement of groundwater through hard rocks. These factors will be considered if and when additional permit applications are submitted for Pinenut and Canyon Mines. This information is not relevant to the permitting of surface impoundments because the general permit requires the liners to be constructed, operated, and maintained so as to not leak.

Nevertheless, these general permits include voluntary, enforceable permit conditions which require rock and soil permeability testing at the bottom of the shafts and sumps, along with protections if appropriate, to prevent the migration of pollutants. Furthermore, the permits also require Denison to monitor the volume of water pumped from the mine to the surface impoundments to determine if groundwater has been encountered. The general permit for surface impoundments requires monitoring of water quantity and quality pumped from the working shafts and sumps of the mines at the point the water enters the permitted surface impoundment. Finally, the general permits contain voluntary, yet enforceable, conditions which require groundwater protections at the bottom of the shaft including permeability testing of the rock and soil to ensure the applicant and ADEQ are aware of any conditions which will facilitate migration of pollutants toward groundwater.