

February 17, 2020

Bureau of Reclamation
Attn: Ed Warner, Area Manager
445 West Gunnison Ave, Suite 221
Grand Junction, CO 81501

Letter sent via email to: paradoxeis@usbr.gov

Re: Paradox Valley Unit Draft EIS

Dear Mr. Warner:

We are providing these comments on the Paradox Valley Unit Draft EIS. San Juan Citizens Alliance has a long history of interest in the Dolores River Canyon, and previously submitted scoping comments in 2012. We have grave concerns about many aspects of the identified alternatives. We are particularly concerned by Alternative B1 which would significantly impair the wilderness character of the Dolores River Canyon Wilderness Study Area (WSA) and the outstandingly remarkable values of the eligible Dolores wild and scenic river.

Alternative B1 is unlawful and violates the Federal Land Policy and Management Act's unambiguous mandate to maintain the Dolores River Canyon WSA in an unimpaired condition, and violates the Wild and Scenic Rivers Act's requirement to retain the outstandingly remarkable values of eligible river segments.

The toxic evaporation ponds of Alternative C would cause significant mortality to birds and violate the Migratory Bird Treaty Act, which prohibits agencies from intentional and incidental take of migratory birds.

Other alternatives are incompatible with existing management plan direction, pose unredeemable conflicts with high value recreation activities, and create insurmountable impacts to wildlife.

We recommend that the Bureau of Reclamation select the No Action Alternative A at this point, or instead pursue development of additional alternatives that minimize impacts to wildlands, wild rivers, scenic resources, archeological sites, wildlife, areas of critical environmental concern, and recreation – all of which are negatively impacted to an unacceptable degree in the current configuration of alternatives. None of the alternatives, other than No Action, achieves the project goal to “avoid and minimize adverse impacts on physical, biological, social, economic, cultural, and tribal resources in the affected environment.” The DEIS does not provide evidence the alternatives other than No Action achieve the stated goals.

Additional alternatives should be developed and evaluated. These could include non-structural options like modification of Dolores River flows, or alternative structural options with less impactful locations or approaches.

PURPOSE AND NEED

The DEIS identifies the project's purpose as the reduction of salinity levels in the lower Colorado River Basin. It would be most advantageous to reviewers for the DEIS to provide a baseline assessment of the benefit of the past 30 years of operation of the Paradox Valley Unit of the Colorado River Basin Salinity Control program. The program has removed apparently several million tons of salt. Has there been a corresponding observed reduction in salinity a thousand miles downstream at Imperial Dam?

Specifically, the brine injection facility has been off-line for much of the past year. What has been the observed impact to salinity levels at Imperial Dam as a consequence of the Paradox Valley Unit's cessation? Is there a measurable impact of brine injection at the point of salinity level measurement at Imperial Dam?

Has there been a cost-benefit analysis of devoting additional resources to other known major source contributors, like the agricultural operations in the Uncompahgre Valley and the Grand Valley, that might suggest more bang for the buck in amplifying efforts there instead of the Paradox Valley Unit?

PROJECT GOALS

The DEIS evaluates alternatives against project goals that include:

- Remove approximately 100,000 or more tons of salt per year that would otherwise enter the Dolores River and the downstream Colorado River.
- Optimize the annual cost per ton of salt removed.
- Avoid and minimize adverse impacts on physical, biological, social, economic, cultural, and tribal resources in the affected environment.
- Minimize the use of nonrenewable resources, including land and energy
- Be consistent with existing BLM resource management plans (RMPs), where applicable.
- Be in the best interest of the public, including considerations of health and safety and the local community's desired future conditions

Unfortunately, it appears none of the analyzed alternatives come close to satisfying these goals. As is described in our comments that follow, while perhaps the goal of removing salt might be achieved by some of the action alternatives, these alternatives other than No Action bring significant adverse impacts, conflict with existing BLM management plans and policies, violate the law, and are not in the public's best interest.

IMPAIRMENT OF DOLORES RIVER CANYON WSA VIOLATES FLPMA

Following the direction of the Federal Land Policy and Management Act of 1976 (FLPMA), the Dolores River Canyon WSA was designated by the BLM in 1980. The Department of Interior subsequently recommended to Congress in 1991 that the area be added to the National Wilderness Preservation System.

Alternative B1 as described in the DEIS entails the construction of a brine injection well 1.3 miles south of the current injection well. Alternative B1 requires directionally drilling from this site at the confluence of Wild Steer Canyon underneath the WSA in order to get southwest of a defining fault block, and/or running a pipeline beneath the cliff to a vertical injection well site on Skein Mesa above the rim.

The BLM's 1991 wilderness recommendation includes lands adjacent to and surrounding the proposed site of the brine injection well in Alternative B1, and also designates as wilderness the location of the proposed pipeline from the Dolores River Canyon to Skein Mesa.

Legislation is now pending in Congress to act on this recommendation. H.R. 2546, the Colorado Wilderness Act of 2019, incorporates the BLM's wilderness recommendation and would designate as wilderness the lands under which the Bureau of Reclamation intends to drill a pipeline.

The DEIS summarizes the wilderness character of the WSA: "It offers outstanding natural scenery, ecological diversity, and opportunities for solitude and primitive, unconfined recreation." (DEIS at 3-58) FLMPA affirmatively directs the BLM to maintain this wilderness character of Dolores River Canyon WSA in an unimpaired condition:

Sec. 603(c) During the period of review of such areas and until Congress has determined otherwise, the Secretary shall continue to manage such lands according to his authority under this Act and other applicable law in a manner so as not to impair the suitability of such areas for preservation as wilderness...

BLM has converted this legislative requirement into policy articulated in BLM Manual 6330, Management of BLM Wilderness Study Areas.

For a proposal to be consistent with the non-impairment standard, it has to be both temporary and not create surface disturbance. The Wilderness Study Area includes all surface and subsurface features. As the DEIS notes, Alternative B1 creates permanent impairment because of the permanent nature of the proposed pipeline through the WSA.

The directional injection well and high-pressure transmission pipeline connecting the BIF to the well head on Skein Mesa would result in permanent placement of subsurface facilities in the WSA. This would not meet the BLM non-impairment standard. (DEIS at 3-60)

Thus, Alternative B1 fails to meet this standard because it is not temporary.

In brief, Alternative B1 violates FLMPA's requirement to maintain the wilderness character in an unimpaired condition. Alternative B1 is a not a lawful alternative, and for that reason alone must be rejected.

The DEIS attempts to override the WSA management policy by referring to an exception that generically describes other legal obligations, and cites the Colorado River Basin Salinity Control Act as such an obligation. This citation to the Colorado River Basin Salinity Control Act as overriding BLM's FLPMA requirements to maintain unimpaired the WSA's wilderness characteristics fails on multiple counts.

First, BLM's WSA management policy states that BLM should pursue other options to implement the project outside the WSA:

"If an impairing proposed project—even one that meets an exception—can be implemented outside of a WSA and accomplish the objectives identified in the purpose and need statement prepared under NEPA, the BLM should endeavor to ensure that the project is implemented outside the WSA." (BLM Manual 6330 - 1.6.C.2)

The DEIS details various other options that can be implemented outside of the Dolores River Canyon WSA that can accomplish the salinity reduction objectives of the Paradox Valley Unit. The DEIS details these alternatives as B2, C and D, all of which are entirely located outside of the WSA. BLM has no justification to except the WSA management policy for Alternative B1, given these other viable and reasonable alternatives outside the WSA as detailed in the DEIS.

Second, the policy states explicitly that BLM should carry out any activities necessary to meet other obligations in the least impairing manner possible:

"Activities required to meet obligations imposed by other laws are allowed even though they may violate the non-impairment standard. Such activities should, however, be carried out in the least impairing manner practicable." (BLM Manual 6330 - 1.6.C.2.g)

Again, given the viability of other alternative activities as documented in the DEIS to meet obligations under the Colorado River Basin Salinity Control Act, BLM should not authorize impairment under Alternative B1.

Third, the Colorado River Basin Salinity Control Act does specify locations or require construction of a particular facility or any facility whatsoever on the Dolores River upstream of Bedrock. The Act just generally describes a Paradox Valley Unit in Montrose County, Colorado. It does not provide an obligation to site an injection well at the location of Alternative B1.

"SEC. 202. The Secretary is authorized to construct, operate, and maintain the following salinity control units as the initial stage of the Colorado River Basin salinity control program. (1) The Paradox Valley unit, Montrose County, Colorado, consisting of facilities for collection and disposition of saline ground water of Paradox Valley, including wells, pumps, pipelines, solar evaporation ponds, and all necessary appurtenant and associated works such as roads, fences, dikes, power transmission facilities, and permanent operating facilities." (Public Law 93-320)

Lastly, the Colorado River Basin Salinity Control Act does not override other federal laws, and nothing in the legislation directs the Department of Interior to ignore FLPMA or the legislative mandate to protect WSA's unimpaired until Congress acts. The Department of Interior is still required to comply with all federal laws, including FLPMA, in implementing the Colorado River Basin Salinity Control Act. Sec. 207 of the Salinity Control Act explicitly notes that nothing in the Act "shall be construed to alter, amend, repeal, modify, interpret, or be in conflict with the provisions of" a whole set of other federal laws, including specifically NEPA and the Federal Water Pollution Control Act, among others. There is no rationale to surmise that for some

reason FLPMA (enacted in 1976) is altered, amended, repealed or modified since none of the other relevant federal laws in place in 1974 were affected by the Salinity Control Act.

To summarize, since there are other alternatives outside the WSA that would satisfy implementation of the Paradox Valley Unit of the Colorado River Basin Salinity Control Act, it is incorrect to say an exception to non-impairment has been met. As well, FLPMA says BLM “shall” not allow impairment; this does not provide for BLM to authorize discretionary activities like salinity reduction facilities. The Salinity Control Act does not require specific action in the WSA, and does not override FLPMA.

In conclusion, there is no defensible justification for BLM to ignore the plain requirements of FLPMA to protect the wilderness character of Dolores River Canyon WSA.

IMPACTS TO WILD AND SCENIC OUTSTANDINGLY REMARKABLE VALUES

Alternative B1 poses direct, significant impacts to the identified Outstandingly Remarkable Value of the eligible Wild and Scenic River.

The DEIS describes Alternative B1:

The access road to the new BIF would extend 1.3 miles past the existing BIF and would require two new bridge crossings of the Dolores River. A buried low-pressure pipeline and aboveground electric distribution lines would be constructed from the existing BIF to the new proposed BIF location. (DEIS at 2-8)

These proposed facilities are located in a river corridor that received at least 5,300 visitors in 2019 according to estimates provided by BLM’s Tres Rios Field Office. This is an undeveloped section of river canyon, presently lacking any roads, bridges, powerlines, pipelines, lights, or other type of intrusion. BLM has identified resources summarized as Outstanding Remarkable Values in its evaluation of eligibility for protection under the Wild and Scenic Rivers Act. These Outstanding Remarkable Values (ORVs) documented by BLM consist of the following, as detailed in the Tres Rios Field Office Resource Management Plan and Record of Decision, Appendix D.

- Recreation and Scenery: one of the most popular and beautiful rafting areas in southwest Colorado.
- Fish and Wildlife: This segment contains occupied roundtail chub (*Gila robusta*), flannelmouth sucker (*Catostomus latipinnis*), and bluehead sucker (*C. discobolus yarrowi*) habitat.
- Geology: There are dramatic Cretaceous sandstone cliffs throughout the canyon, and in some areas the geology has confined the canyon to a uniquely persistent linear and angular form.
- Ecology: The segment contains the New Mexico privet (*Forestiera neomexicana*), which is extremely rare or imperiled globally, and Eastwood’s monkeyflower (*Mimulus eastwoodiae*), which is extremely rare or imperiled within the state and rare globally.
- Archeology: Archeological sites evidence at least 11,000 years of inextricable connection between the Dolores River and the area’s human inhabitants.

The DEIS analyzes the anticipated impacts to the outstandingly remarkable values of these eligible Wild and Scenic River segments:

Under Alternative B in Area B1, the scenic and recreational ORVs for eligible river segments, with a preliminary classification of recreational and wild, would be negatively affected. There would be direct effects to the recreational segment and indirect effects to the wild segment. (DEIS at 3-59)

The DEIS describes the impacts to scenery caused by construction of roads, bridges, and associated facilities:

For river segments with a preliminary classification of wild, the scenery would be altered due to the new injection well facilities, which include two new bridges over the Dolores River, overhead power lines, a new access road, and associated infrastructure constructed on Reclamation land (see Section 3.12). Impacts on scenic ORVs would be minor since the topographic features—the canyon walls and hills—and dense riparian vegetation along the banks screen views from the river. (DEIS at 3-59)

The DEIS appropriately notes the impacts to scenic ORVs, However, the DEIS makes unsubstantiated claims to the impacts perceived from views at the river level. Bridges obviously create a substantially noticeable new impact, as does a powerline, for starters. These cannot be dismissed as minor.

The DEIS also fails to account for other forms of visitation to the river corridor and impacts on the scenic ORVs. For example, the Dolores River Trail (as detailed by the West End Trails Alliance <https://www.westendtrails.org/dolores-river-trail/>) traverses the river corridor from Bedrock boat launch upstream to the confluence with La Sal Creek. The trail's "best feature" is described as "great views from inside the Dolores River Canyon." The new injection well facilities, access road, two bridges and powerline would be immediately adjacent to the Dolores River Trail and will dramatically degrade the outstandingly remarkable scenic values of the river corridor for recreational trail users.

BLM policy requires protection of outstandingly remarkable values of identified rivers. (BLM Manual 6400, Chapter 3.5) In this case, given the degradation of outstandingly remarkable scenic values, BLM policy directs the agency to use its discretion to deny issuance of rights-of-way.

For BLM-identified eligible and suitable rivers, the BLM should consider exercising its discretion to deny applications for right-of-way grants if the BLM determines through appropriate environmental analysis that the right-of-way proposal is not compatible with the river's classification and the protection and enhancement of river values. (BLM Manual 6400, Chapter 3.6 C)

The right-of-way required by Alternative B1 is not compatible with the protection and enhancement of identified outstandingly remarkable scenic values, and BLM should deny application for this alternative, in conformance with its policy direction and with purpose of the Wild and Scenic Rivers Act.

The DEIS also describes adverse impacts to the outstandingly remarkable values of the recreational segment. These also can be discretionally avoided if BLM denies the right-of-way application.

For river segments with a preliminary classification of recreational, the vegetation ORV and free-flowing condition would be adversely affected. (DEIS at 3-59)

It is also worth highlighting here that the recreational classification of river as it traverses the Bureau of Reclamation parcel is inappropriate. The river corridor here is free of any impoundments or flow modifications, is roadless, and is entirely undeveloped in precisely the same fashion as the adjacent wild segment on BLM lands. The appropriate river classification, according to the interagency National Wild and Scenic Rivers System website, is “wild river.” Wild Rivers are “Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.” This exactly describes the Dolores River through the segment that Bureau of Reclamation intends to construct a new road, bridges, and injection well facilities. The river from the BLM/Bureau of Reclamation boundary downstream to the current injection well is free of impoundments and inaccessible except by trail. In contrast, Recreational Rivers are “Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.” This description appropriately describes the segment farther downstream starting at the current brine injection facility, but is clearly inaccurate when applied to the undeveloped section of river canyon. (www.rivers.gov)

In summary, BLM cannot approve issuance of a right-of-way for Alternative B1 in compliance with its policy direction and guidance for managing wild and scenic river candidates.

THE ALTERNATIVES CONFLICT WITH BLM MANAGEMENT PLANS

Several of the DEIS alternatives could substantially impair the purpose for proposed areas of critical environmental concern (ACEC) recommended for designation in BLM’s Uncompahgre Field Office Proposed Resource Management Plan.

BLM’s proposed Paradox Rock Art ACEC is adjacent to the large salt evaporation ponds proposed in Alternative C. These would greatly diminish the setting of the Paradox Rock Art ACEC

The nominated Paradox Rock Art ACEC is located in the eastern part of Paradox Valley. It contains important rock art and archaeological sites, including several outstanding examples of Ancestral Puebloan style petroglyphs, Formative period and earlier occupations, features and isolates, and settled village sites dating more than five hundred to a thousand years old. The site is rare for its northern extent of Anasazi rock art and occupation. (Uncompahgre Proposed RMP FEIS at 4-170).

In addition, BLM proposes that “the 1,080 acres in the Paradox Rock Art Complex would be managed as a National Register District.”

For cultural resources, a significant adverse impact would be the loss of those elements that make them eligible for listing on the National Register of Historic Places due to the extent or degree to which resources are damaged, their physical integrity is lost, or the setting of the resource is damaged. Siting over a thousand-acre salt evaporation pond facility adjacent to a National Register District site would create significant adverse impacts by enormously modifying the setting of the Paradox Rock Art site.

The ACEC is to be managed to protect quiet recreation use (Uncompahgre Proposed RMP FEIS at 4-301). Constructing an industrial facility adjacent to the ACEC does not conform to the proposed RMP's direction for quiet recreation use.

The proposed RMP requires the development of a Cultural Resource Project Plan that develops site-specific management objectives and actions for all Scientific, Conservation Use, Traditional Use, and Public Use (Uncompahgre Proposed RMP FEIS at 2-43). Until this cultural resource project plan is completed, BLM cannot ascertain whether an industrial evaporation pond facility is compatible with the management objectives of the Paradox Rock Art ACEC.

The DEIS contains no specific analysis of impacts of Alternative C on the proposed Paradox Rock Art ACEC. The DEIS acknowledges the existence of BLM's proposed National Historic District (DEIS at 3-76). The DEIS also admits that "visual degradation of the setting associated with significant cultural resources, including rock art sites, could result from development. This could affect significant cultural resources for which visual integrity is a component of their significance, such as sacred sites and landscapes and historic trails and landscapes." (DEIS at 3-77).

In the context of the project's stated goals to minimize adverse impacts to cultural resources, to be consistent with BLM management plans, and to be in the best interest of the public, Alternative C fails on all counts and must be discarded.

BLM's proposed Biological Soil Crust ACEC is adjacent to the location of the Zero Liquid Discharge facility proposed in Alternative D. This ACEC was identified via field surveys in 2009:

The survey discovered that the soils in the inventory area are derived from the Paradox Formation, and are highly gypsiferous. These soils tend to support a higher than normal density and species diversity of biological soil crusts.

The inventory also resulted in the documentation of the occurrence of two species of biological soil crusts that are somewhat rare and typically found only on gypsiferous soils. The two species are: *Lecanora gypsicola* and *Gypsoplaca macrophylla*. The identification of these species was verified by Dr. Larry St. Clair, Lichenologist at Brigham Young University. Dr. St. Clair conveyed via e-mail to Jessie Salix that he felt the lichens were in need of protection for two reasons: 1) they occur exclusively on gypsiferous soils, a limited habitat that is commonly mined, 2) Dr. St. Clair has only observed these two species on less than half of the gypsiferous sites he has inventoried. (Uncompahgre Proposed RMP FEIS at O-30).

The ACEC is proposed specifically to protect these sensitive soils from surface disturbance. Unfortunately, the DEIS explicitly excluded from analysis impacts to biological soil crusts. (DEIS at 3-70) The DEIS contains no acknowledgement of the proximity of the ACEC to the Zero Liquid Discharge facility.

Given the intentional omission of analysis of impacts to biological soil crusts, it is not possible to ascertain whether Alternative D would achieve the project goals to minimize adverse

impacts to cultural resources, to be consistent with BLM management plans, and to be in the best interest of the public.

SCENIC VALUES IMPACTS

The Uncompahgre Proposed RMP classifies much of Paradox Valley as VRM Class II.

VRM Class II management requires a high degree of screening to ensure that man-made intrusions do not attract the attention of the casual observer. Where this degree of screening cannot be achieved, the intrusion would not be allowed. (Uncompahgre Proposed RMP FEIS at 4-268).

The salt evaporation ponds and facilities across 1500 acres envisioned in Alternative C would create unacceptable intrusions incompatible with VRM Class II designated areas of Paradox Valley. For this reason, the DEIS acknowledges that Alternative C would not be “in conformance with the interim visual resource management objectives of the UFO RMP. An amendment to the UFO RMP would be required.” (DEIS at ES-10)

The significant visual impacts of Alternative C cannot be avoided. Again, this is further evidence that Alternative C fails to meet the project goals to minimize adverse impacts to cultural resources, to be consistent with BLM management plans, and to be in the best interest of the public. As a result, Alternative C should be discarded from further consideration.

ALTERNATIVE C POSES UNACCEPTABLE IMPACTS TO WILDLIFE

Alternative C will likely cause major wildlife mortality, as described in detail in the DEIS and in Appendix J. As summarized in Appendix J:

Because of the very high salinity of the water that will be retained in these ponds, they will present a potentially significant hazard to wildlife that may attempt to use them for drinking, feeding, or resting. These hazards include the toxic effects from ingestion of the salts and trace elements in the water; osmotic imbalances from consuming or resting on the water; and entrapment, waterlogging, and eventual mortality due to salt encrustation. (DEIS, Appendix J at ES-2)

The evaporation ponds are particularly toxic to waterfowl and bats. Many of these are BLM sensitive species, including Allen’s (Mexican) big-eared bat (*Idionycteris phyllotis*), Spotted bat (*Euderma maculatum*), Townsend’s big-eared bat (*Corynorhinus townsendii*), Fringed myotis (*Myotis thysanodes*) as detailed in Appendix I. Many if not all of these species are covered by the Migratory Bird Treaty Act.

Alternative C will undoubtedly violate the Migratory Bird Treaty Act by causing enormous mortality to migratory birds. The DEIS Appendix I notes that the Migratory Bird Treaty Act of 1918 prohibits the take, capture, or killing of any migratory birds, and any parts, nests, or eggs of any such birds [16 U.S.C. 703 (a)]. Under Executive Order 13186, federal agencies are liable for both intentional and unintentional take of migratory birds. (DEIS at Appendix I-26)

The U.S Fish and Wildlife Service previously expressed its grave concerns about the impacts to migratory birds from evaporation ponds. These were detailed in the Service’s comments on the 2012 Paradox Evaporation Pond Pilot Study.

The Service's concerns for impacts to migratory birds have not changed as we continue to believe that open brine evaporation has the potential to negatively impact migratory birds. The Migratory Bird Treaty Act (Act) does not have provisions to allow for take and so if birds should die in the pit, Reclamation will be held responsible for their death. The Act provides stiff penalties for actions that take migratory birds.

We have stated that to protect migratory birds the pond will most likely need to be netted and if they are not netted initially the supports will need to be installed to allow the net to be pulled over the ponds, should the brine cause adverse impacts to migratory birds. We note that in your summary sheet you plan to try various means including active and passive deterrents to deter birds from using the ponds. While these methods may provide protection for the ponds without meeting it will be important to have staff on hand daily to visually inspect the ponds for birds that may become trapped in the brine and remove and rehabilitate them if they show adverse effects from the brine solution. (Final Scoping Report-Paradox Evaporation Pond Pilot Study, April 2012)

The Bureau of Reclamation and BLM cannot select Alternative C, thereby intentionally causing take of migratory birds, and still comply with federal law.

Alternative C also would eliminate over 1,500 acres of severe winter range for deer and elk.

Given the severe impacts to wildlife winter range and impacts to migratory birds and bats from Alternative C, this alternative not only violates federal law but also in no way meets the project goals to minimize adverse impacts to cultural resources, to be consistent with BLM management plans, and to be in the best interest of the public.

Desert bighorn sheep are a BLM sensitive species. Alternative B1 would impact over 400 acres of sheep habitat, with particularly significant impacts to lambing areas and to water sources. The Uncompahgre Draft RMP notes that important habitat requirements for the desert bighorn include escape terrain and areas with high visibility, with good forage sources and reliable water sources nearby. Fragmenting over a mile of prime canyon habitat incorporating reliable water sources is a substantial negative impact to desert bighorns.

CONSULTATION WITH USFWS

The DEIS defers any analysis of compliance with the Endangered Species Act until a preferred alternative is identified in the Record of Decision. (DEIS at 5-3) Since the Bureau of Reclamation does not intend to coordinate and consult with USFWS to comply with Section 7 of the Endangered Species Act until a later date, at what point will the public have the opportunity to review and comment in a meaningful way on potential impacts to threatened and endangered species?

IMPACTS TO RECREATION

The DEIS offers an incomplete analysis of impacts to recreation. The DEIS does not assess the degradation in recreational experience that would be caused by the construction of Alternative B1. The Dolores River corridor is currently a primitive recreational opportunity setting, which means it offers opportunities for solitude, natural quiet, and unconfined recreation for non-motorized and non-mechanized travel year-round. (Tres Rios Field Office Approved RMP, II-83). The segment of the river canyon incorporated within Department of

Interior lands administered by the Bureau of Reclamation is similar with the corridor from the BLM WSA boundary downstream to the existing brine injection facility also meeting the description of a primitive recreational opportunity setting though Bureau of Reclamation may not apply that terminology.

The construction of a new road, bridges, and powerline will significantly modify the recreation setting of the river canyon, and will significantly degrade the recreational experience for hikers and boaters. Alternative B1 effectively converts the Dolores River corridor from the WSA boundary downstream into a Roded Natural ROS setting rather than primitive. This is a dramatic and significant impact that should be revealed in the analysis. For boaters floating downstream the last couple of miles to the Bedrock boat ramp, and for hikers and equestrians on the Dolores River Trail, their experience will be negatively impacted to a significant degree.

The DEIS is inaccurate to state that impacts to recreational use from Alternative B1 are minimal. (DEIS at 3-75) In fact, the impacts are substantial. One cannot flip from a Primitive ROS to a Roded Natural ROS, and describe that as a minimal impact.

GEOPHYSICAL RISK OF DOLORES RIVER VALLEY BRINE INJECTION WELL

The second brine injection well contemplated in the Dolores River canyon south of the current injection well, as described by Alternative B1, is a poor choice for geophysical considerations, in addition to its impacts to the WSA, the eligible wild and scenic river, recreation and wildlife.

The Bureau of Reclamation's Consultant Review Board has described the difficulties and risks associated with the Dolores River Valley site. The Alternative B1 site requires directional drilling through the boundary fault, and results in injection near the same location as is causing the extensive earthquakes throughout the Paradox Valley.

The Dolores River Valley sites are considered higher risk because their long offsets require drilling through the boundary fault and at an angle. These sites are also geographically close to clusters of earthquakes associated with the PVU #1 well. (USBR Technical Studies and Evaluations for the Second Injection Well Alternative at the Paradox Valley Unit, September 2017, p. 1-2)

Further geophysical investigation is necessary to ascertain whether a potential second Paradox Valley Unit well (PVU #2) would be hydrologically isolated. This includes a comprehensive 3D seismic survey, drilling exploratory wells, modeling salt rheology and other technical analyses.

For the Dolores River Valley sites to be acceptable, it must be verified that the injection targets for PVU #2 and PVU #1 lie in separate reservoir compartments, i.e., that northern boundary fault of the new fault block is a sealing fault.

The Consultant Review Board was unequivocal in its technical preference for the Monogram Mesa site for PVU #2, though it was more expensive than the Dolores River Valley site. This provides yet more questions about the viability of the Dolores River Valley, Alternative B1 site. Not only does it have dubious legal justification, and serious impacts to highly valued surface resources, it also has potentially extensive concerns about its geophysical suitability.

... the CRB favors the Dolores River Valley surface sites for Alternative PVU #2 because of perceived infrastructure costs; however, in the absence of cost considerations the Monogram Mesa sites are clearly superior. (p. 2-8)

Earlier technical evaluations also raised questions about the Dolores River Valley site. A 2012 technical memorandum questioned whether the Dolores River Valley site (identified as Site A in that review) would be distinct from the existing injection well. The 2012 memorandum stated that fluid injected at the Dolores River Valley site “would almost certainly not be hydrologically isolated from the reservoirs accessed by PVU Injection Well #1.” It would be useful for the DEIS to explain the evolution of rationale from 2012 to present, and why the Dolores River Valley Alternative B1 site is now considered suitable. One can presume it is because of either attempting to directionally drill across the fault zone, or by attempting to locate a vertical well atop Skein Mesa.

The majority of the injection well site locations proposed in the 1980’s are not favorable for the location of a second PVU injection well. Sites A, D, and E lie within the northwest-southeast trending fault-bounded corridor of fluid flow from PVU Injection Well #1, as predicted by Bremkamp and Harr (1988) and corroborated by the pattern of induced seismicity (Figure 25). Hence, fluid injected into the Leadville or Precambrian formations at these locations would almost certainly not be hydrologically isolated from the reservoirs accessed by PVU Injection Well #1.” (Technical Memorandum No. 86-68330-2012-27, Review of Geologic Investigations and Injection Well Site Selection, Paradox Valley Unit, Colorado U.S. Department of the Interior, Bureau of Reclamation, Technical Service Center November 2012, p. 57)

Alternative B1 appears intended to inject brine immediately southwest of the current fault that is presumed to provide a hydrologic isolation from the existing PVU #1 injection well. Is there any concern that filling the limestone formation along the same fault zone but on the southwest side as compared with the northeast side will not simply encourage further earthquakes? Is there geophysical modeling or other information available to confirm that Alternative B1 won’t exacerbate existing earthquakes owing to its proximity to the current injection well?

ADDITIONAL INJECTION WELL ALTERNATIVES EVALUATION

The DEIS includes analysis for several alternative injection well locations in Appendix F, Geomechanical and Flow Modeling Summary Report. These apparently include the locations for Alternatives B1 and B2 (Dolores River Valley and Monogram Mesa). A third well location at Pinion Ridge was evaluated in Appendix F, but apparently not carried forward as a full alternative in the DEIS.

The DEIS should describe the Pinion Ridge location and other alternative injection well locations evaluated, and for what reasons they might have been discarded. Previous technical reviews commissioned by the Bureau of Reclamation identified a number of potential alternative locations. For example, the 2012 Technical Memorandum described one such location:

Site B, located in the center of Paradox Valley close to the Conoco Scorup No. 1 well, remains a potentially viable option. (p.57)

Other sites north of Paradox Valley have also been under consideration. A 2008 technical memorandum described a site near the north side of the valley. Perhaps this is the same site as Site B noted in 2012, but the 2008 review described one alternative thusly:

Alternative 2: Additional Injection Well

A second injection well was anticipated when the deep well injection plan was being developed and implemented. However, the cost of the first injection well precluded installation of the second injection well at that time. The proposed location of the second well is near the north side of the Paradox Valley near a former oil exploration well. This location will allow the second injection well to be completed in the same formation as the first well. The second well should not be hydraulically connected to the first injection well site due to faulting between the two sites. The infrastructure needed to connect a second injection well to the existing extraction system will be needed. This will include a crossing of the Dolores River since the proposed site is on the west side of the river. Approximately two miles of 10-inch HDPE pipeline is anticipated, plus a directional-drilled river crossing. (Phase 3 And 4 Technical Memoranda Evaluation of Salinity Control Alternatives Environmental and Economic Feasibility for Paradox Valley Salinity Control Unit, Franson Civil Engineers Team, 2008 p. 6)

The DEIS is almost exclusively focused on the subsurface attributes of injection well alternatives to the exclusion of surface considerations. The public's review and comment on the DEIS provides the additional information that the Alternative B1 locations do not adhere to FLPMA's mandates, as well as the substantial impacts to scenery, recreation, and other socio-economic concerns. It might have made for more efficient analysis to know these likely fatal surface resource conflicts before investing too much effort into consideration of B1.

With the added information about surface resource concerns, the Bureau of Reclamation should undertake assessment of other injection well locations that incorporate not only subsurface geophysical factors but also surface resource considerations.

It would be useful for the public and reviewers to better understand the range of alternatives contemplated if the DEIS would describe additional alternative injection well sites that might include sites along Highway 90, sites north of the Paradox Valley rim, and sites near existing infrastructure in Paradox Valley.

ADDITIONAL ALTERNATIVES EVALUATION

The Bureau of Reclamation should consider additional alternatives beyond the three options evaluated in the DEIS. These could include river flow modifications and agricultural land management options.

Some geophysical analysis suggests that increased freshwater flows in the Dolores River could provide a buffer against brine intrusions and suppress the brine layer. One report notes the correlation between decreased freshwater flows and greatly increased brine discharge.

When river stage was low, groundwater flowed towards the river, and brine discharge to the river increased. When the river stage was high, the gradient was reversed, and fresh surface water recharged the alluvial aquifer minimizing brine discharge. Most of the salt load to the river occurred during the winter and appeared to be enhanced by diurnal stage fluctuations. (Mast, M.A., and Terry, N., 2019, Controls on spatial and

temporal variations of brine discharge to the Dolores River in the Paradox Valley, Colorado, 2016–18: U.S. Geological Survey Scientific Investigations Report 2019–5058, 25 p., <https://doi.org/10.3133/sir20195058>.)

These new and informative USGS studies assess the sensitive height variations of the fresh-water/brine interface with river streamflow (stage height), especially the observed complete cutoff of salt intrusion during high spring flows. When the height of the adjacent water table is increased (by increased thickness of so-called fresh water “lens”), it apparently drives the top of the brine layer below the riverbed and establishes conventional fresh-water aquifer recharge from the river as opposed to brine intrusion to the river.

This raises the obvious question whether there is a straight-forward non-structural alternative to reduce brine discharge into the Dolores River simply by increasing freshwater flows in the river. The DEIS should discuss the viability of such an approach.

The DEIS should also discuss and evaluate the efficacy of agricultural land management alternatives as compared with the selected alternatives for analysis. This could include modifications to agricultural practices in West Paradox Valley. It could also include the benefit of applying more resources to the mitigation projects in the Lower Gunnison or Grand Valley areas where salt loading has been significantly reduced with improved agricultural practices.

ADDITIONAL QUESTIONS

Downstream Salinity Concentrations

The DEIS models salinity concentrations downstream on the Colorado River, including at Imperial Dam, associated with each of the DEIS alternatives in Appendix H, Hydrologic Modeling Report and Memoranda. Not surprisingly, the model anticipates that alternatives that remove more salt at Paradox Valley result in slightly lower salinity concentrations at Imperial Dam. All alternatives result in salinity concentrations well below the relevant numeric criteria salinity concentration, including No Action.

Since the Paradox Valley Unit has ceased operation over the past year owing to earthquakes, there should be empirical evidence of the downstream consequences of the No Action Alternative. What is the observed impact to salinity concentrations at Imperial Dam over the past year without operation of the Paradox Valley Unit? Does it confirm modeling predictions?

Brine Radioactivity

Brine fluids extracted during oil and gas operations or water processing activities are often highly radioactive owing to naturally occurring radioactive materials. The EPA defines these Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) as, “Naturally occurring radioactive materials that have been concentrated or exposed to the accessible environment as a result of human activities such as manufacturing, mineral extraction, or water processing.” Furthermore,

“Technologically enhanced” means that the radiological, physical, and chemical properties of the radioactive material have been concentrated or further altered by having been processed, or beneficiated, or disturbed in a way that increases the potential for human and/or environmental exposures.

Naturally Occurring Radioactive Material (NORM) is defined as, “Materials which may contain any of the primordial radionuclides or radioactive elements as they occur in

nature, such as radium, uranium, thorium, potassium, and their radioactive decay products, such as radium and radon, that are undisturbed as a result of human activities." (<https://www.epa.gov/radiation/technologically-enhanced-naturally-occurring-radioactive-materials-tenorm>)

What are the radioactive constituents in the Paradox Valley brine, if any? Has Bureau of Reclamation measured for radioactivity of the brine, and similarly radioactivity of remnant waste salt? We would appreciate inclusion of this information in the EIS. The EIS needs to evaluate the consequences of Technologically Enhanced Naturally Occurring Radioactive Material if present, and options for addressing the handling and disposal of these materials.

We appreciate that evaluation of options for removing brine in Paradox Valley has required substantial technical analysis and review. The DEIS is the first opportunity for impacts to surface values – recreation, wildlife, scenery, wilderness, cultural resources, etc – to receive similar scrutiny and feedback. We look forward to the incorporation of these concerns into further analysis and an eventual decision.

Sincerely yours

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