Peer Review and Information Quality Plan for the Paradox Valley Environmental Impact Statement

1. Introduction

This Peer Review and Information Quality Plan for the Paradox Valley Unit Alternatives Study Environmental Impact Statement (Plan) has been developed by the U.S. Department of the Interior's Bureau of Reclamation, Upper Colorado Region (Reclamation). Reclamation is the lead federal agency for preparation of an environmental impact statement entitled Paradox Valley Unit Environmental Impact Statement (EIS). Inquiries regarding the specifics of this plan may be directed to Grand Junction's Western Colorado Area Office Environmental and Planning Group Chief at (970)248-0608 or lmcwhirter@usbr.gov.

2. Purpose and Definitions

This Plan was prepared in compliance with 70 FR 2664-2677 "Final Information Quality Bulletin for Peer Review" issued by the Office of Management and Budget (OMB) on December 16, 2004 (OMB Bulletin) (OMB 2004). The OMB Bulletin has subsequently been incorporated into the U.S. Department of the Interior (Department) information quality guidelines. Reclamation is subject to these guidelines, and also has its own policy and procedures that apply to certain components of the National Environmental Policy Act (NEPA) and Reclamation policy CMP P14, "Peer Review of Scientific Information and Assessments" (Reclamation policy) (Reclamation 2016).

Consistent with the OMB Bulletin and Departmental and agency guidelines, the purpose of this Plan is to ensure that the quality of scientific information used in this project conforms to the standards of the scientific and technical community and to ensure that, per Departmental guidance, the methods for producing quality information will be made transparent, to the maximum extent practicable, through accurate documentation, use of appropriate internal and external review procedures, consultation with experts and users, and verification of information quality.

The purpose of this Plan also is to meet the Council on Environmental Quality's (CEQ) regulatory requirements at 40 CFR § 1502.22, regarding the use of credible scientific evidence in evaluating the reasonably foreseeable significant adverse impacts on the human environment. The CEQ's regulations require that, when the specific information relevant to reasonably foreseeable significant adverse impacts cannot be obtained for certain reasons, the agency's evaluations of such impacts is to be based on theoretical approaches or research methods generally accepted in the scientific community (CEQ 1986).

For purposes of this Plan and in compliance with the CEQ regulations, and OMB, Departmental, and agency requirements, four categories of information are defined:

1) scientific information
2) influential scientific information
3) highly influential scientific assessments, and
4) exempt information.

As defined by the OMB Bulletin, "scientific information" means factual inputs, data, models, analyses, technical information, or scientific assessments based on the behavioral and social sciences, public health and medical sciences, life and earth sciences, engineering, or physical sciences. This includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual forms. This definition includes information that an agency disseminates from a web page, but does not include the provision of hyperlinks to information that others disseminate. This definitely does not include opinions, where the agency's presentation makes clear that what is being offered is someone's opinion rather than fact or the agency's views.

"Scientific assessment" is defined by the OMB Bulletin as an evaluation of a body of scientific or technical information that typically synthesizes multiple factual inputs, data, models, assumptions, and/or applies best professional judgment to bridge uncertainties in the available information. These assessments include, but are not limited to, state-of-science reports; technology assessments; weight-of-evidence analyses; meta-analyses; health, safety, or ecological risk assessments; toxicological characterizations of substances; integrated assessment models; hazard determinations; or exposure assessments.

"Scientific and technical work products" are further defined by the Environmental Protection Agency (EPA) in the 2015 "Science and Technology Policy Council's Peer Review Handbook, 4th edition," as including risk assessments, technical studies and guidance, analytical methods, scientific database designs, technical models, technical protocols, statistical survey/studies, technical background materials, technical guidance (except for guidance providing policy decisions), research plans, and research strategies. The term "scientific and/or technical work" is generally consistent with the term "scientific information" in the OMB Bulletin. (EPA 2015)

As defined by the OMB Bulletin, "influential scientific information" is a subset of scientific information that the applicable agency director can reasonably determine does have a clear and substantial impact on the agency or other known public policies or private sector decisions.

"Highly influential scientific assessment," as defined by the OMB Bulletin, is a subset of scientific information that could have a potential impact of more than $500 million in any year, or which is novel, controversial, or precedent-setting, or has significant agency interest. A scientific assessment of this type requires external peer review.

"Exempt information," in accordance with the OMB Bulletin, includes among other things, information whose dissemination arises in adjudications and permit proceedings, unless the agency, in its discretion, determines that peer review is practical and appropriate and that the influential dissemination is scientifically or technically novel (i.e., a major change in accepted practice) or likely to have precedent-setting influence on future adjudications or permit proceedings. This exclusion is intended to cover, among other things, licensing, approval and

registration processes for specific product development activities as well as site specific activities.

The main purpose of this Plan for the Paradox Valley Unit EIS is to explain the process that will be used for determining which work products will require peer review, and how that peer review will be approached. The four levels of involvement discussed in this plan are public review, peer input, internal peer review, and external peer review. For Reclamation and the Cooperating Agencies, it is anticipated the large majority of scientific information which will be used during preparation of the EIS is Exempt Information excluded from the OMB Bulletin requirements or which does not otherwise meet the criteria for external peer review set forth in Section 4.

3. Information Quality Guidelines

3.1 Public Review and Comment on EIS

In compliance with CEQ regulations, the Draft and the Final EIS will be circulated to persons, organizations and agencies. These public reviews are not peer reviews. As the EPA noted, peer review and public comment are mutually exclusive. Substantive and relevant public comments may be provided as part of a review package to peer reviewers if such information would assist with a peer review. Decision documents, including but not limited to the EIS (draft or final) and the Record of Decision, are not scientific or technical work products and will not be subject to peer review; however, underlying scientific and technical work products used in the EIS may be candidates for peer review. (EPA 2015)

3.2 Peer Input for Scientific Information

A variety of scientific and technical work products will be used and cited, or their conclusions will be summarized in the EIS. Many are existing studies or assessments that have already undergone scientific peer review and, where that is the case, it will be documented. Information that does not rise to the level of influential scientific information or highly influential scientific assessments does not require peer review, but it might require what EPA calls peer input or peer consultation (EPA 2015). This connotes an interaction during the development of the EIS, providing for an open exchange of data, insights, and ideas. Peer input may be characterized by a continued and iterative interaction with scientific experts during scientific work product development.

Peer input is generally internal. Examples of work products that will be subject to peer input include cultural resource survey reports, biological field survey reports, or collection and summation of U.S. Census data used to characterize socio-economic conditions of affected communities. Reclamation will decide, with input from the Cooperating Agencies and advice from Reclamation's Director, Office of Research and Development (R&D Director) when necessary, which work products are neither influential nor highly influential and may require only peer input at most. The OMB Bulletin does not require scientific information that is not influential or highly influential to be peer reviewed. For the EIS, there is an extensive interdisciplinary team of experts within Reclamation, and among the Cooperating Agencies, who

may be involved in internal peer input based on internal agency review policy, or by the agencies' agreement for specific work products.

3.3 Internal Peer Review Process

The goal of peer review is to obtain an independent, third-party review of the product from experts in the relevant scientific disciplines having applicable technical expertise. In order to be independent, peer review requires that the reviewers have not participated in development of the work product being reviewed (OMB 2004, pp. 17-20). Scientific or technical work products that are less complex, novel, or controversial, or have a lower impact but nevertheless constitute non-exempt influential scientific information may be peer reviewed using internal federal government experts as long as the reviewers did not participate in the development of the work product. Examples of internal peer review include, but are not limited to the following:

(a) Individual scientists or appropriately accredited experts employed by Reclamation or the Cooperating Agencies who did not participate in the development of the work product or the use of the work product in the EIS;

(b) Individual scientists or appropriately accredited experts from other federal bureaus or offices;

(c) An *ad hoc* panel of independent experts from within Reclamation, the Cooperating Agencies, and/or other federal bureaus or offices.

Internal peer review comments will be documented and saved as part of the EIS administrative record.

3.4 External Peer Review Process

Depending upon whether a scientific or technical work product is influential or highly influential, the product may need to be peer reviewed by external experts outside the federal government. External peer review mechanisms range from individual letter reviews by outside scientists or accredited technical experts, to a panel review by independent experts outside the federal government. The level and intensity of peer review should match the impact and complexity of the work product being reviewed. Peer reviewers shall be selected based on expertise, experience and skills, including specialists from multiple disciplines as necessary.

External peer reviewers will prepare a report that describes the nature of their review and their findings and conclusions which discloses the names of the reviewer(s) and organizational affiliation(s). Reclamation may post the report on the EIS website.

4. Peer Review Decisions

4.1 Second Well Alternative Investigations

The second well investigations will result in multiple reports based on scientific information, including data, models, analyses, technical information, and scientific assessments from the engineering and physical sciences. The investigations will consist of studies on the following topics:

- Pressure-flow modeling
- Seismic reflection data
- Aeromagnetic data
- Well-logging data
- INSAR data
- Integrated geologic model
- Geologic feasibility
- Geomechanical & flow modeling

The results of the studies will be used as the basis for documents prepared pursuant to NEPA, and will inform decisions made by Reclamation regarding development of an alternative to the Paradox Valley Unit Injection Well #1. The reports are not expected to have a clear and substantial impact on important public policies or private sector decisions. These reports will be produced by Reclamation's Technical Services Center (TSC) technical, scientific and engineering staff, as well as by contractors. Prior to the preparation of the draft EIS, the results of these studies may be made available to the Cooperating Agencies for peer input, based on their legal jurisdiction or special expertise.

A panel review of some or all topics will be conducted by a Consultant Review Board (CRB). A CRB consisting of 4-8 members in the fields of deep-well drilling, petroleum engineering, petroleum/structural geology, seismic reflection, rock mechanics, and/or induced seismicity is expected to be empaneled. The CRB will be charged with conducting an external review of some or all of the studies. CRB members will be selected by Reclamation using a competitive contracting process. The public will not directly participate in the peer review, although all reports and the CRB's report will be made available to the public on Reclamation's web site.

The second well investigation studies are not expected to have a clear and substantial impact on important public policies or private sector decisions. Because these studies are not considered influential scientific information, peer review is not required; however, Reclamation may elicit peer review for these studies if Reclamation determines it will be beneficial for enhancing the quality of scientific information produced, used, and disseminated by Reclamation. The external peer review planned for these studies goes above the requirements set forth for information that does not rise to the level of influential scientific information or highly influential scientific assessments; however, it is expected to result in increased credibility of the decisions to which this scientific information will contribute, and would be both cost effective and beneficial in defining the risk associated with implementing a second injection well in the Paradox Valley.

4.2 Evaporation Pond Alternative Investigations

The evaporation pond investigation consists of four parts: Hydrogen Sulfide Management Study, Pond Design Optimization Study, Brine Disposal Study, and Predictive Ecological Risk Assessment. These studies will result in multiple reports which will be utilized in the NEPA process to help inform a decision on the preferred alternative to pursue for the Paradox Valley Unit. Prior to the preparation of the draft EIS, the studies may be made available to the Cooperating Agencies, based on their legal jurisdiction or special expertise.

The Hydrogen Sulfide Management Study requires an Architectural and Engineering (A&E) firm to recommend a method to manage and remove hydrogen sulfide which is in the brine. As hydrogen sulfide is a naturally occurring compound which is commonly dealt with in industries such as oil and gas production, it is not anticipated the solution for removing it from the brine will be novel or precedent setting. It is also not anticipated the solution will have a clear or substantial impact on important public policies or private sector decisions.

The Pond Design Optimization Study requires an A&E firm to propose an optimal strategy to design and operate evaporation ponds to dispose of 300 gallons per minute (GPM) of brine. This analysis shall not employ proprietary software unless that software is commercially available. The design shall be optimized for the location of the Paradox Valley Unit and include life cycle costs for 50 years. As evaporation ponds are utilized throughout the world for salt and bittern production, it is not anticipated the design of the ponds will be novel or precedent setting. It is also not anticipated the design will have a clear or substantial impact on important public policies or private sector decisions.

The Brine Disposal Study requires an A&E firm to evaluate the possible methods of disposal for 300 GPM of brine or the solid byproduct generated. This shall include evaluating the potential to develop a market for the brine or byproducts as well as identifying other disposal methods. It is not anticipated the Paradox Valley brine contains rare or unique chemistry which would produce highly valuable byproducts. Therefore, it is not anticipated the byproduct disposal methods will be novel or precedent setting. It is also not anticipated the solution will have a clear or substantial impact on important public policies or private sector decisions.

The Predictive Ecological Risk Assessment requires an A&E firm to conduct a predictive ecological risk assessment to evaluate the severity and extent of potential ecological impacts of an evaporation pond alternative on birds and other wildlife, as well as propose mitigation measures which will minimize ecological risk. This assessment will be conducted utilizing commercially available scientific information, and mitigation measures are not anticipated to be novel or precedent setting. Therefore, it is not anticipated that the assessment will have a clear or substantial impact on important public policies or private sector decisions.

The Hydrogen Sulfide Management, Pond Design Optimization, Brine Disposal, and Predictive Ecological Risk Assessment studies are all based upon commercially available scientific information and technology, and are not expected to have a clear and substantial impact on important public policies or private sector decisions. Because these studies are not considered influential scientific information, peer review is not required; however, Reclamation may elicit peer input for these studies. Reclamation may seek peer input by the Cooperating Agencies with applicable jurisdiction or special expertise if Reclamation determines such input may enhance the quality of scientific information produced, used, and disseminated by Reclamation.

4.3 Zero Liquid Discharge Alternative Investigations

The zero liquid discharge (ZLD) technology investigation will consist of a compilation of existing technologies which have the capability of separating salts as a solid waste product from liquid brine. This information will be derived based upon publicly available technology and

literature. As part of the alternative investigation, commercial vendors who provide products with these technologies will be contacted via an information request. The information request will include topics such as the total life cycle cost of implementation, environmental impacts, chemical demand, reliability, and waste byproduct formation rate and composition. Vendors will also be asked if their technology can address hydrogen sulfide risks, which is a concern for human exposure and equipment corrosion. This information will be collected and evaluated by a team of engineers and scientists from the TSC. The TSC will evaluate the technologies and associated vendor responses for applicability to the EIS.

It is anticipated that some of the technologies identified and determined to be reasonable during the ZLD technology investigation will warrant further investigation at a demonstration stage in order to verify the effectiveness of the proposed technology(s). Demonstration tests of one or two technologies will provide information necessary to determine if the implementation of multiple full-scale units should be further considered as an alternative in this EIS.

The products and systems evaluated in the ZLD investigations are all based upon commercially available scientific information and technologies, and are not expected to have a clear and substantial impact on important public policies or private sector decisions. Because these studies are not considered influential scientific information, peer review is not required; however, Reclamation may elicit peer input for these studies if it determines peer input by the Cooperating Agencies will be beneficial for enhancing the quality of scientific information produced, used, and disseminated by Reclamation.

4.4 Value Planning Study

Once the second well, evaporation pond, and ZLD studies are complete and the reports submitted, a Value Planning Study will be performed. A Value Planning Study uses the Value Method to optimize alternatives. The Value Method is a systematic and organized way to develop and compare alternatives which provide all of the essential functions for the desired project with the greatest project efficiency, economy, quality, and the least delay. The value method produces recommendations. The outcome of the Value Planning Study will be reflected in the Draft EIS, which will be distributed to Cooperating Agencies and the public.

The recommendations produced by the Value Planning Study are all based on commercially available scientific information and technology, and are not expected to have a clear and substantial impact on important public policies or private sector decisions. Because this study is not considered influential scientific information, peer review is not required.

5. Peer Review Plan

5.1 Second Well Alternative Peer Review Plan

The second well investigation studies meet the definition of scientific information and therefore do not require peer review. However, Reclamation may conduct external and internal peer review as well as elicit peer input from the Cooperating Agencies, based on their legal jurisdiction or special expertise.

External review will be conducted for some or all the second well studies. Reclamation intends to solicit independent external panel review of some or all topics by a CRB. Reviewers will be selected by Reclamation; outside organizations will not be asked to nominate potential peer reviewers. The CRB will consist of a highly-qualified panel of experts which will be selected through a competitive procurement process. Each proposed panel member will be evaluated by a Reclamation technical review team to determine the most qualified expert within each field. The top-ranked experts will be selected independent of the contractor (i.e., the panel may consist of experts from multiple contractors). The overall scope of the external review is to provide expert review and recommendations of the scientific information used to establish the 2nd well alternative. The charge of the reviewers is to provide such a review. The reviewers will not provide advice on a policy or decision, such as the amount of uncertainty that is acceptable or the amount or precaution that should be embedded in an analysis, as such considerations are the purview of Reclamation.

5.2 Evaporation Pond Alternative Peer Review Plan

The hydrogen sulfide management study, pond design optimization study, byproduct disposal study, and ecological risk assessment meet the definition of scientific information and therefore do not require peer review. However, Reclamation may elicit peer input from the Cooperating Agencies based on their legal jurisdiction or special expertise. These studies are scheduled to be conducted February 2016 to December 2016. Peer input may be requested from the Cooperating Agencies, and would have a duration of approximately one month.

Peer input may be obtained from individuals with backgrounds encompassing a multitude of disciplines who are associated with agencies who have jurisdiction by law or special expertise regarding various resources analyzed in the EIS. These reviewers are selected by Reclamation, and have not been designated by an outside organization. The public will not be asked to nominate potential peer reviewers. Reclamation may elicit peer input from the Cooperating Agencies, based on their legal jurisdiction or special expertise, during the studies' work product development in the form of promoting an open exchange of data, insights, comments, questions, and ideas from the inputters. The inputters will not provide advice on a policy or decision, such as the amount of uncertainty that is acceptable or the amount or precaution that should be embedded in an analysis, as such considerations are the purview of Reclamation.

5.3 Zero Liquid Discharge Alternative Peer Review Plan

The ZLD technology assessment and demonstration project(s) meet the definition of scientific information and therefore do not require peer review. However, Reclamation may elicit peer input from the Cooperating Agencies, based on their legal jurisdiction or special expertise. The assessment is scheduled to be conducted November 2015 to March 2016, with a final report disseminated for peer input in the summer of 2016. The demonstration project is scheduled for summer of 2018. Peer input may be requested from the Cooperating Agencies, and would have a duration of approximately one month.

Peer input may be obtained from individuals with backgrounds encompassing a multitude of disciplines who are associated with agencies who have jurisdiction by law or special expertise

regarding various resources analyzed in the EIS. These reviewers are selected by Reclamation, and have not been designated by an outside organization. The public will not be asked to nominate potential peer reviewers. Reclamation may elicit peer input from the Cooperating Agencies during the studies' work product development, based on their legal jurisdiction or special expertise, in the form of promoting an open exchange of data, insights, comments, questions, and ideas from the inputters. The inputters will not provide advice on a policy or decision, such as the amount of uncertainty that is acceptable or the amount or precaution that should be embedded in an analysis, as such considerations are the purview of Reclamation.

5.4 Value Planning Study

Value Planning Studies utilize a formal study method to develop and compare alternatives that will provide all of the essential functions for the project for the3 greatest value (i.e. greatest efficiency, economy, quality, and the least delay). This study produces recommendations, not decisions. Value Planning managers select a team leader and team members (usually 5 to 7 individuals with relevant expertise) to conduct the study. The Value Planning Study meets the definition of scientific information and therefore does not require peer review. The study schedule is anticipated to be within the summer of calendar year 2017. A team of individuals with backgrounds encompassing a diversity of disciplines will be convened to conduct the study. The Value Planning Study is "For Official Use Only", intended for use by Reclamation to evaluate potential advantages, disadvantages and risks of alternatives. Therefore, external peer review will not be sought.

5.5 Design, Estimating, and Construction (DEC) Review

A DEC Review is an internal peer review process which will be utilized by Reclamation as a component of the peer review plan for this EIS. DEC Reviews are internal independent expert team oversight reviews of large Reclamation technical projects. DEC Reviews are conducted by a panel consisting of a team leader, four to five team members, and occasionally technical advisors. The objective of a DEC Review is to ensure that project cost estimates are appropriate, there are no major technical flaws, that project risks and uncertainties are identified and addressed, and executive-level management decisions and products are sound at both the project and corporate levels. A DEC Review of the project costs will be completed for the preferred alternative once the preferred alternative is identified. This review is anticipated to take approximately one week to complete and will occur prior to the Draft EIS public comment period. The DEC Review report is "For Official Use Only", intended for use by Reclamation to evaluate risks and uncertainties. Therefore, external peer review will not be sought.

5.6 Draft EIS Quality Assurance and Quality Control

The Draft EIS will undergo quality assurance and quality control (QA/QC) management and quality improvement activities in an effort to ensure quality standards are met in accordance with various laws, regulations, and policies. An internal QA/QC review will be conducted by Reclamation in tandem with the Draft EIS development. Reclamation will also be conducting a final QA/QC review of the completed Draft EIS prior to dissemination. This final internal review is anticipated to begin in June 2019 and extend for a period of three weeks. Reclamation

will request comments from the Cooperating Agencies. In addition, the Draft EIS will be disseminated for public review and comment for a period of approximately 45 days (anticipated schedule includes public comment during Fall or Winter 2019).

6. Potential for Additional Studies

The potential exists that a need for additional studies may be identified at a future point during the development of the EIS. It is unlikely that any potential studies will reach the level of influential scientific information or highly influential scientific information. In the event additional studies are required, Reclamation may elicit peer input as described throughout this Peer Review Plan, and the Peer Review Plan will not be updated. In the unlikely event additional studies are required which will result in influential scientific information or highly influential scientific information, Reclamation will update this Peer Review Plan.

7. Publication of Peer Review Documentation

In order to be compliant with OMB's transparency requirements, documentation for influential or highly influential peer reviews will be posted to the Paradox Valley Unit EIS website and/or Reclamation's peer review website. While none of the studies identified for the EIS investigations are anticipated to rise to the level of influential, Reclamation plans on publishing the finalized studies, as identified above, to the EIS website.

References Cited

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