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December 6, 2016

WM-00011

Christine Pineda
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

RE: U.S. Nuclear Regulatory Commission's Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada Final Report (Docket ID NRC-2015-0051)

Dear Ms. Pineda:

We thank the Nuclear Regulatory Commission (NRC) for considering Inyo County's comments on the NRC's Draft Supplement to the U.S. Department of Energy's (DOE) Environmental Impact Statement (EIS) for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (SEIS). As we indicated in our November 17, 2015 correspondence, the long-term health, safety and welfare of Inyo County residents is our highest concern, particularly in relation to potential contamination of groundwater resources as a result of the proposed Repository.

The Final SEIS does not properly address potential groundwater contamination in our communities pursuant to applicable law, nor does it identify mitigation, remediation, and groundwater monitoring to ensure that any contaminants from the Repository that enter the groundwater system are detected and that the impacts, should such contamination be detected, are mitigated. It is therefore very disappointing to us that the NRC declined to incorporate our requests concerning these critical concerns into the Final SEIS.

Analysis

NRC's National Environmental Protection Act (NEPA) regulations (10 CFR § 51.109(c)(2)) provide that it will not be practicable to adopt any EIS prepared by DOE for a geologic repository if there is "significant and substantial new information or new considerations [that would] render such environmental impact statement inadequate." As identified in our comments regarding the Draft SEIS and in Attachment A hereto, such new information exists and should have been analyzed in the Final SEIS. As noted in Section 3.2.1.4.2 of NRC's Adoption Determination Report (ADR), an incomplete and inadequate characterization of a potential impact constitutes a significant new consideration that renders the SEIS inadequate—irrespective of the magnitude of potential impacts.

Scope of the Final SEIS

Section 3.2.1.4.2 of the ADR, "Impacts on Groundwater and from Surface Discharge of Groundwater," provides the NRC's staff's assessment of the groundwater and surface discharge impact analyses in DOE's EISs. As described in the ADR, the NRC staff finds that the EISs did not adequately characterize potential

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contaminant release to groundwater and from surface discharges of groundwater. The ADR explained that while DOE's analysis of the postclosure behavior of the Repository recognizes that the release of contaminants to groundwater can be expected over the long term, the analysis does not provide adequate discussion of the cumulative amounts of radiological and nonradiological contaminants that may enter the groundwater over time, and how these contaminants would behave in the aquifer and surrounding environments.

The Final SEIS states that it addresses two distinct but related aspects of potential impacts on the groundwater system (1) the nature and extent of the Repository's impacts on groundwater in the aquifer and (2) the potential impacts of the discharge of potentially contaminated groundwater to the ground surface. The Final SEIS elaborates on the two aspects as follows:

Impacts on Groundwater

- A description of the full extent of the volcanic-alluvial aquifer, particularly those parts that could become contaminated, and how water (and potential contaminants) can leave the flow system.
- An analysis of the cumulative amount of radiological and nonradiological contaminants that can be reasonably expected to enter the aquifer from the Repository, and the amount that could reasonably remain over time.
- Estimates of contamination in the groundwater, given potential accumulation of radiological and nonradiological contaminants.

Impacts from Surface Discharges of Groundwater

- A description of the locations of potential natural discharge of contaminated groundwater for present and expected future wetter periods.
- A description of the physical processes at potential surface discharge locations that could affect accumulation, concentration, and potential remobilization of contaminants carried by groundwater.
- Estimates of the amount of contaminants that could be deposited at or near the surface, including estimates of the amount of discharged groundwater and near-surface evaporation; the amounts of radiological and nonradiological contaminants in that groundwater; contaminant concentrations in resulting deposits; and potential environmental impacts.

Despite the fact that both the ADR and the Final SEIS outline a need for a broad assessment of the Repository's impacts to groundwater and from surface discharges of groundwater, the Final SEIS limits its analyses to "the affected environment with respect to the groundwater flow path for potential contaminant releases from the repository that could be transported beyond the Postclosure compliance location [11 miles from the Repository in the Amargosa Valley] through the volcanic-alluvial aquifer in Fortymile Wash and Amargosa Desert, and to the Furnace Creek/Middle Basin area of Death Valley." This geographic limitation on the scope of the Final SEIS, results in the omission of discussion the Repository's potential impacts on groundwater and surface discharges of groundwater in other areas such as in the vicinity of the Repository, between the Repository and the postclosure compliance location, and in the Shoshone-Tecopa section of the Southern Death Valley Subregion. The geographic limitation is inconsistent with the findings of the ADR and is a violation of NEPA.

Another serious shortcoming of the Final SEIS is that the Final SEIS accepts DOE's analysis of the amount of releases from the Repository and the use of DOE's analysis as representative of the likely types and levels of contaminant that could enter the groundwater system and be transported to the postclosure compliance location. Since the release of DOE's EISs, significant new information has become available which casts serious doubt on DOE's performance assessment with regard to the type and amount of contaminants that could be released from the Repository. This DOE assessment provides the "source term" which is used in the

Final SEIS for the type and amount of contaminants reaching the postclosure compliance location. If there is serious doubt as to amount of contaminants released from the Repository, there can be no meaningful evaluation in the Final SEIS of the Repository's impacts on groundwater and potential discharges of groundwater to the ground surface.

Groundwater – Andy Zdon & Associates, Inc. (AZI) has prepared the attached report (Attachment A hereto) describing the final SEIS' inadequacies in regards to addressing Inyo County's comments regarding groundwater. In particular, the report notes the following regarding the Final SEIS:

1. Does not adequately address the changes in the conceptual model provided, including changes accepted by the U.S. Geological Survey.
2. Utilizes AZI's comments in a misleading manner.
3. Utilizes static population and groundwater assumptions inappropriately.
4. Fails to incorporate new research regarding groundwater movement southward from the Amargosa Desert and elsewhere upgradient to the Tecopa Shoshone area.
5. Utilizes outdated flow path data, including utilizing such data inappropriately in the Death Valley Regional Flow System model.
6. Fails to address source-area contaminants.
7. Fails to account for future groundwater pumping scenarios upgradient from the Repository.

With regard to future groundwater pumping scenarios upgradient from the Repository, the Final SEIS states that potential future groundwater pumping by the Southern Nevada Water Authority (SNWA) in Railroad Valley was not evaluated because such pumping is not reasonably foreseeable. However, the Final SEIS quotes the SNWA as stating that it intends to pursue the Railroad Valley development "when need to supply future water demands (SNWA, 2015)." Given SNWA's position, such groundwater pumping is reasonably foreseeable and should be analyzed in the Final SEIS.

As stated in the County's comments on the Draft SEIS, in the vicinity of Yucca Mountain, there is an upward hydraulic gradient between the lower regional carbonate aquifer and the overlying volcanic aquifers. The upward gradient is important to the performance of the Repository because it restricts groundwater flow and radionuclide transport pathways to overlying volcanic and alluvial aquifers and it prevents radionuclides from entering the lower carbonate aquifer. Groundwater pumping from Railroad Valley could have significant effects on the upward gradient as could potential future groundwater pumping by the SNWA in the Spring, Snake, Delamar, Dry Lake, and Cave Valleys in Eastern Nevada. In order to adequately assess the impacts of the Repository on groundwater and discharges of groundwater to the ground surface, the potential impacts of SNWA's future groundwater pumping on the upward gradient must be analyzed in the Final SEIS.

Additionally, the County raised other comments that were not addressed in the Final SEIS. The following summarizes these key failures of NRC's analyses.

Cumulative Impacts – the Final EIS dismisses the County's concerns about cumulative impacts by indicating that such impacts would be small. However, there is little data presented to substantiate these claims, which appear to be qualitative arguments and unsubstantiated by data. Contamination is spreading from the Nevada National Security Site, and the recent events at the Beatty Low Level Waste and Hazardous Waste Disposal Facilities referenced in our correspondence regarding the Draft EIS illustrate how easily contamination can occur, especially over the time frames being considered. The potential cumulative impacts should be evaluated quantitatively with appropriate reasonable worst-case assumptions of potential contaminant concentrations spreading in the groundwater to properly make conclusions. Such an analysis would provide the basis for impact determination pursuant to reasonable worst-case environmental assumptions required by NEPA's cumulative impact methodologies.

Mitigation and Monitoring – the Final EIS indicates that mitigation and monitoring will be implemented through operational controls. While this is comforting, it cannot be assured at this time. Therefore, the Final EIS should explicitly include these concepts as mitigation measures to ensure less than significant effects to support its conclusions.

Socioeconomics – the Final EIS acknowledges errors presented in the Draft EIS regarding socioeconomic data and updates information about the Timbisha Shoshone Tribe. While the Final SEIS admits that contaminated groundwater effluent from the Repository will reach springs (many of which are located within Death Valley National Park in Inyo County) that the Timbisha Shoshone hold as sacred and require to be kept pure, the Final SEIS contains no consideration or meaningful analysis of this injury to Timbisha Shoshone cultural interests or to Death Valley National Park, nor does the Final SEIS discuss how these effects can be prevented. The lack of such discussion is a violation of NEPA (see 40 C.F.R. 1502.16(g),CEQ Guidance and 10 C.F.R 51.71(b)).

Moreover, the Final SEIS fails to address the impacts of the Repository on disadvantaged community of Tecopa and on Inyo County. As indicated in the Final SEIS, the census geography in Death Valley is vast, and therefore it obscures the unique socioeconomic character of individual communities, like Tecopa. As indicated in the 2008 Gruen + Gruen Report,[1] the stigmatization impacts from even a small release of contamination at the Repository could result in significant impacts to Inyo County. Assuredly impacts would be proportionately greater to existing disadvantaged communities like the Timbisha Shoshone Tribe and Tecopa, given their reliance on tourism for local income generation.

Conclusion

Overall, the Final SEIS fails to adequately respond to the County's input regarding the Draft SEIS. As noted in the Final SEIS, the NRC Chairman has acknowledged that, although the adjudication focusing on the DOE's license application is currently suspended, if the adjudication resumes, the participants in the adjudication may pursue their contentions before the Atomic Safety and Licensing Board, as well as raise new issues or amended contentions. As a participant in the adjudication, the County therefore reserves its rights to object to adequacy of the Final SEIS and its conclusions should the adjudication resume.

Thank you again for the opportunity to comment on the SEIS. If you have any questions, please contact the County's Administrative Officer, Kevin Carunchio, at (760) 878-0292 or kcarunchio@inyocounty.us.

Sincerely,

Jeff Griffiths, Chairperson
Inyo County Board of Supervisors

Enclosure: Attachment A, "Summary of Review—Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository at Yucca Mountain, Nevada by Andy Zdon & Associates

cc: Department of Energy

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[1] Gruen Gruen + Associates. *A County at Risk: The Socio-economic Impacts of the Proposed Yucca Mountain High-level Nuclear Waste Repository.* 2008.

ANDY ZDON & ASSOCIATES, INC.
Water Resources / Geology / Expert Services

June 30, 2016

Josh Hart
County of Inyo Planning Department
P.O. Box L
Independence, CA 93526

Subject: Summary of Review – Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository at Yucca Mountain, Nevada

Dear Josh:

The following summarizes the results of additional review and information developed by AZI on behalf of the County of Inyo (County) regarding the "*Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada. – Final Report*" (Final Report). AZI prepared a technical review summary report regarding the draft version of the supplemental EIS (Draft Supplement) on November 11, 2015. This review letter provides comments regarding the Final Report and it's responsiveness to AZI's comments and the County's concerns as well as other technical issues brought up in the Final Report.

Background

AZI previously provided technical comments related to the "*Draft Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*" (Draft Supplement) prepared by the United States Regulatory Commission (NRC), and released August, 2015. This Supplement to the EIS was prepared in response to findings identified in the NRC's "*U.S. Nuclear Regulatory Commission Staff's Adoption Determination Report for the U.S. Department of Energy's Environmental Impact Statements for the Proposed Geologic Repository at Yucca Mountain*", herein referred to as the Adoption Determination (NRC, 2008).

The Adoption Determination noted that the EISs did not provide a complete and adequate discussion of the impacts on soils and surface materials from a potential future discharge of contaminated groundwater. More specifically, the Adoption Determination noted the following items that should be included (but not necessarily limited to) the following (as quoted from Adoption Determination):

- *NRC Item #1 - "A description of the locations of potential natural discharge of contaminated groundwater for present and expected future wetter periods (for example, as discussed in DOE, 2008, Safety Analysis Report, Section 2.3.1.2);*
- *NRC Item #2 - A description of the physical processes at the surface discharge locations that can affect accumulation, concentration, and potential remobilization of groundwater-borne contaminants; and,*

- *NRC Item #3 - Estimates of the amount of contaminants that could be deposited at or near the surface. This involves estimates of the amount of groundwater involved in discharge or near-surface evaporation, the amounts of radiological and non-radiological contaminants in that water, contaminant concentrations in the resulting deposits, and potential environmental impacts (e.g. effects on biota)."*

The County had previously provided comments with respect to the EIS (U.S. Department of Energy, 2008), regarding the following issues:

- Inyo Item #1 - The full extent of the lower carbonate aquifer, particularly those parts that could become contaminated and how water can leave the flow system should be described;
- Inyo Item #2 - The potential for a decrease or elimination of the upward vertical gradient beneath Yucca Mountain due to future upgradient water-gathering activities (e.g. by Southern Nevada Water Authority);
- Inyo Item #3 - Impacts to Endangered Species that utilize the springs in the region; and,
- Inyo Item #4 - Cleanup and remediation measures should be described.

Addressing all of these points are dependent on a complete description of the conceptual model of the basin. Consideration of work conducted in the Shoshone-Tecopa area since 2010 was absent from the Draft Supplement. The results from these hydrogeologic investigations affect the conceptual model employed in the Draft Supplement.

AZI's review of the Draft Supplement indicated that the Draft Supplement was non-responsive to each of the items listed in the Adoption Determination and to each of the issues raised by Inyo County. Based on the lack of updated information presented in the Supplement to the EIS, and errors identified in the Draft Supplement, there was a high degree of additional uncertainty attached to the conclusions presented.

Further, recommendations were made for future work included:

- Reevaluation of the conceptual model and associated numerical flow and particle tracking modeling;
- Additional data collection including initiating a monitoring program protective of water resources within Inyo County (both in Death Valley and the Shoshone-Tecopa area); and,
- Development of a groundwater remedial action plan based upon the results of the reevaluation described above.

Conceptual Model and Modeling Issues

The Final Report does not address the changes in the conceptual model that were provided by AZI, including those changes that have been readily accepted by the U.S. Geological Survey including groundwater movement southward toward the Shoshone-Tecopa area from the Nevada portion of the

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basin (and beyond) via both the fractured rock and alluvial aquifers present. The Final Report continues to not address the substantial uncertainty with the results of any numerical flow modeling and associated particle tracking modeling given these changes to the system. Currently there are completely new modeling efforts being conducted by the U.S. Geological Survey in the Amargosa Basin recognizing that further understanding of the groundwater system is needed beyond existing modeling. That these modeling efforts are needed point to the accepted uncertainty and other issues associated with the existing modeling on which the Final Report's analyses are largely based. Given the degree of certainty that the Final Report attaches to the previous modeling (circa 2010) for this critically important analysis, it is unclear why further definition of the numerical models including the ongoing SAMM analysis described in the Final Report is being conducted.

Further, the Final Report uses portions of AZI's comments and previously prepared State of the Basin Report and other prepared documents (e.g., Andy Zdon & Associates, Inc., 2014, Zdon, Davisson & Love, 2015), in a manner in which the context of those statements is lost, or at worst misleading.

Examples of other associated issues that reflect on the quality of analysis provided include the following:

1. The Final Report continues with the flawed assumption (e.g., Section 2.1.1) that population and associated groundwater usage will continue as currently being used despite upward trends in groundwater usage in Amargosa Desert and past history showing that substantial changes to groundwater usage can occur in this region under very short time frames, as illustrated by the history of groundwater pumping in Pahrump Valley (see attached).
2. The Final Report continues to be non-responsive regarding the new understanding of additional groundwater movement southward from the Amargosa Desert – Ash Meadows region in both alluvium and likely fractured rock toward Shoshone, California. There is considerable uncertainty regarding specific flow paths from Amargosa Desert southward into California, both in alluvium along the Amargosa River and along faulting that appears to run east of Eagle Mountain southward toward Shoshone, California. Given the absence of hydrogeologic information in this area, the portion of the analysis associated with quantity of flow southward beneath the river and Franklin Playa, and the specific paths that flow follows in reaching the Amargosa Wild & Scenic River as presented in the Final Report remains flawed due to its use of untested assumptions.
3. The Final Report continues to use an outdated flow path diagram (Figure 2-3) which is acknowledged by AZI, the U.S. Geological Survey, and others to be incorrect.
4. The Final Report continues to build these flawed or untested assumptions into the flow and particle tracking modeling analysis, including using the Death Valley Regional Flow System model in a manner in which it was not originally intended.
5. The Final Report focuses its analysis on the compliance point and does not address issues and questions raised that are related to representation or analysis of the source area (the repository). An example of this is for Comment B.2.3.1.1. The Final Report states the comments are outside the scope of the supplement. However, any kind of water quality analysis is dependent on the accurate representation of the source of the potential impact. This response approach leaves the Final Report continuing to be non-responsive to comments.

Responses to Inyo County Comments

The Final Report remains non-responsive to the County's concerns outlined above. For example, the analysis continues to fail in accounting for future pumping scenarios up-gradient of the project (e.g. regarding potential Southern Nevada Water Authority pumping) and the effect that pumping would have on the vertical gradient between the carbonate and volcanic rocks beneath the Yucca Mountain facility. Further the absence of a reliable tool to conduct that analysis is not discussed to the extent required. The response to comment B.2.3.2.5 (and other similar comments) in the Final Report that *"The effects of pumping on potentiometric conditions below Yucca Mountain including the reversal of the vertical gradient between the carbonate and overlying volcanic rock aquifer is outside the scope of this report."* This response to comments is not only non-responsive, but it leaves open an important question that would directly affect the analysis of particles reaching the compliance point.

Further, the Final Report does not address recommendation for the development of a groundwater remedial action plan at this time, or for additional data collection in the Middle Amargosa Valley groundwater basin (inclusive of the Shoshone-Tecopa area).

New Information

As has been previously relayed to the County, AZI has been working on a project funded by the U.S. Bureau of Land Management and The Nature Conservancy to document springs throughout the Mojave Desert region. This has provided us a means to go back and perform a secondary round of reconnaissance activities in the Shoshone-Tecopa region. As a result of these efforts, we have identified 11 springs/seeps that had not been previously monitored or reported on. Of these, five were only discovered in the past year in the Shoshone Spring area as a result of restoration efforts. Additional geochemical analyses have been received and need to be analyzed in the context of the overall groundwater conceptual model.

As part of the ongoing characterization of the Inyo County part of the Amargosa Basin, the U.S.G.S. has just completed installing three monitoring wells at the same location (but at differing depths) to characterize the carbonate rock sequence in that area. They installed the wells near the intersection of U.S. Highway 178 and Chicago Valley Road. As would be expected based on the orientation of the rock units in that area (and which is completely consistent with the State of the Basin Report) they only encountered approximately 400 feet of carbonate rocks before reaching the underlying siliciclastic rocks (e.g. shales of the Carrara Formation, Zabriskie Quartzite). It is our understanding they plan on hydraulically testing the wells and sampling them but we don't believe that has been accomplished quite yet. Of the three monitoring wells, one is installed in the carbonate Bonanza King Formation, one in the Carrara (underlying the Bonanza King) and one shallow well in the alluvium at that location.

These results indicate that significant movement of groundwater beneath Chicago Valley to the west toward Shoshone is unlikely and gives greater credence to the northerly source (Amargosa Desert/Ash Meadows area) for Shoshone Spring as described in our review comments submitted last fall. Given the geochemical signatures of water at springs such as Resting Spring (a mixture of water from Pahrump Valley and the Amargosa Desert/Ash Meadows area, and the apparently differing groundwater gradients near the intersection of Pahrump, Stewart and Chicago Valleys, points to the potential for yet another southward

flow path yet to be fully characterized. Although substantial efforts have been undertaken to evaluate the hydrogeologic regime and solute transport in the Nevada-portion of the basin, understanding the linkage between the Middle Amargosa Basin (inclusive of the Shoshone-Tecopa area) and the Nevada-portion of the basin has not been sufficiently considered and investigated for the analysis.

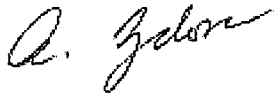
Closing

As described above, the Final Report remains non-response to the County's areas of concern and the technical issues raised in AZI's comments provided during November 2015. Given the criticality of an analysis that weighs impacts of a magnitude that require a one million year impact time interval, greater consideration of the concerns raised by the County and technical shortcomings and uncertainties raised regarding the analysis should be more fully addressed.

If you have any questions or need additional information, please feel free to contact me at 925-974-3680.

Sincerely,

Andy Zdon & Associates, Inc.



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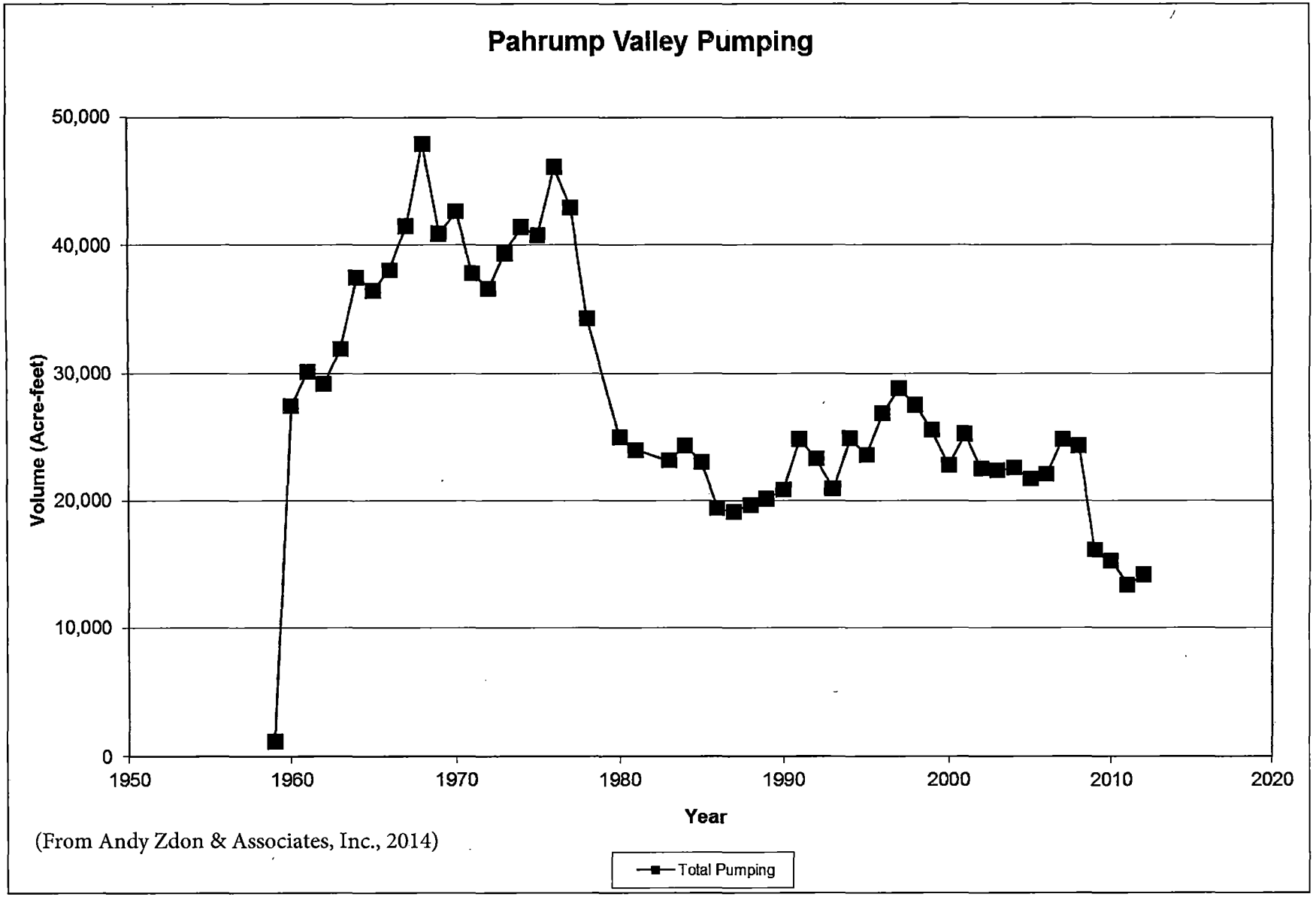
ATTACHMENT



(From Andy Zdon & Associates, Inc., 2014)

Figure 3-10. Pumping vs. Time, Pahrump Valley, Nevada

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