

FINAL

VOLUME 2

**COMMENT RESPONSE DOCUMENT FOR THE
ENVIRONMENTAL ASSESSMENT
FOR THE
SITE, LAUNCH, REENTRY AND RECOVERY
OPERATIONS AT THE KISTLER LAUNCH
FACILITY, NEVADA TEST SITE (NTS)**

**Prepared for the
U.S. Department of Transportation
Federal Aviation Administration
Office of the Associate Administrator
for Commercial Space Transportation
Washington, DC 20591**

APRIL 30, 2002



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EXECUTIVE SUMMARY

In accordance with the National Environmental Policy Act (NEPA) the Federal Aviation Administration (FAA) as the lead agency and the Department of Energy (DOE) as a cooperating agency initiated a 30-day public review and comment period for the Environmental Assessment for the Site, Launch, Reentry and Recovery Operations at the Kistler Launch Facility, Nevada Test Site (NTS). This document was developed to specifically address the environmental impacts of the proposed action of licensing Kistler's commercial launch and reentry operations at the NTS.

Thirty commentors provided comments on the Draft Kistler Environmental Assessment (EA). These comments were categorized into three groups based on the commentor's affiliation: Government Agencies, Industry, and Private Citizens. Specific comments requiring responses were received from the following government agencies: Les Bradshaw, Nye County Commissioner; the Nevada Department of Water Resources; Nevada State Historic Properties Office; and Thomas Krawczyk, USAF (SMC/AXFV). No comments requiring responses were received from academic organizations or from industry or industrial organizations. Two comments requiring responses were received from private citizens. In addition, twenty-three sets of comments were received which did not require a response, the full text of these comments is included in Appendix A.

On May 2, 2000, a public meeting was held in Las Vegas, Nevada. Interested individuals were encouraged to attend and record their comments. This Comment Response Document contains the full record of this meeting in Appendix B and this document is intended to address all comments raised in this meeting.

The comments that required responses were further characterized by subject matter and were each coded into one of the following topic areas: Miscellaneous, Biological Resources, Cultural and Historic Resources, Maps, Water, Socioeconomics, Noise, Safety, and Transportation. To facilitate the organization of the comments, an index was developed that grouped the comments by topic area. Appendix C provides a characterization of the comments received during this process.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
1.0 HANDWRITTEN COMMENTS RECEIVED FROM SUSI SCHNYDER.....	1
1.1 Comment 1 [Socioeconomics].....	1
1.2 Comment 2 [Water]	1
1.3 Comment 3 [Miscellaneous].....	2
1.4 Comment 4 [Cultural and Historical Resources].....	2
1.5 Comment 5 [Cultural and Historical Resources].....	3
1.6 Comment 6 [Safety]	3
1.7 Comment 7 [Socioeconomics].....	4
1.8 Comment 8 [Noise]	5
1.9 Comment 9 [Miscellaneous].....	5
1.10 Comment 10 [Miscellaneous].....	6
1.11 Comment 11 [Miscellaneous].....	6
1.12 Comment 12 [Miscellaneous].....	7
2.0 COMMENTS FROM LES BRADSHAW.....	9
2.1 Comment 13 [Transportation].....	9
2.2 Comment 14 [Miscellaneous].....	9
2.3 Comment 15 [Miscellaneous].....	11
2.4 Comment 16 [Miscellaneous].....	11
2.5 Comment 17 [Socioeconomics]	12
2.6 Comment 18 [Miscellaneous].....	12
2.7 Comment 19 [Miscellaneous].....	13
2.8 Comment 20 [Miscellaneous].....	13
2.9 Comment 21 [Miscellaneous].....	13
2.10 Comment 22 [Miscellaneous].....	13
2.11 Comment 23 [Water]	14
2.12 Comment 24 [Water]	14
3.0 WRITTEN COMMENTS RECEIVED FROM THE NEVADA DIVISION OF WATER RESOURCES	15
3.1 Comment 25 [Water].....	15
3.2 Comment 26 [Water].....	15
3.3 Comment 27 [Water].....	15
3.4 Comment 28 [Miscellaneous].....	15
4.0 COMMENTS FROM THE NEVADA STATE HISTORIC PROPERTIES OFFICE	17
4.1 Comment 29 [Cultural and Historic Resources].....	17
4.2 Comment 30 [Cultural and Historical Resources].....	17
4.3 Comment 31 [Cultural and Historical Resources].....	18
5.0 USAF – THOMAS KRAWCZYK SMC/AXFV.....	19
5.1 Comment 32 [Miscellaneous].....	19
5.2 Comment 33 [Miscellaneous].....	20
5.3 Comment 34 [Miscellaneous].....	20
5.4 Comment 35 [Safety].....	22
5.5 Comment 36 [Safety].....	22
5.6 Comment 37 [Miscellaneous].....	22
5.7 Comment 38 [Noise].....	23
5.8 Comment 39 [Miscellaneous].....	23
5.9 Comment 40 [Miscellaneous].....	24
5.10 Comment 41 [Miscellaneous].....	24
5.11 Comment 42 [Miscellaneous].....	24
5.12 Comment 43 [Safety].....	24
5.13 Comment 44 [Safety].....	25
6.0 AEROSPACE CORPORATION – JOHN EDWARDS.....	27
6.1 Comment 45 [Miscellaneous].....	27
6.2 Comment 46 [Safety].....	28

6.3 Comment 47 [Miscellaneous].....	28
7.0 WRITTEN COMMENTS RECEIVED FROM VERNON J. BRECHIN	301
7.1 Comment 48 [Miscellaneous].....	31
7.2 Comment 49 [Safety].....	31
7.3 Comment 50 [Miscellaneous].....	32
7.4 Comment 51 [Miscellaneous].....	33
7.5 Comment 52 [Miscellaneous].....	33
7.6 Comment 53 [Miscellaneous].....	33
7.7 Comment 54 [Miscellaneous].....	34
7.8 Comment 55 [Miscellaneous].....	34
7.9 Comment 56 [Noise].....	34
7.10 Comment 57 [Miscellaneous].....	34
7.11 Comment 58 [Miscellaneous].....	35
7.12 Comment 59 [Miscellaneous].....	35
7.13 Comment 60 [Water]	36
7.14 Comment 61 [Biological Resources].....	36
7.15 Comment 62 [Miscellaneous].....	37
7.16 Comment 63 [Miscellaneous].....	38
7.17 Comment 64 [Maps].....	38
7.18 Comment 65 [Maps].....	39
7.19 Comment 66 [Maps].....	39
7.20 Comment 67 [Miscellaneous].....	40
7.21 Comment 68 [Miscellaneous].....	40
7.22 Comment 69 [Miscellaneous].....	41
7.23 Comment 70 [Miscellaneous].....	42
7.24 Comment 71 [Maps].....	42
7.25 Comment 72 [Safety].....	42
7.26 Comment 73 [Biological Resources].....	44
7.27 Comment 74 [Miscellaneous].....	44
7.28 Comment 75 [Biological Resources].....	45
7.29 Comment 76 [Biological Resources].....	45
7.30 Comment 77 [Biological Resources].....	45
7.31 Comment 78 [Biological Resources].....	45
7.32 Comment 79 [Miscellaneous].....	46
7.33 Comment 80 [Miscellaneous].....	46
7.34 Comment 81 [Miscellaneous].....	48
7.35 Comment 82 [Miscellaneous].....	48
7.36 Comment 83 [Miscellaneous].....	48
7.37 Comment 84 [Miscellaneous].....	49
7.38 Comment 85 [Biological Resources].....	49
7.39 Comment 86 [Miscellaneous].....	49
7.40 Comment 87 [Noise].....	50
7.41 Comment 88 [Miscellaneous].....	50
7.42 Comment 89 [Miscellaneous].....	50
7.43 Comment 90 [Safety].....	51
7.44 Comment 91 [Safety].....	51
7.45 Comment 92 [Miscellaneous].....	52
7.46 Comment 93 [Miscellaneous].....	52
7.47 Comment 94 [Miscellaneous].....	53
7.48 Comment 95 [Map and Safety].....	53
7.49 Comment 96 [Miscellaneous].....	53
INDEX.....	55
APPENDIX A – OTHER COMMENTS.....	57
A.1 WRITTEN COMMENTS RECEIVED FROM SHELLEY BERKLEY	61
A.2 WRITTEN COMMENTS RECEIVED FROM RANDY BLACK.....	62
A.3 WRITTEN COMMENTS RECEIVED FROM LES BRADSHAW	63

A.4 WRITTEN COMMENTS RECEIVED FROM JOSEPH BROWN.....	64
A.5 WRITTEN COMMENTS RECEIVED FROM RICHARD H. BRYAN.....	65
A.6 WRITTEN COMMENTS RECEIVED FROM ROBERT CAMPBELL.....	66
A.7 ORAL COMMENTS RECEIVED FROM RED COPASS	67
A.8 WRITTEN COMMENTS RECEIVED FROM RED COPASS	68
A.9 WRITTEN COMMENTS RECEIVED FROM LOU EMMERT	69
A.10 WRITTEN COMMENTS RECEIVED FROM GARY FITZGERALD	70
A.11 WRITTEN COMMENTS RECEIVED FROM JIM GIBBONS.....	71
A.12 WRITTEN COMMENTS RECEIVED FROM KENNY GUINN	72
A.13 WRITTEN COMMENTS RECEIVED FROM A.E. GURROLA	73
A.14 WRITTEN COMMENTS RECEIVED FROM BRUCE JAMES.....	74
A.15 WRITTEN COMMENTS RECEIVED FROM THE NEVADA DIVISION OF WATER RESOURCES.....	76
A.16 WRITTEN COMMENTS RECEIVED FROM THE NEVADA STATE HISTORIC PROPERTIES OFFICE	77
A.17 WRITTEN COMMENTS RECEIVED FROM HARRY REID.....	78
A.18 WRITTEN COMMENTS RECEIVED FROM DAN SIMMONS.....	79
A.19 WRITTEN COMMENTS RECEIVED FROM RAYMOND RAWSON	80
A.20 WRITTEN COMMENTS RECEIVED FROM STEPHEN RICE.....	81
A.21 WRITTEN COMMENTS RECEIVED FROM A.C. ROBISON.....	82
A.22 WRITTEN COMMENTS RECEIVED FROM JOHN A. RUSI	83
A.23 WRITTEN COMMENTS RECEIVED FROM ROBERT E. SHRIVER	84
A.24 WRITTEN COMMENTS RECEIVED FROM BRUCE SPOTLESON.....	85
A.25 WRITTEN COMMENTS RECEIVED FROM KATHLEEN E. TREVER.....	86
A.26 WRITTEN COMMENTS RECEIVED FROM SONJA F. WALLACE.....	87
APPENDIX B – PUBLIC MEETING TRANSCRIPT	89
APPENDIX C – COMMENT CHARACTERIZATION	103

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1.0 HANDWRITTEN COMMENTS RECEIVED FROM SUSI SCHNYDER

1.1 Comment 1 [Socioeconomics]

- I have concerns that the skilled workers for this project won't come from Las Vegas or Clark County – but in fact would come from other places. It appears that there wouldn't be too much work for construction guys.

FAA Response 1: Section 5.1.5 of the Environmental Assessment (EA) addresses the potential impacts of the proposed project's employment needs on the surrounding counties. In particular, it should be noted that the proposed action is expected to create an average of 85 direct full time and 28 direct part time jobs during the construction phase of the project and 90 direct full time jobs and 28 direct part time jobs during operation of the proposed facility. Kistler evaluates the possibility that all 90 direct full time employees would come from the existing local workforce. No negative socioeconomic effects are expected to occur as a result of this project. In addition, no disproportionate effects on economically disadvantaged or minority groups are anticipated as a result of the proposed action.

1.2 Comment 2 [Water]

- What is the water permit for – how many acre-feet?

FAA Response 2: Due to the commercial nature of the proposed activity, DOE/NV determined that the water appropriations would need to be obtained from the State Engineer of the Division of Water Resources, Department of Conservation and Natural Resources of the State of Nevada. An Application for Permit to appropriate the Public Water of the State of Nevada was filed for the Kistler Aerospace Project on June 12, 1997. The State Engineer granted Permit No. 63176 on March 20, 1998 for this purpose. The Nevada Division of Water Resources has indicated that permit number 63176 would allow for a maximum usage of 7.23 acre-feet of water annually.

Kistler's estimated maximum water requirements for operations are 6,800 cubic meters (1.8×10^6 gallons or 5.5 acre-feet) per year. Construction of the payload processing facility and launch site would require an estimated 3,800 cubic meters (1.0×10^6 gallons or approximately three acre-feet) of water. According to the State of Nevada Water Planning Report 3, basin 227-b has an estimated total perennial yield of 4.4 million cubic meters per year (3,600 acre-feet per year). The launch pad is intended to operate without a deluge system, therefore, water will not be used for flame suppression during the launches. The majority of the water requirements would therefore occur during the construction period. Based

on the capacity and historic use of Well 8 and the estimated total perennial yield of basin 227-b, it is unlikely that the construction and operation of the Kistler facility would affect groundwater availability. Additional information on this topic can be found in Section 5.1.8 of the EA.

1.3 Comment 3 [Miscellaneous]

- Why is FAA involved at all if K-1 is not projected to go through their airspace?

FAA Response 3: As described in Section 1 of the EA, the Commercial Space Launch Act of 1984 (Public Law 98-575) (CSLA), as amended, codified at 49 United States Code Subtitle IX, Ch. 701, Commercial Space Launch Activities, declares that the development of launch vehicles for commercial operations and associated services is in the national and economic interest of the United States. To ensure that launch services provided by private enterprises are consistent with national security and foreign policy interests of the United States, and do not jeopardize public safety and safety of property, the Department of Transportation (DOT) is authorized to regulate and license U.S. commercial launch and reentry activities. Within DOT, the Secretary's authority under CSLA has been delegated to the Federal Aviation Administration (FAA). Because licensing launch and reentry operations is considered to be a major Federal action subject to the requirements of the National Environmental Policy Act (Public Law 91-190), as amended, 42 U.S.C. § 4321, et seq., FAA must assess the potential environmental impacts of an applicant's proposed actions.

In October 1998, Congress passed legislation increasing the FAA's Associate Administrator for Commercial Space Transportation's (AST) role in commercial space launch activities to include licensing of reentries of reentry vehicles, and operation of reentry sites. The FAA will examine the safety and policy implications, as well as environmental impacts associated with space launch and reentry activities in implementing its licensing program.

1.4 Comment 4 [Cultural and Historical Resources]

- What tribal representatives participated in data recovery work and consultations?

FAA Response 4: The American Indian Rapid Cultural Assessment was conducted by the Consolidated Group of Tribes and Organizations (CGTO). The Rapid Cultural Assessment was conducted in October 1997 at the recommendation of tribal elders who visited the area previously in August 1997.

Specifically, Richard Arnold, Pahrump Paiute Tribe, Pahrump, NV; Don Cloquet, Las Vegas Indian Center, Las Vegas, NV; Betty L. Cornelius, Colorado River Indian Tribe, Parker, AZ; Maurice Frank, Yomba Shoshone Tribe, Austin, NV;

and Gaylene Moose, Big Pine Indian Tribe, Big Pine, CA produced the *American Indian Rapid Cultural Assessment of Archaeological Site 26NY10133, Nevada Test Site*. This group was assisted by Richard W. Stoffle and Genevieve Dewey-Hefley from the Bureau of Applied Research in Anthropology University of Arizona, Tucson, AZ.

The FAA and DOE have coordinated with the Native American groups primarily through the CGTO. Mr. Richard Arnold has been the primary point of contact with the CGTO.

1.5 Comment 5 [Cultural and Historical Resources]

➤ What is a rapid Cultural Assessment?

FAA Response 5: The Rapid Cultural Assessment involved a small team of culturally knowledgeable Indian people who spent a few days performing cultural resource assessment work that would have taken many months to accomplish through standard ethnographic research procedures. This survey method has been used by this same team of experts on another study called *Tevitsi Yakakante (It is crying Hard): American Indian Rapid Cultural Assessment of DOE Nevada Operations Office Environmental Restoration Activities at Double Tracks, Clean Slate, and the Central Nevada Test Area* (1996).

The purpose of the Rapid Cultural Assessment was to summarize American Indian cultural resources on and near site 26NY10133 and to consider mitigation strategies. The report is a summary of the cultural assessments made by members of the American Indian Writers Subgroup (AIWS) which represents the cultural resource interests of the 17 tribes and three Indian organizations that constitute the CGTO. The CGTO has been in regular consultation with DOE/NV regarding cultural resources on the NTS since 1991.

The study was conducted in three parts (1) preparation for field surveys, (2) a field visit to the study site and in-field report drafting, and (3) final report preparation.

1.6 Comment 6 [Safety]

➤ Who will conduct mission and safety reviews and what will the criteria be?

FAA Response 6: As part of the licensing process under the CSLA, the proposed action would be evaluated by the FAA against certain risk criteria established for launch and reentry operations. During this process, the FAA conducts Mission and Safety Reviews to determine whether the license applicant can operate safely and whether U.S. national interests (national security and foreign policy) may be jeopardized. This is accomplished by examining Kistler's safety personnel, procedures, and equipment. The Mission and Safety Reviews include evaluation

of the vehicle from a safety perspective to determine whether it is capable of performing as intended, thereby confining risks to the public to acceptable levels.

The purpose of the reviews is to determine whether an applicant can safely conduct the launch and reentry of the proposed launch vehicle and any payload. Because the licensee is responsible for public safety, it is important that the applicant demonstrates an understanding of the hazards involved and discusses how the operations will be performed safely. There are a number of technical analyses, some quantitative and some qualitative, that the applicant may perform in order to demonstrate that commercial launch operations will pose no unacceptable risk to the public health and safety or safety of property. The quantitative analyses tend to focus on the reliability and functions of vehicle safety systems, and the hazards associated with the hardware, and the risk those hazards pose to public safety and property on the ground and in orbit and individuals near the launch site and along the flight path. The qualitative analyses focus on the organizational attributes of the applicant such as launch safety policies and procedures, communications, qualifications of key individuals, and critical internal and external interfaces.

The FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing states: Any unproven RLV may only be operated so that during any portion of the flight – (1) The projected instantaneous impact point (IIP) of the vehicle does not have substantial dwell time over populated areas; or (2) The expected average number of casualties to members of the public does not exceed 30×10^{-6} ($E_c \# 30 \times 10^{-6}$) given a probability of vehicle failure equal to 1 ($pf=1$) at any time the IIP is over a populated area.

1.7 Comment 7 [Socioeconomics]

➤ Clark and Nye counties are growing incredibly fast.

FAA Response 7: Additional information on this topic is available in Section 5.1.5 of the EA. The Las Vegas Metropolitan Statistical Area (MSA) is one of the most rapidly expanding areas in the country. The estimated employment from construction and operation of the Kistler facilities represents a 2.42 percent increase over the 1996 NTS employment and a 1.85 percent increase over the 1996 NTS-related population within the Las Vegas MSA. Of the total employment increase the vast majority (over 98 percent) are expected to live in the Las Vegas, Clark County area. Population estimates were based on the average annual employment level times a 2.72 persons per household (DOE, 1994). Assuming that all 90 full time workers would bring a family, this would represent a population increase of 245 persons in the Las Vegas, Clark County area due to the proposed action. The monthly net immigration to Clark County, Nevada is 3,960 people (Clark County, 1997). The population associated with the proposed action is too small to affect the monthly immigration into the region of influence.

1.8 Comment 8 [Noise]

- Have you ever been in the desert for a sonic boom?

FAA Response 8: The Kistler vehicle will produce sonic booms along the flight path; however these sonic booms may be different from other sonic booms produced as a result of other supersonic operations. The booms from the K-1 launch vehicle are expected to have peak sound pressures of 130 to 140 dB [approximately 65-240 Newtons/meter² (N/m²) or 1.3 to 5.0 pounds per square foot (psf)] and occur over a small area close to the ground path of the launch vehicle for a short duration (approximately 300 meters per second [984 feet per second]). To put this overpressure in perspective, 1.3 to 5.0 psf is comparable to a piledriver at a construction site on the low end and a handgun as heard at shooter's ear on the high end. Behavioral responses to these overpressures range from a mixed pattern of orienting and startle responses; on the low end eyeblink occurs in about half of subjects; arm/hand movements in about a fourth of subjects, but not gross bodily movements to a predominant pattern of startle responses. On the high end, eyeblink occurs in 90 percent of subjects; arm/hand movements occur in more than 50 percent of subjects with gross body flexion in about a fourth of subjects.

For launch operations, sonic boom generation begins after the vehicle reaches the speed of sound, and the shock wave generated intersects the earth. As the vehicle climbs to higher altitudes, the shock waves reaching the surface of the earth are attenuated to the point where they are not discernable from background noise. At an elevation of 60 kilometers (200,000 feet) the sonic boom produced by the K-1 launch vehicle would resemble distant thunder which produces an overpressure of approximately 16 N/m² (0.3 psf) to a receptor on earth. Behavioral responses to this overpressure is an orientation but no startle responses; eyeblink response occurs in 10 percent of subjects; no arm/hand movement occurs.

The frequency of the K-1 launches is expected to have a maximum flight rate of 52 launches per year. In addition, the public would be notified about upcoming launch events.

1.9 Comment 9 [Miscellaneous]

- How often would you be launching from out there? I thought I saw something that said no more than once a week, and that's still 52 times a year, and I'm curious how often the launches would be, you know if it goes forward, if you don't [sic.] get the FONSI.

FAA Response 9: It should first be clarified that the FONSI is a Finding of No Significant Impact which would represent a successful completion of the

review from an environmental perspective. Therefore, if the FONSI were issued and a license were granted by the FAA, Kistler Aerospace would operate its launch vehicle service using a fleet of five K-1 vehicles at a maximum rate of 52 launches per year once the facility is fully operational. Kistler also plans to have the capability to launch two vehicles within three days of each other if the need arises, not to exceed 52 launches per year. The proposed schedule of missions from NTS would begin no earlier than 2002 and build to a capability to support a maximum flight rate of 52 launches and reentries per year from Kistler's facility in Nevada.

1.10 Comment 10 [Miscellaneous]

- How big is the K-1?

FAA Response 10: The K-1 current conceptual designs are for a two-stage vehicle consisting of a Launch Assist Platform (LAP) and an Orbital Vehicle (OV). Each stage would be fully reusable, carry its own avionics, and is intended to operate autonomously under control of on-board computers with no ground control. The LAP has a total height of 18.36 meters (60.24 feet) and a diameter of 6.71 meters (22.01 feet). The OV has a total height of 17.72 meters (58.14 feet) and a diameter of 4.18 meters (13.71 feet). The LAP is expected to weigh 243,687 kilograms (537,231 pounds). The OV is expected to weigh 128,991 kilograms (5,903 pounds). Payloads are estimated to weigh 2,678 kilograms (5,903 pounds). Therefore the total liftoff weight would be 375,356 kilograms (827,506 pounds).

1.11 Comment 11 [Miscellaneous]

- What coordination efforts have been undertaken with people living in the counties under the operational launch corridors?

FAA Response 11: The NEPA process is designed to be a public process. A Proposed Finding of No Significant Impact (FONSI) for the proposed project was published in the Federal Register on April 21, 2000 (Volume 65, No. 78 page 21495). The Draft EA is available to interested members of the public and the public is encouraged to provide comments on the Draft EA. Notices about the public meeting were published in local newspapers and comments were solicited at the meeting. In addition to these meetings, Kistler, the FAA, and the DOE representatives have been meeting with State and local officials in Nevada and Utah to keep them informed about the proposed project. If members of the general public have questions about the proposed project, they are encouraged to address them to the appropriate agency.

1.12 Comment 12 [Miscellaneous]

- Knowing that the K-1 hasn't really been tested yet, and that it is being tested in Australia were aboriginal people consulted with?

FAA Response 12: Kistler was responsible for providing the necessary environmental and cultural information to Australian officials for the test launches proposed to occur from Woomera, Australia. The environmental documentation required for the test launches was produced by the appropriate Australian agency and their applicable laws and regulations were adhered to including coordination with aboriginal groups.

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2.0 COMMENTS FROM LES BRADSHAW

2.1 Comment 13 [Transportation]

- Please ensure the EA includes adequate coverage of highway transport of hazardous materials related to the operation.

FAA Response 13: Please note that the full text of Mr. Bradshaw's comment is available in Appendix A of this document.

As stated in Section 4.3 of the EA, all transport of LO_x and RP-1 and other hazardous materials would be in DOT approved packages and containers. The shipments must meet the DOT requirements including packaging design, marking, labeling, and placarding for shipment over public roadways. For hazardous materials in transit, the danger of a tank leaking during handling is mitigated by compliance with DOT Hazardous Materials Regulations, 49 Code of Federal Regulations (CFR) Parts 171, 172, 173, 174, 175, 176, and 177. These DOT requirements are intended to minimize potential releases, fires, and explosions.

Section 5.1.10 of the EA contains a detailed analysis of transportation impacts with respect to on-site traffic and off-site traffic. The off-site traffic analysis includes an analysis of whether the proposed action will affect the level of service of the roadway operating conditions or the adequacy of the roadway to accommodate additional vehicles.

2.2 Comment 14 [Miscellaneous]

- Nye County, the situs jurisdiction of the proposed action, is pleased to provide its comments on the Draft Environmental Assessment. Nye County was not provided adequate notice for the scoping, review, and public participation opportunities, as discussed below, and requests that its comments be considered. **Comment 1, Administrative Procedure.** Nye County notes that the noticing and distribution of the Draft Environmental Assessment (DEA) and public hearings failed to include Nye County residents and businesses. Additionally, the single copy of the DEA that was sent to the Nye County Commission (as identified in Chapter 7) was incorrectly addressed, and hence, was not timely received. Thus, Nye County notes, as a matter of public record, that the Federal Aviation Administration and its Cooperating Agencies in the review of this action proposal, have failed to abide by the administrative procedures at 40 CFR 1506.6, Public involvement, specifically as described at paragraphs (a), (b), and (c).

FAA Response 14: A Notice of Availability, in the form of a proposed Finding of No Significant Impact (FONSI), for the Draft EA was published in the Federal

Register on April 21, 2000 (Volume 65, No. 78 page 21495). This notice contained the following text

“There will be a thirty (30) day comment period before the FAA makes its final determination on the proposed FONSI. Interested individuals, Government agencies, and private organizations are invited to send comments on the proposed FONSI and/or the Environmental Assessment to the address set forth above by May 22, 2000 by mail.

In addition, a public meeting will be held to record verbal comments made by members of the public on May 2, 2000 in Las Vegas, Nevada. Comments received at the meeting will be responded to in a Comment Response document to be produced by the FAA. Additional information about this meeting is available at the following Internet address: <http://ast.faa.gov>.”

In addition, the following statement appeared on the FAA’s website and was published in a local Nevada newspaper to announce the public meeting.

“The Department of Energy will host an open house May 2, 2000, 6:30-7:30 p.m. on the environmental impacts of Kistler Aerospace Corporation’s proposal to launch and land a two-stage reusable aerospace vehicle at the Nevada Test Site, located 100 miles northwest of Las Vegas. Kistler will use the vehicle to deploy communications satellites into low-earth orbit. As the first step in the vehicle licensing process, the Federal Aviation Administration’s Office of Commercial Space Transportation is conducting an Environmental Review for the project. At 7:30 p.m. representatives from the Federal Aviation Administration, Department of Energy, Kistler and NTS Development Corporation will take formal comments. You are invited to learn about the project and make comments on the Environmental Assessment. Tuesday, May 2, 2000 6:30 p.m.-7:30p.m.-Open House 7:30 p.m.-10:00 p.m.-Public Comment U.S. Department of Energy Great Basin Conference Room 232 Energy Way, North Las Vegas, NV For more information regarding this meeting call (702) 295-3521”

Therefore, Nye County residents were notified of the proposed action, availability of the Draft EA, and public meetings in accordance with applicable law. Although, the commentor correctly pointed out that the copy of the Draft EA sent to the Nye County Commission was not properly addressed, it is not true that Nye County was not provided with adequate resources to provide comments. The FAA provided Nye County with additional time to review the Draft EA and provide comments. Thus, the comments from Nye County dated July 7, 2000 and received by FAA on July 13, 2000 were accepted and are specifically addressed in

the Comment Response Document despite the fact that the comment period ended on May 22, 2000.

2.3 Comment 15 [Miscellaneous]

- **Comment 2, Roads.** From Table 5-31 (pg. 5-61), State Road 433 appears to be the Mercury Highway, or a certain portion of the same. This should be clarified at several points in the text. (e.g., pg. ES-9, section 5.1.10).

FAA Response 15: State Road 433 is correctly called out in Table 5-30 of the Final EA as the access road to the NTS from Highway 95. State Road 433 does connect to the Mercury Highway, however, for the purposes of this discussion it is necessary to refer to the two roads separately.

2.4 Comment 16 [Miscellaneous]

- **Comment 3, Fugitive Dust and Air Quality.** If construction activity generated over 3% of total fugitive dust associated with the land disturbance in the entire Clark-Nye region (pg. ES-9), that seems high and sufficient to warrant consideration of how to reduce or mitigate. On page 5-51, it would be of use to quantify the amount of HCl [sic.] that would be released rather than just classify the release as “small.”

FAA Response 16: The EA does not specifically discuss any mitigation measures that may be employed during the construction and/or operation of the proposed Kistler facility. However, as with other construction projects, Best Management Practices are expected to be employed.

Section 5.1.3 of the EA describes the quantity of HCl to be produced by the launch of the K-1 vehicle as follows:

“The three cartridges will produce approximately three kilograms (six pounds) of CO and approximately two kilograms (four pounds) of HCl. The total list of gas products from the main start cartridge for each launch is shown in Table 5-10.”

Table 5-10. Gas Products from Kistler Start Cartridges for One Launch

<i>Gas Products</i>	<i>Weight Fraction of gas exhaust</i>	<i>Kg per launch</i>
<i>CO₂</i>	<i>0.33279</i>	<i>5.99</i>
<i>CH₄</i>	<i>0.02764</i>	<i>0.50</i>
<i>CO</i>	<i>0.15684</i>	<i>2.82</i>
<i>HCl</i>	<i>0.11866</i>	<i>2.14</i>
<i>H₂</i>	<i>0.03039</i>	<i>0.55</i>
<i>H₂O</i>	<i>0.14222</i>	<i>2.56</i>
<i>N₂</i>	<i>0.18770</i>	<i>3.38</i>
<i>Cr₂O₃ (S)</i>	<i>0.00073</i>	<i>0.01</i>
<i>Cu(L)</i>	<i>0.00304</i>	<i>0.05</i>
<i>Total</i>		<i>18.00</i>

(Aerojet Information Sheet, February 1997, and SRS, 1997)

2.5 Comment 17 [Socioeconomics]

- **Comment 4, Nye Population and Growth Rate.** Nye County population estimates (Table 3-8, pg. 3-22) are taken from the U.S. Census. Nye County’s estimate for 1995 (2nd quarter) is 27,998, 21.5% above the census estimate presented in Table 3-8. This would make the average annual growth rate 9.5% for the first half of the decade, or about 78% above the rate (5.33%, not 5.93%) implied by the EA population estimates for 1990 and 1995.

FAA Response 17: U.S. Census data were used to perform analyses of potential impacts on socioeconomics from the proposed action. Although other data sets including Nye County’s estimates could have been used, the primary message conveyed from these data (i.e., the population is growing rapidly) remains the same regardless of the data set that is used. In addition, U.S. Census data were used to maintain consistency between collection methods and estimating assumptions so data from various counties in Nevada could be compared. It would not be appropriate to use one source of data for Nye County and another source of data for all other counties.

2.6 Comment 18 [Miscellaneous]

- **Comment 5, Transportation Impacts.** Sentence 4 in the summary of transportation impacts (pg. 5-61) seems incomplete...”The impact...would be the result of expanded activities at (NTS, (?)) with traffic...”

FAA Response 18: The statement has been revised to read “The impact on traffic on State Road 433 as a result of the Kistler activities at the NTS would be minimal.”

2.7 Comment 19 [Miscellaneous]

- **Comment 6, Questions about Intended Project Management.** Regarding the Kistler Launch Facility proposal (as presented in sections 5.1.5 and 5.1.10), the EA should consider potential economic effects and contributions at a community level, rather than just at the level of the Clark-Nye region-of-influence considered in the EA (pg. 3-20). Specific issues that should be addressed are described below.

FAA Response 19: It should be noted that the document that was made available for review is an environmental assessment and not an economic analysis of the proposed project, therefore the level of detail for economic effects of the proposed project is appropriate.

2.8 Comment 20 [Miscellaneous]

- **Comment 7, Employment.** Does the estimated employment for the Kistler facilities (Table 5-26, pg. 5-43) include management and administrative staff? If not included in Table 5-26, where would management and administrative employees report to work?

FAA Response 20: This type of information is not generally included in an environmental document. The administrative details have not yet been solidified for this action and therefore it is not possible to provide them at this time.

2.9 Comment 21 [Miscellaneous]

- **Comment 8, Lost Economic Opportunity.** The analysis assumes that 98 percent of the employees are expected to live in Las Vegas (pg. 5-43). Would these employees commute using DOE-subsidized busing services? If so, the final EA should define the cost of Nye County's lost economic opportunity resulting from this residential and commuting arrangement.

FAA Response 21: Please refer to the response to Comment 20. It should be noted that the document that was made available for review is an environmental assessment and not specifically an economic analysis of the proposed project.

2.10 Comment 22 [Miscellaneous]

- **Comment 9, Expected Procurement Dollars.** The Final EA should provide an estimate of the total amount and categories of direct procurement required in the ongoing operations on NTS, and the incremental change that would result from implementing the proposed action.. [sic.] The percentages expected to be spent in Nye and Clark counties, respectively, should be defined.

FAA Response 22: Please refer to the response to Comment 20. It should again be noted that the document that was made available for review is an environmental assessment and not specifically an economic analysis of the proposed project.

2.11 Comment 23 [Water]

- **Comment 10, Water Rights.** Nye County notes that the quantity of water appropriated by the United States for Kistler Aerospace launch operations is reasonable and not expected to produce measurable impacts to senior water users. Nye County believes that water rights for commercial users within Nye County should not be held by the United States of America. Furthermore, Nye County notes as a matter of public record that applications of similar nature and magnitude filed by Nye County and its citizens have been formally protested by agencies of the federal government.

FAA Response 23: Thank you for this comment.

2.12 Comment 24 [Water]

- **Comment 11, Water Resources.** On page 5-52, it would probably be best to modify the last sentence of the fourth paragraph to include that the proposed action would not impact Devils Hole or Death Valley National Park. Nye County notes that although the quantity of water appropriated for use by Kistler Aerospace is unlikely to cause measurable effects of senior water rights, the appropriation of this additional quantity of water by the United States contributes to the cumulative impacts to water resource availability in Nye County, for use by the County and its citizens.

FAA Response 24: The FAA has reviewed the suggestion to include Devils Hole and Death Valley National Park as referenced in the comment but has decided not to incorporate this into the EA because the commentor had no reason to believe that these sites could be impacted by the proposed operations. The FAA has already stated that the use of water for Kistler's construction and operation activities is not expected to pose a significant impact to the environment.

3.0 WRITTEN COMMENTS RECEIVED FROM THE NEVADA DIVISION OF WATER RESOURCES

3.1 Comment 25 [Water]

- Provide an estimate of water usage for your project on an annual basis. Include quasi-municipal use, dust control, wash water, cooling water, fire suppression, and facility construction.

FAA Response 25: As stated in Section 5.1.8 of the EA, “Kistler’s estimated maximum water requirement for operations is 6,800 cubic meters (1.8x10⁶ gallons or 5.5 acre-feet) per year. Construction of the payload processing facility and launch site would require an estimated 3,800 cubic meters (1.0x10⁶ gallons or approximately three acre-feet) of water.”

3.2 Comment 26 [Water]

- If water is required for noise suppression in the flame trench, include an estimate of the quantity of water required.

FAA Response 26: The current design of the K-1 vehicle does not require water to be used for noise suppression. If the design is modified to require water for noise suppression, Kistler will go through the appropriate channels to obtain a water permit and to ensure proper disposal of the wastewater.

3.3 Comment 27 [Water]

- Permit 63176 is currently on file with the State Engineer for the commercial use of water from Well 8 for industrial purposes. The water right allows for a maximum usage of 7.23 acre-feet annually for industrial purposes. If your estimate of water usage exceeds this amount, you will need to obtain additional water rights.

FAA Response 27: Kistler Aerospace has been made aware that in the event that additional water is required, they would need to obtain additional water rights from the appropriate authorities.

3.4 Comment 28 [Miscellaneous]

- In addition to the above remarks, the Division of Water Resources has the following general comments. Before water is diverted from any well, the appropriator must make application to and obtain from the state engineer a permit to appropriate water in accordance with the provisions of Chapter 533 of the Nevada Revised Statutes (NRS). An environmental permit to appropriate the waters of the state of Nevada must be approved by the state

engineer prior to the diversion of any waters for remediation purposes. If any structure impounds more than 20 acre-feet of water or has a dam height of 20 feet or higher, you will be required to obtain a dam permit pursuant to NRS 535. All non-permitted wells must be properly plugged and abandoned by a Nevada licensed well driller. All Nevada water laws must receive full compliance.

FAA Response 28: Thank you for this comment.

4.0 COMMENTS FROM THE NEVADA STATE HISTORIC PROPERTIES OFFICE

4.1 Comment 29 [Cultural and Historic Resources]

- Because the Federal Aviation Administration is permitting a project that is located on federally administered land, it must take into account the effects of the undertaking on properties listed on or determined eligible for inclusion in the National Register of Historic Places. This is consistent with the provisions of the National Historic Preservation Act of 1966.

FAA Response 29: Section 5.1.9.1 of the EA recognizes the requirements of the National Historic Preservation Act of 1966 as stated: "Pursuant to Section 106 of the National Historic Preservation Act of 1966 (P.L. 89-665), as amended, the effects of the proposed Kistler project on historic properties (i.e., sites eligible for the National Register of Historic Places) will be taken into account. In order to take these effects into account, cultural resources within the area of potential effect have been identified by means of surveys conducted by qualified professionals. The area of potential effect includes all three portions of the Kistler facilities (i.e., payload processing facility, launch site, and landing/recovery area) and appropriate buffer areas."

4.2 Comment 30 [Cultural and Historical Resources]

- Archaeologists identified cultural resources within the project are, two [sic.] of which the DOE and Nevada SHPO considered eligible for inclusion in the Register. The DOE proposed data recovery at the one [sic.] of the properties, 26NY10133. Treatment of 26NY4892 was determined unnecessary because data recovery had previously taken place. The Nevada SHPO and the Advisory Council on Historic Preservation concurred with the proposed treatment to mitigate effects to 26NY10133. No further archaeological treatment is required.

The Nevada SHPO noted that the Department of Energy Rapid Cultural Assessment team met with Native American representatives from the potentially affected tribes to identify specific cultural properties in the area and suggest appropriate mitigation measures. These measures are not included within the draft environmental assessment other than a statement to the effect that recommendation would be evaluated and implemented as appropriate (page 5-54).

FAA Response 30: The following language has been added to the EA, "the DOE, FAA, and CGTO met to discuss potential impacts expected from the proposed Kistler project and the possibility of implementing appropriate mitigation measures. As a result, the DOE and FAA will implement the following mitigation measures prior to Kistler initiating operations:

- Preparation of a Rapid Cultural Assessment for the landing/recovery site and
- Permission for Tribal Elders to visit both the launch and landing/recovery sites.

These measures will be undertaken with the involvement of Kistler, DOE, FAA, and the CGTO."

4.3 Comment 31 [Cultural and Historical Resources]

- We request that the federal agencies provide evidence that further consultation with tribes occurred to identify and implement mitigation measures for traditional cultural values connected to the area. Further consultation needs to occur before the environmental assessment is finalized.

FAA Response 31: The FAA is continuing to work collaboratively with the DOE and the CGTO. The CGTO serves as the decision-making body representing the Native American groups that could potentially be impacted by activities on the NTS including the Kistler operations. The collaborative efforts between the FAA, DOE, and CGTO resulted in Appendix A of the Final EA. Some information from Appendix A was incorporated into the body of the Final EA. However, there are various locations where the EA contradicts or controverts Native American comments regarding environmental impacts. The data presented in the EA are supported by scientific findings whereas the Native American comments are not accompanied by any evidence to support assertions of environmental damage. Therefore these comments, while considered by the FAA in developing the Final EA, are not specifically included in the body of the document but are included in full in the Appendix. In addition, Appendix E of the Final EA contains a summary of additional consultation and coordination that occurred between the FAA, DOE, and CGTO.

5.0 USAF – THOMAS KRAWCZYK SMC/AXFV

5.1 Comment 32 [Miscellaneous]

- This EA represents a significant step in launch activities in the mainland of the USA. If the proposed activity occurs, 52 launches per year with the magnitude and size of this launch vehicle, all over LAND, represents a greater risk to the environment than launches over WATER. Consequently our scrutiny is severe in that it questions the sufficiency of this document as the proper platform to present the myriad of environmental issues involved.

FAA Response 32: It is not clear what information the commentor is using to base assumptions that launches over water present less risk to the environment. A comparison of the environmental impacts expected from the K-1 and existing LVs is discussed below.

Atmosphere. The Kistler K-1 vehicle would use a propellant system similar to that on many other existing launch vehicles. Therefore, it is not clear that impacts to the atmosphere from the K-1 would present more risk than other LVs.

Land Use. The proposed Kistler operations are consistent with the goals of the NTS as outlined in the NTS EIS. The Kistler operations are not expected to pose significant negative impacts to the NTS. In addition, the launch and recovery areas for the K-1 are not expected to be significantly different from other launch sites and landing runways for vehicles that launch and reenter over water.

Noise. Launch noise from the K-1 would be audible to people located on the NTS and to members of the public that are off-site but the sound levels experienced off-site would resemble that of a garbage disposal at one meter. Aside from one sea-based launched vehicle and air-launched vehicles, other launch vehicles [including the only other operational reusable launch vehicle (NASA's Space Shuttle)] are launched from land and launch noise impacts are similar to those expected for the K-1 vehicle. Sonic booms would impact populations located along the flight path however, population density is low in these areas. Vehicles that fly over water also produce sonic booms that are propagated over marine environments or oceanic islands with varying human and marine animal population densities.

Biological Resources. Impacts to biological communities around the launch area for the proposed K-1 launch vehicle would be similar to those at other launch and industrial sites.

Water Resources. Finally, the K-1 vehicle would not jettison spent stages and residual propellants into marine environments under normal operating conditions as other launch vehicles are designed to do.

Therefore, it is not clear why the launch and flight of an RLV over land necessarily presents more risk to the environment than the launch of existing launch vehicles that fly over water.

Please note that the environmental review portion of the licensing process is not intended to specifically address issues pertaining to expected casualty risks related to flights over land. The issues will be addressed in the Mission and Safety Reviews as a required component of the licensing process.

5.2 Comment 33 [Miscellaneous]

- It is our sense that because of the complexities involved that this assessment should have taken the form of an Environmental Impact Statement (EIS). Not only because of the complexity of issues but because of the lack of sufficient comment about issues that are to follow. The subsequent comments are those we have in mind.

FAA Response 33: This comment has been noted. The scoping process is designed to identify potentially significant issues related to the proposed action and to determine the level of effort that is required for an environmental review. The FAA and DOE proceeded as required with a scoping process for the proposed Kistler project during which time FAA and DOE solicited opinions of relevant stakeholders and others interested in the project. Based on this process, it was determined that an environmental assessment should be produced. The EA did not discover potentially significant environmental impacts resulting from the proposed action therefore; it does not appear that the preparation of an EIS is warranted at this time.

5.3 Comment 34 [Miscellaneous]

- No comment on De-Orbiting debris, which is a significant item for consideration since these launches are over land.

FAA Response 34: The K-1 vehicle is intended to be an RLV and as such the vehicle and its primary components are designed to reenter the atmosphere and land safely as described in Section 2 of the EA. In the current K-1 conceptual designs, the only components of the vehicle which are not intended to be recovered are the mortar sabot and deployment bag for the parachute system. These components will be jettisoned prior to reaching the landing and recovery area.

Section 4.2 of the EA provides a description of credible accident scenarios including LAP failure, separation system failure, LAP failure to re-ignite, and OV engine failure, based on current conceptual vehicle operating plans. Each of these scenarios could result in vehicle failure and reentry of vehicle components in an uncontrolled manner.

FAA acknowledges that de-orbiting debris is a potential concern and the following language was added to Section 5.1.11 of the EA. “De-orbiting debris is a potential concern in the stratosphere as it can serve as a possible reaction site for ozone depletion. Large pieces of debris are a concern because they can fall through the atmosphere and impact the Earth. There are several sources of orbital debris which can become de-orbiting debris: inactive payloads account for approximately 21 percent of all orbital debris, operational debris released either intentionally (ejection springs, lens debris) or unintentionally (screwdrivers, gloves) which account for approximately 13 percent of all orbital debris, and fragmentation debris accounts for approximately 51 percent of debris. Fragmentation debris is generated by the explosion of rocket bodies or the collision and resulting break up of orbital objects (rocket bodies, payloads, and/or debris).

Orbital debris like other orbiting objects loses energy through friction with the upper layer of the atmosphere and other forces that alter orbits (e.g., solar storms). Over time the orbit decays and the object eventually falls to Earth. As the objects enter the lower portions of the atmosphere, atmospheric drag will either slow the rate of descent and cause the object to either burn up or fall to Earth.

The reusable nature of the K-1 vehicle minimizes the amount of de-orbiting debris produced. Although some small objects (i.e., bolts etc) may be ejected when the payload is deployed, it is unlikely that the K-1 would produce significant amounts of de-orbiting debris.

5.4 Comment 35 [Safety]

- Notwithstanding that the EA provides language concerning the automated nature of the launch vehicle, it should be noted that total reliance on automated systems present a higher risk over land than water.

FAA Response 35: It is not clear what information the commentor is using to base this assumption. Specific issues related to safety and the autonomous system will be addressed in the Mission and Safety Reviews. The FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing Regulations states that "Any RLV that enters Earth orbit may only be operated such that the vehicle operator is able to – (1) Monitor and verify the status of safety-critical systems before enabling reentry flight to assure the vehicle can reenter safely to Earth; and (2) Issue a command enabling reentry flight of the vehicle. Reentry flight cannot be initiated autonomously under nominal circumstances without prior enable." Therefore, the use of a strictly autonomous system would need to be evaluated during the Mission and Safety Reviews and receive specific approval to operate in this manner as it is not currently approved under the FAA's regulations.

5.5 Comment 36 [Safety]

- The size of this launch vehicle precludes a pyrotechnic event, and would be expected to draw considerable crowds for not only the launch operation but recovery as well. No comments were made about this crowd risk potential.

FAA Response 36: Risk assessments including risk to third persons during launch and reentry operations would be under the purview of the Mission and Safety Reviews which will be conducted by the FAA prior to issuing a license. It should be noted that unlike other launch or reentry locations (Cape Canaveral Air Station, Vandenberg Air Force Base, Goddard Space Flight Facility, etc.) the NTS is a remote location and there are not expected to be a large number of public observers. The NTS is a restricted facility and access to the area is strictly limited therefore members of the public would be unlikely to gain access to the NTS during launch events.

The safety of the public at the launch site and along the flight path would be considered in the Safety Review analysis conducted by the FAA as part of the licensing process. Specifically, risks to the public are considered in a calculation of the expected casualty which cannot exceed the FAA standard of 30×10^{-6} .

5.6 Comment 37 [Miscellaneous]

- Neither does the analysis cover the fact that this is a commercial venture. Commercial ventures are subject to profit and loss objectives and success driven. Bad business results may force the abandonment of the launch site as

a business venture and needs to address the responsibility for the resulting clean up and its funding.

FAA Response 37: The EA does address the fact that this is a commercial venture. The requirement to perform the environmental analysis and receive a launch license stems from the fact that this is a commercial (licensable) venture.

In addition, Section 2.3.5 of the EA states “Kistler’s agreement with the NTSDC stipulates that, should Kistler cease operations at the NTS, Kistler is required to remove all equipment and facilities, with the exception of those that the Development Corporation considers an improvement, and return the site to its pre-construction state.”

5.7 Comment 38 [Noise]

- Reviewing the sonic boom imprint discussion on Page 5-35 where it is stated that the booms typically will have peak sound pressures of 1.3 to 5.0 psf and the drawing, Figure 5-7, shows peak overpressure greater than 1 psf which is an understatement and suggests that the footprints may be larger and may have a more deleterious effect on that area.

FAA Response 38: The text in the figure is accurate. The graphic is provided primarily to show the location of the sonic boom. The peak overpressure is explained in the text as being between 1.3 and 5.0 psf.

5.8 Comment 39 [Miscellaneous]

- Page 5-24, drawing the comparison of annual CO₂ and H₂O emissions to the atmosphere, about 4500 tons from the maximum number of Kistler launches and comparing that number to the CO and CO₂ 1990-1994 emissions is misleading and puzzling and may not serve any purpose.

FAA Response 39: The text will be replaced with the following: “Table 5-18 presents the annual CO₂ and H₂O emissions into the upper atmosphere from the maximum projected number of Kistler launches. The total emissions of CO₂ to the stratosphere and above from the K-1 vehicle is 4,455 tons. A U.S. EPA study showed that industrial sources contributed 150,200,000,000 tons of CO/CO₂ to the stratosphere and troposphere from the period 1990-1994 or 37,550,000,000 tons per year. Therefore the cumulative impact on global warming from the Kistler launches is not expected to be significant.”

5.9 Comment 40 [Miscellaneous]

- Launch flame after ignition is to [sic.] according to this analysis to be dissipated in the 'wash' and it is unclear what safety methods are to be employed or ameliorate this 'scorched earth'. It is unclear how particulate matter and soot is to be handled after multiple launches

FAA Response 40: Specific safety procedures will be developed when operational details are finalized. Specific details about disposal of post-launch wash materials will be developed when operational details are finalized.

5.10 Comment 41 [Miscellaneous]

- Tank storage for the propellants is also unclear. Is 'Just In Time ' truck deliveries to be the propellant tank storage facility.

FAA Response 41: Figure 2-6 shows the location of the propellant storage facilities expected to be used for the Kistler operations. Kistler anticipates receiving the propellants shortly before fueling operations are scheduled to begin. The concept of "just in time" delivery minimizes the potential risks associated with long term storage of propellants.

5.11 Comment 42 [Miscellaneous]

- Better maps for the launch corridors would help to view the total azimuth areas would give a better picture of the launch paths especially for LAP failure for a re-ignite scenario

FAA Response 42: The FAA may use some color graphics to enhance the readability of the graphics in the final version of the Kistler EA. In the interim, it is recommended that the commentor refer to the electronic version of the EA that is available at AST's website (<http://ast.faa.gov/>).

5.12 Comment 43 [Safety]

- The proposed launch site is situated between Death Valley National Park on one side and the Desert National Wildlife Refuge and the risks to these area [sic.] has not been evaluated in terms of visitors during launch and recovery operations.

FAA Response 43: The NTS borders the Nevada Test and Training Range. The Desert National Wildlife Refuge and Death Valley National Park are both separated from the NTS; neither protected area directly borders the NTS. In addition, the proposed Kistler operations would be located in the northern portion (Areas 18 and 19) of the NTS which is not near either Desert National Wildlife

Refuge or Death Valley National Park. Since the launch corridors are to the north and east of the NTS it is unlikely that either protected area would experience any negative impacts from a launch and no visitors to either site should be affected by launch operations. Reentry corridors do occur over Death Valley National Park for some missions. However, for many missions the trajectory used during reentry is so steep that it is unlikely that visitors would be affected during normal reentry operations.

The safety of the public at the launch site and along the flight path would be considered in the Safety Review and analysis conducted by the FAA as part of the licensing process. Specifically risks to the public are considered in a calculation of the expected casualty which cannot exceed the FAA standard of 30×10^{-6} .

For accident scenarios, it is important to note that the K-1 vehicle is equipped to land safely using on-board landing equipment. Therefore, it may be possible for the K-1 to safely land even in an unlikely scenario in which the vehicle is forced to land somewhere other than the proposed landing and recovery area. At this stage of flight, the LAP and OV would carry only residual amounts of propellant and therefore, the likelihood of an explosion is extremely remote. However, risks to local populations will be more fully characterized and evaluated in the Mission and Safety Reviews to be conducted by the FAA as a requirement of licensing.

5.13 Comment 44 [Safety]

- Page 4-8 reflects the Risk Analysis to Public Health and Safety leaves it to the FAA to determine if those risks are unacceptable and not worthy to license. Finally there are too many areas in this assessment that are not explained fully and for a significant risk of this magnitude should be analyzed further as an EIS with a Record of Decision and accompanying Mitigation Plan.

FAA Response 44: As the licensing entity, it is under FAA's regulatory authority to determine whether the potential risks of operating the K-1 vehicle are acceptable. The FAA utilizes expected casualty criteria as part of its licensing standards. This expected casualty (E_c) determination is made for all FAA-licensed launches and through the RLV mission licensing regulations which will apply to RLV launch and reentry operations (see 14 CFR Part 431). If the K-1 is not found to meet the E_c requirement during the Safety Review, launches and reentries of this vehicle will not be licensed by the FAA. These standards apply to all FAA-licensed launches of reusable launch vehicles and expendable launch vehicles, and they apply whether a launch vehicle operates over land or water.

The Mission and Safety Reviews are a required component of licensing. Issuance of an environmental finding of no significant impact does not indicate whether a license will be issued for the proposed action.

In response to the commentor's request that an EIS be prepared, please refer to the response to Comment 33.

6.0 AEROSPACE CORPORATION – JOHN EDWARDS

6.1 Comment 45 [Miscellaneous]

- Page 4-4 (Landing and Recovery Area). The Russian Ministry of Defense launches rockets from Pleastsk [sic.] over land and 1st stages fall onto land. There is a large effort going on to determine the effects of this and how to clean it up, since many first stages contain residual fuel. The Russians previously optimized their rockets to reduce extra fuel and recently developed a method to burn up remaining residual fuel in order to reduce downrange contamination. Suggest that the impact zones be analyzed carefully to determine not only their primary desired location, but also contingency areas that could be impacted. Also suggest that impact zone fuel contamination mitigations be employed. Do impact points on page 4-9 include all wind effects?

FAA Response 45: It should be noted that the vehicles that are launched from Plesetsk are expendable launch vehicles that are designed to jettison stages with no intent to recover them. These stages are not brought back to Earth in a controlled manner. Therefore, the potential for spills resulting from rupture of the propellant tanks is significant. The K-1 vehicle is designed to return to Earth in a controlled manner. The LAP and OV are both brought through the atmosphere and slowed by parachutes. In addition, both vehicle stages use air bags to further prevent rough impacts with the Earth.

The K-1 vehicle is designed for unpowered reentry; thus, it is expected that the majority of the propellants will be consumed through the optimized burns for launch and reentry. Therefore, a large quantity of propellants is not expected to remain in the vehicle stages during landing and recovery.

The impact points are instantaneous impact points (IIPs) and as described on page 11-2, IIPs do not consider atmospheric or continuing propulsive effects. Prior to issuance of a launch license the FAA will conduct thorough Mission and Safety Reviews which will examine these impacts in greater detail.

The FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing states: an applicant for RLV mission safety approval shall identify suitable and attainable locations for nominal landing and vehicle staging impact or landing, if any. An application shall identify such locations for a contingency abort if necessary to satisfy risk criteria during launch of an RLV. This information will be evaluated during the Mission and Safety Reviews prior to any licensing action.

6.2 Comment 46 [Safety]

- Page 4-8 Public Safety states there will be a safety analysis. The quantitative risks to public should be provided here. How do these compare with NASA and IADC (Interagency Debris Committee) requirements (of 8m2 maximum debris)?

FAA Response 46: Mission and Safety Reviews are required components of licenses and a quantitative risk assessment is performed during these reviews. Risks to the public are considered in a calculation of the expected casualty which cannot exceed the FAA standard of 30×10^{-6} .

NASA has provided a debris reentry voluntary guideline of no more than 1×10^{-4} risk of debris impacting persons. De-orbiting debris is examined in Section 5.1.11 of the Final EA. In Section 4.6 of the Final Programmatic Environmental Impact Statement for Commercial Reentry Vehicles (May 28, 1992) the U.S. Department of Transportation determined that the risk to persons from reentering debris produced by reentry vehicles is significantly less than the risk of impact from naturally occurring meteorites striking a person and therefore was not a significant impact.¹

6.3 Comment 47 [Miscellaneous]

- Page 5-22 address "Upper Atmospheric Effects" discussing mainly global warming effects. It should be noted that model studies of various propellant types indicates that production of ozone depleting species occur during launch, which are a small part of ozone depletion, and that the Kistler type vehicle has orders of magnitude less impact than a comparable-sized solid rocket. Ref: NASA X-33 EIS &: Effects of Launch Vehicle Emissions in the Stratosphere, B.B. Brady, L.R. Martin, and V.I. Lang, 35th Aerospace Sciences Meeting and Exhibit, January 6 - 10, 1997, Reno, NV, AIAA-97-0531.

Abstract:

A plume dispersion and chemical kinetic model based on SURFACE CHEMKIN has been used to estimate the total impact of motors of different propellant types on stratospheric ozone. In previous studies by other authors industry standard rocket motor performance and plume flowfield computer programs were used to model the chemistry in the rocket combustion chamber and expansion nozzle, and also in the downstream afterburning region of the plume. Our model, based on SURFACE CHEMKIN and the results of previous studies, was used to follow the plume chemistry for up to a day as the plume dispersed into the ambient stratosphere. Several large motor types

¹ U.S. Department of Transportation, Office of Commercial Space Transportation. Final Programmatic Environmental Impact Statement for Commercial Reentry Vehicles. May 28, 1992.

were analyzed: two different solid-fueled motors without chlorine and one with chlorine, and amine/N2O4 fueled first stage, a kerosene/LOX fueled first stage, and a H₂/LOX fueled engine with two nozzle variants. The modeled motors are based loosely on existing vehicles, but we varied several parameters to create hypothetical vehicles that may be viewed as prototypes of next generation launchers. Two dispersion rates were used, a worst case and a "best guess" based on published models. In the worst case, ozone depletion due NO_x or other exhaust species was several orders of magnitude smaller than depletion due to chlorine in the exhaust. Depletion due to motors using LOX was minimal within five minutes of vehicle passage in all cases.

FAA Response 47: Thank you for this comment. The FAA is always interested in reviewing research relevant to launches. It is true that ozone-depleting substances are produced during the launch and subsequent flight of launch vehicles. As noted in the study by Martin Ross, Valerie Lang et al., the K-1 vehicle using LO_x and Kerosene in the propellant system would not produce amounts of ozone-depleting substances at levels comparable to similarly sized vehicles propelled by solid rocket motors. However, the purpose of the EA is to assess the potential impacts of launching the K-1 on the upper atmosphere, not to compare it to LVs using SRMs. It should be noted that the FAA recently released a Final Programmatic Environmental Impact Statement for Licensing Launches, which provides a more appropriate venue for this type of comparative discussion.

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7.0 WRITTEN COMMENTS RECEIVED FROM VERNON J. BRECHIN

7.1 Comment 48 [Miscellaneous]

- Vernon J. Brechin
255 S. Rengstorff Ave. #49
Mountain View, CA 94040-1734
650/961-5123

Mr. Nikos Himaras – Manager, Environmental Program
Office of the Associate Administrator for Commercial Space Transportation
Space Systems Development Division, Suite 331/AST-100
800 Independence Avenue, SW
Washington, DC 20591
202/267-7926

Topic: Comments on the “Draft Environmental Assessment for the Site, Launch Reentry and Recovery Operations at the Kistler Launch Facility, Nevada Test Site (NTS),” April 4, 2000 (D EA), and the Proposed Finding of No Significant Impact (P FONSI) for the proposed action addressed in the D EA.

Dear Mr. Himaras:

Thank you for the opportunity to comment on the proposed actions addressed in the “Draft Environmental Assessment for the Site, Launch, Reentry and Recovery Operations at the Kistler Launch Facility, Nevada Test Site (NTS),” April 4, 2000 (D EA), and the Proposed Finding of No Significant Impact (P FONSI). (1)(2) I have read the two documents and have a number of concerns which I trust you will consider carefully. I urge you to publish all public comments verbatim and distribute those comments along with the Final EA, or EIS.

FAA Response 48: It is the practice of this office to publish public comments in full and to provide responses to all relevant comments. All comments are considered and addressed in the document where appropriate.

7.2 Comment 49 [Safety]

- I believe that the Kistler Aerospace Corporation (KAC) proposal constitutes a major Federal action under the National Environmental Policy Act (NEPA) of 1969. Therefore, the FAA should not issue a FONSI and should require the

preparation of an Environmental Impact Statement (EIS). The proposed action poses a significant risk to thousands of rural and city residents down-range of the launch facility which the D EA failed to properly address. The first sentence on page 4-8 of the D EA stated "...a detailed flight hazard analysis covering these scenarios will be conducted as part of a Safety Review under the auspices of the FAA as part of the licensing process." That detailed Safety Review should have already been completed, subjected to independent peer review, and then provided, with the D EA, for general public scrutiny. The FAA's failure to proceed in this order seriously undermines the agency's credibility. Proceeding with an inland satellite launch facility would set a bad precedent, as was set when atmospheric testing was approved at the Nevada Test Site (NTS), which we now know exposed millions of Americans to dangerous levels of iodine-129 fallout.

FAA Response 49: The FAA recognizes that the proposed action is a major Federal action, and therefore the action is subject to NEPA analysis. The proposed FONSI states that the proposed action is not a major Federal action that requires the preparation of an EIS. The FAA does not believe that it is necessary to complete an EIS for the proposed action. Please refer to the response to Comment 33.

The FAA has at least two other required review components in its licensing process, the Environmental Review and the Mission and Safety Reviews. The licensee generally prepares the environmental documentation either in advance of or in parallel with the Mission and Safety Reviews because the Environmental Review may take more time to complete than the Mission and Safety Reviews. A FONSI does not guarantee or even indicate that a license will be issued. The licensee must obtain a favorable environmental determination as well as meeting the criteria of the Mission and Safety Reviews. Therefore, it is incorrect to state that the "detailed Safety Review should have already been completed,..." The FAA feels strongly that this system of checks and balances ensures safety of both the environment and the public. For additional information about the licensing process and the FAA's regulations regarding RLV mission licensing (14 CFR Parts 400, 401, 404, et al.) please refer to AST's website at <http://ast.faa.gov/>.

7.3 Comment 50 [Miscellaneous]

- First, I will address statements and issues that appeared in the "Proposed Finding of No Significant Impact" FR Notice.
"The NTS is primarily an industrial area..." Inaccurate! (P FONSI/Proposed Action/3rd paragraph/2nd sentence/p. 21496)

FAA Response 50: Section 3.1 provides an overview of the proposed operational area that would be used for the proposed action. As stated in the EA, additional information about the land use on the NTS can be found in the NTS EIS.

7.4 Comment 51 [Miscellaneous]

- The U.S. Department of Energy's (DOE) primary mission, at the NTS, continues to be directed by its Defense Program division. As in the past the focus of its mission is on issues related to nuclear weapons testing. The FAA's justifications, for the KAC action, partly relied upon selected passages derived from the DOE's "Record of Decision: Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada." (3) Other passages tell a different story. For example: "Historically, the primary mission of the Nevada Test Site was to conduct nuclear weapons tests. Since the moratorium on testing began in October 1992, the mission has changed to maintaining a readiness to conduct tests if so directed by the President (under the supreme national interest" withdrawal provision in the Comprehensive Test Ban Treaty) and participating in the Department's science-based stockpile stewardship program by serving as a site for various activities including subcritical experiments..." (ROD-NTS:EIS/Supplementary Information/Background/2nd paragraph/p. 65551)

FAA Response 51: The FAA is not able to comment on the mission of the DOE at the NTS other than to refer the commentor to the NTS EIS that was approved by issuance of a Record of Decision. The proposed Kistler project does not in any way involve the testing or use of nuclear material.

7.5 Comment 52 [Miscellaneous]

- The KAC is well aware of the DOE's Nevada Operations Office (DOE/NV) primary missions. "The National Security Mission of the DOE would continue to have priority over all activities conducted on the NTS. DOE programs would, for reasons related to national security or exigency, preempt Kistler activities." (D EA/Executive Summary/Environmental Impacts/Land Use/p. ES-6)

FAA Response 52: Thank you for this comment. As stated by the commentor, this text is available in the Executive Summary of the EA.

7.6 Comment 53 [Miscellaneous]

- Additionally, KAC had to accept a rather poor quality, and remote site, due to opposition from the DOE division engaged in Yucca Mountain studies. They were concerned that the risk of a catastrophic failure of the K-1 vehicle could interfere with the Nuclear regulatory Commission (NRC) licensing process of the Yucca Mountain high-level nuclear waste, deep geological repository. (D EA/Appendix A/Sensitivity/3rd paragraph/p. Appendix A-2)

FAA Response 53: Section 2.1.1 describes the siting process and explores other alternatives considered by Kistler. The preferred alternative (using sites 18 and 19) meets the needs of the proposed Kistler operations.

7.7 Comment 54 [Miscellaneous]

- Other errors demonstrated a lack of understanding of the political geography of the region. “The Nevada Test and Training Range (also known as the Nellis Air Force Range (NAFR)) and the Nellis Air Force Base (NAFB) borders the NTS.” (P FONSI/Proposed Action/3rd Paragraph/3rd sentence/p. 21496) The Nellis Air Force Base is a separated facility that lies approximately 91 km (57 mi) southeast of the NTS border.

FAA Response 54: Thank you for this comment.

7.8 Comment 55 [Miscellaneous]

- Arrogant attitudes abound in the P FONSI and in the D EA.

FAA Response 55: Thank you for this comment.

7.9 Comment 56 [Noise]

- “Therefore, the NTS and surrounding communities are accustomed to land use for flight testing purposes. (P FONSI/Proposed Action/3rd paragraph/5th sentence/p.21496) Local residents, who out of no choice of their own, are forced to endure the use of once quiet desert lands, for military training and testing exercises, are not necessarily accustomed or pleased with that situation. The D EA seems to suggest that the noise of the rocket launches, and the associated sonic booms, will have little impact since down-range residents and wildlife will become accustomed to it. The final decisions on these matters tend to be largely under the control of administrators who have little understanding of the thousands of rural residents that are expected to adapt to KAC’s desire to provide reduced costs launch services from the NTS.

FAA Response 56: The NTS and surrounding lands are used for military flight and training purposes as discussed in the DOE NTS EIS. Therefore, flight operations are considered an existing use of the land. An impact associated with flight operations and testing is flight noise. The referenced statement in the EA is accurate.

7.10 Comment 57 [Miscellaneous]

- “The use of the NTS by Kistler for the purpose of launching and reentering commercial launch vehicles is consistent with community planning activities in the areas around the NTS.” (P FONSI/Proposed Action/3rd Paragraph/6th

Sentence/p. 21496) The above statement may represent the perspective of the primary KAC promoter, the Nevada Test Site Development Corporation (NTSDC). That perspective is not shared by many local community members who have little interest in the restrictive use of vast stretches of Nevada public lands that were withdrawn for highly hazardous and secretive uses. Virtually all the residents, down-range for the proposed KAC launch site, have absolutely no interest in community planning activities that are consistent with the use of the NTS as a satellite launch facility.

FAA Response 57: The proposed Kistler operations were found in the ROD signed for the NTS EIS to be consistent with community planning activities in the areas around the NTS. A public comment period was available for receiving comments on the proposed action. In addition, the FAA held a public meeting in Nevada in May 2000, to obtain a record of public concerns and questions about the proposed project. These comments are published in this document along with the FAA's responses to these comments. It is expected that concerns of other residents will be captured in this document.

7.11 Comment 58 [Miscellaneous]

- Though the ROD did identify "...Kistler as an example of a potential private use at the NTS," it provided no significant details. (ROD-NTS:EIS/Decisions/Nondefense Research and Development Program/1st paragraph/4th sentence/p.65561) Apparently, at that time, KAC had very limited plans which did not involve siting in the northwestern portion of the NTS. Several other potential users of the NTS were also mentioned in the ROD. Little, or nothing, has come of their plans since the ROD was issued, 41 months ago.

FAA Response 58: Thank you for this comment. This EA was prepared to address the requirements of the National Environmental Policy Act for the proposed Kistler project.

7.12 Comment 59 [Miscellaneous]

- The P FONSI mentioned that the D EA incorporates by reference the NTS EIS (DOE 1996). (4) (P FONSI/Proposed Action/4th Paragraph/last sentence/p.21496) Something it failed to mention was that the document consisted of 11 volumes, with only ten being made available to the public. The 11th volume was classified as Secret Restricted Data. Even in the over-stuffed public EIS volumes, the DOE/NV provided a limited view and analysis of the NTS. Details of the contamination deposited by 921 underground nuclear detonations remained classified. Additionally, the NTS EIS ignored the environment of a 60 square mile section of the test site, in keeping with a tradition that has lasted for over four decades.

FAA Response 59: This comment appears to be specific to the NTS EIS. The NTS EIS was approved, and a ROD was signed for that action. The Kistler EA is a public document that is not based on any portions of the DOE NTS EIS that were classified as Secret Restricted Data.

7.13 Comment 60 [Water]

- “Construction of the proposed Kistler facilities would result in surface clearing of vegetation from an area totaling 671 acres. The loss of vegetation, as a result of clearing, would represent approximately 0.008 percent of the total Artemesia Type vegetation on the NTS.” (P FONSI/Environmental Impacts/Biological Resources/Vegetation/1st paragraph/1st sentence/p.21497) This statement was a typical example of the project promoter’s efforts to project an image of minimal environmental damage. The P FONSI failed to mention that the landing site clearing operation would involve a circular area of 1,828 meters (6,000 feet [1.14 mile]) in diameter. It would involve a major grading effort that is expected to last for a three month time span. Much of the desert pavement would be destroyed in an area that, as yet, remains undisturbed. In addition, drainage control berms and channels are proposed to divert the natural surface water flows around the cleared and leveled circle. The D EA provided no details concerning the flow diversion structures.

FAA Response 60: Section 2.1 provides a description of the land area that would need to be cleared for the proposed Kistler operations. No attempt was made to minimize discussion of potentially relevant environmental impacts expected from the proposed action. The specific structures that would be used to divert runoff were not discussed in the EA.

7.14 Comment 61 [Biological Resources]

- “The land would be devoid of vegetation during the entire Kistler operations.” (D EA/5. Environmental Consequences of the Alternatives/5.1 Proposed Action Area/5.1.7 Biological Resources/ 5.1.7.1 Vegetation/1st Paragraphs/3rd Sentences/p. 5-46) Although specific measures for vegetation removal have not been fully developed, it is anticipated that methods used will be consistent with practices on the NTS. In addition, a dust suppression system would likely be included. Again, this could mean further application of chemicals on the newly exposed desert soils. The natural recovery of desert soils and vegetation tends to take many decades. (9) (10)

FAA Response 61: The EA does not specifically discuss any mitigation measures that may be employed during the construction and/or operation of the proposed Kistler facility. Although specific measures for vegetation removal have not been fully developed, it is anticipated that methods used for removal and maintenance would be consistent with similar practices on other portions of the NTS. The Kistler EA states that while the facility is operational, the landing and recovery

area would remain cleared of vegetation and there would be no opportunity given for re-growth of woody vegetation to occur. The landing and recovery area would be subject to foot and vehicle traffic during landing and recovery operations for each mission.

7.15 Comment 62 [Miscellaneous]

- The ROD-NTS:EIS specifically addressed the issue of developing undisturbed NTS areas, in response to comments submitted by the regional U.S. Environmental Protection Office. “Use of Undisturbed Habitat for Future Tiered Projects: The Environmental Protection Agency also recommended future developments be sited in already disturbed areas unless other overriding factors require placing such facilities in undisturbed areas.” “DOE will develop and implement a Resources Management Plan for the Nevada Test Site that incorporates the goal that when possible; new facilities will be sited in, or as close as possible to, previously disturbed lands in order to protect undisturbed land.” (ROD-NTS:EIS/Comments on the Final Environmental Impact Statement/5th and 6th paragraphs/p.65554)

The D EA failed to note this vague promise made to the regional EPA office. The ROD also mentioned that the EPA desired more extensive distribution of DOE/NV NEPA documentation, including the EAs that dealt with the NTS. In the ROD, the DOE indicated it would do so. Though the distribution list, in this D EA, appears extensive, it failed to list certain parties such as the regional EPA office, that made the comments on the NTS/EIS, and a major environmental organization in Nevada, Citizen Alert. (ROD-NTS:EIS/Comments on the Final Environmental Impact Statement/3rd and 4th paragraphs/p. 65554), (D EA/7. EA Distribution/ p. 7-1)

FAA Response 62: Efforts were made to site the Kistler facilities in previously disturbed areas of the NTS while maintaining compliance with Kistler’s operational requirements and without compromising safety. Please note that the payload processing facility is proposed to be located on previously disturbed land within Area 18. The siting process was carried out with the full cooperation and involvement of the proper authorities including stakeholders at the NTS and government agencies.

In keeping with the FAA’s policies and agreements with other federal agencies multiple copies of the Draft EA were supplied to the EPA Headquarters for distribution as appropriate with the expectation that the EPA would coordinate with its Regional Office consistent with other Federal agency practices. If the regional EPA office would like to be specifically added to the distribution list for future documents, it is recommended that they contact the FAA or refer to the FAA’s website where the full text of the document is available (<http://ast.faa.gov/>). The FAA made extensive efforts to contact and distribute the Draft EA to potentially interested parties including 12 environmental groups.

However, it should be recognized that it is not possible to accurately identify all environmental groups with a potential interest in a project. If members of Citizen Alert are interested in being added to the distribution list for future documents, it is recommended that they contact the FAA.

7.16 Comment 63 [Miscellaneous]

- “The NTS EIS concluded that no cumulative effects are expected as a result of the proposed Kistler facilities and operations.” (PFONSI/Proposed Action/Cumulative Impacts/last sentence/p. 21498) Chapter 6 of the NTS EIS, 1996, covering Cumulative Impacts, failed to address the Kistler proposal which was looking at siting in Area 25, rather than the present siting proposals, in the much more remote Areas 18 and 19. This belies FAA’s misuse of a reference that few readers, of the D EA, have at their fingertips. The cumulative impacts, to the NTS, should have included the environmental damage resulting from, 1021 nuclear explosive detonations at the NTS. Representative of that damage was a conceptual study that estimated that remediation of underground test areas could cost as much as \$7.3 trillion dollars. (5) That is a cost figure that DOE/NV tends to keep quiet about since it is not conducive to the promotion of their goals.

FAA Response 63: Please note that the FAA did consider potential cumulative environmental impacts from the proposed Kistler operation at the proposed Area 18 and 19 sites in Section 5.1.12 of the EA. The cost of nuclear remediation efforts is not relevant for the Kistler operations or this EA.

7.17 Comment 64 [Maps]

- I shall now concentrate on comments that specifically address the contents of the EA.

First, a few words about the first map on page 2-4, Figure 2-1. Location of NTS. It appears to be derived from a Geographic Information System (GIS) which was utilized for many of the other NTS maps in the EA. There are numerous problems with these maps. Technically, the horizontal and vertical aspect ratios are distorted. The vertical scale is squashed by approximately 23%. The “scale” value is off by approximately 25%. The northern boundaries of the Nellis Air Force Range (NAFR) (labeled: Nevada Test and Training Range) depict the boundary positions prior to the June 17, 1988, enactment of Public Law 100-338, which added 89,000 acres. Referred to as the Groom Mountain Addition to the NAFR. (6) The term “Nevada Test and Training Range” applies to a new set of boundary lines established on October 5, 1999, under the enactment of Public Law 106-65. The map baseline database appears to be based on information available prior to the enactment of Pub. L. 106-65. At that time the NTS had a 60 square mile extension

attached to its northeast corner. That was specified in Public Land Withdrawal 1662. (7) For over 41 years the DOE/NV denied their responsibility for the use of that land, and it rarely appeared on any of their maps. Up until the enactment of Pub.L. 106-65, the “baseball cap” portion of the NTS, in the northwest portion, often referred to as “Pahute Mesa,” was assigned to the use of the U.S. Air Force as part of the NAFR. This assignment was affirmed upon the passage of the Military lands Withdrawal Act of 1986 (Pub.L. 99-606, Nov. 6, 1986). Since November of 1983 the Nevada Operations Office has claimed that Pahute Mesa was an integral part of the NTS, and it appeared on all their maps as such. For at least 35 years the DOE depiction of the lands assigned to them failed to conform with the U.S. Department of Interior’s public records of the public lands, withdrawn to the DOE for a specific use. As a result, contractor produced maps, based upon DOE supplied data, have been in error.

FAA Response 64: Thank you for taking the time to provide this historical information on the boundaries of the NTS. However, this information does not affect the location of the proposed Kistler facilities or the affected environment. Therefore, no changes will be made.

7.18 Comment 65 [Maps]

- Another common problem with the regional maps, in the D EA, is that they fail to identify the numerous communities that lie down-range of the proposed launch site. I suspect that these omissions were no accident since small communities, such as Amargosa Valley, appear on the Regional Location map shown on page 2-5.

FAA Response 65: The maps in the Kistler EA were not intended to indicate the location of every populated area, nor were they intended to be a full accounting of every community or landmark in the area. A few communities were identified to provide a reference to the reader.

7.19 Comment 66 [Maps]

- Future EAs, or EISs, of the KAC proposal, should include accurate, current maps, which indicate all communities of more than 20 people in the down-range region of the NTS launch site. All the maintained state and county roads should be shown and labeled. All federal, state, county, and city protected lands should be shown in the down-range region. Additionally, all commercial operations should be presented on the map, along with a comprehensive listing in a adjacent table. This listing should include commercial mining operations and the petroleum production operations in Railroad Valley.

FAA Response 66: While the FAA appreciates the need for detailed information in environmental documentation, the level of detail needs to be appropriate for the proposed action that is being considered. The communities referenced by the commentor are not expected to be impacted by the proposed action. Therefore, it is not clear why these communities should be specifically identified on a map. All potentially affected persons would be considered in the Safety Review and analysis to ensure that the risk criteria for expected casualty are not exceeded. In addition, it is not necessary to list all commercial operations that would be visible within the scale of the map. The FAA believes that the maps provide a useful reference to the reader without including irrelevant information.

7.20 Comment 67 [Miscellaneous]

- The proposed KAC K-1 ground facilities would be located within public lands that were withdrawn to the Atomic Energy Commission for use in connection with the Nevada Test Site, for test facilities, roads, utilities, and safety distances. (8) The use of the NTS was specified in PLO 805 (35 FR 1522) and it was as a weapons testing site. Those use specifications still apply through the DOE/NV claims it can utilize the NTS for many other uses, including major nuclear waste disposal operations. The State of Nevada and the U.S. DOI's Bureau of Land Management (BLM) have questioned the DOE's sweeping interpretation of the uses it makes of the withdrawn public lands. Mention of this dispute appeared in the ROD-NTS:EIS. (ROD-NTS:EIS/Comments on the Final Environmental Impact Statement/16th paragraphs/p. 65554)

In the ROD, DOE/NV claimed it would continue to consult with the BLM on the need to update the Public Lands Withdrawals that formed the NTS. Four years have passed with little evidence of seriousness on DOE/NV's part.

FAA Response 67: Thank you for this comment.

7.21 Comment 68 [Miscellaneous]

- 2. Description of Proposed Action and Alternatives 2.1 Proposed Action (Top of Page 2-2) "To address the scheduling use of the affected airspace, a working group called the Range Management Group has been established to coordinate the withdrawn airspace over the NTS and the Nevada Test and Training Range." The scheduling of the KAC K-1 launches and landings should be provided, in real-time, to the public, over the Internet, and via radio announcements. This may prove difficult for the working group since much of the scheduling work appears to be highly secretive. The FAA delegation of responsibility for the control of the restricted airspace in this region appears to run very deep. The public need to be provided with the statutory and regulatory authority that guides the delegation of FAA responsibility within

the Nellis/NTS restricted airspace complex. The public should know who is responsible for what actions at the basic field level.

FAA Response 68: The FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing states that unless otherwise addressed in agreements between a licensed launch site operator and the U.S. Coast Guard and the FAA, respectively, a licensee authorized to conduct an RLV mission using a launch site or reentry site other than a Federal launch range shall complete the following: (1) An agreement between the licensee and the local Coast Guard district to establish procedures for the issuance of a Notice to Mariners prior to a launch or reentry and other measures as the Coast Guard deems necessary to protect public health and safety; and (2) An agreement between the licensee and the FAA regional office having jurisdiction over the airspace through which a launch and reentry will take place, to establish procedures for the issuance of a Notice to Airmen prior to the conduct of a licensed launch or reentry and for closing of air routes during the respective launch and reentry windows and other measures deemed necessary by the FAA regional office in order to protect public health and safety. The procedures for notification of launch and reentry times for the Kistler operations is not expected to differ significantly from other commercial launch operations. Many commercial Internet sites already track commercial launches from other launch sites around the U.S and the world. The public will be sufficiently notified about launch operations from the proposed Kistler facilities.

7.22 Comment 69 [Miscellaneous]

- (2nd paragraph on page 2.2) "There will be no interruption of commercial aircraft traffic..." The D EA should have also addressed the potential interruption of military and K-1 scheduling when launches are planned for penetration through the large R-4808 Restricted Area that lies northeast of the NTS. Why do the FAA public records show that control of this vast airspace is assigned to the control of the DOE's Nevada Operations Office when little DOE controlled land, presently lies under it? Are the regular flight to and from the air base at "the Air Force Operating location at Groom Lake, Nevada" actually under the control of personnel associated with the Air Force? If so, what legal authority is that delegation of authority based upon? If the answers, to these questions, can not be revealed, due to national security secrecy issues, then clearly state that that is the case, and provide the statutory basis that guides that decision.

FAA Response 69: As with other launch sites co-located with federal facilities, the FAA Airspace Management officials will work with airspace scheduling authorities from other agencies to schedule K-1 launches. The airspace over the NTS is designated by the FAA as Special Use Airspace. The description of Special Use Airspace in Section 3.2 of the Kistler EA describes it as airspace within which specific activities must be confined or for other reasons, access limitations are imposed upon non-participating aircraft. There are two types of

Special Use Airspace: Restricted Areas and Military Operations Areas (MOAs). Restricted Areas are used to contain hazardous military activities. Military Operations Areas are designated for non-hazardous military activities. Due to the fact that the Kistler launch and reentry corridors would impact Special Use Airspace, Section 5 of the Kistler EA considered the potential impacts of Kistler launch and reentry on military and commercial activities.

7.23 Comment 70 [Miscellaneous]

- 2.1.1 Alternatives Considered but Not Evaluated Alternative Locations Considered Within the NTS (Top paragraph on page 2-3) “The entire NTS area totals 3,496 square kilometers (1,350 square miles)...”. The above values are likely derived from the NTS EIS of 1986, and are likely to be erroneous since PLO 1662 land was not considered to be part of the NTS and Pahute Mesa was, when it actually was not. This shell game, with withdrawn public land areas, was apparently all part of the game protecting national security. The recent enactment of Public Law 106-65, 5 Oct. 1999, created another layer of confusion so that it now appears the above values should be approximately 3,648 square kilometers (1,409 square miles). The value of 14,170 square kilometers (5,470 square kilometers) is also doubtful for many of the same reasons given above. The actual value now is more like 15,431 square kilometers (5,958 square miles).

FAA Response 70: Thank you for this comment.

7.24 Comment 71 [Maps]

- Alternative 3: The Preferred Alternative (2nd quarter on page 2-8) Final Siting Location Description. It would be useful to provide the name of the 7.5 minute USGS quad sheet topo maps. Also useful would be center geographic coordinate point references for the three proposed sites.

FAA Response 71: Thank you for this comment. These changes have not been made to the document because they would not enhance the reader’s understanding of the proposed action or the potential impacts.

7.25 Comment 72 [Safety]

- 2.3 Vehicle Operations Landing LRU (3rd sentence, page 2-25) “The current system design does not include active guidance for landing.”

The above statement, combined with the other descriptions that the entire system is intended to operate autonomously under control of on-board computers and inertial measurement units, with no ground control, suggest to me that LAP landings, in particular, could often occur outside the boundaries of the cleared area. That would likely result in damage to the LAP which

could mean the spill of RP-1 residuals. The recovery operations would also involve heavy off-road vehicular damage to vegetation. In addition, such landing targeting failures would likely lead to a call for greatly expanding the already cleared and graded area.

The D EA provided no descriptions of upper wind velocity and direction measurements. Such things as upper-level winds would play a major role in determining the landing accuracy of the parachuted LAP booster. Such simple issues should have been addressed in the D EA. The failure to do so is a sign that such issues might not stand-up under independent critical reviews. When the earlier siting Alternatives were rejected, Kistler may have been forced to adopt a less than ideal landing space. As a result, the detailed analysis of the landing parameters may have been reserved for a time after the issuance of a FONSI. A full and complete, independent evaluation of the landing targeting capabilities should take place before the decision is made to issue a FONSI. This analysis should be based upon more than [sic.] computer modeling. Hopefully, the test launch will also look at various accident scenarios. Those test should be monitored by independent observers who should also be provided access to the tracking data. Any problems with landing and targeting accuracy should be immediately reported to independent preparers of upcoming D EA or EIS reports.

FAA Response 72: The FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing states that an applicant for RLV mission safety approval shall submit procedures – for human activation or initiation of a flight safety system that safely aborts the launch of an RLV if the vehicle is not operating within approved mission parameters and the vehicle poses risk to public health and safety and the safety of property in excess of acceptable flight risk. Acceptable flight risk is measured in terms of the expected average number of casualties which cannot exceed 30×10^{-6} .

The use of a strictly autonomous system would need to be evaluated during the Mission and Safety Reviews and receive specific approval to operate in this manner as it is not currently approved under the FAA's regulations. The details of the launch vehicle operations provided in the Environmental Assessment are based on Kistler's conceptual engineering designs.

The Kistler K-1 vehicle is designed to land safely regardless of the landing location, i.e., the vehicle contains all of the necessary landing gear on-board. Therefore, even if the vehicle does not land within the cleared area of the landing and recovery area it is not accurate to state that damage is likely. The K-1 is designed to consume the vast majority of its propellants prior to beginning reentry and landing operations. Therefore, it is unlikely that even in the event of a non-normal landing the local environment would be impacted by large amounts of residual propellant.

It should be noted that the launch, landing and recovery sites proposed in the EA as part of the preferred alternative meet Kistler's operational requirements.

As is the case with all environmental documents for commercial launch facilities, the Kistler EA has been thoroughly reviewed by the FAA. In addition, Mission and Safety Reviews will be conducted for the proposed Kistler operations and a license will not be issued unless safety criteria are met. The Mission and Safety Reviews will consider accident scenarios in detail and determine whether they satisfy acceptable expected casualty rates.

The test launches will be conducted at Woomera, Australia. The analysis in the Environmental Assessment is based on the conceptual vehicle design. Safety issues will be more specifically addressed in the Licensing Safety Review.

7.26 Comment 73 [Biological Resources]

- 2.3.1 Construction and Site Preparation (last sentence, page 2-25) "The wash would serve as an outlet for engine flame during K-1 launches." The wash constitutes a ephemeral stream bed. On page 3-29 there is a suggestion that Mountain Lions (*Felis concolor*) may utilize caves located in this area.

FAA Response 73: Thank you for this comment.

7.27 Comment 74 [Miscellaneous]

- 2.3.4. Launch, Flight, and Recovery Operations Parachute Sub-System (1st paragraph, last sentence, page 2-29) "The mortar sabot and deployment bag (attached together to the crown of the stabilization chute) separate from the stabilization chute once it is fully deployed, and descend together. They are not recovered."

The lack of recovery may constitute littering of the public lands. The BLM may take a dim view of such practices and may have laws against such activities. Then again, the BLM appears to have little authority over public lands that were turned over to the DOE and military.

FAA Response 74: The Draft EA was provided to the BLM and no comments were received. The FAA will continue to work with BLM and other federal agencies as appropriate to ensure the environment is adequately protected.

7.28 Comment 75 [Biological Resources]

- (3rd paragraph, 2nd sentence) “The stabilization chute will drift across the landing zone at approximately the velocity of the wind until it collapses on the ground.”

If the landing is near the edge of the cleared area, its highly likely that the chute will cross over to the undisturbed vegetation area and tear some of it up. This should have been included in the D EA analysis.

FAA Response 75: The chute is intended to be recovered and crews will make every reasonable effort to recover the chute while causing the least amount of stress to the natural environment.

7.29 Comment 76 [Biological Resources]

- (4th paragraph, page 2-29) Described here are two aluminum disk [sic.] that will be jettisoned at [sic.]drogue at 20,000 feet to fall in a “...designated landing zone alone [sic.] the flight track...” The D EA fails to mention any thing more about this designated landing zone, or the impact on the desert during off-road excursions to recover these. Again, this is a clear case of the D EA’s failure to meet the requirements of the NEPA requirements and the guidance provided in the Council on Environmental Quality.

FAA Response 76: The Final EA states that the mortar covers have streamers attached to further slow rates of descent. The covers will land along the flight path.

7.30 Comment 77 [Biological Resources]

- (5th paragraph, page 2-29) Again, I believe that strong winds could easily carry the drogue chutes well outside the boundary of the cleared landing pad. The chutes are likely to tear-up undisturbed vegetation and the recovery operations will do far more damage.

FAA Response 77: Please refer to the response to Comment 75.

7.31 Comment 78 [Biological Resources]

- (6th paragraph, page 2-29, 2-30) Upon disconnect, the main parachute may also blow across the cleared area to become entangled in undisturbed desert brush. Again, recovery operations would then tear out plants, as well as crush the plants and desert pavement in the attempt to recover the chutes. All possibilities of chute recovery beyo nd the cleared area, were not addressed in

the D EA. Again, the issuance of a FONSI is not in order. The production of an EIS is justified (9) (10).

FAA Response 78: Please refer to the responses to Comments 75 and 33.

7.32 Comment 79 [Miscellaneous]

- Kistler K-1 launch and Recovery Concept (1st [sic.] paragraph, 4th sentence, on page 2-33) “The LAP would fly back,…”

The term fly is misleading here. There is no indication of terminal guidance in the case of the LAP return. After the flyback burn, the LAP travels on a ballistic trajectory for approximately fifty miles before deploying parachutes at high-altitudes. During this time, and during the parachute descent, unpredictable winds can cause the LAP to miss the target by over a half-mile. It doesn't take a rocket scientists [sic.] to understand such things.

FAA Response 79: The term “fly-back” has not been removed from the document because there is no implication of powered movement by using this term. The document clearly states in Section 2.3 that the stages would land after an unpowered reentry. While upper atmospheric wind effects were not analyzed in this environmental analysis, Mission and Safety Reviews will be conducted prior to issuance of a launch license. The K-1 vehicle was designed to carry its landing gear on-board and is prepared, in the unlikely event that it is necessary, to land in areas other than the landing and recovery area.

7.33 Comment 80 [Miscellaneous]

- Kistler K-1 Flight Corridors (2nd paragraph, 2nd sentence, page 2-37) “Figure 2-24 shows the vehicle Instantaneous Impact Point (IIP) trace.”

Numbers such as 120, 180, 240, and 300 are marked alone [sic.] the corridors. No key or other explanation is provided. The single sentence above, or any other part of the D EA, fails to describe or explain what IIP represents. Again, I believe this is a serious omission that was no accident. I suspect that the numbers on the flight corridor represent the OV crash points if there is an early engine shutdown. Note that Spokane, Washington lies under the northern corridor and Salt Lake City, lies under the northeastern corridor. The map is devoid of all community names and that may have been a purposeful decision. Its [sic.] helpful to understand the vested interest that are involved in such presentations. Again, this extremely limited presentation provides sufficient grounds for the withholding of the issuance of a FONSI. Until the public is provided with an extensive presentation of what the Instantaneous Impact Point (IIP) traces represent, the D EA process should be terminated and replaced by the EIS process. In light of the minimal explanation, of what

the IIP traces represent, the FAA should explain why it believes the proposed action is not a major Federal action.

FAA Response 80: Figure 2-24 provides a graphical depiction of the Operational Flight Corridors. The numbers marked along the corridors (as labeled on the graphic) represent the time in seconds after launch.

Instantaneous Impact Points (IIPs) were defined in the Glossary of the Draft Kistler EA as follows “The point on the surface of the earth where an airborne mass would strike without atmospheric (e.g., wind) or continuing propulsive effects; the area containing impact points is described by impact limit lines.” The FAA’s Proposed Rule for Licensing and Safety Requirements for Launch defines IIP as an impact point, following thrust termination of a launch vehicle, calculated in the absence of atmospheric drag effects (see 14 CFR § 417.3). Therefore, the vehicle is designed to operate normally within these corridors. If the vehicle strays outside of the flight corridor, the flight will be terminated.

It should be noted that the Mission and Safety Reviews will fully consider failure scenarios and will examine specific communities located under the flight path to determine risk. This type of analysis is not within the scope of the environmental review and determination and therefore was not conducted for this document.

The proposed action *is* a major Federal action, however, it is not a major Federal action that would significantly affect the quality of the human environment within the meaning of NEPA. The licensing requirement for commercial launch and reentry activities (i.e., the major Federal action) is what triggers the NEPA analysis. The proposed FONSI states:

“After reviewing and analyzing currently available data and information on existing conditions, project impacts, and measures to mitigate those impacts, the Federal Aviation Administration (FAA), office of the Associate Administrator for Commercial Space Transportation (AST) proposes to determine that licensing of the proposed launch and reentry activities are not “a major Federal action that would significantly affect the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969”. Therefore, the preparation of an Environmental Impact Statement (EIS) would not be required and AST is proposing to issue a Finding of No Significant Impact (FONSI).”

7.34 Comment 81 [Miscellaneous]

- 3. Affected Environment and Description of Environmental Baseline (3rd paragraph, page 3-1)

The term “populated” areas may be misleading. Many of the residents in the so-called un-populated rural areas under, and adjacent, to the K-1 flight corridors should also be taken into consideration, just as if they lived in urban areas.

FAA Response 81: Any population that could be impacted by the Kistler K-1 operation would be considered in the Mission and Safety Reviews. It should be noted that the Mission and Safety Reviews will fully consider failure scenarios and will examine specific communities located under the flight path in terms of risk. This type of analysis is outside the scope of the environmental review and determination and therefore was not included in this document.

7.35 Comment 82 [Miscellaneous]

- 3.3 Land Use (2nd paragraph, last sentence, page 3-9) “In addition, numerous camping and fissing [sic.] sites that are used during the spring, summer, and fall months are located in the outlying areas north of the NTS and the Nevada Test and Training Range.”

After mentioning many specific communities and recreation sites to the south, no mention was made of the many communities and specific recreation sites to be [sic.] lie under the proposed flight corridors to the north. This needs to be corrected. Communities such as Rachel, Pioche, Baker and Garrison, Utah should have been mentioned for the northeastern corridor. The northern corridor touches on Austin and Eureka. The Toiyabe National Forest recreation areas lie under these tracks. In addition, Two [sic.] wildlife management areas, a state park, and the Great Basin National Park, lie under the northeastern flight corridor.

FAA Response 82: Please refer to the response to Comment 81.

7.36 Comment 83 [Miscellaneous]

- (3rd paragraph, “Nuclear Test Zone” paragraph, page 3-9)

The proposed K-1 launch site lies in area 19 which is designated as a Nuclear Test Zone. Refer to Figure 3-3, on page 3-14 of the NTS EIS. Although, Area 18 is now designated as a Reserved Zone, it played host to several past atmospheric and, near surface underground nuclear explosive test shots.

FAA Response 83: Thank you for this comment.

7.37 Comment 84 [Miscellaneous]

- (2nd paragraph, top of page 3-12)

Section 4.1.1 of the NTS EIS, fails to provide a complete story due to secrecy and lack of data.

FAA Response 84: Thank you for this comment.

7.38 Comment 85 [Biological Resources]

- 3.4 Air Quality Existing Conditions Pre-Activity Environmental Condition (top paragraph on page 3-14)

The “Environmental Condition Survey” results should have been ready for inclusion into the D EA. The statement, that the study has been contracted, should play no role in the issuance of a FONSI.

FAA Response 85: It would not be appropriate to conduct this survey at this time. The purpose of the Environmental Condition Survey is to characterize the natural environment just prior to construction. It is unlikely that Kistler would commence construction prior to receiving a license to launch from the FAA. Please note that an approved FONSI would not guarantee or even indicate that a license would be granted. The Mission and Safety Reviews would need to be conducted and safety criteria met prior to a license being issued. Therefore, it is not appropriate to perform the Environmental Condition Survey in advance of the licensing determination.

7.39 Comment 86 [Miscellaneous]

- Compliance with Air Quality Standards (2nd paragraph, page 3-16) “Ambient air quality at the NTS is currently monitored only for radionuclides. However, there are no radiological monitors located specifically in Area 18 or the region or Area 19 being examined for Kistler use.”

It would seem to make sense not to issue a D EA and a possible FONSI decision before such monitors are established in the proposed action areas. Once established, data should be taken for several months to determine baseline background levels. Apparently, the urgency of this project precludes such careful scientific studies.

FAA Response 86: The proposed action does not warrant radiological monitoring. Therefore, the above mentioned monitoring is not relevant for this project.

7.40 Comment 87 [Noise]

- 3.5 Noise Existing Conditions (3rd paragraph, page 3-19)

The D EA should have provided baseline background noise levels at the three proposed K-1 sites. It is quite unscientific to provide a estimated value based upon a 1983 study. Again, such sham science has no place in a public document upon which a FONSI decision is about to be made.

FAA Response 87: The requirements of NEPA do not dictate that new environmental research must be conducted when other relevant and valid data already exist. It should be noted that there has not been a significant change in the land use in Area 18 since 1983 and therefore, these data are expected to be an accurate baseline study of the existing noise conditions in the Area. Please note that this Section also provides data from other sources and not just the 1983 study.

7.41 Comment 88 [Miscellaneous]

- 3.7 Visual Resources Existing Visual Resource Conditions (1st paragraph. Last sentence, page 3-25)

The lack of public visibility has nothing to [sic.] with the Kistler proposed action. The public lands were withdrawn from public access by past military and AEC needs.

FAA Response 88: Thank you for this comment.

7.42 Comment 89 [Miscellaneous]

- 3.10 Geology and Soils (2nd paragraph on page 3-34)

As is typical, the DOE/NV descriptions in the NTS EIS are muted and fail to reflect the \$7.3 trillion damage estimate of just the underground test areas. The term “ground motion” is used. A better term would have been seismic shock. Kistler would be wise to design their facilities to withstand rather large seismic shocks to cope with the high-yield nuclear tests that may again be conducted in areas 18 and 19.

The statement is made that the effects are “relatively localized.” The question needs to be asked, what do they mean by the term “relatively.” Nuclear explosives are miniature nuclear reactors that are designed to explode. The process explosively disperses spent nuclear fuel like materials into the surrounding environment. So how relatively localized is a below groundwater nuclear shot when compared to the planned containment of spent nuclear fuel, isolated in carefully formulated glass, a thick stainless steel cask which is then

places well above the local groundwater table in Yucca Mountain. Nuclear test proponents tend to shy away from such comparisons.

FAA Response 89: Thank you for this comment.

7.43 Comment 90 [Safety]

- 4. Safety and Health 4.2 Hazard Analysis Flight Operations (First paragraph reads as follows, page 4-6) “A detailed flight hazard analysis will be conducted as part of a Safety Review under the auspices of the FAA before a determination is made to license the launch activities.”

The results of the Safety Review should have been presented in the D EA. The present document only hints at possible accident scenarios without providing any statistical estimates of the risk factors. It wouldn't surprise me that a FONSI will be issued despite the lack of a Safety Review, and then the licensing process will go forward, based partly on the issuance of the sham FONSI. I repeat, the Safety Review must be conducted independently, peer reviewed by other groups of independent experts, including members who reside in downrange communities such as Salt Lake City and Spokane, and then presented to potentially affected members of the public, including those who the promoters expect to adapt to the frequent sonic booms. I suggest that members of the NASA Challenger accident review committee serve as peer reviewers, or that it is done by the National Academy of Sciences.

FAA Response 90: The FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing describes the Safety Review as follows: The FAA conducts a safety review to determine whether an applicant is capable of launching an RLV and payload, if any, from a designated launch site, and reentering the RLV and payload, if any, to a designated reentry site or location, or otherwise landing it on Earth, without jeopardizing public health and safety and the safety of property. The FAA issues a safety approval to an RLV mission license applicant that satisfies the requirements. The FAA evaluates on an individual basis all public safety aspects of a proposed RLV mission to ensure they are sufficient to support safe conduct of the mission. A safety approval is part of the licensing record on which the FAA's licensing determination is based. Please also refer to Section 431.35 of the FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing which is available at AST's website (<http://ast.faa.gov>) for criteria that must be met by a license applicant.

7.44 Comment 91 [Safety]

- (1st full paragraph on page 4-7) “Its Flight Safety System (FSS) consists of various functions that are activated in the event the vehicle strays from its preplanned trajectory.”

The term “various functions” conveys very little meaningful information.

FAA Response 91: The description of the FSS is not intended to be specific. The purpose of this document is to examine potential environmental impacts resulting from the proposed action. The specific details of the FSS would not enhance the readers understanding of the environmental impacts of the proposed action or fulfill the purpose of NEPA and therefore were not included in this document.

7.45 Comment 92 [Miscellaneous]

- (2nd paragraph, page 4-7) “In the event that the LAP experiences an engine or guidance system failure during boost phase, the vehicle is equipped to [sic.] recognize the deviation from the planned flight path. The vehicle will then shut down the remaining engines and impact in open terrain.”

What [sic.] are the engineers certain that it will “impact in open terrain.” There was no analysis in this, in the D EA, that ensured that that would be the case. Perhaps this statement was driven, largely, by wishful thinking on the part of the design engineers. Again, a completely independent review is needed to counter those who have come to view their world through rose colored glasses. The rosy picture continues in the D EA.

FAA Response 92: Technical aspects related to the engineering of the vehicle during flight and in the event of a failure as they may affect public health and safety and safety of property will be examined in the Safety Review. For a description of the requirements that must be met for FAA licensure please refer to the FAA’s Final Rule for Reusable Launch Vehicle and Reentry Licensing. A copy of this regulation is available at <http://ast.faa.gov>.

7.46 Comment 93 [Miscellaneous]

- (3rd paragraph, page 4-7)

The LAP will not “likely” be damaged by a fire-in-the-hole, it will certainly be severely damaged. The dimensions of the stated elliptical area needs to be provided. The reference to atmospheric conditions is likely a vague reference to winds that could carry some debris well outside the flight corridor.

FAA Response 93: The technical aspects related to failure scenarios and risk associated with an OV failure will be examined in the Safety Review conducted for a launch and reentry proposal. For a description of the requirements that must be met for FAA licensure please refer to the FAA’s Final Rule for Reusable Launch Vehicle and Reentry Licensing. A copy of this regulation is available at <http://ast.faa.gov>.

7.47 Comment 94 [Miscellaneous]

- (4th paragraph, page 4-7)

The OV will likely be damaged by the fire-in-the-hole forced separation and not make it into orbit. The programmed fuel release might not function. In any case, a fuel release would likely leave residuals in the tank that would present an explosion, or leak hazard upon its crash landing. Though the D EA text states that an attempt would be made at a controlled, intact landing, I seriously doubt that the vehicle will happen to come down on a flat, brushless pad, similar to the carefully prepared landing pad at Area 18.

FAA Response 94: Technical aspects related to the engineering of the vehicle during flight and in the event of a failure will be examined in the Safety Review conducted for a launch and reentry proposal. For a description of the requirements that must be met for FAA licensure please refer to the FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing. A copy of this regulation is available at <http://ast.faa.gov>.

7.48 Comment 95 [Map and Safety]

- (5th paragraph, page 4-7) "Figure 4-2 displays graphically the impact [sic.] points for the LAP failure to re-ignite scenario."

The graphic presentation of the crash points were actually lines. I found the graphic to be quite unclear so I've produced another graphic that shows the potential crash area and the human based features that lie in that area. I suspect that some, in-flight, accident scenarios could result in debris falling well outside the flight corridors.

FAA Response 95: Each corridor represented on Figure 4-2 of the EA considers a range of azimuths, i.e., the northeastern corridor considers azimuths from 45° to 60°. However, any one flight would only be along one azimuth within this range. Therefore, the corridors do not represent "crash points." They simply indicate the area in which the vehicle could be traveling. These corridors do account for debris dispersion in the unlikely event of an accident. Therefore, debris is not expected to fall outside the corridors represented graphically in Figure 4-2.

7.49 Comment 96 [Miscellaneous]

- Public Safety and Health Analysis (2nd paragraph, page 4-8) "Kistler's strategy for emergency landings is to avoid populated areas rather than designate emergency landing sites."

Nothing is said about how this avoidance is to be achieved. I believe it is mostly based on wishful thinking. I seriously doubt that the avoidance is achieved via on-board intelligent guidance computers determining which direction the missile body falls, or directing the drifting parachuted missile to a particular patch of land.

The paragraph finished with the saddest story of all. It seems that the D EA preparers made a modeled determination of human population density, in the downrange area, by utilizing a zip code database. The modeling indicated that less than 0.2 people per square mile lived in the downrange areas. I would like to see what remote land area was chosen to produce this figure. Of course, such abstract figures assume that the population is uniformly distributed. I would not be surprised if those zip code derived figures will serve a key input data into the Safety Review process. After the action is approved all it will take is one extremely unlikely crash, onto a small rural school, to ruin the promoter's whole day.

Perhaps the number crunchers [sic.] need to have dinner with some downrange Indian families, or go out on the range, with a local rancher, to recover a dead steer that broke a leg due to a startle reflex caused by a sonic boom.

Sincerely,

Vernon J. Brechin

FAA Response 96: Thank you for this comment. Please note that the FAA's Final Rule for Reusable Launch Vehicle and Reentry Licensing states that to satisfy risk criteria an applicant for RLV mission safety approval shall identify suitable and attainable locations for nominal landing and vehicle staging impact or landing, if any. An applicant shall identify such locations for a contingency abort if necessary to satisfy risk criteria during launch of an RLV. A nominal landing, vehicle staging impact and contingency abort location are suitable for launch and reentry if – (1) for any vehicle or vehicle stage, the area of the predicted three-sigma dispersion of the vehicle or vehicle stage can be wholly contained within the designated location; and (2) The location is of sufficient size to contain landing impacts, including debris dispersion upon impact and any toxic release.

Index

Comment Topic	Comment Number
Biological Resources	61, 73, 75, 76, 77, 78, 85
Cultural and Historical Resources	4, 5, 29, 30, 31
Maps	64, 65, 66, 71, 95
Miscellaneous	3, 9, 10, 11, 12, 14, 15, 16, 18, 19, 20, 21, 22, 28, 32, 33, 34, 37, 39, 40, 41, 42, 45, 47, 48, 50, 51, 52, 53, 54, 55, 57, 58, 59, 62, 63, 67, 68, 69, 70, 74, 79, 80, 81, 82, 83, 84, 86, 88, 89, 92, 93, 94, 96
Noise	8, 38, 56, 87
Safety	6, 35, 36, 43, 44, 46, 49, 72, 90, 91, 95
Socioeconomics	1, 7, 17
Transportation	13
Water	2, 23, 24, 25, 26, 27, 60

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APPENDIX A – OTHER COMMENTS

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The documents in this Appendix were received as part of the public review process and all comments are provided in their entirety. All comments requiring responses from the FAA are addressed in previous sections of this document.

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A.1 Written Comments Received from Shelley Berkley

A.2 Written Comments Received from Randy Black

A.3 Written Comments Received from Les Bradshaw

A.4 Written Comments Received from Joseph Brown

A.5 Written Comments Received from Richard H. Bryan

A.6 Written Comments Received from Robert Campbell

A.7 Oral Comments Received from Red Copass

[For the full text of this comment please refer to Appendix B of this document.]

Mr. Himaras,

The Nevada Test Site is located on land within Nye County. As a Nye County commissioner, I support new projects that contribute to the economy expansion for my community and the whole county, if you will.

Kistler Aerospace and their operation at the Nevada Test Site will provide employment opportunities to the people in my county. Many of those same people were displaced when the site downsized due to the end of the Cold War. And believe me, a lot have lived out there too, a lot of them here in town.

Kistler's project provides a great opportunity for Nye County to build upon. With a well-executed plan, we could grow our county's economic job and our job base. One example, we're presently working with the Nevada Test Site Development Corporation on a partnership project that will develop an industrial park adjacent to the Nevada Test Site in Nye County. The Kistler project will open the door for other aerospace companies to locate within Nye County, possibly in our industrial park.

We believe Kistler is good for Nevada and good for Nye County, and I am pleased that our environmental assessment will now let them move forward.

A.8 Written Comments Received from Red Copass

A.9 Written Comments Received from Lou Emmert

A.10 Written Comments Received from Gary Fitzgerald

A.11 Written Comments Received from Jim Gibbons

A.12 Written Comments Received from Kenny Guinn

A.13 Written Comments Received from A.E. Gurrola

A.14 Written Comments Received from Bruce James

**A.15 Written Comments Received from the Nevada Division of Water
Resources**

**A.16 Written Comments Received from the Nevada State Historic
Properties Office**

A.17 Written Comments Received from Harry Reid

A.18 Written Comments Received from Dan Simmons

A.19 Written Comments Received from Raymond Rawson

A.20 Written Comments Received from Stephen Rice

A.21 Written Comments Received from A.C. Robison

A.22 Written Comments Received from John A. Rusi

Written Comment Sheet Kistler Aerospace Operations at the Nevada Test Site Environmental Assessment Meeting

Date 5/02/00

Kistler Aerospace should be encouraged in this endeavour [sic]. An FAA approved Commercial Aerospace port is vital to the future of America as well as the state of Nevada. Currently Kistler is looking at the satellite market but FOUR Space Stations will be flying in the next 15 years. The ISS, MIR, and at least TWO other Private Space Stations by Bigelow Aerospace and Island One for example will need to be resupplied by such businesses as Kistler. We will need a launch a week to resupply all the Four Space Stations currently contemplated.

Name: John A. Rusi

Address: 5134 S. Jones Blvd. #202

City: Las Vegas

State, Zip Code: Nevada, 89118

A.23 Written Comments Received from Robert E. Shriver

A.24 Written Comments Received from Bruce Spotleson

A.25 Written Comments Received from Kathleen E. Trever

A.26 Written Comments Received from Sonja F. Wallace

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APPENDIX B – PUBLIC MEETING TRANSCRIPT

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1
6 OPEN HOUSE RE:

7
8 THE ENVIRONMENTAL IMPACTS OF KISTLER AEROSPACE
9 CORPORATION'S PROPOSAL TO LAUNCH AND LAND A
10 TWO-STAGE REUSABLE AEOSPACE VEHICLE

11
12
13
14 Taken at the U.S. Department of Energy
15 At 232 Energy Way
16 North Las Vegas, Nevada

17
18
19 On Tuesday, May 2, 2000
20 At 8:00 p.m.

21
22
23
24 REPORTED BY: MONICE KRMPOTIC CAMPBELL,
25 CCR #312, RPR

1 LAS VEGAS, NEVADA; TUESDAY, MAY 2, 2000;
2 8:00 P.M.

3 -oOo-

4 MR. WRUBELE: Mr. Brown, if you would like
5 to take the microphone in the middle of the aisle. I
6 believe it's on.

7 MR. BROWN: Mr. Himaras, I'm the chairman
8 of NTS Development Corporation, and I'm here to
9 indicate the unanimous support of the board of NTS
10 Development Corporation for this project. We're very
11 enthusiastic about the Kistler project, and at the
12 risk of retracing some of the comments previously made
13 by Tim and Dirk and the general, I'd like to read a
14 letter which was written to you by me last week.

15 Dear Mr. Himaras, the NTS Development
16 Corporation is a community-based reuse organization
17 that works to promote the growth of science and
18 technology in Nevada. This is accomplished through a
19 strategic partnership with the U.S. Department of
20 Energy.

21 Over the past four years, the NTS
22 Development Corporation has helped Kistler Aerospace
23 in commercializing a launch recovery operation for
24 their K1 vehicle at the Nevada Test Site. During this
25 process, we have learned much about the Kistler

3
1 operation, its people, its business plan and the
2 benefits that a project of this magnitude would bring
3 to this state.

4 The positive results of the environmental
5 assessment bring Kistler a step closer to meeting the

6 requirements of this licensing process. This project
7 will create high value jobs, similar to those that
8 were lost when the Nevada Test Site downsized due to
9 the end of the cold war. In addition, Kistler will
10 attract other high technology companies to the region,
11 upon their success.

12 Our organization will continue to work with
13 Kistler as they progress through the various steps to
14 licensing, and Kistler is just the kind of company
15 that can change the way the world views Nevada and
16 assist us with our efforts in diversifying Nevada's
17 economy. Thank you.

18 MR. WRUBELE: Thank you very much. Bill,
19 if you'd take the floor. Bill Vasconi.

20 MR. VASCONI: Mr. Himaras, naturally Tim
21 and Dirk and Jack, thank you for an opportunity to
22 address the group. Nick, I'm a construction worker.
23 I've been in the state for 36 years, and at the test
24 site, approximately half that time of the 18 years.
25 I'm well familiar with the area in question. I feel

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1 very strongly that the site is suitable.

2 I look at it from a different aspect. You
3 know, there's been a lot of programs come and go on
4 the Nevada Test Site. We've used a lot of manpower
5 and a lot of time over the last 50 years. The first
6 event with the test site was in '51 and the last one
7 is in '92. And one time we had a population of
8 workers at the test site that approached right over
9 11,000. At that time we started downsizing. Right
10 now we're at probably about 2200.

11 The promise of the projects, we've had them
12 too, but they've come and go. Now we have Kistler
13 Aerospace, we're talking about commercial launch and
14 recovery of vehicles, K1 vehicles. It looks awful
15 good to some of us here in Nevada. You know, we like
16 to maximize on the scientific and technological
17 expertise that's been developed at that Nevada Test
18 Site over these last 50 years.

19 We know we have the management, we know we
20 have the manpower to do the job, and do it right. We
21 know socioeconomically it's sound, it's good for
22 southern Nevada. It's good for the southern Nevada
23 region. It's good for the state of Nevada.

24 A lot of us will look further than the
25 initial launches. As far as construction work goes,

5

1 that's not a lot of construction work, but we do know
2 that it will bring in new industries, new
3 technologies. We know that we have the abilities, we
4 know we have the fortitude, and we know we have the
5 opportunity, and we don't want to lose that
6 opportunity for this facility.

7 I hope your department is -- will hear lots

8 of comments tonight. I hope the majority of them are
9 directed the way I put mine to you. I am available
10 for questions and comments. I feel very strongly
11 about the NTS Development Corporation, which was a
12 CRO, environmental/restoration waste management
13 project, and in some capacity, I served on most of
14 those committees. In some capacity I'm with the
15 historical foundation.

16 It's not like being a construction worker
17 you can't be involved. In my case, as a construction
18 worker we may not have the degrees that other people
19 have but, you know, the good Lord give us two ears and
20 one mouth, and I've been spending a good many years
21 listening twice as hard as I talk, and it's time now
22 if we got a project coming, it's time for me to talk.
23 Thank you very much.

24 MR. WRUBELE: Thank you, Mr. Vasconi. The
25 next hand that came up was Red Copass, if I have the

6

1 name correctly, county commissioner from Nye County.

2 MR. COPASS: Thank you very much for
3 allowing me to come over the hump from Pahrump.
4 Before we get too much started, you've got to
5 understand that I'm originally born in Texas and I'm
6 part Irishman, so what does one say? But before I
7 really get start, I would like for some of you people
8 to really understand that some of the driving force
9 behind what we do here is Tim Carlson and his bunch of
10 people, and without those people, like I say, there
11 would be no us. So, Tim, I thank you.

12 Now, this letter was written, and I'm going
13 to read it. If I fumble and stumble, don't shoot me
14 this week, wait until next week. Okay. It says, Mr.
15 Himaras, the Nevada Test Site is located on land
16 within Nye County. As a Nye County commissioner, I
17 support new projects that contribute to the economy
18 expansion for my community and the whole county, if
19 you will.

20 Kistler Aerospace and their operation at
21 the Nevada Test Site will provide employment
22 opportunities to the people in my county. Many of
23 those same people were displaced when the test site
24 downsized due to the end of the Cold War. And believe
25 me, a lot have lived out there too, a lot of them here

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1 in town.

2 Kistler's project provides a great
3 opportunity for Nye County to build upon. With a
4 well-executed plan, we could grow our county's
5 economic job and our job base. One example, we're
6 presently working with the Nevada Test Site
7 Development Corporation on a partnership project that
8 will develop an industrial park adjacent to the Nevada
9 Test Site in Nye County. The Kistler project will

10 open the door for other aerospace companies to locate
11 within Nye County, possibly in our industrial park,
12 and I must add, it's not written down here that this
13 industrial park is at the gate that goes into the
14 Nevada Test Site, the east -- or the westward, if you
15 will.

16 We believe Kistler is good for Nevada and
17 good for Nye County, and I am pleased that our
18 environmental assessment will now let them move
19 forward. And I thank you very much. I thank all of
20 you, and I'll get out of your way.

21 MR. WRUBELE: All right. Thank you, sir.
22 Anyone else? Yes, there is a hand in the back.
23 Please state your name, if you would.

24 MR. RICE: Thank you. My name is Steven
25 Rice. I'm with the University of Nevada, Las Vegas,

8

1 and it's my pleasure on behalf of the university to
2 endorse this project. We feel that our academic
3 programs that we are building in science and
4 engineering will be enhanced by the presence of the
5 Kistler project.

6 Our colleges of engineering and science are
7 anxiously awaiting this project and looking forward to
8 supporting it. We're delighted with the success of
9 the environmental assessment and look forward to
10 working with you in the next phase of the project.
11 Thank you.

12 MR. WRUBELE: Thank you, sir. Someone
13 else? Yes, sir, another gentleman in the back row, if
14 you would state your name when you get to the
15 microphone, please.

16 MR. WOODWOORTH: Thank you. My name is
17 Glen Woodworth. Most people I know in here know me as
18 Woody. I am a Teamster by trade and business agent
19 with the Teamsters Local 631.

20 First of all, I would like to address
21 Mr. Carlson and Mr. Harris. The NTS Development
22 Corporation, I think, has been a long-time coming, and
23 now that they're here, it has greatly enhanced the
24 area. What I mean by that is one example is we now
25 have, we, the Teamsters, have benefited from the NTS

9

1 Development Corporation inasmuch as we have a driving
2 school, a truck driving school, CDL school, located on
3 the Nevada Test Site.

4 And that was made possible, in part, by the
5 NTS Development Corporation, the DOE and the Teamsters
6 Union. So I would like to take this opportunity to
7 thank you very much, Mr. Carlson. We now have people
8 that were out of work, didn't have a trade, and
9 because of that, they now have their CDL licenses and
10 they're now productive citizens of our community. So
11 thank you very much.

12 And as far as Kistler is concerned, we're
13 waiting for this to happen. It's not just about jobs,
14 it's about the future of Nevada. I think that the
15 Nevada Test Site has enjoyed a long and prosperous
16 era. That era came to an end with the end of the Cold
17 War and the CROs that were put in place by the 31 --
18 the act of 3161 act, basically the communities -- I
19 live in Nye County, and I have for 30 years. I live
20 in Pahrump, and the communities around -- surrounding
21 the test site have suffered greatly by the slow down,
22 if you will, of the work force at the test site.
23 So this is an opportunity to help build
24 those communities back up. I think it's a safe
25 venture. You know, we talk about a lot of things

10

1 about jobs, but I think first and foremost is the
2 safety, and that's what we're looking at. The area is
3 rural, as you well know, and it's an ideal spot to do
4 this kind of work. So we highly endorse this project
5 and we're just waiting to get going. I thank you very
6 much.

7 MR. WRUBELE: All right. Thank you, sir.
8 Gentleman in the front row.

9 MR. BRUCE: Well, I'm going to, provided
10 all of you can hear me, I'm going to work from here.
11 I don't think you're recording my remarks on there,
12 are you?

13 Mr. Himaras, ladies and gentlemen, I'm one
14 of Joe Brown's minions. I'm Bruce James. I'm a
15 director of the Nevada Test Site Development
16 Corporation. I'm also a director of Desert Research
17 Institute, and I'm chairman of the board of trustees
18 of Sierra Nevada College.

19 And I've prepared a couple remarks that I
20 would like to make. The agreement reached between
21 Kistler Aerospace Corporation and the NTS Development
22 Corporation is a milestone in Nevada's quest to
23 broaden our economic base through identifying,
24 cultivating and supporting areas of specialization,
25 which Nevada could lead the nation through the 21st

11

1 century.

2 Without question, the exploration and
3 commercialization of space is one such area. With
4 high barriers to entry in most states in regions of
5 the country, Nevada is in the singular position of
6 being able to support the emerging private
7 commercialization of the space industry through the
8 use of the federal government control lands in our
9 state.

10 Nevada is, indeed, fortunate to have Kistler
11 Aerospace Corporation as one of our first customers in
12 this endeavor. Kistler is managed by the people who
13 helped build NASA's brilliant and successful space

14 exploration programs. These are exceptionally well
15 educated people of great integrity with more
16 experience than any private group in the country.
17 They have people who have always put safety first
18 above all other aspects of their work.

19 I have no doubt that Nevada's partnership in
20 this instance with Kistler, as well as the federal
21 government, will reap rich rewards for all Nevadans
22 with a minimum of danger to our environment and
23 virtually no risk to our people. I endorse Kistler's
24 program as proposed for the Nevada Test Site.

25 MR. WRUBELE: Thank you very much. Anyone

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1 from the middle of the room?

2 MR. SIMMONS: I'm Dan Simmons. I'm the
3 director of Nevada Science & Technology corridor, a
4 Nye County initiative.

5 We have a number of projects up and down
6 highway 95 from Pahrump, Indian Springs, through
7 Beatty, and up in Tonopah. We have some involvement
8 in some projects involving solar energy, wind energy,
9 high-speed test facility in Beatty, an industrial park
10 in Lathrop Wells, and we find that all of these
11 projects that we envision and we have planned and that
12 we're in the process of instituting are completely
13 compatible with Kistler's plans, and we'd welcome them
14 to Nye County as partners in Nye County to march on
15 into the new decade. Thank you.

16 MR. WRUBELE: All right. Thank you. Sir,
17 would you like to go ahead?

18 MR. BRADSHAW: Les Bradshaw, Nye County.
19 I'm one of Red's minions, so there's two people that
20 have minions here tonight. I run the department of
21 natural resources and federal facilities in Nye
22 County. We'd welcome Kistler Aerospace to Nye County.
23 This fits very well with, as Dan said, with many
24 initiatives and programs that we have. It's very
25 compatible with the vision we have of what we want to

13

1 be as we go into this new venture. We fully envision
2 that in the year 2010, that there will be 60,70,000
3 people living in the Pahrump area, perhaps ten to
4 15,000 in the Armagosa Valley area, and perhaps a few
5 less than that over the Beatty area. So we believe we
6 can be an effective contributor, both as to a pleasant
7 community to house your people in and a pool of
8 qualified and educated work force to help you be
9 successful in your program.

10 We believe that we can provide you with a
11 quality of life that will help you attract people to
12 your operation that will make you successful. We're
13 also hoping to bring university level educational
14 programs to our county through cooperation with the
15 university system. We're putting in an infrastructure

16 of video conferencing up and down the highway 95
17 corridor to bring these sorts of educational programs
18 to the people of our county.

19 We believe that as you grow and as Nye
20 County grows, that we can be effective partners in
21 making this project a success. We're also very
22 mindful that the Nevada State Taxing Institute will
23 allow us to have a long and profitable relationship
24 with you folks.

25 One issue that has been brought up by people

14

1 in our county, and I hope that it's addressed in your
2 EA, is the issue of the transportation of materials to
3 your site. I know the answer to the question, because
4 we've asked it already, but just for the record, I
5 hope that your EA addresses the issue of proper
6 highway safety transportation of the materials,
7 especially the propellants.

8 This has been mentioned, that these
9 materials will be transported safely along the
10 highways to your launch site. No matter which way you
11 bring your materials to your project, you're going to
12 have to go through a couple of Nye County -- and we
13 stand ready to work with you to make this an operation
14 that gives the citizens of Nye County no extra cause
15 for concern.

16 As you're aware, we have level upon level of
17 federal projects stacked up in our county, and so we
18 look at this project, while we welcome you with open
19 arms, we must consider the cumulative impact of what
20 you're doing as compared to the total range of
21 projects that the federal government is operating
22 within the county.

23 So we urge you to work with us. We stand
24 ready to help you. As the years go by, we look
25 forward to a successful operation on your side of the

15

1 fence, and we stand ready to partnership with you in
2 any way that we can to make your operation successful.

3 Welcome to Nye County.

4 MR. WRUBELE: All right. Thank you, sir.
5 Ma'am, if you'd like to take the microphone, state
6 your name.

7 MS. SNYDER: I like being called ma'am.
8 That makes me feel old.

9 My name is Susi Schnyder, and I live here
10 in Las Vegas, and it's nice to see all these people
11 out here. I hope everybody gets a chance to speak.
12 More than anything I've -- you know, I saw some -- I
13 saw a blurb in the paper, came out here and wanted to
14 find out more about what you all are doing. So more
15 than anything I have questions for you that I would
16 like to read in. If you could get them down so I
17 could get a response, which you said you'd be doing.

18 So that's -- from your presentations, that's what I
19 have here, mostly.

20 I took a lot of questions. The first thing
21 I heard that you had the -- I heard you say is that
22 the water use permit was granted for this project from
23 the state agencies. I would like to know how much
24 water you plan on using, what the acre-feet per year
25 is. You know, what -- how much water are we talking

16

1 about? We live in the desert and, well, you know, I
2 know I didn't drink enough water today. I can feel
3 it. So I'm concerned about the water usage. So I
4 would like to know how much you're planning on using.

5 I saw something with the -- you were talking
6 about the tribal representatives you had spoken with,
7 and I would like to kind of see who you had talked to.

8 I know a lot of tribal folks here in this part of the
9 country and just, you know, checking with -- I would
10 like to check in with them, as well as hearing your
11 side of things, because I know that, you know,
12 sometimes the glass is half full and sometimes it's
13 half empty. So I would like to hear from all sorts of
14 different perspectives, so I would like to find out
15 who you spoke with.

16 You mentioned when you found the second site
17 that hadn't been found before in area 25, I saw that,
18 I think, and I can't remember whose presentation it
19 was, but there was a note about rapid cultural
20 assessment, I believe, and I don't have any idea what
21 that is, and I would really like to know. So if you
22 could help me out with that.

23 Okay. I'm curious about what the criteria
24 is for the mission and safety reviews and also who
25 will be conducting those reviews. You know, pretty

17

1 easy question.

2 I also want to know -- you mentioned that
3 there would be a sonic -- it would be -- there would
4 be -- when you were talking about the noise impact,
5 that there would be a sonic -- a sonic boom, thank
6 you, sorry, and I've been in the -- I've been in the
7 middle of the desert when you hear a sonic boom, and I
8 was wondering if any of you all had and have you
9 felt -- because you can feel it in your guts. If you
10 just ate a lot, like if you came out of a good buffet,
11 you feel a sonic boom in your gut, it makes you want
12 to "urrr". I'm kind of curious about that.

13 And how often would you be launching from
14 out there? I thought I saw something that said no
15 more than once a week, and that's still 52 times a
16 year, and I'm curious how often the launches would be,
17 you know, if it goes forward, if you don't get the
18 FONSI, I like that acronym, FONSI, found no
19 significant impact. That's kind of neat.

20 Another thing is that, you know,
21 Mr. Vasconi, mentioned that, you know, this would be
22 bringing a lot of jobs, but he also mentioned he works
23 construction, and so you would be building the
24 facility and there would be these construction jobs
25 while you're building, but what I saw in this -- the

18

1 federal register notice was that it would bring in all
2 these skilled workers.

3 Well, I just want to know, are these skilled
4 workers, are they really going to be coming from Las
5 Vegas and coming from Clark County or coming from Nye
6 County or coming from Pahrump, or is it going to be
7 folks that are specially brought in from Livermore,
8 specially brought in from Los Alamos or Oak Ridge.

9 Are we really going to bringing jobs from our
10 community here? And that's another question of mine.

11 Let's see, what else did I have here? All
12 right. Oh, yeah, these K1, they look like -- like
13 if -- how big is it? I couldn't quite grasp that from
14 the slides. It seems like I saw an image that had it,
15 what looked like a heavy haul truck. I mean, is this
16 a huge thing we're talking about? How big is that? I
17 guess it might be in the EA here, and I'll read it. I
18 just got my copy. I'll read it today or whenever I
19 get around to it. But how big is it?

20 You know, I was talking to Tom before, you
21 were answering some questions about -- I was looking
22 at this, the impact points for the lap failure, and
23 this stuff, and I don't -- I guess I'll look in here
24 and find out what a lap failure is and get that
25 information, but that also -- you know, if you want to

19

1 talk to me later or something, we can work that out a
2 little bit more.

3 And I think -- let's see. What was the
4 other -- a couple other little things that -- oh,
5 yeah, these operational launch corridors that I was
6 looking at there, I see a lot of counties. I see
7 county lines delineated -- that's a big word for me --
8 delineated in this, and I'm wondering if this -- you
9 know, I see that there might not be an actual
10 environmental impact statement because of the
11 environmental assessment, and I'm wondering how the
12 people, along in these counties, there is a lot of --
13 lot of counties in there, whether they'll be able --
14 or I guess it's in the federal register, but is there
15 a way to notify these people in the counties that
16 they're in potential launch corridor?

17 Like, you know, I wouldn't live in Cape
18 Canaveral because, man, I saw the challenger, and,
19 man, we watched that on TV, "ooh, ooh". It's creepy.
20 So I just want to know if those folks are going to be
21 alerted to that.

22 The other thing was that I know that the K1
23 hasn't really been tested yet, and it's being tested
24 in Australia, is what I was told, so I would like to
25 find out, if you could get back to me, I signed in on

20

1 the mailing list, you can get back to me about how
2 those tests come out, what -- how it moves forward
3 from there. I'm curious as to why it was -- why the
4 types of tests in Australia and whether -- you know,
5 you said you did all this consultation with the
6 tradition -- the native people here, but did you
7 consult with the aboriginal people there? That's just
8 another question of mine I'm curious about.

9 And I think -- okay. I asked about the
10 water. I asked about the tribal reps. The mission --
11 I think that's just about all my questions and, you
12 know, I realize you all have worked very hard for the
13 last few years to put this thing together, and I look
14 forward to reading it and seeing what comes out of it.
15 I noticed in your images you were showing you had
16 these solar-powered satellites, and I thought that was
17 great.

18 I am way more supportive of solar-powered
19 satellites, solar-powered technology, than of things
20 like the Cassini Probe, which was a nuclear power.
21 That's all I had to say. Thank you very much. I look
22 forward to hearing from you. We can talk afterwards
23 or you've got my name on the mailing list.

24 MR. WRUBELE: All right. Excellent. Thank
25 you very much. Yes, sir, back to the back row again.

21

1 Please state your name for the stenographer.

2 MR. HASSELMAN: Yes. My name is John
3 Hasselman, district representative for the Operating
4 Engineers Local 12 in Las Vegas, and I'm also
5 vice-president of Southern Nevada Building Trades. I,
6 rest assure you, we have a skilled work force at the
7 building trades, and we look forward to working with
8 the Kistler folks in the construction phases of it.

9 Any time you would like to come out and join
10 us like UNLV did and tour our training facilities,
11 where we train our apprentices and do our retraining
12 of our journeymen, but with that, we look forward to
13 working with the Kistler folks and being a test site
14 worker myself. We certainly appreciate that projects
15 are coming to the Nevada Test Site. Thank you.

16 MR. WRUBELE: Thank you. Anyone else?
17 Anyone from the front? Back to the middle? Second
18 chance. And don't forget, if you don't wish to speak
19 tonight, you can always -- you have until May 22nd to
20 put in your comments, in written form.

21 So we've come to the end of the agenda, and
22 so Nick, as far as you're concerned, are we finished
23 for the evening? Okay. Thank you on behalf of FAA

24 and these gentlemen at the front table for coming. We
25 will see you next trip.

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Full, true and accurate transcription.

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MONICE K. CAMPBELL, CCR #312

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APPENDIX C – COMMENT CHARACTERIZATION

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