

HEALTH CONSULTATION

Evaluation of Potential Exposures from the Fallon JP-8 Fuel Pipeline

FALLON NAVAL AIR STATION

FALLON, CHURCHILL COUNTY, NEVADA

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

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INTRODUCTION

Statement of Issues and Purpose

The identification of a larger than expected number of childhood leukemia cases in Fallon, Nevada, has caused residents to be concerned about the possibility that exposure to chemicals in the environment may be associated with this illness cluster. One of the concerns raised is whether certain components of military jet fuel, specifically jet propellant (JP)-8, might be responsible for the leukemia cluster. Naval Air Station Fallon (NASF) is an aircraft weapons delivery and tactical air combat training facility, located approximately six miles southeast of the city of Fallon. JP-8 is used by aircraft at NASF.

Based on this community concern, the Agency for Toxic Substances and Disease Registry (ATSDR) has prepared this health consultation to evaluate whether jet fuel releases are likely to have occurred along the pipeline, and to then determine whether people might be exposed to this fuel at levels that may be harmful. ATSDR has also compared the toxicity of specific constituents of JP-8 military jet fuel with other military jet fuels, commercial aviation fuels, and regular gasoline. ATSDR has released this comparative toxicity assessment between different fuels in a public health assessment for Naval Air Station Fallon.

Kinder Morgan Energy Partners (KM), which operates natural gas and fuel pipelines across the United States, owns the Fallon pipeline. To investigate whether leaks may have occurred, ATSDR gathered information and, in November 2001, conducted a site tour of the Fallon pipeline starting at the KM Reno/Sparks terminal and ending at NASF. This health consultation will answer the following question:

- Do jet fuel releases from the Fallon pipeline pose a past, present, or future public health hazard?

ATSDR's health consultations provide information on a specific public health issue or concern related to possible human exposure to toxic materials or contaminants. This health consultation includes information on the following: (1) Fallon leukemia cluster site description and history; (2) the history of the pipeline; (3) the operation, maintenance, and monitoring of the pipeline; (3) ATSDR's site visit and visual inspection; (4) the potential pathways for human exposure from the pipeline; and (5) ATSDR's public health conclusions and/or recommendations and future actions based on the available information.

Site Description and History

In July 2000, the Nevada Department of Human Resources, Nevada State Health Division (NSHD) identified an increase in the incidence rate of leukemia in children for Churchill County,

Nevada. A majority of the leukemia cases have been identified within the city of Fallon, located within Churchill County. Fallon is the largest population center in the county with approximately 7,540 residents. Approximately 23,980 people live in the surrounding unincorporated parts of Churchill County, which includes just under 4,930 square miles of land (US Census Bureau 2000).

In response to this unexplained increase in leukemia, resources from local, state, and federal agencies were mobilized to provide scientific and technical expertise in hopes of better understanding the cause of the leukemia cluster. In March 2001, the state of Nevada requested ATSDR to assist the local and state health and environmental agencies in evaluating historical contaminant releases and potential exposure pathways, and investigating the potential for environmental factors to contribute to the increase in leukemia within Churchill County. As part of the agency's efforts to assist NSHD, ATSDR has attended meetings in Fallon, participated in public availability sessions, conducted site visits within Churchill County (e.g., NASF and Fallon pipeline), met with state agencies (e.g., NSHD and Nevada Division of Environmental Protection [NDEP]) and gathered information about potential environmental exposures, and recorded community environmental health concerns. During these site visits and discussions with members of the community, ATSDR discovered that residents were concerned about possible jet fuel releases at NASF and leaks along the Fallon jet fuel pipeline. This document looks in detail at the possibility that jet fuel has been accidentally released from the pipeline. ATSDR has also compared the toxicity of specific constituents of JP-8 military jet fuel with other military jet fuels, commercial aviation fuels, and regular gasoline. This comparative toxicity assessment is included in the public health assessment for Naval Air Station Fallon.

BACKGROUND

History of the Fallon Pipeline

The Fallon pipeline was constructed in 1957 and has been owned and operated by KM since March 1998, when KM acquired Santa Fe Pacific Pipeline Partners. The 63-mile pipeline transports military jet fuel from the KM terminal in Reno/Sparks, Nevada, to NASF. JP-8 fuel has been delivered to NASF via the pipeline since October 1993. Prior to this, JP-5 fuel was delivered to NASF. The 6-inch steel pipeline is entirely underground

What is JP-5 and JP-8?

JP-5 and JP-8 are shorthand for jet propellant-5 and jet propellant-8. These products are used by the military as aircraft fuels. Both of these jet fuels are colorless liquids made up of many different substances. The largest constituent by far is kerosene, which makes up more than 98% of the total volume for both JP-5 and JP-8.

Other substances which make up a very small fraction of JP-5 and JP-8 fuels include benzene, toluene, ethylene, and xylenes. JP-8 generally contains less benzene than JP-5. Regular automobile gasoline typically contains more benzene than the kerosene based jet fuels (i.e., JP-5 and JP-8).

JP-8 and other commercial jet fuels are chemically identical, except for specific performance additives such as icing inhibitors, anti-static compounds, and corrosion inhibitors.

and is buried to an average depth of 4 to 6 feet below the ground surface. The pipeline is single walled with some portions surrounded by a casing to protect it from railroad and vehicle crossings. The U.S. Department of Transportation (DOT) oversees the operations, maintenance, and monitoring activities for the pipeline. DOT's Office of Pipeline Safety inspects the pipeline on a routine basis (usually every 1-3 years) and KM is required to maintain detailed records on its operations, maintenance, and monitoring activities (KM 2001b).

Operation, Maintenance, and Monitoring of the Pipeline

The Fallon pipeline is a small portion of a 3,300 mile product pipeline system that transports gasoline, jet fuel, and diesel fuel across several western states. The Fallon pipeline segment has transported an average of 33 million gallons of jet fuel per year over the last 10 years. The pipeline is monitored 24 hours a day, seven days a week by personnel at the Reno/Sparks, Nevada, terminal. An electronic surveillance computer system, referred to as Supervisory Control and Data Acquisition (SCADA), collects and stores data along the entire extent of the pipeline (e.g., pressure, volume, flow rate, and operational status of valves and pumping equipment). SCADA displays information in real time and KM personnel on duty at the Reno/Sparks terminal are alerted by an alarm whenever operating conditions change.

KM has stated that routine monitoring procedures have not detected any leaks or releases from the Fallon pipeline since the company acquired it in March 1998. The DOT Office of Pipeline Safety (OPS) maintains a database of reported spills of 50 gallons or more, called the 30-day accident report data base, included in this would be any such releases from the pipeline. ATSDR received information from DOT on spills, accidents, or violations from 1970 to the present. According to these records, there have been no documented releases of 50 gallons or more in Churchill County since 1970 (personal communication with Linda Daugherty, DOT Office of Pipeline Safety, May 21, 2002). Further, there no reported spills of any size according to the OPS national response center telephonic database, which documents spills of any size as reported by any reporting entity, such as U.S. EPA, state regulatory agencies or local emergency response programs (personal communication with Linda Daugherty, DOT Office of Pipeline Safety, May 21, 2002).

One incident did occur at NASF, however, during a maintenance operation to transfer JP-8 fuel from the pipeline to a truck. In December 1998, during a routine transfer of JP-8 fuel, a hose connection fitting broke loose releasing up to 40 gallons of jet fuel to the ground. The contaminated soil was removed immediately and disposed according to approved standard procedures (KM 2001a; 2001b).

As a result of routine maintenance, approximately 10 miles of pipeline have been replaced. According to KM representatives, the replacement activities were preventive in nature and not the result of a failure in the structural integrity of the pipeline. In addition, minor repairs to the

pipeline were conducted following an inspection of the line in 1997, prior to the purchase by KM. The results of the 1997 inspection did not indicate the presence of any leaks or damage to the pipeline (KM 2002).

There are several routine procedures and technologies employed to ensure the safety and integrity of the Fallon pipeline and to protect communities in close proximity to the pipeline (personal communications with Girard Gonyeau and Eugene Braithwaite, KM. November 15, 2001; KM 2001a; 2001b). These procedures are listed below:

- Pipeline Protection

- A cathodic protection (CP) system is being used to protect the pipeline from external corrosion through the use of an electrostatic current. The CP system applies a small negative electrical potential to the pipeline, which is designed to reverse the corrosion process and reduce the rate of corrosion of the metal. A network of checkpoints (Electronic Testing Stations) have been placed along the pipeline and are routinely monitored (bi-weekly).

- Block valves have been placed at eight points along the pipeline. The valves are designed to protect the pipeline in case of an accident or emergency and will prevent fuel from being transported past the shutoff (block valve) points. The frequency of block valves, activated by the monitoring system placed along the pipeline increases in populated areas.

- Inspections

- Visual inspections are routinely (at least bi-weekly) conducted by air and/or ground to check for possible leaks or suspicious activity along the pipeline. During aerial inspections, the pilot records any activity near the pipeline that could potentially impact the integrity of the system. Any reports of unusual activity are investigated by KM personnel on the ground. The pilot also checks visual indicators on CP equipment to confirm that the system is operating.

- KM personnel on the ground work along the pipeline on a daily basis performing routine maintenance activities and reporting unusual activity.

- Internal inspections of the pipeline are conducted every 3-5 years using computerized equipment, referred to as “smart pigs”, which are mobile remotely operated devices that are run through the pipeline. This technology is used to transmit data about the condition of the pipeline (e.g., to confirm the wall thickness of the pipe).

- Public Outreach, Education, and Emergency Planning

- KM has a public education program in place to protect against third-party damage to the pipeline. Information about the pipeline is mailed out every two years to residences and businesses within 1/8 mile of the pipeline.

- KM has an emergency preparedness plan in place in the event of an incident and works closely with local emergency response organizations.

In addition to the routine pipeline monitoring, additional monitoring activities have been recently implemented as a result of concerns about possible links between the childhood leukemia cluster and exposures to JP-8 fuel from the pipeline. These concerns have resulted in the following activities:

- In June 2001, the NDEP conducted an inspection of a 4-mile span of the Fallon pipeline. The walk began on Coleman Street on the west end of Fallon and ended just north of the wastewater treatment plant on the east end of the city. The purpose of this inspection was to look for any visible signs or odors that may be suggestive of fuel releases along the line. According to the inspection report, there was no evidence of leaks from the pipeline (NDEP 2001).
- KM also contracted with the Tracer Research Corporation to perform a special procedure, referred to as “line tightness test,” of the pipeline. The purpose of this test is to detect any releases of tracer-labeled fuel greater than 0.5 gallons from the pipeline, which is the limit of the test’s sensitivity. The test is performed by adding a leak-indicating chemical referred to as a “tracer” to the JP-8 fuel. The procedure was applied to the last 15 miles of the Fallon pipeline. The test was conducted in July 2001, in response to community concerns about the childhood leukemia cluster (TRC 2001). A copy of the Tracer Report is included as Appendix A.

Samples were collected from a total of 110 points along the pipeline by drawing air through sampling tubes while passing over the ground surface above the pipeline. Duplicate samples were collected from each sampling point. Information about each sample, including a unique sample identification number, start and end time, starting and ending longitude and latitude, and any comments about the sample, were recorded using a handheld computer (TRC 2001). NDEP oversaw the sample collection activities to provide an additional measure of assurance that the sampling protocol was being followed.

According to the results of the test, no significant levels of the test tracer were detected in any of the valid samples. A small number of samples were discarded during the investigation because it was determined that the samples contained “non-site related tracer gas.” This is explained in more detail in the Tracer report (Appendix A). The report concluded that there was no evidence of a product release from the 15-mile stretch of pipeline that was tested (TRC 2001).

- As part of the childhood leukemia investigation, the United States Geologic Survey (USGS) has collected groundwater samples from 11 monitoring wells within 1000 feet of the pipeline. Preliminary test results showed that one well contained trace levels of fuel-related contaminants (e.g., ethylbenzene, isopropyl benzene, 2-ethyl toluene), well below levels associated with health effects. However, the source of contamination from this well is believed to be an asphalt manufacturing plant and not the pipeline. According to USGS, the plant is no longer in business and the supply well is not being used. No other fuel-related contaminants were detected from the remaining samples (Correspondence with Ralph Seiler, USGS, December 26, 2001).

ATSDR Site Visit and Visual Inspection

During the November 2001 site visit to KM’s Reno/Sparks terminal, ATSDR and a representative from the Navy’s Environmental Health Center met with KM representatives and toured the fuel tank facility. The Regional Director of Operations and the Area Manager for the Reno/Sparks terminal provided an explanation of the day-to-day operations for the pipeline, demonstrated how JP-8 fuel was received at the terminal, and explained how JP-8 additives (i.e., the static dissipater and icing inhibitor) are mixed in with the military fuel prior to leaving the Reno/Sparks terminal.

The site visit also included a visual inspection of the ground surface above the pipeline at several different locations in Fallon. During the visual inspection, KM personnel referenced specific items of interest associated with the pipeline, including casing vents and test points. These items are briefly described below:

- *Casing Vents:* Small segments of the Fallon pipeline near railroad or vehicle crossings are protected by a metal casing. The casings have vents that allow condensation to evaporate from the case walls. The vents are not openings in the pipeline where jet fuel product or vapors can be released.

- *Pipeline Test Points:* There are a number of test points where a straight pipe comes up above ground from the pipeline. The test points allow KM workers to electronically test the integrity of the pipeline. The test points do not penetrate the pipeline so that there is no opportunity for venting or leaking of jet fuel.

DISCUSSION

The Fallon pipeline begins in Reno, Nevada, and runs underground until it reaches its end terminal at NASF (Figure 1). The 63-mile stretch of pipeline is not in close proximity to many population centers. The most densely populated areas that are closest to the pipeline are the cities of Fernley and Fallon. Fernley, which has a current population of 8,500, is approximately 30 miles from the Reno terminal. Fallon, which has a current population of just over 7,500, is located close to the end of the pipeline. A large portion of the pipeline follows closely along the path of the Southern Pacific Railroad and Interstate 80 (US Census Bureau 2000).

In the city of Fallon, the pipeline runs near several residential areas and comes in close proximity to the Northside Middle School (approximately 1,000 feet). Prior to entering NASF property, the pipeline runs underneath a church parking lot and a small portion of the E.C. Best School. The pipeline also runs adjacent to several commercial buildings in the vicinity of NASF. Other than the areas noted above, the pipeline generally runs along Interstate 50, which is either not developed or primarily zoned for commercial use.

Potential exposures from JP-8 fuel could occur if there were leaks in the pipeline or unintentional releases. The most likely pathways of exposure (i.e. how people could come in contact with jet fuel) would be from groundwater contamination, exposure to contaminated soil, or from inhalation of jet fuel vapors. However, based on review of that data, routine monitoring by KM and visual inspections of the pipeline by NDEP and ATSDR, no evidence of any soil contamination along the path of the pipeline was found. Based on discussions with a representative from DOT's Office of Pipeline Safety, the Fallon pipeline has not had any reports of violations for the period from 1970 to the present, and is in full compliance with DOT's maintenance and monitoring requirements. According to the Office of Pipeline Safety's records, the Fallon pipeline is due to be inspected this year (Personal communications with Claude Allen, Staff Engineer, DOT's Office of Pipeline Safety. January 11, 2001).

Preliminary results from USGS sampling of 11 groundwater wells within 1000 feet of the Fallon pipeline do not indicate contamination related to jet fuel releases or leaks. Routine air monitoring and soil sampling have not been conducted along any portions of the pipeline to date. However, during both the ATSDR visual inspection of several points of interest along the pipeline and NDEP's 4-mile walk along the pipeline path, there were no visible soil stains, sheens on water, or characteristic hydrocarbon odors.

Evaluation of Potential Exposures from the Fallon JP-8 Fuel Pipeline

Based on the information provided in this health consultation, ATSDR does not consider the Fallon pipeline to pose a current or future public health hazard. Information on the pipeline from 1970 to the present was evaluated. For that period of time, the pipeline does not present a past health hazard.

This public health determination is based on several factors: (1) the pipeline is completely underground and not directly accessible to residents; (2) throughout the operating history of the pipeline, there have been no reported releases or leaks along the pipeline other than the one incident during a transfer of jet fuel to a truck that occurred in December 1998 at NASF; (3) monitoring of the pipeline conducted by KM (e.g., Tracer Test, Smart Pig) has not identified any releases or leaks of JP-8 fuel since 1998; and (4) visual inspections by ATSDR and NDEP did not identify any unusual odors, sheens, or stains in close proximity to the path of the pipeline.

In addition, much of the pipeline runs along unpopulated stretches of highway or along streets that are primarily zoned for business or industry. There is no evidence that the Fallon pipeline has leaked or is leaking. If a leak were to occur, there are multiple safeguards in place to ensure KM would be notified and the leak attended to immediately. ATSDR considers it highly improbable that any community health concerns, including childhood leukemia, are related to the Fallon pipeline.

CONCLUSIONS

- ***The Fallon pipeline does not pose a current or future public health hazard. Information regarding the pipeline was evaluated from 1970 to the present. Based on the information provided, the pipeline did not pose a past public health hazard during that time period.***

PUBLIC HEALTH RECOMMENDATIONS

- ATSDR does not recommend any public health actions at this time

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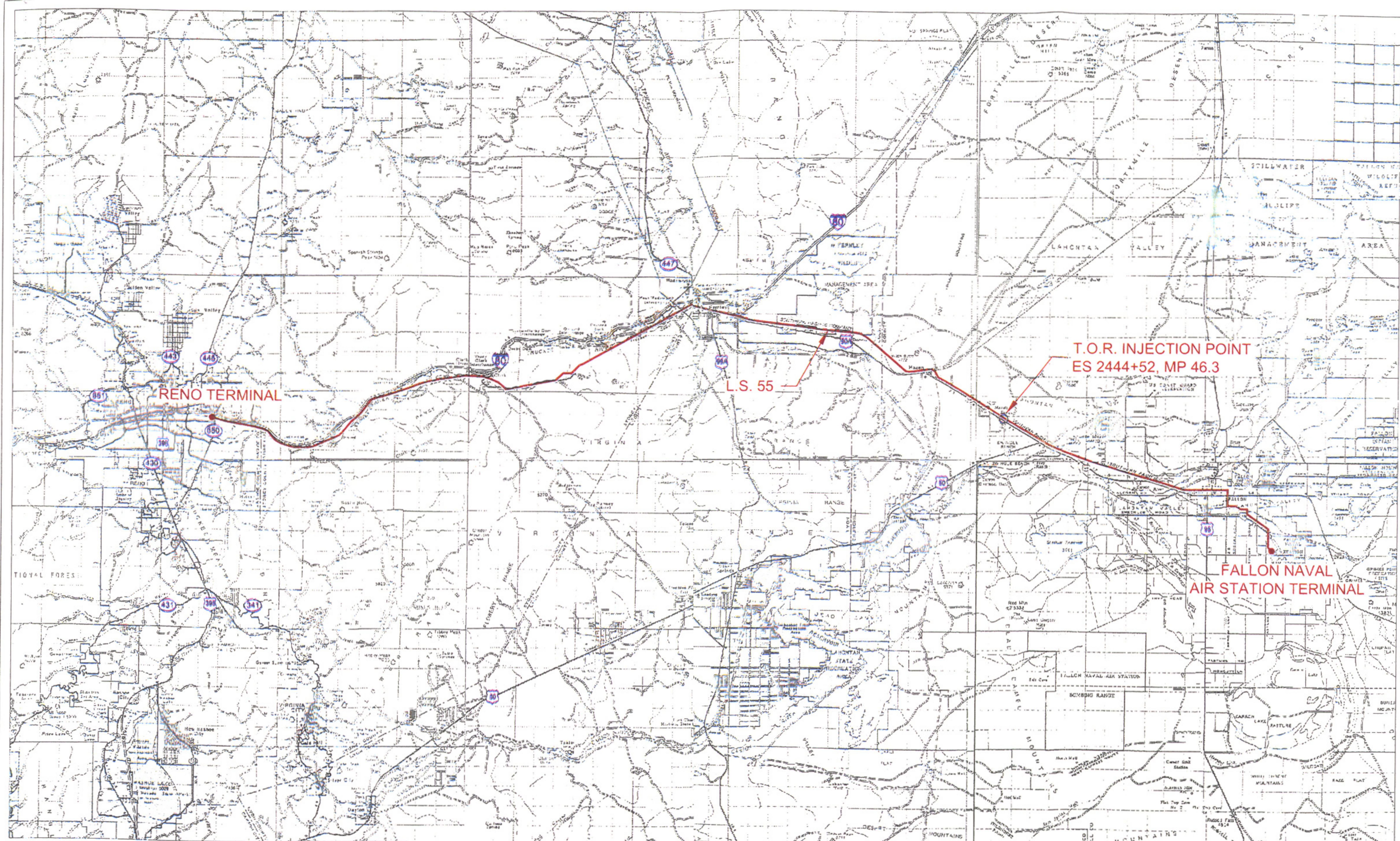
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FIGURE 1



RENO TERMINAL

L.S. 55

T.O.R. INJECTION POINT
ES 2444+52, MP 46.3

FALLON NAVAL
AIR STATION TERMINAL

REV	DATE	DESCRIPTION	BY	CHK	APV	MGR



SFPP, L.P.
RENO TERMINAL TO
FALLON N.A.S. TERMINAL
LINE SECTION 55

RECORD DRAWING NUMBER
SK-55-01
CADFILE/MODEL:
DATE: 05/31/01 BY: BJZ