



***Southern Inyo Fire  
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## **Hazardous Materials Commodity Flow Study for California State Routes 127 and 178**

### **Executive Summary**

**September 2006, Revised December 2006**

This study was funded by a California Hazardous Emergency Preparedness Grant and conducted for the Southern Inyo Fire Protection District by HOME: Healing Ourselves Mother Earth, a §501(c)(3) nonprofit research and education corporation. HOME's mission is to make information about hazards to health and habitat accessible and understandable, particularly for impacted rural communities.

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## Executive Summary

The purpose of this study is to define risks to the public and Emergency Responders from the transportation of hazardous materials within the Southern Inyo Fire Protection District (SIFPD). The SIFPD provides volunteer fire, ambulance, rescue, and limited hazardous materials response within 1,250 square miles that includes more than 100 miles of highway in southeast Inyo County, California. The district is bordered by Death Valley National Park on the west, San Bernardino County, California, to the south, and Nye and Clark Counties in Nevada to the north and east.

The district is challenged by a large rural sparsely populated area, minimal communications infrastructure, extreme temperatures and seasonal flash floods, with no designated alternative routes. To adequately protect the public and district personnel and to utilize limited public funds most effectively, the SIFPD determined that further characterization of traffic patterns and categories, particularly hazardous materials, was required. This report may be used to develop future emergency response plans, evaluate equipment and staffing needs, and augment training with accurate data. On a regional scale, hard data about traffic and road use patterns will be helpful in developing plans and agreements between the SIFPD and other agencies.

**The Study Area:** The primary routes within the district are California State Routes (SR) 127 and 178. Three other routes within the district, the Old Spanish Trail Highway, Highway 190, and State Line Road are not used significantly for commercial transportation. SR 127 is the primary north-south corridor for multiple categories of traffic, including hazardous materials. Since the majority of travelers on SR 127 are visiting Death Valley National Park, SR 127 is considered to have local, regional and national significance. SR 127 is used by trucks going to and from both facilities described above, and is also the shortest north-south route between Interstate 15 and access to western and central Nevada via Highway 95.

SR 178 links Shoshone and Furnace Creek in Death Valley National Park to the rapidly growing town of Pahrump, Nevada, now 40,000 people. It intersects with SR 127 in Shoshone. SR 178 is also used by a significant number of truck deliveries of consumer goods, bulk commodities, and building and landscaping materials traveling from Interstate 15 in the south to Pahrump.

There are no railways, waterways, pipelines or other modes of transportation within the district. No hard rock mines are currently operating in the district, although significant through traffic originates at the volcanic cinder mine in Amargosa Valley. There is a small airport in Shoshone used by private craft and helicopter emergency medical evacuations, but the nearest commercial airport is McCarran International in Las Vegas, 87 miles away. Businesses are limited to a museum, gas station, a restaurant and café in Shoshone, China Date Ranch in Tecopa, and eight small hotel or campground tourism facilities in either location, in addition to Death Valley National Park's campground, shops, hotel and golf course. Two gas stations within the Park are resupplied via SR 127 and SR 190. The school district maintains three campuses, in Shoshone, Tecopa and Furnace Creek, and refuels its buses at the Shoshone Inyo County Road Dept. Yard. Other public services include the Death Valley Health Clinic in Shoshone, the Shoshone Caltrans station, the Sheriff Dept. and BLM Shoshone substation, and the SIFPD Tecopa Station. SIFPD also refuels at the County Road Dept. Yard.

The Amargosa River crosses back and forth underneath SR 127 and generally parallels the road from the northern district border to Tecopa. Given the sudden nature of flash floods and the alluvial gravel fill on which most of the road beds are laid, rapid damage to roadways and

undercutting is a serious problem. Combined with the lack of turn-outs, passing lanes, rest stops or alternative routes, the possibility of stranded or damaged vehicles is a very real one. The river bed is normally dry along most sections, but flash floods present regularly recurring problems at crossings when existing channels fill to capacity. In recent years, flood damage to SR 190 and to Old Spanish Trail Highway caused road closures for months and required extensive rebuilding. The Caltrans Route 127 Route Concept Report states that "On average, such flooding occurs twice a year, causing considerable damage to the pavement surface and supporting roadbed, and results in road closures for sustained periods once every two years."

**Study Methodology:** All data presented in this report, unless otherwise identified, is hard data collected by direct observation within the study area over a three month period, between April and June, 2006. A total study sample of 13,356 vehicles was recorded, including 1,518 tractor trailer trucks. Due to the lack of significant commercial or agricultural enterprises in the region, little useful information could be gleaned from existing commodities databases. Even hazardous materials information sources do not offer a lot of information about hazardous wastes, which are of primary concern. We were also unable to canvass drivers or examine documents, and there are no access points such as truck stops, rest stops, turn-outs or weigh stations within the study area. As a local organization, we were in a good position to collect hard data through direct observation and recording, and to conduct interviews with professionals and business owners who live and work in the study area. Since recording detailed observations about moving vehicles is challenging, we developed a careful system involving photography, good training and easy but detailed reference materials for survey staff. We used four main survey sites in Shoshone surrounding the SR 127/178 southern intersection, and two others along SR 127 for one time each. Data was also compared to a previous county survey in 1994 that was able to ask drivers questions about points of origin and destination.

**Identified Hazardous Materials Points of Origin or Destination:** Two disposal facilities for hazardous and radioactive materials are located in Nevada directly north of the district, with the most direct route from the south and west being through the district.

1. The Nevada Test Site receives shipments of radioactive Low Level Waste (LLW) materials from mandated environmental restoration programs at nuclear weapons design and production facilities all over the US. One of two federally designated southern routes to the Nevada Test Site is through the district. This route was also used exclusively by forty eight trucks carrying transuranic wastes from the Nevada Test Site to the Waste Isolation Pilot Plant in New Mexico, between January, 2004, and November, 2005. Our survey did not observe any placarded radioactive shipments, but NTS reports that 46 LLW shipments traveled SR 127 between January and September, 2006.
2. The U.S. Ecology Nevada hazardous materials disposal facility in Beatty, Nevada receives a wide range of hazardous liquid and solid materials from the petroleum and other industries as well as environmental restoration firms, for burial, thermal treatment, and occasionally, transfer for treatment elsewhere. US Ecology Nevada increased its volume of total production-related wastes by 390% between 1998 and 2002, from 1,591,260 to 6,201,699 pounds, according to reports filed with the EPA.

Materials listed for treatment in their Nevada Dept. of Environmental Protection permit include: Solvents, Pesticides, Chlorinated Hydrocarbons, Reactives, Inorganic Acids/Bases, Metals, State Regulated Wastes, Labpacks, Containerized Soils, Contaminated Soil-Remediation Waste, Contaminated Liquids, and "any other waste that will be stored, treated, and disposed at US Ecology which originates from a wide

variety of sources including industrial and environmental remediation waste. Any residues or wastes that cannot be disposed or treated onsite must be shipped to an off-site permitted treatment or disposal facility.”

Three fireworks businesses in Pahrump, Nevada, are another regular source of hazardous materials shipments, and the only type routinely using SR 178 besides fuel and carbon dioxide deliveries. Although it is illegal to own or use fireworks in Pahrump, it is not illegal to sell them. They must be transported out of the area within 24 hours after purchase. The fireworks are shipped from southern California ports in intermodal containers on flat-bed trucks or in box trailers, legally placarded as Class C Explosives, 1.4G. After purchase, they are transported by individuals in box trucks and campers right back across the border in illegal, unpermitted, unplacarded loads.

With the rapid rise in wildfire management and law enforcement costs, California has adopted a zero tolerance policy for illegal fireworks. When possible, illegal shipments are stopped and confiscated. In 2006 alone, 46,000 pounds of illegal fireworks were confiscated from 90 vehicles on SR 127, with a purchase value of around \$200,000 and potential street resale value upwards of \$1 million, according to District Chief Paul Postle. Working with Inyo County Sheriff's Deputy Dave Vaulet, around 25% of SIFPD response incidents and 75 staff hours through July 31<sup>st</sup> involved fireworks confiscations. This is in addition to time spent transferring, storing or disposing of fireworks. Fireworks debris has been identified at local vegetation fires as well.

**General Traffic Summary:** Out of a total survey sample of 13,356 vehicles, passenger cars comprised 70%. Tractor trailer trucks were the next highest category, at 11%. Tour buses and recreational vehicles of all sizes comprised 6%, motorcycles and all government vehicles each 5%, and small (non-semi truck) commercial vehicles comprised 3%. The low number of commercial vehicles reflects the small number of businesses in the district, and most vehicle signage observed was for home services, such as carpet cleaning, window installation for home and auto, prepared food delivery, and package delivery services.

Passenger vehicles averaged 52.16 per hour, all semi trucks 8.45 per hour, tour buses and recreational vehicles 4.64 per hour, motorcycles 3.5 per hour, government vehicles 3.4 per hour, and small commercial vehicles averaged 2.21 per hour. Generally, we observed a slight rise in most categories in the afternoon from the morning figures, except for somewhat fewer trucks. At night, the recorded volume was about one third of daytime traffic. As expected, there was very little government, commercial, motorcycle or recreational vehicle traffic at night. After midnight and on Sundays, the only trucks were milk tankers, which run around the clock.

The months covered by our traffic survey, April through June, did not allow for projections for year-round traffic, but did record significant change as the weather warmed up. Generally, we observed that the level of U.S. tourists and seasonal winter residents drops off significantly starting at the first of April. Vacationing European tourists visit the area briefly during June, July and August, some on organized motorcycle or bus tours. However, there is an overall drop of 45% in traffic between April and June. Government vehicles drop by 47%, largely because of the close of school. RVs drop by 81%, commercial by 56%, passenger vehicles by 42%, and motorcycles by 31%. Trucks, however, only drop by 14%.

**Truck Traffic Summary:** In this survey, a total of 1,518 trucks were recorded. 62% of all truck traffic in the study area traveled exclusively north and south on SR 127. The remaining 38% also traveled to or from Pahrump, Nevada, on SR 178. Other than local deliveries or stops at

the Shoshone store or café, no trucks that traveled on SR 178 traveled on SR 127 north of the Shoshone intersection. Any trucks wishing to access the northern portion of SR 127 to connect with SR 190 or Highway 95 in Nevada would likely use State Line Road from Pahrump to Death Valley Junction. There are no active points of destination or origin between Shoshone and Death Valley Junction. All trucks traveling SR 178 in either direction also traveled the southern portion of SR 127, between Shoshone and Baker, entering or exiting the district.

From our total truck sample, 119 trucks, 7.3% of the total, were placarded as hazardous material. 326 additional trucks, 22.6%, were designated by trailer type or carrier name as "Identified Hazardous Waste" (IHW) trucks traveling to or from the US Ecology facility. As stated above, only northbound trucks are likely to carry hazardous materials. The combination of these two categories of identified hazardous materials trucks was a ratio ranging from 26% to 35% over the three month study period, averaging almost 30%. 233 trucks, 15.8% of the total, were bulk milk tankers traveling to or from the Ponderosa Dairy in Amargosa Valley. This left 840 trucks, 54.2% of the total, engaged in other commerce. We believe that our estimate of IHW trucks is conservative, and that the volume of unplacarded hazardous materials on SR 127 is likely 10-15% higher than reported here.

When we include direction of travel, we observe an anomaly: notably more trucks going south than north on SR 127. Even though the great majority of trucks traveling on SR 127 were traveling round trip to and from the US Ecology facility, the Amargosa Valley cinder mine, the Ponderosa Dairy, or making gasoline deliveries to and from Death Valley National Park, 27% on average traveled north, and an average of 35% traveled south. One possibility, since we observed some trucks from environmental cleanup firms with eastern US addresses, is that trucks returning home empty from deliveries to the Nevada Test Site are no longer required to use the designated route, and may find the southern route more direct. The amount of truck travel to and from Pahrump on SR 178, 18% north and 20% south, is more consistent.

The total volume of trucks within the study area, on both SR 127 and SR 178, averaged 8.45 vehicles per hour. All combined placarded hazardous materials trucks traveled at an average rate of one every hour and a quarter, or .66 vehicles per hour. That is one half the volume of the milk tankers, which averaged 1.3 per hour. Additional IHW shipments not requiring placarding traveled SR 127 at the rate of three to every one placarded vehicle.

The number of trucks per hour changed significantly at different periods of the day. The total number of trucks per hour dropped 23% between morning and afternoon, from 11.03 to 8.48 trucks per hour. The change between morning and night trucks per hour was 69.4%, dropping to 3.37 trucks per hour. Different categories of trucks changed at different rates. Placarded hazardous shipments dropped around 76% between morning and night, to .20 trucks per hour, and IHW shipments and all other trucks dropped by around 70%, averaging .55 and 1.84 trucks per hour, respectively. Milk tanker trucks dropped by only 47.6%, still averaging more than one truck every hour and a half through the night.

Between April and June, we noted an overall seasonal drop of 14% in trucks per hour, significantly less than the 45% drop in all traffic combined. The truck per hour rate of placarded hazardous materials shipments dropped by 21%, and the IHW category dropped 38%. All other trucks also dropped during this period by 6%. The milk trucks were the only category to increase in trucks per hour during the survey period, by 8%.

**Placarded Hazardous Materials Traffic Summary:** We observed that 78% of all hazardous placarded vehicles traveled exclusively north or south on SR 127. Only 22% of placarded

trucks also traveled to or from Pahrump. Hazardous waste comprised 65% of all placards documented in the study, and almost 90% of all placarded loads traveling north on SR 127. Total numbers of placards below will not be identical to total number of placarded trucks reported, due to the fact that some trucks displayed more than one placard at a time.

North on SR 127: 95 of the total 130 placards recorded, or 73%. With the exception of 2 propane deliveries to Shoshone and 8 gasoline deliveries to Shoshone and points north, it is likely, based on placard type, that all placarded vehicles are carrying various types of hazardous waste to US Ecology.

South on SR 127: 7 out of 130 placards, or 5%. Five were returning fuel deliveries, and two were likely to be returning from the US Ecology facility with liquid tanks that had not yet been cleaned.

North on SR 127 and North on SR 178: Eighteen out of 130 placards, or 14%. Eight were fireworks deliveries in van trailers or intermodal containers, six were propane trucks, either Shoshone Propane or large delivery tankers, and 2 were carbon dioxide refrigerated gas tankers. (NOTE: Shoshone Propane Co. trucks were the only placarded vehicles that were not always large trucks.)

South on SR 178 and South on SR 127: Ten out of 130 placards, or 8% of the total. Eight were propane trucks, either local Shoshone Propane or large deliveries returning from Pahrump. Two were either diesel or fuel oil tankers.

**Hazardous Materials Placarding Considerations:** The transportation of hazardous materials is governed by the federal Hazardous Materials Regulation (HMR), 49 CFR, Parts 171-180. The HMR covers five main areas: hazardous materials definitions and classification, hazard communication, packaging requirements, operational rules, and training. Vehicles transporting any quantity of explosives 1.1, 1.2, or 1.3, Poison Gas 2.3, Dangerous When Wet 4.3, Organic Peroxide 5.2, Poison Inhalation Hazard 6.1 or Radioactive Materials III must display placards. This includes trace amounts (such as a returning empty tanker that has not been thoroughly cleaned). However, there are a number of conditions which could occur within the fire district in which no placard or an ambiguous placard is used, which creates a significant potential hazard for First Responders.

If two or more different hazard classes are being transported on the same truck in amounts each totaling more than 1,000 pounds but less than 5,000 pounds, the "Dangerous" placard may be used instead of the specific hazard class placards. This placard is also used for individual shipments of Explosives C or Irritants.

No placard is required on shipments of radioactive materials, combustible liquids in containers of less than 110 gallons, etiological agents, Otherwise Regulated Materials (ORM) and small hazardous loads which total less than 1,000, excepting those specifically listed above under "Always Placarded". This could be a problem for First Responders with a majority of the hazardous waste shipments to the US Ecology facility, which were either placarded with a very broad category or, more often, not placarded at all. Also, many products to resupply the large supermarkets, garden centers and hardware and automotive stores of Pahrump may be traveling on the same truck. Significant quantities of solvents, cleansers, pesticides, herbicides and other chemicals could be very dangerous if combined in an accident scenario, even if below the 1,000 pounds required by HMR for placarding. For example, during the survey, Wal-Mart trucks were recorded almost every weekday, as were other unplacarded shipments from

automotive supply and hardware companies, which could contain a variety of incompatible and hazardous chemicals in quantities under 1,000 pounds.

**Observations about Recorded Placards:** Placards were recorded in all Classes of Hazardous Materials except Class 7, Radioactive Hazard. Many of the placard designations are either very broad, or indicate that more than one class of hazard is on board the vehicle, while offering no further detail. Sixty four placards indicated solid wastes of various kinds, and five more contained PCBs. Eighteen loads contained hazardous or corrosive liquids, some also acidic, some basic, and one toxic as well.

Grouping observed placards by hazard class illustrates further the lack of accurate information available about almost half of the placarded shipments observed. Sixty three shipments were grouped under the Miscellaneous Dangerous Substances Class 9 category, which sometimes may be due to multiple classes of hazardous wastes being shipped on the same truck. Forty nine were solids, 12 were liquids, and 2 were unknown. Of the rest, 8 were Explosives Class 1.4 (fireworks), 21 were Class 2 Gases (propane or carbon dioxide), 14 were Class 3 Flammable Liquids (gasoline or diesel), 5 were Class 4 Flammable Solids, 2 were Class 6 Poisons, 11 were corrosive liquids or solids, and 5 were PCB contaminated solids (listed separately here because of multiple characteristics).

Although little information is readily available about these transported hazardous wastes, they should be taken very seriously. In 2002, US Ecology treated 1,256,496 pounds of material on site primarily by thermal desorption. This process released 65,541 pounds of chemicals into the atmosphere, including Aldrin, Chlordane, Napthalene, various Benzenes, Disocyanates, and Methyl Ethyl Ketone, among others. The remaining solids were buried with other landfill wastes. EPA health effects listed for these chemicals include carcinogens, blood, developmental, reproductive, liver, kidney and other toxicants.

A total of thirteen different response protocols, as detailed in the 2004 Emergency Response Guide, are recommended for the placards recorded in the survey. Further study of these response guides may be helpful in evaluating SIFPD response capacity for potential hazardous material accidents in the future.

**Accident Characteristics of SR 127 and SR 178:** According to the federal Dept. of Transportation's Hazardous Materials Information System, of the 1,261 hazardous materials incidents in California in 2005, 1,100 of them involved truck accidents. These included the single fatality, all five hospitalization injuries, and seven of the eight non-hospitalized injuries. California ranked third in hazardous materials incidents and fifth in highway incidents, comparable to its ranking of third in overall hazardous materials truck transportation nationwide.

In June of 2006, the Inyo County Transportation Risk Assessment Project produced a report assessing mitigation and safety measures on SR 127 by E. J. Bentz and Associates. Accident analysis is for the period 4/1/2000-3/31/2005. We note that truck accidents on SR 127, are 21% of all traffic accidents, although our observed truck traffic is only 11% of overall traffic. Truck injury accidents are 13% of total injury accidents on SR 127, and the only fatality accident during this period was a truck fatality accident. These ratios are considerably higher than either Inyo County or California truck-to-general-traffic ratios. On SR 178, of the 21 injury accidents during the same time, there were no truck injury or fatality accidents. In addition, there was an airplane accident in January 2004. Small planes take off over SR 127 from the Shoshone

airport, which could potentially involve hazardous materials trucks on the roadway, in addition to the airplane fuel on board.

The Transportation Risk Assessment Task 5 report corroborated anecdotal information from our interviews with local law enforcement and emergency response personnel. The report states that:

- 12 out of 13, or 92%, of tractor trailer truck accidents on Inyo SR 127 in the last five years (2000-2005), were single-vehicle accidents.
- The dominant tractor trailer truck accident profile on Inyo SR 127 is going off the road after speeding or making an improper turn, resulting in overturning of the truck off the road.
- Two adjoining “hotspot” road segments [north of Shoshone] constitute 62% of all tractor trailer truck accidents. Over one half of all vehicle accidents involve tractor trailer trucks at milepost (MP) 17.0-17.99, and 80% of all vehicle accidents involve tractor trailer trucks at MP 16.0-16.99.
- Over the five year period, 5 accidents occurred in July, 2 accidents in September and one each in January, February, June, August, October and December.
- Truck accidents are highest Wednesday through Saturday, with Thursday and Friday being significantly higher than other days.
- Truck accidents were most common between 6:00 and 8:00 a.m., 5 accidents, with 2 accidents between 4:00 and 6:00 a.m., and 2 accidents between 2:00 and 4:00 p.m.. One other accident took place at night, 10:00 p.m. to midnight, and three were evenly dispersed during morning daylight hours, from 8:00 a.m. to 2:00 p.m..

**Local Response Capacity to Potential Hazardous Materials Accidents:** The Southern Inyo Fire Protection District has strengthened its capacity significantly in recent years, particularly since adding a full-time administrator, District Chief Paul Postle. However, the SIFPD- remains a volunteer fire and emergency service provider in a remote, very sparsely populated rural area that is bisected by a significant hazardous materials transportation corridor. For significant portions of 2005, no Inyo County Sheriff’s Dept. law enforcement officer was even stationed in the district.

These limitations are recognized and described by the Dept. of Energy as “extremely limited and remote emergency response capabilities” regarding radioactive shipments on SR 127. It is one reason why shipments are only allowed during certain portions of the year. Another reason given is the recognized flash flood season for the Amargosa River and tributaries.

An important next step, which is beyond the scope of this hazardous materials commodity flow study, would be further analysis of recommended emergency response protocols for the types of hazardous materials identified in this report as regularly passing through the Southern Inyo Fire Protection District. This could be followed by an equipment and training needs assessment and inventory for the district and other regional emergency response agencies, and possibly the development of an interagency long-term Emergency Response Plan. Such a plan should address possible road blockages from natural disasters or hazardous materials accident scenarios and the lack of alternative routes for emergency response and evacuation.