

A publication of the Arizona Governor's  
Office of Highway Safety  
Director Alberto Gutier

## Truth in Science

### Plans for the Future: By Looking at the Past

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Welcome to the third issue of the Arizona Police Science Journal. The Governor's Office of Highway Safety (GOHS) has continued to actively support this publication over the last two years since its inception.

In 2011, awareness of the APSJ has grown tremendously. The "Journal" has been presented to the National Highway Transportation Safety Administration and many Law Enforcement and Public Safety Agencies throughout the Southwest.

Numerous officers throughout the state have expressed their appreciation for training and updates, such as Case Law Review and Legal Updates, and technical scientific articles such as those provided by Dr. Rudy Limpert and the DPS Crime Laboratory. Much of this training and information is not easily accessible outside of the metropolitan areas in the state.

This issue is dedicated to the past, to the

very origins of the Drug Recognition Expert concept. The APSJ Editorial Staff hopes to highlight the birth of the DRE program, the agencies this program originated with and grew under, and the leadership and direction the Arizona Governor's Office of Highway Safety provides for these programs.

With any technical program such as DRE, quality assurance, program integrity, standards for initial and continuing education training, as well as a standardized and systematic approach are vital to success in training and court. Rule of Evidence 702 (Daubert) is here, and the stakes are high. The integrity and professionalism of our technical programs must be enhanced and highlighted. Under the direction of Director Alberto Gutier, GOHS continues to lead from the front.

Daven Byrd  
Executive Editor, APSJ

### The Birth of the Drug Recognition Expert Program

#### Sergeant Richard Studdard (LAPD, Retired)

When someone asks why I became interested in what became the Drug Recognition Expert Program (DRE), I tell them it started before I joined LAPD.

After spending three years in the army as missile crew man on a Nike site, I joined the California National Guard and worked full time on the Nike site in Torrance, California. I became close friends with one of the members of my crew and we decided that we would go into law enforcement. I worked on the Nike site for nine months and was accepted to attend the LAPD academy. Gary, my friend, also decided to join the LAPD and was

on the list to attend the academy six months after I was accepted. My first assignment was to Harbor Division and I spent several weeks working under cover, buying drugs from young dealers in San Pedro and Wilmington.

A narcotic officer taught our recruit class how to test for barbiturate influence and it was called "Barb Bounce". It is now called "Horizontal Gaze Nystagmus". Barbiturates were the drug of choice in 1960 and they were known on the street as "reds, yellow jackets, and rainbows". I became proficient at using "Barb Bounce" and arrested a number of sub-



jects for being under the influence of barbs. The only cases that went to court were juveniles and I was able to go to juvenile court and then qualify as an expert on barbiturate influence.

One night in November of 1960, my partner and I received a radio call to assist the traffic unit at an "ambulance TA" in Wilmington. When we arrived at the scene, I recognized the over turned car in the intersection as Gary's and Gary was pinned in the wreck. Gary was able to talk to me and I held his hand when he died. The other driver was not hurt and appeared to me to be impaired. He was a local known "gang banger". My supervisor sent me to make the notification to Gary's wife. I will never forget what the Sergeant said to me, "Your friend is only a few weeks from entering the academy and we consider him a member of the LAPD family". That was very tough on me as our families had done a lot of things together and his daughter was only one month older than my daughter.

After Gary's funeral, I met with the two traffic officers to find out what charges they had filed on the other driver. They informed me that there were no charges filed as the other driver was not under the influence of alcohol and they thought he was just shook up from the crash. There were no witnesses to the crash and they could not establish who ran the red light and caused the crash. A few months later, I received a phone call from a detective in Harbor division and he told me that the individual that was involved in the accident with Gary was killed in a drive by shooting.

I should have looked closer at the other driver and I may have been able to establish that he was impaired on drugs. I decided that I would not make that mistake again.

I was on the next transfer to 77<sup>th</sup> Division. Working in Watts and south central LA gave me a lot of field experience in the drug culture. In almost all of my arrests there were drugs involved. The only school for influence of drugs was the "Hype School" for identifying heroin users. I was able to attend that school and the rest of my early training came from my contact with users on the street.

In 1962, I was transferred to Wilshire Division and the same drug problems were there. I was able to

talk my way into the juvenile unit where they were doing a study of kids using inhalants. We would arrest the kids and they would get photos of the kids and a physical was conducted by a doctor. It was remarkable how the kids' physical and mental condition would change each time they were arrested.

By this time I had qualified in court on marijuana, heroin, cocaine, barbiturate, inhalants and alcohol impairment.

In the 60s and 70s the charge was "DRUNK DRIVING". The case was not filed unless the violator was a .15 BA or higher and many of the cases were reduced to a "WET" reckless driving charge. There was not a standardized exam for drunk drivers. Everyone had their own way of doing a field sobriety exam. One of the reasons for the lack of prosecution was the poor arrest reports. I saw many that didn't even cover the symptoms of intoxication. They were the "SAW DRUNK DRIVING-BOOKED SAME" reports.

In 1971 I was transferred to Traffic Enforcement Division and placed in charge of a driving under the influence squad on motors. At that time Lynn Leeds and I were the only ones that qualified in court on the seven classifications of drugs and we decided to call ourselves "DRUG INFLUENCE RECOGNITION EXPERTS" (DIRE). I don't recall when or why "INFLUENCE" was dropped, but we became "DRUG RECOGNITION EXPERTS" (DRE). There were narcotic experts who qualified in court as experts for heroin users only. Lynn and I were instructed by our Captains to start training other officers to be "DREs". By this time the only schools available for determining impairment by drugs were the "Hype" School and the PCP school. We sent officers to these schools and loaned them to Narcotics Division. Officers were sent through the DEA School in Los Angeles and loaned to undercover narcotic assignments for experience. Lynn Leeds and I would also have members of our teams work with us as we conducted drug evaluations on suspects. The officers seemed to respond to this "on the job training" (OJT) better than the classroom training. The certification training at the jails that is currently part of the DRE training is basically the same as the OJT training Leeds and I conducted prior to the first DRE School. Lynn Leeds received a medical retirement due to a bad heart in 1982 and died in 1995.

When the Standardized Field Sobriety Test study was started at Southern California Research Institute, (SCRI), Doctor Marceline Burns invited me and some of my team to participate in the study. The study was to develop a road side test to identify an impaired driver with a BAC of .10. As the study progressed, it became obvious that everyone tested with the Standardized Field Sobriety Test was impaired and unable to safely operate a motor vehicle at a .08 BAC.

The first DRE School was conducted in early 1980 funded by a grant for the California Office of Traffic Safety. The instructors were PhDs and MDs who were experts in their field. For example, Dr. Burns taught the marijuana class as she had conducted several studies at SCRI on marijuana and its impairment in driving situations. The agencies that attended the first school were members of LAPD, California Highway Patrol and the LA Sheriffs Crime Lab. We were required to video all of the classes for future schools. This school was a lot longer than present schools. For example, each drug category was several days long. The students at this school were being groomed to be instructors in future schools.

The National Highway Traffic Safety Administration, (NHTSA) and the National Institute on Drug Abuse did not believe that police officers could be trained to conduct a DRE evaluation and determine what category or categories of drugs an individual was under the influence of. Numerous police agencies requested to attend the DRE School as its success spread through the law enforcement community and NHTSA refused to fund agencies to attend the DRE Schools. In 1984 due to the numerous requests for grant funds to attend the LAPD DRE School, NHTSA contacted LAPD and invited us to participate in a study at Johns Hopkins University School of Medicine. I requested a copy of how the study was going to be conducted and asked several researchers to read the study. After reading the study the researchers advised me not to do the study as it was set up to fail. Dr. Burns pointed out to me that the dose levels were too low and the 20 minutes to conduct the evaluation on subjects and document the results could not be done. All of the test subjects smoked a marijuana cigarette and the THC content was very low or it was a placebo. We could not use the odor of marijuana to influence our decision on marijuana use and impairment. The subjects also

took two tablets which also could be a placebo. The tablets could be an amphetamine at 15 or 30 milligrams, diazepam at 15 or 30 milligrams or secobarbital at 300 milligrams. The marijuana content was 0.0%, 1.3% or 2.8% THC. I decided to participate in the Johns Hopkins study with the understanding that there would be a field study of the DRE Program. The results of the laboratory study were considered to be extremely positive.

Dr. Bogelow, the principal investigator for the Johns Hopkins study made the following comment in the conclusion of the study:

“IT SHOULD BE NOTED THAT THIS STUDY WAS THE FIRST OCCASION THAT THE RATERS HAD EVER USED THE SPECIFIC MODIFIED EVALUATION PROCEDURE THAT HAD THEY HAD DEVELOPED IN ORDER TO MEET THE TIME CONSTRAINTS OF THE STUDY. IT IS POSSIBLE THAT ACCURACY OF JUDGEMENTS WOULD HAVE BEEN DIFFERENT IF THE RATERS HAD BEEN ABLE TO USE THEIR USUAL, LONGER EVALUATION PROCEDURE. IT IS ALSO POSSIBLE THAT THE PRESENT BRIEF EVALUATION PROCEDURE COULD ACHIEVE HIGHER LEVELS OF ACCURACY AFTER RATERS GAINED EXPERIENCE WITH IT.”

Diane Steed, the Administer of NHTSA took the results of the study to the White House and President Ronald Reagan ordered NHTSA to conduct a field study. The field study referred to as the 173 field study was conducted in Los Angeles in 1985. The study was conducted at Parker Center in down town LA and in Van Nuys at the Van Nuys jail. I supervised the DREs at Parker Center and I selected Sgt. Art Haversat to supervise the DREs at the Van Nuys jail. Art and I selected 28 DREs to participate in the study. Two DREs were assigned to each jail and they worked on a rotating schedule so that they would all get chances to participate in the field study.

The restrictions we had on the subjects we could use in the study were as follows:

The subject could not be involved in a crash.

DUI drug cases only.

Drugs could not be found on the subject or in the vehicle.

Two blood samples must be taken, one sent to a NI-

DA lab and one sent to the LAPD lab. One of the arrestees was under the influence of five of the seven classifications of drugs, the DREs opinion was confirmed by the lab results. The results were very good considering the labs could not test for all the drugs. This is a problem we have even today.

The DRE Program has been very successful across the country. The reason for its success has been the dedication of the DREs and their agencies. We continue having a few individuals and agencies attempting to make changes in the program. There have been agencies that want to shorten the evaluation to save time. They may save a few minutes doing the DRE evaluation, but that has cost them hours in court and loss of some of the cases. **"IF IT IS NOT BROKEN, DON'T TRY TO FIX IT!"**

How can we improve the DRE Program?

- Train more officers in SFST and ARIDE.
- Train more DREs so we have DREs 24/7.
- Keep up to date with current drug trends through yearly in-service schools.
- Update labs and training for the lab technicians on current drug trends.
- Get prosecutors and lab technicians more involved in the training.

What is in the future for DREs? DREs have already gone into schools to educate kids on the problems of drug use. The next step is getting the DREs into the workplace. I have been working on a screening device to identify impairment through eye signs in the workplace. The employee's eye signs will be recorded on the device for a "base line". The device will only identify changes in an individual's eye signs and will need a DRE to review the video of the individual's eyes and advise the employer that there is something wrong with this individual that indicates impairment. Then it is up to the employer and the company policy what to do with the employee.




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## Car-Trailer Under-Ride Crash Test Analysis

Dennis F. Andrews & Rudy Limpert

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Two car-semitrailer side under-ride crash tests were conducted at the 2010 ARC-CSI Crash Conference in Las Vegas, Nevada. This paper presents the impact speed calculations.

Analysis of Monte Carlo Crash Test.

In Test #1 a 2001 Chevrolet Monte Carlo 2-door coupe was driven under an angle of approximately

45 degrees against the left side of a stationary empty tractor-semi trailer with its right front corner leading. The measured impact speed was approximately 17 mph.

The Monte Carlo at rest is shown in Figure 1.







*Figure 1. Monte Carlo at rest partially under trailer.*

The frontal damage is illustrated in Figure 2. The left most contact point on the car is located left of center to the driver's side at the base of the windshield.



*Figure 2. Frontal view of roof damage of Monte Carlo.*

Inspection of Figure 3 shows the roof/trailer contact damage extending beyond the upper A-pillar to include approximately two-thirds of the upper edge of the passenger door. The authors measured a maximum crush penetration depth of approximately 55 in. from the baseline of the windshield to the damaged top of the right door. The initial contact between trailer rail and right A-pillar was slightly above

the base of the upper A-pillar.

The speed reconstruction of under-ride crashes is based upon the determination of roof crush energy.

Many under-ride crash tests were conducted to develop the empirical expression relating crush energy to impact speed (Ref. 1 and 2). As it is the case with any empirical relationship, the user must be careful to



Figure 3. Side view of Monte Carlo roof damage.

determine if the test parameters including vehicles tested are reasonably similar to the actual accident under investigation.

The authors have taken the roof crush methodology discussed by Bruce Enz and others (Ref. 1 and 2) and formulated the software program MARC 1-Module Y for speed calculations in under-ride crashes (Ref. 3).

The top view of an automobile outline is shown in

Figure 4a with the area between the bases of the windshield and rear window divided into six equal-distant sections. Each rectangle is associated with a specific amount of crush energy measured in lbft. The specific energy of each roof section was derived from the basic research data published by Enz.

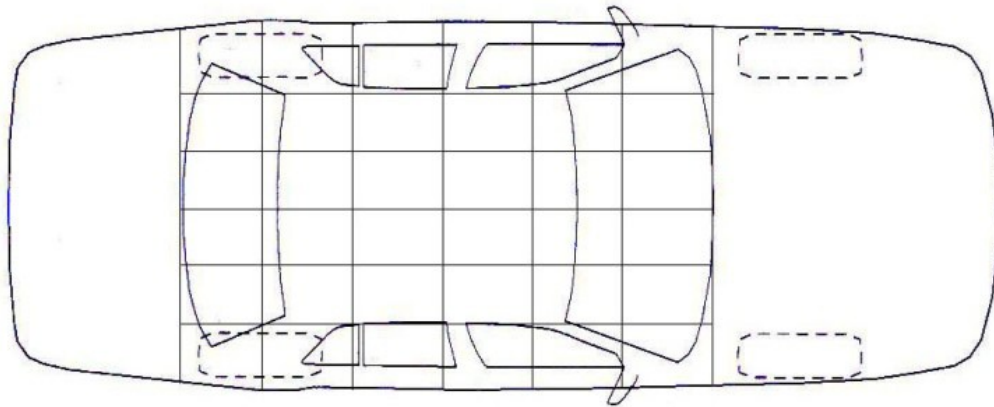


Figure 4a. Automobile top view with roof crush energy matrix.

The percentage figure involved in the roof crush used in our reconstruction is shown in Figure 4b for the Monte Carlo tested. The reader is reminded that the roof of the Monte Carlo may not entirely correlate with the test vehicles underlying the development of the empirical relationships used in MARC 1-Y. The analysis also accounts for where on the A-pillar the trailer contact occurs. An impact at the low-

er portion of the upper A-pillar represents larger crush energy (shorter impulse lever arm), and hence, higher impact speed, than a higher impact point. Readers are reminded, as in any speed calculation involving empirical crush energy equations, to employ a range of meaningful crush depth values. Consequently, a reasonable range of probable impact speeds should be stated.

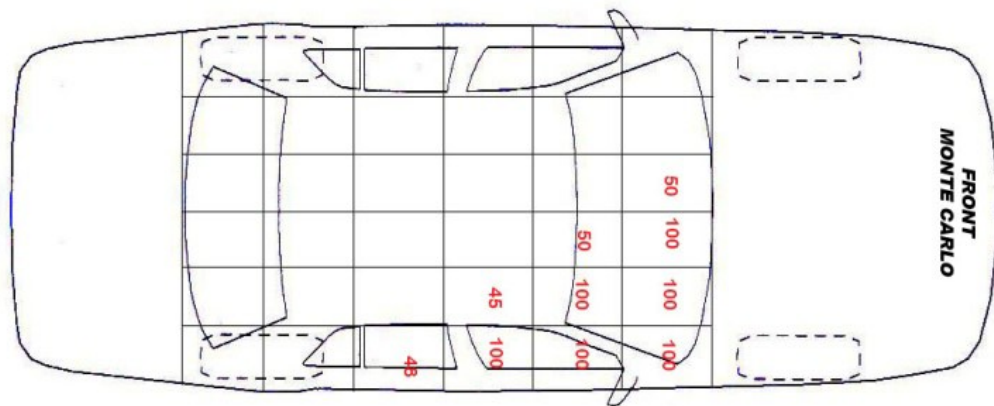


Figure 4b. Monte Carlo roof crush energy percentages.



The MARC1-Y computer results are shown in the MARC 1-Y Monte Carlo printout. The test weight of the Monte Carlo was not provided. The weight used was obtained from published Monte Carlo curb

weight data. For a low A-pillar impact point an impact speed of 17.70 mph is computed. If a middle A-pillar impact point is used, the impact speed decreases to 16.3 mph.

Tuesday, June 15, 2010

MOTOR VEHICLE ACCIDENT RECONSTRUCTION AND CAUSE ANALYSIS  
 \*\*\*\*\* PROGRAM 'Y' RUN FOR Monte Carlo Under-ride \*\*\*\*\*  
 TRACTOR-TRAILER SIDE UNDERRIDE ANALYSIS

Information For Vehicle	2001 CHEVROLET Monte Carlo
=====	
Vehicle Weight, LBS:	====> 3366.00
Angle of Impact, DEG:	====> 45.00
After Exit Distance Traveled, FT:	====> 0.00
After Exit Drag Factor, g-units:	====> 0.00
Before Impact Braking Distance, FT:	====> 0.00
Before Impact Drag Factor, g-units:	====> 0.00
Driver Reaction Time, SEC:	====> 0.00
=====	
Crush Energy, LB*FT:	====> 17568.68
Vehicle Energy Equivalent Speed, MPH:	====> 17.70
Vehicle Exit Speed, MPH:	====> 0.00
Vehicle Speed at Impact, MPH:	====> 17.70
No Pre-Impact Braking . . . . .	
Distance from Driver Reaction to Impact, FT:	====> 0.00
Time from Driver Reaction to Impact, SEC:	====> 0.00
=====	

MARC 1-Y Monte Carlo printout.



The deceleration determined from the EDR down load is shown in Figure 5. It is interesting to note that the average deceleration computed from the average test impact speed of 17 mph and a stopping

distance of 55 in. (4.58 ft) is 2.1g indicating general agreement with the download.

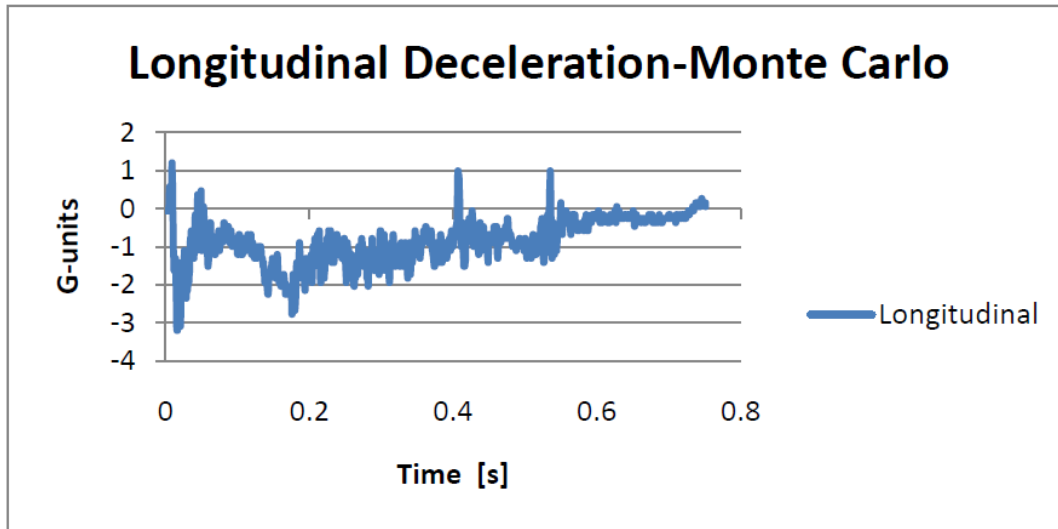


Figure 5. Monte Carlo longitudinal acceleration.

#### Analysis of Saturn Crash Test

In Test #2 a 1996 Saturn was driven at 90 degrees into the same side of the trailer. The impact speed was determined by the authors from the video tape

provided at approximately 20 mph.

The rest position of the Saturn is shown in Figure 6 indicating a roof crush penetration to the B-pillar area.



Figure 6. Rest position of Saturn.

The right upper A-pillar is shown in Figure 7 indicating initial trailer contact near the top.



Figure 7. Trailer/A-pillar contact point.

The percentage roof crush penetration is shown in Figure 8.

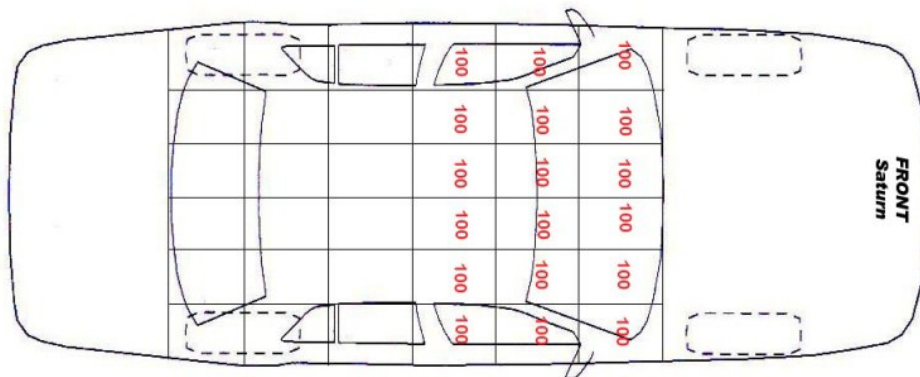


Figure 8. Saturn roof crush energy percentages.

The MARC1-Y results are shown in MARC 1-Y printout for the Saturn indicating an impact speed of 19.59 mph. A high trailer/A-pillar contact point was used in the analysis. The crush

penetration measurements are much cleaner than those of the Monte Carlo, resulting in a smaller range of probable impact speeds.

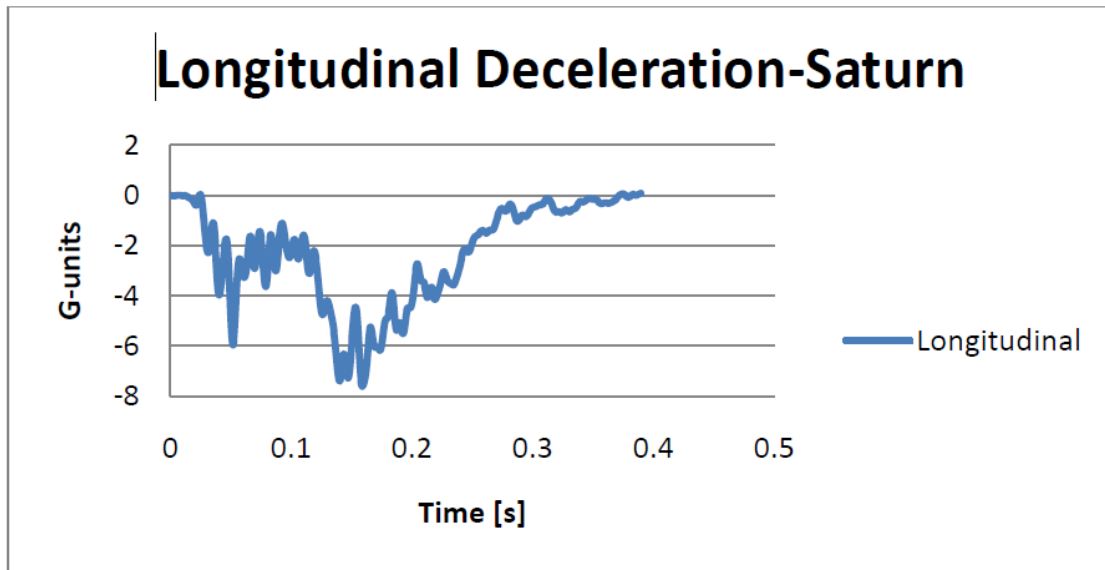
Tuesday, June 15, 2010

MOTOR VEHICLE ACCIDENT RECONSTRUCTION AND CAUSE ANALYSIS  
 \*\*\*\*\* PROGRAM 'Y' RUN FOR Saturn Under-ride \*\*\*\*\*  
 TRACTOR-TRAILER SIDE UNDERRIDE ANALYSIS

Information For Vehicle	1996 SATURN SL
=====	
Vehicle Weight, LBS:	==> 2330.00
Angle of Impact, DEG:	==> 90.00
After Exit Distance Traveled, FT:	==> 0.00
After Exit Drag Factor, g-units:	==> 0.00
Before Impact Braking Distance, FT:	==> 0.00
Before Impact Drag Factor, g-units:	==> 0.00
Driver Reaction Time, SEC:	==> 0.00
=====	
Crush Energy, LB*FT:	==> 29784.00
Vehicle Energy Equivalent Speed, MPH:	==> 19.59
Vehicle Exit Speed, MPH:	==> 0.00
Vehicle Speed at Impact, MPH:	==> 19.59
No Pre-Impact Braking . . . . .	
Distance from Driver Reaction to Impact, FT:	==> 0.00
Time from Driver Reaction to Impact, SEC:	==> 0.00
=====	

MARC 1-Y Saturn data printout.

The longitudinal acceleration of the Saturn downloaded from the EDR is shown in Figure 9.



*Figure 9. Saturn longitudinal acceleration download.*

#### Conclusions

The reconstruction of under-ride crashes using MARC 1-Y yields acceptable results provided the subject vehicle is similar to the test vehicles used for the roof crush energy analysis.

#### References:

1. Trego, Angela, et al., A Scientific Approach to Tractor-Trailer Side Underride Analysis, SAE paper 2003-01—178.
2. Enz, Bruce, et al., Mathematical Approach to Side Underride Vehicular Accident, Mathematical Modeling and Scientific Computing, Vol. 13, No. 1-2, pp. 136-156, 2001.
3. MARC 1 Software available as free download from [www.pbrakelinc.com](http://www.pbrakelinc.com).

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## Arizona Legal Updates

Beth Barnes

Traffic Safety Resource Prosecutor

### **Change to the Rules of Evidence - Daubert is Here**

On January 1, 2012, the Arizona Rules of Evidence changed. The modification that will most significantly impact DUI cases is the change to Rule 702, the rule governing the admissibility of expert testimony. Even though law enforcement officers traditionally have not been allowed to testify as experts, there are several scientific, specialized or otherwise technical portions of DUI and traffic cases that are subject to the requirements of the rule, such as HGN, radar, portions of the DRE examination etc.

The new rule provides:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) the testimony is based on sufficient facts or data;
- (c) the testimony is the product of reliable principles and methods; and
- (d) the expert has reliably applied the principles and methods to the facts of the case

This rule change will impact officer testimony and the types of questions asked in a DUI trial. In addition to providing testimony regarding training and experience, officers may be asked to provide testimony to satisfy the requirements of subsections (b), (c) and (d) above. You are encouraged to talk to your prosecutor prior to testifying in order to avoid surprises. Officers are also encouraged to review training and other materials related to this type of testimony.

Please let your prosecutor know if defense interviews appear to focus more than usual on technical procedures studies, scientific principles and the like.

If officers or prosecutors have any questions regarding this rule change or want materials, training and/or other assistance preparing for the rule change, please contact GOHS Traffic Safety Resource Prosecutor Beth Barnes at [beth.barnes@phoenix.gov](mailto:beth.barnes@phoenix.gov).

### **Case Law – Stopping Vehicles for Brake Light Violations**

In *State v. Fikes*, 2 CA-CR2011-0124 the Arizona Court of Appeals held it was not a violation of A.R.S. § 28-939 for a vehicle to have a brake light at the top rear of the vehicle not working when the other two brake lights were working. Accordingly, the officer who observed this did not have reasonable suspicion for the stop of the vehicle when he did not observe any other traffic violations nor provide any other basis for the stop.

**Facts:** After observing that the brake light located at the top rear of the defendant's vehicle was not working, a police officer stopped the defendant for violating A.R.S. § 28-939 entitled: "signal lamps and devices." The officer saw no other traffic violations and did not provide any other reason for the stop. The defendant's motion to suppress for lack of reasonable suspicion to stop the vehicle was denied by the trial court. The defendant was convicted of two counts of aggravated DUI. He appealed to the court of appeals.

**Holding:** The Arizona Court of Appeals reversed the conviction for the following reasons. A.R.S. § 28-939 (B)(1) provides in pertinent part: ". . . If a vehicle is equipped with a stop lamp or other signal lamps, the lamp or lamps shall: (1) be maintained at all times in good working condition." After a lengthy analysis, the appellate court held that A.R.S. § 28-939(B)(1) requires only one working stop lamp on a vehicle. Accordingly, the court found that even though the de-

endant's top rear stop lamp was not working, this did not provide grounds for the stop.

The court also rejected the state's contention that A.R.S. § 28-921(A)(1)(b) provided grounds for the stop. That provision prohibits driving a vehicle that is not equipped with lamps and other equipment that is in proper working condition and adjustment. The

court noted that provision is limited by the phrase "as required by this article." The only statute in article 16 that speaks to the maintenance of stop lamps is A.R.S. § 28-939. Because the appellate court found A.R.S. § 28-939 requires only one stop lamp to be maintained, A.R.S. § 28-92 (A)(1)(b) did not apply.

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## Haze for Daze

Jennifer Kochanski

Department of Public Safety Toxicology Supervisor

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### A "New" CNS Depressant Surfaces in Arizona

Over the past several months, the Arizona Department of Public Safety Crime Laboratory has seen an increase in the number of toxicology and controlled substances cases containing the drug phenazepam, a lesser known drug in the benzodiazepine class of Central Nervous System (CNS) Depressants.

Phenazepam (street names include: Bonsai and Bonsai Super Sleep) is a benzodiazepine which has been prescribed for clinical use primarily in Russia since the 1970's

and continues to be prescribed there for the treatment of anxiety, epilepsy, insomnia, and alcohol withdrawal.<sup>1</sup> It is similar in chemical structure to other benzodiazepines such as diazepam, temazepam, oxazepam, nordiazepam, and lorazepam but has not been approved for clinical use in the United States.<sup>3,8</sup> Since it is not currently controlled by federal and state laws, it has the potential to become as serious a problem as other previously unregulated drugs such as synthetic cannabinoids (Spice) and mephedrone (bath salts).



### **A Brief History of Benzodiazepines**

During the 1950's the dangers associated with the use of barbiturates, the most commonly prescribed central nervous system depressants at the time, became apparent. The high potential for abuse, severe withdrawal symptoms, and high number of overdose cases leading to fatal respiratory depression emphasized the need for an alternative option. That alternative came in 1957 when Dr. Leo Sternbach stumbled upon a benzodiazepine derivative while doing research for the Hoffman – La Roche pharmaceutical company. This new compound underwent clinical trials and, in 1960, Librium (chlordiazepoxide) became the first benzodiazepine approved for clinical use for the treatment of anxiety. Librium would be the first in what would eventually become one of the largest classes of prescribed drugs and the most widely prescribed in the world.<sup>4</sup> Today, there are approximately 15 different benzodiazepines approved for use in the United States and controlled in Schedule IV of the Controlled Substances Act.<sup>5</sup>

In 1970, Dalmane (flurazepam) was released and along with the other benzodiazepines previously brought to market, essentially replaced barbiturates as the sedative hypnotic drug of choice. While flurazepam was effective for the indication of insomnia, it produced active metabolites with half lives of up to 100 hours (half life refers to the time it takes for a particular drug concentration to decrease by one half). As a result, the effects of the drug would be felt long after the initial dose, a phenomena commonly referred to as the 'hangover effect'. Eventually, benzodiazepines with shorter half-lives were successfully researched and released in order to avoid

this effect.<sup>3</sup> Today, benzodiazepines may be classified as either short acting (half-life of < 6 hours), intermediate acting (half-life 6-24 hours) or long acting (half-life > 24 hours).<sup>6</sup> This classification system is useful for physicians when prescribing or administering these drugs. For example, a short acting benzodiazepine may be used for short term sedation in a critical care environment, an intermediate benzodiazepine for day time anxiety, and a long acting benzodiazepine for insomnia or alcohol withdrawal.

\* Note: Some benzodiazepines are difficult to classify in this manner due to the formation of active metabolites which may have extensive half-lives.

As a drug class, benzodiazepines are all very similar in their structure and mechanism of action. In general, they may be prescribed interchangeably, however, most benzodiazepines are commonly prescribed for specific conditions. Other factors which make the individual drugs in this category unique, and are considerations in prescribing, include: their route of administration, potency, pharmacodynamics (how the drug specifically affects the nervous system), duration of action, half-life, and whether the drug produces active metabolites or not. A summary of the benzodiazepines currently available in the United States is provided in the following table:



Benzodiazepine	Trade Name(s)	Use (s)	Active Metabolite(s)	Half Life {Active Metabolite}
Alprazolam	Xanax, Xanax XR, Niravam, Alprazolam Intensol	Anxiety, Short Acting Anti-Depressant, Panic Attacks, Panic Disorders	No	6-27 hrs
Chlordiazepoxide	Librium, H-Tran	Anxiety; Ethanol Withdrawal; Insomnia	Yes	6-27 hrs
Clonazepam	Ceberclon, Klonopin	Seizures, Panic Disorders, Insomnia	No	19-60 hrs
Chlorazepate (Pro-drug for Nordiazepam)	Tranxene, Tranxene SD, GenXene	Anxiety, Ethanol Withdrawal, Seizures, Insomnia	Yes	2 hrs {31-97 hrs}
Diazepam	Valium, Dizac, Diastat	Anxiety, Seizures, Muscle Spasms, Sedation Induction, Amnesia Induction, Ethanol Withdrawal, Tetanus	Yes	21-37 hrs
Estazolam	ProSom	Insomnia	Yes, not significant	10-30 hrs
Flunitrazepam *	Rohypnol	Hypnotic, Anesthesia Induction, Ethanol Withdrawal	Yes, Not significant	9-25 hrs
Flurazepam	Dalmane	Insomnia	Yes	1-3 hrs {47-100 hrs}
Lorazepam	Ativan	Anxiety, Sedation Induction, Insomnia, Amnesia Induction	No	9-16 hrs
Midazolam	Versed	Amnesia Induction, Anxiety, Anesthesia Induction, Sedation Induction	Yes	1-4 hrs
Oxazepam	Serax	Anxiety, Alcohol Withdrawal, Insomnia	No	4-11 hrs
Phenazepam	Unavailable in the U.S.	Anxiety, Seizures, Sedation Induction, Hypnotic, Alcohol Withdrawal	Yes**	60 hrs
Prazepam	Centrax (discont. in US)	Anxiety	Yes	1.3 hrs
Quazepam	Doral	Insomnia	Yes	39-53 hrs
Temazepam	Restoril	Insomnia	No	3-13 hrs
Triazolam	Halcion	Insomnia	Yes	1.8-3.9 hrs

\* Not currently available in the US. Has been associated with drug-facilitated sexual assaults.

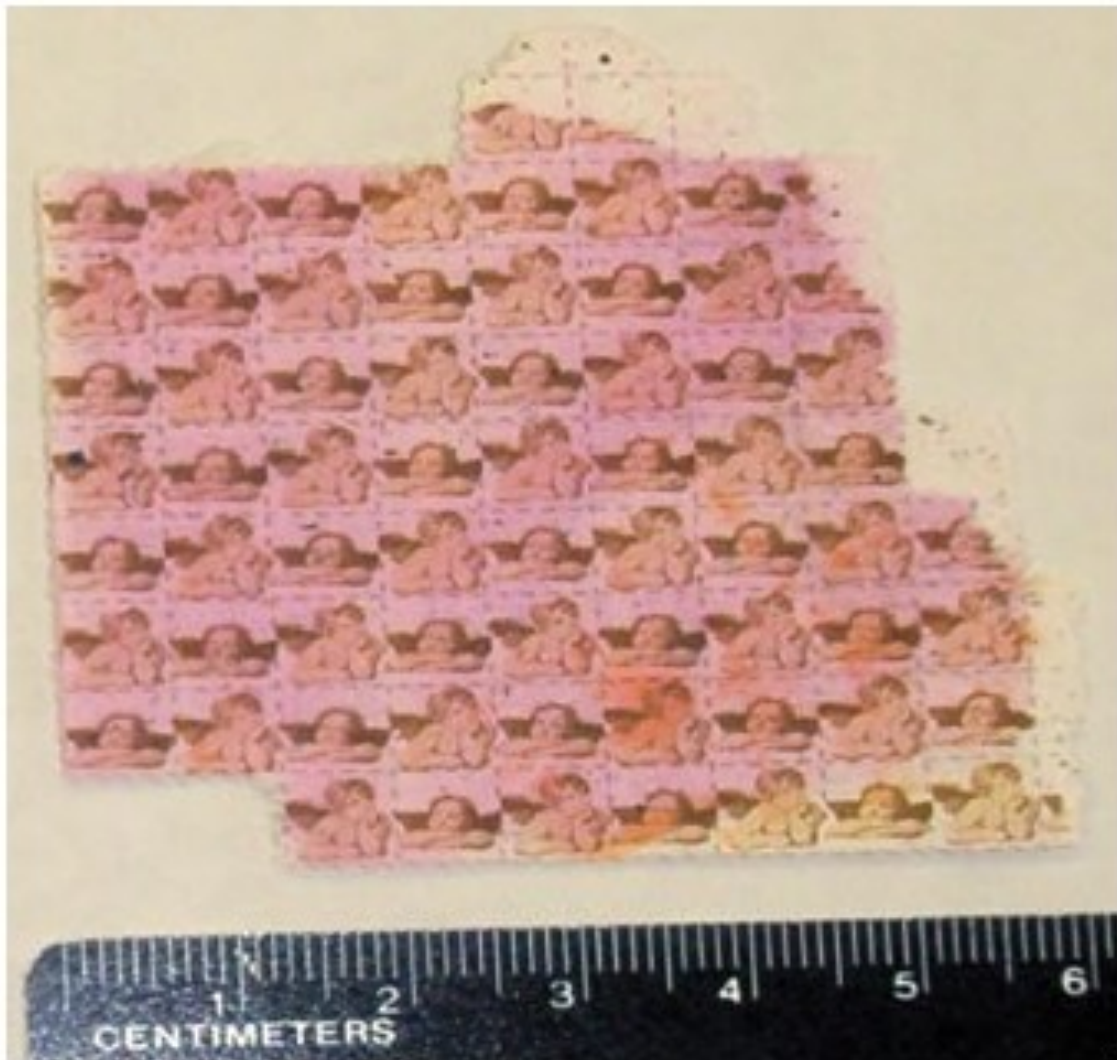
\*\* Experimentally in animals; unevaluated in humans.



### **Phenazepam: The Most Recent Challenge for Law Enforcement**

Phenazepam is very similarly structured to other benzodiazepines which are listed as Schedule IV in the Controlled Substances Act. While it could be considered an analog to the other benzodiazepines, federal analog laws only apply to Schedule I and II drugs, making phenazepam legal to possess and sell in the United States.<sup>9</sup> Without federal or state restriction, phenazepam is easily obtained through various Internet websites and mostly marketed as a research chemical. This is consistent with the availability of other previously unregulated substances such as

Spice, which was marketed as “incense”, or Mephedrone, which was marketed as “bath salts”. Phenazepam is typically available in powder or liquid form, but is also sold as tablets, and it is most often advertised as “not for human consumption.” While powder, liquid, or tablets are the most commonly encountered forms of phenazepam, in 2009 the North Carolina Bureau of Investigation Crime Laboratory received a sheet of paper perforated into 72 squares which they suspected to contain LSD. However, forensic drug analysis showed the paper to be laced with phenazepam.<sup>10</sup>



[www.justice.gov/dea](http://www.justice.gov/dea)<sup>10</sup>

### So You Want To Try Phenazepam...

Since it is currently uncontrolled, Phenazepam is very easy to obtain and is openly marketed on the internet and in other media such as alternative newspapers. The following passage is taken directly from the website phenazepambuy.com, one of the first websites listed when "purchase phenazepam" is typed into the Google search engine:

*"Your one stop for the absolute best research supplies, at unbeatable prices. All orders shipped from the USA. PhenazepamBuy.com has been supplying researchers with top-quality (99+%) Research supplies and has gained quite a reputation for our prompt and caring customer service. Please email us if you have any questions or concerns.*

**PhenazepamBuy@gmail.com**"

The drug is sold in varying amounts which range in price from \$40 to \$570, and purchasing it is as easy as clicking on a "Purchase Now" box and entering your credit card number.

While most websites claim phenazepam should only be used for research, most contain a warning regarding the potency and dangers of the drug and recommend anyone interested in participating in "research" acquire a scale which is accurate to 0.001g (1 mg). The reason for this is because these suppliers are not selling phenazepam in a form similar to what you would obtain from a pharmacy or off a drug store shelf, but rather it is typically supplied as a solid, pure powder (or liquid). It does not come in pre-measured tablets or capsules or as a diluted liquid. With prescription benzodiazepine medications, the amount of actual drug which is prescribed is extremely small. Therefore, since it is too difficult to accurately administer such small doses of drugs, pharmaceutical manufactures encapsulate them in a tablet or capsule, or dilute them in a liquid for accurate, and more manageable dosing.

As an example, a tablet containing a 10 mg dose of Valium (diazepam) may actually weigh, on average, 500 mg. That means only 1/50, or 2%, of the tablet contains the actual drug. According to Randal Baselt's *Disposition of Toxic Drugs in Man*, a typical, therapeutic dose of phenazepam is 0.5 mg (but is also available in 1-2 mg tablets). Assuming the tablet still weighs approximately 500 mg, this would mean only 0.1% of the tablet is actual phenazepam!



<http://www.drugs-forum.com><sup>11</sup>

Imagine trying to measure out a single dose from a pile of powder equivalent in size to 0.1% of an average pharmaceutical tablet.

According to Internet drug forums, some users admit to "eyeballing" their dose by placing a small amount on the tip of a pin or paper clip, others attempt to dilute the powder in alcohol or some other



© Cerner Multum  
ROCHE VALIUM 10 (rxList.com)<sup>12</sup>

liquid before ingesting it. Either way, without an accurate way to measure out such a small dose, it would be very easy to ingest an amount well above a therapeutic dose. This could easily lead to an overdose with fatal, or irreversible, consequences. (One website, herbalsolutions.com, did sell “25mg” tablets of phenazepam which they were marketing as plant food. Again, 25 mg is well over a single therapeutic dose.)

### **The Phenazepam Experience**

Since phenazepam is not regulated in the U.S., and has only recently been encountered in the forensic community, there is very little published data regarding the effects of the drug on human performance including effects and/or impairment related to driving. However, since phenazepam belongs to a thoroughly researched class of drugs and is structurally analogous to many of the compounds in that class, similar effects can be expected. The physical effects associated with therapeutic dosing of phenazepam may include: sedation, confusion, somnolence, dizziness, and incoordination.<sup>8</sup> DRE indicators would also be consistent with other central nervous system (CNS) depressants and would include: the presence of HGN, possible VGN at high doses, lack of convergence, possible normal pupil size, slow reaction to light, low pulse rate, blood pressure, and body temperature, and flaccid muscle tone.<sup>13</sup> The half-life of phenazepam is approximately 60 hours, so the effects can last for some time.<sup>8</sup>

Most individuals who purchase unregulated “research chemicals” are typically doing so in an effort to get high rather than treat a legitimate medical condition. Therefore, doses are generally higher, and the drug is usually re-administered more frequently than what would be medically recommended. Although there are few peer reviewed literature references related to effects, there are many Internet drug forums where users can share their drug experiences. In one such forum, the ‘Erowid Experience Vaults’ one self reported 125lb male user described his first trip after purchasing 200mg of powdered phenazepam. In summary, this particular individual initiated his experience by ingesting his first dose, which he approximated to be somewhere between 4 and 20 mg (remember, there is literature which states a typical, clinical, phenazepam dose is between 0.5 mg to 2 mg). Within 20 minutes the user described the effects as being similar to those from a 10mg Valium. After another 35 minutes, he ingested another dose, approximately double the first.

Shortly after ingesting this second dose, the user stated that the following few days were “a haze”. The high was described to be similar to other benzos, but with longer lasting amnesia. Another interesting reported effect was a loss of feeling and pain in one finger. This effect was described as “similar to something that happened during another “benzo-induced-haze”. This user summarized the positives and negatives associated with phenazepam as follows:

#### Positives

- ✦ Cheap
- ✦ Strong
- ✦ Legal
- ✦ Functional (able to function and perform tasks)
- ✦ Slight Euphoric
- ✦ Very Effective for Anxiety

#### Negatives

- ✦ “Very Amnesiac”
- ✦ STRONG
- ✦ Very Long Lasting
- ✦ “Moreish”

Finally, this user warns “newbies” on the dangers of phenazepam, claiming it to be a dangerous, powerful, and long acting drug which can “cause serious changes in someone’s life.”<sup>14</sup>

This user’s experience with phenazepam was generally similar to that of other experiences reported by users in other drug forums. Amnesia and “benzo black outs” sometimes lasting for several days were the most common negative side effects associated with taking the drug. Again, most of these users warn others who are considering experimenting with phenazepam to purchase an accurate scale for proper dosing, and many warned that any remaining drug should be locked away after the initial administration due to the strong urge for repeat dosing. Also, many of the users described the high to be not worth the long lasting amnesia and many would most likely not purchase the drug again in the future.<sup>15</sup>

### **Final Thoughts**

Phenazepam belongs to a well researched and commonly prescribed class of pharmaceutical drugs which, when taken as prescribed, are very effective in the treatment of a variety of conditions, including anxiety, seizures, insomnia, muscle spasms, and alcohol withdrawal. Individuals who are on a benzodiazepine regime are closely monitored by their physicians, who are trained to recognize and address any negative side effects of the drug. Phenazepam is mostly available as a pure powder, and since it is “not recommended for human consumption”, websites which sell the drug do not have posted dosing guidelines or suggested methods of ingestion. Therefore, users are forced to rely on recommendations of friends or Internet drug forums for an appropriate dosing amount. With such little research available on the negative effects of phenazepam, including overdose and effects of long term use, users are truly risking their health, and possibly their lives, with every experience. Eventually, phenazepam will most likely take its place with other previously unregulated drugs, such as Spice and mephedrone, and end up on the DEA controlled substances schedule. Until then, the Arizona D.P.S. Crime Laboratory has the ability to identify and report phenazepam in biological and solid dose samples. Although there is currently no Arizona state statute which makes it illegal to possess phenazepam, reporting the drug will aid officers in cases involving unknown powders or pills and possibly provide an explanation for observed impairment.

### **References**

1. Johnson, Bill, Society of Forensic Toxicologists - 'Tox Talk', (2010, March); 34(1): p.17.
2. Image retrieved November 26, 2011, from <http://www.cumbriacrack.com/2011/07/21/import-ban-of-new-legal-high-introduced/phenazepam/>
3. Elsevier/Gold Standard, Clinical Pharmacology. Benzodiazepines. (2011). Retrieved November 26, 2011, from <<http://www.clinicalpharmacology.com/Forms/Resources/overviews.aspx?oid=24>>
4. Jufer-Phipps, Rebecca A. and Levine, Barry (Ed.), 2010, Principles of Forensic Toxicology (3<sup>rd</sup> Ed.), Washington, DC: American Association for Clinical Chemistry (AACC) Press. (2010); p.191, 216.
5. Controlled Substances Schedule. Office of Diversion Control. Drug Enforcement Administration. U.S. Department of Justice. Web. 15 November 2011. <[http://www.deadiversion.usdoj.gov/schedules/orangebook/e\\_cs\\_sched.pdf](http://www.deadiversion.usdoj.gov/schedules/orangebook/e_cs_sched.pdf)>.
6. Jufer-Phipps, Rebecca A. and Levine, Barry (Ed.), 2010, Principles of Forensic Toxicology (3<sup>rd</sup> Ed.). Washington, DC: American Association for Clinical Chemistry (AACC) Press. (2010); p.197.
7. Baselt, Randall C., Disposition of Toxic Drugs and Chemicals in Man (9<sup>th</sup> Ed.), Seal Beach, CA: Bio-medical Publications. (2011).
8. Baselt, Randall C., Disposition of Toxic Drugs and Chemicals in Man (9<sup>th</sup> Ed.), Seal Beach, CA: Bio-medical Publications. (2011). p. 1320-1321.
9. Unites States Code, Title 21 (Controlled Substances Act), Section 802, Subchapter 32 (i)
10. United States Department of Justice, Drug Enforcement Administration. Microgram Bulletin. (2009, December); 42(12): p. 94.
11. Image retrieved November 26, 2011, from [http://www.drugs-forum.com/photopost/data/533/medium/phenazepam\\_fatality.jpg](http://www.drugs-forum.com/photopost/data/533/medium/phenazepam_fatality.jpg)
12. Image retrieved November 26, 2011, from <http://images.rxlst.com/images/multum/valium2mg.jpg>
13. DRE Drug Category Symptomology Matrix
14. Erowid, 'Erowid Experience Vaults'. Retrieved November 26, 2011, from <http://www.erowid.org/experiences/exp.php?ID=83521>
15. Drug forums which were consulted for this article include:
  - Erowid Experience Vaults at Erowid.org
  - Drugs-Forum.com
  - PartyVibe.com
  - BlueLight.ru
  - DrugsandBooze.com
  - HipForums.com
  - Forum.Opiophile.org



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## Article Submission Requirements and Protocols

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The Arizona Police Science Journal publishes peer-reviewed scientific papers and works significant and relevant to the law enforcement community. APSJ also publishes editorials and training articles that, while based on science or relevant to science, may not include new scientific research or theories. The goal of APSJ is to provide a combination of works written by well-renowned and credible authors, as well as prosecutors, criminalists, officers and engineers who may be new to the writing process, but have relevant and important information to share.

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