COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS DIVISION (HMD)

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CHIEF'S NOTES

Regulatory agencies are often perceived as non-communicative, inflexible, or rigid in their interpretation of the laws and regulations. Our challenge is to change this perception. One of the ways we are meeting this challenge is establishing industry workgroups. They provide for an exchange of information on issues that are of importance to both the regulatory agency and the regulated community, such as the uniform application of laws and regulations. They also foster a forum to discuss the potential for legislative and regulatory changes.

Several years ago we established the HMD Industry Coordination Workgroup. This workgroup is comprised of various representatives from large industry, small businesses, medical facilities, and the military. We have coordinated various technical workgroups over the years to assist in the interpretation of new legislative and regulatory mandates.

This year we established more focused workgroups to address specific needs of certain business types and to allow for broader participation of industry and small business.

Training and outreach continue to be a high priority for us. This year alone, we provided several workshops that included topics on universal waste, pollution prevention, medical waste management, and underground storage tank requirements. Most recently we upgraded our website to provide better access to technical information and regulatory forms.

This is the third edition of our *Environmental Press.* I think that by reading the following articles you will find that HMD continues to promote compliance through education and strives to maintain an open communication with our regulated community.

HMD FEATURED EMPLOYEE

MARGARET NYAGA

Margaret Nyaga is an Environmental Heath Specialist with the HMD. Margaret is responsible for inspecting businesses within a designated geographical area in the County. These inspections ensure compliance with hazardous materials, hazardous waste, underground storage tanks, and medical waste requirements.

Margaret came to the United States from her native Kenya in 1996 to begin her post-graduate studies in Environmental Management. Prior to that, Margaret had a successful career in the telecommunications industry with Kenya Posts and Telecommunications, in Nairobi. Due to an economic downturn, the company decided to provide a financial incentive for many of their employees to retire. Margaret invested her severance pay in the field of Environmental Health and enrolled at National University where she received her Masters Degree in Environmental Management in 1998.

While attending National University Margaret was also a student worker for the County's Land Use Division of DEH. In 1998, she accepted a position as an EHS trainee with Imperial County, where her responsibilities included monitoring the compliance of food establishments with the California Unified Retail Food Facilities Law (CURFFL), inspecting swimming pools and septic systems, and assisting in enforcing housing code regulations.

In November 2000, Margaret returned to San Diego County and began her present

assignment as an Environmental Health Specialist and, on the same date she began her employment, presented her exam to become a Registered Environmental Health Specialist (REHS) in California.

When Margaret is not doing inspections or assisting customers, she enjoys traveling, reading, and gardening.

Peter Piper Picked…

By Ellen Schulte
Environmental Health Specialist II

A Peck of Pollution Prevention!

Reducing waste and conserving resources just seems like good old-fashioned common sense, and it is! Pollution prevention has been around a long time; it just has a catchy name now. Here at HMD we have the opportunity to provide businesses with current information to help them fine-tune their operations while implementing pollution prevention and reducing waste at the same time.

The automotive repair industry recently received statewide attention resulting in numerous outreach resources developed by the U.S. EPA and the California Department of Toxic Substances Control (DTSC). One of these resources is the **Auto Repair Pollution Prevention Tool Kit**. This Tool Kit includes interesting flyers with humorous graphics, case studies showing successful implementation of pollution prevention and worksheets to help businesses in their efforts. All this information is contained in a thick paperboard file that allows the business operator to easily access it from a file drawer.

The first worksheet, **Profit Through Prevention**, is an overview on how to implement pollution prevention into the business in three easy steps.

Step 1: Calculate wastes currently generated;

Step 2: Implement the Best Management Practices (BMPs) suggested; and

Step 3: Calculate wastes that will be generated in the future.

Although businesses don't have to complete this worksheet, its use is highly recommended because it substantiates the cost savings associated with the implementation of pollution prevention activities.

The **Aqueous Brake Washers*** fact sheet covers a topic that has been meticulously researched and proven to be a viable Best Management Practice (BMP). Aqueous (water-based) brake washing truly provides undeniable benefits and should be embraced. They enhance worker's safety, because aqueous based cleaners are non-flammable, are less toxic and present less of an inhalation hazard. Currently, most brake cleaning is done with aerosols, many of which contain chlorinated solvents and other volatile organic compounds. A recent HESIS† Health Advisory warns of n-Hexane exposure for auto mechanics. The solvent n-Hexane is a common ingredient in brake cleaners that can cause permanent nerve damage. Because of this hazard, the use of chlorinated solvent aerosols in auto repair will be banned after Dec. 31, 2002.

The **Aqueous Parts Cleaning** fact sheet also reinforces making the switch to aqueous cleaners and dispels some of the myths associated with making the change. For example:

1) "They do not work as well as solvents" - Their efficiency depends on the aqueous unit you decide to use. The aqueous spray cabinets and agitators are very effective for cleaning.

2) *"Parts will rust"* - Many aqueous cleaners now contain a rust inhibitor. If they don't, you may add a drying step after parts cleaning.

3) "Aqueous cleaning is expensive" - Shops can actually save money on labor when using an aqueous spray cabinet. Using cleaners properly, they can maximize the time they can be used.

4) "Disposing of the waste is difficult": Most hazardous waste haulers can pick up aqueous cleaner wastes, which will be hazardous after use. Aqueous cleaner wastes have been added to the Consolidated Manifesting list for "milk run" pick up and many companies now offer the same turn-key service as was provided for solvent machines. In addition, Conditionally Exempt Small Quantity Generators can now self-haul hazardous waste to local facilities (call 800-714-1195 for more information). If maintained properly, aqueous cleaners may last longer so they may not have to be disposed of as often.

As with most less-toxic cleaners, once used, these products become hazardous waste. Aqueous cleaner wastes must NEVER be disposed to sewer or storm drains. And although a little more "elbow grease" may be needed, the increased level of safety and reduced amount of waste makes the change to aqueous cleaners well worth it!

A **Refillable Spray Bottles** fact sheet describes the opportunity for businesses to reduce their dependence on aerosols and to increase the use of low Volatile Organic Compound (VOC) aqueous products thereby reducing emission of air pollutants. Ounce for ounce, aerosols are twice as expensive as bulk product; moreover, propellants in aerosols contribute to global warming, and many cans end up in the solid waste stream. A business benefits by evaluating the current aerosols being used, consolidating actual needs and reducing extra non-essential products. The labor required to fill a spray bottle is nominal. An increased savings may be seen in bulk purchasing and reduced disposal costs. Businesses can contact their product supply company to inquire about the availability of refillable bottles and bulk products.

The Automotive Pollution Prevention Tool Kit also includes a flyer encouraging **antifreeze recycling**, a guide on **oil/water separators** and even a step-by-step process for

proper **spill cleanup**! With this Tool Kit the automotive repair industry has been given a great opportunity to make an informed decision on changing work habits and incorporating BMPs. The HMD inspectors can guide businesses towards pollution prevention by providing valuable supportive information and viable alternatives.

Automotive repair BMPs involve a new way of doing things and businesses must be assured that it is worth the pay back. Integrating new work habits to keep a clean shop not only benefits the business and its workers but also their families and the surrounding community.

Resources:
*List of aqueous cleaning products and suppliers: Go to http://www.aqmd.gov/business/water.html
†HESIS- Hazard Evaluation System & Information Service, California Department of Health Services, Occupational Health Branch. For a copy of the n-Hexane flyer and other occupational issues see www.dhs.ca.gov/ohb/hesis under *Publications - Hazard Alerts*.
Fact sheets online: go to DTSC's website at http://www.dtsc.ca.gov/PollutionPrevention/index.html -*Vehicle Service Repair Project.*

How Automobile Airbags Work & Hazardous Waste Concerns

By Todd Burton
Environmental Health Specialist III

Airbags were first developed in 1953 but were not commonly available until the early 1980s. Airbags are mandatory in new vehicles as a supplemental safety device in addition to a seat belt. Airbags work by means of a gas generator. Gas generators are located in more places than just the driver and passenger side dashboards. They are located at several locations throughout the vehicle.

So how do they work?
There are three components to a gas generator: the sensor, the chemical canister and a nylon bag or a seat belt tensioner. The sensor must be able to detect the difference between a severe crash and simple fender bender. A cylinder shaped sensor is held in place by a magnet until a significant collision releases it from its hold. The cylinder impinges on a roller spring, which closes an electrical circuit that deploys the airbag. This initiation process and the chemical reaction described below must be completed within 0.06 seconds as a typical automobile accident only lasts about 0.125 seconds. Once the nylon bag is fully deployed it immediately begins to deflate. Making contact with the deflating airbag provides a cushion to absorb a person's potential energy before they strike a part of the vehicle. This short and very clever process saves many lives each year.

The chemical canister is composed of sodium azide, potassium nitrate, and silicon dioxide. There can be up to twelve or more chemical canisters in a vehicle. The chemical canisters (gas generators) are used to deploy the driver nylon bag, passenger nylon bag and seat belt tensioners in the event of an accident. The sodium azide is ignited by an electrical impulse provided by the sensor. The sodium azide decomposes instantaneously into sodium metal and nitrogen gas, which immediately inflates the nylon bag, or it may power a device that tensions a safety belt. A second reaction occurs between potassium nitrate and the sodium metal to form potassium oxide, sodium oxide and more nitrogen gas that continues to fill the airbag. A third reaction occurs between silicon dioxide, potassium oxide and sodium oxide to form an inert and stable silicate glass. See table below:

Gas Generator Reaction	Reactants	Products
First Reaction triggered by sensor	NaN_3-sodium azide	Na-sodium N_2 (g)-nitrogen gas
Second Reaction	Na-sodium KNO_3-potassium nitrate	K_2O-potassium oxide Na_2O-sodium oxide N_2-nitrogen gas
Final Reaction	K_2O-potassium oxide Na_2O-sodium oxide SiO_2-silicon dioxide	Alkaline Silicate (Glass)

Current industry policy for disposal of gas generators requires trained personnel to deploy them according to strict procedures under controlled conditions. A detonator is connected to the gas generator with special connections. Once it is deployed it is disposed into the trash.

The Department Toxic Substances Control (DTSC) has not determined whether the controlled deployment of gas generators is considered treatment of a hazardous waste. Considering that airbags are now a mandatory safety device in all new automobiles there will be a significant increase in the numbers of undeployed airbags that make it to auto recycling facilities. According to the Insurance Institute for Highway Safety, more than 95 million of the 203 million cars and light trucks on U.S. roads have driver air bags. More than 68 million of these vehicles also have passenger air bags. Additionally, one million new cars and trucks are sold each month.

By law, beginning with year model 1998, all new passenger cars must have driver and passenger side air bags and safety belts. When vehicles are sent for recycling, the driver and passenger side air bags are usually removed for resale, but the remaining gas generators are not removed from the automobile. Autoliv's President, Lars Westerberg, recently predicted cars of the future will be armed with driver air bags, passenger air bags, side air bags, and "curtain" air bags that drop from above the windows to form a wall of protection. These cars will have fifteen air bag gas generators.

Currently there are no laws or little financial incentive for recyclers to remove all of the gas generators from vehicles. The majority of the gas generators are never deployed and remain in the automobile when it is recycled. This can pose a significant health hazard to automobile recycling workers.

When an automobile is recycled, it is

for separation and recovery of different types of metal. Sodium azide released during this process may contaminate these recycled metals. A greater concern is the heat and friction generated by the shredding process that might ignite the sodium azide. When sodium azide comes into contact with lead or copper it may form a sensitive explosive. When sodium azide comes into contact with water (as in a wet shredder) it may generate the highly toxic and explosive hydrazoic acid (HN_3), along with the corrosive sodium hydroxide.

Sodium azide +water = hydrazoic acid + sodium hydroxide
$NaN_3 + H_2O = HN_3 + NaOH$

Sodium azide is used in the majority of all gas generators and is a tricky substance to handle in manufacturing. So dangerous in fact that one of Arizona's manufacturers plant experienced at least 45 explosions, fires and spills between 1989 and 1997. In 1997 another plant incident resulted in 9.8 million pounds of toxic sodium azide wastewater being deposited at a landfill unauthorized to accept hazardous waste.

These problems must be addressed before automobiles containing gas generators are recycled. Simply removing the gas generators before a vehicle is recycled can eliminate potential environmental and worker safety hazards. Automobile recycling facilities should have policies in place to address the removal of sodium azide gas generators. If these safety policies are not put in effect voluntarily by these companies, new laws requiring their safe removal may be needed.

*References: 1. Automotive Recyclers Association. 2. Insurance Institute for Highway Safety.

La Paz Agreement

By Aura Quecan
Environmental Health Specialist II

The La Paz Agreement or El Tratado de La Paz (Spanish), is the abbreviated name for the treaty signed in the city of La Paz in 1983 by the governments of the United States and México: Agreement for the Protection and Improvement of the Environment in the Border Area.

The objective of the treaty is to protect, improve and conserve the environment in the border region. The agreement went into effect on February 16, 1984.

The agreement is subdivided into twenty-three articles. The first three articles along with articles 5 and 6 allow for the establishment of bi-national cooperation in the:

- Protection, improvement and conservation of the environment
- Establishment of measures for the prevention and control of pollution
- Creation of a system of notification for emergency situations.

The articles set necessary framework for both governments to adopt the available measures to prevent, reduce, and eliminate sources of pollution in the United States and Mexico. Additionally, the articles provide both parties the authority to develop special bi-national arrangements for the solution of environmental problems in the border area. According to article 4, the "border area" is defined as the area covering 100 kilometers or 62.5 miles north and south of the United States-Mexico international border.

The agreement facilitates the designation of a National Coordinator in each country to coordinate and monitor the implementation of the agreement and to organize bi-national meetings. In the United States the Assistant Administrator for International Activities of the EPA acts as the National Coordinator, in Mexico, International Affairs Coordinator of the Secretaría del Medio Ambiente, Recursos Naturales y Pesca (SEMARNAT). Representatives of the federal, state and municipal govemments and the private sector are invited to participate in these meetings. Coordinators assign personnel to assist them to achieve the agreement objectives. Expenses incurred are paid by the respective border government (Articles 8-14).

Articles 14-16 of the La Paz Agreement facilitate the entry of personnel and equipment from the neighboring country. Environmental professionals assist in the monitoring of pollution and work as consultants in the measurement and analysis of indicators of pollutants in the border region. The information obtained through this exchange and the conclusions of environmental studies in the region is required to be available to other interested individuals if approved by the United States and Mexican governments.

Since 1984, five annexes have been added to La Paz Agreement. Each one of the annexes refers to a specific environmental issue identified and addressed in the border region:

- Sanitation
- Discharges of hazardous substances into the land
- Trans-boundary shipments of hazardous waste and hazardous substances
- Trans-boundary air pollution caused by copper smelters
- International transport of urban air pollution.

The Annex III, *"Agreement of Cooperation between the United States of America and the United Mexican States regarding the Trans-boundary Shipments of Hazardous Wastes and Hazardous Substances,"* was signed in Washington, DC on 1986. This annex was developed with the objective of providing guidelines for the trans-boundary shipment of hazardous waste and hazardous materials. These transportation guidelines ensure the reduction or prevention of risks to the public health, property and environment without affecting the commerce of goods and services between the two countries. This annex is the basis for the Hazardous and Solid Waste Work Group, one of nine bi-national work groups developed since the creation of the La Paz Agreement.

Initially four working groups were created to implement the La Paz Agreement and its annexes. Later, five more groups were added to address different environmental concerns:

- Air
- Contingency planning and emergency response
- Enforcement

- Environmental health
- Hazardous and solid waste
- Information resources management
- Natural resources
- Pollution prevention
- Water.

These Work Groups were implemented through the United States-Mexico Border XXI Program.

References:
www.epa.gov/usmexicoborder/index.htm
US-Mexico Border XXI Program Framework Document, October 1996. EPA 160-R-96-003

SB 989 – Secondary Containment Testing

By Juan Fernandez
Environmental Health Specialist II &
Robert Rapista
Environmental Health Specialist III

Reference: Understanding Line Leak Detection System. CalEPA, 2000.

Senate Bill (SB) 989 introduced new underground storage tank (UST) requirements that affect all owners and operators of UST's in the State of California. SB 989 became effective January 1, 2000. This new bill was introduced by Bruce Sher (D), signed into law by Governor Gray Davis, and incorporated into the California Health and Safety Code (HSC) under Chapter 6.7. The California State Water Resources Control Board (SWRCB) is responsible for developing UST regulations pursuant to Chapter 6.7 of the HSC. The first set of regulations came into effect on May 14, 2001. These regulations are found in Title 23 of the California Code of Regulations (23CCR).

Periodic secondary containment testing is one component of SB989 that must be complied with by January 1, 2003. Under SB 989, all secondary components of a UST system must be tested to determine if the secondary containment system is capable of containing a release from the primary containment until the release is detected and cleaned up. Currently, California is the only state that requires regular testing of all areas of secondary containment. These requirements have been enacted in order to help mitigate the problem with groundwater contamination.

The secondary containment components for a UST system include annular spaces, secondary piping, turbine sumps, fill/vapor riser sumps and under dispenser containment (UDC). In San Diego County, all UST systems installed on or after July 1, 1989 are required to have secondary containment around all primary openings to the UST such as riser fittings to the turbine, fill, vapor and automatic tank gauges (ATG). All these components are required to be tested. Currently, testing is not required for overspill buckets, but it is strongly recommended to ensure component integrity. One of the main reasons for the introduction of this new law is to demonstrate that the UST system continues to perform at least as well as it did when it was first installed.

Secondary containment testing requirements can be found under **23CCR 2637 (a).** Under SB 989, effective January 1, 2001 secondary containment testing is required for new installations at:

- Original time of installation
- 6 months after installation, and
- Every 36 months thereafter

All UST systems installed prior to January 1, 2001 shall perform testing by January 1, 2003 and every 36 months thereafter. An owner/operator must notify the HMD's UST Group least 48 hours prior to conducting the test, via e-mail or fax. If an owner of a UST system determines that **the secondary system cannot be tested**, the owner has the following options:

- Replace the secondary containment system with a system that can be tested, or
- Submit a proposal and work plan for enhanced leak detection and complete the program of enhanced leak detection by December 31, 2002; and replace the secondary containment system by July 1, 2005. Currently, systems that have automatic continuous monitoring of both, the primary and secondary containment (like systems hydrostatically monitored or under constant vacuum) are exempt from periodic secondary containment testing.

All persons performing secondary containment testing must meet the licensing and certification requirements of **23CCR 2637(b)(1)&(2).** The County of San Diego DEH in conjunction with the Southern California Underground Storage Tank Technical Advisory Group, developed minimum standards for secondary containment testing in order to promote consistency among all testers. The SWRCB allows flexibility in testing methods to encourage the development of new technology and allow different testing methods to be utilized. Regardless of the method utilized, the key is to ensure that the test method demonstrates that the secondary containment system performs at least as well as it did upon initial installation.

All UST tank owners and operators are required to submit a copy of their test results to the HMD within 30 days of test completion. All test results must be submitted as pass or fail. The San Diego County Secondary Containment Testing Report Form can be obtained from the San Diego County website at http://www.sdcounty.ca.gov/deh/hmd. The completed form, written test procedures, and printouts from tests (if applicable), should be provided to the facility owner/operator for submittal to the local regulatory agency.

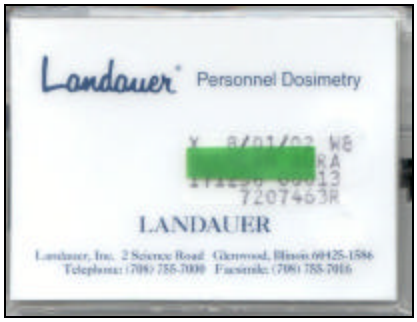
If the system fails a secondary containment test, owners or operators may not have to shutdown or remove product from their system. Failed tests do not necessarily indicate a

secondary containment systems do not routinely contain product. Facilities with failed UST secondary containment systems may be allowed to stay open for a reasonable time until the repairs are made. A qualified person must perform the repairs as soon as possible. Before any repairs are made, it is strongly advised that DEH be contacted to determine if a permit to repair will be required. Failure to obtain a required permit may result in enforcement action. The permit process may take 7 to 10 working days.

With the implementation of SB 989, UST owners and operators will be assured that if a leak occurs within their primary system, the leak will be contained, thus minimizing cleanup costs and ensuring a safe environment. DEH is committed to working with all tank owners, operators, contractors and consultants in complying with the provisions of SB 989 secondary containment testing. If you have any questions regarding secondary testing and repair permit requirements in San Diego, please contact Robert Rapista at (619) 338-2207 or Sylvia Mosse at (619) 338-2309.
SB989 notification e-mail address:
Robert.Rapista@sdcounty.ca.gov
Sylvia.Mosse@sdcounty.ca.gov
UST fax number: (619) 338-2335.

Radiological Health Program: A Case of Overexposure?

By Eileen Struthers, Associate Health Physicist



The primary function of the radiological health program is to perform inspections of facilities that either utilize radioactive materials or operate x-ray machines in San Diego County. Investigations are performed when problems arise at these facilities. The most common investigations involve overexposures to individuals that work, in some capacity, with ionizing radiation.

As a result of the potential for occupational exposure, workers wear personal dosimeters badges that record the dose of radiation received by the individual over a period of time (monthly or quarterly). The three most common types of personal dosimeters are:

1) Film badges
2) Thermo luminescent dosimeters
3) Luxel dosimeters (aluminum oxide strips)

These dosimeters record doses in units of millirem (mrem) and enable individuals to keep track of their radiation exposure to ensure that they don't exceed the annual occupational limit of 5,000 mrem. If a worker does exceed that limit, then our office performs an investigation into the cause of the overexposure.

An interesting investigation performed by this office involved an x-ray machine repairman whose Luxel dosimeters badge recorded a dose of 127,000 mrem over a period of one month. This dose was twenty-five times higher than the annual permissible limit, causing concern for both the individual and his employer regarding the possible health effects from such a high dose.

During an investigation of an overexposure, an individual can usually recall the date and cause of the exposure. However, in this case, the employee had no recollection of any situation where such an exposure could have occurred. We called the dosimeters badge company to confirm that the badge had not given an erroneous reading and they assured us that the badge had recorded a true exposure. However, the employee's previous dosimeters readings were minimal and the likelihood of a personal exposure of that magnitude in his line of work seemed remote. As a result, we suspected that the exposure had been to the badge and not to the individual. This type of occurrence is not uncommon. During the course of an investigation, we occasionally discover that another employee deliberately exposed an individual's badge to a source of radiation as a prank. Obviously, our office takes this type of behavior seriously. Because dosimeters badges are normally clipped to the collar, it is more common to find that a badge slipped off of the collar and onto the floor of an x-ray room, unnoticed for days. This usually results in an overexposure to the badge. Since this employee could not recall such an incident, we had to find some way to determine if he had personally received such a significant dose.

A routine medical examination was performed with lab tests for blood cell count. This revealed no physical manifestations of extreme radiation exposure. Since blood cell counts are generally useful indicators of radiation exposure when performed immediately after the incident, not weeks later (as was the case in this situation), the medical determination of exposure was not conclusive.

We then consulted with REACTS, the Radiation Emergency Assistance Center Training Site in Oakridge, Tennessee, to inquire about the use of cytogenetic testing for chromosomal aberrations caused by high radiation exposure. Through their research, they had developed calibration curves to determine quantifiable doses based upon the number of chromosomal aberrations seen in the blood cells of an individual. Unfortunately, we were informed that they could not perform the tests on private individuals at their facility. However, they knew of a scientist at the Lawrence Livermore National Laboratory that was directing a research project conducting cytogenetic testing for radiation exposure to the "clean-up" workers at the Chernobyl nuclear reactor accident site.

As a result, we called the director of the project and he offered to test the employee as a professional courtesy to

our department. The employee and a control subject that fit the same age, sex and smoking habits, then flew up to the Lawrence Livermore Laboratory in northern California to have their blood drawn for the tests. Two weeks later we received a report from the lab stating that the only chromosomal damage that was detected was due, not to radiation, but to the employee's ten-year habit of smoking cigarettes.

Needless to say, the employee was greatly relieved, as was the employer. We, too, were pleased with the results, recognizing that the positive outcome of the investigation was due to government agencies working together for the public

Plating: A new technique that can be hazardous to your health

By Peter Monnier
Environmental Health Specialist II

Recently, while conducting an inspection of a powder coating facility, I noticed what appeared to be chrome plated exhaust headers in a showcase by the entrance.

Normal powder coating is a plastic coating produced by the electrostatic deposition of a polyvinyl chloride, (pvc) colored powder onto a metal and the subsequent baking of the metal part in an oven to melt the powdered plastic. Since exhaust headers can get extremely hot, I realized that had to be coated with a much different type of material.

When I asked the owner of the shop how he was powder coating the exhaust headers, he replied that it was not a powder coat, but a liquid he sprayed onto the metal which he then baked on in his ovens. He took me over to a small, open booth about the size of a small closet at the rear of his shop, next to an open dock-loading door. The booth was piped to the ceiling for the exhaust and paint booth filters were used to catch the over-spray. The filters were covered with a grayish deposit and when I touched them a fine powder, it immediately became airborne. I then asked for a Material Safety Data Sheet (MSDS) for the product.

The MSDS showed that the hazardous ingredients listed less than 15% of a phosphate/chromate solution which contained less than 2.5% total weight of CrO_3. In addition, there was a note that stated, "The National Toxicology program lists chromium and certain chromium compounds to be carcinogenic. The finished, properly cured product does not contain CrO_3 as it is converted to a non-hazardous state and CrO_3 is not present in a free or hazardous state."

At that point I asked the owner of the shop what he knew about hexavalent chrome. He said, "Nothing, is there a problem?" "Yes, there is," I replied. Hexavalent chrome is a known inhalation carcinogen. The material he was spraying could contain 15,000 ppm of hexavalent chrome or more, which did not get converted to Cr_2O_3, (trivalent chrome) until after it was baked in the oven. Title 22 CCR STLC (Soluble Threshold Limit Concentrations) indicated the cutoff for managing hexavalent chrome as a hazardous waste was 5 ppm, so he was using a product that potentially could be contaminating his shop with levels 3,000 times above the safety level! Of particular concern was the dried powder in the filters and booth where the spraying was being done. Since it was very fine and friable, and had not been cured by heat, it was probably heavily contaminated with hexavalent chrome that could easily become airborne. He said, "What should I do? My children come to this shop all the time. I don't want to get anyone sick."

I asked the owner to mist the booth with a little water to keep the powder from becoming airborne, carefully cover it with plastic, and stop using the product until a sample of the contaminated booth filter could be tested. A few weeks later, the test results of the filter came back and indicated 17,000 ppm total chrome.
The owner had the booth dismantled and discontinued this production. In addition, he had a California certified lab test all areas of his shop for hexavalent chrome contamination and any areas that tested for its presence were cleaned.

What was specifically dangerous about this method of plating was that the solution was sprayed in concentrated form as it came out of the container; moreover, the over-spray was allowed to dry on the filter and surrounding areas so that hexavalent chrome containing dust could easily become airborne even when the coating wasn't being applied. Normal chrome plating baths keep a dilute solution of hexavalent chrome in solution preventing it from becoming airborne unless actual plating is taking place. When plating of this type actually does take place the hexavalent chrome that would become airborne due to the hydrogen and oxygen bubbling mist that is created during the electro deposition can be controlled by surfactants, plastic beads, a demister or a combination of these things.

Although the idea of spraying on a chrome solution and baking it on in an oven seems like a much simpler way of chrome plating, the health risks of this procedure are considerable and should be avoided. In a subsequent conversation with the chemical manufacturer indicated that the CrO_3 was used as an oxidizer and that the actual plating was aluminum. In addition, he indicated that the company was trying to reformulate the product to eliminate all chrome content. In the meantime he agreed that if this product was used, steps to eliminate the movement of the dust should be taken, such as a constant misting spray of water (whether coating or not), and main-

taining negative atmosphere all times in a closed booth. In addition, the workers should be wearing disposable, protective clothing to prevent CrO_3 containing dust from being transported to the outside environment and a respirator capable of preventing inhalation of the CrO_3 containing dust. The final filter media should be rated as high efficiency particulate air (HEPA) for the air exiting the booth. We recently notified the County's Air Pollution Control District about this practice. In protecting public health and safety we want to ensure that other businesses, which may be using chemical products containing hexavalent chromium, are aware of the potential health risks and can take steps to reduce or eliminate those risks.

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