



Global Lubricants



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September 12, 2005

Chevron Lubrication Customers  
Chevron Lubrication Marketers  
Chevron Field Sales  
Chevron LubeTek

## **RE: POST-HURRICANE PACKAGE FOR LUBRICATION CUSTOMERS & MARKETERS**

Chevron Customers and Lubrication Marketers,

The devastation left by Hurricane Katrina is some of the worst ever seen in the United States. This catastrophe has left tens of thousands without food, shelter, and means to sustain "life as we know it". Out of our extended family of customers and lubrication marketers, several locations have been either completely destroyed or severely damaged. Others, in outlying areas, have also sustained significant damage. In an effort to assist those who are beginning to get back into these storm-ravaged facilities, we have assembled this information package. We hope that you find it helpful in piecing your operation back together. The primary areas of focus here are safety, lubricant recovery, and equipment start-up tips.

### **SAFETY**

Your safety is our number one priority. "Do it safely or not at all" is a key phrase we use every day that has particular importance in these times of crisis. Lack of sleep, sensory overload, dehydration, and food shortages can combine to destroy our attention to detail and cause injury. Some basic things to remember that will help to keep you safe during recovery operations are listed below.

Remember that water and electricity don't mix – make sure electricity is secured before entering damaged facilities. Take special note of downed power lines and arcing transformers on your first assessment of a building. When venturing into abandoned structures, always wear a hard-hat with a head-lamp to investigate damage.

Always carry survival tools such as a multi-tool and flashlight. With accessories such as Phillips & flat head screwdrivers, bottle & can openers, a file, and a knife blade, the multi-tool is very handy. Never assume that fresh batteries are in your flashlight. Always replace them with new ones before every inspection and carry a back-up. The last place anyone wants to be is lost in a large, dark, unfamiliar facility without a light. The **Leatherman®** Tool Group makes a handy, black-nylon combination case that can carry a multi-tool and a mini-mag light simultaneously. This belt-mounted kit can really make a difference. This kit can be found quickly at <http://www.case4less.com/toolkits.html>.

Invisible killers are everywhere in the form of toxic & explosive gases. This can be especially true in facilities that store, manufacture, or use chemicals such as chlorine. Full-face respirators with bottle-supplied air (example: Scott Air-Pak®) are always the safest bet for first-in investigators and gas-free engineers. Prior to entering a space unprotected make sure the air quality has been tested. Immediate suffocation due to the lack of oxygen is a very-real consequence of forgetting about toxic gas. Only certified, explosion-proof electronics (flashlights, laptops, etc.) should be used.

Exposure to mixtures of water, oil, and miscellaneous waste products can cause serious skin illnesses. The best bodily protection comes in the form of impermeable rubber. Do your best to limit the bare skin

exposure of anyone working in high-water levels for any period of time. Oily water creates very slippery conditions that can be especially treacherous. Dark water can also mask currents and drainage areas that recovery workers may accidentally step or slip into. Be aware of designed and natural drainage pathways to keep your people out of danger.

High water-levels can also hide dangerous animal life common to this area such as snakes and alligators. Bulk tanks of any size may offer refuge for other types of wildlife such as birds, turtles, frogs, lizards, raccoons, etc. Domesticated animals may also have chosen to take up residence in your facility. Though not typically thought of as aggressive, these hungry and “cornered” animals can become ferocious. Be wary of these animals. Dead animals should be removed and quarantined without making physical contact so as to minimize the risk of contracting disease.

Always wear steel toed safety shoes or boots with metatarsal protection. Steel lined soles will also be of added benefit to prevent nail punctures through the bottom of the foot in seriously damaged structures. Tennis shoes, flip-flops, or soft-sole water shoes should not even be considered for this type of work. These recommendations come from our experience during the 2004 floods in Pennsylvania (Hurricane Ivan) where Chevron volunteers helped in the clean-up. With elevated bacterial levels in these flooded areas, infection may occur quickly after even the smallest of puncture wounds. Rapid infection can be avoided by protecting hands, feet, arms, and legs from scratches, cuts, and other wounds commonly experienced when working around damaged areas. Coveralls, long-sleeved shirts, gloves, and boots are some examples of protective clothing worn to reduce risk of infection.

### LUBRICANT RECOVERY

Understanding that the most probable issue with bulk and/or drum lubricant recovery in this situation is water contamination, we’ve gathered some guidelines that will help you make the decision whether to save or dispose. Many lubricant types can be reconditioned back to new lubricant performance levels through the use of modern dehydration technologies.

Lubricant type	Can it be recovered?	Exceptions/comments/methods
Diesel Engine Oils	Yes with exceptions	After vacuum dehydration, verify continued use through <b>mandatory LubeWatch or Texchek</b> oil analysis.
Passenger Car Motor Oils	Yes with exceptions	After vacuum dehydration, verify continued use through <b>mandatory LubeWatch or Texchek</b> oil analysis.
Natural Gas Engine Oils	Yes with exceptions* (see details below)	After vacuum dehydration, verify continued use through <b>mandatory LubeWatch or Texchek</b> oil analysis.
Railroad Engine Oils	Yes with exceptions	After vacuum dehydration, verify continued use through <b>mandatory LubeWatch or Texchek</b> oil analysis.
Marine Engine Oils	Yes with exceptions	After vacuum dehydration, verify continued use through <b>mandatory LubeWatch or Texchek</b> oil analysis.
Transmission Oils	Yes with exceptions	After vacuum dehydration, verify continued use through <b>mandatory LubeWatch or Texchek</b> oil analysis.
Hydraulic Oils	Yes with exceptions	Not 10W named hydraulic oil. Vacuum dehydration
Turbine Oils	Yes	Vacuum dehydration & filtration
Gear Oils	Yes with exceptions	Borate containing gear oils should be drained from systems with water contamination. The gear box should be flushed and then refilled with fresh borate gear oil. Sulfur-phosphorous containing gear oils may be vacuum dehydrated with <b>mandatory</b> verification of “suitability for continued use” through oil analysis
Compressor Oils	Yes	Vacuum dehydration & filtration
Way Lubricants	Yes	Vacuum dehydration
Metalworking Fluids	Yes & No	Soluble oils no, straight oils yes
Food grade oils	No	Due to sensitivity of application, replace all food grade oils without exception to eliminate risk of bacteria
Grease	Yes*	See details below
Others	Yes & No	Consult 1-800-LUBETEK

Vacuum dehydration is a safe & effective way of removing water from industrial (primarily) lubricants. Fortunately, we have a network of ISOCLEAN Service Providers that provide vacuum dehydrator services in your affected areas. Ask your ISOCLEAN Service Providers about others capabilities.

ISOCLEAN provider	City	State	Phone	Contact
Hill Petroleum	Shreveport	Louisiana	318-368-3101	Scott Hill
The Hurt Company	Houston	Texas	713-747-7411	Jay Hurt
Petrolink	Olathe	Kansas	913-782-6600	John Whigam
Petrolink	Apopka	Florida	352-223-4374	Mike Burger
Oil Filtration Services	San Antonio	Texas	830-816-3332	Duke Cooper

### **Natural Gas Engine Oil specifics**

For NGENO bulk storage tanks that have been flooded with fresh water, dehydration may work if the oil/water mixture hasn't formed an emulsion. In this case some simple separation (e.g. decanting with an API tank) may work. Avoid any mixing that may promote emulsion formation such as running an oil/water mixture through a pump. Following decanting, run the oil through a portable oil purification rig with a high speed centrifuge and heat to insure any residual water and impurities are removed. The purified oil should be analyzed to check its additive content and contamination level. Water should be <0.10%. Checking appearance and running a crackle test could serve in a pinch. If contaminated with salt water, one could follow the same procedure, making sure to be more thorough in the decanting and purification process - and to change the oil as soon as possible.

If engines that are flooded, the oil should be drained and the engine dried. The engine should be thoroughly borescoped and cranked with plugs/injectors removed to insure there is no possibility of hydro-locking prior to start-up. The engine crankcase should be vacuumed. Ensure all filters (air and oil, etc.) are changed and that new-oil supply tank, piping, and fuel supply are water-free. Once refilled with fresh oil and ready to run, warm the engine under no-load conditions in an attempt to dry it out as much as possible. Finally, shut the engine down, change the oil, and restart for cautious, normal operation. With salt water, our recommendation is to do an extra drain and flush.

### **Grease specifics**

The first step with grease is to open a few representative containers and to look for any water present on the top. If a small amount of water is present, the water can be poured off and the grease will be fine for use. If there is evidence that a significant amount of water has been mixed into the grease, this water cannot be removed from the grease in the field and the grease should be replaced. As for greased equipment that has been submerged in water, the best practices are to thoroughly clean and dry the equipment and replace the old grease with new.

### **EQUIPMENT START-UP TIPS**

On-site assessment of equipment condition is critical when deciding whether machinery is damaged beyond repair or suitable for continued service. If deemed suitable for continued service, there are several tips that will increase the chances of successful machinery start-up and long-term reliability.

- 1) Perform "crackle" test and visual inspection to determine gross water contamination
  - a. Crackle test safely exposes lubricant sample to elevated temperature
  - b. 0.1% water content in oil can be determined by hearing sample "crack" or "pop"
  - c. Quick "go, no-go" test that can be done with an aluminum can and a cigarette lighter. (Contact your local Chevron representative for the proper crackle-testing technique)
  
- 2) For questionable systems, sample oil in reservoirs to determine rehabilitative action
  - a. Is there water, dirt, or chemical contamination?
  - b. Include particle counts to see what amount of solid contamination is present

- 3) Drain, flush, and dry contaminated reservoirs
  - a. Retract all hydraulic cylinders, evacuate as much fluid as possible
  - b. Flush system to remove any water or contaminants that may have entered the system.
  - c. A wipe-down with lint-free absorbents eliminates moisture on reservoir walls
  - d. Remove any filters in the system and replace with new filters
  
- 4) Conduct internal inspections of system condition
  - a. Visual inspections with digital photography are valuable for documentation
  - b. Gear systems, hydraulic systems, turbine systems, engines, etc. can benefit from internal visual inspections
  - c. Borescoping technology also available for impossible to see areas
  - d. Compare previous documentation to new photos for damage assessment
  
- 5) Locate predictive maintenance records to compare before vs. re-start results
  - a. Oil analysis results & trending
  - b. Vibration analysis typicals
  - c. Thermographic documentation
  - d. Ultrasonic documentation
  
- 6) Accumulate same oils in tote tanks for dehydration and filtration
  - a. Most effective when using the same manufacturer
  - b. Operations using multiple machines of the same type can greatly benefit from this
  
- 7) Larger volume accumulation makes vacuum dehydration and filtration more efficient
  - a. Large systems that are needed for production can be filtered on-line
  - b. Consult with your ISOCLEAN service provider for final recommendation
  
- 8) Install desiccant breathers to all reservoirs prior to re-fill
  - a. Any remaining moisture will pass through breathers during normal system function
  - b. This completes the moisture evacuation "fine-tuning" that prevents immediate problems
  - c. Continue using desiccant breathers as part of the long-term maintenance program
  - d. This will minimize future contamination of both water and dirt to maintain cleanliness levels
  
- 9) Conduct final inspection to make sure
  - a. All tools and cleaning materials have been removed before start-up
  - b. Desiccant breathers have been installed
  - c. New filters have been installed
  
- 10) First start-up after dewatering
  - a. Run at no or low-load to warm machinery and drive off excess water
  - b. Visually inspect oil samples every hour to determine remaining water in system
    - i. Look for foam and cloudiness while mixed
    - ii. Allow sample to settle for no less than 30 minutes
    - iii. Check for water layer settling to the bottom of the sample
  - c. Flush and refill system if oil continues to show signs of contamination

Additional information has been made recently available from the **American Society of Safety Engineers** in the form of a disaster safety checklist. This information is easily obtainable at <http://www.asse.org/press848htm>. This, in addition to Chevron's Lubrication Technical Bulletin, LTB-04, entitled "Tips for dealing with water damaged vehicles" can help get you up and running.

### **ADDITIONAL CHEVRON SERVICE CAPABILITIES**

**T-REX (Total Reliability Excellence):** this service is designed to evaluate the current state of equipment reliability in your facility. This in-depth, consulting service, typically has a 10:1 payoff in regards to bottom-line corporate profitability. It focuses on increasing the effectiveness of the production team, which includes maintenance, operations, and purchasing. By employing current technology, a team of field engineers, and best-in-class manufacturing processes, T-REX can *“transform your plant from dinosaur to dynasty.”* Initial engagements include the Business Case for Reliability Workshop and the Reliability Game. What better time to make sure you get a fresh start in the right direction?

**Computex MMS:** this is a Computerized Maintenance Management System built on a lubrication backbone. As a web-based lubrication routing & scheduling program, Computex Intermediate provides the “missing” lubrication module in the industry today. Computex Advanced combines the power of a well-designed lubrication program with a full-scale CMMS offering to give the best of both worlds. Visit [computexmms.com](http://computexmms.com) to find out more. Professional lubrication surveys are also a part of this offering. These include data accumulation through the use of a notepad PC that can immediately upload survey results into Computex MMS on-line. This enables instantaneous use and more rapid implementation than previously seen.

**Lubrication Training:** Both on-line and face-to-face training is available from Chevron’s talented group of trainers. A lack of lubrication knowledge has been cited as one of the main causes of lubrication failures. Increasing the lubrication competency of your maintenance and production staff can dramatically improve your lubrication reliability.

**Extended Life Coolant Kits:** these kits allow for the on-site testing of Extended Life Coolant. By using this tool, you can effectively and safely get the most out of using Extended Life Coolant.

**ISOCLEAN Automatic Lubricators:** these automatic grease lubricators are used in hard-to-access areas as well as areas of criticality. By employing this timer controlled, regulate volume, injection of grease into bearings, best-in-class facilities can maximize lubrication efficiency and reliability.

### **FINAL WORDS**

As the recovery effort begins to make an impact on New Orleans and the surrounding areas, we recognize that the health and welfare of your family are the first priority. Chevron has established a Hurricane Katrina Relief fund that is growing every day. Contact your local Chevron representative for assistance in any of these areas.

All the best to you and your families in this time of turmoil,



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