Attachment F. Department of Toxic Substances Control's Review and Comments to Lubrizol Final Report: Multimedia Evaluation, PuriNOx Fuel (Public Version)

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Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Catherine Witherspoon
Executive Officer
California Air Resources Board

FROM: Peggy Harris, P.E., Chief
Regulatory and Program Development Division
Hazardous Waste Management Program

DATE: February 27, 2004

SUBJECT: REVIEW AND COMMENTS TO LUBRIZOL FINAL REPORT: MULTI-MEDIA EVALUATION, PURINOX FUEL

Attached is the Department of Toxic Substances Control's evaluation summary of the hazard effect of PuriNOx fuel on human health and the environment. LUBRIZOL Corporation proposed a new diesel fuel, PuriNOx. A major benefit of this fuel is reduction of air emissions from diesel engines. Pursuant to Health and Safety Code section 43830.8, Air Resource Board (ARB) cannot adopt any motor vehicle fuel regulations unless a multi-media evaluation is conducted and reviewed by the California Environmental Policy Council (Council). DTSC's evaluation is limited to assessing the related impact if PuriNOx and its components become a waste or are released into soil.

According to the data presented in the report, application of PuriNOx fuel can reduce PM and NOx air pollution. Most chemicals in the PuriNOx additives have low water solubility and were used in fuel industrial for many years. Compared with regular diesel, DTSC believes that PuriNOx fuel will not cause significant impact of groundwater due to the low solubility of additive components. However, the application of the PuriNOx fuel may potentially cause soil contamination. Soil cleanup technology needs to be further studied. You will find two summaries attached. One comment summary is a confidential document as it contains materials that LUBRIZOL has identified as

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confidential business information. The other one has been revised for release to the public.

If you have any questions, please contact Mr. Edward Nieto at (916) 322-7893.

Attachments

cc: Watson Gin, P.E.
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REVIEW AND COMMENTS TO LUBRIZOL FINAL REPORT: MULTIMEDIA EVALUATION, PURINOX FUEL
Version 2
December 4, 2003

Evaluation Summary:

DTSC reviewed LUBRIZOL final report titled "Multimedia Evaluation, PuriNOx Fuel" dated July 16, July 31, and September 5, 2003. PuriNOx fuel is a stable diesel emulsion comprised of diesel, purified water, and additives. Since the use of the PuriNOx fuel reduces engine air emissions, U.S. EPA granted registration for PuriNOx summer blend fuel on October 2, 2002, and California Air Resource Board issued a verification for PuriNOx fuel emission reduction on January 31, 2001. The LUBRIZOL report contains evaluation results, including air emission, chemical and physical properties of additive chemicals, toxicity of the additive chemicals, and potential impact to the environment. DTSC's mission is to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality, by regulating hazardous waste, conducting and overseeing cleanups, and developing and promoting pollution prevention. DTSC's review and comments below are related to potential impact on human health and the environment due to hazardous waste and constituent releases to groundwater and soil. Evaluation on component environmental fate and toxicity are not included here, as they were addressed in State Water Resources Control Board's staff review.

The amount of additives used in California could be 80,000 gallons per year initially and grow to 1,100,000 gallons per year. It is anticipated that in 2003 approximately 3 million gallons of PuriNOx fuel will be marketed and sold in California compared to 2.9 billion gallons of diesel fuel. By the year 2012, the market share of PuriNOx fuel is anticipated to be 40 million gallons annually compared to 4.1 billion gallons of diesel consumption in 2012. Over the next 10 years it is anticipated that approximately 150-250 million gallons of PuriNOx fuel will be utilized in California.

There are two type of PuriNOx fuel: Generation 1 and Generation 2, based on the additive formulations utilizing similar chemical components. The quantities of additives in the PuriNOx emulsion are very small. Water concentrations are 20%.

Potential release scenarios for both the additive package and PuriNOx fuel are during transportation, blending and storage process. The additive package is manufactured

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outside California, so hazardous waste generation or release of the additive package during manufacturing is not a relevant pathway in California. The PuriNOx additive packages are not currently stored in underground storage tanks and the majority of storage will likely be in aboveground storage tanks. Both batch and continuous blenders may be used to create the PuriNOx diesel-water emulsion. Spill prevention applied for transportation, blending and storage of PuriNOx fuel and additive packages is similar to that for diesel fuel management.

The chemicals in both PuriNOx additives consist of large molecular polymers and small molecular inorganic chemicals. All of them or chemically similar materials have been used in the fuel and lubricant industry for over 20 years. LUBRIZOL's final evaluation report provided the major environment-relative properties of individual components in the additives, including human health toxicity, water solubility, soil adsorption coefficient, and their current commercial applications. Spill prevention applied for management of PuriNOx fuel and additives is similar to that for diesel fuel management.

Discussions and Recommendations:

According to the information provided in the LUBRIZOL evaluation report, DTSC does not expect that the individual chemicals in the PuriNOx additives will contribute significantly to the hazardous properties of diesel fuel due to their low concentrations. DTSC believes that use of PuriNOx fuel will not cause significant impact to groundwater if spill from transportation, blending, and storage can be mitigated. Most chemicals in the PuriNOx additives have low water solubility, except one inorganic salt, which are commonly used in agriculture field. Therefore, the spill of PuriNOx fuel is unlikely to pose a threat to groundwater.

However, the most significant impact from accidental release will be soil contamination due to the strong soil adsorption of the additive components. Data shows that 96.6% - 99.8% of additive chemicals will distribute into soil if accidentally releases into all three media (air, water, and soil). It may be more difficult to remove these additive chemicals from contaminated soil than diesel fuel. Therefore, DTSC recommends that a feasibility study on cleanup of PuriNOx fuel contaminated soil needs to be conducted.

The LUBRIZOL report has provided detailed data on physical, chemical and environmental toxicity characteristics of individual PuriNOx additive chemicals. The report also indicated that concentrations of each chemical in PuriNOx fuel are very low. It seems that their toxicity characteristics carried by individual chemicals, if any, would not pose significant impact to human health and the environment at such low concentrations.

Although the evaluation report provided detailed information, there are other uncertainties that are not addressed. The non-hazardous properties may need to be re-evaluated if the use of PuriNOx fuel is significantly increased. There are still potential spill scenarios even though all operation and construction processes are in compliance with applicable regulatory requirements. Soil contamination could be caused accidentally. For example, there is no secondary containment constructed for the continuous blenders. Therefore, as mentioned above, a feasibility study on cleanup of the spilled additives from contaminated soil is important.

Conclusions:

DTSC staff reviewed the final report of PuriNOx Fuel Multimedia Evaluation dated July 16, 2003. Based on DTSC's review, we would not oppose to use the PuriNOx fuel as an alternative fuel. According to the data presented in the report, application of PuriNOx fuel can reduce PM and NOx air pollution. Most chemicals in the PuriNOx additives have low water solubility and were used in fuel industrial for many years. Compared with regular diesel, DTSC believes that PuriNOx fuel will not cause significant impact of groundwater due to the low solubility of additive components.

However, the application of the PuriNOx fuel may potentially cause soil contamination. Soil cleanup technology needs to be further studied.