

Hazardous Waste Evaluation

Department of Toxic Substances
Control (DTSC):

- Assess potential impact on human health and environment due to hazardous waste and releases to the groundwater/soil
- Reviewed potential release scenarios for PuriNOx and additives during transport, blending, and storage

Hazardous Waste Evaluation (cont)

Findings:

- Use of PuriNOx fuel will not significantly differ from the present impacts of diesel fuel use
- A PuriNOx spill most likely will not cause significant impact to groundwater
- An accidental release of PuriNOx fuel will be adsorbed in soil more strongly than typical diesel fuel

Key Findings

- No issues that preclude the limited use of PuriNOx while concurrently addressing knowledge gaps
- Compared to CARB diesel fuel:
 - Reduces PM and NOx emissions
 - Reduction in PM and NOx reduces mortality and morbidity due to lung diseases
 - Identified where more knowledge would be beneficial

Peer Review

Peer Review

- Peer Reviewers from University of California
 - Exposure assessment, Thomas McKone, Ph.D., LBNL
UCB Peer Review Coordinator
 - Air emissions, Don Lucas, Ph.D., Lawrence Berkeley
National Laboratory (LBNL)
 - Effects on underground storage systems, Timothy Ginn,
Ph.D., UCD Peer Review Coordinator
 - Water quality, Graham Fogg, Ph.D., UCD
 - Aquatic impacts, Michael L. Johnson, Ph.D., UCD
 - Biodegradation, Kate Scow, Ph.D., UCD
 - Human health impacts, Hanspeter Witschi, Ph.D.,
Emeritus

Peer Reviews (cont)

- Support conclusion of multimedia evaluation that the limited and controlled use of PuriNOx does not pose a significant adverse impact on public health and the environment as compared to California diesel fuel
- Support recommendations to conduct studies concurrent with limited use of PuriNOx

Recommendations

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- Find that the limited and controlled use of PuriNOx formulations as described in the multimedia assessment does not pose a significant adverse impact on public health and the environment as compared to California diesel fuel

Recommendations (cont.)

- The Council's finding be conditioned on the following:
 - Lubrizol shall provide additional information and studies to fill knowledge gaps
 - Requested information and studies shall be provided on a prioritized schedule

Modification to Recommendations

- Lubrizol requested modifications to the staff's recommendations
- ARB, SWRCB, OEHHA, DTSC, and Cal/EPA reviewed Lubrizol's request

Suggested Modifications

- Lubrizol requested:
 - All suggested studies to be completed
 - Schedule is adjusted to reflect a reasonable timeframe and effort to conduct studies
 - Studies prioritized to provide short-term and long-term evaluations

Modified Recommended Conditions

- Lubrizol shall provide additional information and studies to fill knowledge gaps on the following schedule:
 - National annual PuriNOx sales is less than 5 million gallons:
 - Analytical test methods (complete within 1 year)
 - Compatibility information (completed within 1 year)
 - Short term soil, aquatic, and biodegradation studies (completed within 2 years)

Modified Recommended Conditions (cont.)

- National annual PuriNOx reaches 15 million gallons:
 - Supplemental biodegradation studies (completed within 5 years)
 - Supplemental aquatic toxicity testing (completed within 5 years)

Modified Recommended Conditions (cont.)

- National annual PuriNOx sales reaches 30 million gallons or when national cumulative sales volume exceeds 180 million gallons :
 - Environmental fate and transport comparative study (completed within 7 years)
 - Conduct comparative test for nitrosamines (completed within 4 years)

Modified Recommended Conditions (cont.)

- The requested information and studies shall be reviewed and approved by the appropriate Board, Department, or Office of California Environmental Protection Agency (Cal/EPA) and shall be coordinated through ARB.

Modified Recommended Conditions (cont.)

- Before the submission of information and design of studies requested, Lubrizol shall consult with the appropriate Board, Department, or Office of the Cal/EPA.

Modified Recommended Conditions (cont.)

- In the event that short term studies indicate significant risk to public health or the environment, the supplemental biodegradation and aquatic toxicity studies shall be conducted on an expedited schedule
- In the event that the requested information indicate significant risks to public health or the environment, the use of PuriNOx will be reviewed by the California Environmental Policy Council for consideration for appropriate action

Air Quality Evaluation

Summary of Air Quality Assessment

- Assessment based on a relative comparison to CARB diesel fuel
 - Direct emissions measurements
 - Chemistry of CARB and PuriNOx fuels
- Criteria pollutants: NOx, THC, CO, PM
- Air toxic emissions: diesel PM, additives, other toxics
- Greenhouse warming gases: carbon dioxide, black carbon

Comparative Emission Studies

- Results from Lubrizol Internal Research and Development
- Results from CARB Diesel Retrofits In-Use Program (CARB Verification)
- Results from U.S. EPA Registration

Criteria Pollutant Emission Results

- PuriNOx compared to diesel reduces PM and NOx emissions and increases total hydrocarbon (THC) emissions
 - On-road Emissions
 - Significant reductions in PM and NOx
 - Small increase in THC

Impact on On-road Emissions in SCAB in 2010

– Impact on PM, NOx, and HC

- Reduce PM by .22 tons/day-a 6% reduction in PM from on-road Heavy-Duty Diesel Engines
- Reduce NOx by 2.4 tons/day-a reduction in NOx of 0.3% from all sources, 1.1% from on-road Heavy-Duty Diesel engines
- Increase in ROG of 0.70 tons/day

Toxic Emissions

- PuriNOx results in significant reduction in diesel toxic emissions overall

PuriNOx Generation 1 and Generation 2 Formulations

- Criteria and toxic emissions similar for Gen 1 and Gen 2

ARB Staff Conclusions

- Significant reduction of PM and NOx
- Toxics
 - Significant reduction in emissions and risk from diesel PM
 - Of specific toxics with increased emission rates, absolute levels are small and does not appear to be a significant cancer risk
- The small increase in combustion efficiency results in a small reduction in greenhouse gases