

Testimony for D-1

I oppose Aerial Fireworks.

Hawaii Administrative. Rules (HAR) § 13-252-6  
**§ 13-252-6. Littering or Polluting Water Prohibited.**

No person shall place, throw, deposit, or discharge, or cause to be placed, thrown, deposited, or discharged into the ocean waters or shores any litter, sewage, or other gaseous, liquid, or solid materials which render the water unsightly, noxious, or otherwise unwholesome and detrimental to the public health and welfare or to the enjoyment of the water or shore.

What is the cost to environment for something that is not critical to have, just nice to have?

Mahalo

Keone Downing



**Backcountry Attitude**

*Enjoy  
Travel Lightly  
Minimize Impact*



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**SmartMeterEducationNetwork.com      MichiganStopSmartMeters.com**

[Backcountry Attitude Home](#) >> [Leave No Trace](#) >> [Fireworks pollution](#)

## Fireworks - Cheap Thrills with Toxic Consequences

**Pollution from Fireworks is an Unnecessary Risk to Our Personal and Environmental Health**

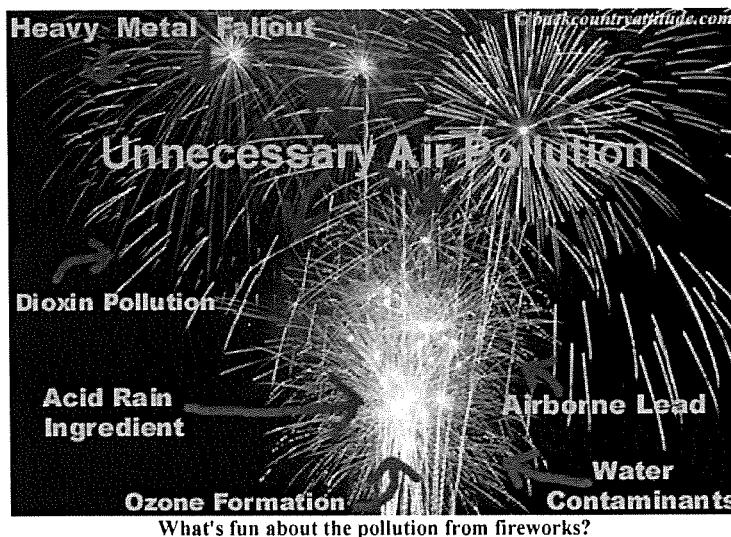
[The Polluting Patriot -- How Fireworks Pollute -- The Toxic Elements -- Research](#)  
[Fireworks Alternatives](#) -- [More Thoughts on Fireworks](#) -- [References](#)

### Why Celebrate those Special Occasions by Polluting?

*Is poisoning the air and water a patriotic way to recognize the 4th of July??*

*Is unnecessary air pollution a good way to ring in the New Year??*

Do you consider yourself environmentally conscious and responsible?? You might not know that all those colorful explosives used to celebrate special occasions.... (your firecrackers, skyrockets, Roman candles and yes even those so-called "harmless" sparklers)... pose a serious environmental and health danger from heavy metals and other toxic firework fallout. So the next time you are about to set off or buy some cheap fireworks or even attend an outdoor fireworks display, ask yourself..... **Is a few minutes of pyrotechnic entertainment really worth needlessly polluting the environment?**



What's fun about the pollution from fireworks?

### How Fireworks Cause Pollution

Fireworks contribute to polluting or damaging our planet in various ways throughout their life cycle.

- **Manufacturing:** Raw materials and energy are used to create the final firework product. Firework ingredients often come from elements that need to be mined from the earth. Mining is not exactly

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environmentally friendly. Minerals then need to be processed and isolated... often with chemicals. Fireworks use plastic plus paper & cardboard (which kills trees) and are all made at factories that pollute.

- **Transportation:** Firework components are transported to the firework assembly plant, finished fireworks are transported to their various distribution centers and stores. Transporting may include planes, boats, and trucks. I don't need to tell you the pollution that vehicles cause. And don't forget that the consumer drives to purchase the fireworks, sometimes hundreds of miles to another state to bypass local restrictions.
- **Combustion:**
  - **Air Pollution:** The smoke from fireworks consists mainly of fine toxic dusts (particulate matter) that can easily enter the lungs. This represents a real threat for people with asthma or multiple chemical sensitivity (MCS). Smoke from fireworks combustion may contain a mixture of sulfur-coal compounds, traces of heavy metals, and other toxic chemicals or gases. The combustion cloud can contain harmful fumes such as ozone, sulfur dioxide and nitric oxide. Smoke from consumer fireworks is of most concern because they are released at a low level which makes inhalation more likely compared to professional displays. Additionally, in this time where the issues of climate change and global warming are being presented with a sense of urgency, we need to be concerned about the greenhouse gases fireworks produce, which include Carbon dioxide (CO<sub>2</sub>) and ozone.
  - **Water Pollution:** Fireworks fallout can contaminate water supplies and residue on the ground can be carried away by rain and end up in our lakes, rivers, or oceans.
  - **Noise Pollution:** Fireworks can be loud and the vibrations can travel far. In the middle of the night fireworks often disturb people trying to sleep. Fireworks can exceed 140 decibels and noise at 85 decibels or above can damage hearing. Some people also argue the noise from fireworks scares pets and wildlife like birds, etc.
- **Accidents:** In 2000-2004, fireworks started an estimated 32,300 reported fires per year, including 2,700 building and vehicle fires. More fires are reported on the 4th of July than any other day of the year [1].

For the color effect of fireworks, toxic heavy metals like barium, aluminum, lead, mercury salts, antimony, copper, and strontium can be used in firework compositions. Outdated heavy metals that have been used in the past include rubidium and cadmium. Some toxic elements are supposedly not used in fireworks anymore like lead compounds, chlorates, and mercury as mercurous chloride (calomel), but some firework chemical outlets still sell some of these ingredients, they can still be seen in some pyrotechnic chemical lists, and homemade fireworks makers still sometimes talk about using them.

Many fireworks are imported from China which is scary because they have a proven track record of cutting corners by using cheaper, more toxic materials. Some of the metals also have radioactive isotopes... hopefully they aren't being used in any fireworks. The American Fireworks Standards Laboratory (AFSL) has established a testing and certification program for Chinese and U.S. fireworks to determine if they are being produced according to AFSL Standards (which meet all U.S. federal requirements). There is a list of prohibited toxic chemicals in the standards but unfortunately participation in the program is voluntary for manufacturers and importers. Firework shipments that pass standards only assure that one random sample from the lot has been tested and met all requirements [2]. Will you trust the quality of your air to China??

### The Toxic Elements of Fireworks - Pick Your Poison

<u>Toxic Element</u>	<u>Fireworks Usage</u>	<u>Toxic Effect of Fallout Dust &amp; Fumes</u>
Aluminum	brilliant whites	Contact dermatitis, bioaccumulation
Antimony sulfide	glitter effects	Toxic smoke, possible carcinogen
Arsenic compounds	Used as colorants. Sadly still out there. [3]	Toxic ash can cause lung cancer, skin irritation and wart formation.
Barium Nitrate	glittering greens	Poisonous. Fumes can irritate respiratory tract. Possible radioactive fallout. [4]
Copper compounds	blues	Polychlorinated dioxins and dibenzofurans. [5] Can bioaccumulate. Cancer risk.

Hexachlorobenzene (HCB) [5]	Use was supposed to be banned globally.	Persistent environmental toxin. Is a carcinogen, mutagen and a reproductive hazard [13].
Lead Dioxide / Nitrate / Chloride	oxidizer	Bioaccumulation, developmental danger for kids & unborn babes, may remain airborne for days, poisonous to plants & animals
Lithium compounds	blazing reds	Toxic and irritating fumes when burned
Mercury (Mercurous chloride)	chlorine donor	Toxic heavy metal. Can bioaccumulate.
Nitric oxide	fireworks byproduct [6]	Toxic by inhalation. Is a free radical
Nitrogen dioxide	fireworks byproduct [6]	Highly toxic by inhalation. SIDS risk [8].
Ozone	fireworks byproduct [7]	Greenhouse gas that attacks & irritates lungs
Perchlorate - Ammonium & Potassium	propellant / oxidizer	Can contaminate ground & surface waters, can cause thyroid problems in humans & animals
Potassium Nitrate	in black powder	Toxic dusts, carcinogenic sulfur-coal compounds
Strontium compounds	blazing reds	Can replace calcium in body. Strontium chloride is slightly toxic.
Sulfur Dioxide	gaseous byproduct of sulfur combustion	Acid rain from sulphuric acid affects water sources, vegetation & causes property damage. SIDS risk [8].

### **Fireworks Research**

A case study has shown that within 1 hour of fireworks displays levels of Strontium in the air increased 120 times, Magnesium 22 times, Barium 12 times, Potassium 11 times, and Copper 6 times more than the amount present in the air before the event. Strontium was found to be the best tracer in this study because it measured very high during the event and much lower at other time intervals which indicated that it was mostly a result of the fireworks display. [9]

Another study found that firework events brought air pollution spikes in suspended particles, Nitric oxide (NO), Sulfur dioxide (SO<sub>2</sub>), and created and dispersed an aerosol cloud hosting a range of metallic elements. The researchers found that although the "recreational pollution" from fireworks is transient in nature, the pollutants are highly concentrated and add significantly to the total yearly metal emissions and the particles are on average small enough to be easily inhaled which poses a health risk to sensitive individuals. [10]

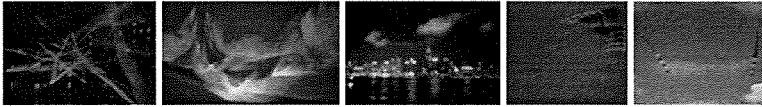
Researchers have found that fireworks can create a burst of ozone which is an extremely reactive greenhouse gas molecule that can attack and irritate the lungs. The ozone is believed to be caused by ultraviolet light released by chemicals in fireworks... which in this study were sparklers. [7]

A 3 week study in London recorded two major festivals celebrated with pyrotechnic events and found that they were marked by increased gas phase pollutant levels of Nitric oxide (NO<sub>x</sub>) and Sulfur dioxide (SO<sub>2</sub>), elevated PM mass concentrations, as well as trace metal concentrations, specifically Strontium (Sr), Magnesium (Mg), Potassium (K), Barium (Ba), and Lead (Pb). These changes in air quality were then related to the oxidative activity of daily PM samples by assessing their capacity to drive the oxidation of physiologically important lung antioxidants. Because of the elevated PM concentrations caused by firework activity and the increased oxidative activity of this PM source, the researchers believe more work needs to be done in examining if exposure to firework derived PM is related to acute respiratory outcomes. [11]

Another study from 2010 attempts to estimate the probable health impact of exposure to the pollution caused by fireworks. Using risk data from epidemiological studies conducted in USA, they estimated that when exposed to air pollution from fireworks the relative risk of cardiovascular mortality would increase as high as 125.11% and the relative risk for cardiovascular morbidity was found to increase 175.16% over a regular winter day. The authors conclude that further studies on control measures for firework displays are needed to help reduce the probable health hazards to the general public. [12]

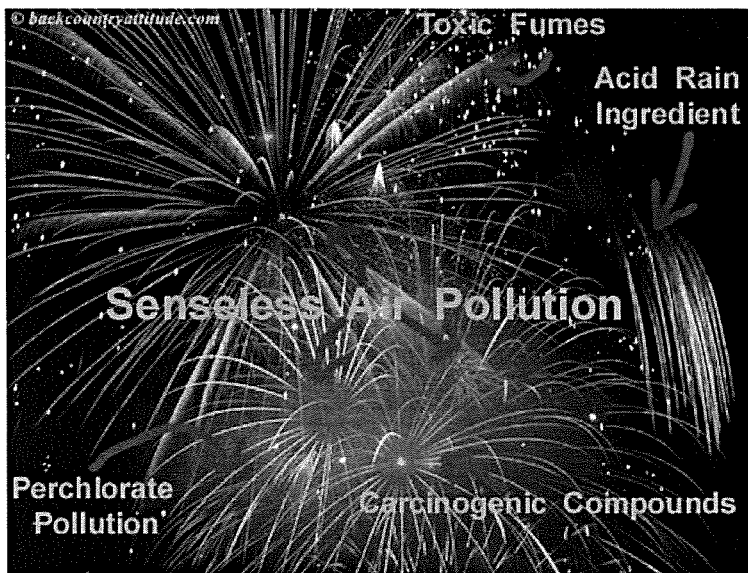
### **Fireworks Alternatives**

- How about we protect our health and the health of our outdoor environment by switching to an environmentally friendly laser light show?
- How about a block party to celebrate?
- A stunt kite show at night with some LED's would be cool.
- Try watching the stars or organize an outdoor movie.
- Some people are organizing community drum circles and drumming instead of lighting fireworks.
- Indoor fireworks projectors are small devices that can be used indoors that produce convincing reproductions of firework displays as well as simulating the noise of real fireworks.
- Electronic fireworks display lamps produce colorful explosions of light all night long without the pollution or noise of real fireworks.
- Electronic pyrotechnics don't use explosives either. Electronic blasts can form a canopy up to 25 feet in the air that rain down glitter, confetti, rose petals or even candy.
- Just imagine all the possible more meaningful and beneficial ways we could use all the money spent on fireworks that wouldn't pollute our environment.



### If you Must...

- If fireworks must go on then displays should use air-launch technology, which utilizes compressed air to launch the fireworks instead of gunpowder, in combination with fireworks with low-gunpowder formulations. There is talk of new shells that use "biodegradable plastic" but what remains to be seen is if they are 100% non-toxic and leave no nano-plastic residues after breakdown, plus we still need to know what conditions they require to biodegrade.
- Avoid Chinese made fireworks because of their pattern of using banned or more toxic chemicals without regard for the safety of the rest of the world.
- Low-smoke pyrotechnics produce practically none of the smoke or ash that traditional black powder fireworks do. Although they are being tagged as environmentally friendly or "green fireworks" the combustion byproducts still contain carbon dioxide which is a harmful greenhouse gas and also trace amounts of toxic metal salts. In addition ammonium perchlorate could still be used as an oxidant which still has the potential to contaminate water supplies. In a positive note less heavy metal salts are needed to produce the color effects. Unfortunately fireworks will never be eco-friendly but will be subject to greenwashing that distracts people with good intentions from the overall negative environmental impacts.



Cheap fireworks give inexpensive thrills but what about the pollution???

### Fireworks - Cheap Thrills or Head for the Hills?

Personally I take the health risk from fireworks very seriously. Around the 4th of July I try to always be hiking or camping and seeking shelter outdoors... as far away from the noise and toxins as possible. If for some reason I can't be on the trail backpacking then I'll hole up indoors next to my air filter. I think we need to become more socially responsible in regards to fireworks. The smoke from consumer fireworks take away peoples right to

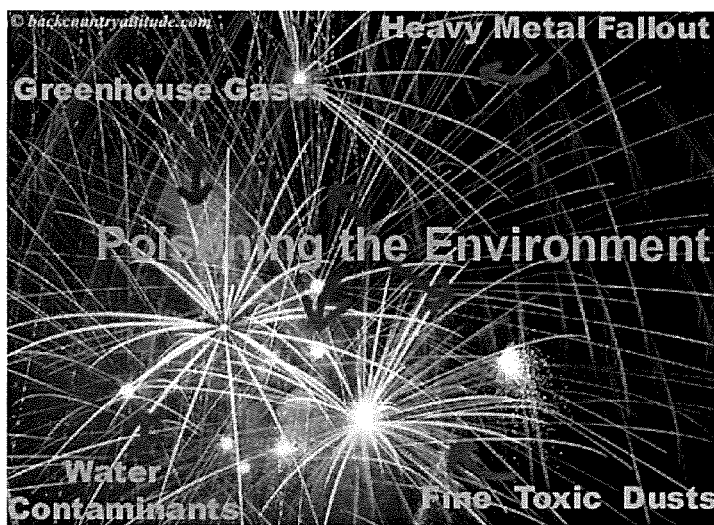
breathe clean air. This is ironic because the 4th of July is Independence Day, yet people who are sensitive to the clouds of smoke that cover metropolitan areas are held prisoner indoors as they flee the toxic firework fumes.

We also need to be more environmentally responsible as well. When you buy fireworks you are buying the whole pollution cycle... from the beginning to the end of the product. We should be concerned about how all the pollutants related to fireworks can affect our environment and our health. Fireworks not only pollute the air and water with heavy metals, etc. but they also cause noise pollution and physical litter. Does anyone enjoy picking up stray fireworks (bottle rockets, etc.) from their yard, garden, etc? When I hear about fireworks safety it makes me laugh because the pollution from these colorful displays of toxic exploding materials doesn't seem safe to me. It really seems to me that the cheap thrills that fireworks provide are just an empty distraction and really have nothing to do with the actual true recognition of a particular holiday. Besides the big 4th of July holiday in the US, in the UK on the fifth of November... Guy Fawkes Night (aka Bonfire Night) is frequented with fireworks, and there is also the environmental disaster that is Diwali over in India.

### **Take a Stand Against Fireworks**

- Write, call, or meet your local or state officials and tell them your concerns regarding outdoor air pollution and noise pollution from fireworks.
- The Clean Air Act permits state and local governments to enact laws relating to the prevention and control of outdoor air pollution.
- Pollutants discharged by fireworks also need to be regulated in accordance with the Clean Water Act. Recently some environmental groups have caused the cancellation of some fireworks shows held over water, after threatening organizers with a Clean Water Act lawsuit for lacking the appropriate permits.
- Boycott outdoor fireworks displays and encourage others to do the same.
- Have your local police department enforce any laws pertaining to fireworks.
- Educate others by sharing the pollution dangers of fireworks.

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



Fireworks are truly hazardous to the environment.

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- [1] "Fireworks." [National Fire Protection Association](#), April 2007
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- [4] Steinhäuser G and Musilek A. "Do pyrotechnics contain radium?" [Environ Res. Lett.](#) 4 034006 July-September 2009
- [5] O. Fleischer. "Release of polychlorinated dibenzo-p-dioxins and dibenzofurans by setting off fireworks." [Chemosphere](#) Volume 39, Issue 6, September 1999
- [6] Russell, Michael S. [The Chemistry of Fireworks](#). 2000
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- [8] Dales, Robert. "Air Pollution and Sudden Infant Death Syndrome." Pediatrics Vol. 113 No. 6 June 2004
- [9] Vecchi, Roberta. "The Impact of Fireworks on Airborne Particles." Atmospheric Environment Volume 42, Issue 6, February 2008
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## The Environmental Impact of Professional Fireworks Displays

Like many other objects created and consumed by humans, the use of fireworks has an impact on the environment. The devices that produce the beautiful colors and large booms are manufactured from a number of chemical compounds. Professional fireworks displays typically contain many of these devices set off over a large field or body of water within a short duration—often lasting less than ten minutes.

The pyrotechnic reaction within a fireworks device consists of two primary ingredients: the fuel and the oxidizer. By adding energy, an exothermic chemical reaction occurs and the fuel contained within the compound is oxidized. The resultant reaction results in the emission of heat, certain wavelengths of light and, depending upon the speed of the reaction, audible sound waves. The resultant derivative compounds from these reactions vary depending upon the originating composition.

The two primary oxidizers utilized in display fireworks are Nitrates and Perchlorates. Nitrates—Potassium Nitrate (Saltpeter) in particular—is a primary component of black powder, which serves as the most common propellant and can comprise as much as 40 percent of the total weight of the device. Potassium Nitrate is typically mixed with Charcoal and Sulfur as fuels. Perchlorates are typically used to oxidize the metal salts that produce the colors. Other fuels commonly used include Strontium Nitrate, Aluminum, Barium Chloride, Iron and Copper Chloride. Derivatives of particular interest from these reactions include Nitrogen Oxide, Sulfur Dioxide, Ozone, Carbon Monoxide, and Carbon Dioxide. In addition a small amount of particulate matter is produced containing compounds such as Potassium Oxide, Barium Chloride, Strontium Chloride, and Aluminum Oxide. Important to note is that the quantity of fuels in a typical fireworks device is rather small, typically less than 5% of the total weight of the device. Other non-reactive components present include binders and paper compounds.

While the emissions from pyrotechnic reactions are pollutants, the quantity produced in a typical fireworks display is small in comparison to other common sources. For example, the emission of these gasses and particulates from a single commercial passenger airplane flight is far greater than the emissions of one 5-minute long fireworks show. Moreover, studies have indicated that hazardous concentrations of these gasses quickly dissipate to background levels in both a short time and distance from the discharge site. Testing has shown particulate matter concentrations are also small due to their dispersal over a relatively large area, and compounds present within this particulate are relatively inert. Again, the concentration of particulates is miniscule in comparison to other common sources such as automobile exhaust emissions.



One area of concern that studies have identified is perchlorate contamination. Residual amounts of the oxidizer have been detected at various sites following fireworks displays. Since perchlorates are highly soluble in water, this is a particular concern for areas where the watershed incorporates drinking water sources or in small, closed bodies of water such as ponds. In larger bodies of water or areas of high circulation (such as the ocean) however, the high solubility actually benefits dispersal and minimizes impact.

Pollution is measured as the relationship between a compound's toxicity and its concentration in a given area. The natural dispersion of the compounds present in pyrotechnic products during the oxidation process and their limited use over time in any single area causes the actual level of pollution to be relatively small--especially when compared to other forms of industry performed in a single location over a long period of time. As with any activity, progress must be made to mitigate any adverse impact on the environment. In recent years, there are many compounds which have been eliminated from fireworks compositions in order to increase safety and reduce toxicity, such as arsenic, chlorates, and lead. There has also been significant progress made recently in eliminating the use of perchlorates as oxidizers within the industry, though there are still significant economic barriers to overcome. While the adverse impact of fireworks on the environment is not zero, the quantity of pollutants generated and their infrequency of use makes them a fairly insignificant contributor to the adverse environmental impacts of modern human life.

## References:

*"Impact of Ambient Air Quality by Outdoor Fireworks Displays in Hong Kong"*, Andrew Tang, Wilson Mau, October 2013

*"Evaluation of Perchlorate Contamination at a Fireworks Display"*, Massachusetts Department of Environmental Protection, August 2007

*"Perchlorate: Health Effects and Technologies for Its Removal from Water Resources"*, Asha Srinivasan and Thiruvengkatachari Viraraghavan, April 2009

*"Fireworks and Particulate Matter (PM<sub>2.5</sub>)"*, Huang Chaxiang and Yang Lin, October 2013

*"Perchlorate Behavior in a Municipal Lake Following Fireworks Displays"*, Richard T. Wilkin, Dennis D. Fine, and Nicole G. Burnett, May 2007



## Sea Engineering, Inc.

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Phone: (808) 536-3603 • FAX (808) 536-3703 • [www.seaengineering.com](http://www.seaengineering.com)

March 9, 2016

Miss Stephanie Pascual  
Vice President  
Hawaii Explosives & Pyrotechnics, Inc.  
P.O. Box 1244  
Keaau, HI 96749

Dear Stephanie.

Sea Engineering, Inc. conducted a debris inspection of the waters fronting the Hilton Hawaiian Village on March 9, 2016. Diving was conducted under OSHA and ADCI guidelines, which require a minimum 3-man team. Divers inspected the project area, shown in Figure 1 below, for any firework debris. Debris was collected using hands, nets and game bags and brought back to shore for collection and analysis by HiPyro personnel. Visibility during the inspection was estimated to be 2 to 4 ft., with better visibility in some areas. SEI estimates that approximately 100% coverage of the area completed over the 4-hour period. Divers swam transects both parallel and perpendicular to shore using fixed compass headings.



Figure 1: Inspection Area

Bottom conditions were a combination of soft silty sand, small cobble and live-rock. SEI divers found a combined total of approximately 3 gallons of debris associated with the project. To note, approximately 1.5 to 2 gallons of plastic, coffee cups and general beach user debris was also found. SEI divers estimate that 95% of the debris was found in area "A" with the remaining 5% found in area "B". Divers did not find any debris in area "C".



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If you have any other questions regarding the findings please do not hesitate to contact me.

Regards,

Andrew Rocheleau, Marine Operations Manager

**From:** [Bruce Albrecht](#)  
**To:** [DLNR.BLNR.Testimony](#)  
**Subject:** [EXTERNAL] Fwd: June 12 Grand Hyatt display testimony  
**Date:** Thursday, May 12, 2022 1:07:46 PM  
**Attachments:** [image001.png](#)

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Aloha,

Please add the following content to the testimony if item D-1 on the May 13, 2022 Board meeting agenda.

Mahalo,

**Bruce Albrecht**  
**Operations Manager**  
**Hawaii Explosives And Pyrotechnics, Inc.**  
**808-968-0600**  
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[www.hipyro.com](http://www.hipyro.com)

*Aloha,*

*We are writing this letter on behalf of Hawaii Explosives and Pyrotechnics and the Meetings, Conventions, and Incentives market in Hawaii.*

*Corporate meetings, conventions, and incentives travel is essential to Hawaii's overall visitor industry. They not only provide jobs to hotel staff, such as bell men, valet, housekeeping, banquets, F&B, activity attendants, etc. Transportation companies, greeters, drivers, porters, and luggage tucks co.. They provide jobs for amenity companies, local artisans, hundreds of activities, venues – including privately owned ranches, historical venues such as Iolani Palace, Hulihee, Bishop Museum, Missouri, where the venue fees go toward the restoration for these locations that are vital to our cultural history. Meetings and incentives provide jobs to tenting and rental companies, florist, caterers, entertainers, staging, sound, and lighting companies. This is just a small sample of how the corporate incentive business provides thousands of jobs and significantly impacts the cultural and economic success in the state.*

*MC&A offers services that are equal or superior to other locations worldwide. Superior service demands an extra bit of flare, flawless execution, and must have lasting impact on groups. MC&A offers high-end entertainment options, one that includes ariel fireworks and displays. Our local award-winning Creative Service team works with partners like Hawaii Explosives and Pyrotechnics to create unforgettable events to seamlessly immerse and leave indelible memories for our clients and visitors.*

*We find it our responsibility to continue to foster and grow the meetings and incentives market throughout the state by offering superior services like Hawaii Explosives and Pyrotechnics, that compete with other destinations worldwide. Failure to do so would put Hawaii behind and have lasting effects of our economic future.*



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