March 10, 2005

Sunoco's Oregon Refinery: 21 accidents in the last six months

This report was compiled by Rachael Belz, Crystal Cottrill, and Spencer Dennis of Ohio Citizen Action and the Ohio Citizen Action Education Fund. It was compiled from Sunoco reports to Toledo Environmental Services, September 1, 2004-February 28, 2005.

During the past six months (September 1, 2004 - February 28, 2005), Sunoco's Oregon Refinery has had 21 accidents. The accidents varied, but included releases of the following pollutants: sulfur dioxide, black smoke, particulates, hydrocarbons, carbon monoxide, butane, natural gas, refinery fuel gas, and nitrogen oxide.

In almost 40% of the accidents, Sunoco released more than one type of pollutant. One-third of the 21 accidents involved sulfur dioxide releases, with six of the seven being permit violations. Neighbors have complained for years of sulfur and "rotten egg" smells from the refinery.

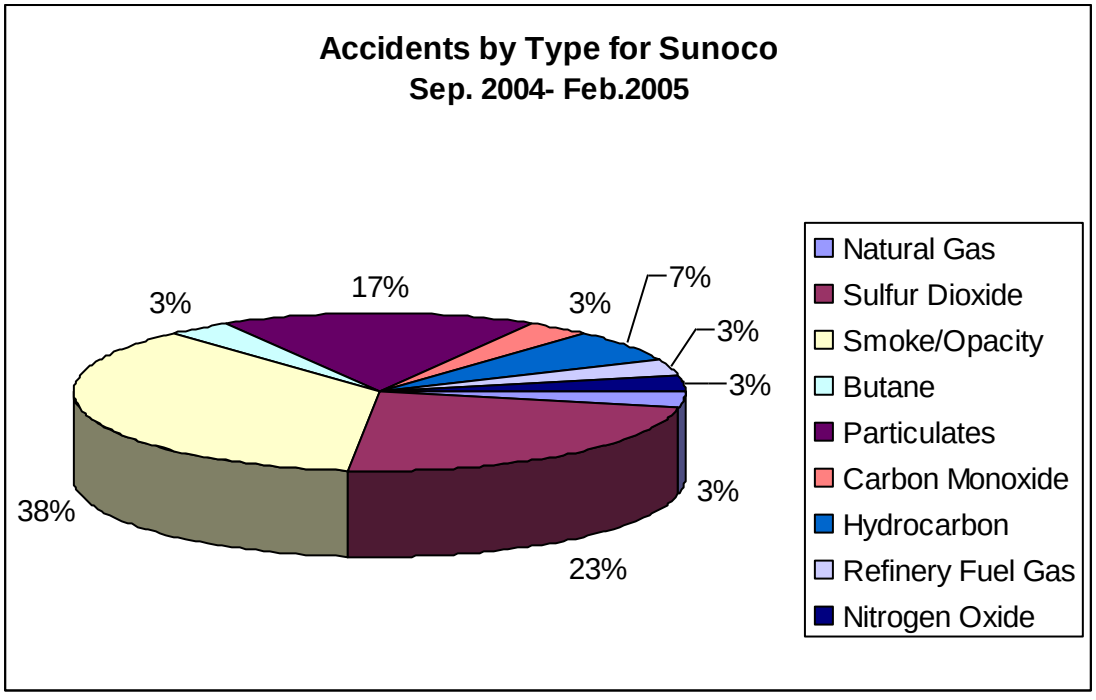

Figure 1: Accidents by Type for Sunoco

Ohio Citizen Action compiled this information from reports sent to Toledo Environmental Services from Sunoco's Oregon Refinery. Any enforcement actions, or consequences of the accidents are unknown. The company submits the accident information to the regulatory agency.

Independent verification is not required, so the accuracy of the information is dependent solely on the self-reporting of the company.

Accidents are often called malfunctions, upsets, equipment breakdowns, “near-misses”, emergency shutdowns, startups, etc. For the purposes of this report, all are classified as accidents.

The most complete of Sunoco’s reports were for sulfur dioxide releases. Much of the information was incomplete concerning releases of black smoke (opacity), particulates, hydrocarbons, butane, natural gas and refinery fuel gas.

October, December and January showed a particularly high number of accidents.

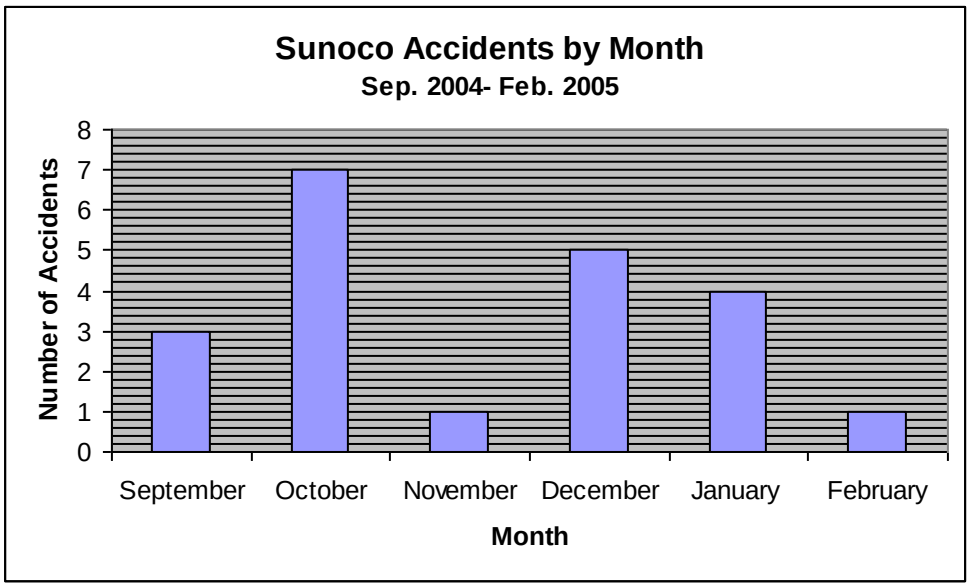

Figure 2: Sunoco Accidents by Month

On the chart of accidents, you will sometimes see more than one incident on the same day. As much as possible, Ohio Citizen Action listed together accidents that occurred at the same time. Accidents that were reported separately by Sunoco to Toledo Environmental Services were listed that way. For example, a sulfur dioxide release in excess of 500 pounds and a black smoke and/or particulate release of more than six minutes are separate permit violations, even if occurring simultaneously. Often more than one pollutant is released as part of the same accident. These are listed as one accident.

From the information Sunoco submitted to Toledo Environmental Services, it appears that most of the actions taken at the time of the upsets were of a "band-aid" nature, rather than a long-term fix. This may explain why in the past six months Sunoco has had similar problems with the same pieces of equipment. Ohio Citizen Action has found this to be the case in former Sunoco

accident reports as well (see *Sunoco Oregon Refinery - Upsets, accidents and malfunctions 2002-2003*) compiled by Ohio Citizen Action and released August 18, 2004. The report can be found at www.ohiocitizen.org/campaigns/sunoco/081804sun.html

The descriptions of cause and action sometimes include acronyms used by Sunoco and Toledo Environmental Services:

"FCC": Fluidized catalytic cracker
"HCC": Hydrogen catalytic cracker
"SRU": Sulfur recovery unit

Health effects associated with common pollutants released by Sunoco

Carbon monoxide: Symptoms of carbon monoxide exposure at lower concentrations in healthy people include headaches, decreased alertness, dizziness, flu-like symptoms, nausea, fatigue, rapid breathing, confusion, disorientation, impaired judgment and weakness. Symptoms of carbon monoxide exposure at higher concentrations include brain damage, coma and death.

Sulfur dioxide: Short-term exposure irritates and restricts airways, tightness in the chest, reduces mucus clearance. There are fewer long-term studies, but they suggest the health effects of long-term exposure are bronchitis and the suppression of the immune system.

Particulates: Studies show particles damage lungs by increasing asthma attacks, aggravating bronchitis, reducing lung function growth in children, and contributing to premature death and hospital visits of people with respiratory and cardiac problems.

Sources for health effects: "Poisons in our Midst" report by Ohio Citizen Action Education Fund; "Health effects of shipping related air pollutants" by Diane Mitchell, Ph.D., California EPA Air Resources Board; US Agency for Toxic Substances and Disease Registry

SUNOCO OREGON REFINERY ACCIDENTS

SEPTEMBER 1, 2004 - FEBRUARY 28, 2005

Date of release	Type of release	Quantity of release	Release duration	Cause(s) of release according to Sunoco	
9-14-04	Black smoke (opacity)	unknown	0.7 hour	When catalyst was being cleared from the FCC Unit, loose catalyst traveled to stack	
	Particulates	unknown	0.7 hour		
9-20-04	Black smoke	unknown	0.3 hour	Excess black smoke when boiler shut down due to faulty fuel gas controller; excess carbon monoxide from the carbon monoxide bypass being open.	
	Carbon monoxide	13,000 pounds	0.75 hour		
	Particulates	unknown	0.3 hour		
9-22-04	Smoke	unknown	0.33 hour	Upset at Hydrocracker unit caused excess gas vented to plant 9 flare, which caused smoke.	

10-3-04 to 10-04–04	Sulfur dioxide	957 pounds	1.0 hour	The Hydrogen Catalytic Cracking Unit (HCC) is equipped with an Emergency Depressuring System to depressure the unit to the flare in the event of an emergency. A bleeder valve on an exchanger broke, allowing distillate material to be discharged to the refinery sewer system. Emergency Depressuring System depressured the material in the reactors to the flare after loss of feed.	
	Hydrocarbon vapor cloud	unknown	not complete		
10-05-04	Smoke	unknown	0.1 hour	Hydrocracker being restarted from 10/03/04 valve failure; excess gas was vented to the Plant 9 flare and caused smoke.	
10-07-04	Sulfur dioxide	2,560 pounds	8.1 hours	A compressor that processes gas from the FCC unit shut down after an electrical malfunction, caused by water getting into the compressor motor. With the compressor down, gas normally processed by the compressor was diverted to Flare 4. FCC unit was shutdown, other refinery operating unit rates decreased to reduce amount of gas being flared. Even after the FCC unit was shut down, some gas was still being sent to the Plant 4 flare. Sunoco personnel eventually discovered an open relief valve that was allowing gas to be sent to the flare.	
	Smoke	unknown	1 hour		

10-07-04	Black smoke	unknown-opacity limits exceeded	1 hour	The above accident caused excess smoke to be released, exceeding opacity limits.	
10-8-04	Sulfur dioxide	3,942 pounds	1.5 hours	FCC Unit was restarted after 10/7 shutdown, difficulties with start up caused some gas containing sulfur diverted to Plant flare 4.	
10-08-04	Black smoke	unknown	0.4 hour	Excess black smoke during FCC unit start up due to 10/7 electrical problems.	
	Particulates	unknown			
10-16-04	Sulfur dioxide	unknown amount, SRU exceeded daily emissions limit	24 hours	There were excess sulfur dioxide emissions from the Sulfur Recovery Unit, which was unable to operate in compliance at low operating rate due to Hydrocracker unit and sour water stripper start up. Exceeded daily emissions for Sulfur Recovery Unit.	
11-18-04	Sulfur dioxide	133 pounds	1 hour	Sulfur dioxide released from plant 4 flare, reason not given.	
12-07-04	Butane	not recorded	not recorded	Relief valve on process unit opening and closing rapidly, which caused a release of butane.	

12-11-04	Black smoke (opacity)	unknown	3 separate releases- total of 0.4 hour	Excess opacity occurred during cooling down FCC Unit. Feed taken out of unit to try to reduce vibrations.	
	Particulates	unknown			
12-11-04 to 12-12-04	Sulfur dioxide	2,640 pounds	24 hours	FCC unit was shutdown due to high vibrations in the motor generator bearing, which caused other units to be operated at minimum rates. The Hydrocracker unit also shut down due to an equipment malfunction. Both of these shutdowns together contributed to the Sulfur Recovery Unit operating with virtually no feed gas and exceeded its daily permit limit.	
12-14-04	Smoke	unknown	0.1 hour	The compressor had problems processing light gas; unprocessed gas vented to flare 4 and caused smoke.	
12-25-04	Natural gas	unknown	½ hour	The plant 9 flare went out; unburned natural gas, refinery fuel gas released.	
	Refinery fuel gas	unknown			
1-13-05	Opacity	unknown	0.1 hour	Loss of power to soot blowers and rappers. (on ESP inlet field)	
	Particulates	unknown			

1-15-05	Smoke	unknown	0.15 hour	The compressor had problems processing light gas, unprocessed gas vented to flare 4 and caused smoke.	
1-17-05	Hydrocarbon	less than 500 pounds	0.05 hour	Line on relief valve froze and was lifting prematurely, operators used a steam hose to thaw out the line.	
1-18-05	Sulfur dioxide	653 pounds	4 hours, 51 minutes	Hydrogen Catalytic Cracking (HCC) unit had an upset due to cold ambient temperatures, which caused instrumentation to freeze. This caused a pressure control valve to vent to the plant 9 flare.	
2-28-05	Nitrogen oxide	less than 10 pounds	25 minutes	not given (from phone record)	

Data reported to Toledo Environmental Services by Sunoco Oil Refinery, Oregon OH

Accidents at the Sunoco Refinery cause problems for everyone

–**Accidents create releases on both ends: the shutdown of a unit and its startup**. For instance, on October 7, 2004, the Fluid Catalytic Cracker (FCC) unit was shut down and 2,560 pounds of sulfur dioxide was released over 8 hours; when the FCC unit was started up the following day, 3,942 pounds were released in 1.5 hours. It seems the only thing worse for neighbors and workers when Sunoco has a piece of heavy equipment go down is when it's started back up.

–**Accidents in one process unit often cause problems or equipment malfunctions in additional units, creating a "domino effect."** For example, on December 11-12, 2004, the FCC unit was shutdown due to high vibrations in the motor generator (after attempting to correct the same vibration problem earlier on December 11.) The HCC unit was also shut down due to an equipment malfunction. Both of these shutdowns together contributed to the Sulfur Recovery Unit operating with no feed gas, exceeding its daily permit limit. Sunoco often has problems operating the Sulfur Recovery Unit when there is no feed gas due to other units having been shut down.

–**No offsite monitoring was done in the community to determine health effects** related to Sunoco's 21 accidents in the past six months. On the reports, Sunoco lists that there are no offsite health effects, but since there is no monitoring done, there is simply no way for them to know whether there are negative health effects or not. Neighbors are not informed while these accidents are taking place and may not be aware of the health effects of these emissions. Symptoms of exposure can be as common as headaches and nausea, and might even be confused as the flu in some instances.

–**There are no complete records of complaint calls from neighbors** to the Sunoco refinery, or the local air agency. Neighbors have no way to receive reliable information during or after an accident. Neighbors have also reported that they have noticed frequent accidents, sulfur smells and other noxious odors, and black smoke coming from the plant recently. Some of these people told Ohio Citizen Action that they called either the plant or the air agency, but did not receive adequate information about the accident.

–**The public, and likely Sunoco's own workers, don't know the economic impact of Sunoco shutting down it's largest units** - the Fluidized Catalytic Cracker (FCC), the Hydrogen Catalytic Cracking Unit (HCC) and the Sulfur Recovery Unit (SRU) - due to accidents. None of the accidents reported to the local air agency included information about how the accident affected the refineries bottom line, since the question is listed as "voluntary." The amount of money lost due to chronic equipment failures could be used to reduce or eliminate excess pollution harming neighbors and workers.