

**How Off-the-Books  
Industrial Upset  
Emissions  
Cheat the Public  
Out of Clean Air**

# **Gaming the System**



August 2004



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**Environmental Integrity Project**

AUGUST 2004

**THE ENVIRONMENTAL INTEGRITY PROJECT (EIP)** is a non-profit, non-partisan organization dedicated to more effective enforcement of existing federal and state environmental laws and to the prevention of political interference with those laws. EIP's research and reports shed light on how enforcement and rulemaking affect public health. EIP also works closely with local communities seeking the enforcement of environmental laws.

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**A**ir pollution limits are designed to keep the air safe to breathe. Unfortunately, loopholes in the law render some of these limits virtually meaningless. Upset loopholes, in particular, allow industrial sources to pollute significantly more than the law allows. Upsets are non-routine events, such as equipment breakdowns, startup, shutdown and maintenance, at industrial facilities that cause them to emit more pollution than allowed by their permits and applicable rules.<sup>1</sup> As the result of upsets, pollution is often routed to a flare or vented directly to the air and normal pollution controls are bypassed.

Industry data show that upsets are causing air pollution in amounts above legal limits and, in some cases, far exceeding annual reported emissions. While all pollution in excess of permit or rule limits is illegal under the Clean Air Act, approximately half of the states have created loopholes that allow pollution resulting from upsets to exceed those

limits. To make matters worse, many states fail to track upset pollution or to include it in state inventories used to develop pollution control plans.

Our review of industry-filed reports and state rules found the following:

- *Upset emissions release toxic and carcinogenic chemicals that threaten the health and safety of communities already overburdened with toxic pollution.* For example, the upset emissions alone from BASF in Port Arthur, Texas, make it the sixth largest emitter of butadiene and the twelfth largest emitter of benzene in the country. Benzene and butadiene are both carcinogens, and Port Arthur is already home to many of the top national sources of butadiene.
- *Illegal loopholes allow upset emissions to exceed pollution limits.* Over half of the states excuse some upset emissions from compliance with pollution limits. In many of these states, facili-

ties essentially get a “get-out-of-jail-free card” for upset emissions. See Appendix A.

- *Loopholes in the law and lack of reporting allow upset emissions to be kept off-the-books.* Many states fail to accurately track the amount of pollution emitted during upsets. As a result, this pollution is kept “off-the-books” and is left out of models and plans for clearing the air.<sup>2</sup>
- *Annual upset emissions can actually exceed the total annual emissions a company reports to the state.* Upsets result in large emissions that may or may not be included in the emissions totals facilities must report to the state every year. More than half of the 37 facilities studied had upset emissions of at least one pollutant that were 25% or more of their total reported annual emissions of that pollutant. For ten of the facilities, upset emissions of at least one pollutant actually exceeded

the annual emissions each facility reported to the state for that pollutant. Upset emissions of carbon monoxide (CO) from Exxon Mobil’s Baton Rouge facility were almost three times its reported annual CO emissions.

Four of the six natural gas plants’ 2003 upset emissions of volatile organic compounds (VOCs) were greater than the total VOC emissions each plant reported to the state in 2002. The Boyd Compressor Station in San Angelo, Texas, released 50 times its total reported 2002 VOC emissions. Likewise, the one carbon black facility included in the study, the Sid Richardson Carbon facility in Borger, Texas, emitted VOCs through upsets that were 85 times its 2002 reported emissions.

- *Upset emissions are largely avoidable.* A handful of plants appear to have minimized upset emissions, thereby proving that pollution from upsets is not an inevitable product of manufacturing. Better management practices would significantly reduce upset emissions.

### Hilton Kelley, Port Arthur, TX

Whenever an upset takes place, you see the flares from these eighty to a hundred foot towers.... If it is night the sky is a bright orange and the strong chemical and sometimes ammonia odors burn your eyes and make you cough; many times people have to go to the hospital because of nausea, skin irritation and asthma attacks.... Whenever someone dies in Port Arthur it’s usually because of cancer. We have lived with this environmental injustice for many years and the sad fact of the matter is that for years industry has known about the dangerous impact of these chemicals on the human body and yet they have operated out of compliance and dumped tons of illegal emissions on our community.... Port Arthur is home to 57,755 people with a strong sense of community and we are standing together and fighting for our kids, our elderly and our selves to have clean air. It’s our God given right to have clean air.

Upsets (including malfunctions, startups, shutdowns and maintenance) frequently result in large emissions over short periods of time. The pollution includes toxics and carcinogens that can affect the health of nearby communities. Upsets are a significant problem for many areas, including rural ones, but they are a particular problem for the predominantly low-income communities of color surrounding many refinery and chemical complexes.

The stories from these communities around the country are similar—from burning throats and eyes, difficulty breathing, and high asthma rates to rare cancers and high rates of hysterectomies among young women. People living near clusters of large industrial sources are told by regulatory agencies not to worry, that permits and regulations are in place

to keep the air safe, but common health problems in these communities suggest something is wrong.

Part of the problem is upset emissions. For example, BASF's Port Arthur facility released over 174,665 pounds of the carcinogens benzene and butadiene during upsets (including malfunctions, startups, shutdowns and maintenance) in one year. Yet, regulatory agencies rarely acknowledge the alarming magnitude of these emissions, or the fact they are often not subject to permits or regulations.

Industry, primarily the refining and power companies, continues to push for "streamlined" federal air pollution permitting and "relaxed" monitoring requirements. A recent bill by Congressman Barton, which passed the U.S. House of Representatives, would effectively relax air pollution requirements for refineries in areas with high unemployment.<sup>3</sup> Data reviewed for this report show that low income communities, like those targeted by the Barton bill, are already being exposed to high levels of toxic pollution as a result of existing loopholes in the law. "Streamlining" requirements to create additional loopholes will only increase this pollution and the harm it causes.

The pollution caused by upsets is at least as harmful as "routine" pollution and should not be allowed to evade emission limits designed to protect public health. Many upsets are avoidable. Some refineries report far fewer emissions from such events than others. If the reporting data is accurate, this means facilities are capable of reducing the number of upsets. A handful of facilities and states have begun to look more closely at upsets and the role they play in overall air quality. We hope this report will encourage EPA and additional states and facilities to do the same, and to take action to reduce the amount of pollution in the air due to these events.

## Recommendations

***Eliminate Loopholes:*** EPA should eliminate the upset exemptions and defense provisions in its permitting rules and in State Implementation Plans. In addition, EPA and states should ensure that upset emissions are considered when issuing permits, tallying annual emissions and developing pollution reduction plans.

***Improve Monitoring and Reporting:*** States should require facilities to utilize the best technologies available for monitoring sources of upset emissions, including flares, valves and cooling towers. They should centrally track all excess emissions, including those caused by upsets, and make this information easily accessible to the public using an electronic reporting system like that in Texas. States should require facilities to report excess emissions electronically within 24 hours, and immediately for toxics, and the public should be able to access these reports through state agency websites within 72 hours.

***Increase Enforcement:*** EPA and states should prioritize enforcement actions for illegal upset emissions. States should make penalties for upset emissions automatic, based on the amount and toxicity of the emissions, and require reductions in routine emissions to offset releases from these events. Making all excess emissions subject to regulation, enforcement and offset provides an incentive for facilities to prevent upsets and reduce air pollution. In addition, permits should require facilities to shut down once they exceed a certain number of upsets.

***Study Health Effects:*** Although communities near refinery and chemical complexes are exposed to a large volume of toxic emissions, there have been few studies of the health effects of such exposure. EPA and states should make funding these studies a priority.





### What is being emitted?

Upsets are a significant source of air pollution. In some cases, releases from upsets actually dwarf a facility's routine emissions. We obtained upset reports filed by 57 facilities in five states. While the reporting in several of these states was so inadequate that we could not track upset emissions, data available in two states provides a glimpse of the extent of the problem.

The reported emissions from upsets (including malfunctions, startups, shutdowns and maintenance) from thirty facilities in Texas and seven facilities in Louisiana are included in Table 1. In total, these 37 facilities released at least 63,411,603 pounds of pollution as a result of upsets over a one year period.<sup>4</sup> This is more than 3½ times the total pollution from all facilities in Dallas County, Texas.<sup>5</sup>

The facilities studied include refineries, chemical plants, gas plants and a car-

bon black plant, all of which have been found to be significant sources of upsets.<sup>6</sup> We tracked emissions of nitrogen oxides (NOx), sulfur dioxide (SO<sub>2</sub>), hydrogen sulfide (H<sub>2</sub>S), CO and VOCs—including benzene and butadiene.<sup>7</sup>

In sum, CO was released in the largest quantities, followed by VOCs, SO<sub>2</sub>, NOx, and H<sub>2</sub>S respectively. See Figure 1.

**FIGURE 1. UPSET EMISSIONS BY POLLUTANT**

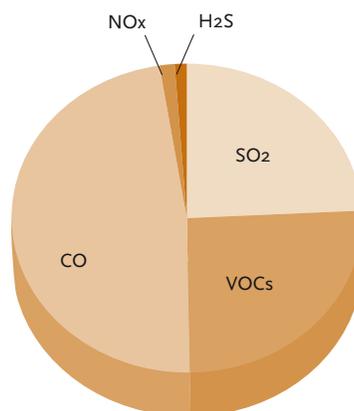


TABLE 1. UPSET EMISSION TOTALS

Facility	SO <sub>2</sub>	H <sub>2</sub> S	CO	NO <sub>x</sub>	Total VOCs	Benzene	Butadiene	Total <sup>8</sup>
TX 2003 upsets								
Blalock Booster Station (Garden City, TX)	0	0	0	0	1,230,475	0	0	1,230,475
SACROC CO <sub>2</sub> (Snyder, TX)	155,082	12,846	137,277	39,520	1,368,913	0	0	1,713,638
Welch CO <sub>2</sub> Gas (Welch, TX)	213,910	2,319	17,245	2,011	17,029	0	0	252,514
Boyd Compressor Station (San Angelo, TX)	0	0	0	0	3,550,022	2,792	0	3,550,022
Goldsmith Gas Plant (Goldsmith, TX)	3,262,402	79,929	164,718	42,678	3,363,410	0	0	6,913,137
Wasson CO <sub>2</sub> Removal (Denver City, TX)	384,612	4,162	184,077	25,677	142,183	0	0	740,711
BASF (Port Arthur, TX)	1,776	0	570,789	134,114	1,523,983	91,274	83,391	2,230,662
BP Plant B (Texas City, TX)	6,000	0	1,166	1,111	50,199	15,250	30	58,476
Dow (Freeport, TX)	8	12	309,036	52,730	781,597	11,173	8,109	1,143,384
Equistar (Channelview, TX)	0	0	173,117	23,804	271,544	14,233	17,663	468,465
Equistar (Deer Park, TX)	0	0	52,643	10,055	97,944	231	926	160,642
Equistar Chocolate Bayou (Alvin, TX)	0	0	101,286	14,085	132,734	4,435	10,106	248,105
Exxon Chemical (Baytown, TX)	41,094	448	8,204	982	13,333	8	8	64,061
Exxon Olefins (Baytown, TX)	0	0	47,615	4,814	22,080	380	3,946	74,509
Huntsman (Port Neches, TX)	19	0	92,036	7,135	452,320	577	9,286	551,510
Huntsman Petrochemical (Odessa, TX)	0	0	15,675	6,752	358,734	3,797	2,369	381,161
Sid Richardson Carbon (Borger, TX)	0	309,170	11,691,373	1,801	461,523	0	0	12,463,867
Atofina (Port Arthur, TX)	5,012,808	95,983	43,323	16,808	24,600	443	0	5,193,523
BP Products North America (Texas City, TX)	219,857	6,721	498,955	18,952	294,206	6,650	313	1,038,691
Citgo East (Corpus Christi, TX)	73,252	230	465,904	3,554	42,930	7,920	0	585,870
Exxon (Baytown, TX)	598,756	6,821	591,139	57,613	188,538	202	311	1,442,867
Exxon Refinery (Beaumont, TX)	247,846	3,945	695,345	6,863	346,541	16	19	1,300,540
Flint Hills West (Corpus Christi, TX)	84,803	2,967	260,516	1,717	37,156	364	0	387,159

## Upset Emission Totals

Facility	SO <sub>2</sub>	H <sub>2</sub> S	CO	NO <sub>x</sub>	Total VOCs	Benzene	Butadiene	Total <sup>8</sup>
Flint Hills East (Corpus Christi, TX)	36,495	0	10,780	6,804	3,800	5	30	57,879
Motiva (Port Arthur, TX)	97,871	2,764	10,688	12,735	390,852	15	453	514,910
Phillips 66 (Borger, TX)	243,756	1,757	252,401	47,524	80,517	1,488	0	625,955
Premcor (Port Arthur, TX)	407,486	4,739	15,088	10,910	56,706	2,094	0	494,929
Valero East (Corpus Christi, TX)	455,990	4,546	29,246	3,293	31,524	76	0	524,599
Valero West (Corpus Christi, TX)	613,268	6,515	118,232	39,154	52,974	45	0	830,143
Western Refinery (El Paso, TX)	141,196	1,541	411	487	8,518	200	0	152,153
LA 2001/2002 avg. upsets								
Murphy Oil (Meraux, LA)	135,716	28	165,782	23,030	26,082	0	0	350,638
Exxon Mobil (Baton Rouge, LA)	1,435,604	3,223	13,381,005	163,054	122,778	567	289	15,105,664
Chalmette Refinery (Chalmette, LA)	1,050,746	2,632	10,880	8,276	294,298	1,393	0	1,366,831
Citgo (Lake Charles, LA)	351,406	3,181	380	1,750	72,088	592	0	428,805
Motiva (Norco, LA)	25,086	194	44,456	153,263	36,286	187	417	259,285
Exxon Mobil Chemical (Baton Rouge, LA)	13,173	35	61,621	34,304	112,745	176	756	221,877
Shell Chemical (Norco, LA)	98,395	0	2,049	47,320	136,183	553	4,332	283,946
<b>TOTALS</b>	<b>15,408,412</b>	<b>556,708</b>	<b>30,224,459</b>	<b>1,024,681</b>	<b>16,197,344</b>	<b>167,133</b>	<b>142,754</b>	<b>63,411,603</b>

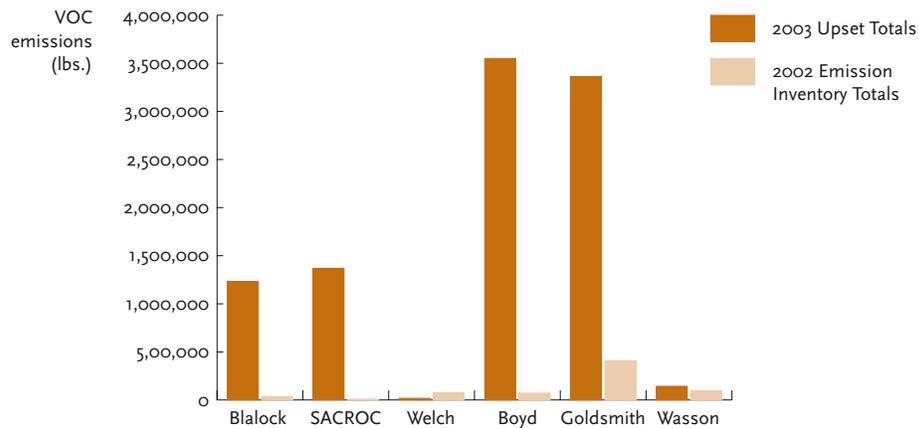
While refineries and chemical plants are the most notorious upsetters, and likely release the most toxic emissions in the closest proximity to large populations, the gas plants released an alarming amount of VOCs during upsets.

**Natural Gas Plants:** The six gas plants included in our review reported a total of 9,672,032 pounds of excess VOCs during upsets in 2003. Four of the gas plants also released significant quantities of SO<sub>2</sub>.

To help gauge the magnitude of these upset emissions, we compared them to the total annual emissions reported by each facility to the Texas emission

inventory.<sup>9</sup> The SACROC CO<sub>2</sub> plant's VOC upset emissions were 163 times the total annual VOCs it reported to the Texas emission inventory.<sup>10</sup> The Blalock Booster Station's VOC upset emissions were more than 35 times the annual VOC emissions it reported to the emission inventory and Boyd Compressor Station's VOC upset emissions were almost 50 times the annual VOC emissions it reported to the emission inventory. See Figure 2.

Gas plants are obviously not including all of their upset emissions in the total annual emissions they report to the emission inventory. This leaves the state

**FIGURE 2. NATURAL GAS PLANT UPSETS**

with faulty information on which to base its air pollution control plans.

**Refineries:** The refineries included in the study released significant amounts of SO<sub>2</sub>, CO and VOCs during upsets. Of 18 refineries, ten had annual upset releases of at least one pollutant amounting to more than one-quarter of

their emission inventory annual totals for that pollutant.<sup>11</sup> The Atofina Port Arthur facility's SO<sub>2</sub> upset emissions were 2 ½ times the total SO<sub>2</sub> emissions it reported to the Texas emission inventory. Likewise, the Exxon Mobil refinery in Baton Rouge, Louisiana, had upset emissions of CO that were almost three times the CO emissions it reported

**TABLE 2: REFINERY ANNUAL UPSETS AND DAILY PRODUCTION CAPACITY**

Refinery <sup>12</sup>	Total Emissions from Upsets	Production Capacity (barrels per day)
Western Refinery – El Paso, TX	152,153	90,000
Valero (East & West) – Corpus Christi, TX	1,354,742	134,000
Premcor – Port Arthur, TX	494,929	255,000
Phillips 66 – Borger, TX	625,955	143,800
Murphy Oil USA – Meraux, LA	350,638	95,000
Motiva – Port Arthur, TX	514,910	250,000
Motiva – Norco, LA	259,285	219,700
Flint Hills (East & West) – Corpus Christi, TX	445,038	259,980
Exxon Mobile – Baton Rouge, LA	15,105,664	491,500
Exxon Refinery – Beaumont, TX	1,300,540	348,500
Exxon – Baytown, TX	1,442,867	523,000
Citgo – Lake Charles, LA	428,805	324,300
Chalmette Refinery – Chalmette, LA	1,366,831	182,500
BP Products North America – Texas City, TX	1,038,691	437,000
Atofina – Port Arthur, TX	5,193,523	175,068

to the Louisiana emission inventory. Table 2 shows total reported annual upset emissions and daily refinery capacity for the refineries studied. Atofina, which is one of the smaller refineries included in the study, had the second highest total upset emissions.

**Chemical Plants:** The chemical plants in the study released significant quantities of VOCs and CO during upsets. The largest source of total benzene and butadiene upset emissions was BASF in Port Arthur, Texas. That facility alone released 91,274 pounds of benzene and 83,391 pounds of butadiene in upsets in 2003. This compares to 2002 reported emissions totals for benzene and butadiene of 13,800 pounds and 133,900 pounds, respectively.<sup>13</sup> Shell Chemical in Norco, Louisiana, reported releasing over 2,000 pounds of butadiene in one upset event, and more than 1,517 pounds of butadiene during another event.

**Carbon Black Plant:** The one carbon black plant included in our review, the Sid Richardson Carbon facility, released 461,523 pounds of VOCs and 11,691,373 pounds of CO during upsets in 2003. These upset releases were more than 85 times the total VOC emissions the facility reported to the emissions inventory and almost eight times the total CO emissions reported.

## Why does it matter?

### Health and Environmental Effects

The pollutants emitted during upsets can cause significant adverse health and environmental effects. They contribute to ozone formation, cause cancer, aggravate respiratory conditions and cause neurological and reproductive problems. See Table 3.

Because facilities like refineries and chemical plants are often clustered together, neighboring communities are sub-

ject to cumulative upset emissions. Toxic emissions are therefore of particular concern. Complaints by local community members, including reports of nausea, burning eyes and throat, difficulty breathing, and cancer clusters, are consistent with exposure to toxic emissions.

Just 37 of the facilities studied for this report released more than 167,133 extra pounds of benzene and 142,754 extra pounds of butadiene during one year's worth of upsets. Both benzene and butadiene are carcinogens associated with cancers including leukemia. Benzene is ranked by EPA as one of two chemicals posing the greatest national cancer risk. Butadiene is listed by EPA as one of the two most significant probable carcinogens contributing to regional cancer risk.<sup>14</sup>

Despite the clear toxicity of upset emissions, few health studies have been conducted in communities most affected by this pollution. Some communities around refinery and chemical complexes

### Shonda Lee, New Sarpy, LA near Valero

It's at night that the flare blows, when we're sleeping. The rumbling, the noise. I hear it so clear at night. Especially at 2 or 3 in the morning, when we're really trying to sleep to get up for the next day...

My daughter wakes up in the middle of the night because she's afraid. She even had a nightmare the other night. She dreamed the other night that the refinery just blew up. "Mama I dreamed that those places just blew up and our house, our house was blown." Her sleeping pattern is irregular now, and that's bad on school.

It's really breaking our hearts. It has taken a toll health wise, I truly believe. The smell. Yesterday was so disgusting, yesterday I was in the car... and the smell was so awful, we were sick to our stomachs. We left New Sarpy and felt much better. We got back here and we were sick again. This is no lie, sometimes the smell is so bad I hang out of my door and throw up.

**TABLE 3: RELEASES AND EFFECTS**

Releases		VOCs	SO <sub>2</sub>	NO <sub>2</sub>	CO	H <sub>2</sub> S	Toxic Air Pollutants
Human Health Effects	Reacts with other chemicals to create particulate pollution that can cause respiratory illness, aggravation of heart conditions and asthma, permanent lung damage, and premature death.		◆	◆			
	Aggravates respiratory conditions.					◆	
	Reacts with other chemicals leading to ground-level ozone and smog, which can trigger respiratory problems.	◆		◆			
	Can cause health problems such as cancer.	◆					◆
	Can cause reproductive, neurological, developmental, respiratory, immune system, and other health problems.						◆
	Reacts with common organic chemicals forming toxins that may cause bio-mutations.			◆			
Environmental Effects	Affects cardiovascular system and can cause problems within the central nervous system.					◆	
	Causes haze that can migrate to sensitive areas such as National Parks.	◆	◆	◆	◆		
	Contributes to formation of acid rain, which damages crops, trees, and buildings; and increases acidity in soils, lakes, and streams.		◆	◆		◆	
	Contributes to the formation of ground-level ozone, which harms vegetation.	◆			◆		
	Contributes to global warming, which leads to rising sea levels and other adverse changes to plant and animal habitat.			◆			
	Causes environmental hazards, including concentration of toxic chemicals (e.g., mercury) up the food chain.						◆
Settles on ground and water, acidifying streams and lakes, damaging forests and farm crops, and depleting soil nutrients.		◆					

SOURCE: EPA Office of Inspector General, "EPA Needs to Improve Tracking of National Petroleum Refinery Program Progress and Impacts" (June 22, 2004), Appendix D. Note: many VOCs are toxic air pollutants.

have compiled their own health surveys that clearly indicate something is wrong. Research into the long and short-term effects of the toxic soup that is emitted from many refining and chemical companies is desperately needed.<sup>15</sup>

*Financial Effects*

The adverse health effects likely caused by upset pollution cost states, as well as individuals, in terms of increased hospitalizations, lost work days and children with health problems and learning difficulties. In addition, the failure to regulate

upset emissions costs many states significant revenue. States normally require facilities to pay emission fees based on the amount of pollution emitted. Because facilities often underestimate or fail to report upset emissions, they avoid paying the full fees owed the state. Almost half of the states that responded to our survey said they either do not collect fees for upsets, or only sometimes collect fees for upsets. See Appendix A. This lost revenue is money that could be used to provide health clinics, medical services and health studies in the communities most affected by upset emissions.

## How Can Upset Emissions Be Reduced?

Upset emissions are not inevitable. Our review of upset data shows that some facilities have significantly fewer upsets than others. Table 2, comparing refinery upset emissions to production capacity at refineries, shows that bigger facilities are not necessarily responsible for greater upsets. A combination of better management practices, adequate staffing and improved technologies could significantly reduce upset emissions.

A 2001 study by the state of Texas found that much upset pollution was due to the lack of best management practices.<sup>16</sup> Facilities can do a number of things to reduce such emissions. The most obvious is to conduct a thorough root cause analysis for each upset event. This analysis helps facilities identify why upsets are occurring and what can be done to prevent them.

In addition, improved technologies could limit upset emissions. For example, refineries can recycle their gases with a vapor recovery system rather than flare them. Flares should only be used in true emergencies, not as a regular system for disposing of gases or “off-spec” product. Installing adequate compressor and

sulfur recovery unit capacity, and ensuring there are adequate back-up systems for these units, would likely significantly reduce upsets. Likewise, facilities should be required to have adequate back-up power supplies to prevent upsets during power outages. These back-up supplies should be fueled by clean fuels, not diesel.

Without adequate staffing, accidents are more likely. Refinery production and capacity has increased over the past ten years, while the number of people employed in the refining sector has declined.<sup>17</sup> Employment numbers for the chemical industry have also declined.<sup>18</sup> Facilities should ensure that they have adequate staffing to operate safely.

Finally, laws that require upset emissions to be included in pollution limits will force the development of technologies to better control these emissions. For example, Texas’ rules include a cap on total VOC emissions in the Houston/Galveston area. The current rules exempt upset emissions from the cap, but Texas has proposed new rules that would generally require upset emissions to be included in the cap.<sup>19</sup> Requiring facilities in Houston and Galveston to count upsets against their VOC limits will likely spur creative solutions for preventing upsets.





## Failure to Regulate Upset Pollution

**R**egulations and permit limits, no matter how stringent, cannot clear the air if sources continue to emit extra pollution through loopholes in the law. Loopholes, which grant facilities a free pass for excess emissions labeled as upsets, provide little incentive for industry to prevent upsets, and make it difficult for regulators to keep air pollution below harmful levels.

### Clean Air Act Requirements

The federal Clean Air Act mandates continuous compliance with its pollution limits.<sup>20</sup> It does not provide general exceptions for excess pollution due to upsets, but instead requires that any exceedance of a federal air pollution limit be treated as a violation subject to enforcement.

The Clean Air Act requires states to adopt and enforce emission limits at least as stringent as those in federal and EPA

approved state rules.<sup>21</sup> In addition, states must have the authority to collect penalties of at least \$10,000 per day for each violation of a federal air pollution limit.<sup>22</sup>

### Upset Loopholes

Despite the Clean Air Act's requirement for continuous compliance, EPA's rules and policy have created numerous loopholes that allow emissions during upsets to exceed pollution limits.<sup>23</sup> Three of the loopholes that can excuse or limit enforcement for excess emissions caused by upsets are discussed below.

#### *Loopholes in Federal Emission Limits*

The Clean Air Act requires EPA to set New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS). NSPS applies to types of sources that EPA has determined "cause(s), or

contribute(s) significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare."<sup>24</sup> NESHAPs apply to certain categories of sources that emit air toxics that are known or suspected of causing cancer or other serious health effects.<sup>25</sup>

EPA's NSPS and NESHAP rules include general exemptions for excess emissions caused by upsets. For example, while sources subject to a NESHAP must develop and comply with a plan to ensure operation "in a manner consistent with safety and good air pollution control practices for minimizing emissions" during upsets, they are generally exempt from the NESHAPs' emission limits during upsets.<sup>26</sup> The rules state:

The . . . standards set forth in this part shall apply at all times *except during periods of startup, shutdown, and malfunction*, and as otherwise specified in an applicable subpart.<sup>27</sup>

Likewise, the NSPS rules generally provide that excess emissions during startup, shutdown and malfunction are not violations of the pollution limit, unless otherwise specified in a particular standard.<sup>28</sup>

These rules apply to pollutants that Congress and EPA have determined can harm human health. EPA's exemption of these pollutants from compliance with emission limits during upsets does not "provide an ample margin of safety to protect public health" as required by the law.<sup>29</sup> EPA should review and revise its standards, taking into consideration the health impacts of pollution caused by upsets.<sup>30</sup>

### *Loopholes in Federal Air Permits*

Additional loopholes allow upset emissions to exceed limits in federal air permits. The Clean Air Act includes two basic permitting programs, New Source Review (NSR) and Title V.

### **NEW SOURCE REVIEW**

NSR requires preconstruction permits for major new facilities and for emission-increasing changes at major facilities. Whether or not a source is major is determined by the amount of pollution a facility has the potential to emit. EPA has clearly stated that regular startup, shutdown and maintenance emissions should be counted towards a facility's potential to emit and should be subject to permit limits.<sup>31</sup> Despite this requirement, they often are not.

For example, Texas' rules include a provision allowing some startup, shutdown and maintenance emissions to be kept off-permit.<sup>32</sup> Not counting these regular startup, shutdown and maintenance emissions in determining whether a facility is major may allow a facility to illegally avoid federal NSR permitting and associated requirements for: (1) good design and operation, including the use of best available control technologies, (2) studies of off-property impacts, including health impacts, and (3) reductions in pollution to "offset" any pollution increases.

Similarly, keeping regular startup, shutdown and maintenance emissions "off-permit" means that these emissions are not subject to pollution limits included in permits. EPA has approved an Alabama rule expressly exempting sources from compliance with permit limits during upsets. It states:

The Director may, in the Air Permit, exempt on a case by case basis any exceedances of emission limits which cannot reasonably be avoided, such as during periods of start-up, shut-down or load change.<sup>33</sup>

The Clean Air Act requires facilities to obtain NSR permits to help keep pollution within safe levels and to ensure that new pollution control technologies continue to be developed. EPA should eliminate state SIP provisions that allow

upsets to evade NSR requirements and thwart these goals.

#### TITLE V

Title V of the Clean Air Act requires major sources to obtain operating permits that list all of the federal air pollution control requirements applicable to a facility. These applicable requirements include NSR permit terms, SIP requirements and federal regulations. The intent of the permit is to locate in one document all of a facility's applicable requirements and to assure compliance with those requirements.

EPA has included in its rules a provision that allows Title V permits to exempt excess emissions from compliance with technology-based limits if the source can show the emissions were caused by an "emergency."<sup>34</sup>

Because the law does not allow EPA to create Title V permit terms that alter applicable requirements, this emergency provision is illegal. Title V permits are supposed to be a tool for ensuring compliance with Clean Air Act requirements, not for creating excuses for noncompliance. Furthermore, it is simply one more vaguely defined loophole on top of all of the other loopholes already included in applicable requirements.

#### *Loopholes in State Implementation Plans*

In addition to setting certain emission limits and overseeing state permitting programs, the Clean Air Act requires EPA to review and approve or disapprove State Implementation Plans (SIPs). SIPs are state-specific plans to bring state air pollution levels below federal health-based air quality standards, known as National Ambient Air Quality Standards, and to make sure they stay there. States are required to submit these plans, along with modeling demonstrating that they will work, to EPA for approval. The plans include permitting requirements and state emission limits.

EPA's policy is that states cannot adopt SIP rules that generally exempt upsets from compliance with legal limits because such rules would violate the Clean Air Act. There are several loopholes, however, through which EPA has allowed states to evade this general policy. Further, EPA has turned a blind eye while states have abused the loopholes and allowed far broader exemptions than EPA's policy allows. Three of these loopholes are discussed below.

#### FACILITY-SPECIFIC VARIANCES

States must prove that their SIPs will keep air pollution within legal limits. States are largely free, however, to choose the methods they will use to reduce pollution. A state can, therefore, ask EPA to amend its SIP as long as the state proves that, under the revised SIP, pollution will still meet legal limits.

Contrary to these requirements, EPA has allowed states to amend their SIPs without EPA approval by allowing states to grant facility-specific variances from compliance with SIP emission limits. The variances do not require a demonstration that, in light of the emissions authorized by the variance, the state SIP will still keep air pollution below legal limits. Nor is EPA approval required before the variance can take effect.

For example, the Louisiana SIP includes a variance provision that allows the state to exempt facilities from compliance with SIP and other requirements without EPA approval and without a demonstration that the SIP will continue to comply with Clean Air Act requirements. To qualify, a facility must simply show that compliance with a rule "would cause undue hardship, would be unreasonable, impractical or not feasible under the circumstances."<sup>35</sup> Louisiana frequently grants variances that exempt upset emissions from compliance with legal limits. Similarly, EPA has approved a California variance that allows the South Coast Air Quality Management

District to grant variances from federal requirements without individual EPA approval.<sup>36</sup>

#### WAIVER OF PENALTIES

While EPA does not, theoretically, allow state SIP rules to exempt upsets from compliance, it has adopted a policy allowing state rules to immunize certain upset emissions from monetary penalties. In other words, while excess emissions are still violations of the law, states can adopt rules guaranteeing industry that it cannot be required to pay monetary penalties for certain excess emissions. EPA's Startup, Shutdown, Malfunction guidance, issued in 1983 and reaffirmed in 1999 and 2001, lays out conditions that states must require facilities to prove in order to qualify for this waiver of penalties.<sup>37</sup> These conditions are listed in Table 4.

State rules may not waive penalties for upset emissions in areas where a single source or small group of sources has the potential to cause an exceedance of health-based, ambient air quality standards and may not excuse violations of federally promulgated standards. In spite of these limits, EPA's guidance conflicts with the Clean Air Act requirement that states have the authority to recover penalties for each violation of federal standards.<sup>38</sup>

Even more problematic than the guidance itself, however, is the fact that EPA has approved numerous SIP upset provisions that are far broader than those authorized by its own guidance. In 1999 EPA noted:

A recent review of SIPs suggests that several contain provisions that appear

**TABLE 4: EPA'S STARTUP, SHUTDOWN & MALFUNCTION GUIDANCE REQUIREMENTS**

For Malfunctions	For Startup and Shutdown
The excess emissions were caused by sudden, unavoidable breakdown of technology beyond the control of the owner/operator.	The periods of excess emissions were short and infrequent and could not have been prevented through careful planning and design.
The excess emissions did not stem from any activity or event that could have been foreseen and avoided, or planned for.	The excess emissions were not part of a recurring pattern indicative of inadequate design, operation or maintenance.
The excess emissions could not have been avoidable by better operation and maintenance practices.	If excess emissions were caused by an intentional diversion of control equipment, that diversion must have been unavoidable to prevent loss of life, personal injury, or severe property damage.
The excess emissions were minimized to the extent practicable using air pollution control equipment or processes consistent with good practices.	At all times, the facility must have been operated in a manner consistent with good practice for minimizing emissions.
Repairs were made in an expeditious fashion, including the use of off-shift labor and overtime.	The frequency and duration of operation in startup or shutdown mode must have been minimized to the extent practicable.
Emissions were minimized, both in terms of quantity of emissions and duration of the event, to the extent practicable.	All possible steps must have been taken to minimize the impact of the excess emissions on ambient air quality.
All possible steps were taken to minimize the impact of the excess emissions on ambient air quality.	All emission monitoring systems must have been kept in operation if at all possible.
All emissions monitoring systems were kept in operation if at all possible.	The owner/operator's actions during the period of excess emissions must have been documented by a properly signed, contemporaneous logs or other relevant evidence.
The owner/operator's response to the excess emissions was documented by properly signed, contemporaneous operating logs, or other relevant evidence.	The owner/operator properly and promptly notified the appropriate regulatory authority.
The excess emissions were not part of a recurring pattern indicative of inadequate design, operation or maintenance.	
The owner/operator properly and promptly notified the appropriate regulatory authority.	

to be inconsistent with this policy, either because they were inadvertently approved after EPA issued the 1982–1983 guidance or because they were part of the SIP at the time and have never been removed.<sup>39</sup>

It has been five years since EPA's acknowledgement of this problem, yet many illegal provisions remain in state SIPs. Our review found at least 29 illegal state upset provisions in SIPs. See Appendix A. A detailed analysis of SIP upsets provisions in two California air districts, as well as Georgia, Louisiana, Ohio, Pennsylvania and Texas is included in Appendices B through G. Common flaws run through many of these SIP provisions, including the following:

- *The rules exempt upset emissions from compliance with pollution limits:* Over half of state SIPs allow some upset emissions to exceed air pollution limits by exempting the emissions from compliance with the federal law. This clearly violates EPA's guidance, which states "any provision that allows for an automatic exemption for excess emissions is prohibited."<sup>40</sup> According to the guidance, state SIPs may, at most, grant a waiver of penalties for excess upset emissions. The excess emissions remain a violation, and EPA, states and citizens must remain free to bring their own enforcement actions.
- *The rules apply to violations of health-based limits and federal standards:* Many SIP upset provisions apply broadly to exceedances caused by upsets, including exceedances of health-based limits and federal standards, such as federal permit limits. Very few

of the provisions reviewed expressly prohibit the defense or exemption from applying to federal based limits.

- *The rules apply to excess emissions caused by planned maintenance:* Maintenance is a regular part of doing business at an industrial facility, and excess emissions that occur during maintenance do not qualify for a defense.<sup>41</sup> These emissions should be included in facility permits. Despite this, a number of the provisions reviewed excuse excess emissions during planned maintenance.

Based on our analysis, at least 50 percent of state SIPs include upset provisions violating both the Clean Air Act and EPA's guidance. These provisions often exempt upset emissions from compliance with pollution limits and allow industry to emit millions of pounds of additional pollution with impunity.

## Conclusion

EPA has approved numerous loopholes that allow emissions during upsets to exceed otherwise applicable limits. These upsets create extra pollution for which there is a health, environmental, social and economic cost. Upsets are avoidable with better management practices. Facilities have little incentive, however, to invest in better management practices and pollution controls if there is no penalty for excess emissions resulting from upsets. EPA and states should remove all legal and regulatory provisions that provide general exemptions or defenses for upset emissions.



# Failure to Monitor and Report Upset Pollution



**T**he large number of loopholes in the law makes it difficult to track how much pollution is really being emitted during upsets. This problem is exacerbated by the fact that states do not require adequate monitoring or reporting of upset emissions. As a result, states do not have adequate and timely data about pollution levels and community members cannot get information about emissions that may be harmful to their health.

## Monitoring

Like most air pollution, upset emissions are usually not monitored. Instead, facilities estimate the amount of pollution emitted during upsets. These estimates are often based on one-time tests conducted when a facility began operation (which may have been long ago), calculation methods developed by EPA, and/or manufacturer's specifications regarding the efficiency of a piece of equipment.

Upset emissions are significantly underestimated.<sup>42</sup> The U.S. General Accounting Office, the U.S. House of Representatives Committee on Government Reform (Minority Staff, Special Investigations Division) and the EPA's Office of Inspector General have all concluded that EPA's calculation methods, called "emission factors," are unreliable and do not accurately predict emissions from a particular facility.<sup>43</sup> In addition, one-time tests are usually performed under ideal operating conditions and do not reflect true emission levels.

Studies from several states have shown that there is more VOC pollution in the air than there should be based on industry's reported VOC emissions.<sup>44</sup> The underreporting of upset emissions, particularly those from flares, cooling towers and leaks, is likely a part of this problem.<sup>45</sup>

Existing monitoring technologies would improve the accuracy of upset emission estimates. For example, portable optical gas imaging devices have been

found to be effective at finding emissions from broken valves or pipes. Open-path UV monitors have been effective at measuring VOC emissions at refineries and chemical plants.<sup>46</sup>

Several state and local pollution control districts have adopted improved monitoring requirements for flares. While not as reliable as direct monitoring, regulations in California's South Coast and Bay Area Air Quality Management Districts do require monitoring that is significantly more detailed than that required by other states. These rules include requirements for flow monitoring and, in the Bay Area, video monitoring of flares.<sup>47</sup>

Industrial facilities should be required to use the best monitoring technologies available for monitoring upsets. Without such monitoring, it will be impossible to know the true magnitude of air pollution from these facilities and to adequately account for these emissions in clean air plans and local health studies.

## Reporting

Given the magnitude of upset emissions, and their frequently toxic nature, it is important that affected communities have quick access to information regarding what is being emitted during upsets and what actions they may need to take to protect their health. We spent over six months gathering data on upset emissions from facilities in California, Louisiana, Ohio, Pennsylvania and Texas.

### State Reporting

Louisiana and Texas have centralized excess emission reporting systems that allowed us to track excess emissions for particular facilities.

- **Texas:** We gathered data on 30 Texas facilities. Texas has the best system for

reporting upset emissions. Facilities must electronically report all excess emissions exceeding a reportable quantity to the Texas emission event database within 24 hours.<sup>48</sup> Those reports are made available to the public on the Texas Commission on Environmental Quality's website within days after the upset.<sup>49</sup> Any corrections or updates to the reports must be filed within two weeks and those corrections are reflected in the online database. Texas' database could be improved, however, by requiring reports of toxic emissions more rapidly, by including excess emissions below the reportable quantity in the online database when they are reported, and by allowing access to rolling annual totals of facility upset emissions. The Texas facilities included in our study released 45,394,557 pounds of excess pollution during upsets in 2003. Detailed information regarding Texas' upset laws, as well as facility-specific data, is included in Appendix G.

- **Louisiana:** We gathered data on seven Louisiana refineries and chemical plants. Louisiana requires the reporting of all excess emissions. While these reports were only available in hard copy, they were generally accessible in the file room. Additionally, most of the reports included the required quantification of emissions. It is impossible for us to determine whether facilities were accurately reporting all upsets. The Louisiana records, however, appeared complete enough for us to total facility upset emissions. During 2001 and 2002, the seven facilities studied collectively released an average of 18,017,046 pounds of pollution per year from upsets. Detailed information regarding Louisiana's upset laws and reports, as well as data on emissions from specific facilities, is included in Appendix D.

While state agency file room staff in California, Ohio and Pennsylvania were helpful, we were simply not able to obtain reliable data regarding the amount of excess pollution emitted by particular facilities in those states.

- **California:** We gathered data on eight California refineries, three in the Bay Area and five in Southern California. California has reporting systems for excess emissions, but reports that were available frequently did not quantify excess emissions. Some reports merely stated that pollution exceeded applicable limits and some included emission rates, rather than the total pollution releases. The Bay Area Air Quality Management District also withheld many reports that contained emission data because they were being reviewed by the legal division. It was, therefore, not possible to gain an accurate picture of upset emissions at California facilities. Detailed information regarding California's upsets laws, as well as data on the specific facilities included in our study, is in Appendix B.
- **Ohio:** We gathered data on ten Ohio refineries and chemical plants. Ohio does not have a central reporting system for excess emissions. The files we were able to obtain suggest that many facilities are simply not reporting upsets in Ohio. In addition, those facilities that did file upset reports often did not include the amount of pollution released due to the upsets. Approximately two-thirds of the reports failed to specifically quantify emissions. As a result, we were not able to tally upset emissions for Ohio facilities. Detailed information regarding Ohio's upset laws and reports, as well as a sample spreadsheet showing the lack of data available regarding upset emissions, is included in Appendix E.

- **Pennsylvania:** We gathered data on two Pennsylvania refineries. Pennsylvania does not have a central reporting system for upsets. Many of the upset reports reviewed did not quantify the amount of pollution released. In addition, many failed to include any emissions of certain pollutants. We were not, therefore, able to determine the amount of pollution emitted by the Pennsylvania facilities during upsets. Detailed information regarding Pennsylvania's upset laws and reports, and a sample spreadsheet showing the lack of data available, is included in Appendix F.

While most states have some sort of reporting system for upset emissions, as is required by EPA's Startup, Shutdown and Malfunction guidance, the reporting systems vary significantly in terms of what must be reported and how quickly it must be reported. See Appendix A.

### *Federal Reporting*

In addition to state reporting rules, federal law requires that anyone who releases a hazardous substance in amounts exceeding certain thresholds must report the release to the National Response Center (NRC) and the Local Emergency Planning Committee.<sup>50</sup> The NRC then posts those reports to its publicly accessible website.<sup>51</sup> The Clean Air Act also requires facilities to "promptly" notify the state or local permitting authority of all violations of federal air pollution standards.<sup>52</sup> While these reporting requirements should result in reliable data regarding upset emissions, in reality, they do not.

Local Emergency Planning Committees sometimes take months to respond to requests for information, and often keep records of releases for only one year. The NRC database is extremely difficult to use and often contains information that is different from what is

included in state records for the same upset. For example, a search of the NRC website for releases at BASF Fina Petrochemical in Port Arthur, Texas, found that 20 releases, which appeared to be above the federal reporting threshold, were missing. These releases were reported to the state of Texas. In addition, at least five events reported in the NRC database included different information from that included in the reports filed to Texas for the same event.

Likewise, the Clean Air Act Title V requirement that deviations be reported promptly, while beneficial, does not specifically require facilities to report the amount of pollution caused by their violation of the law. Instead, facilities generally just report that they exceeded a permit or rule limit.

These problems with the federal and state reporting system prevent the public from obtaining accurate information regarding excess emissions, including emissions of hazardous pollutants. Due to problems with the federal online database, and to the lack of specificity in Title V reports regarding upset emissions, it is difficult to determine from federal

reports how much pollution is being released during upsets.

## Conclusion

Improved monitoring and reporting of upsets would serve multiple purposes. States would be more confident in the emissions estimates reported by industry and would be better equipped to develop pollution reduction plans. The public, particularly communities near industrial facilities, would be able to determine quickly whether upsets—which they often see, hear and smell—are creating a health hazard or are merely a nuisance. Every state should require a centralized electronic reporting system, like Texas', for all excess emissions. Facilities should be required to report most excess emissions within 24 hours and all toxic emissions immediately. These reports should be made available to the public through a state agency website as soon as possible, at least within 72 hours. Facilities can file follow-up reports within two weeks to correct and supplement the initial reports as necessary.



**B**oth EPA and states fail to take adequate enforcement action for upset emissions. In general, enforcement at the types of facilities responsible for large numbers of upsets has declined in recent years. Research by the Fort Worth Star Telegram found that Notices of Violation for refineries have fallen by 52% since 2001, while formal enforcement actions have fallen by 68%.<sup>53</sup>

While budget shortfalls and changing political priorities are part of the reason for this drop, loopholes in the law make it more difficult to bring enforcement actions. Often, only the facility has the information necessary to determine whether or not its excess emissions meet the requirements for an upset defense. As a result, states frequently assume that exceedances reported as upsets qualify for a defense. Out of 7,520 total reported excess emission events in Texas for 2003, Texas issued only 165 notices of violation and only 30 notices of enforcement.<sup>54</sup>

Many upset reports do not include enough data to explain the root causes of upset events. The abbreviated explanations that Texas and Louisiana companies are required to provide, however, demonstrate that companies are reporting excess emissions that do not qualify for a defense and should result in enforcement action. Many of these excess emissions fall into one of the three following categories: (1) emissions due to non-technological failures, (2) emissions due to foreseeable and preventable causes, and (3) maintenance emissions.

### Non-technological Failures

EPA's guidance states that, to qualify for a defense, malfunctions must have been caused by "sudden, unavoidable breakdowns of technology, beyond the control of the owner or operator."<sup>55</sup>

A number of the reports reviewed, however, document excessive emissions caused by human error or other non-

technological causes. At least eleven reports by Shell Chemical's Norco facility and three reports by Exxon Mobil Chemical's Baton Rouge facility specifically listed human error as the cause. Similarly, the SACROC CO<sub>2</sub> treatment plant in Texas reported releasing more than 100 tons of VOCs after defective product forced a shutdown of production. These events clearly do not qualify for a defense and should be subject to enforcement action.

### Foreseeable/Preventable Causes

EPA's guidance provides that the excess emissions must not have stemmed "from any activity or event that could have been foreseen and avoided, or planned for."<sup>56</sup> This requirement set a very high bar that is not being enforced. In one instance, Motiva's Norco Refinery reported to Louisiana that its excess emissions were avoidable, yet the Louisiana Department of Environmental Quality's report on the July 21, 2002 upset states, "this release appears to be not preventable disregarding the facility's statement to the contrary. This release qualifies as an upset ... There are no areas of concern at this time."

In addition, a number of the reports cited causes for excess emissions that were clearly foreseeable or could have been prevented by better operational and maintenance practices. For example:

**Power Outages:** Power interruptions were one of the most frequently cited explanations for some of the worst upsets. Occasionally, these outages occurred due to loss of power from a source outside the plant. Other power interruptions involve voltage surges, or other malfunctions of electrical components within the plant. Outages due to storms and lightning strikes caused some of the most dramatic upsets. Table 6 identifies some of the larger emission events triggered by internal or external power failures.

Petrochemical plants today are largely computer controlled, and a loss of power can reverberate throughout the plant. Electrical storms, hurricanes and flooding are a fact of life, particularly on the Gulf Coast. These events are clearly foreseeable and excess emissions that result from them should not qualify for a defense.

**Cooling Towers:** Facilities identified leaks from cooling towers as the source of some of the largest excess emissions. Just three plants—Huntsman Chemical in Port Neches, BASF-Fina in Port Arthur, and BP's Texas City refinery—together released nearly 400 tons of VOCs from cooling towers in 2003 alone. Such emissions often include large amounts of carcinogens like benzene and butadiene.<sup>57</sup>

An October 2003 report by the Galveston-Houston Association for Smog Prevention (GHASP) found that cooling towers at fourteen area plants

**TABLE 6: POWER FAILURES**

Facility	Cause	Emissions
Atofina Port Arthur	Power supply from Entergy cut off	90 tons SO <sub>2</sub>
Goldsmith Gas Plant	Blowout of voltage surge protector	70 tons SO <sub>2</sub> and VOCs
BASF	Onsite electrical malfunction	14 tons benzene; 11 tons butadiene
Atofina Port Arthur	Lightening knocked out onsite power station	1,300 tons SO <sub>2</sub>
Boyd Compressor Station	Storm blew down power lines	800 tons SO <sub>2</sub>

leaked 1,300 excess tons of VOCs into the atmosphere every year, or about half the amount of annual VOCs these fourteen plants reported to the emissions inventory.<sup>58</sup> Our review of upset reports lends further support to GHASP's findings. Given the frequency of cooling tower leaks, their emissions are foreseeable and should not be excused as upsets.

**Compressor Malfunctions:** Compressor malfunctions are endemic at petrochemical and natural gas processing plants, and occurred repeatedly at some of the facilities studied. For example:

- The Wasson CO<sub>2</sub> removal plant in Yoakum County reported malfunctions at its #1 inlet compressor on at least ten different occasions in 2003 (June 12, July 7 and 30, August 9 and 11, November 1, 11, 16, and 21 and December 3);
- The Welch CO<sub>2</sub> plant reported five malfunctions at the U201 compressor in 2003 (February 2, March 12, September 5, September 20, and December 11);
- Valero's Corpus Christi Refinery (East plant) released nearly 200 tons of SO<sub>2</sub> as a result of repeated breakdowns of its vacuum jet compressor.

These and other repeated malfunctions of the same compressors may have different causes, but their frequency warrants further investigation.

**Sulfur Recovery Units:** Upset reports from Texas and Louisiana document numerous failures of sulfur recovery units. A breakdown at Exxon Mobil's Chalmette refinery, for example, triggered flaring that released nearly 200 tons of SO<sub>2</sub> in just a nine hour period. The Atofina refinery in Port Arthur dumped more than 300 tons of SO<sub>2</sub> after breakdowns at its sulfur recovery units in mid-June last year.

Petroleum refineries strip sulfur from refinery gases in order to meet federal limits on how much sulfur is allowed in gasoline. New "clean fuels" requirements will require additional sulfur to be removed from gasoline. This removed sulfur is sent to the end of the plant for recovery because it can sometimes be recycled as a feedstock for other products. Undersized or poorly maintained sulfur recovery systems can cause this sulfur to be released into the air in local communities.

Refineries should be required to have sulfur recovery units that are adequately sized and maintained to handle their workload. Excess emissions due to undersized or poorly maintained units should not be excused.

## Maintenance Emissions

EPA's Startup, Shutdown and Malfunction guidance does not allow excess emissions from planned maintenance to qualify for a defense. Facilities must perform maintenance as a routine part of doing business. Emissions from maintenance should, therefore, be included in facility permits and should be subject to best available pollution controls. Texas and Louisiana plants, however, frequently report substantial excess emissions from maintenance activities. The emissions during these events were typically flared or even vented to the atmosphere in lieu of the more stringent pollution controls required during normal operations.

For example, during its "annual overhaul" of its number 22 compressor engine, Duke Energy's Goldsmith Gas plant in Ector County reported releasing nearly 1,000 tons of VOCs, or more than ten times the total the plant reported to the state's annual emission inventory. The Goldsmith plant reported another 1,800 tons of SO<sub>2</sub> as a result of an annual shutdown of its sulfur recovery plant

so the state could complete its annual inspection. The Sid Richardson Carbon plant in Hutchinson County reported 1,500 tons of CO through four separate maintenance events.

Likewise, the Wasson CO<sub>2</sub> plant routed gas to its flares while replacing worn out pipe, releasing more than 400 tons of SO<sub>2</sub> in the process. Natural gas and petrochemical plants are crisscrossed by miles of piping. Repair and maintenance of these pipes should be a normal, planned part of facility operations and any excess emissions resulting from

such maintenance should not qualify for a defense.<sup>59</sup>

Sometimes, large amounts of pollutants are released because something goes wrong during maintenance. Citgo's Corpus Christi refinery released more than 180 tons of CO when its boiler overloaded during maintenance of a steam generator, while the Boyd Compressor station off-gassed 150 tons of VOCs after a breakdown occurred during repairs. These and similar events warrant a closer look to determine whether such accidents could have been avoided with greater care.



Pollution from upsets has been allowed to occur under the radar and largely without regulation or enforcement. The emissions that are slipping through loopholes in the law are significant and are contributing to adverse health effects in communities that are already overburdened by pollution. These extra emissions are not unavoidable. Better management practices and control technologies at industrial facilities would reduce upsets. EPA and states should eliminate legal loopholes and bring enforcement actions for upsets to provide facilities with incentives to make improvements. States should require better monitoring and electronic reporting to allow regulatory agencies and the public to track excess emissions.

### Eliminate Loopholes

EPA should eliminate the “emergency” loophole in its own Title V regulations

and should carefully review its New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants to limit upset exemptions and ensure that the standards for hazardous pollutants provide an ample margin of safety to protect public health. EPA should also remove from federally approved state air pollution plans all upset loopholes that go beyond recognizing agency enforcement discretion. EPA has known about illegal State Implementation Plan provisions for years, and its failure to act is inexcusable and clearly violates the Clean Air Act.

EPA and states should ensure that federal permits do not create additional loopholes for upset emissions. States should consider regular upset emissions when issuing permits. These emissions should be included in calculations of a facility’s potential to emit, which determines the applicability of many federal requirements. In addition, these emissions should be included in the modeling

used to ensure that new or expanded sources do not cause ambient air quality to exceed health-based levels. Finally, upsets should not be exempt from best available control technology requirements.

### Improve Monitoring and Reporting

Real monitoring of upset emissions should be increased. In particular, improved monitoring is needed for flares, leaks and cooling towers. Better reporting of excess emissions is also needed. States should have a central, electronic reporting system for all excess emissions. States should require electronic reporting of all excess emissions within 24 hours, and toxic emissions should be reported immediately. These reports should be made available to the public on state agency websites within 72 hours. It is important that members of the public have quick access to information regarding the excess pollution to which they are being exposed. The reports should, at a minimum, specify:

- the individual pollutants emitted,
- the amount of each pollutant emitted,
- the method of calculating emissions,
- the cause of the emissions,
- the amount by which the emissions exceed regulatory limits,
- the regulatory limits that apply, and
- the actions planned to prevent such excess emissions from occurring in the future.<sup>60</sup>

### Increase Enforcement

Increased enforcement for upset emissions is necessary to provide incentives for facilities to reduce these emissions. Industry has little incentive to hire sufficient staff and perform preventive maintenance if it is cheaper to simply allow excess emissions. EPA and states should take the following steps:

- EPA should act on the Environmental Integrity Project's March 19, 2003 request for enforcement action for excess emissions in Port Arthur. EPA should also investigate and take enforcement action for excess emissions at other facilities documented in this report;
- States should allocate sufficient funding and enforcement staff to review upset reports and to take enforcement action for illegal excess emissions, particularly those that cause nuisance conditions and contribute to health threats;
- States should adopt automatic mandatory penalties for upset emissions. For example, a "three strikes" policy would allow the state to exercise enforcement discretion for the first two upset emissions in a year, but would require automatic penalties for subsequent upsets.<sup>61</sup> Permits should also automatically require facilities to shut down if they exceed a certain number of upsets, or if pollution from their upsets exceeds a set amount. In addition, states should require facilities to offset their upset emissions by reducing routine emissions by at least an equal amount;
- Penalties, for all air violations, should be based on the amount and toxicity of the emissions. Under Clean Air Act Section 113(d), EPA is limited to assessing penalties of \$25,000, adjusted

for inflation, per day for each violation of the Clean Air Act. This means that a source that exceeds its emission limit by 100 pounds of toxic pollution may be liable for the same maximum penalty as a source that exceeds its limit by 1,000,000 pounds. Congress should amend the Clean Air Act to allow additional penalties based on the quantity of toxic or hazardous pollution emitted. A similar approach is authorized by section 311(b)(7) of the Clean Water Act for discharges to water of hazardous substances or oil.

### Study Health Effects

There have been no comprehensive studies on the effects of upset emissions on the health of many refinery and chemical

communities. People from these communities tell the same stories regarding breathing difficulties, burning eyes, rashes, and high cancer and hysterectomy rates. Toxic upset emissions, added on top of the large number of toxics to which these communities are already exposed, are a likely culprit. EPA and states should prioritize funding studies on the long and short-term effects of toxic upset emissions on local communities. As a first step, they should fund and organize comprehensive health registries for cancer, birth defects, autoimmune diseases and asthma. These registries should be geographically targeted to the communities surrounding large industrial sources. These communities deserve to know what is being emitted into their air, as well as what effects those emissions may have on their health.

## NOTES

- <sup>1</sup> There is no uniform definition of "upset." In this report it is used broadly to cover excess emissions that are allowed to evade regulation and enforcement, and may include malfunctions or breakdowns, as well as some startups, shutdowns and maintenance activities.
- <sup>2</sup> Facilities are required to report their total annual emissions of certain pollutants to states every year. These emission numbers are compiled into state "emission inventories" and are used for developing air pollution reduction plans and for assessing fees. Some states require upset emissions to be included in annual emission inventory reports and others do not. Emission fees are generally assessed by states based on the size of a facility's emissions as reported to the emission inventory. If upset emissions are not included in the inventory, therefore, they are often not assessed fees. In addition, many states have emission caps that require facilities to pay fees on only their first 4,000 tons of emissions. This means, even in states where upset emissions are reported in the annual inventory, large facilities with routine emissions over 4,000 tons do not have to pay fees on their upset emissions.
- <sup>3</sup> H.R. 4517, 108<sup>th</sup> Cong., 2d. Sess. (2004).
- <sup>4</sup> This includes only SO<sub>2</sub>, NO<sub>x</sub>, VOCs and H<sub>2</sub>S. Other pollutants were not tallied.
- <sup>5</sup> Neither the upsets total, nor the Dallas total includes PM emissions.
- <sup>6</sup> Texas data show that these types of facilities were responsible for the majority of upset emissions in Texas in 2003. Facilities in just five industrial classifications—industrial organic chemicals, natural gas liquids, crude petroleum and natural gas, carbon black and petroleum refining—were responsible for 94% of the 2003 upset emissions in Texas. Texas Commission on Environmental Quality, Annual Enforcement Report Fiscal Year 2003 (December 1, 2003).
- <sup>7</sup> In addition, upsets cause the formation of Products of Incomplete Combustion (PICs). PICs are hazardous air pollutants that are formed as artifacts of combustion, but are not present in the original waste stream. Dioxins and furans are the most commonly identified PICs. Emissions of dioxins and furans can rise up to 50 times during upsets in medical waste incinerators.
- <sup>8</sup> The total includes upset emissions of SO<sub>2</sub>, H<sub>2</sub>S, CO, NO<sub>x</sub>, and VOCs. Upset emissions for Texas facilities are emissions reported from 1/31/03 to 1/31/04. Texas' online upset reporting system began tracking upsets on 1/31/03. Upset emissions for Louisiana facilities are the average of upsets reported to the state for 2001 and 2002.
- <sup>9</sup> Texas 2003 upsets were compared to Texas emission inventory data for 2002, the most current year for which data is available.
- <sup>10</sup> SACROC's 2003 upset emissions were six times the total emissions it reported to the emission inventory for 2001.
- <sup>11</sup> For Texas facilities, 2003 upset data was gathered and compared to Texas 2002 emissions inventory data. For Louisiana facilities, 2001 and 2002 upset data was gathered and compared to Louisiana emission inventory data for 2001 and 2002.
- <sup>12</sup> Citgo's Corpus Christi refinery is not included on this list because we gathered upset data for only the East Plant, while available production capacity was for the East and West plants together. Capacity data are as of 1/31/03.
- <sup>13</sup> 2002 totals are as reported on the EPA Toxics Release Inventory.
- <sup>14</sup> EPA "National Air Toxics Assessment" at <http://www.epa.gov/ttn/atw/nata/risksum.html>. See also, California Environmental Protection Agency, "Toxicity Criteria Database—OEHHA Cancer Potency Values" (Office of Environmental Health Hazard Assessment, December 2002).
- <sup>15</sup> See, "The Silent Treatment," Natural Resource Defense Council's One Earth (Spring 2002).
- <sup>16</sup> Memorandum re: Summary of Significant Events from March 1, 2000 through December 31, 2000 for the Gulf Coast Upset Maintenance Pilot Project from Michael Freer, Air Liaison, Gulf Coast Upset/Maintenance Coordinator, to Texas Natural Resource Conservation Commission Commissioners (Jan. 10, 2001).
- <sup>17</sup> U.S. Dept. of Labor, Bureau of Labor Statistics. <http://www.data.bls.gov>. From 1994 to 2003, the total number of employees in petroleum refining declined by approximately 21%.

- <sup>18</sup> U.S. Dept. of Labor, Bureau of Labor Statistics. <http://www.data.bls.gov>. From 1994 to 2003, the total number of employees in chemical manufacturing declined by approximately 30%.
- <sup>19</sup> 30 Tex. Admin. Code, Chapter 115, Subchapter H.
- <sup>20</sup> Clean Air Act §302(k).
- <sup>21</sup> Clean Air Act §116.
- <sup>22</sup> Clean Air Act §502(b)(5)(E).
- <sup>23</sup> The theory behind these defenses is that, for some pollution limits, the stringency of the limit is based on a determination of what is technologically feasible, rather than what is needed to achieve certain air quality goals. Because technologies sometimes fail, due to no fault of a facility, EPA believes some defenses are warranted. EPA has not been consistent, however, in defining what is a technology-based limit versus what is an air quality-based limit. Likewise, EPA has not limited approved defenses to technology-based standards. See, for example, 61 Fed. Reg. 64463, 64470 (Dec. 5, 1996) and 60 Fed. Reg. 45530, 45558-45561 (Aug. 31, 1995). In addition, EPA's theory fails to consider the impacts of pollution on public health, regardless the culpability of the facility emitting the pollution. For example, drivers must pay for the damage they cause others in a car accident even if the accident was caused by a failure of technology beyond their control, such as brake failure.
- <sup>24</sup> Clean Air Act §111(b).
- <sup>25</sup> Clean Air Act §112(b)(2).
- <sup>26</sup> 40 C.F.R. §63.6(e).
- <sup>27</sup> 40 C.F.R. §63.6(f) (emphasis added).
- <sup>28</sup> 40 C.F.R. §60.8(c).
- <sup>29</sup> Clean Air Act §112 (f)(2).
- <sup>30</sup> The CAA requires EPA to review its NESHAP standards within eight years after promulgation to ensure that they provide an "ample margin of safety to protect public health." If the standards do not reduce the lifetime excess cancer risks to the individuals most exposed to cancer-causing emissions from regulated facilities to less than one in one million, the standards must be revised. Clean Air Act §112(f)(2). EPA should clearly consider exposure to upset emissions when making these cancer risk determinations.
- <sup>31</sup> See example, Letter from David Neleigh, EPA Region 6 Chief Air Permits, to John Steib, Texas Commission on Environmental Quality Director Air Permits Division (May 1, 2002).
- <sup>32</sup> 30 Tex. Admin. Code §§ 101.222(c) & (e).
- <sup>33</sup> Alabama SIP section 335.3.14-03(1)(h).
- <sup>34</sup> 40 C.F.R. §70.6(g)(2).
- <sup>35</sup> 33 LAC III.917.
- <sup>36</sup> SCAQMD Rule 518.2. These Louisiana and California rules are discussed in more detail in Appendices B and D.
- <sup>37</sup> U.S. EPA Memorandum, "State Implementation Plans: Policy Regarding Excess Emissions During Malfunctions, Startup and Shutdown," (Sept. 20, 1999).
- <sup>38</sup> Clean Air Act §502(b)(5)(E). In addition, EPA has allowed state affirmative defense provisions to apply to citizen suit actions for penalties under the Clean Air Act. EPA has, therefore, added additional requirements to what a citizen must prove to prevail in a citizen suit. This violates Clean Air Act §304.
- <sup>39</sup> U.S. EPA Memorandum, "State Implementation Plans: Policy Regarding Excess Emissions During Malfunctions, Startup and Shutdown," (Sept. 20, 1999); A study by EPA Region 9 found similar problems. Memorandum from Nadia Wetzler to Ginger Vagenas "Excess Emission Provisions" (Sept. 26, 2000).
- <sup>40</sup> EPA Guidance at Attachment p. 1.
- <sup>41</sup> Letter from Jeffrey Holmstead, EPA Assistant Administrator Office of Air and Radiation and John Suarez, EPA Assistant Administrator Office of Enforcement and Compliance Assistance to Eric Schaeffer (Oct. 28, 2003).
- <sup>42</sup> This is true for normal air emissions as well because those emission estimates are based largely on calculations.
- <sup>43</sup> United States General Accounting Office, "Air Pollution: EPA Should Improve Oversight of Emissions Reporting by Large Facilities (GAO-01-46, April 2001); U.S. House of Representatives, Minority Staff, Special Investigations Division, Committee on Government Reform, "Oil Refineries Fail to Report Millions of Pounds of Harmful Emissions" (Prepared for Rep. Henry A. Waxman, November 10, 1999); United States Environmental Protection Agency, Office of Inspector General, "EPA's Method for Calculating Air Toxics Emissions for Reporting Results Needs Improvement" (Report No. 2004-P-00012, March 31, 2004)
- <sup>44</sup> Bay Area Air Quality Management District, "Technical Assessment Document: Further Study Measure 8, Flares" (Draft Revision 2, December 2002), "Technical Assessment Document: Further Study Measure 8, Pressure Relief Devices" (Draft Revision 2, December 2002), and "Proposed Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries" (Draft Staff Report, March 2003); Katzenstein, Doezeema, Simpson, Blake and Rowland, "Extensive Regional Atmospheric Hydrocarbon

- Pollution in the Southwestern United States" (August 2003) and Mid-Atlantic Regional Air Management Association, "Evaluating Petroleum Industry VOC Emissions in Delaware, New Jersey and Southeastern Pennsylvania" (October 2003).
- <sup>45</sup> Environ International, "Measurement and Assessment of Equipment Leak Fugitives and Vent Emissions in Industrial Ethylene and Other Chemical Sources" (Texas Environmental Research Consortium, June 2003); U.S. House of Representatives, Minority Staff, Special Investigations Division, Committee on Government Reform, "Oil Refineries Fail to Report Millions of Pounds of Harmful Emissions" (Prepared for Rep. Henry A. Waxman, November 10, 1999) (estimating that leaking components at refineries released an average of 40,000 tons more VOC's to the atmosphere than reported in EPA's official emissions inventory); Galveston-Houston Association for Smog Prevention, "Smoke in the Water: Air Pollution Hidden in the Water Vapor from Cooling Towers—Agencies Fail to Enforce Against Polluters" (February 2004).
- <sup>46</sup> The Institute of Clean Air Companies website at <http://www.icac.com/welcome.html> provides useful information about available monitoring (and control) technologies.
- <sup>47</sup> SCAQMD Rule 1118 & BAAQMD Reg. 12-11-500.
- <sup>48</sup> 30 Tex. Admin. Code §101.201(g).
- <sup>49</sup> <http://www.tnrcc.state.tx.us/enforcement/fod/eer/>.
- <sup>50</sup> Comprehensive Environmental Response, Compensation, and Liability Act §103(a); Emergency Planning and Community Right to Know Act §304(b).
- <sup>51</sup> <http://www.nrc.uscg.mil/foia.html>.
- <sup>52</sup> Clean Air Act §503(b)(2). EPA used to interpret "promptly" as within two to seven days. EPA now interprets "promptly" as within six months.
- <sup>53</sup> Jeff Claassen, Scott Streater & Seth Borenstein, *Is the EPA Doing Enough?*, Fort Worth Star-Telegram, July 18, 2004, at 1A.
- <sup>54</sup> Texas Commission on Environmental Quality, Annual Enforcement Report Fiscal Year 2003 (Dec. 1, 2003); <http://www.tnrcc.state.tx.us/enforcement/AER>.
- <sup>55</sup> EPA Guidance at Attachment p. 4.
- <sup>56</sup> *Id.*
- <sup>57</sup> Even with these large numbers, it appears that cooling tower leaks may be underreported. The reports reviewed reveal that upon discovering cooling tower leaks, some plants work backward to try to determine when the leak first occurred, then estimate all emissions from the start of the leak to its final repair. Other plants, however, seem to calculate emissions from the date the leak is discovered, which would likely substantially underestimate actual releases.
- <sup>58</sup> Galveston-Houston Association for Smog Prevention, "Smoke in the Water: Air Pollution Hidden in the Water Vapor from Cooling Towers—Agencies Fail to Enforce Against Polluters" (February 2004).
- <sup>59</sup> Excess emissions from leaking valves and flanges may be systematically underreported. Some companies appear to believe that extra pollution from valves and flanges is allowed if those valves and flanges are covered by the federal Leak Detection and Repair (LDAR) program. For example, Huntsman Port Neches withdrew one of its upset reports stating the excess emissions did not have to be reported because they were from a valve covered by LDAR. LDAR does not, however, authorize excess emissions. As its name suggests, it requires only that components be repaired within a certain amount of time after a leak is discovered.
- <sup>60</sup> These are all required in the electronic reports that must be filed in Texas following an upset.
- <sup>61</sup> States should clearly take enforcement action for all upsets that create a threat to public health or a nuisance.

## APPENDIX A

## 50-State SIP Upset Rule Summary

State	Are some upset emissions allowed to exceed permit/rule limits? <sup>1</sup>	Type of rule <sup>2</sup>	SIP rule <sup>3</sup>	Are upset emissions included in the emissions inventory? <sup>4</sup>	Are fees charged on upset emissions?	How quickly must upsets be reported?
AL	Yes	Variations; Exemptions in permits	ADEM. Admin. Code R. 335-3-1-.09; 335-3-14.03(1)(h)(1) & (2)	No	No	Maintenance – 24 hrs. prior; Malfunctions – w/ in 24 hrs.
AK	Yes	Affirmative Defense/ Exemption (rule not clear)	18 AAC 50.240	No	No	Within 2 days for unavoidable emergencies and malfunctions; 30 days after end of month incident occurred for other excess emissions, but ASAP if potential threat to human health
AZ	No	Affirmative Defense	A.A.C. R18-2-310	Sometimes	Yes, if included in inventory	24 hours w/ 72 hour follow up
AR	No	Enforcement Discretion	AR Reg 19, sec. 19.601 & 19.602	No	No	By end of next business day
CA		See Appendix B				
CO	Yes	Exemption	COLO. CODE REGS. Rule 1.G; Rule 2 II.E.			No later than 2 hours after the start of the next working day; followed by written notice
CT	Yes	Variations	CT 19-508-7; 19-508-13			Any shutdown of control equipment which may last more than 72 hours and during which the source will be operated must be reported “promptly”
DE	No	Enforcement Discretion	7 Del. C., sec. 6028 (reporting)	Yes	No	Immediately w/ written follow up in 30 days
DC	Yes	Variance	DC 8-2:724			
FL	Yes	Exemption	FAC 62-210.700; 62-4.130			Immediately for breakdowns
GA	Yes	Exemption	EPD Rule 391-3-1.02(2)(a)(7)	Yes	Yes	7 days for breakdowns causing excess emission for 4 hrs or more from a major source
HI	No	Enforcement Discretion	DOH Rule 11-60-16 (reporting)			24-hrs prior to maintenance; “immediately” for breakdowns
ID	No	Enforcement Discretion	IAC 58.01.01.130 – .136	Yes	Yes	2 hours before maintenance and 24 hours after breakdown w/ 15 day follow up
IL	Yes	Exemption	IAC 201.261 - .265	Yes	Yes (for Title V sources)	Immediately for malfunction or breakdown where source continues to operate
IN	Yes	Exemption	326 IAC 1-6-4; 326 IAC 1-6-2			Within 4 daytime, business hours for excess emissions lasting more than one hour
IA	Yes	Exemption	IAC 24.1 (455B); 445B.143	Yes (for Title V sources)	Yes (for Title V sources)	For excess emissions that are not the result of startup, shutdown or cleaning, within 8 hours of, or at the start of the first working day following the event; written follow up within 7 days

State	Are some upset emissions allowed to exceed permit/rule limits? <sup>1</sup>	Type of rule <sup>2</sup>	SIP rule <sup>3</sup>	Are upset emissions included in the emissions inventory? <sup>4</sup>	Are fees charged on upset emissions?	How quickly must upsets be reported?
KS	Yes	Exemption	KAQR 28-19-11			Within 10 days for breakdowns; Prior approval for scheduled maintenance
KY	Yes	Exemption	401 KAR 50:055	No	No	3 days prior for planned shutdown; "as promptly as possible" for malfunctions or unplanned shutdowns or start-ups
LA	Yes	Exemption	33 LAC § 917	Yes	Yes	Within 1 hour for emergency conditions; w/in 24 hours for non-emergency conditions over the reportable quantity
ME	No	Affirmative Defense	SIP 101(4)	No	No	Within 48 hours; written report quarterly
MD	No	Enforcement Discretion	COMAR 26.11.01.07			Report onset of any excess emissions expected to last more than 1 hour; written report within 10 days of request by Department
MA	No	Enforcement Discretion				Most permits require w/in 3 days
MI	No	Enforcement Discretion (malfunction, startup, shutdown); Affirmative Defense (startup, shutdown)	R. 336.1912, 1915 & 1916	Sometimes	Sometimes	Notify of breakdown lasting more than 1 hour (if toxic or hazardous emissions) or 2 hours (if other emissions) "as soon as is reasonably possible" with written report in 10 days
MN		Enforcement Discretion	Minn. R. 7019.1000 (reporting)	Yes	Yes	24 hours prior to shutdown; immediately for emissions which endanger human health or environment; w/in 24 hours of breakdowns lasting more than one hour
MS	Yes	Exemption	APC-S-1 Section 10			Within 5 working days
MO	No	Enforcement Discretion	10 CSR 10-6.050	Yes	Yes	2 business days after malfunction emissions lasting more than 1 hour; 10 days prior to maintenance, startup or shutdown emissions lasting more than 1 hour. Written follow up in 15 days
MT	No	Enforcement Discretion	ARM 17.8.110	No	No	"Promptly" of malfunctions causing excess emissions or lasting more the 4 hours; written report w/in 1 week
ND	Yes	Exemption up to 10 days (may be extended)	NDCC 33-15-01-13	Yes (generally)	Yes (generally)	24 hours prior to planned shutdown; immediate notification of malfunction that threatens health or welfare; notification "as soon as possible" of other malfunctions lasting more than 24 hours.
NE	No	Enforcement Discretion	Title 129, Chap. 35, 001 - 008	Yes	Yes	10 days prior to planned startup or shutdown; w/in 48 hours of malfunction or unplanned startup or shutdown; written report w/in 15 days of request
NV	Yes	Exemption	Article 2.5.4 <sup>5</sup>	Sometimes	Sometimes	Within 24 hours with written report in 15 days
NH	Yes	Exemption for up to 48 hrs for malfunction (may be extended)	Part ENV-A 902.03	Yes	Sometimes	Within 8 hours

State	Are some upset emissions allowed to exceed permit/rule limits? <sup>1</sup>	Type of rule <sup>2</sup>	SIP rule <sup>3</sup>	Are upset emissions included in the emissions inventory? <sup>4</sup>	Are fees charged on upset emissions?	How quickly must upsets be reported?
NJ	No	Affirmative Defense (not clear whether just applies to penalties)	NJAC 7:27-22.16(l) <sup>6</sup>			By 5 pm of the 2nd full calendar day
NM	Yes	Exemption	20 NMAC 2.7.100-109	Yes	No	24 hours prior to scheduled maintenance; 24 hours after the start of the next business day for malfunction, startup or shutdown, followed by written notification within 10 days after the start of the next business day (some notice may be waived)
NY	Yes	Exemption	Sec. 201.5			Reports of maintenance or startup if requested; Reports of malfunctions w/in 72 hours with written report w/in 30 days if requested
NC	Yes	Exemption	Reg. 2D.0535			Within 24 hours of excess emissions which last for more than 4 hours
OH	Yes	Variance (but see Appendix E)	SIP 3745-15-06	No	No	"Immediate" notice of malfunction; if event lasts longer than 72 hrs, must follow up with written report. Notice and request to operate during maintenance at least 2 weeks prior to planned maintenance
OK	Yes	Exemption	OK 252:100-9-3			Notice prior to proposed startup/shutdown; notice by next working day for malfunction
OR	No	Enforcement Discretion	Rules 340-028-1400 & 340-028-1430	Yes	Sometimes	Immediately for upsets at large sources
PA	No	Enforcement Discretion		Yes	Yes	According to permit provisions
RI	Yes	Variance	APCR 16	Sometimes	Sometimes	Depends on permit
SC	No	Enforcement Discretion				Within 24 hours, written report in 30 days
SD	No	Enforcement Discretion				Depends on permit
TN	No	Enforcement Discretion (rule unclear)	Chap. 1200-3-20			Within 24 hours of most malfunctions; 24 hours prior to most planned shutdown
TX	Yes	Exemption (Startup, Shutdown, Maintenance); Affirmative defense (malfunctions)	30 TAC 101.222(a) – (f)			Within 24 hours for emissions exceeding reportable quantity; follow up within 2 weeks
UT	Yes	Exemption for breakdowns	UAC R307-1-4.07			Within 3 hours "if reasonable" but at least within 18 hours for breakdowns lasting more than 2 hours
VT	No	Enforcement Discretion				As required

State	Are some upset emissions allowed to exceed permit/rule limits? <sup>1</sup>	Type of rule <sup>2</sup>	SIP rule <sup>3</sup>	Are upset emissions included in the emissions inventory? <sup>4</sup>	Are fees charged on upset emissions?	How quickly must upsets be reported?
VA	Yes	Variance	9 VAC 5-20-180; VR 120-02-05A	Maybe	Yes	Within 4 daytime business hours for malfunctions causing excess emissions for more than 1 hour; Within 24 hours prior to planned shutdown resulting in excess emissions for more than 1 hour
VI	No	Enforcement Discretion	Section 204-29			Within 4 business hours; Written report within 1 week
WA	Yes (not clear)	Exemption (not clear)	WAC 173-400-107			If threat to human health or safety or unavoidable, report as soon as possible. Others reported within 30 days after end of month
WV	Yes	Variance	Rules 45-3-7, 45-5-13, 45-6-8, 45-7-9 and 47-10-9			Application for variance w/in 24 hours
WI	No	Enforcement Discretion				Immediate notice of hazardous substance air spills; 8 hours for other malfunctions; prior notice of scheduled maintenance, startup or shutdown
WY	Yes	Exemption	Chapter 1, Section 19			Within 24 hours

## NOTES

<sup>1</sup> In addition to rules noted here, many states have Title V emergency provisions which allow certain upset emissions to exceed pollution limits.

<sup>2</sup> The interpretation of the provisions included in the chart is not necessarily the interpretation given by the states. In some cases, the regulations are vague and should be clarified. As used in the table:

- "Variance/Exemption" means the state can exempt facilities from compliance with clean air requirements, rather than merely waiving penalties (the rule may still require the facility to prove that certain conditions are met, as in an affirmative defense). Variances were not included if they require individual EPA approval. While exemption or variance rules may allow upset emissions to exceed permit/rule limits, we did not research how frequently these rules have been used in such a manner.
- Affirmative Defense means the rule grants a waiver of penalties if certain conditions are proven by source. The excess emissions still, however, constitute a violation.

- Enforcement Discretion means the state or local agency may choose which excesses to take enforcement action for, but none are excused from compliance or from penalties.

<sup>3</sup> The information regarding current SIP upset provision was generally obtained from EPA Regional SIP webpages. The provisions in the approved SIP may vary from those in the states' current regulations. Additional information was provided by state environmental agency staff.

<sup>4</sup> The information regarding whether upset emissions are included in the inventory and are charged fees was provided by states in response to a survey. If a state did not answer the survey, or did not answer this question on the survey, no information is included in these columns.

<sup>5</sup> Nevada's SIP is not available online. EPA provided information regarding Nevada's SIP.

<sup>6</sup> This rule does not appear to be in NJ's SIP, but is part of its Title V program.



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