

Excel Dairy: Health Impacts and the Draft Permit

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Disclaimer: The contents of this presentation do not necessarily represent the official views of ATSDR

Mission of MDH

to protect, maintain, and improve the health of all Minnesotans

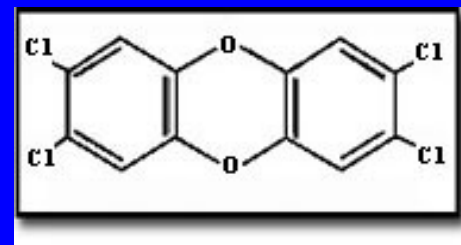
- ✓ Provide leadership and expertise
- ✓ Invest effectively in prevention, early detection and early intervention
- ✓ Use balanced and trusted science- and research-based information to guide policy and decision-making
- ✓ Provide guidance and support to local communities

Goals of MDH-ATSDR

- ✓ Prevent or reduce exposures of individuals or communities to releases of hazardous substances
 - Identify exposure pathways
 - Identify, implement and coordinate public health interventions to reduce exposures
 - Use measurable outcomes to document achievement of objectives

SAC Areas of Expertise

- Toxicology
- Health Risk and Exposure Assessment
- Environmental Chemistry
- Health Education & Risk Communication



Excel Dairy Chronology

1

- 2006: Dairy re-opens under the management of the Dairy Dozen, SD; permitted for 1544 animal units (1000 dairy cows)
- In response to citizen complaints in 2007, the MPCA installs hydrogen sulfide (H₂S) monitoring equipment to the northeast and west of the facility in May, 2008
 - Equipment records hydrogen sulfide from 0-90 parts per billion (ppb)



MPCA
Northeast CAM

MPCA West CAM

Excel Dairy Chronology

2

- MDH receives citizen complaints beginning in May 2008
- Citizens obtain a Jerome meter and record several periods of hydrogen sulfide outdoor air concentrations in the hundreds of ppb, and an episode of concentrations in excess of 1,000 parts per billion (ppb).

Excel Dairy Chronology

3

- In response to a request from MDH to collect more data on community exposures, ATSDR approves an Exposure Investigation in June 2008.
- In July 2008, ATSDR measures hydrogen sulfide air concentrations at 3 residences near the Excel Dairy for a 2-3 week period.

Health Effects of H₂S

1

- **>100,000 ppb**: Immediately Dangerous to Life and Health; unconsciousness; permanent neurological damage
- **5-10,000 ppb (15-30 min)**: changes in blood chemistry
- **2,000 ppb (30 min)**: Impaired lung function in some people
- **> 600 ppb (nearly 1 year)**: Long-term neurological damage in a toddler

Health Effects of H₂S

2

- 40-100 ppb H₂S or total reduced sulfide (peak community outdoor air levels lasting 30 min to several hours; episodes sometimes continuing for weeks to months): headache, nausea, eye and respiratory irritation, cough; increased hospital visits
- Short-term, single or rare exposures: reversible effects. Unknown if prolonged or repeated exposures cause more long-lasting effects in sensitive people.

Guidelines for H₂S Exposure

	<u>Level</u>	<u>Time, Freq.</u>
• AIHA, ERPG1	100 ppb	1x, rare
• MN AQ Std	50 ppb	½ hr, 2x/year
• MN AQ Std	30 ppb	½ hr, 2x/5 days
• ATSDR MRL	70 ppb	1-14 days
• ATSDR MRL	20 ppb	15days-1 year
• MDH HRV	7 ppb	up to 13 weeks
• EPA Ref. Conc.	1.4 ppb	annual average

Air Monitoring Results

MPCA DATA

May-October 2008

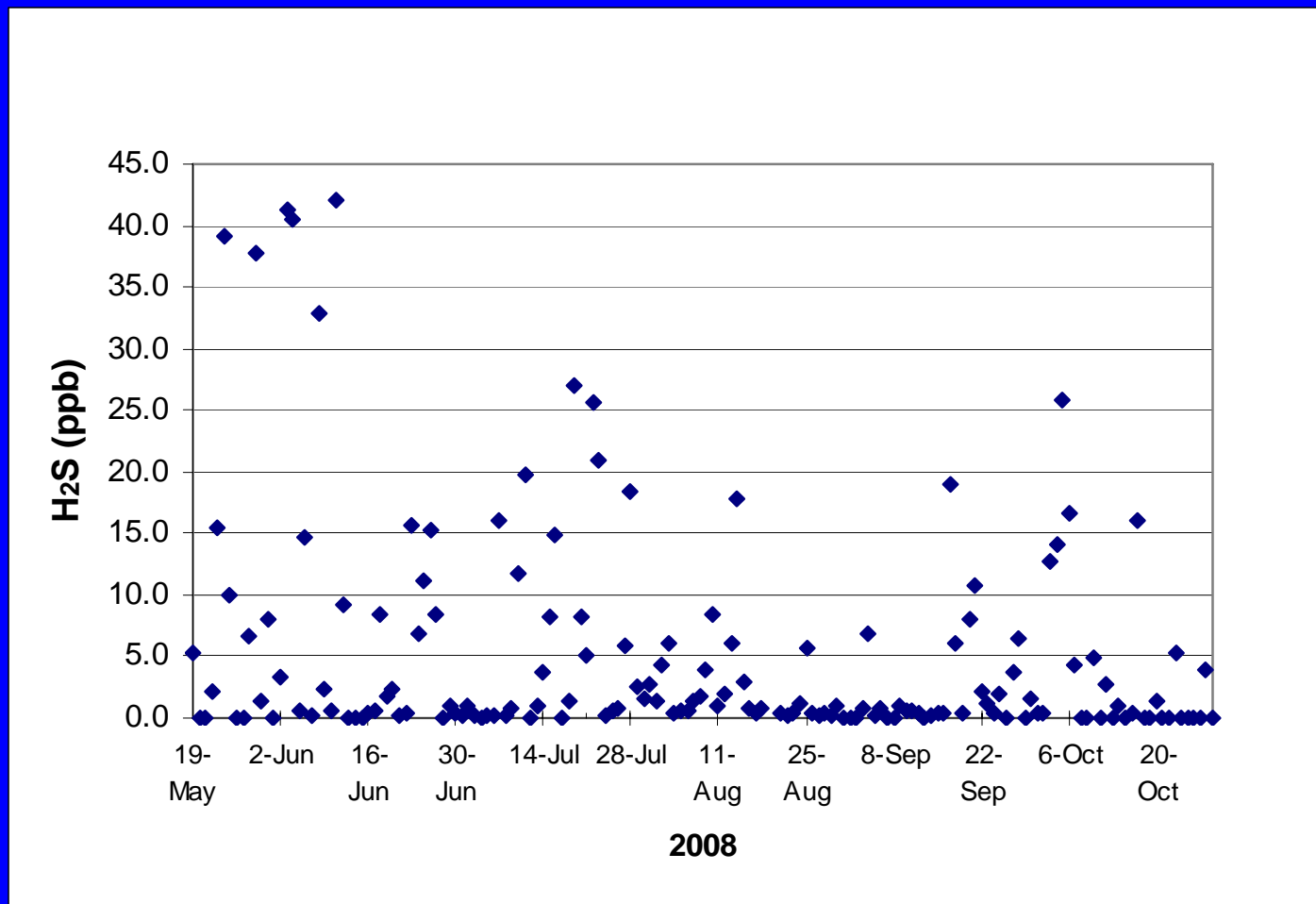
West CAM, 19 May-29 October

- 435 ½ hrs > 30 ppb
- 97 ½ hrs > 90 ppb
- Exceed ATSDR MRL 70 ppb, 6/3-6/4
- Exceed MDH HRV 7 ppb, 5/19-8/17
- Exceed EPA RfC 1.4 ppb: annual average greater than 2.4 ppb (19 May-29 Oct., even if 0 ppb for rest of year)

Northeast CAM, 19 May-29 Oct.

- 41 ½ hrs > 30 ppb
- 5 ½ hrs > 90 ppb

MPCA West CAM, 24 hr Average H₂S Concentrations



Air Monitoring Results

ATSDR DATA

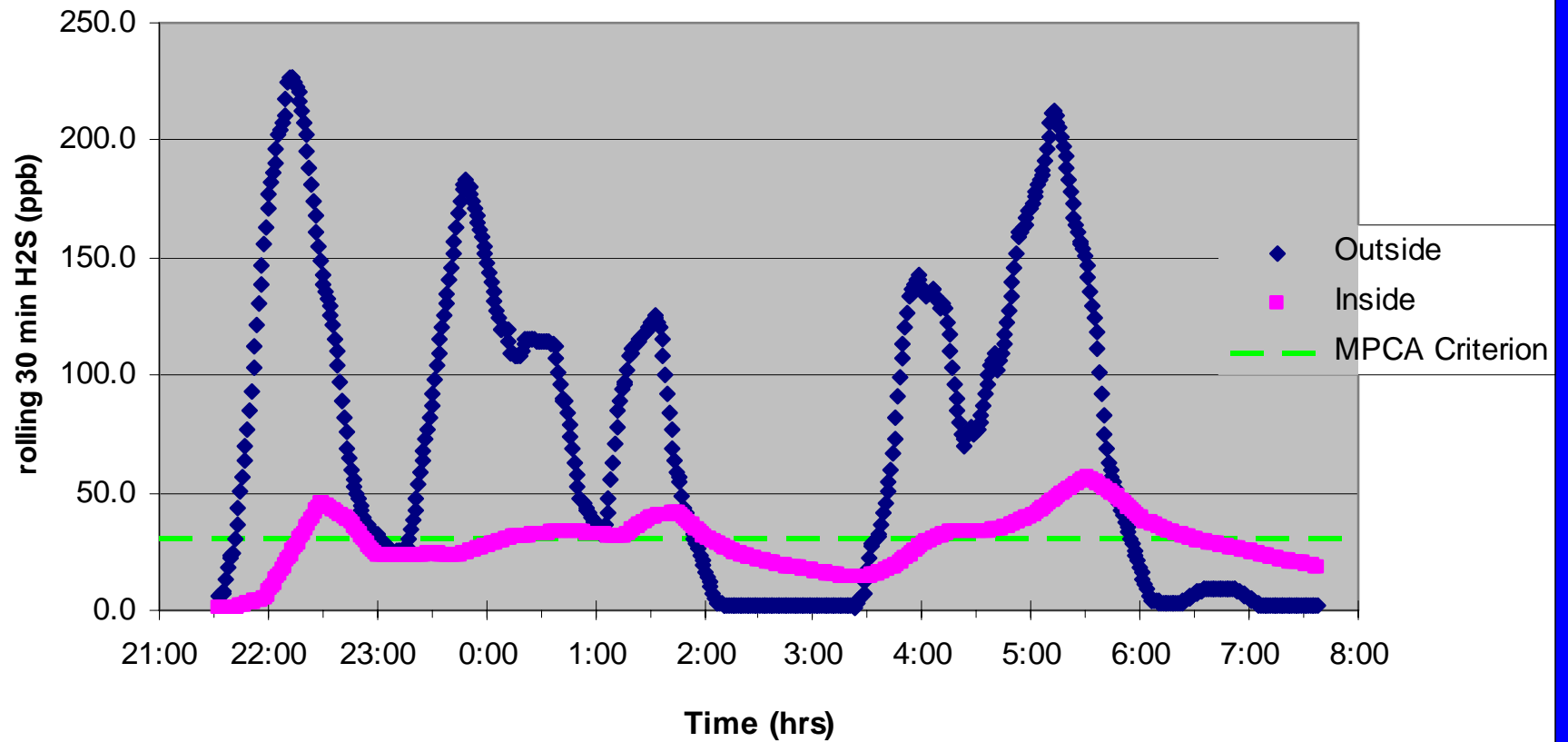
Snapshot: July 2008

Rolling 30 min > 30 ppb Location S1, outside:

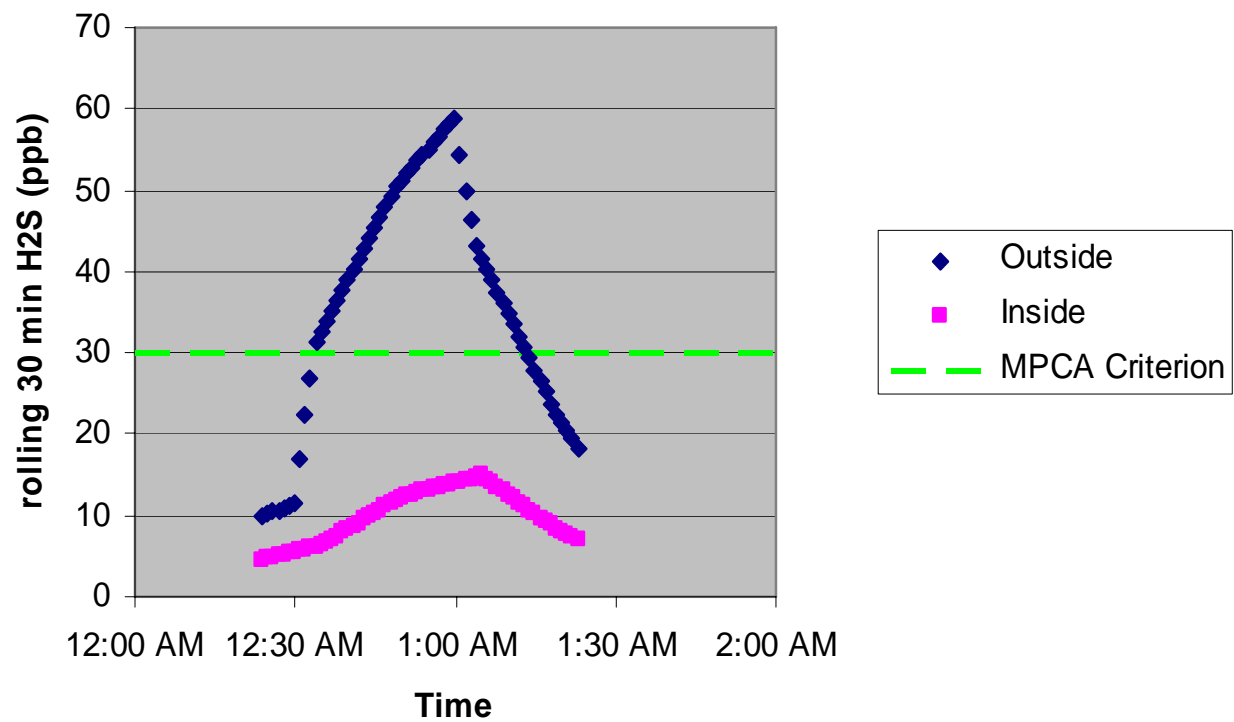
many periods near or above ERPG-1

<u>Date</u>	<u>Minutes</u>	<u>Mean</u>	<u>Max 30 min</u>
7/19	88	72	158
	102	80	165
7/21	88	94	229
	108	97	227
	186	87	183
7/22	169	101	143
7/27	72	37	69
	103	55	105
7/30	67	51	111

Location S1 - July 21-22, 2008



Location S2 - July 19, 2008



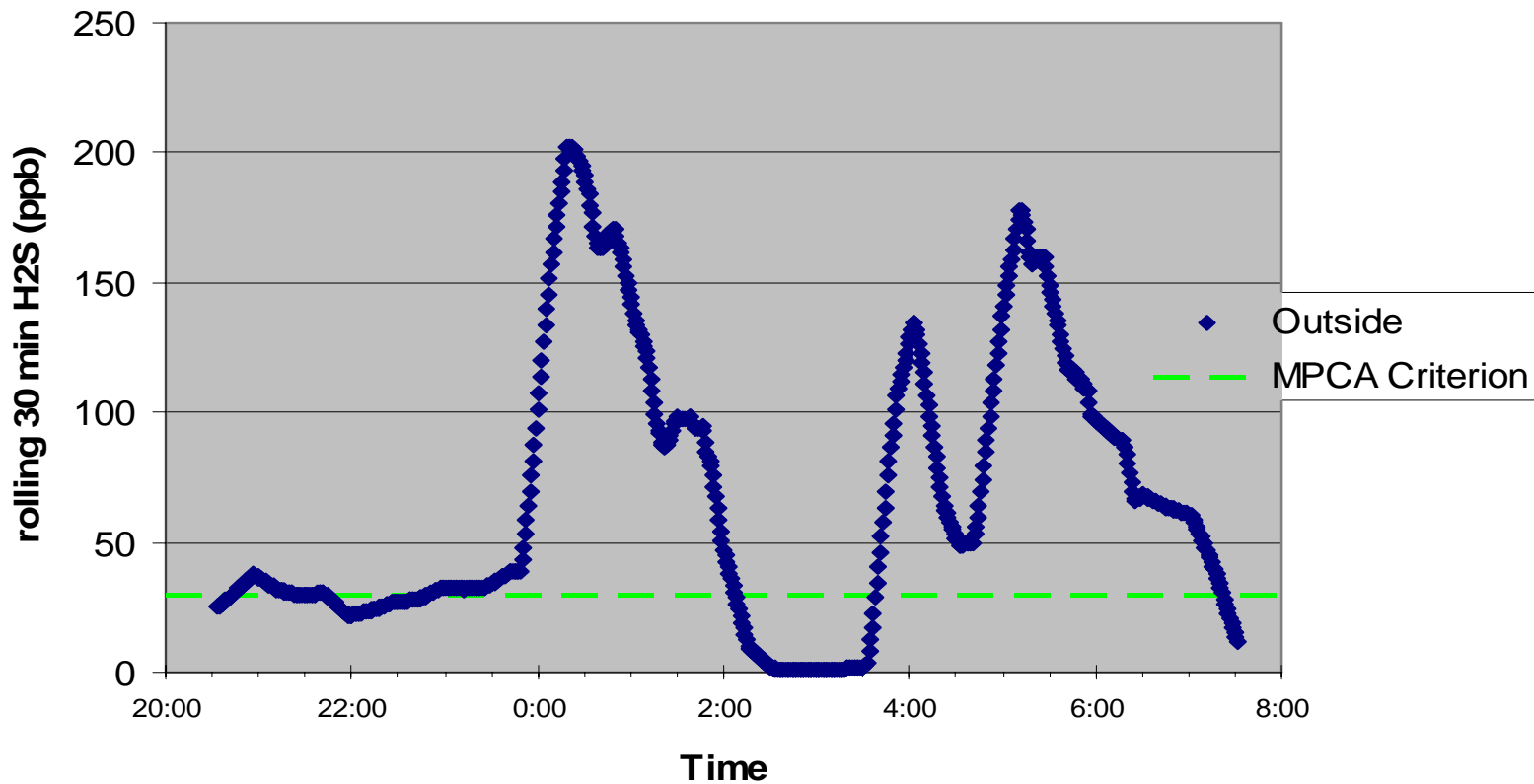
Rolling 30 min > 30 ppb

Location S3, outside:

Many periods near or above ERPG-1

<u>Date</u>	<u>Minutes</u>	<u>Mean</u>	<u>Max 30 min</u>
7/19	104	52	89
7/20	97	42	71
7/21	37	30	42
	46	30	56
	74	39	61
7/22	89	32	38
	43	28	30
	226	87	202
7/23	252	84	178
7/28	37	32	45
	309	77	154
	82	49	99
7/30	80	62	147
7/31	56	30	37

Location S3 - July 22-23, 2008



Summary and Conclusions-1

- Dairy air emissions are a **Public Health Hazard** for families living nearby.
- Enforcement of Minnesota Statutes and Rules may not entirely eliminate odors and toxic levels of gases originating at the Dairy, but enforcement will, at a minimum, greatly reduce the frequency and intensity of exposures to toxic gases *and protect public health.*

Summary and Conclusions-2

- Health symptoms are apparently reversible when single or very few exposures to hydrogen sulfide occur at levels seen near the Excel Dairy.
- It is not known if repeated exposures to hydrogen sulfide at observed levels over several months could cause longer term effects, especially in sensitive sub-populations, such as children and people under stress.

If a New Permit is Issued-1

- **Violations of permit** requirements for air quality, water quality management and manure management (including land application) **must be quickly corrected**.
 - Enforcement activities should be specified.
 - Enforcement timelines should be specified.
- The permit should require manure basins to be fenced and appropriate signage installed.

If a New Permit is Issued-2

- No cows should be allowed at the Dairy before a new permit is issued, and changes completed as required in the new permit.
- Before manure basins are emptied, there needs to be a plan in place: 1) for land spreading at agronomic rates, and 2) for compliance with 21 day maximum exemption from air quality standards for manure transfer.

If a New Permit is Issued-3

- **Citizens should be notified** when air quality waivers are requested for emptying manure basins.
- **Emergency plans** should be in place to prevent basins from over-flowing.
- Manure management, including land application, should be done to ensure that vulnerable source water protection areas for public water supplies, in addition to private wells, are protected.

If a New Permit is Issued-4

- The permit should implement appropriate controls and monitoring to ensure that ambient air standards for sulfur dioxide are not exceeded.
- Citizens should be notified of any plans to expand the Dairy; any plan should undergo environmental review to determine the need for an EIS.

MDH Plans

- MDH will continue to provide people living at the Dairy and nearby with appropriate information to protect their health and safety.
- MDH will continue to comment to regulatory agencies on permitting and environmental review.