



Noise update

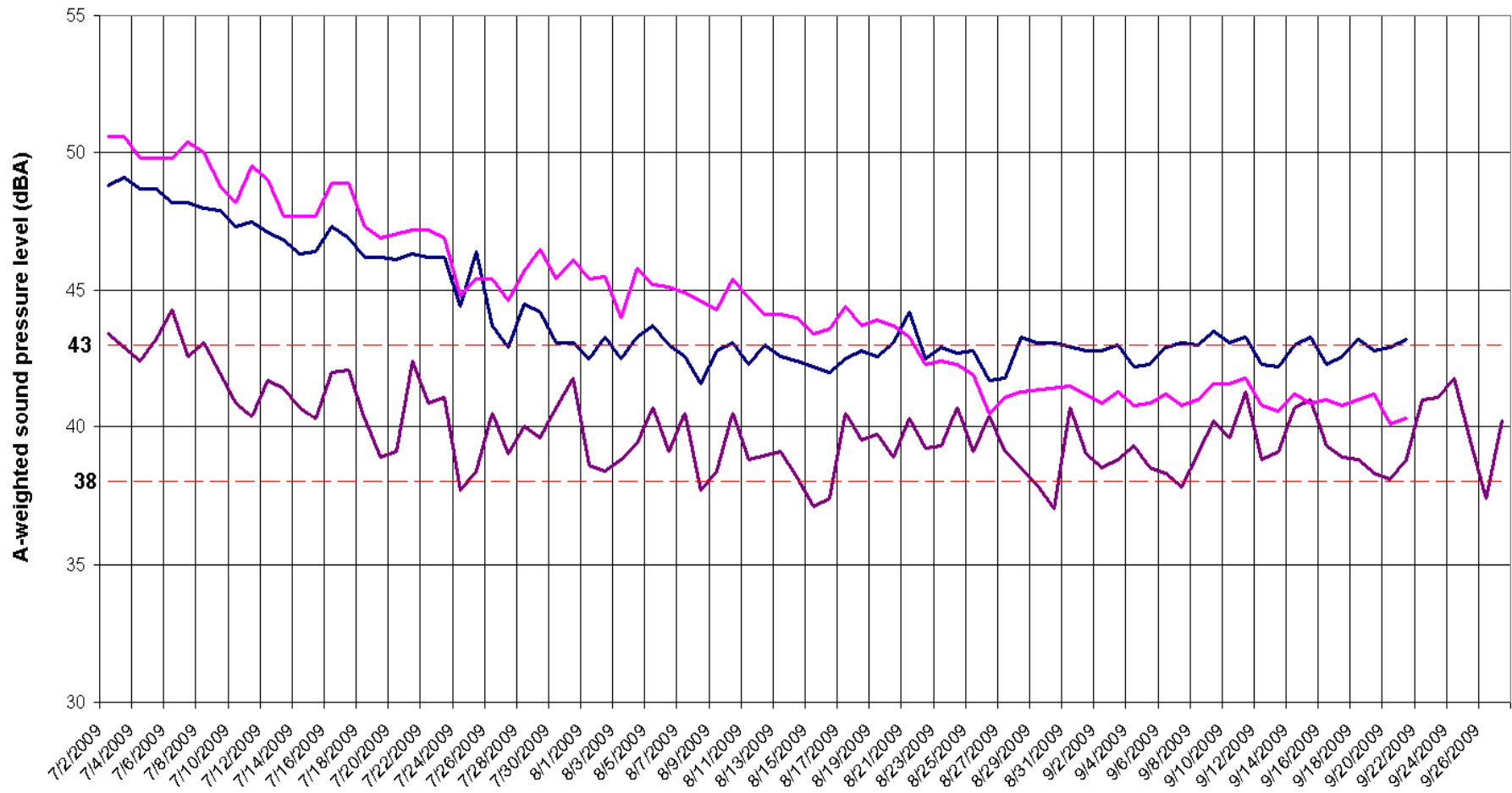
September 29 2009

- Follow up from September 3rd DEC meeting
- September 5th, 6th and 7th sound level measurements
- September 12th and 13th sound level measurements
- Worst case scenario status
- Additional sound mitigation
- Permanent sound monitoring status

September 3rd follow up



Lowest A-weight sound pressure levels (L90)



Date

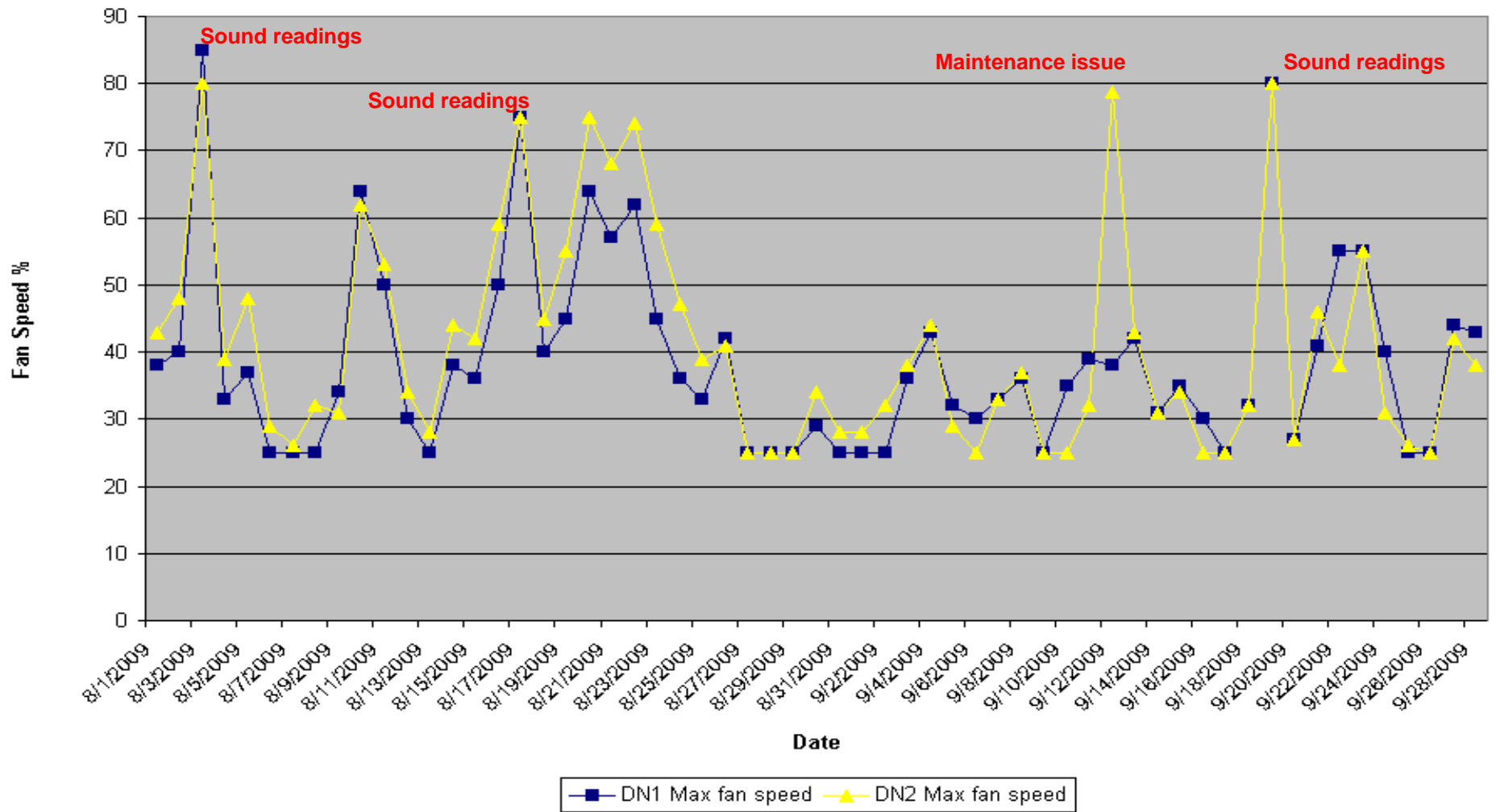
- R1 - Behind back pasture (off riding trail, overlooking Cold Spring Creek)
- R2 - Overlooking Cold Spring Creek, perpendicular to VOC equipment
- R3 - Overlooking Cold Spring Creek, perpendicular to Cooling towers

September 3rd follow up



- 8 days fan speeds exceeded 60%
- 4 days were weather related
- 3 days were for noise readings
- 1 day was maintenance related

Cooling Tower maximum fan speeds Aug/Sep



September 3rd follow up (New protocols)



- Initiated 24 hour external patrol of the factory for 'out of character' sound.
- Established a noise 'check point' for all vehicles entering the back of the facility.
- CEO set cooling tower fan speed control limit to 80%-password protected.

September 5th-7th sound data (Verified/not observed)



Evergreen Solar - Dunroven Farm Horse Trail (R1)

Summary of 20-minute Sound Monitoring

September 5 - 7, 2009 (12 Noon to 6 PM)

Date	Start Time	Measured L _{eq} (dBA)	L _{eq} (dBA) Insect Sounds Removed	Equipment Operating Ranges for measurement				Comments
				Cooling Towers	NOX Scrubber	VOC Scrubber	ASX Scrubber	
Saturday, September 05, 2009	12:01 PM	38.8	37	P1-25%	P1-54%	3 @ 60-66%	P1-70%	Crickets, distant lawn mower
	12:21 PM	38.5	38	P2-35%	P2-25%		P2-88%	Occasional back-up alarms, distant train horn
	12:41 PM	38.7	38					Horse ride on trail, back-up alarm
	1:01 PM	40.6	39					Plane flyover, train horn
	1:21 PM	40.1	38					Plane flyover
	1:41 PM	40.5	39					Horse ride on trail
	2:01 PM	40.8	39					Slight increase in wind speed and insect noise
	2:21 PM	40.3	39					Truck idling across Barnum Rd.
	2:41 PM	40.9	39					Increase in Evergreen Solar Sound, periodic breeze
	3:01 PM	40.2	39					Intermittent train horn
	3:21 PM	41.3	39					Slight breeze, trucks unloading across Barnum Rd
	3:41 PM	40.2	39					Horse ride on trail, distant back-up alarms
	4:01 PM	41.0	39					Back-up alarms, occasional train horns
	4:21 PM	41.8	40					Back-up alarms, occasional train horns, bird noise
4:41 PM	41.2	39					Back-up alarms	
5:01 PM	40.2	38					Back-up alarms	
5:21 PM	41.0	40					Back-up alarms	
5:41 PM	41.1	39					Back-up alarms	
Sunday, September 06, 2009	12:00 PM	40.5	39	P1-25%	P1-54%	3 @ 60-66%	P1-70%	Train activity, horns, breezy
	12:20 PM	40.4	39	P2-35%	P2-25%		P2-88%	Breezy, planes overhead, trains idling
	12:40 PM	39.7	38					Breezy, trains idling
	1:00 PM	40.2	39					Breezy, trains idling
	1:20 PM	40.7	39					Trains, trucks
	1:40 PM	40.1	38					Plane, trains idle
	2:00 PM	39.6	38					Trains at beginning, breezy at end
	2:20 PM	39.6	38					Plane flyover, breezy
	2:40 PM	39.6	38					Planes
	3:00 PM	39.8	38					Planes, trains (whistles and horns)
	3:20 PM	40.1	38					Trains
	3:40 PM	39.4	38					Plane flyover, breezy
	4:00 PM	39.9	38					Planes, Train idle
	4:20 PM	40.2	38					Train idle, truck at EG
4:40 PM	40.0	38					Train idle and horns	
5:00 PM	39.5	38					--	
5:20 PM	40.1	38					Fire alarm, truck around back	
5:40 PM	40.1	38					Plane, train	
Monday, September 07, 2009	12:00 PM	38.9	36	P1-30%	P1-54%	3 @ 60-66%	P1-70%	Plane flyover, loud trucks on Barnum
	12:20 PM	39.7	37	P2-45%	P2-25%		P2-88%	Plane flyover, rail activity
	12:40 PM	39.9	37					Planes, truck-gas delivery
	1:00 PM	40.1	38					Gas delivery, Planes
	1:20 PM	39.5	37					Planes, truck-gas delivery, horse and rider, talking at EG
	1:40 PM	39.8	38					Planes, truck-gas delivery
	2:00 PM	39.8	38					Planes
	2:20 PM	40.3	38					EG Louder than before, banging at EG, gas truck idle
	2:40 PM	39.9	38					Planes, truck activity at EG
	3:23 PM	40.0	38					Talking with D. Sheadel
	3:43 PM	40.3	37					Talking at EG
	4:03 PM	41.0	38					Talking at EG, Planes
	4:23 PM	40.9	37					Planes
	4:43 PM	39.4	37					Planes
5:03 PM	39.6	37					Rail activity, clapping noises and truck at EG	
5:23 PM	39.6	37					--	
5:43 PM	39.0	37					--	

September 12th-13th sound data (Verified and observed)



Evergreen Solar - Dunroven Farm Horse Trail (R1)

Summary of 20-minute Sound Monitoring

September 12 - 13, 2009

Date	Start Time	Measured Sound Levels (L ₉₀)			Insect Sounds Removed A-weighted L ₉₀ (dBA)	Equipment Operating Ranges for measurement period				Comments
		A-weighted (dBA)	16 Hz (dB)	31 Hz (dB)		Cooling Towers	NOX Scrubber	VOC Scrubber	ASX Scrubber	
Saturday, September 12, 2009	12:15 PM	42.6	55	59	42	P1-25% P2-50%	P1-49% P2-25%	3 @ 55-63%	P1-69% P2-86%	Rain
	12:35 PM	42.6	55	59	41					Rain
	12:55 PM	42.8	56	58	42					Rain
	1:15 PM	44.1	57	59	43					Rain
	1:35 PM	43.9	55	59	43					Rain
	1:55 PM	44.1	55	59	43					Rain
	2:15 PM	46.9	56	59	46					Rain
	2:35 PM	45.0	56	59	44					Rain
	2:55 PM	44.0	56	60	43					Rain
	3:15 PM	45.0	55	58	44					Rain
	3:35 PM	45.3	56	58	44					Rain
	3:55 PM	43.3	55	58	42					Rain
	4:15 PM	41.6	55	58	41					Rain
	4:35 PM	45.4	55	58	44					Rain
	4:55 PM	42.4	55	57	41					Rain
5:15 PM	41.8	55	57	41					Rain	
5:35 PM	48.7	55	57	48					Rain	
5:55 PM	47.8	55	57	47					Rain	
Sunday, September 13, 2009	12:06 AM	43.7	54	56	38	P1-25% P2-60%	P1-49% P2-25%	3 @ 55-63%	P1-69% P2-86%	Audible vent from EG, traffic on Barnum
	12:26 AM	43.7	54	56	38					Vent, insects, several train whistles
	12:46 AM	43.6	55	57	38					Vent noise
	1:06 AM	43.0	54	56	38					Vent noise
	1:26 AM	42.4	54	56	38					Vent noise
	1:46 AM	42.5	54	57	38					Some talking between D. Bell and
	2:06 AM	42.4	54	56	38					Occasional Vent
	2:26 AM	42.6	54	56	37					Sneeze at 2:46
	2:46 AM	42.5	55	56	37					Bang from Evergreen Solar
	3:06 AM	42.1	54	56	37					Car on Barnum Rd.
3:26 AM	42.0	55	56	38					--	
3:46 AM	41.3	54	56	37					--	
Sunday, September 13, 2009	12:01 PM	39.7	55	57	38	P1-35% P2-50%	P1-49% P2-25%	3 @ 55-63%	P1-70% P2-88%	Plane flyover, Rail activity, Insects, Breezy
	12:21 PM	39.6	55	57	38					Insects, Planes, Rail Activity
	12:41 PM	39.9	55	57	39					Lawn Equipment at Evergreen Solar
	1:01 PM	40.7	56	57	40					Lawn Equipment at Evergreen Solar
	1:21 PM	44.8	55	57	43					Lawn Equipment at Evergreen Solar
	1:41 PM	45.9	56	57	44					Lawn Equipment at Evergreen Solar
	2:01 PM	42.8	56	59	41					Lawn Equipment at Evergreen Solar
	2:21 PM	40.3	55	57	39					Lawn Equipment at Evergreen Solar
	2:41 PM	41.0	55	57	39					Lawn Equipment at Evergreen Solar
	3:01 PM	40.6	55	57	38					--
	3:21 PM	40.0	55	57	38					Insects, Planes
	3:41 PM	39.6	55	57	37					Planes, insects, trucks on Barnum
	4:01 PM	41.6	55	57	39					Several Aircraft Flyovers
	4:21 PM	41.6	54	57	38					Insects, planes, rail activity
	4:41 PM	41.4	55	57	38					Loud cars on Barnum
5:01 PM	41.6	55	57	39					Rain	
5:21 PM	41.6	55	57	39					Audible Rail Activity	

- Attempting to identify boundary conditions of noise sources.
- Cooling towers run at maximum 80% fan speed.
- NOX fans run at pre-maintenance problem max of 80% fan speed.
- VOC fans run at maintenance max of 75% fan speed.
- ASX fans run at top of operating range, ph1=86% and ph2 =67%.
- Two issues were identified during the initial evaluation.
 - NOX fans
 - Cooling Towers

- NOX
 - Elevated fan speeds showed about a 2dBA increase at the reference monitor.
 - Fan speeds increase as filters get dirty.
 - Original PM was triggered when fan speed reached 80%.
 - Current PM is triggered at 60% fan speed. (15min cleaning process)
- Cooling Towers
 - Sound measured 43dBA at R1 when ramped up to the maximum. (Influenced by the NOX fans)
 - Options need to be evaluated, this may include additional sound wall installation or additional chiller/cooling tower.
- VOC
 - Preventive maintenance will not be scheduled during heat wave.

'Worst Case' scenario evaluation #1 (Data)



Evergreen Solar - Dunroven Farm Horse Trail (R1)

Summary of 5-minute Sound Monitoring Samples with Various Cooling Tower Fan Speeds

September 19 - 20, 2009

Date	Start Time	Measured Sound Levels (L ₉₀)			Rounded to Nearest 1dBA A-weighted L ₉₀ (dBA)	Equipment Operating Ranges for measurement period				Comments
		A-weighted (dBA)	16 Hz (dB)	31 Hz (dB)		Cooling Towers	NOX Scrubber	VOC Scrubber	ASX Scrubber	
Saturday, September 19, 2009	11:54 PM	39.5	54	55	39	5 @ 25%	P1-83% P2-77%	2 @ 75%	P1-86% P2-67%	Train noise audible
Sunday, September 20, 2009	12:24 AM	43.5	57	63	43	9 @ 80%	P1-83%	2 @ 75%	P1-86%	Train noise audible
	12:36 AM	42.7	60	64	42	9 @ 70%	P2-77%		P2-67%	Train noise audible
	1:11 AM	41.1	58	58	41	9 @ 60%				Train noise audible
	1:21 AM	40.0	55	57	40	9 @ 50%				Train noise audible
	1:30 AM	43.7	57	62	43	9 @ 80%				Train noise audible
	1:56 AM	39.3	54	56	39	5 @ 25%				Train noise audible
							* 60%, 60%	3 @ 63%	88%, 70%	Normal condition max.
							* Changed maintenance trigger point			

Additional Sound Mitigation

- Completed
 - Installed sound insulation material around the ASX pumps.
 - Changed NOX PM trigger level to 60%.
- Under Evaluation
 - Compressor room louver sound attenuators.
 - Possible relocation of the VOC 'combustion' blowers to the ground.
 - Sound walls for the cooling tower complex.
 - 1 additional cooling tower or additional chiller.

- Long term compliance measurement protocol is being developed by Cavanaugh Tocci for review by the DEC and neighbors sound consultant. (First draft delivered today)
- A purchase specification for the permanent sound monitoring system is being developed and will be completed by October 2nd.
- Competitive bids will be solicited for hardware, software and installation.
- Vendor selection should be complete by October 16th.
- We plan to have the installation completed by the first of December.