

**Table 1: WTG Locations**

WTG Number	Municipality	Lot	Concession	GIS Easting	GIS Northing	Phase
1	Melancthon	7	7SW	553932	4878515	1
2	Melancthon	8	7SW	553699	4878711	1
3	Melancthon	9	7SW	553470	4878895	1
4	Melancthon	9	7SW	553292	4879035	1
5	Melancthon	9	7SW	553517	4879286	1
6	Melancthon	9	7SW	553706	4879494	1
7	Melancthon	5	6SW	555776	4879080	1
8	Melancthon	5	6SW	555831	4879302	1
9	Melancthon	8	6SW	554778	4880008	1
10	Melancthon	300	4SW	558014	4879946	1
11	Melancthon	301	4SW	557937	4879653	1
12	Melancthon	299	3SW	558265	4880530	1
13	Melancthon	302	3SW	559179	4880055	1
14	Melancthon	302	3SW	558994	4880272	1
15	Melancthon	300	4SW	558139	4880194	1
16	Melancthon	298	3SW	558104	4880744	1
17	Melancthon	297	3SW	558110	4881055	1
18	Melancthon	290	3SW	556982	4881856	1
19	Melancthon	294	4SW	557026	4880552	1
20	Melancthon	294	4SW	557247	4880928	1
21	Melancthon	292	3SW	557089	4881222	1
22	Melancthon	291	3SW	556945	4881547	1
23	Melancthon	288	4SW	556087	4881414	1
24	Melancthon	287	4SW	556008	4881793	1
25	Melancthon	285	3SW	555970	4882124	1
26	Melancthon	285	3SW	556189	4882472	1
27	Melancthon	300	2SW	559336	4881585	1
28	Melancthon	300	2SW	559549	4881832	1
29	Melancthon	299	2SW	559416	4882076	1
30	Melancthon	289	3SW	556760	4882025	1
31	Melancthon	301	4SW	557717	4879374	1
32	Melancthon	294	2SW	558611	4882506	1
33	Melancthon	293	2SW	558511	4882720	1
34	Melancthon	292	2SW	558512	4882975	1
35	Melancthon	287	2SW	557376	4883205	1
37	Melancthon	287	2SW	557603	4883475	1
43	Melancthon	8	6SW	554802	4880277	1
44	Melancthon	297	2SW	559254	4882372	1
45	Melancthon	11	8SW	553759	4880768	1
46	Melancthon	11	8SW	553804	4880485	1
47	Melancthon	281	2SW	556363	4884085	1
48	Melancthon	282	2SW	556583	4883889	1
49	Melancthon	284	2SW	556645	4883532	1
50	Melancthon	8	6SW	554718	4879729	1
51	Melancthon	294	2SW	558424	4882271	1

WTG Number	Municipality	Lot	Concession	GIS Easting	GIS Northing	Phase
52	Amaranth	28	10	554586	4875661	2
54	Amaranth	27	10	554532	4875071	2
55	Amaranth	29	8	557128	4876625	2
56	Amaranth	30	10	554409	4876444	2
57	Amaranth	30	10	554204	4876712	2
60	Amaranth	30	9	555670	4877009	2
61	Amaranth	30	9	555262	4876695	2
62	Amaranth	31	8	556643	4878239	2
64	Amaranth	30	8	556824	4877446	2
65	Amaranth	29	8	556696	4876882	2
66	Amaranth	29	8	556748	4876497	2
67	Amaranth	27	8	556992	4875830	2
68	Amaranth	27	8	556915	4875393	2
69	Amaranth	27	7	558231	4875728	2
70	Amaranth	28	7	558385	4876342	2
71	Amaranth	29	7	558272	4876952	2
72	Amaranth	30	7	558221	4877569	2
73	Amaranth	30	6	559091	4876236	2
74	Amaranth	30	6	559556	4877921	2
75	Amaranth	29	6	559603	4877547	2
76	Amaranth	29	6	559391	4877265	2
77	Amaranth	29	10	554006	4876112	2
101	Melancthon	13	9SW	550959	4878540	2
102	Melancthon	13	9SW	551101	4878874	2
104	Melancthon	13	7SW	552238	4879658	2
105	Melancthon	14	7 SW	551947	4880165	2
106	Melancthon	14	7 SW	551912	4880555	2
108	Melancthon	16	7SW	551290	4880647	2
109	Melancthon	16	7	551600	4881044	2
110	Melancthon	19	7 SW	550540	4881641	2
111	Melancthon	19	7 SW	550461	4882003	2
112	Melancthon	19	6 SW	551297	4882986	2
113	Melancthon	18	6SW	551639	4882814	2
114	Melancthon	18	6SW	551651	4882389	2
115	Melancthon	16	6SW	552217	4881846	2
116	Melancthon	13	6	553125	4881107	2
117	Melancthon	12	5SW	553668	4881426	2
118	Melancthon	13	5SW	553361	4881663	2
119	Melancthon	14	5SW	553504	4882077	2
122	Melancthon	18	5 SW	552234	4883355	2
123	Melancthon	19	5 SW	551523	4883290	2
124	Melancthon	267	4	552670	4883989	2
126	Melancthon	274	4SW	553957	4883375	2
127	Melancthon	277	4SW	554414	4883019	2
128	Melancthon	278	4SW	554441	4882675	2
129	Melancthon	280	4SW	554791	4882499	2
130	Melancthon	282	4SW	555205	4882343	2
131	Melancthon	283	4SW	555288	4882020	2

WTG Number	Municipality	Lot	Concession	GIS Easting	GIS Northing	Phase
132	Melancthon	276	3SW	554620	4883474	2
134	Melancthon	266	3SW	553262	4885179	2
135	Melancthon	265	3SW	552857	4884816	2
136	Melancthon	263	3SW	552416	4885011	2
137	Melancthon	263	3SW	552879	4885471	2
138	Melancthon	257	3SW	551796	4886195	2
139	Melancthon	257	3SW	551640	4885880	2
141	Melancthon	253	3SW	550917	4886369	2
142	Melancthon	253	3SW	551157	4886751	2
143	Melancthon	263	2SW	553325	4886032	2
144	Melancthon	263	2SW	553593	4886364	2
145	Melancthon	263	1SW	554047	4886894	2
146	Melancthon	264	1SW	554427	4887105	2
147	Melancthon	272	2SW	554978	4885203	2
148	Melancthon	274	2SW	555098	4884824	2
149	Melancthon	276	2SW	555409	4884559	2
150	Melancthon	275	2SW	555792	4885181	2
151	Melancthon	278	2 SW	556083	4884705	2
152	Melancthon	279	2 SW	556238	4884383	2
153	Melancthon	278	1NE	557390	4886324	2
154	Melancthon	278	1NE	557150	4885954	2
155	Melancthon	276	1NE	557051	4886458	2
156	Melancthon	274	1 NE	556799	4886786	2
157	Melancthon	272	1 NE	556628	4887133	2
158	Melancthon	288	2NE	556134	4887841	2
159	Melancthon	266	2NE	555853	4888023	2
160	Melancthon	265	1NE	555337	4887750	2
161	Melancthon	263	1NE	554831	4887862	2
162	Melancthon	264	1NE	555182	4888191	2
163	Melancthon	263	2NE	555331	4888523	2
164	Melancthon	16	3NE	555805	4889450	2
165	Melancthon	16	4NE	556206	4889922	2
166	Melancthon	280	1NE	557682	4886082	2
204	Melancthon	16	3NE	556014	4889714	2
205	Melancthon	260	2 SW	553002	4886805	2
206	Melancthon	266	2SW	554042	4888061	2
207	Melancthon	268	2SW	554224	4885619	2
208	Melancthon	11	3NE	557345	4888106	2
209	Melancthon	10	3NE	557784	4888049	2
210	Melancthon	9	3NE	558019	4887646	2
Transformer site	Amaranth	15	9			1

Ministry of the Environment  
 Guelph District Office  
 1 Stone Road West  
 4<sup>th</sup> Floor  
 Guelph, Ontario N1G 4Y2  
 Tel.: 519 826-4255  
 Fax: 519 826-4286

Ministère de l'Environnement  
 1, chemin Stone ouest  
 4<sup>e</sup> étage  
 Guelph (Ontario) N1G 4Y2  
 Tél.: 519 826-4255  
 Téléc.: 519 826-4286



Table 3: Calculated Wind Shear Coefficients - Residence 5

Date	Time	Comment	WTGs (80 m height) Hourly Average Wind Speed (m/s) of nearest WTGs	MOE Ground Level (2 m height) Hourly Average Wind Speed (m/s)	Calculated Wind Shear Coefficient
2009/11/24	3:00 PM	Whistle	2.25	1.5	0.11
2009/11/25	7:00 AM		6.89	4.2	0.13
2009/11/28	7:00 AM		9.46	4.8	0.18
2009/11/29	9:50 PM		5.43	2.7	0.19
2009/11/30	4:40 PM		5.23	2.7	0.18
2009/11/30	9:50 PM		6.56	0.1	1.13
2009/12/01	6:30 AM		8.80	4.1	0.21
2009/12/02	2:45 AM	Woke up	8.06	2.3	0.34
2009/12/03	9:50 PM		9.44	5.1	0.17
2009/12/04	4:20 PM		8.39	4	0.20
2009/12/08	10:29 PM		9.48	2.9	0.32
2009/12/12	7:39 PM		8.58	2.9	0.29
2009/12/13	10:00 AM		10.29	5	0.20
2009/12/27	2:30 AM	Woke up; WTGs 60, 62 and 64 off	6.70	2.8	0.24
2010/01/10	5:00 AM		8.62	1.2	0.53
2010/01/14	1:00 AM		4.39	1	0.40
2010/01/15	12:15 PM		4.27	2.9	0.10
2010/01/23	12:00 PM		5.31	3.8	0.09
2010/01/23	8:26 PM		7.40	4.4	0.14
2010/01/24	3:18 AM		5.83	1.6	0.35
2010/01/24	9:41 PM		8.22	3.9	0.20
2010/01/26	8:30 PM		11.13	7	0.13
				Average:	0.27

**Flynn, Magdelene (ENE)**

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**From:** Tomlinson, Gary (ENE)  
**Sent:** August 21, 2009 5:38 PM  
**To:** Tomlinson, Gary (ENE); Bardswick, Bill (ENE)  
**Cc:** Glassco, Jane (ENE); Hall, Cameron (ENE)  
**Subject:** RE: Canadian Hydro Developers Noise Abatement Plan  
**Attachments:** CHD Transformer CofA 7257-7DDJP3.pdf; CHD Turbine CofA 2429-7DZHCV.pdf; npc103.pdf; NPC-232.pdf; 4709e Interpretation Wind Turbines.pdf; 4709e.pdf

It occurs to me that it might be valuable for you to also have copies of the two CofA(Air) for the CHD Site, as well as a copy of NPC-232, and the "interpretation documents" while you are reviewing the "plan".

G.W. Tomlinson  
Provincial Officer  
Badge # 132  
District Supervisor (Acting)  
Guelph District Office  
West Central Region  
Ontario Ministry of the Environment  
Tel: 519 826 4272  
Fax: 519 826 4286  
[Gary.Tomlinson@ontario.ca](mailto:Gary.Tomlinson@ontario.ca)  
Spills Action Centre 1 800 268 6060



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**From:** Tomlinson, Gary (ENE)  
**Sent:** August 21, 2009 5:30 PM

**To:** Bardswick, Bill (ENE)  
**Cc:** Glassco, Jane (ENE); Hall, Cameron (ENE)  
**Subject:** Canadian Hydro Developers Noise Abatement Plan

Bill:

Further to our telephone conversation this afternoon, below is the abatement plan we discussed to address the Canadian Hydro Developers wind turbine and transformer noise complaints in Dufferin County. As we discussed I have identified the issues and challenges we are faced with, as well as the proposed strategy and the abatement plan itself.

## 1.0 Issue:

1.1 Noise Emissions from Canadian Hydro Developers, (CHD), Dufferin County wind turbine operations, (Melancthon I and Melancthon II now collectively known as *Melancthon EcoPower Center*), are producing large numbers of complaints, (dating back to March, 2006), alleging adverse effects, (i.e. harm or material discomfort, allegations of adverse effect on health, rendering property unfit for human use, loss of enjoyment of normal use of property, and, interference with the normal conduct of business), due to the noise emissions from the 133 wind turbines, and the associated step-up transformer station.

1.2 Reports generated by the owner, as well as MOE noise measurements are unable to demonstrate non-compliance with the CofA (Air) noise limits, (NPC-232 and NPC-232 via the "Interpretation Document for Wind Turbine Generators").

1.3 Area residents are continuing to complain of noise emissions causing adverse effects. At least two families have moved out of their homes due to noise impacts from the operation of the Melancthon EcoPower Center. MOE District Staff are aware of at least 6 cases where CHD has bought out resident's homes to address and silence their ongoing noise complaints.

1.4 Operationally with regard to noise, (due to its subjective nature), MOE has taken the position that for a contravention of S.14(1) EPA to be demonstrated that there must also be a demonstrated exceedance of the applicable NPC guideline, (and conversely that no exceedance of the applicable standard indicates no S.14(1) EPA contravention).

1.5 MOE Provincial Officers have attended at several of the complainant's residences and have confirmed that despite the noise emissions apparently complying with the applicable standard\CofA(Air) limits, that the noise emissions are in fact causing material discomfort to the residents in and around their homes.

1.6 GDO Provincial Officers have measured wind turbine noise levels at complainant's homes that appear to indicate non-compliance with the CofA(Air).

1.7 Environmental Assessment and Approvals Branch, (EAAB), Staff have stated to District Staff that any field measurements of noise emissions from wind turbines will be inconclusive at best as there is currently no practical, reliable and defensible methodology to measure noise emissions from wind turbines. As such there is no way to measure compliance, (or lack thereof), with guideline\CofA limits in the field.

1.8 An approved and defensible procedure exists to measure noise emissions from transformer stations. Measurements of the noise emissions from the Melancthon EcoPower Center step-up transformer station by both CHD's consultant and MOE Provincial Officers indicate compliance with the NPC- 232\CofA(Air) limits.

1.9 District Staff have recently met with Amaranth Township Council regarding this matter. Amaranth Council strongly expressed its concern as to the ongoing complaints and the apparent inability of MOE to address the various complaints\complainants except to state that the noise emissions from the facility are in compliance with the applicable limits. Staff from the other municipality that the Melancthon EcoPower Center is also located in, (Melancthon Township), have indicated that its municipal council is also deeply concerned with MOE's apparent inability to address the various complaints.

## **2.0 Challenges:**

2.1 Valid complaints continue to be received by MOE. MOE District Provincial Officers have verified that the complaints of adverse effect by area residents are for the most part justified.

2.2 MOE District Provincial Officers are unable to confirm compliance, (or more to the point demonstrate non-compliance), with the CofA (Air) limits for the wind turbines as there is no practical, reliable and

defensible methodology to measure noise emissions from wind turbines. In the opinion of District Staff, noise emissions from the wind turbines are causing the area residents adverse effect.

2.3 MOE District Provincial Officers are able to demonstrate compliance with the CofA(Air) limits for the step-up transformer, however in the opinion of District Provincial Officers the noise emissions from the step-up transformer are causing area residents adverse effect.

2.4 The conventional approach to addressing noise complaints by requiring compliance with the applicable NPC guideline limits will not address this set of complaints. This would also appear to be the case for a number of other wind turbine facility complaints across the province.

### 3.0 Strategy:

3.1 The strategy to address these fairly unique series of complaints and circumstances is predicated upon the following items, (in no particular order):

3.1.1 With regard to the operation of the wind turbines, conventional noise measurement protocols should be considered of no current use, and most likely will not be for an extended period of time in the future.

3.1.2 The development\acceptance of an interim field wind turbine noise measurement methodology will not occur in a suitable time frame to be of any use in addressing these particular complaints.

3.1.3 As EAAB has indicated that essentially any measurements of noise emissions from wind turbines will be inconclusive at best as there is currently no practical, reliable and defensible methodology to measure noise emissions from wind turbines; the various reports generated by CHD are only useful in demonstrating that the wind turbine noise is impacting on the complainants. Likewise the field measurements obtained by MOE District Staff must be viewed in the same light.

3.1.4 The transformer measurement events by both MOE and CHD's consultant appear to indicate that there is compliance with the noise emission limits in NPC-232\the CofA(Air); despite this they are useful in demonstrating that the step-up transformer



station is impacting on the complainants.

3.1.5 MOE District Provincial Officers have attended at several of the complainants residences and have confirmed that the noise emissions from the Melancthon EcoPower Center are causing an adverse effect to the complainants.

3.1.6 At least two families have moved out of their homes, (i.e. do not sleep there any more), as a result of the noise emissions impacting on them during the night time hours. Reasonable people do not leave their homes to sleep elsewhere for frivolous reasons.

3.1.7 It is well settled in the courts and before the ERT that compliance with a CofA(Air), (or standard\guideline), does not guarantee that there will be no S. 14(1) EPA contravention(s), and that compliance with the limits in a CofA(Air) do not necessarily constitute a defence to a claim that the emissions regulated by the CofA(Air) are causing an adverse effect.

3.1.8 MOE District Provincial Officers are aware that CHD can reduce the noise emissions from the wind turbines via a process of limiting the allowable revolutions of the blades on the turbines, and/or stopping the turbines altogether.

3.1.9 MOE District Provincial Officers are aware that CHD can reduce the noise emissions from the step-up transformer by totally enclosing the transformer inside an acoustical structure, (a building).

3.2 Based on 3.1 above, the intent of the GDO is to inform CHD that in it's opinion the noise emissions from the Melancthon EcoPower Center are causing an adverse effect contrary to S.14(1) of the EPA, and ask it to forthwith address the contravention of S.14(1) of the EPA via at last the abatement measures identified above for he time period of either 19:00 Hrs. or 23:00 Hrs. to 07:00 Hrs.

3.3 Failing to obtain voluntary abatement action will result in the issuance of a Provincial Officer Order requiring at a minimum the above noted actions.

3.3.1 The justification\grounds for the Provincial Officer Order will

be that MOE Provincial Officers have attended at the complainants residences and confirmed that the noise generated by the various components of the Melancthon EcoPower Center are impacting on the complainants and are causing them material discomfort contrary to S.14(1) EPA.

3.3.2 Additionally reports generated by CHD and observations\measurements obtained by MOE District Provincial Officers confirm that the noise being emitted by the Melancthon EcoPower Center is impacting on the complainants residences.

3.4 With regard to the operational practice identified in item 1.4 above, as the wind farm noise issue is not something that MOE has been asked to address previously it is appropriate for it to develop operational procedures to address that various problems\adverse effects that relate to it as they become apparent to MOE. In this case it is appropriate, and in the public interest, to modify it's operational procedures for wind energy facilities to indicate that compliance with the CofA(Air)\NPC-205 \NPC-232\the interpretation documents does not also demonstrate compliance, (i.e. no contravention of S.14(1) EPA).

3.5 As it has been verified by MOE Provincial Officers that an adverse effect is occurring, and therefore a contravention of S.14(1) EPA is occurring, that appropriate abatement action must occur forthwith, and if necessary be made mandatory via a Provincial Officer Order.

#### **4.0 Abatement plan:**

4.1 Meet with CHD, (during week of 24 August), to:

4.1.1 Explain MOE's current position with Melancthon EcoPower Center's compliance with the CofA(Air), and CHD's contravention of S. 14(1) EPA.

4.1.2 Discuss abatement options to resolve the noise issues with the transformer and wind turbines.

4.2 If CHD agrees to voluntarily address the complaints by forthwith identifying the abatement options and implementing them, (i.e. total enclosure of the transformer station, and stepping down the revolutions of the wind turbines and\or discontinuing wind turbine operation between

either 19:00 Hrs. or 23:00 Hrs. and 07:00 Hrs.), write a letter to confirm the abatement plan and schedule.

4.2.1 Monitor compliance with the agreed abatement plan.

4.2.2 If necessary, make the agreed to abatement plan mandatory via a Provincial Officer Order. See also item 4.3.1 below.

4.3 If CHD refuses to address complaints in a voluntary manner move to mandatory abatement.

4.3.1 If mandatory abatement is required, (i.e. Provincial Officer Order), craft an Order and send to WCR Legal Support, (Brian Byrnell), for review.

4.3.2 Issue the Order.

4.3.2.1 Defend Order at ERT, (if necessary).

4.3.3 Monitor compliance with the Order.

4.4 GDO continue to work with company to find immediate solutions so people can return to their homes.

4.5 GDO to continue to work with CHD to find immediate solutions to complaints of adverse effect.

4.6 Share information\actions taken by MOE with Amaranth and Melancthon Township Councils\Staff as appropriate.

4.7 Continue to meet with Amaranth Council\Staff, (and Melancthon Township if required) on a monthly basis.

4.8 Continue to collect information, (field measurements), on the transformers and wind turbines.

4.9 Work with future expert\consultant\EAAB on improved ways to measure and abate noise issues caused by wind turbines and transformers.

G.W. Tomlinson  
Provincial Officer

Badge # 132  
District Supervisor (Acting)  
Guelph District Office  
West Central Region  
Ontario Ministry of the Environment  
Tel: 519 826 4272  
Fax: 519 826 4286  
[Gary.Tomlinson@ontario.ca](mailto:Gary.Tomlinson@ontario.ca)  
Spills Action Centre 1 800 268 6060



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