Hingtgen, Robert J

From: Donna Tisdale [tisdale.donna@gmail.com]
Sent: Monday, March 11, 2013 11:58 AM
To: Hingtgen, Robert J
Subject: Soitec Solar PEIR MUP comments from Jan 31
Attachments: Soitec Solar PEIR MUP Tisdale scoping 1-31-13.pdf; Soitec PEIR MUP comments e-mail 1-31-13.pdf; Henshaw EMF adverse health effects 2010.pdf

Hi Robert,

I tracked down the e-mail message I sent to you and others on January 31 with 4 attachments for the Soitec Solar PEIR MUP record.

Apparently my message was kicked back and fro some reason I failed to resend it. It is attached as a pdf to this message along with the Soitec Solar PEIR MUP Tisdale scoping comment document and the Henshaw EMF adverse health effects 2010 document. Dennis Henshaw, PhD is an physics professor and EMF expert based in the UK who was also involved in the 2001 California Dept of Public Health EMF guidelines review.

I will resend the other two Henshaw document attachments in separate e-mails to avoid additional kick backs.

Do I need to forward them to other PDS folks?

Thanks

Donna

On Mon, Mar 11, 2013 at 9:37 AM, Hingtgen, Robert J <Robert.Hingtgen@sdcounty.ca.gov> wrote:

Hi Donna,

The attached files are everything that I have received from you regarding the Soitec Solar projects. I have minutes of the Boulevard CPG meetings from January of 2013 and most of last year. The September 2012 minutes state that the CPG voted to deny the Tierra Del Sol and Rugged Solar projects during the August 2, 2012 meeting. However, the August 2, 2012 minutes indicate the vote was taken on June 14, 2012 –for which I do not have minutes. If you have minutes of that meeting, could you please send them to me? The CPG voted to deny the LanWest project on May 3, 2012.

Pat Brown of Soitec has indicated the 1st Draft EIR may be submitted next week or the following week for staff review.

Thanks,

Robert Hingtgen, Planner III
Planning and Development Services
5510 Overland Avenue, 3rd Floor
San Diego, CA 92123
Tel - (858) 694-3712
email - robert.hingtgen@sdcounty.ca.gov

From: Donna Tisdale [mailto:tisdale.donna@gmail.com]
Sent: Thursday, March 07, 2013 12:32 PM
To: Hingtgen, Robert J
Subject: Sotiec update?

Hello Robert,

Any update on Soitec's Boulevard projects?

Did I send you anything from the Planning Group, or just the comments with my name on them?

Sorry, I have lost track in the flood of projects and comment deadlines.

Thanks!

Donna Tisdale, Chair

Boulevard Planning Group

619-766-4170

Gmail by Google

Donna Tisdale< tisdale.donna@gmail.com>

Soitec Solar PEIR MUP comments

11 messages

Donna Tisdale< tisdale.donna@gmail.com> Thu, Jan 31, 2013 at 11:19 AM
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>

Hello Robert,
Attached are comments on the Soitec Solar PEIR MUP scoping submitted on behalf of myself and my family as local property owners, on behalf of the Boulevard Planning Group (as authorized by majority vote),
and for any other groups that may want to use them.
Several attachments are included from EMF expert, Dennis Henshaw, PhD, documenting adverse impacts to people and wildlife related to electrical pollution and the urgent need to update current inadequate EMF and Radio Frequency Standards that are needed to protect public health and safety.
New studies are now out with the BioInitiative 2012 Report: www.bioinitiative.org
The scale, scope and density of these 4 Soitec Solar projects, even without all the other cumulative impact projects, are unprecedented and unstudied for human health and safety. Soitec's largest project is less than 2 MW, and uses smaller CPV modules!
The County has an obligation to provide us with equal protection under the law and not grant discriminatory privileges to certain individuals at the expense of our human and natural communities and long-range community planning.
Regards,
Donna Tisdale
619-766-4170
PO Box 1275
Boulevard, CA 91905

4 attachments

- Henshaw EMF adverse health effects 2010.pdf 478K
- Henshaw_ARR_June_2011.ppt 9959K
- EMF 2001 Henshaw summary CDPH report.pdf 464K
- Soitec Solar PEIR MUP Tisdale scoping 1-31-13.pdf 488K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <adam.wilson@sdcounty.ca.gov> was undeliverable.
The reason for the problem:
5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size'

Final-Recipient: rfc822;adam.wilson@sdcounty.ca.gov

Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

-------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <darren.gretler@sdcounty.ca.gov> was undeliverable.
[Quoted text hidden]

Final-Recipient: rfc822;darren.gretler@sdcounty.ca.gov
Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

--------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <Ashley.Gungle@sdcounty.ca.gov> was undeliverable.
[Quoted text hidden]

Final-Recipient: rfc822;Ashley.Gungle@sdcounty.ca.gov
Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

--------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <Matthew.Schneider@sdcounty.ca.gov> was undeliverable.
[Quoted text hidden]

Final-Recipient: rfc822;Matthew.Schneider@sdcounty.ca.gov
Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

--------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <Beth.Murray@sdcounty.ca.gov> was undeliverable.
[Quoted text hidden]

Final-Recipient: rfc822;Beth.Murray@sdcounty.ca.gov
Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

--------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <Robert.Hingtgen@sdcounty.ca.gov> was undeliverable.
[Quoted text hidden]

Final-Recipient: rfc822;Robert.Hingtgen@sdcounty.ca.gov
Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

--------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <dianne.jacob@sdcounty.ca.gov> was undeliverable.
[Quoted text hidden]

Final-Recipient: rfc822;dianne.jacob@sdcounty.ca.gov
Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

--------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <Mark.Slovick@sdcounty.ca.gov> was undeliverable.
[Quoted text hidden]

Final-Recipient: rfc822;Mark.Slovick@sdcounty.ca.gov
Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

--------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark"

<Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

Mail Delivery System< MAILER-DAEMON@mail1.sdcounty.ca.gov> Thu, Jan 31, 2013 at 11:20 AM

To: tisdale.donna@gmail.com

The following message to <Mark.Wardlaw@sdcounty.ca.gov> was undeliverable.
[Quoted text hidden]

Final-Recipient: rfc822;Mark.Wardlaw@sdcounty.ca.gov
Action: failed
Status: 5.0.0 (permanent failure)
Remote-MTA: dns; [10.46.18.69]
Diagnostic-Code: smtp; 5.1.0 - Unknown address error 552-'5.3.4 Message size exceeds fixed maximum message size' (delivery attempts: 0)

-------- Forwarded message ---------
From: Donna Tisdale <tisdale.donna@gmail.com>
To: "Hingtgen, Robert J" <Robert.Hingtgen@sdcounty.ca.gov>
Cc: "Slovick, Mark" <Mark.Slovick@sdcounty.ca.gov>, "Schneider, Matthew" <Matthew.Schneider@sdcounty.ca.gov>, "Gungle, Ashley" <Ashley.Gungle@sdcounty.ca.gov>, "Jacob, Dianne" <dianne.jacob@sdcounty.ca.gov>, "Wardlaw, Mark" <Mark.Wardlaw@sdcounty.ca.gov>, "Murray, Beth" <Beth.Murray@sdcounty.ca.gov>, "Gretler, Darren M" <darren.gretler@sdcounty.ca.gov>, "Wilson, Adam" <adam.wilson@sdcounty.ca.gov>
Date: Thu, 31 Jan 2013 11:19:46 -0800
Subject: Soitec Solar PEIR MUP comments

noname
0K

SOITEC SOLAR DEVELOPMENT PROGRAMATIC EIR/MUP/GENERAL PLAN AMENDMENT FOR 4 INDUSTRIAL-SCALE SOLAR ENERGY PROJECTS (168 MW) PROPOSED IN BOULEVARD, RURAL EAST COUNTY[1]

Comments submitted by

Donna Tisdale, PO Box 1275, Boulevard, CA 91905, 619-766-4170 tisdale.donna@gmail.com

LIST OF ISSUES AND CONCERNS RAISED BY MEMBERS OF THIS DISPROPORTIONATELY IMPACTED LOW-INCOME RURAL COMMUNITY, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

- ✓ Experimental nature and unprecedented scale and density of massive tracking CPV modules
- ✓ Soitec CPV modular density =8,748,00 sq ft = 47.28 Wal-Mart Supercenters (avg. 185,000 sq ft)
- ✓ 7-9 Boulevard Community Plan Amendments to updated plan approved by County in August 2011—after close to 15 years of regional efforts and 700 meetings.
- ✓ Industrial conversion of 2.3 square miles or rural low-income community to serve distant cities
- ✓ Increased risk of wildfire, impediment to fire fighting, loss of chaparral carbon sequestration
- ✓ Estimated 1.5million cubic yards of soil moved / disturbed
- ✓ Over 50 million gallons of irreplaceable groundwater resources for construction
- ✓ Potentially harmful levels of increased noise, low-frequency noise, and vibrations
- ✓ Too-close proximity to existing residences and other sensitive receptors
- ✓ Potentially health threatening levels of electrical pollution through ground, air, utility lines
- ✓ Environmental Justice and disproportionate adverse impacts to low-income rural communities
- ✓ Over 800 MW of significant and cumulatively considerable industrial scale energy projects planned in and around targeted rural border communities (tribal, non-tribal, and cross-border)
- ✓ Point-of-use alternative renewable energy and energy efficiency projects and initiatives

1. **Experimental nature of Soitec CPV module and groundbreaking levels of density, bulk, scale, and proximity of solar energy generation, transformation, and export transmission:**
    a. **168 MW:** 80 MW Rugged Solar; 60 MW Tierra Del Sol Solar; 22MW LanEast Solar; 6.5 MW LanWest Solar
    b. Total 7,290 Soitec Concentric CPV tracking modules= 8,748,000 square feet of panel face /density: Each CPV module is 48' wide X 25' (1,200 square feet each /35' maximum height).
    c. 8,748,000 square feet = 47.28 Walmart Supercenters that average 185,000 square feet each, planned for lands zoned for 1 dwelling unit per 80 acre acres due to a lack of infrastructure, groundwater resources, and emergency services.
    d. 1 demo Soitec Concentric 28kWp CPV tracker module installed at USCD in 2011[2]; 1 demo 8.2KW CPC tracker module installed at UCSD 2009.
    e. 10MW listed as Soitec's total worldwide installation as of October 2012[3]: *Soitec lists CPV installations in 14 countries on 4 continents.*

[1] http://www.sdcounty.ca.gov/pds/regulatory/docs/3800-12-010-GPA/3800-12-010-GPA-IS.pdf
[2] http://www.soitec.com/en/products-and-services/solar-cpv/our-references/
[3] http://www.soitec.com/en/news/press-releases/soitec-completes-delivery-of-5-mw-in-solar-energy-systems-to-italy-1081/

f. *1.37MW La Questa project is their largest existing project compared to 6.5MW to 80 MW planned in Boulevard.*

2. **7-9 controversial and inconsistent Amendments needed to the Boulevard Community Plan** that was approved in August 2011 by the Board of Supervisors, with General Plan Update , *after over a decade of region-wide hard work and 700 meetings*[4]:.
   a. The General Plan Update reduced development and density in rural areas due to limited groundwater resources, infrastructure and emergency services, and to reduce development in high fire hazard areas and risk of catastrophic wildfires[5].
   b. Changes to the Community Plan alter the intent and findings of approved General Plan Update EIR, making it inconsistent.
3. **Industrial Conversion of 1,473 acres (2.3 square miles)** of Boulevard's currently open and scenic rural lands, wildlife habitat and chaparral that serves as a carbon sink above and below ground[6], watershed filter, seasonal wetlands, converting residential neighborhoods into commercial industrial energy generation / export / sacrifice zones.
4. **Increased risk of catastrophic wildfires through significant increase in fire ignition sources and number of impediments to fire fighting efforts.**
   a. Cal Fire has identified Boulevard as Very High Fire Hazard Severity Zone[7]
   b. Firefighters must wait for equipment to be de-energized to avoid electrical shock, electrocution, which can allow a fire to grow (per retired Cal Fire Battalion Chief)
   c. It is physically impossible to turn off thousands of massive solar energy generators during daylight hours (moonlight?) placing fire fighters, adjacent homeowners, others at great risk of harm, recreation visitors in McCain Valley Recreation Area and National Cooperative Land and Wildlife Conservation Area.
   d. Forced change of fire fighting strategies, tactics, and avoidance of at least 1,000 feet or more of energized solar modules, switchyards, substations, power lines.
   e. Fires may be allowed to burn through these projects and surrounding private properties (homes) and sensitive habitats until the fire has moved far enough away from the energized equipment.
   f. Related increase in rates or total cancellation of fire insurance policies for impacted non-participating property/homeowners located too close to high risk energized projects.
   g. Electrical fires cannot generally be fought with water, so large amounts of chemical foam would be needed to be stored and ever-revolving volunteer fire fighters would need to be trained.
   h. Wildfires destroy habitat and chaparral that sequesters carbon above and below ground[8].
   i. East County and Boulevard have high levels of sensitive flora and fauna[9]

---

[4] http://www.sdcounty.ca.gov/pds/press/Supervisors_Approve_GPUpdate_8-3-2011.html
[5] http://www.sdcounty.ca.gov/pds/press/GP_Update_Wins_Two_Awards_5-7-12.html
[6] http://www.californiachaparral.com/images/Chaparral_as_carbon_sink_LuoLL.pdf ; http://www.defenders.org/publications/an_economic_analysis_of_the_benefits_of_habitat_conservation_on_california_rangelands.pdf
[7] Fire Hazard Severity Zones map: http://frap.cdf.ca.gov/webdata/maps/san_diego/fhszs_map.37.pdf
[8] http://www.winrock.org/ecosystems/files/WestcarbRPT/Appendix_C_Sandberg.pdf
[9] http://www.sdcounty.ca.gov/pds/mscp/docs/east_mscp_veg_8x11.pdf

5. **1,485,810 Cubic Square Yards of soil moved for 3 of 4 Soitec projects.**
6. **40,582, 793 Square feet = 932 acres of DISTURBED AREA**
7. **Estimated over 50 Millions of gallons of finite and irreplaceable sole-source groundwater resources** used that can negatively impact adjacent private wells, and water sensitive habitat and wildlife that rely on springs, seeps, and vegetation—all supported by higher ground water levels:
    a. Construction: estimated at over 50million gallons / 153 acre feet
    b. Annual operation & maintenance: currently unknown; panel washing with de-ionized water may be required more frequently in high altitude area where vegetation is removed; soils disturbed, and dry air generates more static electricity. Washing can only be done at night when panels are not generating energy, thereby introducing new night time noise issues in residential and wildlife habitat areas used to quiet ambient noise levels averaging 25-30 dbA.
    c. ½ of Boulevard (Manzanita) area is located in the USEPA designated Campo/Cottonwood Creek Sole Source Aquifer[10], one of only two designated SSA's in Southern California. Entire cross-border area is groundwater dependent.
8. **Close proximity of industrial energy production to existing homes and small livestock operations/sensitive receptors, including cross-border Ejido community(Jardines Del Rincon), regional recreation areas and access routes:**
    a. Soitec projects are located less than several hundred feet from existing homes and small ranches in an area where 58-65 % of school children qualify as socioeconomically disadvantaged[11] and some seniors reportedly could not qualify for meals on wheels due to lack of required ability to keep food fresh and /or warm.
    b. Adverse health and safety impacts related to potentially high, chronic, and genotoxic levels of electrical[12] and noise / vibration pollution emissions[13]. Electrical emissions and radiation can travel through the ground (increased ground currents)[14] , through the air (radation), and through common utility distribution system wires and common ground wires.
    c. Soitec's Tierra Del Sol Solar project will abut the US/Mexico border Right Of Way and Ejido Jardines Del Rincon, immediately south of border fence, which just got electricity a few years ago.
    d. US neighbors rely on groundwater wells that may be impacted by project wells and groundwater drawdown and/or electromagnetic interference with well equipment.

---

[10] http://www.epa.gov/region9/water/groundwater/ssa-pdfs/Campo-Cottonwood-SSA-map.pdf

[11] Jacumba School: http://meusd-ca.schoolloop.com/file/1314534050429/1314534049750/8275035730257247045.pdf ; Clover Flat School: : http://meusd-ca.schoolloop.com/file/1314534050429/1315231078251/156882106380789890.pdf

[12] http://www.emfrf.com/images/stories/pdfs/Bioinitative_Report.pdf; ; http://www.emfrf.com/images/AustrianMedicalAssociationEMF-Guideline.pdf ; http://www.emfrf.com/images/stories/pdfs/Benevento_Resolution.pdf http://www.eaglecliffs.com/HTMLobj-280/EMF_and_RF_Emission.pdf ; http://www.emfrf.com/images/stories/pdfs/Venice_Resolution.pdf

[13] http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/noise/facts-and-figures/health-effects-of-noise ; http://www.hiaguide.org/sectors-and-causal-pathways/pathways/noise-pollution http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=4747500&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D4747500 ; http://www.scotland.gov.uk/Resource/Doc/158512/0042973.pdf ; http://docs.wind-watch.org/Oud_NAG2012.pdf

[14] http://www.electricalpollution.com/intro.html

e. Cross border impacts: In Jardines Del Rincon, groundwater-fed spring (downstream for project site and wells) are a main water source that may be negatively impacted through solar project drawdown of water and /or diversion of current surface and groundwater flows.

f. Disorienting and debilitating Glint and Glare generated by intense reflections from thousands of dual tracking solar modules that stand almost vertical during early morning and late afternoon hours of the day. (See attached photographs)

g. Project site abuts Tierra Del Sol Road, one of only 4 paved public roads in Boulevard.

h. 3 of 4 Soitec projects will be highly visible from adjacent and surrounding homes and recreation areas and I-8; 2 will abut Historic Route 80; 3 will straddle McCain Valley Road –the only public access route to McCain Valley National Cooperative Land and Wildlife Management Area and Recreation Area and campgrounds.

9. **Increased levels of noise and vibrations in quiet rural setting with low ambient levels:**
   a. CPV Modules, inverters, and Switchyard transformers generally generate a constant low-frequency hum that can be audible or infrasound pressure waves that are felt more than heard.[15]
   b. Switchgear noise is generated by the operation of circuit breakers and is "impulsive" in character - it is loud but of short duration.
   c. Audible Corona noise and wind vibrations of electric lines and CPV modules.
   d. Noise, low-frequency, and vibration sources include construction with expected pile driving of module pedestals, industrial scale inverters, transformers, air cooling fans, module tracking motors, substation transformers, transmission line corona noise, wind vibration/ rattling of solar modules.

10. **Up to 109 Inverters stations with transformers for 3 of 4 projects:**
    a. Inverters convert DC power to AC and can result in transient high frequency electrical currents/harmonics[16] (Total Harmonic Distortion) that may be discharged to ground to protect grid stability and sensitive equipment from Electrical Magnetic Interference (EMI)[17].
    b. Unsafe levels of radiation can migrate off-site through ground currents[18], the air (radiation), and through the local distribution lines that share common ground wires and conductors, generating adverse health and safety issues.
    c. Current EMF standards are not adequate to be protective of human health and safety[19] and should be updated using biologically based dose-response standards.
    d. Physical noise can also be an issue with inverters, transformers, substations.

11. **Soitec claims an average production rate of 27%[20] that is limited to day-light generation hours with reduction during DC to AC conversion and transmission line losses.**

---

[15] http://electrical-engineering-portal.com/sources-of-sound-in-transformers ; http://www.acousticalsolutions.com/transformer-electrical-substation-noise

[16] Inverter electrical and physical noise emissions: http://www.civicsolar.com/resource/Inverter-Noise-Emissions

[17] Electromagnetic Interference: http://www.energy.ca.gov/process/pubs/power_quality.pdf

[18] Ground currents: http://www.electricalpollution.com/intro.html

[19] http://cetf.us/wp-content/uploads/2009/03/carpenterreh-emf.pdf; www.bionitiative.org http://www.safespaceprotection.com/electrostress-from-power-lines.aspx

[20] Soitec's current claim of 27% and 35% by 2015: http://www.soitec.com/pdf/brochure_cpv_en.pdf

a. According to local energy expert, Bill Powers (Powers Engineering), the 27% capacity (during sunny hours) includes an average of 15% loss of energy during conversion through inverters from DC to grid compliant AC[21].
b. Average of 7-15% transmission line loss can be expected between Boulevard and San Diego (depending on grid congestion).
c. The 168 MW of stated capacity and number of homes alleged served is significantly reduced along with claimed reductions of green house gases
d. What fossil fuel energy source will be displaced by Soitec? SDG&E has filed applications with the CEC/CPUC for load-balancing, back-up gas-fired peaker plants that must be kept running continuously to accommodate quick ramp-up energy when intermittent remote solar and wind projects drop production due to weather conditions, equipment failure or grid congestion.

12. **Substation/switchyards:** Estimated 6-8 acres for substations with at least 1,000 square feet of metal clad switching gear that all generates noise, vibrations, and electrical pollution
13. **Environmental Justice issues:**
    a. Attorney General Kamala Harris report interprets to require consideration of Environmental Justice issues a local and regional levels.[22]
    b. While the Report acknowledges that there is no mention of "environmental justice" within CEQA, CEQA's main purpose is to evaluate whether a project may have a significant effect on the physical environment, and asserts that "human beings are an integral part of the environment."
    c. Lack of Informed consent for health experiments / human rights issues: unwarranted experimentation with disproportionate and dense energy generation and transmission zone in rural residential areas. No other community is facing this level of unwelcome and unjust conversion.
    d. Lack of equal protection under the law (California and US Constitutions)[23]
14. **Significant number of Cumulative impact projects = over 800 MW** of industrial wind and solar projects located within and abutting the Boulevard Planning Area.
    a. Dense concentration of additional industrial scale wind and solar energy, transformation, and transmission projects intended for export to distant urban areas: existing 25 MW Kumeyaay Wind; approved 201MW Tule Wind; proposed 158MW Jewel Valley Wind; proposed 160-250 Shu'luuk Wind; 5 mile Shu'luuk Wind Gen-tie across 29 private properties; 168 MW Soitec Solar (80 MW Rugged Solar, 60 MW Tierra Del Sol Solar, 22 MW LanEast Solar, 6.5 MW LanWest Solar) ; 57-100MW Manzanita Wind; 5 MW Sol Orchard; Amonix Solar; BP Solar; Sempra's 156-1,250 MW Energia Sierra Juarez Wind with approved cross-border 230-500kV transmission line; 138, 230, 500KV ECO Substsation; 500 kV Sunrise Powerlink ; 500kV Southwest Powerlink; Pattern Energy's Cleveland National Forest wind project proposal;
    b. Boulevard will be criss-crossed and virtually surrounded by a web of existing and proposed high voltage transmission (2-500kV) and generation tie-lines (69 and 138kV)

---

[21] Per SDG&E's Power Purchase Agreement documents

[22] http://oag.ca.gov/sites/all/files/pdfs/environment/ej_fact_sheet_final_050712.pdf ; http://thomaslaw.com/attorney-general-releases-report-interpreting-ceqa-to-require-consideration-of-environmental-justice-issues-at-the-local-and-regional-levels/

[23] http://www.leginfo.ca.gov/.const/.article_1

that will be linked with the local distribution lines, many of which date back to the Mountain Empire Electrical Cooperative era before SDG&E's hostile take-over.

c. Each project also has new road systems (more disturbance and dust) and new wireless / microwave communications equipment (more electro smog).
d. There is a current glut of industrial scale energy projects planned in Southern California, beyond what is needed to reach the mandated 33%[24]

15. **Point-of-use alternatives & more:**
    a. San Diego Sierra Club's Run with the Sun[25] rooftop solar initiative
    b. Environmental Health Coalitions Green Jobs / Solar for All initiatives[26]
    c. Dept of Defense Energy Efficiency and Renewable Energy Initiatives[27]
    d. Mayor Filner's new solar San Diego plans that merge with
    e. Supervisors Dianne Jacob has stated support for point of use roof top solar and alternative community choice for SDG&E monopoly.
    f. San Diego Energy District Foundation & Community Choice Aggregation[28]
    g. Commercial and residential Geothermal Heat Pumps/Ground source pumps[29]
    h. Fuel Cells using bio-gas, natural gas and hydrogen[30]
    i. Combined Heat and Power / Co-Generation using waste heat for energy[31]

Not all so-called green energy is good, without pollution, and other potentially life-altering / threatening impacts at ground zero. Consider how you would react if you, your family, your friends, your favorite quiet retreats, were placed in harm's way under similar circumstances—especially if less expensive and destructive alternatives were available.

There is much more information available for those who seek it. If you have not done your own research into major projects and technologies (beyond proponents biased information) that you and / or your associates may be supporting or promoting then you have no right or justification to support inflicting potentially harmful / deadly projects on low-income rural communities, with limited groundwater resources and emergency services that will disproportionately impact sensitive receptors and resources. These communities do not generally have the education, financial wherewithal, support, or means to fully and properly defend themselves against well heeled and politically connected project applicants, developers, supporters.

# # #

---

[24] http://www.governorswindenergycoalition.org/?p=4472

[25] http://connect.sierraclub.org/app/render/go.aspx?g=e581fc37-9865-4836-8742-0d16a9fea5b7&xsl=tp_SocialObjects_ObjectType_SIERRA_CLUB_ONLINE_COMMUNITIES_TEAM_PUBLIC.xslt&id=e581fc37-9865-4836-8742-0d16a9fea5b7&cons_id=&ts=1358393907&signature=198a5d406a6a659007130736d9b756b8

[26] http://www.environmentalhealth.org/index.php/en/what-we-do/green-energy-green-jobs/solar-initiatives

[27] http://files.eesi.org/dod_eere_factsheet_072711.pdf

[28] SD Energy District Foundationhttp://www.eastcountymagazine.org/node/12197

[29] http://www1.eere.energy.gov/geothermal/heatpumps.html

[30] http://www1.eere.energy.gov/hydrogenandfuelcells/fuelcells/

[31] EPA CHP: http://www.epa.gov/chp/ ;
DOE CHP: http://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/chp_clean_energy_solution.pdf
http://aceee.org/topics/chp

University of BRISTOL

H H Wills Physics Laboratory
Royal Fort, Tyndall Avenue, Bristol, BS8 1TL
Tel: (0117) 9260353
Fax: (0117) 9251723
E-mail: D.L.Henshaw@bristol.ac.uk

Denis L Henshaw
Professor of Physics

TO WHOM IT MAY CONCERN

May 2010

Dear Sir

Adverse health effects of exposure to power frequency electric and magnetic fields (EMFs)

I am writing in response to enquiries I have received on the above issue.

It is indeed unfortunate that the question of health effects of exposure to EMFs well below current exposure guidelines has not received the highest level of scientific or public health attention that it deserves. The evidence of adverse health effects from EMFs associated with the electricity supply, in particular magnetic field (MF) exposures around or below 1 microtesla (μT), is huge and it is quite clear across a range of outcomes. We have long passed the stage where application of the Precautionary Principle and of appropriate legislation against undue exposure is warranted, including a substantial lowering of permitted MF exposure limits, currently 100 μT. In the case of high voltage overhead powerlines, these should not be built close to houses or farms where cattle and poultry are housed.

The available evidence on adverse health effects of MF exposure speaks for itself. No longer can we talk of differing opinions of whether or not there are such adverse health effects: the question is not about what people think, rather it is about what the evidence says.

Official review bodies are usually constrained by their Terms of Reference and have not been in a position to access the bulk of our scientific knowledge of MF interactions with biological systems. As I will explain below, I estimate that such bodies have at most addressed only 10% of the available evidence/data.

I will deal in turn with some aspects of the available scientific evidence/data.

1. Epidemiological evidence

The epidemiological evidence of adverse health effects from EMFs from human population studies has emerged continuously in recent years and it continues to do so. Particular emphasis has been placed on MF exposures, although electric field, EF effects continue to be researched. It may be useful to consider what recent official reports have said concerning MF health effect in particular – see summary table attached.

Internationally, the first major report of note was the US NIEHS report of 1999 (see list of acronyms below). This concluded that both adult and childhood leukaemia was associated with EMF

exposure. However, the 2002 IARC report (part of WHO) without apparent reference to the NIEHS conclusions, concluded that childhood leukaemia was the only cancer associated with EMF (note that IARC is only concerned with non-cancer health outcomes). However, the California Department of Health Sciences report, also published in 2002 concluded that increased risk of five health outcomes was associated with MF exposures: (i) childhood leukaemia; (ii) adult leukaemia; (iii) adult brain cancer; (iv) amyotrophic lateral sclerosis, ALS (or motor neurone disease) and (v) miscarriage. More recently the EU SCENIHR report has associated childhood leukaemia and Alzheimer's disease to MF exposures. The 2007 WHO EHC Report appears to prevaricate on a range of health outcomes, admitting to the existence of evidence but saying simply that this is 'not as strong' as for childhood leukaemia. It is noteworthy that the various reported adverse health effects are associated with average MF exposures around or below 1 μT. In the specific case of childhood leukaemia, a doubling of risk is seen with average exposures above 0.4 μT.

The 2002 IARC and California Reports are now a little historic, but their findings have set the trend of perceived MF health effects in recent years. Given that these two reports were published at about the same time, a number of commentators have asked why two major reports using presumably the same available data came to quite different conclusions with respect to the many studies of adult leukaemia and adult brain cancer. This led my colleague Professor Mike O'Carroll and me to study what was said in both reports and to publish our findings in a learned peer-reviewed journal (O'Carroll & Henshaw 2007). We focused on adult leukaemia and adult brain cancer. We found that whereas the California report had looked at each individual study and at the overall findings of the studies in aggregate, the IARC report had made no attempt to look at the aggregate data. This was strange because IARC had listed in tables the findings from 33 studies of adult leukaemia and 43 studies of adult brain cancer. It was quite clear from inspection of these tables that there was a clear dominance of studies reporting a positive association with MF exposure. In the case of adult leukaemia, the association was, if anything, stronger than that for childhood leukaemia. In O'Carroll & Henshaw we concluded: *"IARC shows no evidence of considering the aggregation of results other than subjectively. It considered individual studies but this led to a tendency to fragment and dismiss evidence that is intrinsically highly significant".*

Naturally, I am critical of the 2002 IARC report for not carrying out a rather basic analysis of the overall data. However, this tendency has been repeated in later WHO Reports and by the UK NRPB (now subsumed into the HPA). In fact, these later reports fail to cite or in anyway discuss the conclusions of the California Report. I have to say that this is simply bad science and indeed it is unprofessional. Were any of these reports submitted for publication to a good scientific journal, failure to pick up these failures of citation and basic analysis would be picked up by the blind peer-review system and the reports would not be published. Instead, sadly, they enjoy a rather false sense of respectability. I am bound to say that Governments and Power Companies are being poorly advised if they seek to reply solely on advice from these sources.

Notwithstanding this situation, as mentioned above, the February 2009 update of the EU SCENIHR report has added Alzheimer's disease as associated with MF exposures, based on recent studies that were not available to the earlier review bodies. Alzheimer's disease is highly prevalent in the aging population and of considerable public health significance. Of special note is the 1.5 to 2-fold increase in risk specifically seen near powerlines in Switzerland (Huss *et al.* 2008).

2. Magnetic fields and living systems

I now expand on my above comment that official review bodies have accessed at most only 10% of the relevant scientific data. The areas where MF interactions with living systems have been extensively discussed are:

1. The known ability of birds and other animals to detect tiny changes in the Earth's magnetic field (the Geomagnetic or GM) for the purposes of navigation.

2. The ability of plants to sense magnetic fields including power frequency AC fields.

3. Health effects arising from fluctuations in GM fields

4. The use of magnetic fields, including levels below the ICNIRP limit for medical treatment in wound & bone healing.

I will refer below to the 2008 Bioinitiative Report, but here is an extract of what it says about the use of MFs for medical treatment:

> **"Another Way of Looking at EMFs: Therapeutic Uses**
>
> Many people are surprised to learn that certain kinds of EMFs treatments actually can heal. These are medical treatments that use EMFs in specific ways to help in healing bone fractures, to heal wounds to the skin and underlying tissues, to reduce pain and swelling, and for other postsurgical needs. Some forms of EMFs exposure are used to treat depression. EMFs have been shown to be effective in treating conditions of disease at exposure levels far below current public exposure standards. This leads to the obvious question. How can scientists dispute the harmful effects of EMF exposures while at the same time using forms of EMF treatment that are proven to heal the body?
>
> **Medical conditions are successfully treated using EMFs at levels below current public safety standards, proving another way that the body recognizes and responds to low-intensity EMF signals. Otherwise, these medical treatments could not work. The FDA has approved EMFs medical treatment devices, so is clearly aware of this paradox.**
>
> Random exposures to EMFs, as opposed to EMFs exposures done with clinical oversight, could lead to harm just like the unsupervised use of pharmaceutical drugs. This evidence forms a strong warning that indiscriminate EMF exposure is probably a bad idea.
>
> **No one would recommend that drugs used in medical treatments and prevention of disease be randomly given to the public, especially to children. Yet, random and involuntary exposures to EMFs occur all the time in daily life.**

I would add that medical treatment is normally given for a fixed period and not continuously and chronically as for an MF exposure near powerlines.

It is in the field of animal navigation that most progress is currently being made in elucidating the *primary* mechanism by which MFs are known to interact with biological systems. The scientific literature in this field is vast but reference to five recent publications is given below (Ritz *et al.* 2000, 2004 & 2009; Begall *et al.* 2008, Burda *et al.* 2009). Current research suggests that birds posses a magnetic compass in the eye which functions by means of a process which is deeply rooted in chemistry known as the Radical Pair Mechanism. This is the mechanism by which low intensity MFs can increase the lifetime of free radicals. In birds, magneto-reception appears to occur in biological molecules known as cryptochromes, the same molecules that have been associated with magneto-reception in plants. Crucially, cryptochromes are present in human tissues generally, so here too they could be responsible for the primary detection of magnetic fields in man (though I stress such research has not yet been carried out). Whereas in birds the MF-induced increase in lifetime of free radicals is detected for the purposes of navigation, in general such an increase results in their greater ability to cause biological damage, especially in DNA.

The way in which MFs affect biological is becoming increasingly understood. A detailed description and excellent summary may be found in the Bionitiative Report. Here are some extracts from Section 1 (note that this report also discusses health effects from radio frequency RF exposures, principally from mobile phones. The term 'ELF' refers to power frequency EMFs):

> Page 17: Both ELF and RF exposures can be considered genotoxic (will damage DNA) under certain conditions of exposure, including exposure levels that are lower than existing safety limits.
>
> Very low-level ELF and RF exposures can cause cells to produce stress proteins, meaning that the cell recognizes ELF and RF exposures as harmful. This is another important way in which scientists have documented that ELF and RF exposures can be harmful, and it happens at levels far below the existing public safety standards.

> Page 18: There is substantial evidence that ELF and RF can cause inflammatory reactions, allergy reactions and change normal immune function at levels allowed by current public safety standards.

> Page 19: Oxidative stress through the action of free radical damage to DNA is a plausible biological mechanism for cancer and diseases that involve damage from ELF to the central nervous system.

3. The 2007 BioInitiative Report

This is an independent report on EMF health effects, which covers both power frequency MFs and radio frequency EMFs such as from mobile phones. The authors include three former Presidents of the International Bioelectromagnetics Society and it presents an authoritative view of the state of the science and the need for precaution against exposure. The report may be accessed at: http://www.bioinitiative.org/index.htm

4. Summary

It is notable that some countries took action many years ago to limit public exposure to magnetic fields associated with high voltage powerlines, for example Sweden in 1996, Switzerland and Italy in 2000. Included in the substantial literature of EMF health effects is the 2007 study by Lowenthal *et al.* of increased risk of lymphoproliferative and myeloproliferative disorders in Tasmania.

It is indeed unfortunate that power companies and some governments continue to be ill advised on the adverse health effects of EMF exposures. In the case of overhead powerlines, we really are passed the stage where we should be erecting overhead powerlines close to house and centres of population.

Yours sincerely

Denis L Henshaw

Denis L Henshaw

Review bodies' assessments of EMF causation of various diseases.
- health outcomes classified as Class 2B - possible causal.

Disease	IARC[1] 2002	NIEHS 1999[2]	California 2002	EU: SCENIHR[3] February 2009
1. Childhood Leukaemia	**Yes**	**Yes**	**Yes**	**Yes**
2. Adult Leukaemia		**Yes**	**Yes**	
3. Adult brain cancer			**Yes**	
4. Miscariage			**Yes**	
5. ALS[4]			**Yes**	
6. Alzheimer's disease				**Yes[5]**
7. Childhood brain tumours				**Emerging evidence**

[1]International Agency for Research on Cancer
[2]US National Institute of Environmental Sciences
[3]EU: Scientific Committee on Emerging and Newly Identified Health Risks: Possible effects of Electromagnetic Fields (EMF) on Human Health
[4]Motor neurone disease
[5]Studies only recently published

Table Note. A doubling of childhood leukaemia risk is seen for average exposures above 0.4 μT. Other health risks refer generally to increased risk around or below 1 μT average exposure. The current ICNIRP exposure guidelines are set at 100 μT, 250 times higher than 0.4 μT where the doubling of childhood leukaemia risk is seen.

Acronyms

HPA: Health Protection Agency (UK)
IARC: International Agency for Research on Cancer (a branch of WHO)
ICNIRP: International Commission on Non-ionising Radiation Protection
NIEHS: National Institute of Environmental Health Sciences (USA)
NRPB: National Radiological Protection Board (UK)
SCENIHR: Scientific Committee on Emerging and Newly Identified Health Risks (EU)
WHO: World Health Organisation
WHO EHC: World Health Organisation Environmental Health Criteria

References

Begall S, Cerveny J, Neef J, Vojtech O and Burda H, 2008. Magnetic alignment in grazing and resting cattle and dear, *PNAS,* **105**(36), 13451-13455.

BioInitiative Report 2007: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELS and RF) Authors: Sage, Xu, Chen, Lai, Blank, Johansson, Hardell, Mild, Kundi, Davanipour, Sobel, Blackman, Gee and Carpenter. http://www.bioinitiative.org/index.htm

Burda H, Begall S, Cerveny J, Neef J and Nemec P. 2009. Extremely low-frequency electromagnetic fields disrupt magnetic alignment of ruminants. *PNAS*, 106(14),5708-13, 2009.

California Health Department Services (CHDS) Report, 2002. An evaluation of the possible risks from electric and magnetic fields (EMFs) from power lines, internal wiring, electrical occupations and

appliances. (Eds: Neutra, DelPizzo and Lee). California EMF Program, 1515 Clay Street, 17th Floor, Oakland, CA 94612, USA.
http://www.ehib.org/emf/RiskEvaluation/riskeval.html

Garcia AM, Sisternas A, Hoyos S P.2008 Occupational exposure to extremely low frequency electric and magnetic fields and Alzheimer's dosease: a meta-analysis *Int. J. Epidemiol.* **37**, 329-340.

Huss A, Spoerri A, Egger M, Martin Röösli M, 2008. Residence Near Power Lines and Mortality From Neurodegenerative Diseases: Longitudinal Study of the Swiss Population. *Am J Epidem* **169(2),** 167 -175.

IARC Monographs of the Evaluation of Carcinogenic Risks to Humans, 2002. Non-Ionizing Radiation, Part 1: Static and Extremely Low-Frequency (ELF) Electric and Magnetic Fields. Volume 80, 19-26 June 2001, IARC Press 2002, 150 Cours Albert Thomas, F-69372 Lyon Cedex 08, France.

Lowenthal, R. M., Tuck, D. M. and Bray, I. C., 2007. Residential exposure to electric power transmission lines and risk of lymphoproliferative and myeloproliferative disorders: a case-control study. *Internal Medicine Journal*, **37**, 614-619.

National Institute of Environmental Health Sciences (NIEHS), 1999, NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic fields. *NIH Publication* No. 99-4493, P. O. Box 12233, Research Triangle Park, NC 27709.

O'Carroll, M. J. and Henshaw, D. L., 2008. Aggregating epidemiological evidence: comparing two seminal EMF reviews. *Risk Analysis*, **28**(1), 225-234

Ritz, T., Adem, S., and Schulten, K., 2000. A model for photoreceptor-based magnetoreception in birds. *Biophysical Journal,* **78**, 707-718.

Ritz T, Thalau P, Phillips JB, Wiltschko R, Wiltschko W. Resonance effects indicate a radical-pair mechanism for avian magnetic compass. Nature 2004; **429:**177-180.

Ritz T, Wiltschko R, Hore PJ, Rodgers CT, Stapput K, Thalau P, Timmel and Wiltschko W. 2009. Magnetic compass of birds is based on a molecule with optimal directional sensitivity. *Biophys J,* **96**, 3451-3457.

SCENIHR 2009 update: Scientific Committee on Emerging and Newly Identified Health Risks: Possible effects of Electromagnetic Fields (EMF) on Human Health. Published by the European Commission, Health & Consumer Protection DG, Directorate C: Public Health and Risk Assessment, Unit C7 – risk Assessment, Office: B232, B-1049 Brussels; weblink:
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf

WHO: World Health Organisation Environmental Health Criteria 238: Extremely Low Frequency Fields, 2007. Available online at:
http://www.who.int/entity/peh-emf/publications/Complet_DEC_2007.pdf