



IAS Solar Dish Technology Evaluation

Submitted to the
United States Department of Justice

United States v. RaPower-3, et al.
Civil No. 2:15-cv-00828 DN

by

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TRMancini Solar Consulting, LLC

July 28, 2017

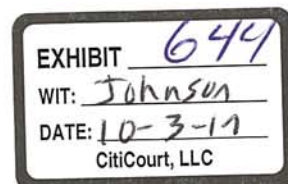




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1. REPRESENTATIONS AND CERTIFICATIONS

1. I am retained by United States Department of Justice (U.S. DOJ):
 - a) to explain the basic concepts involved in workable solar energy power generation technology;
 - b) to evaluate and explain the "IAS Solar Dish Technology" at issue in this case, which includes any equipment installed on sites identified by the Defendants, any technological plans or schematics provided by the Defendants;
 - c) to determine whether the IAS Solar Dish Technology is currently converting sunlight into energy; and
 - d) to opine on whether the IAS Solar Dish Technology is commercially viable on any scale (or may become commercially viable on any scale) to convert sunlight into electrical power.
2. I confirm that I have identified the facts and matters referred to in this report that are within my own knowledge and those that are not. Those that are within my own knowledge I confirm to be true. The opinions in this report represent my complete professional opinions on the matters discussed.
3. I have no present or past relationships with any Defendant in this case. My relationship with U.S. DOJ is a contractual one to perform this evaluation as stated above.
4. I am the Principal of TRMancini Solar Consulting, LLC, and have more than 35 years of experience with Concentrating Solar Power (CSP) systems. As a Professor of Mechanical Engineering at New Mexico State University, USA (1975-1985), I performed research in solar power generation, passive solar cooling, active heating and cooling, and taught undergraduate and graduate courses in energy-related areas, heat transfer and fluid mechanics.
5. Prior to my current position, I was at Sandia National Laboratories¹ in Albuquerque, NM, (1986-2011) where I was a Distinguished Member of the Technical Staff working on CSP prior to becoming the Program Manager for Concentrating Solar Power at Sandia from 2002 to 2011.
6. I have been active in the American Society of Mechanical Engineers (ASME) as Chair of the Solar Energy Division, Chair and Member of the Energy Resources Board, and Chair of the ASME Energy Committee. In 1994 I was elected to the rank of Fellow of the ASME.

¹ Sandia Corporation operates Sandia National Laboratories under contract to the U.S. Department of Energy (DOE) and supports numerous federal, state, and local government agencies, private companies, and organizations. It is one of the DOE's Federally Funded Research and Development Centers (FFRDC).



7. From 1994 through 2011, I served on the International Energy Agency's (IEA) Solar Power and Chemical Energy Systems (SolarPACES) Implementing Agreement, which is the international organization tasked with the sharing of CSP R&D information between and among member governments. I chaired SolarPACES from 2004 through 2011.
8. Appendix I is my complete C.V. It also contains a list of all of my publications from the last 10 years and all of my solar energy-related publications regardless of date of publication.
9. During the last 4 years, I served as an Expert Witness for the following three cases:
 - a. Evaluation of the Expected Lifetime of the Andasol Solar Parabolic Trough Plants, EISER Infrastructure Limited and Energia Solar Luxembourg S.à.r.l. vs. The Kingdom of Spain, International Center for Settlement of Investment Disputes, ICSID Case No. ARB/13/36, February 2016.
 - b. Evaluation of the Expected Lifetime of the Andasol Solar Parabolic Trough Plants, ANTIN Infrastructure Services Luxembourg S.à r.l. ANTIN Energia Termosolar B.V. vs. The Kingdom of Spain, International Center for Settlement of Investment Disputes, ICSID Case No. ARB/13/31, October 2016.
 - c. Evaluation of the Expected Lifetime of the REEF Solar Parabolic Trough Plants, RREEF Infrastructure (G.P.) Limited REEF Pan-European Infrastructure Two Lux S.à r.l. vs. The Kingdom of Spain, International Center for Settlement of Investment Disputes, ICSID Case No. ARB/13/30, March 2017.
10. I have been and am currently being compensated by the U.S. Department of Justice at my consulting rate of \$300/hour for work related to the evaluation of the IAS Solar Dish Technology, the preparation of this report, and any testimony I may provide.
11. The materials, including documents and in-person visits to sites identified by the Defendants, that I have examined and relied upon in preparing this report are listed in Appendix II. Some of these materials are cited in this report.
12. Appendix III is a glossary of terms that I use in this report.
13. My opinions are based on the detailed analysis presented in this report. I affirm that my opinions are solely and completely my own, that they are independent, and free of influence from anyone, including but not limited to all Defendants in this case and the U.S. DOJ.



Conclusion 1: Status of the IAS Solar Dish Technology

The IAS Solar Dish Technology is in the research Stage 1 of development. The "Technology" comprises separate component parts that do not work together in an operational solar energy system. The IAS Solar Dish Technology does not produce electricity or other useable energy from the sun.

Conclusion 2: Commercialization Potential of the IAS Solar Dish Technology

The IAS Solar Dish Technology is not now nor will it ever be a commercial-grade dish solar system converting sunlight into electrical power or other useful energy.

A handwritten signature in black ink that reads 'Thomas R. Mancini'.

Thomas R. Mancini

A handwritten date in black ink that reads 'July 28, 2017'.

DATE



APPENDIX II LIST OF FACTS AND DATA CONSIDERED

Documents produced in *United States v. RaPower-3, et al.*, 15-828 (D. Utah)

<u>Bates Begin</u>	<u>Bates End</u>
Freeborn_Roger-00001	Freeborn_Roger-00624
Gregg_P&R-000564	Gregg_P&R-000583
Gregg_P&R-000939	Gregg_P&R-000943
Gregg_P&R-000946	Gregg_P&R-000951
Gregg_P&R-001042	Gregg_P&R-001046
Gregg_P&R-001242	Gregg_P&R-001243
Gregg_P&R-001320	Gregg_P&R-001321
Gregg_P&R-001452	Gregg_P&R-001454
Gregg_P&R-001757	Gregg_P&R-001758
Gregg_P&R-001859	Gregg_P&R-001860
Gregg_P&R-001938	Gregg_P&R-001939
Gregg_P&R-001987	Gregg_P&R-001992
LUCITE0001	LUCITE0981
PAC00001	PAC02425
PSK000001	PSK000072
Ra3 000001	Ra3 018637.623
Ra3 023288	Ra3 023594
Shepard_Greg-00001	Shepard_Greg-04016
US000001	US004270

Other Sources of Information and Materials in *United States v. RaPower-3, et al.*, 15-828 (D. Utah)

- April 4, 2017 Site Visit to the Manufacturing Facility, the Construction Site, and the R&D Site in Millard County, Utah, with United States Department of Justice attorneys Erin Healy Gallagher, Erin Hines, Christopher Moran and associated video (3 disks)
- United States' Complaint
- United States Written Discovery Requests and Defendants' responses
- Deposition Transcripts⁷³ of:
 - Robert Aulds
 - Kenneth Birrell

⁷³ Unless otherwise noted, refers to depositions taken in this case.



- Cody Buck
- Peter Gregg
- Roger Halversen
- John Howell
- Frank Lunn
- David Mantyla
- Preston Olsen
- Ken Olson
- Samuel Otto
- Kenneth Oveson
- PacifiCorp
- Mike Penn
- Robert Rowbotham
- Matthew Shepard
- Lynette Williams
- Brian Zeleznik
- Greg Shepard
- Roger Freeborn
- Neldon Johnson (which Dr. Mancini also attended in person)
- International Automated Systems, Inc.
- RaPower-3, LLC
- LTB1, LLC
- Neldon Johnson (deposition taken by the Securities Exchange Commission on May 10, 2001 in *SEC v. International Automated Systems, Neldon Johnson, et al.* Case No. 2:98-cv-562s (D. Utah))
- Plaintiff's Exhibits 1 through 558
- Dr. Mancini reviewed the rapower3.com and iaus.com websites as they have appeared at different times since September 2015.
- Videos and PDF's from Defendants' websites
 - Animated Hydraulic Pivot.avi
 - Benefit Final Thoughts.avi
 - ChefPlex News Story.avi
 - Dual Axis Tracking.avi
 - History in Pictures.mp3
 - History in Pictures.wmv
 - Hydraulic Pivot in Use.avi
 - IAUS Dynamic Voltage Controller.wmv
 - IAUS Solar Dual Axis Tracking.wmv
 - IAUS Solar Receiver.wmv
 - Jet Propulsion Turbine.wmv
 - Learning Center – Rental Agreement.wmv
 - Pictures from the 2014 MEGA Tour.mp3
 - Pictures from the 2014 MEGA Tour.wmv
 - Program Summary.avi
 - RAPower3 – 2014 Mega Tour video of Turbine.wmv
 - RaPower3 – Concentrated Photovoltaic.wmv
 - RaPower3 – Concentrated PV Field Test.wmv
 - Rapower3 – Manufacturing Update.wmv
 - Rapower3com.avi
 - Solar Lens Test.avi



- Solar News.wmv
- Solar Tech01.avi
- Solar Tech02.avi
- Solar Tech03.avi
- Solar Tech04.avi
- Solar Thermal Heat
-

Lenses.wmv

- Solar Tracking.avi
- Turbine Prototype.avi
- XSun Energy.avi
- 2011 Convention Freebor's Facebook (folder)
 - 15 Minute RaPower3 Video.avi
 - RaPower3 Convention Clip #1.avi
 - RaPower3 Convention Clip #10.avi
 - RaPower3 Convention Clip #2.avi
 - RaPower3 Convention Clip #4.avi
 - RaPower3 Convention Clip #5.avi
 - RaPower3 Convention Clip #6.avi
 - RaPower3 Convention Clip #7.avi
 - RaPower3 Convention Clip #8.avi
 - RaPower3 Convention Clip #9.avi
 - RaPower3 Intro Movie.avi
 - RaPower3 System Heat Demo.avi
 - Webinar.avi
 - Untitled.avi
- IAS Website (folder)
 - AdvancedSolarCollector.aspx.pdf
 - AirportSecurity.aspx.pdf
 - AutomatedSupermarket.aspx.pdf
 - BladelessTurbine.aspx.pdf
 - Company.aspx.pdf
 - Contact.aspx.pdf
 - Fingerprint.aspx.pdf
 - Home Page.pdf
 - JoinEmailList.aspx.pdf
 - LouveringPanels.aspx.pdf
 - OrderXcel.aspx.pdf
 - news2011.aspx
 - news02092006.aspx.pdf
 - news02132007.aspx.pdf
 - news02232009.aspx.pdf
 - news03182009.aspx.pdf
 - news04092007.aspx.pdf
 - news06152010.aspx.pdf
 - news07112006.aspx.pdf
 - news07172009.aspx.pdf
 - news08232007.aspx.pdf
 - news11122007.aspx.pdf
- Solco Energy Website (folder)



- Business Opportunity - Video.avi
- Solco Energy - YouTube Video.avi
- www.rapower3.com (folder)
 - Benefit Final Thoughts - Video.avi
 - about_us.shtml.pdf
 - benefit_commissions.shtml.pdf
 - benefit_final_thoughts.shtml.pdf
 - benefit_options.shtml.pdf
 - benefit_residual.shtml.pdf
 - benefit_retirement.shtml.pdf
 - benefit_success_stories.shtml.pdf
 - Compensation_04082011.pdf
 - convention.shtml.pdf
 - current_news.shtml.pdf
 - EquipmentPurchase_04082011.pdf
 - Home Page.pdf
 - OperationMaint_11192010.pdf
 - PoliciesReport.pdf
 - 101 purchase_join.shtml.pdf
 - solar_sites.shtml.pdf
 - tax_cpa_info.shtml.pdf
 - tax_credits.shtml.pdf
 - tax_finer_points.shtml.pdf
 - tax_forms.shtml.pdf
 - tax_history.shtml.pdf
 - tax_opinionletter.shtml.pdf
 - tax_quarterly.shtml.pdf
 - tax_state_credits.shtml.pdf
 - tech_closed_loop.shtml.pdf
 - tech_going247.shtml.pdf
 - tech_heatexchangers.shtml.pdf
 - tech_lens.shtml.pdf
 - tech_turbine.shtml.pdf
- www.sunpowerassociates.com (folder)
 - SunPowerAssociates Video.avi
 - www.sunpowerassociates.com.pdf
- www.tvital.com (folder)
 - test.avi
 - www.tvital.com.pdf
- www.xsunenergy.com (folder)
 - XSun Energy Video.avi
 - www.xsunenergy.com.pdf
- www.xsuntaxprogram.com (folder)
 - Program Summary - Video.avi
 - Solar Technology - Video 2.avi
 - Solar Technology - Video 3.avi
 - Solar Technology - Video 4.avi
 - Solar Technology - Video.avi
 - About XSun.pdf
 - Home Page.pdf



- Program Summary.pdf
- Solar Technology.pdf
- Tax Calculator.pdf

Information and Documents Provided by IRS, Office of Chief Counsel in related Tax Court case, *Olsen v. Commissioner*, United States Tax Court, Docket No. 26469-

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- Ninety-two pictures (taken on or about September 1, 2011) of the R&D Site, surrounding area and some other related properties
- Deseret News article (Dec. 21, 2013) discussing the IAUS and RaPower3 project in Millard County, Utah
- Two pages printed (Apr. 4, 2014) from the IAUS website, www.iaus.com, two pages with four pictures of the IAS Solar Dish
- Two pages printed (Apr. 4, 2014) from the Wikipedia entry for IAUS
- Form 10-QSB, Quarterly Report, filed with the United States Securities and Exchange Commission by IAUS for quarter ended September 30, 2007
- Form 10-QSB, Quarterly Report, filed with the United States Securities and Exchange Commission by IAUS for fiscal year ended June 30, 2008
- Form 10-QSB, Quarterly Report, filed with the United States Securities and Exchange Commission by IAUS for fiscal year ended June 30, 2009
- Form 10-QSB, Quarterly Report, filed with the United States Securities and Exchange Commission by IAUS for fiscal year ended June 30, 2010
- Form 10-QSB, Quarterly Report, filed with the United States Securities and Exchange Commission by IAUS for quarter ended December 31, 2010
- Form 10-QSB, Quarterly Report, filed with the United States Securities and Exchange Commission by IAUS for quarter ended March 31, 2011
- IAS Articles of Incorporation, dated September 26, 1986
- Three pages printed from IUAS website, www.iaus.com, series of news articles reproduced on the IAS website:
http://www.iausenergy.com/NewsHistory/20060118_SolarTaxCredit.html
- RaPower3 Articles of Organization, dated November 17, 2009
- Page prints made on April 16, 2013 from RaPower3 website, www.RaPower3.com, approximately 50 pages of the RaPower3 website with apparent downloads of other documents from the site
- RaPower3 Compensation Contract and Policies and Procedures dated September 2009.
- Sample RaPower3 Equipment Purchase Agreement with invoice, placed in service letter and Referral Fee Contract
- Sample RaPower3 Operation and Maintenance Agreement
- Tax Court Rule 143(g) discussing expert witness reports
- January 24, 2017 Site Visit to the Manufacturing Facility, the Construction Site, and the R&D Site in Millard County, Utah, with IRS Chief Counsel attorneys Skyler Bradbury and David Sorenson