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SkyFuel, Inc.

ACC Docket Number: E-00000D-07-0376

Comments from SkyFuel Inc., regarding the application of concentrating solar thermal collector fields in conjunction with new transmission substations.

26 August 2008

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SkyFuel

August 26, 2008

Subject: ACC Docket Number: E-00000D-07-0376
Comments from SkyFuel Inc., regarding the application of concentrating solar thermal collector fields in conjunction with new transmission substations.

Docket Control
Arizona Corporation Commission
1200 W. Washington
Phoenix, AZ 85007

SkyFuel Inc., a solar thermal technology company based in Albuquerque, NM, appreciates the opportunity to provide comments to the Fifth Biennial Transmission Assessment and respectfully offers the following input for consideration by the ACC.

This document describes how solar collector fields might be deployed in conjunction with the development of major substations as a "buffer" between transmission systems and commercial and residential spaces. These comments are provided in consideration of the significant potential for concentrating solar thermal development in Arizona, the expected near-term growth of transmission facilities in Arizona necessary to serve a growing population and economy, and the need for renewable energy to fulfill legislated RPS goals and advance other important public policy imperatives.

The concept of the "Solar Buffer" is one in which utilities (or independent transmission developers) set-aside land surrounding substations for future development of solar collector fields. The nature of a transmission substation implies that multiple overhead transmission lines converge upon a relatively small parcel of land, making land adjacent to such substations considerably less valuable for future development. The deployment of a Solar Buffer offers one use for land that would otherwise be de-valued from a private land-owner's perspective.

By employing the Solar Buffer concept, land that would otherwise be of limited use for other purposes would be utilized as a means of meeting renewable energy goals. In addition to land-use considerations, the Solar Buffer concept would enable renewable generation to be sited closely to future loads and it would reduce the need for generator tie-lines.

We have defined the Solar Buffer concept as using concentrating solar thermal for several reasons. First, concentrating solar thermal using parabolic trough geometry is a proven technology for producing cost-effective, utility-scale power generation plants on the order of 10's or 100's of MW, with over 20 years of operational experience. Secondly, the physical profile of trough technology is well-suited to the Solar Buffer application, as (1) it would serve as a visual and security buffer between a transmission substation and commercial development and (2) due to its relatively low profile, it could be readily deployed under overhead transmission lines. Third, solar thermal technology is relatively predictable in terms of output compared to other forms of solar generation, simplifying the integration of a solar thermal plant into the power system. Finally, concentrating solar thermal can be combined with combined cycle gas-fired plants in a hybrid form. A hybrid solar/combined cycle plant offers the absolute lowest-cost form of solar-generated electricity.

In conclusion, SkyFuel requests that the Commission consider the Solar Buffer concept in the context of BTA sections 3.5 and 3.6.

Sincerely,

Eric M. John

Attachment

Contact

SkyFuel, Inc.
10701 Montgomery Blvd. NE, Suite A
Albuquerque, NM 87111
Phone: (505) 293-1023
Fax: (505) 323-2747

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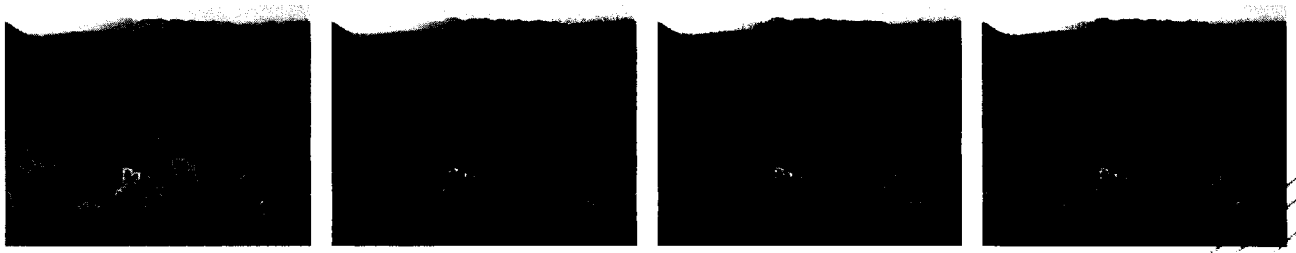

Solar Field Buffers

A New Concept in Land Use Planning
Presented to CRT

May 19, 2008

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Solar Buffer Concept

SkyFuel

- **Land adjacent to major substations can be greatly diminished in value**
  - Multiple overhead lines
  - Audible noise
  - Potential generating stations
- **Economics of solar improve dramatically when used to augment existing fossil plants (hybrid or FuelSaver™)**
  - Minimal capital deployment as turbine-generator is a sunk cost
  - Can be deployed in phases based on cost and risk tolerance
- **Solar field is low-profile apparatus that provides cost and environmental benefits while buffering substations and power plants from encroaching development**

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Santan Power Plant, Gilbert, AZ

Google Maps: 2000' Scale

Plant was sited and built years before residential development. Landscaping (photo-right) costing millions of dollars was required for security and aesthetics after homes were built on adjacent lands.

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Benefits of Solar Buffer Concept

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- **Improved land use on T-line approaches to major substations**
- **Economics**
  - Improved heat rate with "free" solar steam (BTU perspective)
  - Hedge against increases in natural gas and oil prices
- **Emissions**
  - Reductions in NOx, SOx, CO (additive in time on worst air-quality days)
  - Hedge against potential cost for GHG emissions
- **Electrical output can be firmed with gas for low capital cost**
  - Very low operational cost because highest electrical demand times tend to be well correlated with bright sunshine
- **Notion of buffering implies that generation is sited in proximity to load**
  - Reduced transmission requirement
  - Dynamic voltage and reactive support

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Solar Buffer Reality Check

Land buffering large substations loses development value due to concentration of overhead transmission lines. Use solar field as a buffer.

Midway s/s, Central Valley, CA
Google Maps: 500' scale

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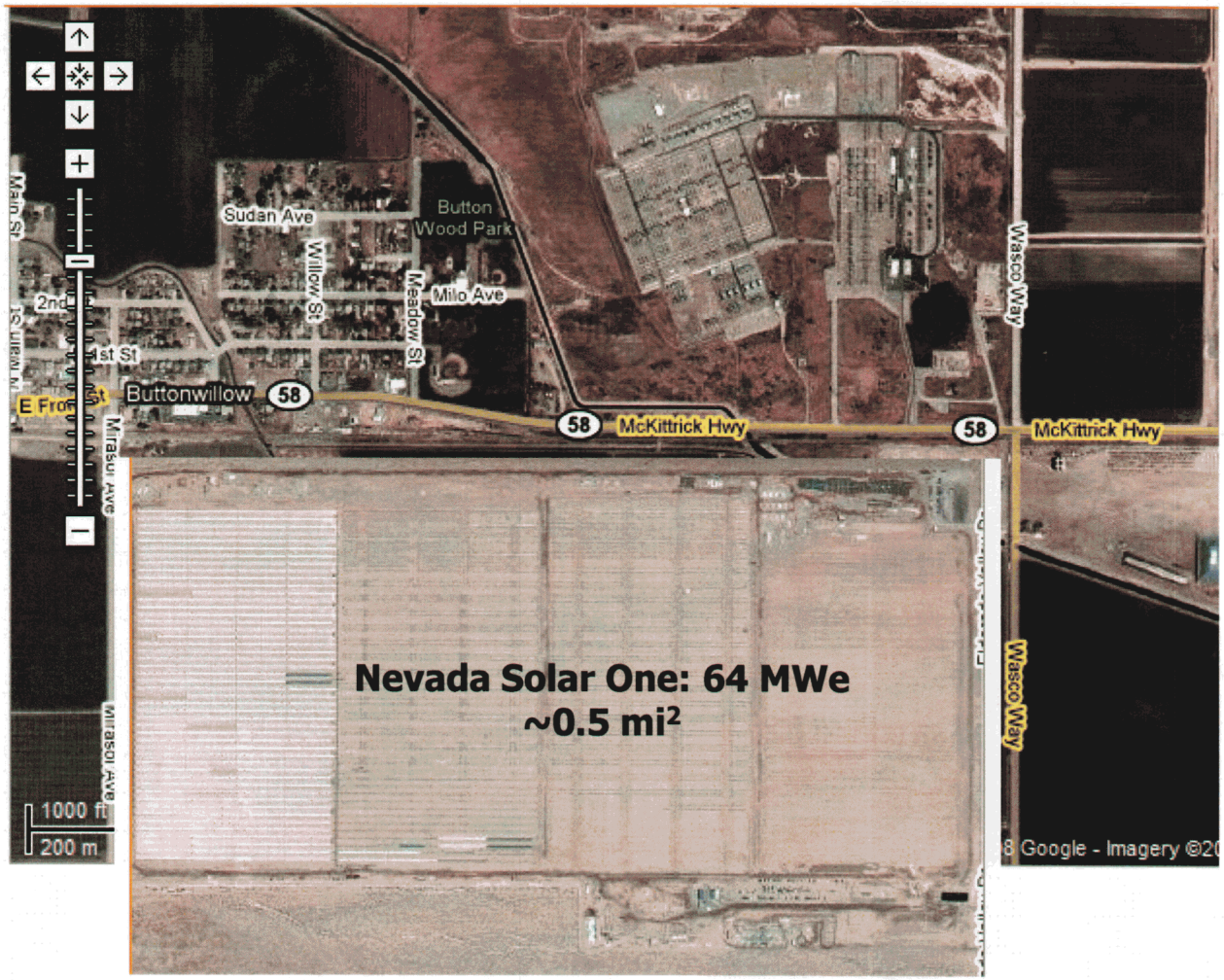
South Side of Midway Sub

Google Maps: 500′ Scale

© SkyFuel, Inc

Solar Field as Substation Buffer



Google Maps: 1000' scale

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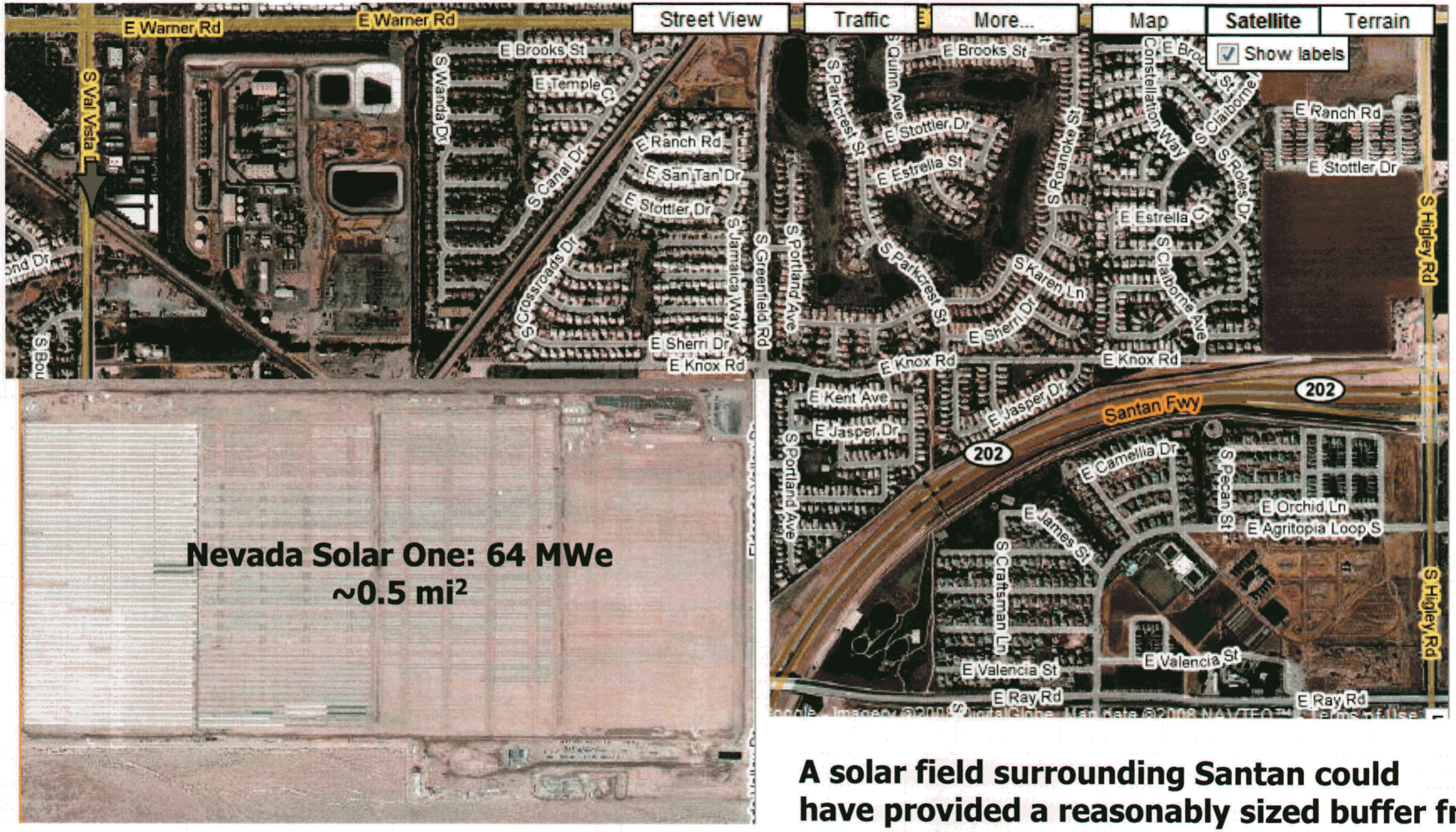
Santan and Solar Field Buffer



Google Maps: 1000′ scale

A solar field surrounding Santan could have provided a reasonably sized buffer from residential development had the land been set aside prior to residential development.

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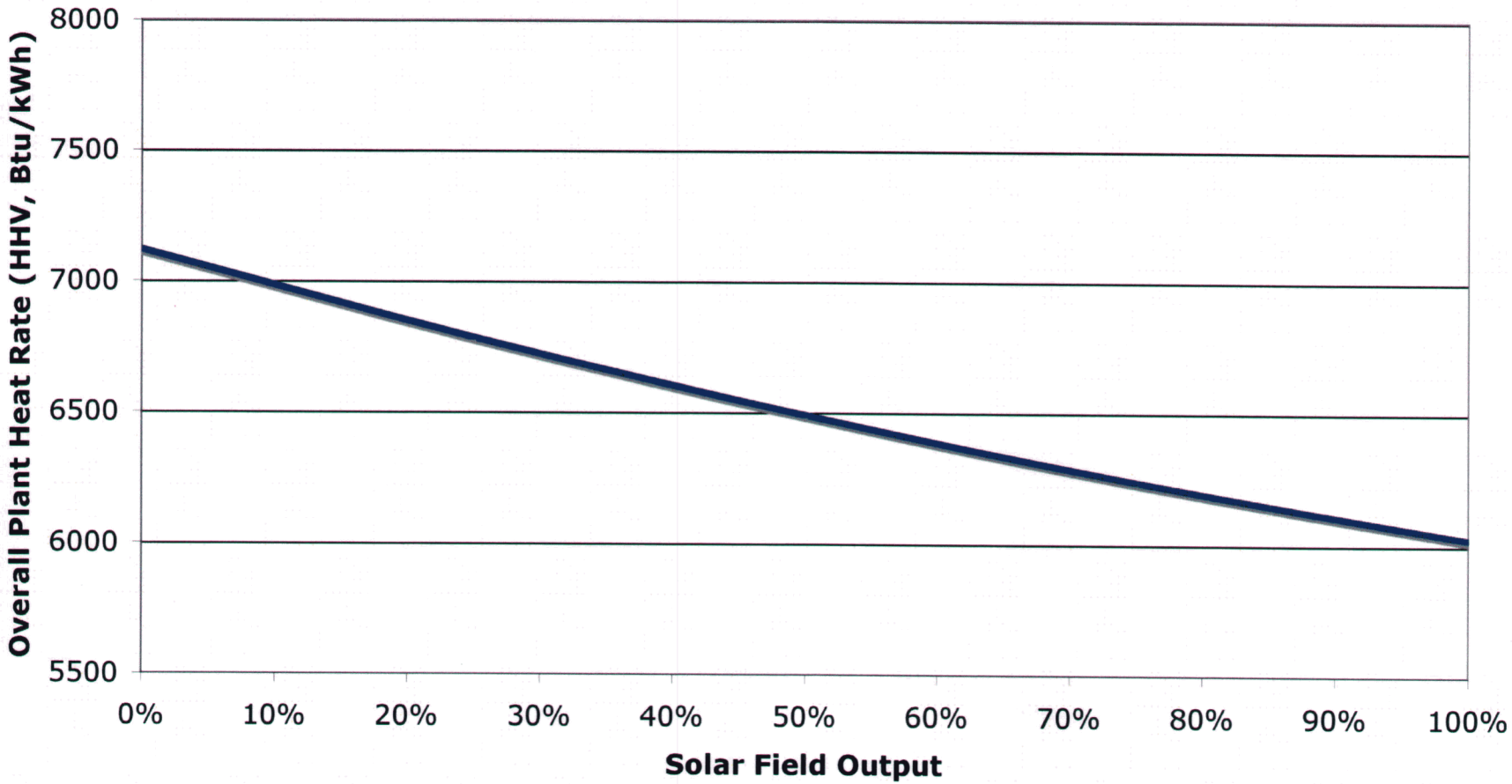
Impact of FuelSaver™ on CCGT heat rate



2x1 CCGT with 100 MW of duct firing; 415 MW output @ 90 F, Ambient
Plant uses dry cooling; Ducts are not fired
X-axis shows contribution of "free" solar field steam

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Contact Information

SkyFuel, Inc.

Info@SkyFuel.com
www.SkyFuel.com

Corporate Headquarter
SkyPro™ Project Development
10701 Montgomery Blvd.
Albuquerque, NM 87111
Phone: (505) 293-1023
Fax: (505) 323-2747

Finance Office
430 Park Avenue, Suite 701
New York, NY 10022
Phone: (212) 461-6221
Fax: (212) 842-1540

SkyWorks™ R&D
18300 W. Hwy 72
Arvada, CO 80007
Phone: (303) 330-0276

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