



Date: 1/13/2016

**COMPANY INFORMATION**

<b>Company Name:</b> Ag Waste Solutions	
<b>Phone:</b> 805-551-0116	<b>Web Site:</b>
<b>Address:</b> 4607 Lakeview Canyon Rd, Suite 185	<b>City:</b> Westlake Village
<b>State:</b> CA	<b>Zip Code:</b> 91361

**BUSINESS CONTACT**

<b>Name:</b> Steve McCorkle, CEO
<b>Phone:</b> 805-551-0116
<b>Email:</b> mccorkle@agwastesolutions.com
<b>Address:</b> 4607 Lakeview Canyon Rd, Suite 185
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**TECHNICAL CONTACT**

<b>Name:</b> Steve McCorkle, CEO
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<b>Address:</b> 4607 Lakeview Canyon Rd, Suite 185
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<b>Zip Code:</b> 91361

**BUSINESS HISTORY**

**How long have you been in business?** 12 years

**Are you part of a larger company?**  Yes  No

**Did you exist as another company before this company was formed?**  Yes  No

*If so, what was that company's name?*

**Number of employees?** 0 – Consultants Only in AWS, 4 employees in project JV

**What is your business structure?** Delaware C Corp, form JV partnerships with farms

**What types of insurance and or surety do you provide?**

None – all insurance is currently site specific  
Surety planned through EPC partner at 100 BPD size

**References. Please provide customers or colleagues with whom we can discuss your business and performance.**

*Please include a separate list with company name, location, contact name and contact information.*

Bruce Scott – Partner, Scott Brothers Dairy Farms  
18051 Gilman Springs Rd., San Jacinto, CA 92555  
(951)692-6069 bruce@sdbfarms.com  
Bob Monley – General Mgr. FPPC (retired)  
(727) 686-9113  
Dr. C. Mike Williams, Department Chair, Poultry Science –  
NCSU. Former Director of NCSU APWMC  
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Dr. Len Bull, Associate Director of NCSU APWMC (retired)  
919-491-3317 homebull@aol.com  
Jeff Porter – Manure Management Team Leader – NRCS  
2901 E. Lee Street, Ste. 2100 Greensboro, NC 27401  
(336) 370-3342 jeffrey.porter@gnb.usda.gov

**Describe your business service(s).** *For example: consulting, development, engineering, equipment sales, finance, other.*

Consulting & Project Development

**Area or region of operation.**

California, U.S., Spain

**Does your company hold any patents or the rights to any patents?** *Please identify.*

AWS Patents: US 7,828,979; 7,547,390  
AWS Patent Rights: US 5,718,828, US 5,776,340, US  
5,951,874, US 6,776,913, US 6,998,054 US 7,276,160, US  
7,470,413, US 8,314,044, US 8,598,240, US 8,784,687, US  
8,946,111

**Do you manufacture equipment?**  Yes  No *Please describe.*

No, AWS only manufactures prototypes and upgrades. AWS controls engineering and manufacturing files for patented technologies using outsourced manufacturing. Will integrate front-end collection equipment on farms with supplier partners who build, sell and service standard equipment skid mounted to AWS specs. All production systems will be integrated and tested together in regional logistics centers before shipping to pre-configured building structures for rapid installation (no permanent infrastructure on farms)

**Do you integrate equipment manufactured by others?**  Yes  No

*If you integrate, please list the names of the companies you represent.*

Partnership agreements in process with two suppliers.  
Cannot print names until agreements in place

**How do you answer potential customer’s question about financial strength of your company?**

Pre-revenue company with first revenues planned in 2016 from biochar sales. Funding thus far through grants and private equity. First commercial 10 BPD JV project with Scott Brothers Dairy Farms to be funded through preferred project capital provider partnership.

**Do you offer technical/service support?**  **Yes**  **No** *If so, what methods?*

Build, own and operate model for central plants. Will offer service support for on-farm front-end systems from central plant personnel and partner service organizations.

**Do you offer design services?**  **Yes**  **No** *Please describe.*

AWS will design the integrated system tailored for each farm and JV project.

**Do you offer financing?**  **Yes**  **No** *If so, what terms?*

Yes, AWS provides project financing. Participating farmers have the option to purchase equity in the project and/or participate in a profit sharing agreement based on the quality, quantity and delivery of their feedstock.

**Are you a full stop shop?** *Design to construction to operate?*  **Yes**  **No** *Please describe.*

Yes, AWS owns a significant percentage of each project and manages all JV projects in order to provide best practices, technology enhancements, local and national off-take agreements and profit maximization.

**Do you have preferred partners?**  **Yes**  **No**

*If so, please list and provide contact information/identify partners by name.*

Yes, but we will need to sign an NDA together before naming our partners and having you contact them directly

**Do you have any third-party verification/research that has been done on this technology?**  Yes  No

*If so, please describe.*

NCSU APWMC solids separation trials (2004), FPPC grant Final Report (2010), White Paper by Dr. Greg Morris (CA Biomass Collaborative – 2010), first EQIP gasification grant award (2012), CEC grant Final Report (2015)

**Do you provide a performance guarantee?**  Yes  No

*If so, what are you guaranteeing? For example: up time, methane production, biogas production, parasitic load, throughput, O&M cost, percent recovery, other.*

AWS and their preferred EPC implementation partner will provide performance guarantees as required at the 100 BPD project scale level. We are currently at the 1 BPD scale, with plans to begin the 10 BPD scale in late 2016 and the 100 BPD level in 2018 after the 10 BPD project is fully proven

**Are there any other aspects of your business that you feel should be included in this document?**

AWS forms partnerships with farmers using a build, own, and operate business model in order to tailor the best solutions for converting their most significant liabilities into the most profitable and sustainable assets for the partnership

**INITIAL TECHNOLOGY OVERVIEW**

**This information is to guide in the development of a more specific and detailed Technology Information Request. Please answer the following questions for each Technology or Service Provided.**

**What is the name of the technology or service?**

AWS Biofuels and Biochar Production System – Renewable Low Carbon Transportation Fuels and Nutrient Concentrated By-Products

**What unit process is the technology used in?**

*For example: initial collection/transfer manure storage, energy recovery, primary/coarse solids recovery, advanced suspended/fine solids recovery, drying, struvite production, nitrification denitrification, ammonia stripping, algae, vermi composting, membrane filtration, evaporation, other.*

The AWS technology unit process is used in the following unit processes: coarse solids screening and large fiber recovery, advanced suspended/fine solids recovery, membrane filtration and water treatment, pre-drying, pyrolysis gasification for bio-syngas production and nutrient recovery (biochar +ash), ammonium sulfate and elemental sulfur recovery, steam methane reforming,

Fischer-Tropsch (FT) synthesis, distillation, energy recovery for parasitic power needs.

**How many systems have you installed on dairy farms or other livestock operations?**

Two demonstration and testing systems – The first being a solids separation and batch gasification system at IEUA and a Chino dairy farm; the second being a solids separation, potable water, continuous gasification and biofuels + biochar system at SBDF.

**Size of farm(s)?**

IEUA – 700 milking head dairy, SBDF – 1100 milking, 2000 head total dairy

**Location of farm(s)?**

Chino, CA; San Jacinto, CA

**What's the smallest/largest farm for your system?**

Hub and spoke project system can work even with the smallest farms having separators installed on the farms or using mobile separators and hauling the separated solids to the central energy production site. Smallest biofuels + biochar central plant to produce a 3 year or less EBITDA ROIC is 10 BPD biofuels + 20 TPD biochar = 6000 total head dairy. Standard size biochar-only production = 3000 total dairy head for plant, can use feedstock from multiple farms.

**Input material description/characteristics:**

*For example: raw manure, digestate, screened digestate, suitable non-farm feedstocks, other.*

All of these input materials have been successfully processed through the AWS system. High BTU, low moisture feedstocks provide the best energy conversion characteristics.

**Does the technology treat the full manure stream for a farm or a fraction of the stream?**

The technology can treat the full manure stream for a farm.

**Do you consider this a mature system or ongoing farm development?**

The basic AWS system is well proven and mature. The combined syngas-biochar gasifier design improvements will be piloted and proven in 2016, as well as the improved FT catalytic activation and process controls; however, the basic AWS systems and the science behind them are mature and unchanged with the improved designs that will lower capex and opex costs for farm systems.

**Any weather constraints?**  Yes  No *Please describe.*

No show stopping constraints, only mass balance issues related to corral manure drying energy requirements and aged manure storage systems (e.g. deep pit) that can reduce the BTU value of feedstocks. AWS systems can process these manures in a more real-time basis in order to minimize these issues.

**Any bedding constraints?**  Yes  No *Please describe.*

Sand should be removed to maximize throughput, but the system can handle sand. Biochar is an excellent bedding material that can be recycled through the gasifier after use to produce more syngas or biochar.

**Is this process scalable and to what extent (top and bottom limits)?**  Yes  No *Please describe.*

The largest module, the gasifier, will be standardized to a 2 ton/hr. size (~3000 cows), which is the largest size that can still be skid mounted and portable. Gasifiers can be set side by side to scale up the plant throughput. Smaller farms in the hub and spoke system can provide feedstock to the gasifier, and this is the bottom limit. A 2 ton/hr. gasifier will produce 10 BPD of biofuels plus the parasitic energy required to power the entire system. Two 2 ton/hr. gasifiers plus FT will produce 10 BPD FT liquids + 20 TPD of biochar, the smallest scale system to meet or exceed the 3 year EBITDA ROC.

**Do you have a known scaling factor?**  Yes  No *Please describe.*

1 BPD (current) to 10 BPD to 100 BPD

**Input and output of your unit/system – do you have a mass balance analysis?**  Yes  No *Please describe.*

Yes, the mass balance analysis exists and can be provided after NDA execution.

**Do you consider this technology part of a larger system that you provide?**  Yes  No *Please describe.*

Yes, we can scale up to 100 BPD with the same portable technology and without permanent infrastructure on the farm. Over 100 BPD would require permanent infrastructure and nonmobile equipment.

**Has your technology been accepted by the NRCS?**  Yes  No *Please describe.*

Yes, the AWS gasifier has been accepted by the NRCS and included as a practice standard. SBDF has received the maximum \$450,000 grant reimbursement for the AWS gasifier on their project. The FT system has not been included as a practice standard.

**Would you be willing to provide information for a technical review?**  Yes  No

**Would you be willing to respond to a Request for Quotation (RFQ) on a generic project for comparison of your technology against other technologies in the same unit process?**  Yes  No

**Are there any other facts about this technology that you feel should be included in this document?**

The process improvements to our FT system will produce the lowest capex and opex costs in the industry for small scale, portable FT. This will enable AWS to convert AD biogas or any other type of low value stranded gas (too remote/costly to sell) into high value, no sulfur diesel/jet fuel products. By changing out field replaceable catalyst cartridges, the system can also produce ethanol, methanol, butanol, propanol, naphtha, etc. in order to best meet the needs of AWS' off-take partners.