



# HUMBOLDT STATE UNIVERSITY

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## MEMORANDUM

To: Jacqueline Debets and Carol Rische, Humboldt Bay Municipal Water District

From: Adrienne Harling, OECD Competitive Intelligence Research Service

Date: January 7, 2010

Subject: Research Summary (Update)

**Question: For several known water-intensive businesses, what is their daily water use, non-water related driving factors for determining facility location (including sensitivity to freight costs), and potential issues relating to discharge/waste products?**

- Beverages
  - Beer Breweries
    - Anheuser Busch, Fairfield, CA
      - Source: phone interview by Pat Kaspari (Humboldt Bay Municipal Water District) of Phil Bennett (Anheuser Busch, 707-429-7595), December, 2009.
        - Produce 4.2 Million barrels of beer per year (1 barrel=31 gallons)
        - **Use 1.78 Million Gallons of water per Day**
        - One of the largest breweries in the country; a similar sized facility is not likely to be built in California anytime soon
        - A more realistic size for a new facility would be 0.5 Million barrels per year, using an estimated 6 barrels of water per barrel of beer (332,143 gallons per day)
      - Mad River Brewery, Blue Lake, CA
        - Source: phone interview by Pat Kaspari (HBMWD) of Kevin Fischer (Mad River Brewery, 707-668-4151), December 2009.
          - **Use ~9000 Gallons of water per day**
    - Coca-Cola
      - Bottling Facility in Downey, California
        - Source: phone interview by Adrienne Harling of Coca-Cola quality control manager at the Downey facility (Coca-Cola, 562-803-8100)
          - Use 70,000 gallons of water per hour (they are a “very large” production facility – defining their output volume was considered confidential).

- Their bottled water product *Dasani* is produced at the same facilities as the other Coca-Cola soft drink products.
    - Transportation cost and availability plays a “huge role” in where facilities are located. Rail access is not necessary.
  - Bottled Water
    - Fiji-Roxane (by Crystal Geysers), 760-764-2885
      - Source: telephone interview with representative of Fiji-Roxane by Adrienne Harling on December 23, 2009
        - Did not have specific figures about daily water use, but did indicate that they only use spring water.
    - Mt Shasta Spring Water Co Inc, Mount Shasta, CA 530-926-5854
      - Source: Phone interview with Mark (Mt Shasta Spring Water) by Adrienne Harling on December 23, 2009
        - Regional operation with 15,000 customers
        - Bottle 3 and 5 gallon containers
        - Use 2.4 Million gallons of water per year
        - Adrienne’s math (please check for errors): **0.0066 Millions of gallons per day**
- Gypsum Board
  - US Gypsum (Fremont, CA 510-794-6282)
    - Source: April 15, 2004 letter from Parsons Brinckerhoff Quade & Douglas, Inc. to the Humboldt Bay Municipal Water District
      - Average water usage: **0.30 mgd**
      - Peak water usage: **0.90 mgd**
    - Source: email between Marie Liscom and Carol Rische on December 14, 2009
      - In 2005 US Gypsum’s water use was **500,000 gallons of water per day**
- Aquaculture
- Solar Hot Water Systems
  - Fafco Inc, Chico CA
    - Source: phone interview of representative of Fafco, Inc. by Adrienne Harling on December 21, 2009
      - Representative explained that they don’t use very much water and that hot water system manufacturing is not water intensive in general.
- Power Generation
  - Source: April 15, 2004 letter from Parsons Brinckerhoff Quade & Douglas, Inc. to the Humboldt Bay Municipal Water District
    - “a power plant generating a continuous average of 10MW would require approximately **20 mgd** of water. Estimates for a future power plant project in Humboldt County forecasted as much as **30 mgd**, again depending on the water source and cooling system design.”
  - California Biomass Energy Alliance, Somis, CA 805-386-4343
    - Source: telephone interview of Phil Reese (CBEA) by Adrienne Harling on December 23, 2009
      - Water use would be about 10<sup>th</sup> on the list of considerations for developing a new biomass plant.
      - Driving factors for developing a new plant are 1) getting a long term contract with a buyer (like PG&E) that is high enough to pay for

permitting and building, 2) difficulty of permitting new plant (they tend to get a lot of opposition) and 3) availability of wood waste (needs 10,000 tons of wood waste per year per MW)

- Water use: a plant between 20 and 50 MW would use 9 acre feet per year per MW in a cool climate. In a hot climate, a plant of the same size would use 15 acre feet per year per MW. 1 acre ft. = 325,000 gallons
- Adrienne's math based on cool climate numbers (please check for accuracy!): **A 20 MW plant would use 180 acre feet of water per year=58,500,000 gallons of water per year=160,273 gallons per day**
- Building a plant smaller than 20MW is not feasible because "economies of scale work too much against you"
- Another potentially more feasible possibility is to expand an existing plant
- DG Fairhaven Power
  - Source: 2009 Retail Water Rate Study for Humboldt Bay Municipal Water District as cited in email from Carol Rische to Adrienne Harling on December 28, 2009
    - 15,252,200 CF in 2008
- Metals Manufacturing
  - Company: Steelscape
    - Source: April 15, 2004 letter from Parsons Brinckerhoff Quade & Douglas, Inc. to the Humboldt Bay Municipal Water District
      - **Average Water Usage: 0.13 mgd**
      - **Peak Water Usage: 0.40 mgd**
- Food Processing
  - Source: Morrison, Jason, Mari Morikawa, Michael Murphy, and Peter Schulte. 2009. Water Scarcity & Climate Change: Growing Risks for Business & Investors. Oakland: Pacific Institute and Boston: Ceres.  
[http://www.pacinst.org/reports/business\\_water\\_climate/full\\_report.pdf](http://www.pacinst.org/reports/business_water_climate/full_report.pdf)
    - Uses water as a product ingredient, washing, cleaning, pasteurization (steam)
    - High wastewater discharge
  - Source: Mannapperuma, Jatal D., E.D. Yates and R. Paul Singh. 1993. Survey of Water Use in the California Food Processing Industry. 1993 Food Industry Environmental Conference. <http://www.p2pays.org/ref/13/12908.pdf>

Product	Flow Gallons per ton	BOD lb per ton	TSS lb per ton
Apple Sauce	275		
Apricots	2,992	39.0	9.0
Artichokes	766	3.3	3.9
Asparagus	808		
Brussels Sprout	813		
Cheese	1,700	1000	29.0
Cherry	11,932	102	21.0
Frozen Fruits	1,780		
Garlic	2,800	1.8	
Meat	4,000		
Mushrooms	1,818	1.8	0.8
Mushrooms*	781		
Onions	1,000		
Pears	4,174	11.0	6.0
Pumpkins	3,690		
Raisins	2,000	75.0	15.0
Seafood	2,700	12.9	7.9
Seafood*	2,662		4.0
Specialty	3,514		12.7
Vegetable Oils	2,111	1.1	0.3
Yams	6,094	8	3.0
Yams*	4,186	39.8	22.3
Zucchini	7,975	340	104.0

\* Data from two different plants

- Cherries
    - Gray & Co, Forest Grove, OR
      - Source: telephone interview of Chad Duherst (Gray & Co, 503-357-3141) by Adrienne Harling (HSU Office for Economic Community and Business Development) on December 17, 2009.
        - Produce 50-60,000 lbs of canned maraschino cherries in one production day
        - **Use 60-70,000 gallons of water per day (average) and 100,000 gallons of water per day (peak)**
        - Primary considerations for siting a new facility (and they are looking to relocate) are:
          - Disposal of wastewater (high in sulfur and sugar content)
          - Availability of natural gas
          - Access to rail
          - Trained labor (specialized skills required)
          - Access to/expense of water not a driving factor
        - Lack of access to full size trucks is a major disadvantage to attraction to area; they ship out 4-5 truckloads per day of product
- Meat
  - Harris Ranch Beef Company, Selma, CA, 559-896-3081
    - Source: phone interview of representative of Harris Ranch Beef Company by Adrienne Harling on December 23, 2009

- General rule of thumb: 450-500 gallons of water per head (for slaughter plants using water conservatively)
- Small facilities may do 200 head per day, medium may do 1200 per day, and large plants may do 7000 per day.
- Adrienne's math based on 475 gallons of water per head (check for accuracy!): **for small slaughterhouse: 95000 gallons of water per day, for medium slaughterhouse: 570000 gallons of water per day, for large slaughterhouse: 3,325,000 gallons of water per day.**
- Driving site considerations are proximity to feed lots and ability to transport animals from feed lots to slaughter facility; this factor is more important than transportation to customers
- Rail is not used for transport
- Silicon wafer/semiconductor and electronic parts manufacturing
  - Source: Morrison, Jason, Mari Morikawa, Michael Murphy, and Peter Schulte. 2009. Water Scarcity & Climate Change: Growing Risks for Business & Investors. Oakland: Pacific Institute and Boston: Ceres.  
[http://www.pacinst.org/reports/business\\_water\\_climate/full\\_report.pdf](http://www.pacinst.org/reports/business_water_climate/full_report.pdf)
    - Requires "ultra-pure water for wafer manufacturing; Freshwater for scrubbing and cooling; a typical fab can use as much as **3 million gallons of water per day**"
    - Discharge amount is high and the wastewater contains heavy metal and toxic chemicals

### Estimated Value of Services

Humboldt State University is offering Competitive Intelligence Services free of charge to qualifying businesses until January 1, 2010. Then, we will implement a fee schedule for these services at approximately 40% of what it would cost from an independent source. We estimate that the value of the services we have provided, as described in this memo and if provided through an independent source, is approximately \$1800.

Because Humboldt State University is dedicated to community and economic development of the North Coast, we intend to secure grant support for this service on an ongoing basis to keep the fees as low as possible. Therefore, the estimated value of this research assignment provided by our office after December 2009 would be \$720. Please consider budgeting for Competitive Intelligence Research Services in the future.