

Dear Honorable Tucson Pima Water Study Members,
PO Box 2344
Tucson, Az 85701

20 Sept. 2008

Subject: Cost/Benefit Air Water Generators

Dear Honorable Study Members,

An email communication entitled, "Water Sustainability: air water generators", was submitted to the Study Members on 2 Sept. 2008. A reply has been received from the Water Administrator, Tucson Water Dept. in response to Inquiry-Assignment No. 34852. The Tucson Water Dept. response is *autoanalysis*: a comprehensive analysis of the cost/benefits necessitates additional input by scientific/technological disciplines in addition to those associated with water production.

A single Hercules Atmospheric Water Generator capable of producing 3,470 gallons daily of potable water can be ordered from the manufacturer(Infrastructure Installation Time):

Model: XZIEX-150-XXA

Water Output*, **: 3,470 gal/day=1,266,550 gal/yr=3.8868 acre-ft/yr

Power Input: 195 kwh

Power Cost***: \$15.69/h=\$374.40/day=#136,656/yr

Power Source: 110V/60 Hz; 220V/50 HZ

Contaminant Control: Sediment Filter

Carbon Filter

Ultra Violet

Ozone injection

Certification: ISO 9001

Qualifies for LEED credits in US only

UL Approved

Filtration Systems exceed NSF Standards

Results of Water Tests available

Air Conditioner Output*: 36,000 Standard cf/m(SCFM)

400cftm=1 ton air cooling capacity

36,000cftm=90 ton air cooling capacity

As a rule of thumb, 400 sqft can be cooled by 1 ton air cooling capacity

90 Ton x 400 sqft/ton=36,000 sqft

Ref: Wikipedia, the free encyclopedia

A/C Power Savings*** =Water Power Cost***

**Based on ideal conditions of 85 F and 70% RH

***Computed at 8 cents/kwh for continuous annual operation

The quantity of potable water output is contingent upon the temperature and relative humidity. For Tucson climate, a software program for these variables, and specifications for a particular unit, could compute the total unit potable water output for a given year. An alternative methodology is the installation of a potable

water generating unit(of lesser capacity) with monitoring of water output vis-à-vis temperature and relative humidity conditions.

Data from another manufacturer of a lesser potable water output of 15.3 gal/day, at maximum at 95 F and 100% RH, cites 1.7 gal/day at 59 F and 50% RH.

Automatic on/off settings for temperature and relative humidity variables reduces operating costs.

Additional potable water output at a given location can be obtained by combining multiples of the XZIEX-150-XXA. For example, 288 units would output ~ 1 million gal/day(~1120acre-ft/yr) and cool ~10,000,000 sqft a day. The Atmospheric Water Generating market is emerging-cost per unit is rarely quoted-costs are negotiable.

Radon deaths,from lung cancer in the United States are 21,000 annually(Ref: American Lung Association, Radon Fact Sheet, Sept. 2007). The estimated population of the United States in 2008 is 306.4 million (Ref: Wikipedia, the free encyclopedia). For a one million(MSA) population, Tucson` s share of radon deaths is 69 annually. In a cost/benefit analysis, what value does the City of Tucson, Water Dept. place on the lives of 69 Tucson citizens?

In 1999, the Tucson Water Dept. had six of thirty reservoirs with radon levels exceeding 300 pCi/L- the National Academy of Sciences and US EPA` s recommended maximum concentration in potable water. In 1999, 53 of 153 Points of Entry, Tucson Water Dept., exceeded 300 pCi/L(Ref:Tucson Water Dept., 1999 Point of Entry Radon Levels). The location and radon concentrations of the following Point of Entry/wells are significant:

POE No.	Address	Radon Concentration, pCi/L
AV-001A	7295 S. Sandario Rd	1,230
AV-002A	11001 W. Ajo Way(South)	790
AV-003A	11007 W. Ajo Way(S.Well)	860
AV-005A	6505 S. Sandario Rd.	1,070
AV-006A	11002 W. Ajo Way(North)	1,400
AV-007A	12600 W. Ajo Way(North)	1,078
AV-008A	10200 W. Ajo Way(C Well)	903
AV-009A	10190 W. Ajo Way(S Well)	1,056
AV-011A	10971 W. Park Rd(N Well)	1,210
AV027A	9830 W. Ajo Highway	1,370

What are the present radon levels in the Clearwater CAP blend?

Output from an Atmospheric Water Generator would eliminate the radon killer. In a cost/benefit analysis, what value does the City of Tucson, Tucson Water Dept. place on the lives of 69 Tucson citizens? It is suggested that the citizens of Tucson be asked this question rather than the Tucson Water Dept.

The potable water output of Atmospheric Water Generators contain no Total Dissolved Solids(TDS) which is a Clearwater CAP blend problem for Tucson and Pima County(Ref: Conclusions, The Tucson Basin Desalinization Project, Group 3,

29 Sept. 2005,

ag.Arizona.edu/swes/tucwater1/For%20website%20Fall05/Final%20Draft%20Gro
up%203%). A cost/benefit analysis of Atmospheric Water Generators should
include the cost savings for the possible elimination, partially or completely, of the
CAP blend TDS disposal problem. Should TDS disposal be the responsibility of
Pima County, their input into a cost/benefit analysis is crucial and essential in
deference to the Tucson Water Dept.

The elimination of other contaminants, such as per chlorate, uranium, K40,
endocrine disruptors, pharmaceuticals, sediments, et al(Ref. Clean Colorado River
Alliance) should also be included in a cost/benefit analysis.

Other considerations for inclusion are the benefits of Atmospheric Water
Generators under/in the following circumstances/events:

1. Drought impacts on supply of Colorado River water.
2. Uranium contaminations from active mining in Utah and flooding of existing
tailings adjacent to the Colorado River.
3. Radioactive contamination of CAP canal water from a nuclear accident at the
Palo Verde Nuclear Generating Station.
4. Radiological/chemical/biological contamination of Cap Canal water by
domestic or foreign terrorists.
5. Buildup of contaminants in Pima County/Tucson from repeated deposits from
recycled water used for potable or irrigative purposes.
6. Cessation of CAP water deliveries due to CAP infrastructure
repair/replacement/maintenance.
7. Increase of contaminant to unacceptable concentrations due to increased
urbanization and population increases of existing urban areas

Infrastructure savings from flexibility usage of Atmospheric Ware Generators and
the cost savings for obtaining air conditioning and potable water for the same kwh
cost should be included.

A cost/benefit analysis should be applicable to, and participated in, by all
Tucson/Pima County entities subject to expenditures/savings and health/welfare
benefits/losses from the use of Atmospheric Water Generators.

Volitional participation by industrial /commercial entities, with incentives, could
be an additional source of potable water as a byproduct of air conditioning.

From a citizen of Tucson, please accept my gratitude for the allowance of open
expression and participation by expression at your open meetings and by
letter/email.

Respectfully, Capt. Clyde H. Stagner, Chemical Corps, U.S. Army, Ret.

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