

Summary of VOC Mitigation Alternatives – Unit Well 15

UNIT WELL 15 CITIZEN ADVISORY PANEL

August 2, 2011

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The table below summarizes and compares the three Volatile Organic Compound (VOC) mitigation alternatives for Unit Well 15 under evaluation by the Madison Water Utility. The majority of data used in the table is derived from the *Draft Unit Well 15 VOC Mitigation Memo (May 12, 2011)*, prepared by Black & Veatch and the Madison Water Utility, with additional information provided by the Utility, members of the East Side Water Supply Project Citizen Advisory Panel and members of the Well 15 Citizen Advisory Panel as of July 31, 2011.

The Table is intended not only to serve as summary of the more detailed information available, but also to serve as a tool for evaluating and ranking alternatives based on the criteria identified as important or potentially important to the Madison Water Utility and other stakeholders (utility customers, immediate neighbors, etc.). In order to begin the process of evaluating alternatives based on the various criteria, color coding is used to rate or score each alternative for a given criteria. The color coding is as follows:

Dark Green: Meets minimum performance standards AND offers clear advantage over other alternatives.

Light Green: Meets minimum performance standards

Yellow: May meet minimum performance standards, more information required.

Pink: No established performance standard, but inferior to other alternatives

Clear/ Not highlighted: No Rating, information only

With the obvious exception of VOC mitigation effectiveness in both water and air (the reason for the project), the table in its current form does not attempt to prioritize criteria. Different stakeholders may value criteria differently. For example, a tax payer living far from the well may place more importance on “Project Cost” than on “Compatibility with Neighboring Uses” or “Other Operational Considerations”. A nearby resident or property owner may place a higher priority on “Compatibility with Neighboring Uses” and the Utility may place a higher priority on “Other Operational Considerations”. One of the functions of the Unit Well 15 CAP is to ascertain these priorities, and hopefully reach consensus. In short, the Summary Table in its current form is intended to be used as a tool, not the final recommendation by either the Utility or the Citizen Advisory Panel.

Other issues raised by the public / Well 15 CAP pertaining to VOC contamination at and around Unit Well 15 (i.e. VOC treatment at other wells as it relates to treatment at Well 15, VOC mitigation at source(s), enforcement of regulations preventing new contamination) are not addressed here.

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	Air Strippers		Carbon Filter
	Conventional Air Stripper (25' tall Cylindrical Tank inside Structure)	Low Profile Aeration (Single Story Structure)	Granular Activated Carbon Absorption (Single Story Structure)
Water Contaminant Mitigation			
Removal of VOC 's (PCE and TCE)	99% Removal	99% Removal	99% Removal
Removal of other Existing or Potential Contaminants	No	No	Fe? Mn? Not effective against: Sodium Chloride Chromium Radium
Air Emissions Contamination Mitigation			
Below DNR/EPA Thresholds?	Yes	Yes	Yes
Projected VOC Exhaust/ Off-Gases (PCE)	.003 pounds/hour 26.75 pounds/year	.003 pounds/hour 26.75 pounds/year	None at well site, but filters require off-site disposal.
DNR Air Contaminant Threshold (PCE)	9.11 pounds/hour (24 hour average); 301 pounds/year	9.11 pounds/hour (24 hour average); 301 pounds/year	9.11 pounds/hour (24 hour average); 301 pounds/year
Vapor Phase Treatment Required?	No. Highly unlikely in future per current projections	No. Highly unlikely in future per current projections	No.
Possible to Retrofit Vapor Phase Treatment of VOC air emissions if maximum threshold exceeded?	Yes. Would require 11'x11'x7' Unit plus structure.	Yes. Would require 11'x11'x7' Unit plus structure.	Not Required On-Site, but off-site disposal of filters would need to be addressed.
Solid and Liquid Materials and Waste Disposal			
Waste Water (from cleaning, flushing of equipment)	??	??	????
Solids (mitigation agents, filters)	??	??	????
Energy Use			
Energy Use /Efficiency (kw Hours/Year) (carbon dioxide equivalent assuming coal)	????	????	Not Available; Energy Cost calculation would need to include off-site filter remediation.

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Other Operational Considerations			
Frequency of Routine Maintenance	Every 3-6 months	Every 3-6 months	Every 1.6 years (media replacement)
VOC Mitigation during Maintenance	Good. Well can be taken off line during routine maintenance; worst case: if well is needed during maintenance, very short term (few hours) exposure to VOC's.	Very Good. Two vessels allow some water to be pumped, treated when one filter is down for maintenance. If both filters down, same as Conventional Air Stripper.	Very Good. Two vessels allow some water to be pumped, treated when one filter is down for maintenance. If both filters down, same as Conventional Air Stripper.
Ease of Maintenance	High Access provided to all parts of tower by stairwell and platforms.	Highest. Single story layout allows ground level access to all components	Highest Single story layout allows ground level access to all components
Compatibility with Neighboring Uses / Site Planning Considerations			
Noise (from filtration, air intake/exhaust equipment)	dB rating or comparison; continuous or intermittent ??	dB rating or comparison; continuous or intermittent ??	dB rating or comparison; continuous or intermittent ??
Additional Site (Land) Area Required	1,500 s.f. (approx.) (60' x 25')	1,500 s.f. (approx.) (60' x 25')	> 1,500 s.f.
Site Location	Immediately west of existing well house, between bike path and shopping center	Immediately west of existing well house, between bike path and shopping center	Immediately west of existing well house, between bike path and shopping center
Property to be acquired from:	Reindahl Park*	Reindahl Park*	Reindahl Park*
*Note: Though public water utility uses are generally considered to be compatible with public park and open space uses, Reindahl Park is also governed by private covenants limiting conversion to other than open space uses. Compatibility with covenants likely but may require confirmation.			
Exterior New Building Dimensions (estimated)	Floor Area: 650 s.f. (25' x 26') Height: 35 feet	Floor Area: 900 s.f. (25' x 36') Height: 16 feet	Floor Area: 1,180 s.f. (24' x 54') Height: Not Provided. Similar to Low Profile Aeration.

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Compatibility with Municipal Zoning (C –Conservancy District) : <ul style="list-style-type: none"> • Max Height: 35 feet; • Front/Side/Rear Building Setbacks: 30/80/100 ft. • Conditional Use Permit Required for Well Uses 	Use: Yes Height: Probably Setbacks: TBD Other Conditions: TBD	Use: Yes Height: Yes Setbacks: TBD Other Conditions: TBD	Use: Yes Height: Yes Setbacks: TBD Other Conditions: TBD
All Mechanical Equipment housed in structure?	Yes (?)	Yes (?)	Yes (?)
Proposed Architectural Style	Brick/Block Compatible with existing well house (?)	Brick/Block Compatible with existing well house (?)	Brick/Block Compatible with existing well house (?)
Generally compatible with uses, dimensions and scale allowed in adjacent Zoning Districts.	Yes	Yes	Yes
Project Costs (estimated as of 5/11)			
Project/Construction/Capital Costs	\$1,450,000	\$2,070,000	3.5 – 6 x Air Strippers (Estimate)
Difference with Lowest Cost Alternative (\$)	0	\$620,000	3.5 – 6 x Air Strippers (Estimate)
Difference with Lowest Cost Alternative (%)	0	+42.7%	350-600%
Operation and Maintenance (20 Year Life Cycle)	\$1,765,000	\$2,350,000	Not Available
Difference with Lowest Cost Alternative (\$)	0	\$585,000	Not Available
Difference with Lowest Cost Alternative (%)	0	+33.1%	Not Available
Estimated Annual Increase to Residential Water Utility Bill (assuming \$3-5 per \$1 Million of Capital Cost)	\$4.50-\$7.50/Year	\$6.00-\$10.00/Year	\$30.00 Very Approximate
Potential Vapor Phase Treatment (only if DNR air emissions are exceeded.)	\$170,000 +Building Cost +GAC replacement and cleaning	\$170,000 +Building Cost +GAC replacement and cleaning	None Off-site disposal of filters included in "Operation Maintenance Costs".

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