

ASR License No. _____
(ASSIGNED AFTER FILING)

STATE OF OREGON
WATER RESOURCES DEPARTMENT
APPLICATION FOR LIMITED WATER USE LICENSE
FOR
AQUIFER STORAGE AND RECOVERY (ASR)

Applicant(s): Madison Farms
Contact Person: Kent Madison
Mailing Address: 29299 Madison Road
Echo OR 97826 541-376-8107
City State Zip Phone #

1. DATE(S) OF PRE-APPLICATION CONFERENCE(S): 11/15/99 (original pre-application conference)

INFORMATION REGARDING ASR TESTING UNDER A LIMITED LICENSE

2. SOURCE OF INJECTION WATER for ASR: Alluvial well located at T3N/R28E/S31/SENW a tributary of Umatilla River

3. MAXIMUM DIVERSION RATE: 6.68 cfs (6,000 gpm) authorized by certificates 75107, 83692, 83693, Transfer 11414, and Limited License 1424.

4. MAXIMUM INJECTION RATE AT EACH WELL(S): 6.68 cfs (6,000 gpm)

5. MAXIMUM STORAGE VOLUME: 5,049 acre-ft (1.70 billion gallons)

6. MAXIMUM STORAGE DURATION: 5 years

7. MAXIMUM WITHDRAWAL RATE AT EACH WELL(S): 6.68 cfs (6,000 gpm)

8. LICENSE TERM OR DURATION SOUGHT (5 year maximum): 5 years

9. PROPOSED USE OR DISPOSAL OF RECOVERED WATER: Irrigation

10. IF CONTINGENCIES PRECLUDE THE USE IN ITEM 9, SPECIFY AN ALTERNATE USE OR DISPOSAL OF THE RECOVERED WATER: While highly unlikely, the contingency plan for disposal of injected water includes discharge to Butter Creek.

INFORMATION REGARDING THE ULTIMATE ASR PROJECT
AS CURRENTLY ANTICIPATED

11. SOURCE OF INJECTION WATER for ASR: Alluvial well located at T3N/R28E/S31/SENW a tributary of Umatilla River
12. MAXIMUM DIVERSION RATE: 6.68 cfs (6,000 gpm) authorized by certificates 75107, 83692, 83693, Transfer 11414, and Limited License 1424.
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14. MAXIMUM STORAGE VOLUME: 5,049 acre-ft (1.70 billion gallons)
15. MAXIMUM STORAGE DURATION: 5 years
16. MAXIMUM WITHDRAWAL RATE AT EACH WELL(S): 6.68 cfs (6,000 gpm)

NOTE: The materials required by rule for an ASR limited license are extensive. The items on this sheet consist of those outlined in OAR 690-350-020(2) and (3)(a)(A-E). Please consult the rule and provide as attachments to this form the other requirements in OAR 690-350-020(3)(a).

Signature of Applicant  Date 10/10/12

Title Owner



Technical Memorandum

To: Jen Woody / Oregon Water Resources Department
Phil Richerson / Oregon Department of Water Quality
Tom Pattee / Oregon Health Authority Drinking Water Program

CC: Kent Madison / Madison Farms
Jake Madison / Madison Farms

From: Jason Melady, RG, CWRE / GSI Water Solutions, Inc.
DeEtta Fosbury / GSI Water Solutions, Inc.

Date: **October 8, 2012**

Re: **Madison Farms Aquifer Storage and Recovery (ASR) Limited License Application Supplemental Information and Testing Plan**

Attachments:

- A. Compilation of All Project Water Quality Data
 - B. Quality Assurance and Quality Control Plan
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INTRODUCTION

On behalf of Madison Farms, GSI Water Solutions (GSI) prepared an application package for a new ASR limited license related to proposed modifications to the existing Madison Farms ASR program. The proposed changes are considered "major" to the existing ASR limited license, necessitating a new ASR limited license application to complete the proposed modifications. Proposed modifications to the Madison Farms ASR program include: 1) a reduction in the water quality monitoring frequency, 2) an increase in the storage volume for the project, 3) a reduction in the loss percentage applied to carryover storage, and 4) the addition of a new ASR well targeting the same aquifer utilized by the existing ASR well. This technical memorandum provides supplemental information for a new ASR limited license application and includes information to support the proposed modifications to the ASR program and describes an ASR testing plan for the new ASR limited license, including ASR flow/volume monitoring, water level monitoring, and water quality monitoring during ASR pilot testing.

BACKGROUND

Madison Farms operates an aquifer storage and recovery (ASR) system in Echo Junction, Oregon (Figure 1) currently authorized by ASR Limited License #014, issued by the Oregon Water Resources Department (OWRD) in March, 2008 (OWRD, 2007). ASR pilot testing was initiated at Madison Farms in March, 2006 and was originally authorized for ASR testing by Limited License #007, issued in 2003. ASR Limited License #007 authorized injection of a maximum of 70 million gallons (MG) at a maximum injection rate of 400 gallons per minute (gpm) and a recovery rate of 500 gpm. Initial ASR pilot testing indicated the maximum injection and recovery rates, and the storage volume permitted by the limited license were vastly lower than the capacity of the aquifer and would not be sufficient to adequately conduct ASR pilot testing at the ultimate capacity of the Madison Farms ASR system, which is a primary objective of ASR pilot testing. Initially, a request was submitted to OWRD in 2007 to increase the limited license rates and volumes, but the magnitude of request was considered a “major modification” to the limited license and not allowed by ASR administrative rules. As a result, the limited license modification request was denied by OWRD. As an alternative, a new ASR limited license application was prepared requesting the increases in injection/recovery rates and storage volume. This application was approved by OWRD and ASR limited license #014 was issued to Madison Farms in March, 2008. The maximum injection and recovery rates were increased to 799 gpm and the maximum storage volume was increased to 200 million gallons in ASR limited license #014. ASR pilot testing conducted since its issuance has confirmed these increases have been beneficial to understanding ultimate ASR system capacity for Madison Farms.

ASR pilot testing has been conducted in accordance with ASR testing plans submitted in support of ASR limited licenses #007 and #014 (CH2MHILL, 2000, GSI, 2002a, GSI, 2002b, GSI, 2002c, and GSI, 2007). Monitoring for the project has included groundwater level monitoring within the Columbia River Basalt Group (CRBG) aquifer, flow monitoring, and water quality monitoring. Groundwater level in the Madison ASR well has been monitored throughout ASR pilot testing and is shown on Figure 2.

PROPOSED CHANGES TO CURRENT LIMITED LICENSE

Based on continued successful ASR pilot testing results, Madison Farms is seeking several modifications from the current limited license. Proposed changes include an increase in total maximum storage volume from 200 MG to 1.7 billion gallons, an increase in available ASR stored volume carryover from 98% to 100%, a decrease in water quality monitoring requirements based on Oregon Health Authority Drinking Water Program rules, and the addition of a new ASR well targeting the same aquifer utilized by the existing ASR well. Rationale and observations supporting these modifications is provided in the following section.

Based on discussions with OWRD staff in preparation of this application, we understand there are some concerns regarding an increase in maximum ASR storage volume due to the potential for loss of water in the unsaturated zone. Specifically, the concern is that injected water entering unsaturated interflow zones during ASR injection may not be recoverable and could be “irretrievably lost.” Oregon Administrative Rule 690-350-0010(8) discusses irretrievable loss of groundwater as a result of ASR and migration of stored ASR water, suggesting that the recovery percentage ascribed to the limited license is intended to mitigate this potential loss. Specifically, this rule indicates that if data analysis demonstrates that stored water is not being lost, OWRD may allow up to 100 percent recovery of stored water. This concern is based on the observation that water level rises into the

unsaturated zone in the nearby McCarty ASR well during ASR injection. The water level response (Figure 3) at the Madison ASR well during injection is much lower than observations at the McCarty ASR well, with water level in the borehole not reaching unsaturated interflow zones during injection at current rates and volumes, which are much lower than rates at the McCarty ASR well (799 gpm vs. 2,756 gpm). As such, this potential pathway for loss of stored water does not exist at the current injection rate, but may be present at the increased injection rate proposed in this limited license application. Although current observations do not provide insight into the potential for loss of water in the unsaturated zone at the Madison ASR well, observations from the McCarty project and other hydrogeologic observations from the Madison project provide context for the potential for loss of stored water. The following section discusses observations from the project that support the proposed maximum injection rate increase, maximum recovery rate increase, maximum storage volume increase, and carryover recovery percentage modifications.

Basis for Rate and Storage Volume Increase

This application seeks to add two new authorizations for ASR source water from the Windmill Collector Well; Transfer 11414 and AR limited license 1424. The maximum injection and recovery rate in the current ASR limited license is 1.78 cubic feet per second (cfs) or 799 gpm, which represents the combined rate of certificates 75107, 83692, and 83693. This application requests inclusions of Transfer 11414 and AR limited license 1424 as additional ASR source water authorizations. Transfer 11414 is currently being processed by OWRD and will allow use of the Windmill Collector Well at up to 125 gpm for irrigation of 13.8 acres. AR limited license 1424 is not limited by pumping rate, only by volume, and therefore allows for use of the Windmill Collector Well at rates up to the capacity of the well until 85% of the volume artificially recharge under AR limited license 1193 is exhausted. The capacity of the Windmill Collector Well is approximately 6,000 gpm, which represents the maximum injection and recovery rates requested in this application. Because this rate is based primarily on the AR limited license, which is a temporary authorization and may change over the course of the ASR limited license period, we suggest inclusion of language in the license to indicate a maximum diversion and injection rate no greater than the combined maximum authorized appropriation rate of the Collector Well. The current ASR well is likely only capable of injection and recovery rates of up to 3,000 gpm, but an additional ASR well will be constructed in the near future with an anticipated capacity of 3,000 gpm, for a total of 6,000 gpm between the two wells. Information related to the new ASR well is provided in a subsequent section.

Additionally, this limited license application requests an increase in maximum storage volume to 1.7 billion gallons. The proposed maximum storage volume increase is based on three years of storage from the combined source water authorizations. Specifically, certificates 75107, 83692, and 83693 have a maximum duty of 3.0 acre-feet per acre each and a total acreage of 395 acres for a total maximum duty of 1,185 acre-feet per year. Transfer 11414 is currently being processed by OWRD and authorizes irrigation of 13.8 acres at a maximum duty of 4.0 acre-feet per acre, for a total maximum duty of 55.2 acre-feet per year. AR limited license 1424 allows for the recovery of up to 442.8 acre-feet of artificially recharged water (recharge conducted under limited license 1193). Although limited license will expire October 31, 2012, it is anticipated an AR limited license for recovery will be sought annually to access stored AR water at similar volumes. In combination, these authorizations allow for a total maximum duty of 1,683 acre-feet or 548.4 million gallons per year. The requested maximum storage volume of 5,049 acre-feet or 1.7 billion gallons represents three years of storage at the combined annual duty of the source water authorizations. This proposed storage volume increase is not anticipated to result in a significant increase in year-to-year storage volume and will primarily be utilized to maintain the ASR storage account related to carryover storage. The purpose of this request is to allow sufficient storage to provide irrigation for

multiple seasons to mitigate against drought and low water years that prevent direct use of the alluvial aquifer during the irrigation season. Additionally, the increase in storage volume allows ASR testing at the volume that will likely be sought in an ASR permit in the future.

Hydrogeologic Observations Related to Potential Loss of Stored Water

Over six years of ASR pilot testing under ASR limited licenses' #007 and #014 has been conducted and approximately 414.8 MG of alluvial groundwater has been artificially recharged into the CRBG aquifer at Madison Farms's ASR well with approximately 286.8 MG of stored ASR water recovered (see Table 1). In total, 128 MG of residual stored water remains in aquifer since ASR pilot testing began at the Madison ASR well. Based on the accounting principles described in the limited license which includes maximum recovery and carryover volume loss percentages, approximately 113.2 MG was available for ASR recovery at the beginning of ASR Cycle 8 in 2012. Over this same period of time, groundwater level at the Madison ASR well and other surrounding wells monitored by OWRD appears to be stable or increasing during a period when the cumulative departure from average precipitation has been negative (Figure 4).

As noted at the nearby McCarty ASR well, groundwater level data collected at the Madison Farms ASR well (Figure 2) appears to indicate any loss of stored water is not resulting in negative water level changes. Prior to starting ASR recharge in 2012, groundwater level at the Madison ASR well is roughly equal to the groundwater level at the well prior to initiation of the project. This water level trend represents a stabilization of a declining groundwater level trend observed at the Madison well for over 40 years since the early 1970's (Figure 5). As mentioned above, several nearby irrigation wells monitored by OWRD, specifically UMAT 443, UMAT 1220, UMAT 450, UMAT 441 also are indicating a stable or positive groundwater level change within the last several years. We interpret this stable response in groundwater level change at the Madison ASR well and positive response observed at the McCarty ASR well as an indication of very little, if any, loss of stored water or native groundwater as a result of ASR. We would anticipate continued water level declines if injected water was being irretrievably lost during ASR recovery.

Based on the information presented above, it is our opinion that stored water or native groundwater is not being irretrievably lost at the Madison ASR well. More specifically, existing information indicates that water is not likely being irretrievably lost in the unsaturated zone during ASR injection at the Madison ASR well. Therefore we do not anticipate loss of stored water as a result of the increase in maximum storage volume requested in this application.

Basis for Carryover Storage Loss Factor Reduction

Based on the observations described above, this application also seeks a change in the carryover storage loss factor or carryover recovery percentage from 98% to 100%. This proposed modification is not seeking change to the first year storage loss factor, currently at 98%, but requests removal of the year to year carryover loss factor. This request is based on the observed stabilization and/or slight increase in groundwater levels at the Madison and McCarty ASR wells, as well as surrounding OWRD observation wells, while the Madison and McCarty ASR projects cumulatively have injected slightly more than has been pumped. As previously described, this suggests that stored water or native groundwater losses are either minor or not occurring, as required by OAR 690-350-0010(8). The loss factor of 2% applied to stored water in the initial year of storage is likely sufficient as a safety factor to mitigate potential loss, but the carryover loss factor of 2% for subsequent years is too conservative and not necessary in our opinion.

Additional ASR Well

Madison Farms will be constructing a new ASR well in the near future in the vicinity of the Windmill Collector Well (Figure 1). It is anticipated that the ASR well will be constructed similarly to the existing ASR well and its use authorized under this limited license if possible. Figure 4 shows the anticipated construction information for the proposed ASR well. Although specific elements of the ASR well are not certain at this time, the following items are planned:

- A bi-directional totalizing flow meter that can provide real-time data during injection and recovery.
- A dedicated downhole water level transducer so that the performance of the well can be monitored.
- An access port and sounding pipe for manual water level measurements.
- Access ports for water quality sampling during injection, storage, and recovery.
- A downhole control valve to maintain enough back pressure to ensure the injection pipe remains full during injection and limit the potential for air entrainment.
- Downhole power generation capability during ASR recharge.
- Real-time water level and rate monitoring.

Madison Farms intends to utilize the existing ASR well and the proposed new ASR well to inject and recover a shared volume of water, including any carryover volume of stored water available once the well is constructed. To verify the two ASR wells are accessing the same stored volume of water, hydrogeologic testing will be conducted after well construction and will be submitted to OWRD to evaluate hydraulic continuity between the existing ASR well and new ASR well. A description of proposed hydrogeologic testing to assess hydraulic continuity is described in the ASR testing plan below.

Water Quality Sampling Frequency Reduction

A total of 32 water quality samples have been collected in support of the project, consisting of 12 alluvial groundwater source water quality samples, 14 recovery water quality samples, 5 pre-injection groundwater samples, and 1 pre-ASR native groundwater sample (See Table 2 and Attachment A). Over the course of testing, no volatile organic compounds (VOC's) have been detected in any sample analyzed for the project (Table 2). One very low level synthetic organic compound (SOC), Bis(2-ethylhexyl)phthalate (DEHP), was detected in a single source water sample in 2008. DEHP was not detected in any other samples (groundwater, source water, or recovery water). While DEHP is a common laboratory contaminant because of its presence in laboratory plasticware, it is also a component in Polyvinyl Chloride (PVC), which is present in the Madison Farms distribution system. Since the detection occurred in the first source water sample of Cycle 4, the detection may be attributable to water that had been in contact with the inactive ASR system during the nine months prior to sample collection. The limited license action level of DEHP is 0.2 mg/L, while the detection was 0.000683 mg/L, only slightly above the laboratory practical quantitation limit of 0.0006 mg/L. Although technically considered a detection, it is our opinion that DEHP is not an analyte of concern relative to the ASR project.

Madison Farms is seeking a reduction in water quality monitoring. Table 3 describes the proposed new monitoring plan and Tables 4 and 5 provide specific analytes associated with each sampling event. In general, the new monitoring plan includes decrease in source water and injection water sampling from twice to once per ASR cycle and a reduction in synthetic organic compounds (SOCs)

and volatile organic compounds (VOCs) monitoring to once every third year. This reduction in sampling frequency is based on Oregon Health Authority Drinking Water Program water quality sampling and analytical requirement rules (OAR 333-061-0036) for drinking water systems, which describes conditions in which a reduction in sampling frequency to once every three years can be obtained for synthetic organic compounds (SOCs) and volatile organic chemicals (VOCs) (e.g. OAR 333-061-0036(3)(a)(A)(iv)(II) and OAR 333-061-0036(3)(b)(C)(ii)). Madison Farms water quality analyses have not detected any VOC or SOC contaminants, with the exception of DEHP described above, during ASR testing. We believe water quality data collected to date provides the rationale for this proposed reduction in water quality sampling frequency, particularly given that recovered water is used for irrigation and is not drinking water supply.

List A (Table 4) analytes will be taken annually for the pre-injection groundwater, source water and recovered water. These samples will be collected at approximately 50% of each target volume for List A (Table 2) analytes. SOCs and VOCs, included in List B will be conducted every third year.

ASR TESTING PLAN

The following section describes the proposed testing plan to be completed under the new ASR limited license. With the exception of the reduced water quality monitoring frequency described above, it generally matches the ASR testing plan under ASR limited license #014. Additionally, a description of testing at a proposed new ASR well intended to evaluate hydraulic continuity and potentially allow for shared storage and recovery with the existing ASR well is also described.

FLOW RATE AND VOLUME MONITORING

Madison Farms's existing limited license specifies a maximum injection rate of 799 gpm, recovery rate of 799 gpm, and a storage volume of 200 million gallons. This limited license application requests an increase in the maximum injection and rates to 6,000 gpm (3,000 gpm for the existing ASR well and 3,000 gpm for the proposed new ASR well) with an increase in maximum storage volume to 1.7 billion gallons.

The flow meters installed at Madison Farms monitor instantaneous flow, total injection, total recovery, and net volume. Dedicated flow meters are installed at the Windmill Collector Well, the existing ASR well, and will be installed at the proposed new ASR well. Flow meter readings will continue to be collected on a minimum daily basis during ASR injection and recovery with Madison Farms integrated telemetry system and will be used to evaluate compliance with the flow rate and volume limits in the ASR limited license. The readings will be compiled digitally and will be submitted to OWRD on an annual basis.

WATER LEVEL MONITORING

Water level data will be collected at Madison Farms to assess the hydraulic response of the basalt aquifer to pilot testing at the ASR well and the Gaylord observation well (UMAT 1222). Once constructed, water level monitoring will be conducted at the proposed new ASR well. Figure 1 shows the locations of the wells.

A pressure transducer and data logger is currently installed in the Madison ASR well with a sampling frequency of less than one hour. The data logger operates on a year-round basis and is currently integrated with the Madison Farms integrated telemetry system for continuous data logging and monitoring. Water level data will be collected from the Gaylord observation well using a manual water level meter within one week prior to ASR injection and weekly through ASR recovery. The

data will be provided to OWRD in subsequent ASR annual reports. Electronic versions of the water level data will also be provided to OWRD on an annual basis.

Additionally, to provide verification that native groundwater or stored water is not being lost as a result of the project, a manual water level measurement will be collected each year prior to the initiation of ASR injection. This will provide the most “static” water level to evaluate year to year changes in groundwater level associated with the project.

WATER QUALITY MONITORING

Water quality data will be collected at Madison Farms to assess receiving water, source water, and recovery water during ASR pilot testing. Water quality data will be collected from the ASR well, collector well, and two observation wells. Table 6 summarizes information on the wells used for water quality monitoring and Figure 1 shows the locations of the wells.

Prior to injection, ASR source water is chlorinated to prevent potential borehole clogging issues associated with microorganisms. Sodium hypochlorite solution is dosed into the source water. The target residual chlorine level in source water at the ASR wellhead is 0.5 milligrams per liter. The chlorination system will be assessed and adjusted based on source water chlorine level monitoring performed on a routine basis during ASR injection.

Samples collected during ASR pilot testing will be tested for field parameters (pH, conductivity, temperature, chlorine, and oxygen-reduction potential) and analyzed by an analytical laboratory. Classes of analytes in the testing include geochemical, metals, disinfection by-products (DBPs), bacteriological, radionuclides, synthetic organic compounds (SOCs), volatile organic compounds (VOCs), selected additional site-specific pesticides, and miscellaneous chemistry parameters. A complete list of the water quality testing parameters and associated method detection limits are provided in Table 4 and Table 5. The schedule for ASR water quality monitoring described previously is summarized in Table 3.

GSI developed a Quality Assurance and Quality Control (QA/QC) plan for Madison Farms and McCarty Ranch prior initiating ASR pilot testing (GSI, 2002a). This document is referenced in Madison’s current limited license (OWRD, 2007) and will continue to be used during ASR pilot testing under the new ASR limited license. A copy of the document is included in Attachment C.

Nitrate monitoring will be conducted in accordance with the letter from OWRD to Kent Madison RE: Response to Nitrate Testing Request dated April 15, 2010 (OWRD, 2010) during pilot testing under the new ASR limited license.

NEW ASR WELL WORKPLAN

As previously described, Madison Farms is anticipating construction of a new ASR well in the near future. Prior to the initiation of pilot testing under the limited license proposed in this application at the new ASR well, Madison Farms will submit a workplan to OWRD for approval. The workplan will include the following information:

- Well construction information
- System operations and wellhead facility design
- Hydrogeologic evaluation, including:
 - Aquifer testing data and analysis
 - An assumed 24-hour pump test following well construction with observation at the new and existing ASR wells.
 - An evaluation of hydraulic continuity between new and existing ASR wells.

- Water quality analysis
 - Full drinking water suite analyte list
 - General assessment of water quality compatibility
- Oregon Department of Environmental Quality (DEQ) Underground Injection Control (UIC) registration information
- Land use approval
- ASR Pilot Test Plan
 - Water level monitoring plan
 - Water quality monitoring plan

REFERENCES

CH2MHill, 2000, Echo Junction ASR Monitoring Plan, October 26, 2000.

GSI, 2002a, Water Sampling QA/QC Control Plan, Madison and McCarty ASR Testing Program, September 2002, Groundwater Solutions, Inc.

GSI, 2002b, Madison/McCarty ASR Monitoring Program, October 22, 2002, Groundwater Solutions, Inc.

GSI, 2002c, Continuous Nitrate Monitoring – Madison ASR Project, November 1, 2002, Groundwater Solutions, Inc.

GSI, 2007, ASR Application Work Plan, McCarty Ranch. November 9, 2007, Revised December 27, 2007, GSI Water Solutions, Inc.

OWRD, 2003, Aquifer Storage and Recovery (ASR) Limited License #008, Oregon Water Resources Department, October 1, 2003.

OWRD, 2007, Aquifer Storage and Recovery (ASR) Limited License #013, Oregon Water Resources Department, December 13, 2007.

OWRD, 2010, Letter to Mike McCarty and Kent Madison regarding Response to Nitrate Testing Request, April 15, 2010.

Tables

Table 1. Madison Farms ASR Injection and Recovery Summary

ASR Cycle	Approximate Start Date	Approximate End Date	Injection Volume		Recovery Volume		Volume Difference		End of Year Carryover Volume	
			MG	Acre-ft	MG	Acre-ft	MG	Acre-ft	MG	Acre-ft
1	3/13/2006	3/14/2006	0.11	0.34	0.14	0.43	-0.03	-0.09	0.00	0
2	5/12/2006	6/4/2006	5.36	16.45	5.34	16.39	0.02	0.06	0.00	0
3	3/13/2007	6/27/2007	17.4	53.40	16.7	51.25	0.70	2.15	0.34	1.06
4	3/7/2008	10/4/2008	123.10	377.78	34.70	106.5	88.40	271.28	84.55	259.49
5	2/16/2009	10/4/2009	83.967	257.68	79.18	242.98	4.79	14.71	85.91	263.66
6	2/8/2010	9/1/2010	50.44	154.79	92.11	282.67	-41.67	-127.88	42.37	130.03
7	12/10/2010	8/31/2011	134.47	412.67	58.67	180.05	75.80	232.62	113.17	347.31
		Totals	414.8	1273.1	286.8	880.3	128.0	392.8	NA	NA

Table 2.
Statistical Summary of Water Quality Data
Madison Farms ASR Program

Analyte	Lowest Regulatory Standard	Limited License Action Level	Units	Regulatory Criteria	MDL*	Native Groundwater		Pre-Injection Groundwater				Source Water			
						3/9/2006	Number of Samples	Number of Detections	Minimum	Maximum Detection	Number of Samples	Number of Detections	Minimum	Maximum Detection	
Fecal Coliform / E.Coli			CFU/100 mL		1	-	1	0	ND	NA	6	1	ND	3.1	
Total Coliform	<1/100 ML	None	CFU/100 ml	MML	1	-	1	0	ND	NA	6	5	ND	770.1	
Chloroform (Trichloromethane)	None	None	mg/L	URC	0.0005	0.0005	U	5	0	ND	NA	10	0	ND	NA
Bromodichloromethane	None	None	mg/L	None	0.0005	0.0005	U	5	0	ND	NA	10	0	ND	NA
Dibromochloromethane	None	None	mg/L	None	0.0005	0.0005	U	5	0	ND	NA	10	0	ND	NA
Bromoform (Tribromomethane)	None	None	mg/L	URC	0.0005	0.0005	U	5	1	ND	0.00055	10	0	ND	NA
Total Trihalomethanes	0.08	0.08	mg/L	MCL, MML	0.0005	0.0005	U	5	1	ND	0.00055	10	0	ND	NA
Monochloroacetic Acid	None	None	mg/L	None	0.002	0.002	U	5	0	ND	NA	10	0	ND	NA
Dichloroacetic Acid	None	None	mg/L	None	0.001	0.001	U	5	0	ND	NA	10	0	ND	NA
Trichloroacetic Acid	None	None	mg/L	None	0.001	0.001	U	5	0	ND	NA	10	0	ND	NA
Monobromoacetic Acid	None	None	mg/L	None	0.001	0.001	U	5	0	ND	NA	10	0	ND	NA
Dibromoacetic Acid	None	None	mg/L	None	0.001	0.001	U	5	0	ND	NA	10	0	ND	NA
Total Haloacetic Acids	0.06	0.06	mg/L	MCL	0.001	0.001	U	5	0	ND	NA	10	0	ND	NA
Temperature	None	None	Celsius	None	NA	16.9	5	5	8	16.2	11	11	7.4	13.2	
Conductivity	None	None	µS/cm	None	NA	304	5	5	356	629	11	11	510	811	
Dissolved Oxygen	None	None	mg/L	None	NA	-	4	4	3.5	8.6	7	7	7	12.7	
pH	6 - 8.5	6 - 8.5	Units	SMCL	NA	7.96	5	5	6.8	7.78	11	11	6.32	7.6	
Turbidity	1	0.5	NTU	MCL, MML	NA	0.15	2	2	0.21	0.45	5	5	0.21	0.95	
ORP	None	None	mV	None	NA	-160	5	5	-128	58	11	11	-385	267	
Bicarbonate	None	None	mg/L	None	2	181	5	5	164	209	11	11	188	320	
Calcium	None	None	mg/L	None	0.1	18.9	5	5	19.1	43.1	12	12	38.7	67.4	
Carbonate	None	None	mg/L	None	2-10	2	U	5	1	ND	10	11	0	ND	NA
Chloride	250	250	mg/L	SMCL	0.1-1	22	5	5	13.3	21.8	12	12	7.39	32.7	
Hardness (as CaCO3)	250	None	mg/L	URC	1-4	84.9	5	5	83.8	177	11	11	119	260	
Magnesium	None	None	mg/L	None	0.05-0.1	9.2	5	5	8.75	16.9	12	12	13.8	22.3	
Nitrate as N	10	9.5	mg/L	MML	0.003-0.5	0.084	U	5	2	ND	7.25	10	10	3.52	8.99
Nitrite as N	1	0.5	mg/L	MCL	0.0004-0.5	-	4	1	ND	0.1	10	1	1	0.5	0.5
Total Nitrate-Nitrite	10	9.5	mg/L	MML	0.003-0.5	-	4	1	ND	1.88	12	12	3.52	8.99	
Potassium	None	None	mg/L	None	0.1	7.2	5	5	5.82	6.9	12	12	3.86	5.3	
Silica (as SiO2)	None	None	mg/L	None	0.1-0.2	60.3	5	5	24.4	68	11	11	21.6	54	
Silicon	None	None	mg/L	None	0.1-0.2	-	2	2	23.3	24.6	4	4	20.9	22.2	
Sodium	20	None	mg/L	URC (advisory)	0.05-0.1	39	5	5	33.4	48.9	12	12	42	65.9	
Sulfate	250	250	mg/L	URC, SMCL	1-5	5	U	5	5	5.9	59.4	12	12	26.9	87.2
Total Alkalinity	250	250	mg/L	SMCL	1-2	148	5	5	155	209	11	11	188	262	
Total Dissolved Solids	500	500	mg/L	SMCL	0.7-10	218	5	5	227	412	11	11	305	525	
Total Organic Carbon	None	None	mg/L	None	0.1-0.5	0.5	U	5	5	0.58	2.55	11	11	1.45	4.5
Total Suspended Solids	None	None	mg/L	None	1-10	12	5	1	ND	10	11	2	ND	3.26	3.26
Aluminum	0.05	0.05	mg/L	SMCL	0.007-0.05	0.007	U	5	0	ND	NA	8	3	ND	0.0849
Antimony	0.006	0.003	mg/L	MCL	0.001	0.007	U	5	0	ND	NA	10	0	ND	NA
Arsenic	0.05	0.025	mg/L	MCL, MML	0.0009-0.002	0.0009	U	5	5	0.00176	0.00231	10	8	ND	0.002
Barium	1	0.5	mg/L	MCL, MML	0.001-0.05	0.059	5	5	0.0489	0.074	10	10	0.0643	0.109	
Beryllium	0.004	0.002	mg/L	MCL	0.0005-0.003	0.003	U	5	0	ND	NA	10	0	ND	NA
Cadmium	0.005	0.0025	mg/L	MCL, MML	0.0002-0.001	0.0002	U	5	0	ND	NA	10	0	ND	NA
Chromium	0.05	0.025	mg/L	MCL, MML	0.001-0.005	0.005	5	1	ND	0.00179	9	5	ND	0.0071	
Copper	1.3	0.65	mg/L	MCL, MML	0.001-0.005	0.0023	U	5	2	ND	0.005	8	8	0.00154	0.0079
Iron (Total)	None	None	mg/L	None	0.01-0.05	0.044	5	5	0.1	0.367	10	6	ND	0.559	
Iron (Dissolved)	0.3	0.3	mg/L	SMCL	0.01-0.05	0.004	U	5	5	0.072	0.318	7	3	ND	0.535
Lead	0.015	0.0075	mg/L	Action Level	0.0005-0.001	0.001	U	5	1	ND	0.00269	10	0	ND	NA
Manganese (Total)	None	None	mg/L	None	0.001-0.01	0.027	5	5	0.034	0.0605	10	1	ND	0.0466	
Manganese (Dissolved)	0.05	0.05	mg/L	SMCL	0.001-0.01	0.01	U	5	5	0.039	0.0601	9	0	ND	NA
Mercury	0.002	0.001	mg/L	MCL, MML	0.0001-0.0004	0.0004	U	5	0	ND	NA	10	0	ND	NA
Nickel	0.1	0.05	mg/L	MCL	0.001-0.009	0.009	U	5	0	ND	NA	10	0	ND	NA
Selenium	0.01	0.005	mg/L	MCL, MML	0.0006-0.005	0.0006	U	5	1	ND	0.002	10	2	ND	0.00274
Silver	0.05	0.025	mg/L	MML, SMCL	0.0005-0.009	0.009	U	5	0	ND	NA	10	0	ND	NA
Thallium	0.002	0.001	mg/L	MCL	0.0006-0.001	0.001	U	5	0	ND	NA	10	0	ND	NA
Zinc	5	5	mg/L	SMCL	0.001-0.01	0.015	U	5	5	0.0095	0.0728	10	6	ND	0.00521
Odor	3	3	TON	SMCL	1	1	U	1	1	3	3	6	2	ND	6
Color	15	15	ACU	SMCL	3-5	2	1	1	0	ND	NA	5	3	ND	10
Methylene Blue Active Substance	0.5	0.5	mg/L	SMCL	0.05	0.05	U	1	0	ND	NA	8	0	ND	NA
Corrosivity (Langelier Saturation Index)	Non-Corrosive	Non-Corrosive	mg/L	SMCL	NA	8.36	1	1	0.3	0.3	6	6	-0.226	9.05	
Cyanide (as free cyanide)	0.2	0.1	mg/l	MCL	0.0025-0.025	0.0025	U	1	0	ND	NA	5	0	ND	NA
Fluoride	2	1	mg/L	MCL, MML, SMCL	0.1-0.5	0.11	U	1	1	0.66	0.66	7	6	ND	0.57
Combined Radium 226/228	5	2.5	pCi/L	MCL, MML	NA	-	U	1	1	0.209	0.209	5	3	ND	1.609
Uranium	0.03	0.015	mg/L	MCL	0.001	0.001	1	0	ND	NA	7	7	0.004	0.0083	
Gross Alpha	15	7.5	pCi/L	MCL, MML	NA	1.79	U	1	0	ND	NA	7	7	2.2	7.89
Gross Beta	50	25	pCi/L	MML	NA	8.7	1	1	3.9	3.9	7	6	ND	8.6	
2,4,5-TP (Silvex)	0.01	0.005	mg/L	MCL, MML	0.0004-0.0004	0.0004	U	1	0	ND	NA	7	0	ND	NA
2,4-D	0.07	0.035	mg/L	MCL, MML	0.0001-0.0002	0.0002	U	1	0	ND	NA	7	0	ND	NA
Alachlor	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004	U	1	0	ND	NA	7	0	ND	NA
Atrazine	0.003	0.0015	mg/L	MCL	0.00005-0.0002	0.0002	U	1	0	ND	NA	7	0	ND	NA
Benzo[a]pyrene	0.0002	0.0001	mg/L	MCL	0.00002-0.00004	0.00004	U	1	0	ND	NA	7	0	ND	NA
gamma-BHC (Lindane)	0.0002	0.0001	mg/L	MCL, MML	0.00001-0.00004	0.00002	U	1	0	ND	NA	7	0	ND	NA
Carbofuran	0.04	0.02	mg/L	MCL	0.0005-0.002	0.001	U	1	0	ND	NA	7	0	ND	NA
Chlordane	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004	U	1	0	ND	NA	7	0	ND	NA
Dalapon	0.2	0.1	mg/L	MCL	0.0001-0.002	0.002	U	1	0	ND	NA	7	0	ND	NA
bis(2-ethylhexyl)phthalate	0.4	0.2	mg/L	MCL	0.0006-0.001	0.001	U	1	0	ND	NA	7	1	ND	0.000683
bis-2(ethylhexyl)adipate	0.006	0.003	mg/L	MCL	0.0002-0.001	0.001	U	1	0	ND	NA	5	0	ND	NA
1,2-Dibromo-3-chloropropane(DBCP)	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00002	U	1	0	ND	NA	7	0	ND	NA
Dinoseb	0.007	0.0035	mg/L	MCL	0.0001-0.0004	0.0004	U	1	0	ND	NA	7	0	ND	NA
Diquat	0.02	0.01	mg/L	MCL	0.0004-0.0008	0.0004	U	1	0	ND	NA	7	0	ND	NA
1,2-Dibromoethane (EDB)	0.00005	0.000025	mg/L	MCL	0.00001-0.00002	0.00001	U	1	0	ND	NA	7	0	ND	NA
Endothal	0.1	0.05	mg/L	MCL	0.005-0.01	0.01	U	1	0	ND	NA	7	0	ND	NA
Endrin	0.0002	0.0001	mg/L	MCL, MML	0.00002	0.00002	U	1	0	ND	NA	7	0	ND	NA
Glyphosate	0.7	0.35	mg/L	MCL	0.006-0.01	0.01	U	1	0	ND	NA	7	0	ND	NA
Heptachlor	0.0004	0.0002	mg/L	MCL	0.00001-0.00008	0.00004	U	1	0	ND	NA	7	0	ND	NA
Heptachlor Epoxide	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00002	U	1	0	ND	NA	7	0	ND	NA
Hexachlorobenzene	0.001	0.0005	mg/L	MCL	0.00005-0.0002	0.0001	U	1	0	ND	NA	7	0	ND	NA
Hexachlorocyclopentadiene	0.05	0.025	mg/L	MCL	0.00005-0.0002	0.0002	U	1	0	ND	NA	7	0	ND	NA
Methoxychlor	0.04	0.02	mg/L	MCL, MML	0.00005-0.0002	0.0002	U	1	0	ND	NA	7	0	ND	NA
Polychlorinated Biphenyls (PCBs)	0.0005	0.00025	mg/L	MCL	0.00008-0.0002	0.0002	U	1	0	ND	NA	7	0	ND	NA
Pentachlorophenol	0.001	0.0005	mg/L	MCL	0.00008-0.001	0.00008	U	1	0	ND	NA	7	0	ND	NA
Picloram	0.5	0.25	mg/L	MCL	0.0001-0.0002	0.0002	U	1	0	ND	NA	7	0	ND	NA
Simazine	0.004	0.002	mg/L	MCL	0.00005-0.0001	0.0001	U	1	0	ND	NA	7	0	ND	NA
Toxaphene	0.003	0.0015	mg/L	MCL, MML	0.0005-0.002	0.001	U	1	0	ND	NA	7	0	ND	NA
Vydate (Oxamyl)	0.2	0.1	mg/L	MCL	0.0005-0.004	0.002	U	1	0	ND	NA	7	0	ND	NA
1,1,1-Trichloroethane	0.2	0.1	mg/L	MCL, MML	0.0005	0.0005	U	1	0	ND	NA	7	0	ND	NA
1,1,2-Trichloroethane	0.005	0.0025	mg/L	MCL	0.0005	0.0005	U	1							

Table 2.
Statistical Summary of Water Quality Data
Madison Farms ASR Program

Analyte	Lowest Regulatory Standard	Limited License Action Level	Units	Regulatory Criteria	MDL*	Recovered Water			
						Number of Samples	Number of Detections	Minimum	Maximum Detection
Fecal Coliform / E.Coli			CFU/100 mL		1	6	1	ND	3
Total Coliform	<1/100 ML	None	CFU/100 ml	MML	1	6	4	ND	2
Chloroform (Trichloromethane)	None	None	mg/L	URC	0.0005	11	1	ND	0.00241
Bromodichloromethane	None	None	mg/L	None	0.0005	11	0	ND	NA
Dibromochloromethane	None	None	mg/L	None	0.0005	11	0	ND	NA
Bromoform (Tribromomethane)	None	None	mg/L	URC	0.0005	11	0	ND	NA
Total Trihalomethanes	0.08	0.08	mg/L	MCL, MML	0.0005	11	1	ND	0.00241
Monochloroacetic Acid	None	None	mg/L	None	0.002	11	0	ND	NA
Dichloroacetic Acid	None	None	mg/L	None	0.001	11	0	ND	NA
Trichloroacetic Acid	None	None	mg/L	None	0.001	11	0	ND	NA
Monobromoacetic Acid	None	None	mg/L	None	0.001	11	0	ND	NA
Dibromoacetic Acid	None	None	mg/L	None	0.001	11	0	ND	NA
Total Haloacetic Acids	0.06	0.06	mg/L	MCL	0.001	11	0	ND	NA
Temperature	None	None	Celsius	None	NA	13	13	14.4	20.4
Conductivity	None	None	µS/cm	None	NA	13	13	379	567
Dissolved Oxygen	None	None	mg/L	None	NA	6	6	0	5.8
pH	6 - 8.5	6 - 8.5	Units	SMCL	NA	13	13	7.18	7.88
Turbidity	1	0.5	NTU	MCL, MML	NA	9	9	0.11	2.84
ORP	None	None	mV	None	NA	13	13	-114	143
Bicarbonate	None	None	mg/L	None	2	13	13	22	261
Calcium	None	None	mg/L	None	0.1	13	13	26.9	46.4
Carbonate	None	None	mg/L	None	2-10	13	1	ND	5
Chloride	250	250	mg/L	SMCL	0.1-1	13	13	3.37	16
Hardness (as CaCO3)	250	None	mg/L	URC	1-4	13	13	105	186
Magnesium	None	None	mg/L	None	0.05-0.1	13	13	11	17.1
Nitrate as N	10	9.5	mg/L	MML	0.003-0.5	13	3	ND	3.1
Nitrite as N	1	0.5	mg/L	MCL	0.0004-0.5	13	1	ND	0.392
Total Nitrate-Nitrite	10	9.5	mg/L	MML	0.003-0.5	13	3	ND	3.1
Potassium	None	None	mg/L	None	0.1	13	13	5.23	8.05
Silica (as SiO2)	None	None	mg/L	None	0.1-0.2	12	12	31.3	70
Silicon	None	None	mg/L	None	0.1-0.2	4	4	22.2	27.7
Sodium	20	None	mg/L	URC (advisory)	0.05-0.1	13	13	38.5	52.9
Sulfate	250	250	mg/L	URC, SMCL	1-5	13	13	10.9	54.3
Total Alkalinity	250	250	mg/L	SMCL	1-2	13	13	158	239
Total Dissolved Solids	500	500	mg/L	SMCL	0.7-10	13	13	236	370
Total Organic Carbon	None	None	mg/L	None	0.1-0.5	13	13	0.88	3.26
Total Suspended Solids	None	None	mg/L	None	1-10	13	2	ND	28
Aluminum	0.05	0.05	mg/L	SMCL	0.007-0.05	12	1	ND	0.05
Antimony	0.006	0.003	mg/L	MCL	0.001	12	0	ND	NA
Arsenic	0.05	0.025	mg/L	MCL, MML	0.0009-0.002	12	9	ND	0.002
Barium	1	0.5	mg/L	MCL, MML	0.001-0.05	12	12	0.0424	0.087
Beryllium	0.004	0.002	mg/L	MCL	0.0005-0.003	12	0	ND	NA
Cadmium	0.005	0.0025	mg/L	MCL, MML	0.0002-0.001	12	0	ND	NA
Chromium	0.05	0.025	mg/L	MCL, MML	0.001-0.005	12	2	ND	0.0109
Copper	1.3	0.65	mg/L	MCL, MML	0.001-0.005	12	6	ND	0.00879
Iron (Total)	None	None	mg/L	None	0.01-0.05	12	12	0.017	0.344
Iron (Dissolved)	0.3	0.3	mg/L	SMCL	0.01-0.05	10	7	ND	0.242
Lead	0.015	0.0075	mg/L	Action Level	0.0005-0.001	12	0	ND	NA
Manganese (Total)	None	None	mg/L	None	0.001-0.01	12	12	0.0219	0.0745
Manganese (Dissolved)	0.05	0.05	mg/L	SMCL	0.001-0.01	10	9	ND	0.066
Mercury	0.002	0.001	mg/L	MCL, MML	0.0001-0.0004	12	0	ND	NA
Nickel	0.1	0.05	mg/L	MCL	0.001-0.009	12	0	ND	NA
Selenium	0.01	0.005	mg/L	MCL, MML	0.0006-0.005	12	2	ND	0.00135
Silver	0.05	0.025	mg/L	MML, SMCL	0.0005-0.009	12	0	ND	NA
Thallium	0.002	0.001	mg/L	MCL	0.0006-0.001	11	0	ND	NA
Zinc	5	5	mg/L	SMCL	0.001-0.01	12	9	ND	0.0998
Odor	3	3	TON	SMCL	1	5	1	ND	3
Color	15	15	ACU	SMCL	3-5	6	2	ND	10
Methylene Blue Active Substance	0.5	0.5	mg/L	SMCL	0.05	5	0	ND	NA
Corrosivity (Langelier Saturation Index)	Non-Corrosive	Non-Corrosive	mg/L	SMCL	NA	7	7	-0.474	8.7
Cyanide (as free cyanide)	0.2	0.1	mg/l	MCL	0.0025-0.025	5	0	ND	NA
Fluoride	2	1	mg/L	MCL, MML, SMCL	0.1-0.5	8	7	ND	0.683
Combined Radium 226/228	5	2.5	pCi/L	MCL, MML	NA	5	5	0.1845	0.73
Uranium	0.03	0.015	mg/L	MCL	0.001	6	3	ND	0.00386
Gross Alpha	15	7.5	pCi/L	MCL, MML	NA	7	4	ND	4.97
Gross Beta	50	25	pCi/L	MML	NA	7	7	0.57	10.2
2,4,5-TP (Silvex)	0.01	0.005	mg/L	MCL, MML	0.0004-0.0004	8	0	ND	NA
2,4-D	0.07	0.035	mg/L	MCL, MML	0.0001-0.0002	8	0	ND	NA
Alachlor	0.002	0.001	mg/L	MCL	0.00005-0.0004	8	0	ND	NA
Atrazine	0.003	0.0015	mg/L	MCL	0.00005-0.0002	8	0	ND	NA
Benzo[a]pyrene	0.0002	0.0001	mg/L	MCL	0.00002-0.00004	8	0	ND	NA
gamma-BHC (Lindane)	0.0002	0.0001	mg/L	MCL, MML	0.00001-0.00004	8	0	ND	NA
Carbofuran	0.04	0.02	mg/L	MCL	0.0005-0.002	8	0	ND	NA
Chlordane	0.002	0.001	mg/L	MCL	0.00005-0.0004	8	0	ND	NA
Dalapon	0.2	0.1	mg/L	MCL	0.0001-0.002	8	0	ND	NA
bis(2-ethylhexyl)phthalate	0.4	0.2	mg/L	MCL	0.0006-0.001	8	0	ND	NA
bis-2(ethylhexyl)adipate	0.006	0.003	mg/L	MCL	0.0002-0.001	8	0	ND	NA
1,2-Dibromo-3-chloropropane(DBCP)	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	8	0	ND	NA
Dinoseb	0.007	0.0035	mg/L	MCL	0.0001-0.0004	8	0	ND	NA
Diquat	0.02	0.01	mg/L	MCL	0.0004-0.0008	8	0	ND	NA
1,2-Dibromoethane (EDB)	0.00005	0.000025	mg/L	MCL	0.00001-0.00002	8	0	ND	NA
Endothal	0.1	0.05	mg/L	MCL	0.005-0.01	8	0	ND	NA
Endrin	0.0002	0.0001	mg/L	MCL, MML	0.00002	8	0	ND	NA
Glyphosate	0.7	0.35	mg/L	MCL	0.006-0.01	8	0	ND	NA
Heptachlor	0.0004	0.0002	mg/L	MCL	0.00001-0.00008	8	0	ND	NA
Heptachlor Epoxide	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	8	0	ND	NA
Hexachlorobenzene	0.001	0.0005	mg/L	MCL	0.00005-0.0002	8	0	ND	NA
Hexachlorocyclopentadiene	0.05	0.025	mg/L	MCL	0.00005-0.0002	8	0	ND	NA
Methoxychlor	0.04	0.02	mg/L	MCL, MML	0.00005-0.0002	8	0	ND	NA
Polychlorinated Biphenyls (PCBs)	0.0005	0.00025	mg/L	MCL	0.00008-0.0002	8	0	ND	NA
Pentachlorophenol	0.001	0.0005	mg/L	MCL	0.00008-0.001	8	0	ND	NA
Picloram	0.5	0.25	mg/L	MCL	0.0001-0.0002	8	0	ND	NA
Simazine	0.004	0.002	mg/L	MCL	0.00005-0.0001	8	0	ND	NA
Toxaphene	0.003	0.0015	mg/L	MCL, MML	0.0005-0.002	8	0	ND	NA
Vydate (Oxamyl)	0.2	0.1	mg/L	MCL	0.0005-0.004	8	0	ND	NA
1,1,1-Trichloroethane	0.2	0.1	mg/L	MCL, MML	0.0005	8	0	ND	NA
1,1,2-Trichloroethane	0.005	0.0025	mg/L	MCL	0.0005	8	0	ND	NA
1,1-Dichloroethene	0.007	0.0035	mg/L	MCL, MML	0.0005	8	0	ND	NA
1,2,4-Trichlorobenzene	0.07	0.035	mg/L	MCL	0.0005	8	0	ND	NA
1,2-Dichlorobenzene	0.6	0.3	mg/L	MCL	0.0005	8	0	ND	NA
1,2-Dichloroethane	0.005	0.0025	mg/L	MCL, MML	0.0005	8	0	ND	NA
1,2-Dichloropropane	0.005	0.0025	mg/L	MCL	0.0005	8	0	ND	NA
1,4-Dichlorobenzene	0.075	0.0375	mg/L	MCL, MML	0.0005	8	0	ND	NA
Benzene	0.005	0.0025	mg/L	MCL, MML	0.0005	8	0	ND	NA
Carbon Tetrachloride	0.005	0.0025	mg/L	MCL, MML	0.0005	8	0	ND	NA
Chlorobenzene	0.1	0.05	mg/L	MCL	0.0005	8	0	ND	NA
cis-1,2-dichloroethene	0.07	0.035	mg/L	MCL	0.0005	8	0	ND	NA
Ethylbenzene	0.7	0.35	mg/L	MCL	0.0005	8	0	ND	NA
Dichloromethane (methylene chloride)	0.005	0.0025	mg/L	MCL	0.0005	8	0	ND	NA
Styrene	0.1	0.05	mg/L	MCL	0.0005	8	0	ND	NA
Tetrachloroethene	0.005	0.0025	mg/L	MCL	0.0005	8	0	ND	NA
Toluene	1	0.5	mg/L	MCL	0.0005	8	0	ND	NA
trans-1,2-Dichloroethene	0.1	0.05	mg/L	MCL	0.0005	8	0	ND	NA
Trichloroethene	0.005	0.0025	mg/L	MCL, MML	0.0005	8	0	ND	NA
Vinyl chloride	0.002	0.001	mg/L	MCL, MML	0.0003-0.0005	8	0	ND	NA
Total Xylene	10	5	mg/L	MCL	0.0005-0.0015	8	0	ND	NA
Bromoxynil			mg/L		0.0002	4	0	ND	NA
MCPA			mg/L		0.0002	4	0	ND	NA
Pronamide			mg/L		0.0002	4	0	ND	NA
Terbacil			mg/L		0.0002	4	0	ND	NA

Notes:

*Detection limits vary. See the individual sample reports for specific detection limits.

Table 3.
Madison Farms ASR Water Quality Sampling Schedule

Year	Pre-Injection Groundwater Sample Collected Prior to ASR Injection	Source Water Sample Collected @ 50% Injection Target Volume	Recovery Water Sample Collected @ 50% Recovery Target Volume
	Sample Location: ASR Well	Sample Location: Collector Well	Sample Location: ASR Well
Year 1	List A	List A	List A
Year 2	List A	List A	List A
Year 3	List B	List B	List B
Annual Observation Well Sampling	Gaylord Well: Field Parameters and Nitrate	None	Gaylord Well: Field Parameters and Nitrate

Note:

Sampling cycle is repeated after 3 year period

See Table 4 for specific analytes for List A

See Table 5 for specific analytes for List B

Field Parameters consist of Temperature, Conductivity, pH, and ORP

Table 4.
Analyte List A - Sampling Frequency Once Per Year
ASR Water Quality Testing
Madison Farms

	Analyte	Units	MDL
Field Parameters	Temperature	Celsius	NA
	Conductivity	mS/cm	NA
	pH	Units	NA
	Chlorine	mg/L	NA
	ORP	mV	NA
Bacteriological	Fecal Coliforms/E.Coli		
	Total Coliform	CFU/100 ml	
Disinfection By-Products			
THM	Chloroform (Trichloromethane)	mg/L	0.0005
THM	Bromodichloromethane	mg/L	0.0005
THM	Dibromochloromethane	mg/L	0.0005
THM	Bromoform (Tribromomethane)	mg/L	0.0005
	Total Trihalomethanes	mg/L	--
HAA	Monochloroacetic Acid	mg/L	0.002
HAA	Dichloroacetic Acid	mg/L	0.001
HAA	Trichloroacetic Acid	mg/L	0.001
HAA	Monobromoacetic Acid	mg/L	0.001
HAA	Dibromoacetic Acid	mg/L	0.001
	Total Haloacetic Acids	mg/L	
Geochemical	Bicarbonate	mg/L	2
	Calcium	mg/L	0.1
	Carbonate	mg/L	2
	Chloride	mg/L	1
	Hardness (as CaCO ₃)	mg/L	4
	Magnesium	mg/L	0.05
	Nitrate as N	mg/L	0.5
	Nitrite as N	mg/L	0.01
	Total Nitrate-Nitrite	mg/L	--
	Potassium	mg/L	0.1
	Silica	mg/L	0.2
	Sodium	mg/L	0.05
	Sulfate	mg/L	5
	Total Alkalinity	mg/L	2
	Total Dissolved Solid	mg/L	0.7
	Total Organic Carbon	mg/L	0.5
	Total Suspended Solids	mg/L	2
	Metals	Aluminum	mg/L
Antimony		mg/L	0.001
Arsenic		mg/L	0.002
Barium		mg/L	0.05
Beryllium		mg/L	0.0005
Cadmium		mg/L	0.001
Chromium		mg/L	0.002
Copper		mg/L	0.005
Iron (Total)		mg/L	0.05
Iron (Dissolved)		mg/L	0.05
Lead		mg/L	0.001
Manganese (Total)		mg/L	0.002
Manganese (Dissolved)		mg/L	0.002
Mercury		mg/L	0.0004
Nickel		mg/L	0.004
Selenium		mg/L	0.002
Silver		mg/L	0.005
Thallium		mg/L	0.0006
Zinc		mg/L	0.01
Miscellaneous		Odor	TON
	Color	ACU	5 color units
	Methylene Blue Active Substance	mg/L	0.05
	Corrosivity (Langelier Saturation Index)	mg/L	--
	Cyanide (as free cyanide)	mg/l	
	Fluoride	mg/L	0.5
Radionuclides	Combined Radium 226/228	pCi/L	
	Uranium	mg/L	
	Gross Alpha	pCi/L	1.79
	Gross Beta	pCi/L	2.83

NOTE

MDL = Method Detection Limit
 NA = Not Applicable
 Samples are unfiltered unless noted (i.e., dissolved)

Table 5
Analyte List B - Sampling Frequency Once Per Three Years
ASR Water Quality Testing
Madison Farms

	Analyte	Units	MDL
Field Parameters	Temperature	Celsius	NA
	Conductivity	mS/cm	NA
	pH	Units	NA
	Chlorine	mg/L	NA
	ORP	mV	NA
Bacteriological	Fecal Coliforms/E.Coli		
	Total Coliform	CFU/100 ml	
Disinfection By-Products			
THM	Chloroform (Trichloromethane)	mg/L	0.0005
THM	Bromodichloromethane	mg/L	0.0005
THM	Dibromochloromethane	mg/L	0.0005
THM	Bromoform (Tribromomethane)	mg/L	0.0005
	Total Trihalomethanes	mg/L	--
HAA	Monochloroacetic Acid	mg/L	0.002
HAA	Dichloroacetic Acid	mg/L	0.001
HAA	Trichloroacetic Acid	mg/L	0.001
HAA	Monobromoacetic Acid	mg/L	0.001
HAA	Dibromoacetic Acid	mg/L	0.001
	Total Haloacetic Acids	mg/L	
Geochemical	Bicarbonate	mg/L	2
	Calcium	mg/L	0.1
	Carbonate	mg/L	2
	Chloride	mg/L	1
	Hardness (as CaCO ₃)	mg/L	4
	Magnesium	mg/L	0.05
	Nitrate as N	mg/L	0.5
	Nitrite as N	mg/L	0.01
	Total Nitrate-Nitrite	mg/L	--
	Potassium	mg/L	0.1
	Silica	mg/L	0.2
	Sodium	mg/L	0.05
	Sulfate	mg/L	5
	Total Alkalinity	mg/L	2
	Total Dissolved Solid	mg/L	0.7
	Total Organic Carbon	mg/L	0.5
	Total Suspended Solids	mg/L	2
	Metals	Aluminum	mg/L
Antimony		mg/L	0.001
Arsenic		mg/L	0.002
Barium		mg/L	0.05
Beryllium		mg/L	0.0005
Cadmium		mg/L	0.001
Chromium		mg/L	0.002
Copper		mg/L	0.005
Iron (Total)		mg/L	0.05
Iron (Dissolved)		mg/L	0.05
Lead		mg/L	0.001
Manganese (Total)		mg/L	0.002
Manganese (Dissolved)		mg/L	0.002
Mercury		mg/L	0.0004
Nickel		mg/L	0.004
Selenium		mg/L	0.002
Silver		mg/L	0.005
Thallium		mg/L	0.0006
Zinc		mg/L	0.01
Miscellaneous		Odor	TON
	Color	ACU	5 color units
	Methylene Blue Active Substance	mg/L	0.05
	Corrosivity (Langelier Saturation Index)	mg/L	--
	Cyanide (as free cyanide)	mg/l	
	Fluoride	mg/L	0.5
Radionuclides	Combined Radium 226/228	pCi/L	
	Uranium	mg/L	
	Gross Alpha	pCi/L	1.79
	Gross Beta	pCi/L	2.83

Synthetic Organic Compounds (SOCs)		
Regulated SOCs		
2,4,5-TP (Silvex)	mg/L	0.0004
2,4-D	mg/L	0.0002
Alachlor (Lasso)	mg/L	0.0004
Atrazine	mg/L	0.0002
Benzo(a)Pyrene	mg/L	0.00004
BHC-gamma (Lindane)	mg/L	0.00002
Carbofuran	mg/L	0.001
Chlordane	mg/L	0.0004
Dalapon	mg/L	0.002
Di(2-ethylhexyl)adipate (<i>adipates</i>)	mg/L	0.001
Di(2-ethylhexyl)phthalate (<i>phthalates</i>)	mg/L	0.001
Dibromochloropropane (DBCP)	mg/L	0.00002
Dinoseb	mg/L	0.0004
Diquat	mg/L	0.0004
Ethylene Dibromide (EDB)	mg/L	0.00001
Endothall	mg/L	0.01
Endrin	mg/L	0.00002
Glyphosate	mg/L	0.01
Heptachlor	mg/L	0.00004
Heptachlor Epoxide	mg/L	0.00002
Hexachlorobenzene (HCB)	mg/L	0.0001
Hexachlorocyclopentadiene	mg/L	0.0002
Methoxychlor	mg/L	0.0002
Polychlorinated Biphenyls (PCBs)	mg/L	0.0002
Pentachlorophenol	mg/L	0.00008
Picloram	mg/L	0.0002
Simazine	mg/L	0.0001
Toxaphene	mg/L	0.001
Vydate (Oxamyl)	mg/L	0.002
Volatile Organic Compounds (VOCs)		
Regulated VOCs		
1,1,1-Trichloroethane	mg/L	0.0005
1,1,2-Trichloroethane	mg/L	0.0005
1,1-Dichloroethylene	mg/L	0.0005
1,2,4-Trichlorobenzene	mg/L	0.0005
1,2-Dichlorobenzene (o)	mg/L	0.0005
1,2-Dichloroethane (EDC)	mg/L	0.0005
1,2-Dichloropropane	mg/L	0.0005
1,4-Dichlorobenzene (p)	mg/L	0.0005
Benzene	mg/L	0.0005
Carbon Tetrachloride	mg/L	0.0005
Chlorobenzene	mg/L	0.0005
cis-1,2-Dichloroethylene	mg/L	0.0005
Ethylbenzene	mg/L	0.0005
Dichloromethane (methylene chloride)	mg/L	0.0005
Styrene	mg/L	0.0005
Tetrachloroethylene	mg/L	0.0005
Toluene	mg/L	0.0005
trans-1,2-Dichloroethylene	mg/L	0.0005
Trichloroethylene	mg/L	0.0005
Vinyl chloride	mg/L	0.0005
Total Xylenes	mg/L	0.0005
Selected Additional Site-Specific Pesticides		
Kerb	mg/L	
Sinbar	mg/L	
Bromoxynil	mg/L	
MCPA	mg/L	

NOTE

MDL = Method Detection Limit
 NA = Not Applicable
 Samples are unfiltered unless noted (i.e., dissolved)

Table 6
ASR Project Observation Wells
Madison ASR Project

Well No.	Location	Owner	Total Depth (ft)	Diameter (in)	Pump Installed (Y/N)	Water Level Monitoring Type	Water Level Monitoring Frequency	Comments
Madison ASR Observation Wells								
1222	T3N, R28E, 30DB	Gaylord Madison	629	8	Y	Airline	Prior to start of injection or recovery, and monthly during injection or recovery.	Basalt well
1166/5430/55174	T3N, R27E, 25DD	Kent Madison	693	12 to 693'	Y	Transducer	Once per hour all-year	Madison ASR Well (basalt)
N/A	T3N, R28E, 31BD	Kent Madison	24	36	Y	N/A		Madison Collector Well; 4000 feet long (horizontal) alluvial well. No water level monitoring.

See Figure 1 for well location

Figures



FIGURE 1
ASR Project Location Map
 McCarty Ranch ASR Project

LEGEND

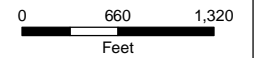
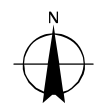
-  ASR Well
-  Collector Well
-  Observation Well
-  Proposed ASR Well
-  Road
-  Water Course

LOCATION DESCRIPTIONS:

Madison ASR Well: Located 50' North and 200' East from the SW corner the SESE quarter quarter of Township 3 North, Range 27 East, Section 25, W.M.

Madison Collector Well: Located 1,620' South and 1,060' West from the North quarter corner of Township 3 North, Range 28 East, Section 31, W.M.

UMAT 1222: Located 2,360' North and 1,830' West from the SE corner of Township 3 North, Range 28 East, Section 30, W.M.



MAP NOTES:
 Date: October 4, 2012
 Data Sources: McCarty Ranch



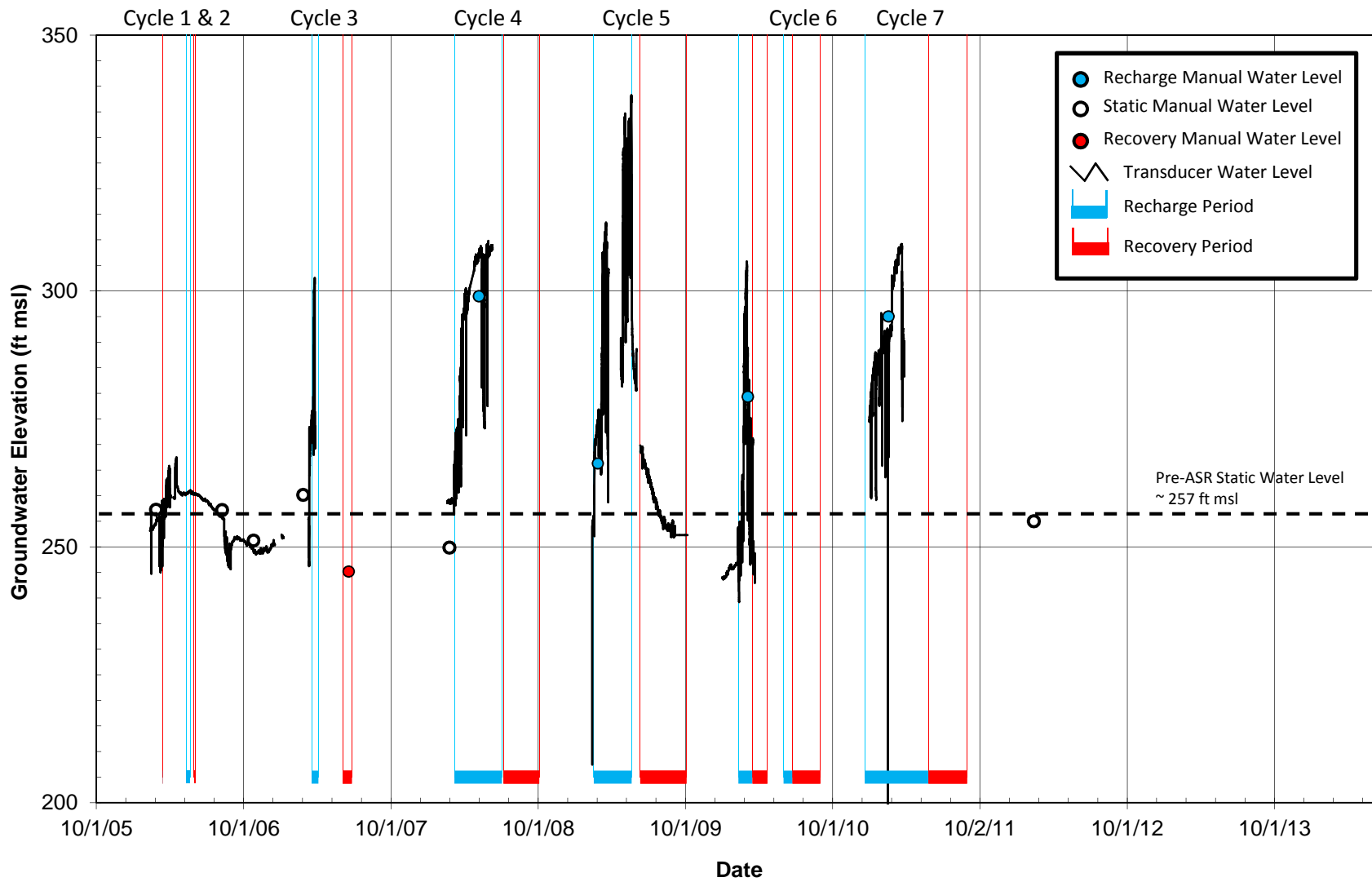


Figure 2.
 Madison Farms ASR Well (UMAT 1166/5430/55174)
 Groundwater Elevation 2006 to 2012

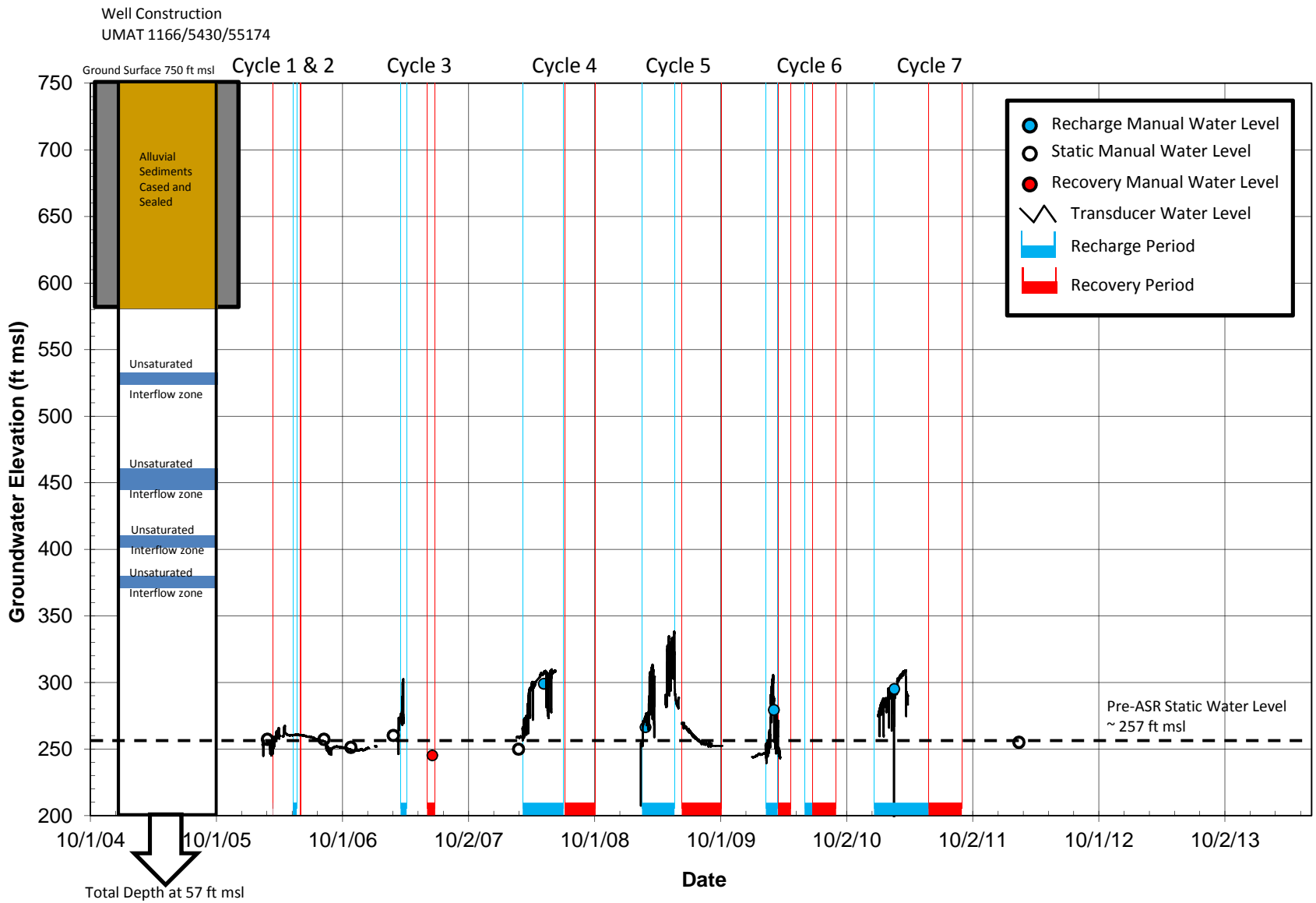


Figure 3.
Groundwater Elevation Relative to ASR Well Construction

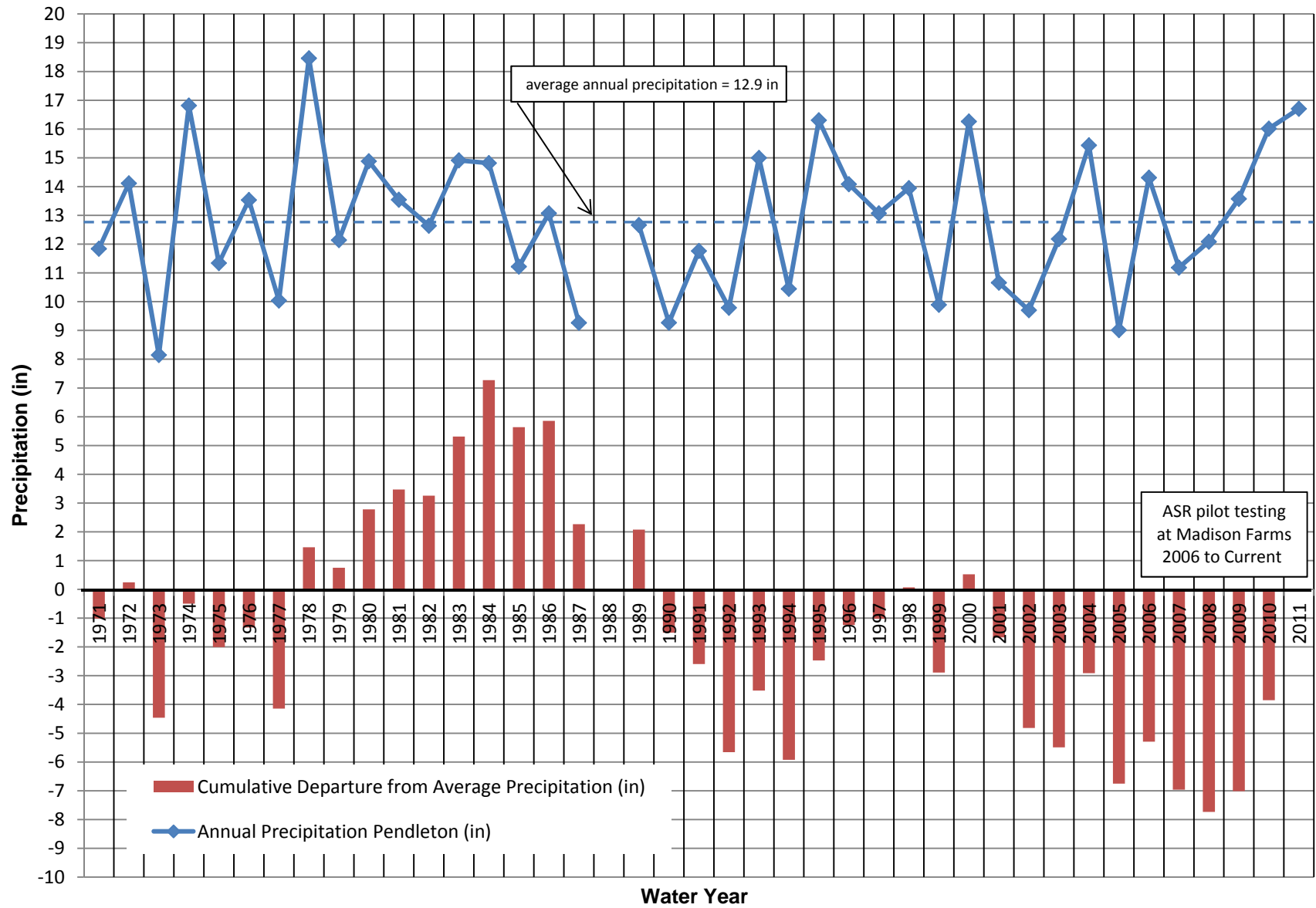


Figure 4.
Precipitation at Pendleton, Oregon 1970 to 2012

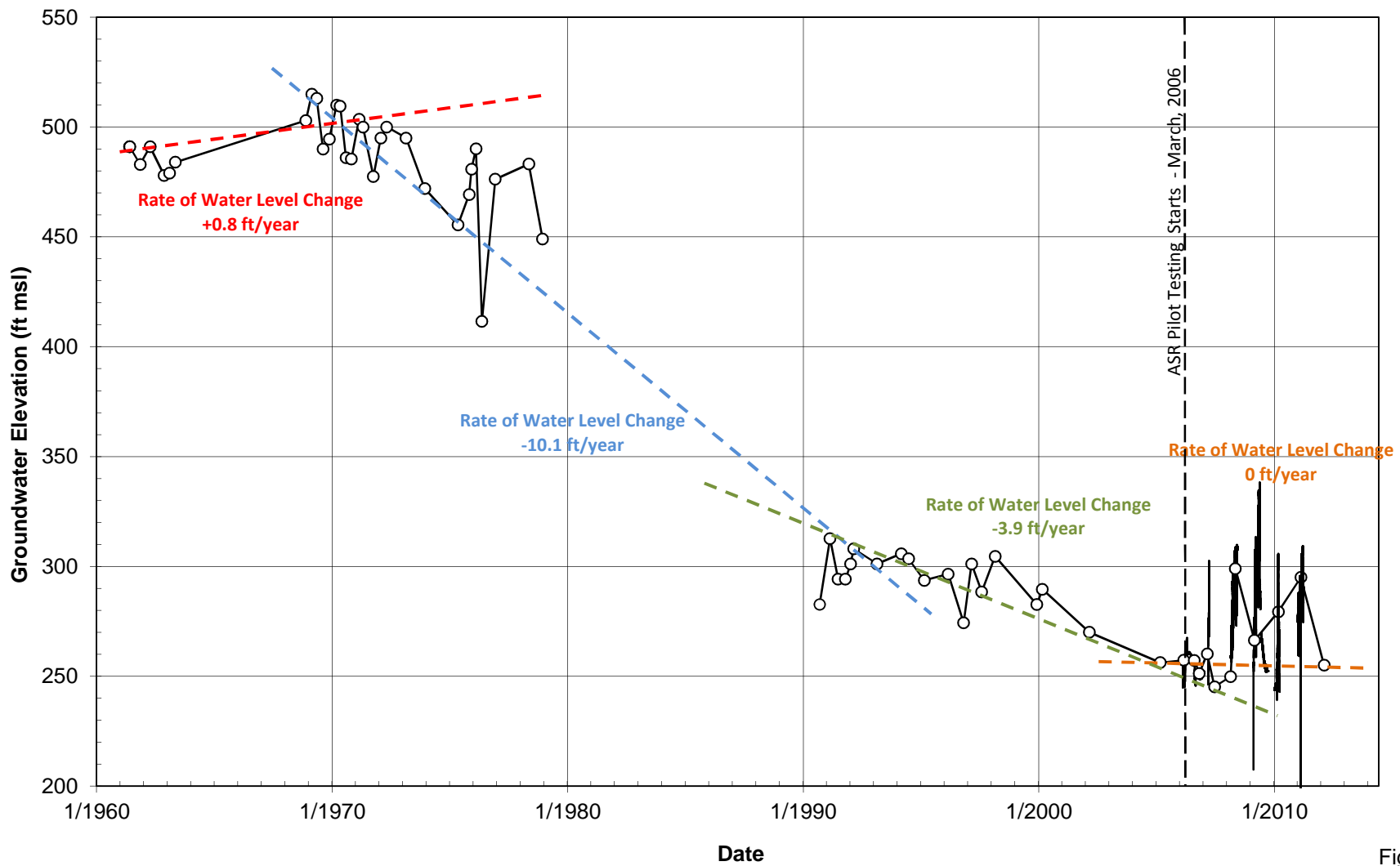
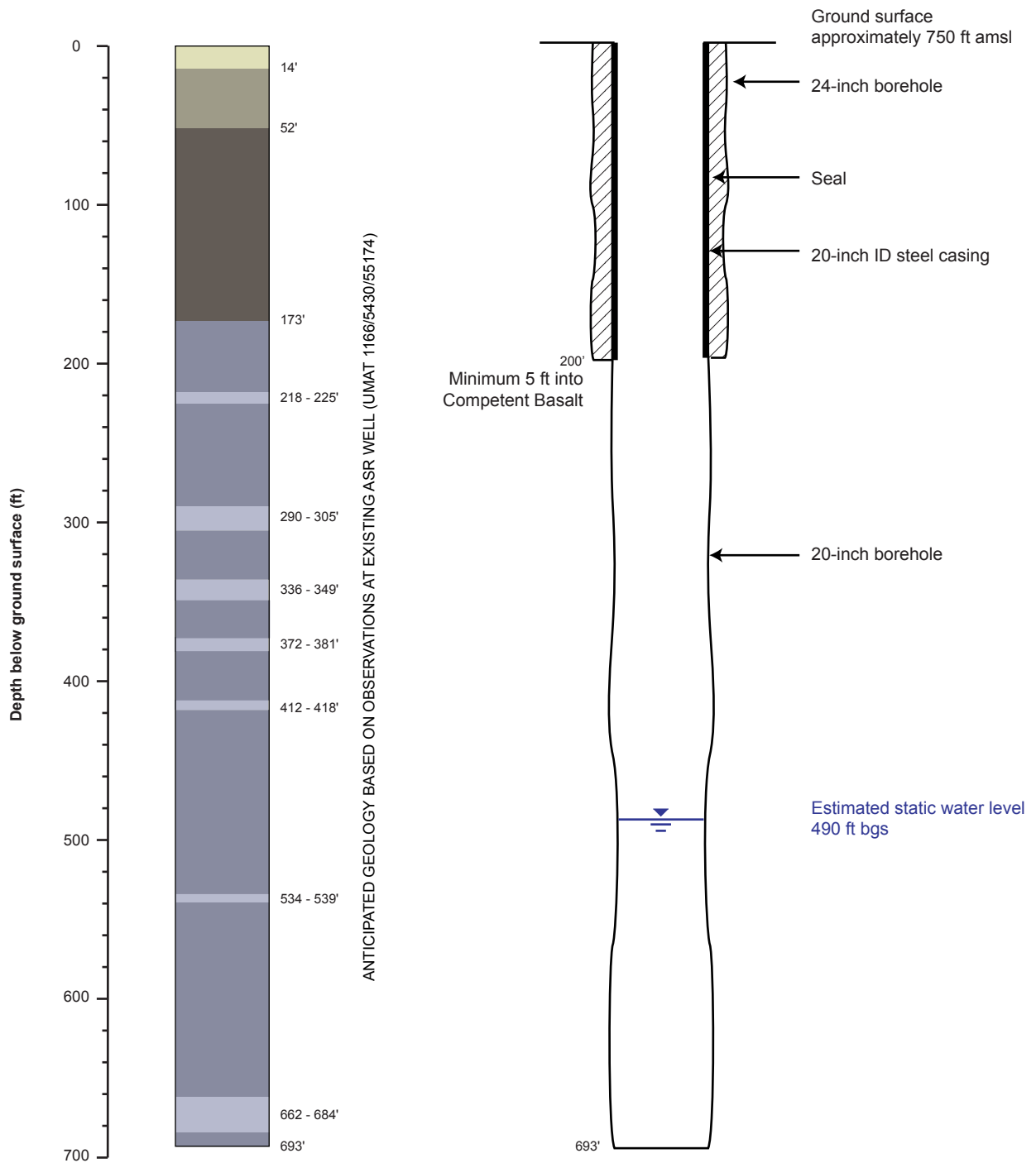







Figure 5.
 Groundwater Elevation at Madison Farms ASR Well
 (UMAT 1166/5430/55174)
 1961-2012



LEGEND

-  Soil
-  Gravel/boulders
-  Clay
-  Interior Flow Basalt
-  Interflow Zone

NOTES:

amsl - above mean sea level
 bgs - below ground surface

Final well depth and diameter are approximate and may vary based on observations during drilling.

FIGURE 6

Proposed As-Built for New ASR Well
 Madison Farms ASR Program



Attachment A
Water Quality Data

Attachment A.

Madison Farms Water Quality Data Compilation

Analyte	Lowest Regulatory Standard	Limited License Action Level	Units	Regulatory Criteria	MDL*	Native Groundwater	Pre-Injection Groundwater	MAD-NBG-C4-1 Pre-Injection Groundwater	MAD-NBG-C5-1 Pre-Injection Groundwater	MAD-NBG-C6-1 Pre-Injection Groundwater	MAD-NBG-C7-1 Pre-Injection Groundwater
						Cycle 1 and 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7
						3/9/2006	3/13/2007	3/3/2008	1/20/2009	2/11/2010	12/20/2010
Fecal Coliform / E.Coli			CFU/100 mL		1	-	Absent	-	-	-	-
Total Coliform	<1/100 ML	None	CFU/100 ml	MML	1	-	Absent	-	-	-	-
Chloroform (Trichloromethane)	None	None	mg/L	URC	0.0005	0.0005	U	0.0005	U	0.0005	U
Bromodichloromethane	None	None	mg/L	None	0.0005	0.0005	U	0.0005	U	0.0005	U
Dibromochloromethane	None	None	mg/L	None	0.0005	0.0005	U	0.0005	U	0.0005	U
Bromoform (Tribromomethane)	None	None	mg/L	URC	0.0005	0.0005	U	0.0005	U	0.0005	U
Total Trihalomethanes	0.08	0.08	mg/L	MCL, MML	0.0005	0.0005	U	0.0005	U	0.00055	U
Monochloroacetic Acid	None	None	mg/L	None	0.002	0.002	U	0.002	U	0.002	U
Dichloroacetic Acid	None	None	mg/L	None	0.001	0.001	U	0.001	U	0.001	U
Trichloroacetic Acid	None	None	mg/L	None	0.001	0.001	U	0.001	U	0.001	U
Monobromoacetic Acid	None	None	mg/L	None	0.001	0.001	U	0.001	U	0.001	U
Dibromoacetic Acid	None	None	mg/L	None	0.001	0.001	U	0.001	U	0.001	U
Total Haloacetic Acids	0.06	0.06	mg/L	MCL	0.001	0.001	U	0.001	U	0.001	U
Temperature	None	None	Celsius	None	NA	16.9		15.7		16.2	
Conductivity	None	None	µS/cm	None	NA	304		356		383	
Dissolved Oxygen	None	None	mg/L	None	NA	-		8.6		3.7	
pH	6 - 8.5	6 - 8.5	Units	SMCL	NA	7.96		7.64		7.59	
Turbidity	1	0.5	NTU	MCL, MML	NA	0.15		0.21		-	
ORP	None	None	mV	None	NA	-160		23		-102.8	
Bicarbonate	None	None	mg/L	None	2	181		190		164	
Calcium	None	None	mg/L	None	0.1	18.9		20		19.1	
Carbonate	None	None	mg/L	None	2-10	2	U	2	U	10	U
Chloride	250	250	mg/L	SMCL	0.1-1	22		14		13.3	
Hardness (as CaCO3)	250	None	mg/L	URC	1-4	84.9		91		83.8	
Magnesium	None	None	mg/L	None	0.05-0.1	9.2		9.9		8.75	
Nitrate as N	10	7	mg/L	MML	0.003-0.5	0.084	U	0.1	U	7.25	U
Nitrite as N	1	0.5	mg/L	MCL	0.0004-0.5	-		0.1	U	-	U
Total Nitrate-Nitrite	10	7	mg/L	MML	0.003-0.5	-		0.1	U	-	U
Potassium	None	None	mg/L	None	0.1	7.2		6.9		5.82	
Silica (as SiO2)	None	None	mg/L	None	0.1-0.2	60.3		68		24.4	
Silicon	None	None	mg/L	None	0.1-0.2	-		-		-	
Sodium	20	None	mg/L	URC (advisory)	0.05-0.1	39		37		33.4	
Sulfate	250	250	mg/L	URC, SMCL	1-5	5	U	5.9		7.4	
Total Alkalinity	250	250	mg/L	SMCL	1-2	148		155		164	
Total Dissolved Solids	500	500	mg/L	SMCL	0.7-10	218		240		227	
Total Organic Carbon	None	None	mg/L	None	0.1-0.5	0.5	U	0.58		1.07	
Total Suspended Solids	None	None	mg/L	None	1-10	12		10	U	1	U
Aluminum	0.05	0.05	mg/L	SMCL	0.007-0.05	0.007	U	0.02	U	0.01	U
Antimony	0.006	0.003	mg/L	MCL	0.001	0.007	U	0.001	U	0.001	U
Arsenic	0.05	0.025	mg/L	MCL, MML	0.0009-0.002	0.0009	U	0.002		0.00231	
Barium	1	0.5	mg/L	MCL, MML	0.001-0.05	0.059		0.051		0.0575	
Beryllium	0.004	0.002	mg/L	MCL	0.0005-0.003	0.003	U	0.001	U	0.001	U
Cadmium	0.005	0.0025	mg/L	MCL, MML	0.0002-0.001	0.0002	U	0.0005	U	0.001	U
Chromium	0.05	0.025	mg/L	MCL, MML	0.001-0.005	0.005		0.001	U	0.001	U
Copper	1.3	0.65	mg/L	MCL, MML	0.001-0.005	0.0023	U	0.002	U	0.005	U
Iron (Total)	None	None	mg/L	None	0.01-0.05	0.044		0.1		0.159	
Iron (Dissolved)	0.3	0.3	mg/L	SMCL	0.01-0.05	0.004	U	0.072		0.154	
Lead	0.015	0.0075	mg/L	Action Level	0.0005-0.001	0.001	U	0.0005	U	0.001	U
Manganese (Total)	None	None	mg/L	None	0.001-0.01	0.027		0.034		0.0406	
Manganese (Dissolved)	0.05	0.05	mg/L	SMCL	0.001-0.01	0.01	U	0.039		0.043	
Mercury	0.002	0.001	mg/L	MCL, MML	0.0001-0.0004	0.0004	U	0.0002	U	0.0001	U
Nickel	0.1	0.05	mg/L	MCL	0.001-0.009	0.009	U	0.005	U	0.001	U
Selenium	0.01	0.005	mg/L	MCL, MML	0.0006-0.005	0.0006	U	0.005	U	0.001	U
Silver	0.05	0.025	mg/L	MML, SMCL	0.0005-0.009	0.009	U	0.0005	U	0.001	U
Thallium	0.002	0.001	mg/L	MCL	0.0006-0.001	0.001	U	0.001	U	0.001	U
Zinc	5	5	mg/L	SMCL	0.001-0.01	0.015	U	0.0095		0.0728	
Odor	3	3	TON	SMCL	1	1	U	3	H	-	-
Color	15	15	ACU	SMCL	3-5	2		3	U	-	-
Methylene Blue Active Substance	0.5	0.5	mg/L	SMCL	0.05	0.05	U	0.05	U	-	-
Corrosivity (Langlier Saturation Index)	Non-Corrosive	Non-Corrosive	mg/L	SMCL	NA	8.36		0.3		-	-
Cyanide (as free cyanide)	0.2	0.1	mg/L	MCL	0.0025-0.025	0.0025	U	0.025	U	-	-
Fluoride	2	1	mg/L	MCL, MML, SMCL	0.1-0.5	0.11	U	0.66		-	-
Combined Radium 226/228	5	2.5	pCi/L	MCL, MML	NA	-	U	0.209+/-0.678		-	-
Uranium	0.03	0.015	mg/L	MCL	0.001	0.001		0.001	U	-	-
Gross Alpha	15	7.5	pCi/L	MCL, MML	NA	1.79	U	3 +/- 1.4	U	-	-
Gross Beta	50	25	pCi/L	MML	NA	8.7		3.9 +/- 1.6		-	-
2,4,5-TP (Silvex)	0.01	0.005	mg/L	MCL, MML	0.0004-0.0004	0.0004	U	0.0002	U	-	-
2,4-D	0.07	0.035	mg/L	MCL, MML	0.0001-0.0002	0.0002	U	0.0001	U	-	-
Alachlor	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004	U	0.00005	U	-	-
Atrazine	0.003	0.0015	mg/L	MCL	0.00005-0.0002	0.0002	U	0.00005	U	-	-
Benzo[a]pyrene	0.0002	0.0001	mg/L	MCL	0.00002-0.00004	0.00004	U	0.00002	U	-	-
gamma-BHC (Lindane)	0.0002	0.0001	mg/L	MCL, MML	0.00001-0.00004	0.00002	U	0.00001	U	-	-
Carbofuran	0.04	0.02	mg/L	MCL	0.0005-0.002	0.001	U	0.0005	U	-	-
Chlordane	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004	U	0.0001	U	-	-
Dalapon	0.2	0.1	mg/L	MCL	0.0001-0.002	0.002	U	0.001	U	-	-
bis(2-Ethylhexyl)phthalate	0.4	0.2	mg/L	MCL	0.0006-0.001	0.001	U	0.0006	U	-	-
bis-2(ethylhexyl)adipate	0.006	0.003	mg/L	MCL	0.0002-0.001	0.001	U	0.0008	U	-	-
1,2-Dibromo-3-chloropropane(DBCP)	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00002	U	0.00001	U	-	-
Dinoseb	0.007	0.0035	mg/L	MCL	0.0001-0.0004	0.0004	U	0.0002	U	-	-
Diquat	0.02	0.01	mg/L	MCL	0.0004-0.0008	0.0004	U	0.0004	U	-	-
1,2-Dibromoethane (EDB)	0.00005	0.000025	mg/L	MCL	0.00001-0.00002	0.00001	U	0.00001	U	-	-
Endothall	0.1	0.05	mg/L	MCL	0.005-0.01	0.01	U	0.005	U	-	-
Endrin	0.0002	0.0001	mg/L	MCL, MML	0.00002	0.00002	U	0.0002	U	-	-
Glyphosate	0.7	0.35	mg/L	MCL	0.006-0.01	0.01	U	0.006	U	-	-
Heptachlor	0.0004	0.0002	mg/L	MCL	0.00001-0.00008	0.00004	U	0.00001	U	-	-
Heptachlor Epoxide	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00002	U	0.00001	U	-	-
Hexachlorobenzene	0.001	0.0005	mg/L	MCL	0.00005-0.0002	0.0001	U	0.00005	U	-	-
Hexachlorocyclopentadiene	0.05	0.025	mg/L	MCL	0.00005-0.0002	0.0002	U	0.00005	U	-	-
Methoxychlor	0.04	0.02	mg/L	MCL, MML	0.00005-0.0002	0.0002	U	0.00005	U	-	-
Polychlorinated Biphenyls (PCBs)	0.0005	0.00025	mg/L	MCL	0.00008-0.0002	0.0002	U	0.00008	U	-	-
Pentachlorophenol	0.001	0.0005	mg/L	MCL	0.00008-0.001	0.00008	U	0.00004	U	-	-
Picloram	0.5	0.25	mg/L	MCL	0.0001-0.0002	0.0002	U	0.0001	U	-	-
Simazine	0.004	0.002	mg/L	MCL	0.00005-0.0001	0.0001	U	0.00005	U	-	-
Toxaphene	0.003	0.0015	mg/L	MCL, MML	0.0005-0.002	0.001	U	0.0005	U	-	-
Vydate (Oxamyl)	0.2	0.1	mg/L	MCL	0.0005-0.004	0.002	U	0.0005	U	-	-
1,1,1-Trichloroethane	0.2	0.1	mg/L	MCL, MML	0.0005	0.0005	U	0.0005	U	-	-
1,1,2-Trichloroethane	0.005	0.0025	mg/L	MCL	0.0005	0.0005	U	0.0005	U	-	-
1,1,1-Dichloroethane	0.007	0.0035	mg/L	MCL, MML	0.0005	0.0005	U	0.0005	U	-	-
1,2,4-Trichlorobenzene	0.07	0.035	mg/L	MCL	0.0005	0.0005	U	0.0005	U	-	-
1,2-Dichlorobenzene	0.6	0.3	mg/L	MCL	0.0005	0.0005	U	0.0005	U	-	-
1,2-Dichloroethane	0.005	0.0025	mg/L	MCL, MML	0.0005	0.0005	U	0.0005	U	-	-
1,2-Dichloropropane	0.005	0.0025	mg/L	MCL	0.0005	0.0005	U	0.0005	U	-	-
1,4-Dichlorobenzene	0.075	0.0375	mg/L	MCL, MML	0.0005	0.0005	U	0.0005	U	-	-
Benzene	0.005	0.0025	mg/L	MCL, MML	0.0005	0.0005</					

Attachment A.

Madison Farms Water Quality Data Compilation

Analyte	Lowest Regulatory Standard	Limited License Action Level	Units	Regulatory Criteria	MDL*	MAD-C1SW-1	MAD-C1SW-2	MAD-C2SW-1	MAD-C3SW-1	MAD-SW-C4-1	MAD-SW-C4-2
						Source Water	Source Water	Source Water	Source Water	Source Water	Source Water
						Cycle 1 3/13/2006	Cycle 1 3/13/2006	Cycle 2 3/22/2006	Cycle 3 3/13/2007	Cycle 4 2/4/2008	Cycle 4 4/14/2008
Fecal Coliform / E.Coli			CFU/100 mL		1	-	-	Absent	Absent	Absent	-
Total Coliform	<1/100 ML	None	CFU/100 ml	MML	1	-	-	Present	Present	Absent	-
Chloroform (Trichloromethane)	None	None	mg/L	URC	0.0005	0.0005 U	-	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Bromodichloromethane	None	None	mg/L	None	0.0005	0.0005 U	-	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Dibromochloromethane	None	None	mg/L	None	0.0005	0.0005 U	-	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Bromoform (Tribromomethane)	None	None	mg/L	URC	0.0005	0.0005 U	-	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Total Trihalomethanes	0.08	0.08	mg/L	MCL, MML	0.0005	0.0005 U	-	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Monochloroacetic Acid	None	None	mg/L	None	0.002	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U
Dichloroacetic Acid	None	None	mg/L	None	0.001	0.001 U	-	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroacetic Acid	None	None	mg/L	None	0.001	0.001 U	-	0.001 U	0.001 U	0.001 U	0.001 U
Monobromoacetic Acid	None	None	mg/L	None	0.001	0.001 U	-	0.001 U	0.001 U	0.001 U	0.001 U
Dibromoacetic Acid	None	None	mg/L	None	0.001	0.001 U	-	0.001 U	0.001 U	0.001 U	0.001 U
Total Haloacetic Acids	0.06	0.06	mg/L	MCL	0.001	0.001 U	-	0.001 U	0.001 U	0.001 U	0.001 U
Temperature	None	None	Celsius	None	NA	11.1	11.6	11.5	11.1	12.3	10.9
Conductivity	None	None	µS/cm	None	NA	525	532	564	697	783	620
Dissolved Oxygen	None	None	mg/L	None	NA	-	-	-	-	8.8	8.7
pH	6 - 8.5	6 - 8.5	Units	SMCL	NA	6.98	7.03	7	7.47	7.5	7.03
Turbidity	1	0.5	NTU	MCL, MML	NA	0.3	0.21	0.37	0.95	-	-
ORP	None	None	mV	None	NA	27	55	70	67	79	109
Bicarbonate	None	None	mg/L	None	2	291	295	240	320	261	200
Calcium	None	None	mg/L	None	0.1	50.7	49.6	47.6	58	60.9	46.3
Carbonate	None	None	mg/L	None	2-10	2	2	2	2	5	10
Chloride	250	250	mg/L	SMCL	0.1-1	12	14	16	17	28.2	11.7
Hardness (as CaCO3)	250	None	mg/L	URC	1-4	200	195	184	230	235	185
Magnesium	None	None	mg/L	None	0.05-0.1	17.8	17.3	15.9	21	20.2	16.7
Nitrate as N	10	7	mg/L	MML	0.003-0.5	5.2	5.5	5.54	6.4	8.99	-
Nitrite as N	1	0.5	mg/L	MCL	0.0004-0.5	0.01 U	0.01 U	0.01 U	0.01 U	0.5 U	-
Total Nitrate-Nitrite	10	7	mg/L	MML	0.003-0.5	5.2	5.5	5.54	6.4	8.99	6.17
Potassium	None	None	mg/L	None	0.1	4.6	4.5	4.52	4.8	4.9	4.29
Silica (as SiO2)	None	None	mg/L	None	0.1-0.2	43.7	44.8	39.8	54	21.6	46.8
Silicon	None	None	mg/L	None	0.1-0.2	-	-	-	-	-	-
Sodium	20	None	mg/L	URC (advisory)	0.05-0.1	55.9	54	49.6	58	57	50.7
Sulfate	250	250	mg/L	URC, SMCL	1-5	34	30	26.9	46	70.8	65.9
Total Alkalinity	250	250	mg/L	SMCL	1-2	239	239	197	262	261	200
Total Dissolved Solids	500	500	mg/L	SMCL	0.7-10	370	362	354	432	466	421
Total Organic Carbon	None	None	mg/L	None	0.1-0.5	3.2	3.1	4.5	2.9	3.12	3.57
Total Suspended Solids	None	None	mg/L	None	1-10	2	2	2	2	1	3.26
Aluminum	0.05	0.05	mg/L	SMCL	0.007-0.05	-	-	-	0.05 U	0.01 U	0.01 U
Antimony	0.006	0.003	mg/L	MCL	0.001	0.001 U	-	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	0.05	0.025	mg/L	MCL, MML	0.0009-0.002	0.002 U	-	0.002 U	0.0017 U	0.00187 U	0.00173 U
Barium	1	0.5	mg/L	MCL, MML	0.001-0.05	0.089	-	0.079	0.091	0.109	0.0841
Beryllium	0.004	0.002	mg/L	MCL	0.0005-0.003	0.0005 U	-	0.0005 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.0025	mg/L	MCL, MML	0.0002-0.001	0.001 U	-	0.001 U	0.0005 U	0.001 U	0.001 U
Chromium	0.05	0.025	mg/L	MCL, MML	0.001-0.005	-	-	0.0071	0.002 U	0.00257 U	0.001 U
Copper	1.3	0.65	mg/L	MCL, MML	0.001-0.005	-	-	-	0.0079 U	0.00198 U	0.00222 U
Iron (Total)	None	None	mg/L	None	0.01-0.05	0.004	-	0.05 U	0.05 U	0.489	0.01 U
Iron (Dissolved)	0.3	0.3	mg/L	SMCL	0.01-0.05	-	-	-	0.05 U	0.535	0.01 U
Lead	0.015	0.0075	mg/L	Action Level	0.0005-0.001	0.001 U	-	0.001 U	0.0005 U	0.001 U	0.001 U
Manganese (Total)	None	None	mg/L	None	0.001-0.01	0.002 U	-	0.002 U	0.002 U	0.001 U	0.001 U
Manganese (Dissolved)	0.05	0.05	mg/L	SMCL	0.001-0.01	0.002 U	-	0.002 U	0.002 U	0.001 U	0.001 U
Mercury	0.002	0.001	mg/L	MCL, MML	0.0001-0.0004	0.0004 U	-	0.0004 U	0.0002 U	0.0001 U	0.0001 U
Nickel	0.1	0.05	mg/L	MCL	0.001-0.009	0.004 U	-	0.004 U	0.005 U	0.001 U	0.001 U
Selenium	0.01	0.005	mg/L	MCL, MML	0.0006-0.005	0.002 U	-	0.002 U	0.002 U	0.00234 U	0.001 U
Silver	0.05	0.025	mg/L	MML, SMCL	0.0005-0.009	0.005 U	-	0.005 U	0.005 U	0.001 U	0.001 U
Thallium	0.002	0.001	mg/L	MCL	0.0006-0.001	0.0006 U	-	0.0006 U	0.0006 U	0.001 U	0.001 U
Zinc	5	5	mg/L	SMCL	0.001-0.01	0.01 U	-	0.01 U	0.01 U	0.00521 U	0.0026 U
Odor	3	3	TON	SMCL	1	-	-	6	1	1	-
Color	15	15	ACU	SMCL	3-5	-	-	-	3	5	-
Methylene Blue Active Substance	0.5	0.5	mg/L	SMCL	0.05	0.05 U	-	0.05 U	0.05 U	0.05 U	-
Corrosivity (Langlier Saturation Index)	Non-Corrosive	Non-Corrosive	mg/L	SMCL	NA	7.81	-	9.05	0.2	0.809	-
Cyanide (as free cyanide)	0.2	0.1	mg/L	MCL	0.0025-0.025	-	-	-	0.025 U	0.01 U	-
Fluoride	2	1	mg/L	MCL, MML, SMCL	0.1-0.5	0.5 U	-	0.57	0.38	0.544	-
Combined Radium 226/228	5	2.5	pCi/L	MCL, MML	NA	-	-	-	0.286+/-0.685	0.27 +/- 0.49	-
Uranium	0.03	0.015	mg/L	MCL	0.001	0.008	-	0.004	0.0083	0.00798	-
Gross Alpha	15	7.5	pCi/L	MCL, MML	NA	5.3	-	3.7	3.4 +/- 2	5.36 +/- 1.25	-
Gross Beta	50	25	pCi/L	MML	NA	8.6	-	6.9	3 +/- 1.3	5.55 +/- 0.86	-
2,4,5-TP (Silvex)	0.01	0.005	mg/L	MCL, MML	0.0004-0.0004	0.0004 U	-	0.0004 U	0.0002 U	0.0001 U	-
2,4-D	0.07	0.035	mg/L	MCL, MML	0.0001-0.0002	0.0002 U	-	0.0002 U	0.0001 U	0.0001 U	-
Alachlor	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004 U	-	0.0004 U	0.00005 U	0.0004 U	-
Atrazine	0.003	0.0015	mg/L	MCL	0.00005-0.0002	0.0002 U	-	0.0002 U	0.00005 U	0.0002 U	-
Benzo[a]pyrene	0.0002	0.0001	mg/L	MCL	0.00002-0.00004	0.00004 U	-	0.00004 U	0.00002 U	0.00002 U	-
gamma-BHC (Lindane)	0.0002	0.0001	mg/L	MCL, MML	0.00001-0.00004	0.00002 U	-	0.00002 U	0.00001 U	0.00004 U	-
Carbofuran	0.04	0.02	mg/L	MCL	0.0005-0.002	0.001 U	-	0.001 U	0.0005 U	0.002 U	-
Chlordane	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004 U	-	0.0004 U	0.0001 U	0.0004 U	-
Dalapon	0.2	0.1	mg/L	MCL	0.0001-0.002	0.002 U	-	0.002 U	0.001 U	0.0001 U	-
bis(2-Ethylhexyl)phthalate	0.4	0.2	mg/L	MCL	0.0006-0.001	0.001 U	-	0.001 U	0.0006 U	0.000683 U	-
bis(2-ethylhexyl)adipate	0.006	0.003	mg/L	MCL	0.0002-0.001	-	-	-	0.001 U	0.0002 U	-
1,2-Dibromo-3-chloropropane(DBCP)	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00002 U	-	0.00002 U	0.00001 U	0.00004 U	-
Dinoseb	0.007	0.0035	mg/L	MCL	0.0001-0.0004	0.0004 U	-	0.0004 U	0.0002 U	0.0001 U	-
Diquat	0.02	0.01	mg/L	MCL	0.0004-0.0008	0.0004 U	-	0.0004 U	0.0004 U	0.0008 U	-
1,2-Dibromoethane (EDB)	0.00005	0.000025	mg/L	MCL	0.00001-0.00002	0.00001 U	-	0.00001 U	0.00001 U	0.00002 U	-
Endothall	0.1	0.05	mg/L	MCL	0.005-0.01	0.01 U	-	0.01 U	0.02 U	0.01 U	-
Endrin	0.0002	0.0001	mg/L	MCL, MML	0.00002	0.00002 U	-	0.00002 U	0.0002 U	0.00002 U	-
Glyphosate	0.7	0.35	mg/L	MCL	0.006-0.01	0.01 U	-	0.01 U	0.006 U	0.009 U	-
Heptachlor	0.0004	0.0002	mg/L	MCL	0.00001-0.00008	0.00004 U	-	0.00004 U	0.00001 U	0.00008 U	-
Heptachlor Epoxide	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00002 U	-	0.00002 U	0.00001 U	0.00004 U	-
Hexachlorobenzene	0.001	0.0005	mg/L	MCL	0.00005-0.0002	0.0001 U	-	0.0001 U	0.00005 U	0.0002 U	-
Hexachlorocyclopentadiene	0.05	0.025	mg/L	MCL	0.00005-0.0002	0.0002 U	-	0.0002 U	0.00005 U	0.0002 U	-
Methoxychlor	0.04	0.02	mg/L	MCL, MML	0.00005-0.0002	0.0002 U	-	0.0002 U	0.00005 U	0.0002 U	-
Polychlorinated Biphenyls (PCBs)	0.0005	0.00025	mg/L	MCL	0.00008-0.0002	0.0002 U	-	0.0002 U	0.00008 U	0.0005 U	-
Pentachlorophenol	0.001	0.0005	mg/L	MCL	0.00008-0.001	0.00008 U	-	0.00008 U	0.001 U	0.00008 U	-
Picloram	0.5	0.25	mg/L	MCL	0.0001-0.0002	0.0002 U	-	0.0002 U	0.0001 U	0.0001 U	-
Simazine	0.004	0.002	mg/L	MCL	0.00005-0.0001	0.0001 U	-	0.0001 U	0.00005 U	0.00015 U	-
Toxaphene	0.003	0.0015	mg/L	MCL, MML	0.0005-0.002	0.001 U	-	0.001 U	0.0005 U	0.002 U	-
Vydate (Oxamyl)	0.2	0.1	mg/L	MCL	0.0005-0.004	0.002 U	-	0.002 U			

Attachment A.

Madison Farms Water Quality Data Compilation

Analyte	Lowest Regulatory Standard	Limited License Action Level	Units	Regulatory Criteria	MDL*	MAD-SW-C5-1	MAD-SW-C5-2	MAD-SW-C6-1	MAD-SW-C6-2	MAD-SW-C7-1	MAD-SW-C7-2	
						Source Water	Source Water	Source Water	Source Water	Source Water	Source Water	
						Cycle 5 1/20/2009	Cycle 5 4/27/2009	Cycle 6 2/11/2010	Cycle 6 3/24/2010	Cycle 7 12/20/2010	Cycle 7 5/3/2011	
Fecal Coliform / E.Coli			CFU/100 mL		1	1	U	-	1	U	3.1	-
Total Coliform	<1/100 ML	None	CFU/100 ml	MML	1	36.4		8.5			770.1	-
Chloroform (Trichloromethane)	None	None	mg/L	URC	0.0005	0.0005	U	0.0005	U	0.0005	0.0005	U
Bromodichloromethane	None	None	mg/L	None	0.0005	0.0005	U	0.0005	U	0.0005	0.0005	U
Dibromochloromethane	None	None	mg/L	None	0.0005	0.0005	U	0.0005	U	0.0005	0.0005	U
Bromoform (Tribromomethane)	None	None	mg/L	URC	0.0005	0.0005	U	0.0005	U	0.0005	0.0005	U
Total Trihalomethanes	0.08	0.08	mg/L	MCL, MML	0.0005	0.0005	U	0.0005	U	0.0005	0.0005	U
Monochloroacetic Acid	None	None	mg/L	None	0.002	0.002	U	0.002	U	0.002	0.002	U
Dichloroacetic Acid	None	None	mg/L	None	0.001	0.001	U	0.001	U	0.001	0.001	U
Trichloroacetic Acid	None	None	mg/L	None	0.001	0.001	U	0.001	U	0.001	0.001	U
Monobromoacetic Acid	None	None	mg/L	None	0.001	0.001	U	0.001	U	0.001	0.001	U
Dibromoacetic Acid	None	None	mg/L	None	0.001	0.001	U	0.001	U	0.001	0.001	U
Total Haloacetic Acids	0.06	0.06	mg/L	MCL	0.001	0.001	U	0.001	U	0.001	0.001	U
Temperature	None	None	Celsius	None	NA	13.2		11.4			7.4	
Conductivity	None	None	µS/cm	None	NA	811		510			554	
Dissolved Oxygen	None	None	mg/L	None	NA	7		7.8			12.7	
pH	6 - 8.5	6 - 8.5	Units	SMCL	NA	7.18		7.6			6.79	
Turbidity	1	0.5	NTU	MCL, MML	NA	-		-			0.66	
ORP	None	None	mV	None	NA	-385		267			20	
Bicarbonate	None	None	mg/L	None	2	255		188			213	
Calcium	None	None	mg/L	None	0.1	67.4		38.7		57.7	42.7	49.1
Carbonate	None	None	mg/L	None	2-10	5	U	5	U	5	U	5
Chloride	250	250	mg/L	SMCL	0.1-1	32.7		8.65		18.5	7.39	9.31
Hardness (as CaCO3)	250	None	mg/L	URC	1-4	260		154		239	119	192
Magnesium	None	None	mg/L	None	0.05-0.1	22.3		13.8		20.2	14.5	16.9
Nitrate as N	10	7	mg/L	MML	0.003-0.5	7.98		4.27		6.73	3.52	-
Nitrite as N	1	0.5	mg/L	MCL	0.0004-0.5	0.01	U	0.01	U	0.01	0.01	-
Total Nitrate-Nitrite	10	7	mg/L	MML	0.003-0.5	7.98		4.27		6.73	5.63	4.79
Potassium	None	None	mg/L	None	0.1	5.18		3.87		4.8	3.86	4.92
Silica (as SiO2)	None	None	mg/L	None	0.1-0.2	47.5		44.1		-	44.7	46
Silicon	None	None	mg/L	None	0.1-0.2	22.2		-		22	20.9	21.5
Sodium	20	None	mg/L	URC (advisory)	0.05-0.1	65.9		42.9		58.4	60.4	42.8
Sulfate	250	250	mg/L	URC, SMCL	1-5	86.6		37		87.2	55.7	37.4
Total Alkalinity	250	250	mg/L	SMCL	1-2	255		188		226	213	229
Total Dissolved Solids	500	500	mg/L	SMCL	0.7-10	525		305		440	412	335
Total Organic Carbon	None	None	mg/L	None	0.1-0.5	3.46		3.22		2.67	1.45	3.36
Total Suspended Solids	None	None	mg/L	None	1-10	2.5	U	1	U	-	1	U
Aluminum	0.05	0.05	mg/L	SMCL	0.007-0.05	0.01	U	0.0187		0.01	0.0849	0.0148
Antimony	0.006	0.003	mg/L	MCL	0.001	0.001	U	0.001	U	0.001	0.001	0.001
Arsenic	0.05	0.025	mg/L	MCL, MML	0.0009-0.002	0.0016		0.00156		0.00173	0.00125	0.00182
Barium	1	0.5	mg/L	MCL, MML	0.001-0.05	0.0974		0.0643		0.105	0.0702	0.0741
Beryllium	0.004	0.002	mg/L	MCL	0.0005-0.003	0.001	U	0.001	U	0.001	0.001	0.001
Cadmium	0.005	0.0025	mg/L	MCL, MML	0.0002-0.001	0.001	U	0.001	U	0.001	0.001	0.001
Chromium	0.05	0.025	mg/L	MCL, MML	0.001-0.005	0.00168		0.001		0.0023	0.001	0.00212
Copper	1.3	0.65	mg/L	MCL, MML	0.001-0.005	0.00154		0.00206		0.00249	0.00546	0.00302
Iron (Total)	None	None	mg/L	None	0.01-0.05	0.559		0.019		0.342	0.367	0.01
Iron (Dissolved)	0.3	0.3	mg/L	SMCL	0.01-0.05	0.369		0.01	U	0.319	-	0.01
Lead	0.015	0.0075	mg/L	Action Level	0.0005-0.001	0.001	U	0.001	U	0.001	0.001	0.001
Manganese (Total)	None	None	mg/L	None	0.001-0.01	0.001	U	0.001	U	0.001	0.0466	0.01
Manganese (Dissolved)	0.05	0.05	mg/L	SMCL	0.001-0.01	0.001	U	0.001	U	0.001	-	0.01
Mercury	0.002	0.001	mg/L	MCL, MML	0.0001-0.0004	0.0001	U	0.0001	U	0.0001	0.0001	0.0001
Nickel	0.1	0.05	mg/L	MCL	0.001-0.009	0.001	U	0.001	U	0.001	0.001	0.001
Selenium	0.01	0.005	mg/L	MCL, MML	0.0006-0.005	0.001	U	0.001	U	0.00274	0.001	0.001
Silver	0.05	0.025	mg/L	MML, SMCL	0.0005-0.009	0.001	U	0.001	U	0.001	0.001	0.001
Thallium	0.002	0.001	mg/L	MCL	0.0006-0.001	0.001	U	0.001	U	0.001	0.001	0.001
Zinc	5	5	mg/L	SMCL	0.001-0.01	0.001	U	0.00489		0.00191	0.00403	0.00381
Odor	3	3	TON	SMCL	1	1	U	-		1	U	-
Color	15	15	ACU	SMCL	3-5	5		-		10	5	-
Methylene Blue Active Substance	0.5	0.5	mg/L	SMCL	0.05	0.05	U	-		0.05	0.05	0.05
Corrosivity (Langlier Saturation Index)	Non-Corrosive	Non-Corrosive	mg/L	SMCL	NA	-0.226		-		-	-0.208	-
Cyanide (as free cyanide)	0.2	0.1	mg/L	MCL	0.0025-0.025	0.01	U	-		0.01	0.01	-
Fluoride	2	1	mg/L	MCL, MML, SMCL	0.1-0.5	0.472		-		0.508	0.535	-
Combined Radium 226/228	5	2.5	pCi/L	MCL, MML	NA	1.2 +/- 0.86		-		0.415 +/- 0.757	1.609 +/- 0.768	-
Uranium	0.03	0.015	mg/L	MCL	0.001	0.00707		-		0.00755	0.00613	-
Gross Alpha	15	7.5	pCi/L	MCL, MML	NA	7.89 +/- 1.55		-		3.84 +/- 1.79	2.20 +/- 1.58	-
Gross Beta	50	25	pCi/L	MML	NA	6.65 +/- 0.90		-		5.73 +/- 1.53	2.70 +/- 1.57	-
2,4,5-TP (Silvex)	0.01	0.005	mg/L	MCL, MML	0.0004-0.0004	0.0001	U	-		0.0001	0.0001	U
2,4-D	0.07	0.035	mg/L	MCL, MML	0.0001-0.0002	0.0001	U	-		0.0001	0.0001	U
Alachlor	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004	U	-		0.0004	0.0004	U
Atrazine	0.003	0.0015	mg/L	MCL	0.00005-0.0002	0.0002	U	-		0.0002	0.0002	U
Benzo[a]pyrene	0.0002	0.0001	mg/L	MCL	0.00002-0.00004	0.00002	U	-		0.00002	0.00002	U
gamma-BHC (Lindane)	0.0002	0.0001	mg/L	MCL, MML	0.00001-0.00004	0.00004	U	-		0.00004	0.00004	U
Carbofuran	0.04	0.02	mg/L	MCL	0.0005-0.002	0.002	U	-		0.002	0.002	U
Chlordane	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004	U	-		0.0004	0.0004	U
Dalapon	0.2	0.1	mg/L	MCL	0.0001-0.002	0.0001	U	-		0.0001	0.0001	U
bis(2-Ethylhexyl)phthalate	0.4	0.2	mg/L	MCL	0.0006-0.001	0.0006	U	-		0.0006	0.0006	U
bis-2(ethylhexyl)adipate	0.006	0.003	mg/L	MCL	0.0002-0.001	0.0002	U	-		0.0002	0.0002	U
1,2-Dibromo-3-chloropropane(DBCP)	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00004	U	-		0.00004	0.00004	U
Dinoseb	0.007	0.0035	mg/L	MCL	0.0001-0.0004	0.0001	U	-		0.0001	0.0001	U
Diquat	0.02	0.01	mg/L	MCL	0.0004-0.0008	0.0008	U	-		0.0008	0.0008	U
1,2-Dibromoethane (EDB)	0.00005	0.000025	mg/L	MCL	0.00001-0.00002	0.00002	U	-		0.00002	0.00002	U
Endothall	0.1	0.05	mg/L	MCL	0.005-0.01	0.01	U	-		0.01	0.01	U
Endrin	0.0002	0.0001	mg/L	MCL, MML	0.00002	0.00002	U	-		0.00002	0.00002	U
Glyphosate	0.7	0.35	mg/L	MCL	0.006-0.01	0.009	U	-		0.009	0.009	U
Heptachlor	0.0004	0.0002	mg/L	MCL	0.00001-0.00008	0.00008	U	-		0.00008	0.00008	U
Heptachlor Epoxide	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00004	U	-		0.00004	0.00004	U
Hexachlorobenzene	0.001	0.0005	mg/L	MCL	0.00005-0.0002	0.0002	U	-		0.0002	0.0002	U
Hexachlorocyclopentadiene	0.05	0.025	mg/L	MCL	0.00005-0.0002	0.0002	U	-		0.0002	0.0002	U
Methoxychlor	0.04	0.02	mg/L	MCL, MML	0.00005-0.0002	0.0002	U	-		0.0002	0.0002	U
Polychlorinated Biphenyls (PCBs)	0.0005	0.00025	mg/L	MCL	0.00008-0.0002	0.0005	U	-		0.0005	0.0005	U
Pentachlorophenol	0.001	0.0005	mg/L	MCL	0.00008-0.0001	0.00008	U	-		0.00008	0.00008	U
Picloram	0.5	0.25	mg/L	MCL	0.0001-0.0002	0.0001	U	-		0.0001	0.0001	U
Simazine	0.004	0.002	mg/L	MCL	0.00005-0.0001	0.00015	U	-		0.00015	0.00015	U
Toxaphene	0.003	0.0015	mg/L	MCL, MML	0.0005-0.002	0.002	U	-		0.002	0.	

Attachment A.

Madison Farms Water Quality Data Compilation

Analyte	Lowest Regulatory Standard	Limited License Action Level	Units	Regulatory Criteria	MDL*	MAD-C1R-1 Recovery	MAD-C1R-2 Recovery	MAD-C2R-1 Recovery	MAD-C2R-2 Recovery	MAD-C2R-3 Recovery	MAD-C3R-1 Recovery	MAD-C3R-2 Recovery
						Cycle 1	Cycle 1	Cycle 2	Cycle 2	Cycle 2	Cycle 3	Cycle 3
						3/14/2006	3/14/2006	8/14/2006	8/17/2006	8/28/2006	6/11/2007	6/27/2007
Fecal Coliform / E.Coli			CFU/100 mL		1	-	-	-	3	-	Absent	Absent
Total Coliform	<1/100 ML	None	CFU/100 ml	MML	1	-	-	-	Present	-	Absent	Present
Chloroform (Trichloromethane)	None	None	mg/L	URC	0.0005	0.0005	U	-	0.0005	U	0.0005	U
Bromodichloromethane	None	None	mg/L	None	0.0005	0.0005	U	-	0.0005	U	0.0005	U
Dibromochloromethane	None	None	mg/L	None	0.0005	0.0005	U	-	0.0005	U	0.0005	U
Bromoform (Tribromomethane)	None	None	mg/L	URC	0.0005	0.0005	U	-	0.0005	U	0.0005	U
Total Trihalomethanes	0.08	0.08	mg/L	MCL, MML	0.0005	0.0005	U	-	0.0005	U	0.0005	U
Monochloroacetic Acid	None	None	mg/L	None	0.002	0.002	U	-	0.002	U	0.002	U
Dichloroacetic Acid	None	None	mg/L	None	0.001	0.001	U	-	0.001	U	0.001	U
Trichloroacetic Acid	None	None	mg/L	None	0.001	0.001	U	-	0.001	U	0.001	U
Monobromoacetic Acid	None	None	mg/L	None	0.001	0.001	U	-	0.001	U	0.001	U
Dibromoacetic Acid	None	None	mg/L	None	0.001	0.001	U	-	0.001	U	0.001	U
Total Haloacetic Acids	0.06	0.06	mg/L	MCL	0.001	0.001	U	-	0.001	U	0.001	U
Temperature	None	None	Celsius	None	NA	14.4		14.9	18.4	20.4	18.4	19.7
Conductivity	None	None	µS/cm	None	NA	492		380	381	399	497	429
Dissolved Oxygen	None	None	mg/L	None	NA	-		-	-	-	-	-
pH	6 - 8.5	6 - 8.5	Units	SMCL	NA	7.88		7.7	7.64	7.49	7.69	7.76
Turbidity	1	0.5	NTU	MCL, MML	NA	0.39		0.2	2.84	0.31	0.63	0.73
ORP	None	None	mV	None	NA	63		-100	-52	-114	16	3
Bicarbonate	None	None	mg/L	None	2	261		227	170	158	250	220
Calcium	None	None	mg/L	None	0.1	34.9		26.9	-	27.7	45.2	36
Carbonate	None	None	mg/L	None	2-10	2	U	2	2	2	2	2
Chloride	250	250	mg/L	SMCL	0.1-1	16		14	-	13.1	13	7.6
Hardness (as CaCO3)	250	None	mg/L	URC	1-4	155		117	119	105	160	120
Magnesium	None	None	mg/L	None	0.05-0.1	16.4		12.2	-	12.1	11	13
Nitrate as N	10	7	mg/L	MML	0.003-0.5	3.1		0.22	-	0.5	0.2	0.2
Nitrite as N	1	0.5	mg/L	MCL	0.0004-0.5	0.01	U	0.01	U	0.01	0.01	0.2
Total Nitrate-Nitrite	10	7	mg/L	MML	0.003-0.5	3.1		0.22	-	0.5	0.2	0.2
Potassium	None	None	mg/L	None	0.1	8.04		8.05	-	7.45	7.3	7
Silica (as SiO2)	None	None	mg/L	None	0.1-0.2	55.2		56.7	-	31.4	31.3	64
Silicon	None	None	mg/L	None	0.1-0.2	-		-	-	-	-	-
Sodium	20	None	mg/L	URC (advisory)	0.05-0.1	49.6		43.9	-	52.7	45.2	48
Sulfate	250	250	mg/L	URC, SMCL	1-5	16.9		41.6	-	15.1	10.9	25
Total Alkalinity	250	250	mg/L	SMCL	1-2	214		186	-	170	158	207
Total Dissolved Solids	500	500	mg/L	SMCL	0.7-10	312		264	-	272	236	326
Total Organic Carbon	None	None	mg/L	None	0.1-0.5	1.9		1.1	-	1.1	0.88	2
Total Suspended Solids	None	None	mg/L	None	1-10	2	U	2	U	2	10	10
Aluminum	0.05	0.05	mg/L	SMCL	0.007-0.05	0.05	U	-	-	0.05	0.05	0.02
Antimony	0.006	0.003	mg/L	MCL	0.001	0.001	U	-	-	0.001	0.001	0.001
Arsenic	0.05	0.025	mg/L	MCL, MML	0.0009-0.002	0.002	U	-	-	0.002	0.002	0.0016
Barium	1	0.5	mg/L	MCL, MML	0.001-0.05	0.087		-	-	0.057	0.064	0.074
Beryllium	0.004	0.002	mg/L	MCL	0.0005-0.003	0.0005	U	-	-	0.0005	0.0005	0.001
Cadmium	0.005	0.0025	mg/L	MCL, MML	0.0002-0.001	0.001	U	-	-	0.001	0.001	0.0005
Chromium	0.05	0.025	mg/L	MCL, MML	0.001-0.005	0.0109		-	-	0.002	0.002	0.001
Copper	1.3	0.65	mg/L	MCL, MML	0.001-0.005	0.005	U	-	-	0.005	0.005	0.002
Iron (Total)	None	None	mg/L	None	0.01-0.05	0.054		-	-	0.049	0.046	0.034
Iron (Dissolved)	0.3	0.3	mg/L	SMCL	0.01-0.05	0.05	U	-	-	0.033	0.042	0.02
Lead	0.015	0.0075	mg/L	Action Level	0.0005-0.001	0.001	U	-	-	0.001	0.001	0.0005
Manganese (Total)	None	None	mg/L	None	0.001-0.01	0.0741		-	-	0.055	0.046	0.065
Manganese (Dissolved)	0.05	0.05	mg/L	SMCL	0.001-0.01	0.002	U	-	-	0.053	0.044	0.066
Mercury	0.002	0.001	mg/L	MCL, MML	0.0001-0.0004	0.0004	U	-	-	0.0004	0.0004	0.0002
Nickel	0.1	0.05	mg/L	MCL	0.001-0.009	0.004	U	-	-	0.004	0.004	0.005
Selenium	0.01	0.005	mg/L	MCL, MML	0.0006-0.005	0.002	U	-	-	0.002	0.002	0.005
Silver	0.05	0.025	mg/L	MML, SMCL	0.0005-0.009	0.005	U	-	-	0.005	0.005	0.0005
Thallium	0.002	0.001	mg/L	MCL	0.0006-0.001	0.0006	U	-	-	0.0006	-	0.001
Zinc	5	5	mg/L	SMCL	0.001-0.01	0.01	U	-	-	0.023	0.026	0.02
Odor	3	3	TON	SMCL	1	-		-	-	-	3	H
Color	15	15	ACU	SMCL	3-5	-		-	-	5	-	-
Methylene Blue Active Substance	0.5	0.5	mg/L	SMCL	0.05	0.05	U	-	-	-	-	-
Corrosivity (Langlier Saturation Index)	Non-Corrosive	Non-Corrosive	mg/L	SMCL	NA	8.7		-	-	-	0.4	0.2
Cyanide (as free cyanide)	0.2	0.1	mg/L	MCL	0.0025-0.025	-		-	-	-	0.025	U
Fluoride	2	1	mg/L	MCL, MML, SMCL	0.1-0.5	0.5	U	-	-	0.6	-	0.5
Combined Radium 226/228	5	2.5	pCi/L	MCL, MML	NA	-		-	-	-	0.327+/-0.154	-
Uranium	0.03	0.015	mg/L	MCL	0.001	0.001		-	-	-	0.001	U
Gross Alpha	15	7.5	pCi/L	MCL, MML	NA	1.79	U	-	-	1.79	U	3
Gross Beta	50	25	pCi/L	MML	NA	10.2		-	-	5.2	-	6
2,4,5-TP (Silvex)	0.01	0.005	mg/L	MCL, MML	0.0004-0.0004	0.0004	U	-	-	0.0004	U	0.0002
2,4-D	0.07	0.035	mg/L	MCL, MML	0.0001-0.0002	0.0002	U	-	-	0.0002	U	0.0001
Alachlor	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004	U	-	-	0.0004	U	0.00005
Atrazine	0.003	0.0015	mg/L	MCL	0.00005-0.0002	0.0002	U	-	-	0.0002	U	0.00005
Benzo[a]pyrene	0.0002	0.0001	mg/L	MCL	0.00002-0.00004	0.00004	U	-	-	0.00004	U	0.00002
gamma-BHC (Lindane)	0.0002	0.0001	mg/L	MCL, MML	0.00001-0.00004	0.00002	U	-	-	0.00002	U	0.00001
Carbofuran	0.04	0.02	mg/L	MCL	0.0005-0.002	0.001	U	-	-	0.001	U	0.0005
Chlordane	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004	U	-	-	0.0004	U	0.00005
Dalapon	0.2	0.1	mg/L	MCL	0.0001-0.002	0.002	U	-	-	0.002	U	0.001
bis(2-Ethylhexyl)phthalate	0.4	0.2	mg/L	MCL	0.0006-0.001	0.001	U	-	-	0.001	U	0.0006
bis-2(ethylhexyl)adipate	0.006	0.003	mg/L	MCL	0.0002-0.001	0.001	U	-	-	0.001	U	0.0006
1,2-Dibromo-3-chloropropane(DBCP)	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00002	U	-	-	0.00002	U	0.00001
Dinoseb	0.007	0.0035	mg/L	MCL	0.0001-0.0004	0.0004	U	-	-	0.0004	U	0.0002
Diquat	0.02	0.01	mg/L	MCL	0.0004-0.0008	0.0004	U	-	-	0.0004	U	0.0004
1,2-Dibromoethane (EDB)	0.00005	0.000025	mg/L	MCL	0.00001-0.00002	0.00001	U	-	-	0.00001	U	0.00001
Endothall	0.1	0.05	mg/L	MCL	0.005-0.01	0.01	U	-	-	0.01	U	0.02
Endrin	0.0002	0.0001	mg/L	MCL, MML	0.00002	0.00002	U	-	-	0.00002	U	0.0002
Glyphosate	0.7	0.35	mg/L	MCL	0.006-0.01	0.01	U	-	-	0.01	U	0.006
Heptachlor	0.0004	0.0002	mg/L	MCL	0.00001-0.00008	0.00004	U	-	-	0.00004	U	0.00003
Heptachlor Epoxide	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00002	U	-	-	0.00002	U	0.00004
Hexachlorobenzene	0.001	0.0005	mg/L	MCL	0.00005-0.0002	0.0001	U	-	-	0.0001	U	0.00005
Hexachlorocyclopentadiene	0.05	0.025	mg/L	MCL	0.00005-0.0002	0.0002	U	-	-	0.0002	U	0.00005
Methoxychlor	0.04	0.02	mg/L	MCL, MML	0.00005-0.0002	0.0002	U	-	-	0.0002	U	0.0001
Polychlorinated Biphenyls (PCBs)	0.0005	0.00025	mg/L	MCL	0.00008-0.0002	0.0002	U	-	-	0.0002	U	0.00008
Pentachlorophenol	0.001	0.0005	mg/L	MCL	0.00008-0.001	0.00008	U	-	-	0.00008	U	0.001
Picloram	0.5	0.25	mg/L	MCL	0.0001-0.0002	0.0002	U	-	-	0.0002	U	0.0001
Simazine	0.004	0.002	mg/L	MCL	0.00005-0.0001	0.0001	U	-	-	0.0001	U	0.0005
Toxaphene	0.003	0.0015	mg/L	MCL, MML	0.0005-0.002	0.001	U	-	-	0.001	U	0.0005
Vydate (Oxamyl)	0.2	0.1	mg/L	MCL	0.0005-0.004	0.002	U	-	-	0.002	U	0.0005
1,1,1-Trichloroethane	0.2	0.1	mg/L									

Attachment A.

Madison Farms Water Quality Data Compilation

Analyte	Lowest Regulatory Standard	Limited License Action Level	Units	Regulatory Criteria	MDL*	MAD-RW-C4-1	MAD-RW-C4-2	MAD-RW-C5-1	MAD-RW-C5-2	MAD-RW-C6-1	MAD-RW-C7-1	MAD-RW-C7-2
						Recovery	Recovery	Recovery	Recovery	Recovery	Recovery	Recovery
						Cycle 4 8/4/2008	Cycle 4 9/8/2008	Cycle 5 6/30/2009	Cycle 5 9/2/2009	Cycle 6 9/13/2010	Cycle 7 5/31/2011	Cycle 7 10/18/2011
Fecal Coliform / E.Coli			CFU/100 mL		1	Absent	-	1	-	1	-	-
Total Coliform	<1/100 ML	None	CFU/100 ml	MML	1	Present	-	1	-	2	-	-
Chloroform (Trichloromethane)	None	None	mg/L	URC	0.0005	0.0005 U	0.0005 U	0.00241 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Bromodichloromethane	None	None	mg/L	None	0.0005	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Dibromochloromethane	None	None	mg/L	None	0.0005	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Bromofom (Tribromomethane)	None	None	mg/L	URC	0.0005	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Total Trihalomethanes	0.08	0.08	mg/L	MCL, MML	0.0005	0.0005 U	0.0005 U	0.00241 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Monochloroacetic Acid	None	None	mg/L	None	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Dichloroacetic Acid	None	None	mg/L	None	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroacetic Acid	None	None	mg/L	None	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Monobromoacetic Acid	None	None	mg/L	None	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dibromoacetic Acid	None	None	mg/L	None	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Haloacetic Acids	0.06	0.06	mg/L	MCL	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Temperature	None	None	Celsius	None	NA	14.5	15.5	15.1	17.4	18	-	14.6
Conductivity	None	None	µS/cm	None	NA	567	526	535	476	416	-	488
Dissolved Oxygen	None	None	mg/L	None	NA	5.8	5.3	0	0	2.5	-	2.3
pH	6 - 8.5	6 - 8.5	Units	SMCL	NA	7.25	7.62	7.18	7.86	7.31	-	7.67
Turbidity	1	0.5	NTU	MCL, MML	NA	-	-	-	-	-	0.11	0.21
ORP	None	None	mV	None	NA	-1	1	47	36	143	-	124
Bicarbonate	None	None	mg/L	None	2	237	219	212	190	22	-	204
Calcium	None	None	mg/L	None	0.1	41.8	36.4	34.4	28	27.8	46.4	34.9
Carbonate	None	None	mg/L	None	2-10	5	5	5	5	5	5	5
Chloride	250	250	mg/L	SMCL	0.1-1	10.9	8.62	3.37	14.8	14.2	11	11.3
Hardness (as CaCO3)	250	None	mg/L	URC	1-4	175	152	145	122	121	186	149
Magnesium	None	None	mg/L	None	0.05-0.1	17.0	14.8	14.4	12.5	12.4	17.1	14.9
Nitrate as N	10	7	mg/L	MML	0.003-0.5	0.01 U	0.5 U	0.08 U	0.08 U	0.08 U	1.24	0.003 U
Nitrite as N	1	0.5	mg/L	MCL	0.0004-0.5	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.392	0.0004 U
Total Nitrate-Nitrite	10	7	mg/L	MML	0.003-0.5	0.01 U	0.5 U	0.08 U	0.08 U	0.08 U	1.63	0.003 U
Potassium	None	None	mg/L	None	0.1	6.31	6.08	5.35	6.05	7.19	5.23	6.65
Silica (as SiO2)	None	None	mg/L	None	0.1-0.2	31.7	-	48.8	49.6	59.3	47.5	50.5
Silicon	None	None	mg/L	None	0.1-0.2	-	25.9	-	-	27.7	22.2	23.6
Sodium	20	None	mg/L	URC (advisory)	0.05-0.1	52.9	44.4	42.6	39.8	44.1	42.8	38.5
Sulfate	250	250	mg/L	URC, SMCL	1-5	54.3	18.6	49.4	29.5	13.5	39.7	26.6
Total Alkalinity	250	250	mg/L	SMCL	1-2	237	219	212	190	172	239	204
Total Dissolved Solids	500	500	mg/L	SMCL	0.7-10	370	343	334	321	349	333	326
Total Organic Carbon	None	None	mg/L	None	0.1-0.5	3.26	2.84	2.39	1.73	1.32	3.25	2.31
Total Suspended Solids	None	None	mg/L	None	1-10	5	5	1	1	1	1	1.63
Aluminum	0.05	0.05	mg/L	SMCL	0.007-0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0137 U
Antimony	0.006	0.003	mg/L	MCL	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	0.05	0.025	mg/L	MCL, MML	0.0009-0.002	0.00144 U	0.00157 U	0.00114 U	0.0015 U	0.00175 U	0.00131 U	0.00164 U
Barium	1	0.5	mg/L	MCL, MML	0.001-0.05	0.0726 U	0.0721 U	0.0599 U	0.0531 U	0.0424 U	0.0717 U	0.0549 U
Beryllium	0.004	0.002	mg/L	MCL	0.0005-0.003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.0025	mg/L	MCL, MML	0.0002-0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chromium	0.05	0.025	mg/L	MCL, MML	0.001-0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00132 U
Copper	1.3	0.65	mg/L	MCL, MML	0.001-0.005	0.00206 U	0.00879 U	0.00127 U	0.00158 U	0.001 U	0.00174 U	0.00159 U
Iron (Total)	None	None	mg/L	None	0.01-0.05	0.0782 U	0.308 U	0.191 U	0.231 U	0.234 U	0.017 U	0.344 U
Iron (Dissolved)	0.3	0.3	mg/L	SMCL	0.01-0.05	0.0488 U	0.240 U	0.01 U	0.181 U	0.242 U	-	-
Lead	0.015	0.0075	mg/L	Action Level	0.0005-0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Manganese (Total)	None	None	mg/L	None	0.001-0.01	0.0717 U	0.0745 U	0.0494 U	0.047 U	0.0366 U	0.0219 U	0.0488 U
Manganese (Dissolved)	0.05	0.05	mg/L	SMCL	0.001-0.01	0.0249 U	0.0588 U	0.0471 U	0.0396 U	0.0395 U	-	-
Mercury	0.002	0.001	mg/L	MCL, MML	0.0001-0.0004	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Nickel	0.1	0.05	mg/L	MCL	0.001-0.009	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Selenium	0.01	0.005	mg/L	MCL, MML	0.0006-0.005	0.001 U	0.001 U	0.001 U	0.00121 U	0.001 U	0.001 U	0.00135 U
Silver	0.05	0.025	mg/L	MML, SMCL	0.0005-0.009	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Thallium	0.002	0.001	mg/L	MCL	0.0006-0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Zinc	5	5	mg/L	SMCL	0.001-0.01	0.0176 U	0.0998 U	0.00627 U	0.00375 U	0.00102 U	0.0031 U	0.0284 U
Odor	3	3	TON	SMCL	1	1 U	-	1 U	-	1 U	1 U	-
Color	15	15	ACU	SMCL	3-5	5 U	-	10 U	-	5 U	5 U	-
Methylene Blue Active Substance	0.5	0.5	mg/L	SMCL	0.05	0.05 U	-	0.05 U	-	0.05 U	0.05 U	-
Corrosivity (Langlier Saturation Index)	Non-Corrosive	Non-Corrosive	mg/L	SMCL	NA	-0.0116	-	-0.359	-	-0.474	-0.237	-
Cyanide (as free cyanide)	0.2	0.1	mg/L	MCL	0.0025-0.025	0.01 U	-	0.01 U	-	0.01 U	0.01 U	-
Fluoride	2	1	mg/L	MCL, MML, SMCL	0.1-0.5	0.594 U	-	0.334 U	-	0.683 U	0.523 U	-
Combined Radium 226/228	5	2.5	pCi/L	MCL, MML	NA	0.73 +/- 0.46	-	0.11 +/- 0.11	-	0.533 +/- 0.772	0.1845	-
Uranium	0.03	0.015	mg/L	MCL	0.001	0.00151 U	-	0.00386 U	-	0.001 U	0.00311 U	-
Gross Alpha	15	7.5	pCi/L	MCL, MML	NA	2.12 +/- 1.01	-	4.97 +/- 1.57	-	0.077 +/- 0.666	1.99 +/- 1.65	-
Gross Beta	50	25	pCi/L	MML	NA	6.82 +/- 1.06	-	6.71 +/- 1.27	-	0.570 +/- 0.748	1.11 +/- 1.34	-
2,4,5-TP (Silvex)	0.01	0.005	mg/L	MCL, MML	0.0004-0.0004	0.0001 U	-	0.0001 U	-	0.0001 U	0.0001 U	-
2,4-D	0.07	0.035	mg/L	MCL, MML	0.0001-0.0002	0.0001 U	-	0.0001 U	-	0.0001 U	0.0001 U	-
Alachlor	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004 U	-	0.0004 U	-	0.0004 U	0.0004 U	-
Atrazine	0.003	0.0015	mg/L	MCL	0.00005-0.0002	0.0002 U	-	0.0002 U	-	0.0002 U	0.0002 U	-
Benzo[a]pyrene	0.0002	0.0001	mg/L	MCL	0.00002-0.00004	0.00002 U	-	0.00002 U	-	0.00002 U	0.00002 U	-
gamma-BHC (Lindane)	0.0002	0.0001	mg/L	MCL, MML	0.00001-0.00004	0.00004 U	-	0.00004 U	-	4.00E-05 U	0.00004 U	-
Carbofuran	0.04	0.02	mg/L	MCL	0.0005-0.002	0.002 U	-	0.002 U	-	0.002 U	0.002 U	-
Chlordane	0.002	0.001	mg/L	MCL	0.00005-0.0004	0.0004 U	-	0.0004 U	-	0.0004 U	0.0004 U	-
Dalapon	0.2	0.1	mg/L	MCL	0.0001-0.002	0.0001 U	-	0.0001 U	-	0.0001 U	0.0001 U	-
bis(2-Ethylhexyl)phthalate	0.4	0.2	mg/L	MCL	0.0006-0.001	0.0006 U	-	0.0006 U	-	0.0006 U	0.0006 U	-
bis-2(ethylhexyl)adipate	0.006	0.003	mg/L	MCL	0.0002-0.001	0.0002 U	-	0.0002 U	-	0.0002 U	0.0002 U	-
1,2-Dibromo-3-chloropropane(DBCP)	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00004 U	-	0.00004 U	-	4.00E-05 U	0.00004 U	-
Dinoseb	0.007	0.0035	mg/L	MCL	0.0001-0.0004	0.0001 U	-	0.0001 U	-	0.0001 U	0.0001 U	-
Diquat	0.02	0.01	mg/L	MCL	0.0004-0.0008	0.0008 U	-	0.0008 U	-	0.0008 U	0.0008 U	-
1,2-Dibromoethane (EDB)	0.00005	0.000025	mg/L	MCL	0.00001-0.00002	0.00002 U	-	0.00002 U	-	0.00002 U	0.00002 U	-
Endothall	0.1	0.05	mg/L	MCL	0.005-0.01	0.01 U	-	0.01 U	-	0.01 U	0.01 U	-
Endrin	0.0002	0.0001	mg/L	MCL, MML	0.00002	0.00002 U	-	0.00002 U	-	2.00E-05 U	0.00002 U	-
Glyphosate	0.7	0.35	mg/L	MCL	0.006-0.01	0.009 U	-	0.009 U	-	0.009 U	0.01 U	-
Heptachlor	0.0004	0.0002	mg/L	MCL	0.00001-0.00008	0.00008 U	-	0.00008 U	-	8.00E-05 U	0.00008 U	-
Heptachlor Epoxide	0.0002	0.0001	mg/L	MCL	0.00001-0.00004	0.00004 U	-	0.00004 U	-	4.00E-05 U		

Attachment B
Quality Assurance and Quality Control Plan

Quality Assurance and Quality Control Plan

Introduction

This quality assurance and quality control (QA/QC) plan describes water sampling QA/QC procedures that will be performed during sample collection for Madison Farm's ASR program. The purpose of the QA/QC plan is to obtain water quality data that are valid representations of the water quality at each sampling location. Kuo Laboratory staff will collect the majority of the water quality data with guidance from GSI Water Solutions (GSI) staff. GSI will periodically check field procedures and will review field and laboratory data for completeness and compliance with this plan.

Field QA/QC

QA/QC procedures that will be used in the field during the ASR program include field equipment calibration, field record keeping, and chain-of custody documentation. No duplicate samples will be collected in the field. If lab testing results indicate that a parameter has an unexpectedly high concentration approaching the MCL or MML, injection or pumping will be stopped and the location will be resampled as soon as possible. Each element of the Field QA/QC is described below.

Field Equipment Calibration

Field meters require calibration to ensure accurate and precise measurement of field parameters. The field meters will be calibrated prior to each sampling event and subsequently operated in a manner consistent with the manufacture's recommendations.

Field Record Keeping

The sampling technician will record field observations and measurements on the Water Sampling Field Form during sampling. A copy of the Water Sampling Field Form is included following this section. The following information will be recorded on the form for each sampling point:

- Time of day and date
- Name of person performing the sampling
- Location of sampling point
- Field parameter values (pH, temperature, and conductivity) collected during sampling
- Appearance of sample
- Thermal and chemical preservation (if any)

If groundwater samples are collected from wells, the following additional information will be recorded on the form:

- Depth to groundwater
- Field parameter values collected during purging intervals
- Purging time and volume of water purged

Sample Labels

A sample label will be secured to each water sample container. The following information will be included on the sample labels:

- Project location
- Sample number (e.g., well ID# and date)
- Name of person collecting the sample
- Date and time of sample collection
- Type of preservative (if any)

Chain-of-Custody

A chain-of-custody form will be used to track possession of each sample and document the requested analyses. The following procedure will be used regarding chain-of-custody records.

1. After collecting the samples, the sampling technician will complete the chain-of-custody form.
2. The chain-of-custody record will accompany the samples from the field to the laboratory.
3. Each individual having samples in his/her custody must ensure that the samples are not tampered with and that the chain-of-custody record is completed upon sample transfer.
4. A copy of the completed forms will be retained in the project files.

Laboratory Quality Assurance Program

Samples collected during the pilot testing program will be analyzed by an analytical laboratory certified by the Drinking Water Laboratory Certification Program (DWLCP) or the Oregon Environmental Laboratory Accreditation Program (OREALAP). DWLCP is in the process of being phased out and replaced by OREALAP, which is recognized by the U.S. Environmental Protection Agency's National Environmental Laboratory Accreditation Program (NELAP) to accredit environmental testing laboratories to national standards as adopted by the National Environmental Laboratory Accreditation Conference (NELAC).

The analytical laboratory will use trip blanks, method blanks, spikes, duplicates, surrogates, and control samples in each analytical batch containing the Madison Farms samples being analyzed or at a frequency of at least one in every 20 samples, depending upon the analysis being performed. The results from these procedures will accompany the sample test results. A copy of the analytical laboratory's quality assurance manual is available upon request.

GROUNDWATER SAMPLING FIELD FORM

Project Name _____ Project Number _____

Well No. _____ Sampled By _____ Date ___/___/___ Casing Diameter ___"

Well Depth _____' Water Level / Time _____' / ___ : _____ TOC Elev. _____' Water Elev. _____'

Well Volume / Purge Volume _____ / _____ gal. Total Purge Time _____

Well Recharge fast - mod - slow Purge Method _____ Sample Method _____

Sample Time _____ : _____ Sample pH / Temp./Cond. _____/_____/_____

Lab Analysis _____ Laboratory _____

Initial Purge Sample _____

Final Purge Sample _____

Time	Volume (gallons)	Temp (deg C)	pH	Conductivity (ms/cm)	Remarks
RPD (Last 3)					