CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MEETING OF MAY 12, AND 13, 2010
Hesperia

ITEM: 7

SUBJECT: STAFF REPORT – EVALUATON OF POTENTIAL WATER QUALITY IMPACTS FROM DAIRY OPERATIONS AND DEVELOPMENT OF REGULATORY STRATEGY

CHRONOLOGY: This is a new item.

ISSUE: This is an informational item. However, the Water Board may provide direction to staff regarding priorities and the regulatory strategy that will be implemented for dairies.

DISCUSSION: Wastes from dairy operations contain salts and nutrients that if not managed properly may cause water quality degradation or pollution. Limited well data indicate that in some areas nitrate pollution has been detected in groundwater beneath dairy operations at concentrations over three times above the maximum contaminant level (MCL). Where groundwater quality is affected by dairy operations, there is a potential for downgradient residents to be exposed to polluted water in their private supply well(s). Water Board staff estimate there may be over 200 residents using a water supply from private wells located within one half mile of an active dairy. The purpose of this report is to describe a regulatory strategy that will address and prioritize the steps needed to protect water quality from dairy operations.

While data collected to date show that dairy waste disposal has polluted groundwater in some areas, there are data gaps regarding the extent of affected water and the magnitude of degradation or pollution. Information needs to be evaluated for each dairy regarding the nutrient and salt content of the waste and the potential uptake capacity of the land and crops in order to develop adequate source control and salt/nutrient management plans. Additional data and information are needed in these areas and will need to be collected by the dairy owners.

To address threatened and actual pollution from diary operations, staff is proposing a regulatory strategy consisting of these four key components:

1. Assess and address risk to downgradient receptors from exposure to polluted groundwater;
2. Implement source control through implementation of appropriate waste control and disposal practices;

3. Ensure adequate monitoring to evaluate the extent of affected groundwater and the effectiveness of source control measures implemented; and
4. Conduct groundwater remediation where water quality is adversely affected.

It is necessary to prioritize sites and actions to be taken considering economic resources available to dairy owners and regulatory resources available to oversee corrective actions, and in order to address the largest risk first. Moreover, industry economics and fair business practices must be considered in the implementation of the strategy. In order to prevent groundwater pollution from dairies, additional facilities may need to be constructed or other changes implemented at the dairy for source control and appropriate land application of dairy wastes. Groundwater investigations and remediation may be needed to address groundwater impacts.

With this in mind, the highest priority is to require dairy owners to determine where private wells are polluted from dairy wastes and, where found, provide alternate water supply to ensure that persons are not drinking polluted water. Some data have been collected in this effort, however dairy owners will be required to fill in any data gaps and take steps to provide water to residents where the groundwater is affected by the diary.

Of medium priority is to require information to fill in data gaps that will determine the magnitude and extent of groundwater impacts and the source(s) of those impacts, and implementation of source control measures. This effort will constitute the bulk of the program as staff works with dairy owners and other agencies as the owners develop site-specific source control and waste management plans, and conduct groundwater investigations. Long term actions include groundwater remediation and long term monitoring. It is appropriate to establish time schedules for compliance because some facilities pose a higher threat to water quality and costs associated with compliance will necessitate allowing time to comply.

This report details staff's recommended dairy strategy to address the short term focus to protect potential receptors and prevent consumption of polluted water, and outlines steps that will be taken to develop a comprehensive regulatory strategy. Information obtained from studies done by other regions and data collected during initial sampling will be used to shape future recommendations at which time staff will provide the Board a report summarizing the additional data and recommendations.

Enclosure: 1. Staff Report

ENCLOSURE 1

STAFF REPORT

EVALUATION OF POTENTIAL WATER QUALITY IMPACTS FROM DAIRY OPERATIONS AND DEVELOPMENT OF REGULATORY STRATEGY

April 8, 2010

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STAFF REPORT

EVALUATION OF POTENTIAL WATER QUALITY IMPACTS FROM DAIRY OPERATIONS AND DEVELOPMENT OF REGULATORY STRATEGY

Problem

Dairy operations produce wastewater and manure containing nutrients and salts. Other constituents of concern include heavy metals, pathogens, antibiotics, and hormones (Bradford et al, 2008). When not properly managed these wastes adversely affect surface and groundwater quality. In the southern watersheds of the Lahontan Region, several domestic supply wells located down gradient of dairy operations have exhibited nitrate and Total Dissolved Solids (TDS) concentrations that exceed drinking water standards. The purpose of this staff report is to outline and prioritize the steps needed to address these problems and to determine the most appropriate regulatory strategy for dairies in the region.

Background

There are eleven active dairies, two feed lots, two inactive dairies and six historical dairies known within the southern Lahontan Region in Los Angeles and San Bernardino Counties. An inactive dairy is one in which the dairy is currently not producing milk and there are no animals present at the site but the facilities that constitute the dairy still remain. A historical dairy is one in which the dairy facilities no longer exist and the land is available for other land uses (i.e. barns, corrals and other dairy apparatus are no longer present). While the location of a historical dairy operation may now support other land uses, past waste disposal practices may continue to degrade or pollute groundwater. Of the active dairies, seven are located near the Mojave River, two are in El Mirage, one is in Newberry Springs, and one is in the Antelope Valley (Figure 1).

In the Lahontan Region, dairies are regulated under the non-point source program using a three tiered approach: 1) voluntary implementation of best management practices (BMPs), 2) regulatory-based encouragement of BMPs, and 3) adoption of waste discharge requirements (WDRs). The Lahontan Water Board has taken a risk-based approach to determine which dairies to regulate under WDRs. Historically, dairies located within and immediately adjacent to the Mojave River floodplain or those exhibiting a groundwater pollution were issued WDRs. WDRs require each dairy to mitigate the impact to groundwater from their operations by directing them to limit manure disposal to 3.6 tons/acre/year and to implement BMPs for wash water disposal. While the Water Quality Control Plan for the Lahontan Region, (Basin Plan) contains the three tier non-point source program approach, the State of California has shifted away from voluntary implementation of BMPs and moved toward regulating discharges of wastes from dairy operations.

Residential Supply Wells

Water Board staff estimate that there may be over 200 residents drawing groundwater from private wells located within one half mile of an active dairy in the region. While groundwater monitoring is required of all dairies regulated under WDRs, some of these monitoring networks are less than ideal due to poor well location or dry well conditions. However, groundwater monitoring data from four dairies (A through D) as shown on Table 1, show nitrate and TDS pollution. Since there are no dedicated monitoring wells in the vicinity of domestic or agricultural supply wells and there is evidence of a potential release from a number of dairies, Water Board staff began sampling domestic wells near dairies in late 2009 to identify if there are receptors that could be affected by polluted groundwater. The limited water quality data suggest groundwater pollution extends beyond some dairy property boundaries and is present in nearby domestic water supply wells. Laboratory results have been provided to all residents and land owners whose supply wells were found to be affected. However, Water Board staff could not sample all domestic supply wells likely to be influenced by dairy contamination due to resources and well access issues. Depending upon the results of the limited groundwater data, the Water Board may require some dairies to conduct additional investigations and/or the Water Board may conduct additional sampling.

Table 1 – Region 6 Dairies

Data Summary

Dairy	WDR or CAO	Number of cows	Depth to ground water (ft)	Highest single nitrate as N sample result (mg/L)	Highest total dissolved solid (TDS) sample result (mg/L)	Sample date	No. of monitoring wells	Wash water disposal method
A	Yes	1500	88	95	4700	10/9/2008	15	Sprinkler
B	Yes	1550	26.5	33.9	3200	7/13/2009	3	Sprinkler
C	Yes	4645	30	32	3210	5/4/2009	4	Retention pond
D	Yes	3340	58	32	2510	5/4/2009	6	Flooding
E	No	1400	70	9.7*	560	2/24/10	NA	Unknown
F	No	900	85	9.4*	520	8/28/09	NA	NA
G	Yes	2280	63	3.8*	550	12/29/2008	None	Sprinkler
H	No	960	70	3.2*	430	7/8/2009 for N & 7/17/09 for TDS	NA	Unknown
I	Yes	3416	185	1.3	500	6/12/2009	1	Retention pond & Sprinkler
J	No	1300	170	0.91*	530	3/12/2008	NA	Retention pond
K	No	4500	307	0.75*	630	8/24/09	NA	NA

Note: 1. (*) denotes supply well
2. Water Board staff collected data from the dairies Self Monitoring Reports or from Field Sampling Data

Proposed Dairy Regulatory Program

The current regulatory approach for dairy operations in the Lahontan Region is to require WDRs and monitoring of BMP performance for dairy operations that have a high potential to affect water quality. Given the recent awareness of the influence of dairy operations on area domestic wells, Water Board staff recommends a change in our regulatory approach to one that is focused on identification of affected receptors, provides an alternate source of water to those affected, and emphasizes source control at dairies. The proposed program consists of short and long-term goals. These goals have been developed to address issues that may be dairy specific while still establishing a level regulatory program and would be implemented in a phased approach. Timing for implementation of these goals depends on resources available to the dairy owners and for regulatory oversight. Because of limited resources, activities must be prioritized with protection of receptors being the highest priority.

Staff recommends a regulatory program consisting of the following key components, shown in priority order:

1. Assess and address risk to downgradient receptors from exposure to polluted groundwater;
2. Identify appropriate source controls and require phased implementation of suitable waste minimization, control and disposal practices under WDRs or a Conditional Waiver;
3. Ensure adequate monitoring to evaluate the extent of affected groundwater and the effectiveness of source control measures implemented; and
4. Require groundwater remediation where groundwater beneficial uses are impaired.

This program would encompass all dairies and would not supercede requirements contained in existing waste discharge requirements or cleanup and abatement orders. Steps to implement these components are detailed further below.

Priority 1 – Assess Risk through Sampling of Residential Wells

Water Board staff have sampled a small subset of the private drinking water wells near dairies. However, once a single well is determined to have groundwater that exceeds or is approaching the drinking water standard for a constituent of concern, then further investigation of all nearby private wells that are likely to be exposed is warranted. It is recognized that other sources of nitrate and salts may also be present in the area including septic tanks and agricultural or similar land uses. Chemical and physical attributes of the groundwater will be evaluated to confirm or eliminate individual dairies as a potential source. Consistent with other groundwater pollution cases, as a first step in the overall strategy, the Water Board would require dairy owners participate in a program to sample residential wells near the dairies to ensure that the residents' drinking water is not affected by dairy operations. Investigative Orders will be issued to dairy owners to conduct further investigation if they are confirmed as the source of groundwater pollution. In cases where groundwater pollution is associated with dairy waste disposal then the Executive Officer

will issue a Cleanup and Abatement Order to require a dairy owner supply potable water to affected residents.

Priority 2 - Source Control

Source control is the most effective means of reducing the impact from all dairy operations on groundwater quality. Harter et al (2002) found that targeted manure management reduced nitrate concentrations by 50% in shallow groundwater within the first two years of implementation at dairies in the Central Valley of California. Source control may require significant changes in dairy operations and/or construction of additional facilities. Before undertaking such changes and making capital improvements, it is appropriate to evaluate existing dairy operations with regard to waste generation and disposal and threat to water quality. Water Board staff recommend that comprehensive nutrient management plans (CNMP) be required of all dairies. These CNMPs would address the exact acreage of croplands, crop type and the crop use of the nutrients in liquid and solid animal wastes to determine appropriate loading rates for available land at the diary. As part of the overall strategy, the Water Board would require dairy owners pursuant to California Water Code Section 13267, Investigative Orders or revised WDRs to develop such plans for regulatory acceptance and implementation over the next three to five years. Successful CNMPs require a sound understanding of the nitrogen balance at a dairy. A dairy owner should consult with and obtain technical advice on developing an effective CNMP from agencies with this expertise such as the local Resource Conservation District.

Priority 3 - Compliance Monitoring

The Dairy Regulatory Strategy must consider the most effective means to monitor compliance with WDRs/Conditional Waivers and nutrient reduction through source controls. There is a large amount of spatial and temporal variability in groundwater data at dairies. Harter (2001) found that this variability severely limits the effectiveness of groundwater monitoring wells at dairies. Dairies in the Lahontan Region can occupy hundreds of acres and dense monitoring well networks are costly. Where applicable, compliance monitoring schemes should incorporate mutually supportive monitoring wells from external agencies and well owners. Moreover, compliance monitoring may need to focus on mechanisms to observe and track farm nutrient budgets in order to better evaluate effectiveness of source controls. Implementation of compliance monitoring will focus on dairies that are regulated under WDRs and have known groundwater pollution. Revision of associated Monitoring and Reporting Programs will be considered where appropriate. Investigative Orders will be employed to require groundwater monitoring networks at unregulated dairies where there is strong evidence of a pollution from the dairy.

Priority 4 - Groundwater Cleanup

In areas where groundwater is polluted, the strategy must include a requirement for replacement water to be provided if receptors are drinking affected water. Additionally, groundwater investigation and remediation is needed to address protection of the resource.

Feedback from Dairy Owners

Dairy owners have indicated that they are going through a period of economic hardship because the costs of dairy operations are higher than their revenue from the dairies. Given this situation, staff is taking the following steps to develop a considered and effective plan.

- Meet with dairy owners to get their input for the best approach to reduce and to contain further degradation of groundwater without placing an excessive burden on them;
- Meet with Western United Dairymen, Milk Producers Council, Natural Resources Conservation Service and counties to seek sources of grants or other financial aid available for pollution prevention programs for the dairies; and
- Detect water quality trends, identify problem areas, and determine the appropriate levels of action necessary to contain further degradation of groundwater.

Based on initial meetings Water Board staff received the following feedback from the dairy owners.

- Good science should be used to determine sources of pollution detected in drinking water well. Dairies should not be automatically assumed to be the source;
- Other potential sources of nitrates may exist in the area;
- Dairy owners do not have financial resources to implement all or parts of the proposed dairy regulatory program and the banks are not lending;
- Identify other resources or grants to do this work; and
- Dairy owners want to comply but need time to obtain resources to do the work.

Comparison to Other Nitrate Groundwater Pollution Cases

Nitrate pollution has been detected in groundwater at other sites in the Region, primarily from sewage treatment plants. In some cases this polluted water has affected private drinking water supply wells. The proposed Dairy Regulatory Program is consistent with the Water Board's approach to dealing with nitrate pollution from other dischargers. The Water Board has issued cleanup and abatement orders to dischargers including the City of Barstow, the Los Angeles County Sanitation District (Palmdale Wastewater Treatment Plant) for plumes with nitrate concentrations of up to 32 mg/L and 19 mg/L as N, respectively. These groundwater pollution cases exhibit nitrate concentrations that are of the same order of magnitude as concentrations observed at several dairies. Enforcement orders have required groundwater investigations and remediation. The Water Board has required dischargers to provide replacement water supply to residences where groundwater has been polluted by the discharge.

Challenges

The top three challenges in protecting water quality from dairy operations are:

1. Protecting the public from exposure to polluted water,

2. Determining the operational control measures necessary to protect water quality, and
3. Developing a regulatory strategy to implement the control measures in a reasonable timeframe while considering the economic constraints of the dairy owners.

Prioritization of dairies and problems is important to make sure that limited resources (private and public) are used most effectively. Developing an effective approach to protect water quality and address existing impacts, using the best science, along with a reasonable implementation schedule will take input from the dairy owners as well as scientists. Implementation will take financial assistance where available.

Recommendations

Staff intends to take the following steps to implement the proposed regulatory strategy.

1. Continue sampling of private wells downgradient of dairies where degradation has been detected or is reasonably suspected in groundwater.
2. Require dairy owners to provide replacement drinking water (e.g., bottled water) to residents with polluted water supply wells, where it is determined that groundwater has been affected and the dairy is the source.
3. Develop a process for dairy owners to prepare and follow a nutrient management plan to apply manure and wash water to land not to exceed agronomic rates.
4. Require dairy owners to develop and follow a waste minimization and BMP plan to control wash water and manure and reduce sources of groundwater pollutants.
5. Prioritize Water Board staff resources for dairy oversight based on threat to water quality and on site-specific environmental and operational conditions.
6. Develop an implementation schedule to implement the proposed dairy regulatory strategy.
7. Use GIS resources to track and manage groundwater and dairy operational data.

Staff will provide a follow-up status item as the strategy is further developed.

References

Bradford et al, 2008, Reuse of concentrated animal feeding operation wastewater on agricultural lands, Journal of Environmental Quality, V37, pp S-97 – S-115.

Harter, T., Meyer, R.D., and Mathews, M.C., 2001, Nonpoint source from pollution from animal farming in semi-arid regions: spatio-temporal variability and groundwater monitoring strategies: Proceedings, 3rd International Conference on Future Groundwater Resources at Risk, Lisbon, Portugal, p. 363-372.

Harter et al, 2001, Effects of dairy manure nutrient management on shallow groundwater nitrate: a case study, Society for Engineering in Agricultural, Food, and Biological Systems Paper No. 01-2192, 9 p.

Harter et al, 2002, Impact of dairy waste and nutrient management on shallow groundwater quality – Final Report, University of California, Davis, Kearney Agricultural Center, 25 p.

Figures: 1. Regional Dairy Map

Attachments: 1. Waste Characteristics
2. Summary of Dairy Regulations

P:BO 2010/DairiesStrategy/dairy staff report 4-8-10RO1.doc

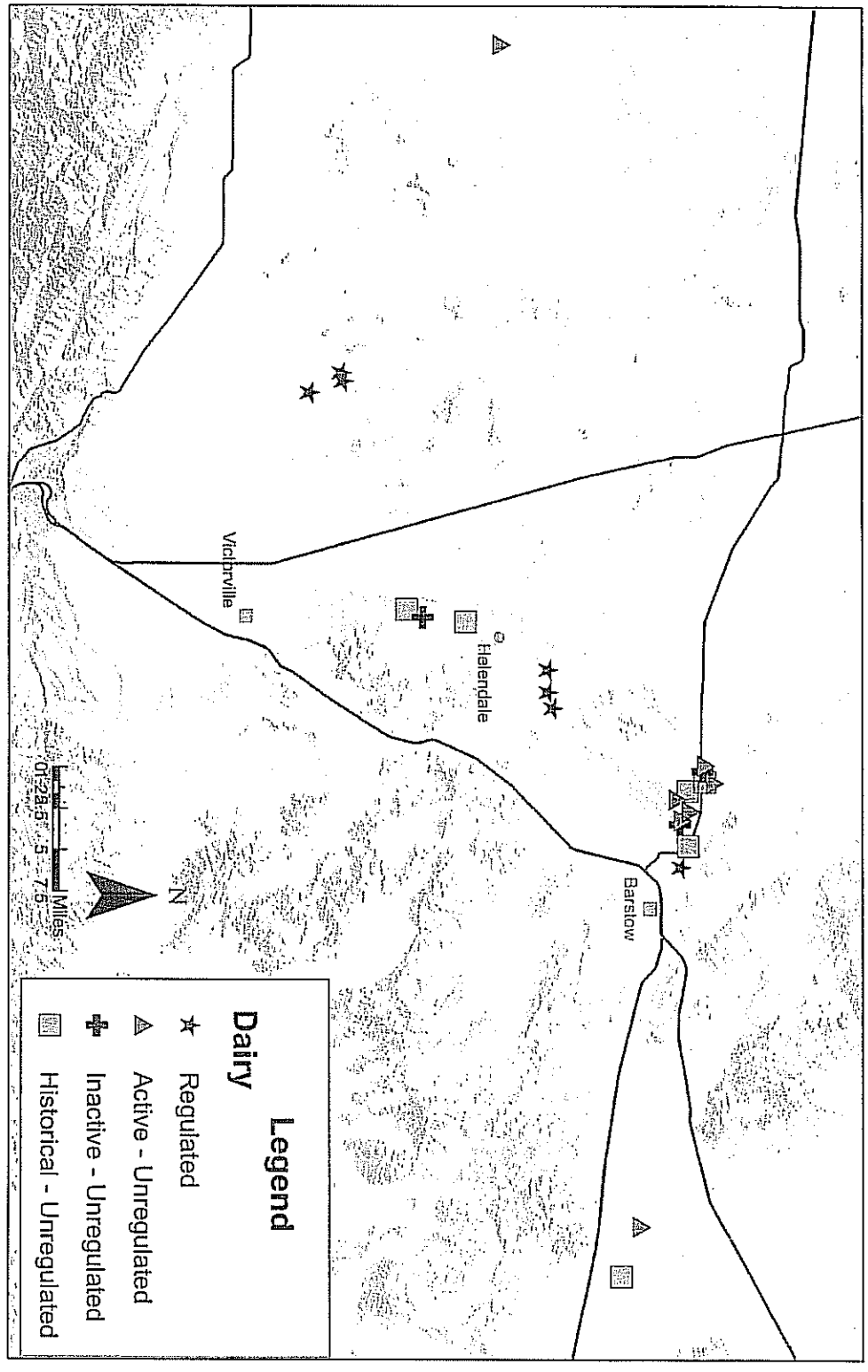
Regional Dairy Map
Victorville
Helendale
Barstow
Legend
Dairy
Regulated
Active - Unregulated
Inactive - Unregulated
Historical - Unregulated
N
0 1.25 2.5 5 7.5
Miles
DairyProj2010RegionaldiaryB_W
RWQCB - Lahontan Region March 30, 2010

Figure 1

Attachment 1

Waste Characteristics

Dairy waste primarily consists of waste wash water and manure. Dairy cows excrete approximately one pound of nitrogen per head per day and approximately 1.3 pounds of salts, primarily sodium, potassium and chloride (Harter, 2002). A dairy with 500 cows could generate roughly 1800 tons of dry manure containing 90 tons of nitrogen and 115 tons of inorganic salts and each year that must be properly managed to prevent impacts to water quality. Nutrients in the wastes (nitrogen, phosphorus and potassium compounds) can be utilized by crops, and wash water and manure is typically land applied for irrigation and fertilization of crops.

Waste Disposal

Wash Water

The volumes of wash and other waste water produced varies greatly based on individual dairy operations. Additionally, the methods of wash water disposal differ from one dairy to another. Disposal methods presently being used include:

- Using a separator to separate manure from wash water before disposal,
- Discharging wash water to unlined ponds, and
- Applying the wash water to cropland using sprinklers or flood irrigation.

Some of the disposal methods contribute to degradation of groundwater. Typically, dairies produce more wash water in the winter than in the summer. The evaporation rate is significantly less in the winter. Therefore, during the winter, corrals stay wetter and cleaning up the cows for milking requires more water. The crops uptake of water and nutrients is also lower in the winter time and may not be sufficient to protect groundwater from contaminants in the waste.

Manure

Another source that may cause pollution in the groundwater is inadequate management and over-application of manure to pasture lands. Many of the dairy owners do not have adequate acreage of croplands for generated manure. Therefore, they have to truck manure to other sites for agricultural usage. One of the regulated dairies generates more manure than it can use on its cropland and has difficulty in finding other places that will accept it, therefore, excess manure is stored at the site. This is a water quality problem because storm water and wash water come in contact with the manure and may percolate to groundwater.

Best Management Practices

Typical BMPs used at dairies includes disposing of wash water and solids on land by crop irrigation and use as a soil amendment. In order to not cause groundwater degradation this application must be done at agronomic rates. BMPs include growing winter crops and high nutrient crops where possible, controlling contact of storm water or wash water with manure, and using a digester to treat manure prior to applying to land. BMPs also include minimizing wash water generation where possible and separating solids from wash water for separate disposal.

Water is re-used several times at the dairies prior to disposal. One dairy in our region reduced wash water generation by washing cows with towels and disinfectant, generating minimal wash water.

Attachment 2

Summary of Dairy Regulations

California Regulations

Regulations for dairy operations are contained in California Code of Regulation, title 27. These regulations require existing milk cow dairies to minimize percolation of wastewater to groundwater in disposal fields, apply manure and wastewater to disposal fields at reasonable agronomic rates, and minimize infiltration of water into underlying soils in solid waste disposal areas. The regulations also require that dischargers locate retention ponds in, or line retention ponds with, soils of at least 10% clay and not more than 10% gravel. Title 27 minimum standards alone may not be adequate to protect groundwater in all cases and waste discharges also must comply with the California Water Code, the Water Quality Control Plan for the Lahontan Region (Basin Plan) and State Policy such at State Water Board Resolution No. 68-16.

Waste Discharge Requirements

There are 11 active dairies in the region. The Water Board has adopted waste discharge requirements (WDRs) for three dairies located within the Mojave River floodplain where groundwater is shallow and most vulnerable to degradation by dairy operations. WDRs were also adopted for two dairies in El Mirage where nitrates and salts were observed in local wells. The other six active dairies and two feed lots are not directly regulated.

The WDRs require each dairy to limit manure disposal to fields to 3.6 tons/acre/year, and implement BMPs for wash water disposal, manure management, and rainfall-runoff control. The WDRs require that waste disposal from dairy operations not cause a pollution or a nuisance.

Monitoring and Reporting Program

Dairy owners monitor and report the amount of manure applied to land. Limited groundwater monitoring data is currently being collected by most dairy owners.

Adequate groundwater monitoring programs are necessary to determine whether waste management BMPs are effective and to detect degradation of water quality. Some regulated dairies have as little as one groundwater monitoring well per facility and one of them has no monitoring well(s).

Storm Water

All of the regulated dairies implement some storm water BMPs voluntarily, but none have storm water permits.

Regulation by other Regions

To address water quality problems, Water Boards have implemented various regulatory strategies. The types of regulatory mechanisms presently in use in other regions are shown in Table 3, below.

Table 3

Permit Type	Water Board Region
Waiver	1,2
Individual	1,2, 6
General WDR	3,4, 5,9
NPDES	7,8

Regions 5, 8 and 9 have contracted for site-specific studies of contaminant transport and waste loading from dairy wastes. Water Board staff plan to further evaluate the results of these studies and mechanisms for applicability in the Lahontan Region and to recommend what approach will be most effective. Technical feasibility, economic feasibility, and political issues will be taken into account while considering the implementation of any recommendations.

Comments From B & E dairy 4/202

Comment on staff report dated April 8, 2010

Thank-you for asking for our input. What I think I will do is go thru this staff report page by page, and make a few comments and rattle on about things that may be site specific or just general with no names. Please do not take any of my comments out of context. If any of staff has some question to what I'm referring to please don't hesitate to call. You may not get the answer you like but sorry that the way some things happen.

Problem:

Pathogens should not be a problem if we look at attachment #1A

Heavy metals should be very limited considering all of our waste has already passed through a cow. If it was a serious issue I think it would kill the cow first. If we want to address heavy metals what about all the storm runoff from all the road and other paved areas in the local cities? When it rains in the high desert most storm drains and local roads all flood and drain to local washes and gullies that drain directly in the Mojave River. It is amazing to see the amount of unregulated water that drains into the river from the urban areas such as Victorville, Silver Lakes, Barstow.

Antibiotics and hormones,
Attachment #1B #2 #3
As for antibiotics and hormones looking at (Bradford et

al,2008) it looks like a non- event. Remember all of our milk and meat is USDA inspected for antibiotics as it leave our dairy on a daily basis which is 3x daily!!
As for estrogen remember all cows are females they all cycle and have PMS just like the human female does, every month until they get pregnant and then carry their calf for 10 lunar months just like humans. After giving birth that is when they start to produce milk. So this is all a natural occurring event and you can't stop mother nature!
Referring to several domestic wells with high nitrate and TDS. Maybe we need to keep our eyes wide open and not focused on just dairies. We need to look at historical data that is available and all the other potential sources that are in the area such as waste water for Victorville, Silver Lakes, and ete. What is the quality of the surface water flowing in Victorville and Silver Lakes, how much nitrogen is applied at the golf course and what is their irrigation routine, possibly daily?? Possible leaching???

Background

As to the 2 inactive dairies what research has been done on that? Are these 2 dairies that were discovered accidentally by line of sight. What I understand that there were at least 50 or 60 dairies in the high desert the 1950's and 1960's. I can show you 4 inactive dairies in Barstow, let alone traveling down Route 66 from Barstow to Victorville you will find more.

Residential supply wells

Again dairies are tarred and feathered by requiring dairies to conduct additional sampling making the dairies look like the guilty party! Many dairies are operating within the WDR so why would you burden us with cost of sampling to prove that there are other likely causes of the less than great water found in an area? Why would the dairies want to start paying for a crime that may not have been committed. There are areas of naturally accruing high nitrates or just an area of historical bad water. I know of areas that are miles away from most any thing, and I am not a chemist but the water is very "bad" quality just by the taste and by looking what happens to the things that it comes in contact with.

Proposed dairy regulatory program

Again are we sure the dairies are the "influence"? Is this scientific or just emotional and political action? Could this be just 1 or 2 isolated incidents, and possibly a few individuals wanting to gain monetary compensation to get out of a situation they are in? I imagine there are people who have purchased property and developed it and now after some time have realized that the water is of a poor quality and want out! The water may always have been bad. Now maybe after consulting some legal advice the finger pointing has begun. So what could potentially happen is because of isolated incidences, all dairies in the high desert are tarred and feathered and required to spend much extra time and money, reporting and sampling.

A prime example of one we are all familiar with is each

time we travel through an airport, because of one isolated incident, we all now must remove our shoes.

Priority #1

"Wells near dairies" Are you on a witch hunt? I imagine that if you sample enough wells you will find a well that doesn't meet some one's standards. Should there not also be the same number of wells tested that are not located near dairies?

"Once a single well" this sounds pretty restrictive! How accurate is this test to confirm or eliminate the dairies as the potential source? Again requiring dairy owners to participate in sampling wells is unfair. The water may have been bad historically or caused by the current property owner or the previous owner. Why would the dairy have to step in pay when they may have had nothing to do with it.

Priority #2

I believe that some dairies already have done the CNMP and are operating per the out come of the CNMP, would that not be redundant to have to redo them?

Priority #3

"where ground water is polluted"

"requirement for replacement water"

What it says here if I so desire to build a house or houses where the water is below safe drinking levels Lahontan will supply me with water. I believe that on some of the nitrate and TDS issues, if some historical data is researched, it will

be discovered that there are historical high levels. If you go out and talk to some of the locals who have lived out here forever and have no financial or political benefit not to tell the truth, you will find out that there are areas that have had bad water for as long as they can remember. There probably are no test results back as far as some these people go back but if it tastes and smells bad it probably was not very good!

Challenges

"protecting water quality from dairy operations"
Why just dairies operations?? What about Victorville Sewer, Silver Lakes Sewer, how high are the nitrate in their test wells? Silver Lakes sod farm, Horse ranches, ostrich ranch, ete. All the time I have lived out in the high desert I have never heard of any local ranches haul waste away except dairies.

Recommendtions

"downgradient of dairies"
What is downgradient of dairies? Who and how will determine what is downgradient? There is much mystery to our underground aquifer. Most people would assume downgradient would be eastward direction that the Mojave river flows in. But for an example, by PG and E the flow has proven to be northward of the Mojave river. So determing what is downgradient from some of the potenial scoures will be very unpredictable. Who will provide

replacement water if there is no dairy to find fault with? Will Lahontan foot the bill while they go on a witch to find someone else to accuse of the bad water. Maybe again is this an area that just has bad water? There are also some areas of very limted supllies of water and you will find these areas the water also has an ofensive taste.

Best management practices

What benefits are involed with the use of a digester or seperator prior to disposal? What goes in must come out so now you have a liquid and solid that are separate but all the componets are still there.

Washing cows with towels

Maybe a misunderstanding. The cows are still washed, some dairies use paper towels, some use cloth towels to wipe the udder prior to milking. The paper towels are disposed of and the cloth towel will need to be washed before it can be reused. So with that said the cloth towel will need water to wash and sanitize it before it is reused.

Summay of dairy Regulations

Who has suddenly decided that 10% clay **"may"** not be adequate??
I'll bet 10% clay is better than a leaky liner on sand, I'm not a licened engineer but a man made liner will leak someday.

Regulation by other regions

What do other regions have to do with our region? This region is so totally different from any other region, we have less rain more wind and a much higher evapertion rate than any where else in our region. What other region has a city the size of Victorville disposing there sewer plant water in a dry river bed that flows eastward towards Barstow, and is reciving credit from Mojave Water Agency for recharging our underground aquifer. Remember every time you flush a toilet in Victorville you are sending a other glass of drinking water to Barstow!!

In closing

I hope you take some of my thoughts and ponder on them as we go forward to make some logical and scientific decisions, that also make common sence. Lets not let some ones political or financial agenda influence our decisions. Has anyone done any study or calulations on these areas of high nitrate and high TDS as to how much water has been contaminated. And how many tons of cow manure would be needed to elavate the water to the levels that are being found? What is the time frame for nitrate to leach to our water table in this area? As for the Desert View area could there be some cross corraltion that the chrouim has an influence on the nitrates??

E Van Dam

Eldert Van Dam

07-0023

1 # A

In a Sept. 25 letter to the DEQ board, Executive Director Bob Naerebout argued against further regulation and questioned the reliability of sprinkler samples provided by the council, "an organization that has demonstrated its bias against the dairy industry."

He also cited a 1975 study that found most bacteria in sprinkler systems could die as quickly as three seconds after being sprayed into the air, and pointed out that his group is helping fund research on the issue by a U.S. Department of Agriculture microbiologist in Kimberly.

"There's no scientific evidence - none, zero, zip," backing the concept of pathogen drift, Naerebout said Thursday.

MacMillan said the DEQ board will keep tabs on the matter to see if it should take any additional steps in the future.

ISDA licenses more than 600 dairies in the state that are inspected an average of two and a half times a year.

Nate Poppino may be reached at 208-735-3237 or npoppino@magicvalley.com.

1 # B

Assessing antibiotic breakdown in manure

USDA-AGRICULTURAL RESEARCH SERVICE (ARS) SCIENTISTS ARE STUDYING HOW OXY-tetracycline (OTC), an antibiotic that is administered to animals, breaks down in cattle manure.

The researchers found that in controlled laboratory conditions, OTC in cattle manure was degraded more quickly as temperatures increased and as the moisture content in the manure increased. But the OTC breakdown slowed as water saturation levels neared 100 percent. Scientists conclude that this slowdown resulted when oxygen levels were not high enough to fuel the OTC biodegradation.

They also note that OTC breaks down more quickly in manure than in soil. Compared to soil, manure has higher levels of organic material and moisture that support the microorganisms that break down this pharmaceutical.

This laboratory research may be useful in designing studies that evaluate the potential effects of lagoons, holding ponds and manure pits on bacteria and antimicrobial resistance.

The study was published in the *Journal of Agricultural and Food Chemistry*.

07-0024

Table 4. Estrogen analyses of whole (free estrogen) and filtered (estrogen conjugate) lagoon samples from different CAFOs (mean with standard deviation, three locations for each lagoon).

CAFO† type	Estrone	17-α-estradiol	17-β-estradiol	Estriol	E1–3S‡	E2α-3S	E2β-3S	E2β-17S
				ng L^{-1}				
Beef feedlot§	17 ± 1	6 ± 1	<20	<8	<1	<1	<1	<1
Dairy§	76 ± 12	229 ± 56	153 ± 34	<8	87 ± 4	166 ± 22	42 ± 3	<1
Poultry¶	2970 ± 150	408 ± 37	64 ± 9	489 ± 49	1 ± 1	<1	<1	<1
Poultry§	1570 ± 80	131 ± 15	21 ± 10	190 ± 5	3 ± 1	<1	10 ± 3	<1
Poultry#	21 ± 2	<4	<20	<8	<1	<1	<1	<1
Swine sow¶	10500 ± 1260	1220 ± 70	211 ± 128	6290 ± 850	2 ± 0	<1	<1	80 ± 7
Swine finisher¶	1640 ± 10	184 ± 24	152 ± 44	1540 ± 30	<1	<1	<1	<1
Swine nursery¶	834 ± 73	74 ± 3	46 ± 32	353 ± 478	<1	<1	<1	<1

† CAFO, concentrated animal feeding operation.

‡ E1–3S denotes estrone-3-sulfate; E2α-3S denotes 17α-estradiol-3-sulfate; E2β-3S denotes 17β-estradiol-3-sulfate; E2β-17S denotes 17β-estradiol-17-sulfate.

Return to article

Table 3. Antibiotic analyses of filtered lagoon samples from different CAFOs (mean with standard deviation, three locations for each lagoon).

CAFO† type	Tetracycline	Oxytetracycline	Chlorotetracycline	Iso-chlorotetracycline	Epi-iso-chlorotetracycline	Sulfamethazine	Lincomycin	Tylosin
				μg L^{-1}				
Beef feedlot‡	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05 ± 0.08
Dairy†	0.13 ± 0.07	<0.01	<0.01	0.01 ± 0.01	0.05 ± 0.08	<0.01	0.01 ± 0.00	<0.01
Poultry§	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01 ± 0.02
Poultry‡	<0.01	<0.01	<0.01	0.02 ± 0.02	0.01 ± 0.01	<0.01	<0.01	<0.01
Poultry¶	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01 ± 0.01	<0.01
Swine sow§	0.84 ± 1.45	<0.01	0.54 ± 0.47	26.7 ± 3.2	19.7 ± 2.6	<0.01	1.73 ± 1.52	<0.01
Swine finisher§	6.61 ± 6.50	0.14 ± 0.24	7.51 ± 6.73	97.3 ± 16.8	53.3 ± 5.1	<0.01	1340 ± 480	0.33 ± 0.30
Swine nursery§	<0.01	68.0 ± 15.4	<0.01	53.3 ± 9.3	22.3 ± 4.5	2.36 ± 1.22	38.0 ± 8.5	<0.01

† CAFO, concentrated animal feeding operation.

‡ Secondary lagoon.

§ Primary lagoon.

¶ Tertiary lagoon.

07-0026

MEADOWBROOK DAIRY

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4/215

April 29,2010

California Regional Water Quality Control Board
Lahontan Region
14440 Civic Drive, Suite 200
Victorville, CA 92392

Board Members and Staff;

Thank you for the opportunity to respond and make comments about the proposed changes that are outlined in the April 8, 2010 staff report. We, as dairyman, and our operations are under intense scrutiny from all agencies, especially in California. This new agenda has caused mixed results and from my own experience, I know that sometimes these policies are adopted because of political and public pressure and not based on current good science, good data and common sense.

In my own operation I was mandated to change from Tier 1 regulations to Tier 3, which involved installing a shallow water monitoring well, as well as other reporting, with nutrient and manure management that we were already practicing. This was the result of community resistance to dairies, basically caused by one person in El Mirage and one neighbor's well that is cross gradient from my operation. This neighbor's well was installed without a permit, on a small parcel with their own septic system upgradient and in close proximity to their well. Now, after 8 years of testing (every 6 months) my monitoring well, which is down gradient from the heart of my operation and has had intense farming and sprinkling of fresh and nutrient water for the last 20 years, we have seen no change in the quality of this shallow ground water (1.3mg/L nitrate, 500 TDS). This personal experience has proven to me that we can dairy with good management practices and not harm water quality. It also has shown me, that a lot of policies are decided and adopted without proper data and without proven reasons, but rather to appease some people or state and federal agendas.

07-0027

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Mandating all dairies to pay for water testing before they are proven to be the cause of poor quality water is unfair. Historical uses, previous operations, and other runoffs over the years can affect water quality. Additionally, requiring every dairy to have CNMPs and WDRs, as well as installing monitoring wells and tracking nutrients in and out of the operation is extremely expensive and time consuming especially in this recession. Every dairy is unique and needs to be handled on an individual basis. In our spectrum of 11 dairies in the high desert there are differences affecting water quality such as: depth to shallow ground water, soil types, permeability rates, crop and nutrient management even between dairies that are only a mile apart.

I am hopeful that your agency can take a common sense approach, obtain good data, use the most current science and the best available testing procedures before deciding what rules and enforcements are to be put in place. All dairymen today realize the importance of protecting our environment. We, as an industry, realize that pleasing our customers, the public, who is requiring sound animal husbandry and environmentally sound practices, will be the only way we can remain in business.

Thank you for your attention.

Edward A. Imsand

Edward A Imsand, Meadowbrook Dairy

07-0028

WESTERN UNITED DAIRYMEN

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April 30, 2010

Ghasem Pour-Ghasemi
Water Resource Control Engineer
California Regional Water Quality Control Board
Lahontan Region
14440 Civic Drive, Suite 200
Victorville, CA 92392

Sent via email to: GPourGhasemi@waterboards.ca.gov

Re: Staff Report—Evaluation of Potential Water Quality Impacts from Dairy Operations and Development of Regulatory Strategy

Dear Mr. Pour-Ghasemi:

Western United Dairymen (WUD) is a voluntary membership trade association in California, representing 1,000 dairy families. Our members produce over 60 percent of the total milk produced in the state, and they come from farms ranging in size from 30 cows to 10,000 cows. Regardless of their size, our member families constantly strive to do a better job of producing milk, while maintaining responsible environmental practices. We appreciate the opportunity to provide comments on the staff report regarding dairies and water quality in the Lahontan region.

There are several areas of the staff report where we have reservations and which we wish to call to your attention. We hope to discuss them further with you.

Problem Statement:
We note reference to constituents of concern; included in those are antibiotics and hormones. It should be noted that the degree of significance of contributions from dairies regarding these substances is not yet well understood and additional research is needed. We do know from the data currently available that present and generally accepted manure management practices, including storage and land application at agronomic rates, have been shown to be beneficial in reducing levels of potential exposure.

USEPA has stated that antibiotics and hormones are under review as emerging contaminants, and that it is inappropriate to regulate emerging contaminants. We concur with USEPA's assessment and point out that proper management of manure is the currently preferred method to deal with any potential of antibiotics and hormones reaching water resources. Additionally, we need to ask if the regional board has documented circumstances where these compounds have been found relative to dairies.

Additionally, it is our understanding that the domestic supply wells in the area of dairies have exhibited elevated nitrate levels when located up gradient of dairies as well as down gradient. That fact should be noted in the problem statement.

Background:
The focus of the background discussion is on dairies, but other agricultural operations and other land uses have existed in this area. Some additional consideration should be provided regarding legacy contributions for all previous sources. The assessment should not be limited to dairies.

Residential Supply Wells:
Data is lacking to accurately assess the groundwater situation in domestic wells throughout the area. It should not be assumed that in all cases that dairies are the source of any identified problems. We understand that water board resources are limited and that sound data is expensive to obtain, but equally, resources of the dairy farmers are also limited, especially since the prolonged depression in milk prices shows little sign of abating. Data from the California Department of Food and Agriculture show that for the last two quarters of 2008 and the first two quarters of 2009, California dairy farmers lost an average of $700 per cow. We agree with the staff report that additional work needs to be performed and a better understanding of water gradients and contaminant sources acquired before additional regulatory requirements are placed on dairies of the area. Accurate source identification is necessary for regulatory fairness. We appreciate that the staff report addresses this need in subsequent pages.

Proposed Dairy Regulatory Program:
The staff report makes the statement, "Given the recent awareness of the influence of dairy operations on area domestic wells...." Western United Dairymen objects to this undocumented presumption. A presumption is not a valid reason to place additional restrictions and financial requirements on a struggling dairy farm, especially in light of the fact that the contamination found may actually be the result of legacy conditions and have little to do with current practices, management, and facilities.

The key priority components of the change in regulatory approach represent an orderly way to approach dairy regulation provided legacy and gradient conditions are adequately addressed. We would appreciate an estimate of the timeline the regional board is anticipating for implementation of the revised program.

Priority 1 – Assess Risk through Sampling of Residential Wells:
The need for up-gradient as well as down-gradient monitoring wells should be clearly identified and the source determination process should consider all potential sources, legacy and current, dairy and non-dairy. It should not only be dairy farmers who "...participate in a program to sample residential wells..." but rather all water users of the area. It is important the water board recognize that the economics of dairy farming we earlier preclude the ability of our farmers to incur additional costs. We simply do not have the financial resources to do so.

Priority 2 – Source Control:
WUD agrees that source control is the most effective means to limit any adverse impact of dairy farms to groundwater quality, and the most effective source control for dairies is the use of nutrient management planning. Water board staff recommends Comprehensive Nutrient Management Plans (CNMPs) as a requirement for all dairies. A CNMP considers all resources, including Soil, Water, Air, Plants, and Animals (SWAPA). While some farmers will prefer to take this route, since it is required for Natural Resources Conservation Service (NRCS) funding under the Environmental Quality Incentive Program

(EQIP), a plan of this detail will not be necessary in all cases. We suggest that often a Nutrient Management Plan (NMP), supervised and prepared by a Certified Crop Advisor, will accomplish equal results. We prefer allowing the dairy producer to have either opportunity. An NMP will be equal to a CNMP relative to water quality protection, but less expensive. Local Resource Conservation District's are mentioned as a provider of these services. It should be noted that Western United Environmental Services (WUES) is experienced in both CNMP and NMP preparation and certification.

Priority 3 – Compliance Monitoring:
The statements regarding the limitations on groundwater monitoring efficacy are correct, and they reflect the reason WUD prefers to implement Conservation Management Practices (CMPs) through NMPs rather than by investing in expensive monitoring wells. Monitoring and reporting programs for those under WDRs should not divert resources from implementation of accepted CMPs. They should be practical for use not only by the water board but for everyday farm management activities. It is easy to get trapped into a reporting program that is heavy on paperwork, overly burdensome to farmers, and of little actual use to the water board.

Priority 4 – Groundwater Cleanup:
WUD does not agree that it should be a farmer's responsibility to provide drinking water for other receptors. This is a grossly unfair burden to place on our member farmers without accurate and non-controversial apportionment of responsibility, especially in consideration of the known legacy influences in the area. Additionally, should remediation be necessary in some situations, provision for engagement with the dairy farmers for additional development of a remediation strategy should be mentioned.

Recommendations:
While we generally agree with the recommendation contained in the staff report, WUD suggests that up-gradient monitoring should be part of any monitoring program. As stated above, we do not agree with the requirement to provide drinking water to receptors. And finally, making the determination that a given dairy is the source of contamination should require rigorous documentation by the water board.

Western United Dairymen remains available to the Lahontan Water Board for additional discussion of the points contained in these comments. Additionally, outreach and education services for dairy farmers are available to you, both from WUD staff and through the California Dairy Quality Assurance Program (CDQAP), online at www.cdqa.org.

Very truly yours,

Michael L. H. Marsh, CPA
Chief Executive Officer

MM/kmr

cc: Jim Griffin, Western United Dairymen

07-0031

Mojave Desert Resource Conservation District
14393 Park Ave., #200 - Victorville, CA 92392
Phone: (760) 843-6882 - Fax: (760) 843-9521

May 4, 2010

California Regional Water Quality Control Board
Lahontan Region
14440 Civic Drive, #200
Victorville, CA 92392

RE: Lahontan's 4/8/10 staff report: "Evaluation of Potential Water Quality Impacts from Dairy Operations and Development of Regulatory Strategy"

The Mojave Desert Resource Conservation District (MDRCD) participated in staff's 3/30/10 meeting with dairy representatives, NRCS, etc. and appreciated the invitation. In a perfect world – dairies would be located in areas less susceptible to ground/surface water pollution than along the Mojave River, and where adjacent agricultural fields could accommodate the generated manure. The RCD is a non-regulatory body, but pledge what support we can provide to assuring the dairies' continued existence and water/air quality compliance with reasonable and effective requirements.

The staff report generally covers the issues discussed at the meeting. It is absolutely critical to identify the real sources of nitrates that are affecting downstream domestic water supplies (i.e. relationships between septic tanks and wells – natural occurrences common in some river systems – previous agriculture – effluent from wastewater treatment plants – etc.). Although far upriver from the most southerly dairy, it would be interesting to determine the extent of nitrate sources from DFG's fish hatchery effluent that passes through the Spring Valley development and Mojave Regional Park systems. Existing groundwater level monitoring wells installed by USGS and the Mojave Water Agency might be available to better define nitrate sources and extent if also designed for determining water quality.

NRCS' various programs and grants that require a match from the applicant are not likely viable options under current economic conditions (especially those affecting dairies nation-wide) – plus with difficulties in obtaining loans with the operator having to front the entire amount before any reimbursement. Matches from other sources (i.e. Clean Water Act and/or Prop. 84 funding, etc.) would have to be obtained to make it work. The State DWR also has a major stake in the effort since the Mojave River system is a major storage for re-charge of Mojave Water Agency's state water entitlement.

Too great an emphasis dealing with the "parts" of the problem dilutes the ability to address the "whole" of a solution. On-site waste ponds obviously have to be dealt with; however, it is obvious that hauling manure to fields in areas of deeper groundwater outside of the Mojave River floodplain – as near the dairy as possible (i.e. Newberry Springs, etc.) would constitute a net water quality benefit. If grant funding can be obtained to cover said hauling expenses – and if requested by the dairies - the MDRCD is willing to help locate farmers who might be willing to utilize the manure as an alternative to commercial sources – and where it can be applied under ergonomic standards. We might also be able to help advance options for a regional digester/power plant – if feasible. Any major effort on our part would require funding assistance due to our limited budget.

Let us know how best we can be part of the solution.

Sincerely,

Chuck Bell
President

Paul Johnson
Director

Cc: Harold Singer, Executive Officer
Mike Plaziak, Supervising Engineering Geologist