STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

In the Matter of: **PROPOSED AMENDMENT TO 20.6.6 NMAC (Dairy Rule)**	**No. WQCC 13-08 (R)**

DIRECT TESTIMONY OF CHARLES W. FIEDLER, P.E., LEED AP

1.0 Experience and Qualifications

1.1. What is your name?

Charles W. Fiedler, P.E., LEED AP

1.2. Who is you employer?

Gordon Environmental, Inc.
Senior Project Director

1.3. Please describe your education and degrees.

Bachelor of Science in Civil Engineering from Texas A&M University (1978)
Master of Science in Civil Engineering from Texas A&M University (1982)

1.4. What professional licenses do you hold?

Professional Engineer-Texas (52247)
Professional Engineer-New Mexico (19731)

1.5. Please describe your experience related to your testimony.

My career began with the Texas Department of Health in their environmental health division where I was responsible for ground water system protection. In this position, I was responsible for monitoring public drinking water systems that primarily relied on ground water. Responsibilities included inspection of ground water well installations for ground water protection.

I subsequently was promoted into the solid waste group where my responsibilities included approving monitoring well installations, inspecting monitoring well installations, sampling and reviewing results from ground water monitoring well systems, and providing feedback confirming ground water sample compliance.

Since my first professional engagement, ground water monitoring has been an integral component of my career. The process of designing a ground water monitoring system has evolved from the days when wells were indiscriminately installed around a facility. Today, we routinely initiate a design process that evolved out of the requirements of the Resource Conservation and Recovery Act of 1976. In this design process, we conduct a hydrogeological investigation that includes exploratory borings to define the underlying geologic formations, including water-bearing zones proposed for monitoring. Through this process, we provide validation for the selected monitoring depths and locations based on site-specific data collected in the investigation, providing a higher quality monitoring well system, typically with an optimized number of wells.

1.6. Approximately how many monitoring well systems have you evaluated, designed and monitored?

Several hundred in a career span of 36 years. Just about every type of facility I have been involved with required some level of compliance monitoring and has included ground water monitoring wells to confirm the integrity of the operation.

1.7. For what types of facilities?

Primarily waste disposal facilities with containment structures such as disposal cells (associated with municipal solid waste, industrial waste, construction & demolition waste, exploration, production waste, hazardous waste, etc.) or containment basins (associated with waste water treatment, stormwater, septage, animal feedlot runoff, produced water, etc.).

1.8. Have you evaluated or designed monitoring well systems for dairies?

Yes, under both the old and new Rules.

1.9. What is the extent of your experience on projects requiring ground water discharge permits under the WQCC's Regulations?

I am routinely involved in the investigation and development of ground water monitoring systems associated with waste disposal facilities. My most recent project experience that required a ground water discharge permit was the permitting and modification of a septage dewatering facility where domestic septage is filtered to remove the solids in a bio-filter. The liquid is used to enhance green waste composting.

1.10. Have you designed any monitoring well systems required by the Dairy Rule, particularly 20.6.6.23NMAC?

No. I have developed and submitted several dairy discharge permits/renewals (for the Las Uvas Valley Dairy, DP-342, DP-946, DP-1265, & DP-1790), but none of these submissions proposed to install the significant number of additional wells this Rule

would require. The decision to oppose the prescriptive well placement required by the Rule was made based on the previous hydrogeological characterization that had been performed for these facilities. This characterization defined the depth to ground water, evaluated the demonstrated historical absence of evidence of ground water contamination, and relied on the findings of the geological and hydrogeological analysis that supported the fact that the existing ground water monitoring well system adequately represented and reported the ground water conditions at the facility.

1.11. What is your experience in monitoring, evaluation, investigation, corrective action and abatement of ground water contamination in New Mexico?

I have significant experience monitoring ground water, from the collection of routine samples to the evaluation of the results; and I am familiar with the standard practices that are routinely implemented with various compliance monitoring programs. When our evaluation indicates that the results are not within the expected parameters, we actively investigate sampling methods and testing protocols to confirm that the results accurately reflect the true ground water condition. These investigations may include additional sampling and testing to confirm the original findings. Additional parameters may also be evaluated to isolate the source of the unexpected findings. Where the elevated readings are confirmed, we have undertaken corrective actions to identify the contamination source and implement abatement practices that rectify the contamination.

2.0 General Design Principles for Monitoring Well Systems

2.1. What technical principles are generally relied upon to design a proper ground water monitoring system under the Commission's general discharge permit regulations or similar regulations?

The technical principles that are generally relied upon to design a proper ground water monitoring system typically start with the characterization of the geological and hydrogeological settings that lead to the site-specific definition of gradient (i.e., the slope of the ground water surface elevation, see ***Fiedler – 1****), and the placement of monitoring wells relative to the gradient and the units being monitored. These principals are detailed in a vast array of technical resources including the* ***RCRA Ground-Water Monitoring Draft Technical Guidance*** *issued by the Environmental Protection Agency, Office of Solid Waste in November 1992. This document outlines the basic principles that are typically relied upon in the development of a ground water monitoring system:*

- *Conduct a Hydrogeologic Investigation*
  - *Define the regulatory requirements and technical objectives*
  - *Conduct the preliminary investigation*
  - *Develop the initial conceptual model (Basis of the field investigation)*
  - *Conduct the field investigation*
  - *Refine the conceptual model based on the field findings*
  - *Conduct additional investigation(s) as necessary to adequately refine the conceptual model*

- *Design the ground water monitoring system based on the hydrogeological investigation*

2.2. Are there standard guidance and technical reference documents utilized by professionals who design ground water monitoring systems?

*Yes. (See **Fiedler – 3**). The **RCRA Ground-Water Monitoring Technical Enforcement Guidance Document** published by the Environmental Protection Agency (EPA), Office of Solid Waste Programs Enforcement in September 1986 represents the original basis for most ground water monitoring system designs undertaken today. This document outlines the process typically used to define ground water at a particular location and outlines the methodology for positioning the upgradient (i.e., the shallowest ground water surface elevation in the study) and downgradient (i.e., deeper ground water surface elevations) monitoring points. (See **Fiedler – 1**). Subsequently, these principles were expanded upon in the **RCRA Ground-Water Monitoring Draft Technical Guidance** issued by the EPA, Office of Solid Waste in November 1992. This document details the basic principles that are typically relied upon in the development of a ground water monitoring system as follows:*

- *Conduct a Hydrogeologic Investigation*
  - *Define the regulatory requirements and technical objectives*
  - *Conduct the preliminary investigation*
  - *Develop the initial conceptual model (Basis of the field investigation)*
  - *Conduct the field investigation*
  - *Refine the conceptual model based on the field findings*
  - *Conduct additional investigation(s) as necessary to adequately refine the conceptual model*
- *Design the ground water monitoring system based on the hydrogeological investigation*

2.3. What site-specific information is utilized by a professional in the design of a monitoring well system?

Professional Engineers and geologists with specific training in hydrogeology are typically relied upon for their technical expertise in the design of monitoring well systems. Often these professionals will work together on a ground water monitoring system design. While DIGCE does not have a position on who is qualified to perform the hydrogeological evaluations, they understand that the Department may accept work from Engineers or hydrogeologists. Therefore, I will refer to these professionals as "qualified professionals." Typically, for a planned new facility, the qualified professional will perform a preliminary investigation that is initiated with the collection of available regional information relating to the geology and hydrogeological setting of the particular site and its surrounding area. Reviewing previous studies that assess the site-specific nature of the ground water setting represents the first step in understanding the ground water regime at a particular location. The studies may include field investigations of previous explorations in the vicinity, providing insight into the ground water

hydrogeology of an area. Some of this information is requested by NMED in 20.6.6.20(X) NMAC, which requires the identification of water wells within one mile of the facility.

The qualified professional will undertake the second step by focusing on data that is relevant to the specific location of interest and outline a conceptual model of the geology and hydrogeology with which to develop a preliminary subsurface investigation plan. The investigation plan typically consists of a minimum of three geotechnical borings, which may be existing borings or well logs in close proximity to the dairy facility, used to define the ground water gradient at a particular location.

The third step in this process is to initiate a site-specific investigation with geotechnical borings based on the conceptual model. This investigation will be used to develop and collect geological and hydrogeological information from field observations of the borings. In some instances, laboratory testing of boring samples may be analyzed to provide additional insights regarding the geology and utilized to correlate the site-specific findings from this investigation to the regional information compiled in the first step.

The final step is to use the field data collected to refine the conceptual model to reflect the observed conditions. With this refined model, the qualified professional can define the basis for upgradient and downgradient monitoring; identifying the most appropriate location for monitoring wells that will confirm the absence (or presence) of contamination from the proposed facility. Based on this investigation, installation of the monitoring well system may be completed.

2.4. How much site-specific information is typically obtained and utilized for the design of a monitoring well system?

As with any technical investigation, determining how much site-specific technical information is required can be a challenging question. Typically, the collection of regional geologic and hydrogeologic information will provide a good assessment of the ground water regime for a particular location. Based on this information, a conceptual model can be defined that provides the basis for a site-specific investigation. Ideally, the completion and analysis of at least three geotechnical borings, or use of information from existing borings in the area, will confirm the regional geologic setting and provide a basis for the facility ground water monitoring plan. Depending on the complexity of the geological setting and the size of study area being evaluated, additional geotechnical borings may be required to define the geologic setting more accurately.

2.5. Are there any differences with respect to dairies that should be considered in the design of a monitoring well system?

No. While no two dairies will possess the same hydrogeologic setting, the process to characterize them, defining gradient and depth to the most-shallow ground water, are the same for all locations. Once a hydrogeologic evaluation has been completed, the monitoring systems will only differ in the number and spatial layout of the wells required

to monitor the facility appropriately. I should note that my testimony in this section is primarily focused upon planning and permitting a new facility. Later in this testimony I discuss how the rule should address existing dairies that have been permitted and have an approved monitoring well system under previously-issued discharge permit.

2.6. What are the typical costs for monitoring wells based upon the design requirements in the dairy rule? How do the costs vary depending on site-specific factors?

Installation and development of a typical monitoring well (per 20.6.6.23(D) NMAC, which references 19.27.4 NMAC) will average approximately $150 per foot of well depth. The required depth of the well to reach the first relevant water-bearing zone is the primary determinant in the final cost of the well (i.e., the deeper you have to go to get to water the more expensive the well). Additionally, diverse geology will also have an impact on the installation cost. A diverse geological and hydrogeological setting may require additional wells to monitor the facility location adequately. (See DIGCE Ground Water Monitoring Presentation to NMED Staff Slide 9 dated 05/16/2014 included as ***Fiedler - 2****). The cost is also affected by the well drilling method required (e.g., hollow stem auger, air rotary, mud rotary, etc.) for the materials encountered (i.e., sand, clay, gravel, rock, etc.).*

The current cost to plug an existing ground water monitoring well is approximately $20 per foot or $2,000 for a 100 foot deep well. Quarterly ground water monitoring (i.e., sampling, analysis and reporting) will cost an additional $3,000 per well per event.

3.0 Current Dairy Rule Requirements

3.1. What problems have been identified with the current ground water monitoring requirements of the Dairy Rule (20.6.6.23 NMAC)?

The prescriptive nature of the current Dairy Rule will require any Permittee that can comply with the monitor well location requirements to request a variance from the Commission. The variance process (20.6.2.1210 NMAC) requires the Permittee to petition the Commission for relief from the prescriptive requirements of the Dairy Rule ground water monitoring requirements. Given the prescriptive nature of this Rule, it is anticipated that almost every dairy seeking a permit will be required to come before the Commission for a variance from some component of the ground water requirements. The ramifications of the Commission hearing and ruling on over 100 variance requests in every dairy permitting cycle will potentially represents a burden beyond the logistical capability available.

The ground water monitoring well location requirements (20.3.3.23(A) NMAC) mandating an installation zone around potential contamination sources (i.e., stormwater/waste water lagoons, application fields, etc.) represent a significant flaw in the potential design of an effective ground water monitoring system. This requirement only considers ground water gradient when determining the monitoring well location (i.e., downgradient). There is no recognition that the hydrogeology of the facility might

dictate a location that provide more accurate monitoring of the ground water passing under the potential contamination source.

3.2. What is the stated purpose of the ground water monitoring requirements in 20.6.6.23(A) NMAC?

To monitor ground water quality hydrologically downgradient of each potential source of ground water contamination. The existing Dairy Rule establishes the requirement for downgradient wells to detect exceedances of the ground water quality standards relative to the upgradient (benchmark) water quality.

3.3. Is this purpose consistent with the purpose of ground water monitoring under other federal and New Mexico environmental laws?

Yes. It is standard practice in both Federal and other State Rules to compare ground water quality both to the upgradient (benchmark) water quality, as well as the established ground water quality standards.

3.4. How does it compare to the provisions of the Commission's general discharge permit regulations, particularly 20.6.2.3107 NMAC?

The Commission's general discharge permit requirements relating to Monitoring, Reporting and Other Requirements (20.6.2.3107 NMAC) are simplistic in their outline of the ground water monitoring infrastructure that is detailed in Section 2, which requires "The installation, use, and maintenance of monitoring devices for the ground water most likely to be affected by the discharge." This leaves the definition of how and where the monitoring wells are installed to the discretion of the Permittee, although more recent experience under the general rules was that the Department often sought to change or add to the monitoring requirements through discharge permit conditions. In comparison, the requirements of 20.6.6.23 NMAC are specific regarding the potential contamination sources that must be monitored; the specific distance within which the monitoring wells must be placed from the potential contamination source; and the mandate to install a monitoring well for a prescribed number of acres utilized for specific land application practices. Unfortunately, the arbitrary nature of the Dairy Rule in §23 does not address the variability of hydrogeologic settings when it prescribes the monitoring well locations relative to potential contamination sources. In comparison, the general discharge permit requirements provide appropriate discretion to the Permittee, while the current Dairy Rule essentially provides no discretion regarding monitoring well placement.

3.5. How is the number of required monitoring wells determined under the Dairy Rule for wastewater impoundments? Storm water impoundments? For land application areas? For a dairy facility in general?

- *Wastewater Impoundments: Rule 20.6.6.23(A)(1) NMAC requires a minimum of one monitoring well downgradient, within **75 feet** of the top inside edge of each impoundment.*

- *Storm Water Impoundment: Rule 20.6.6.23(A)(3) NMAC requires a minimum of one monitoring well downgradient, within **75 feet** of the top inside edge of each impoundment.*
- *Land Application Areas: Rule 20.6.6.23(A)(4) NMAC requires ground water monitoring (at least one monitoring well) downgradient and within **50 feet** of each 40 acre flood irrigated field (or portion) and within **50 feet** of each 160 acre sprinkler or drip irrigated field (or portion).*

***Fielder – 2** provides a graphical example of the requirements for monitoring well locations. These prescriptive setbacks are entirely arbitrary and without technical foundation and can be impossible to attain in certain circumstances.*

3.6. How does this approach to determine the number of monitoring wells compare to the approaches typically used for other types of facilities?

The approach prescribed in Rule 20.6.6.23(A) looks only at one aspect of the hydrogeological setting, the ground water gradient. It ignores the potential geology that might render the prescribed system ineffective in detecting a trend toward exceedance of the ground water standards at the earliest possible occurrence. In addition, this excessively prescriptive Rule has defined a default design that does not account for site-specific conditions that might render the monitoring well locations and layout relative to the potential contamination sources dysfunctional.

Almost without exception, the general regulatory basis for design of ground water monitoring systems relies on the professional characterization of the subsurface geology and hydrogeology to establish the most effective monitoring well layout. Considering that, for the rest of the discharges managed by the NMED Ground Water Quality Bureau, it is sufficient to identify the wells to be used for monitoring (per 20.6.2.3106 NMAC). This raises the obvious question... "Why is the potential for contamination from a Dairy more stringently controlled than potential discharges from a solid waste unit, a hazardous waste unit, a waste water lagoon, or a leaking underground tank?"

3.7. Are the regulations governing the number of monitoring wells required for other types of facilities typically as prescriptive?

No. The generally accepted basis for ground water monitoring system design began with the implementation of RCRA and the guidance documents developed in support of the implementation of the Federal regulations that were established. These guidance documents outlined a methodology that relies significantly on the hydrogeological characterization of a facility (i.e., compile regional hydrogeologic model for the facility, define a conceptual hydrogeologic model of the facility, develop and implement a site investigation with borings, refine the hydrogeologic model, design a ground water monitoring system, implement the system design). This approach represents the basis for ground water monitoring system design for the regulatory programs identified below:

- *Per 20.9.9.9 NMAC, NMED Municipal Solid Waste facilities require that... "A ground water monitoring system shall consist of a sufficient number of wells,*

installed at appropriate locations and depths, to yield ground water samples from the uppermost aquifer that:
(1) represent the background quality of ground water that has not been affected by a release from the landfill as determined under 20.9.9.10 NMAC; and
(2) represent the quality of ground water passing the detection monitoring point which shall be at the waste management unit boundaries on land owned by the owner of the Landfill... ".

- *NMED Hazardous Waste facilities require compliance with Federal regulations (per 20.4.1.500 NMAC) set forth in 40 CFR Part 264 which require the following in Subpart 97(a) relating to general ground water monitoring requirements:*
  (a) The ground-water monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield ground-water samples from the uppermost aquifer that:
  (1) Represent the quality of background ground water that has not been affected by leakage from a regulated unit;

- *NMEMNRD Oil Conservation facilities require (per 19.15.36.17.A NMAC)... "An Engineering Design Plan that includes a hydrogeologic report that provides sufficient information and detail on the site's .....ground water hydrology to enable the division to evaluate the actual and potential effects on ... ground water".*

3.8. Describe how the locations of monitoring wells are determined under the current dairy rule for impoundments and land application areas.

The Rule, 20.6.6.23(A) NMAC, arbitrarily dictates a horizontal distance downgradient of the edge of a potential contamination source (i.e., lagoon, pond, land application field, etc.) within which the monitoring well must be installed. This methodology does not take into consideration the site geology or other characteristics of the local hydrogeology, significantly impacting the ability of the prescribed wells to provide the detection levels required by this section. The prescriptive design arbitrarily assumes that all hydrogeologic conditions can be adequately monitored by a well located within 75 feet downgradient of the edge of a potential contamination source. There is no guarantee that this prescription for monitoring well location will provide the optimal installation to detect an exceedance when the hydrogeology of a location is not considered.

3.9. Are the regulations governing the locations of monitoring wells required for other types of facilities typically as prescriptive?

No. The EPA, in their ***RCRA Ground-Water Monitoring Technical Enforcement Guide (September 1986)****, probably stated it best when they proclaimed... "****clearly, the spectrum of hydrogeologic regimes is great, and no single document could provide detailed, step-by-step instructions for monitoring each one****" when referring to solid waste disposal facilities. This statement also holds true for the diaries regulated by NMED and emphasizes the recognition by the regulating community that there is no prescriptive design that will be applicable to all circumstances.*

3.10. How is information from ground water monitoring used under the contingency provisions for impoundments under the Dairy Rule? [refer to 20.6.6.27 (B)]

20.6.6.27 NMAC requires that ground water sample results from downgradient wells provide the basis for comparison with samples from the upgradient well(s) and the ground water standards (20.6.2.3103 NMAC). Comparing the downgradient sample results to the upgradient sample results provides a site-specific comparison of ground water quality under the facility; and comparing these results to the ground water standards provides a comparison to the level at which the water is considered contaminated. This approach forms the basis for evaluation of all ground water monitoring programs and is applicable to the ground water monitoring results from dairies. DIGCE accepts this as the standard for ground water monitoring analysis.

3.11. In your experience, to what degree can the results of monitoring from a single monitoring well be used to conclusively determine whether a particular impoundment has excessive seepage such that corrective action or replacement is necessary?

Sample results from a single monitoring well are of limited value without the determination of gradient (i.e., the elevation of the ground water surface at one point under the facility relative to the ground water surface elevation at another point, ***Figure 1****). Without a second ground water monitoring point to compare water surface elevations the relative gradient under the facility cannot be defined. The ground water gradient under the facility is a critical component of the ground water evaluation process relative to the monitored unit. The availability of sample results from a second monitoring well in the opposite gradient from the evaluated well allows for comparison of sample results and a determination of water quality variation (i.e., exceedances). At a minimum, the sample results from one ground water monitoring well can be compared to the regulatory standards for a determination of compliance. However, if this sample is from an upgradient well, the results reveal nothing regarding the potential impacts to ground water quality from a facility.*

3.12. Would your conclusion be any different for different types of liner systems utilized for the impoundment?

No. A leaking liner is a leaking liner. The characteristic ground water quality constituents evaluated are the same, irrelevant of the type of liner utilized. Ground water sample monitoring results are not dependent on the type of liner providing containment for a particular unit.

4.0 DIGCE Proposed Amendments

4.1. What amendments would be required in the current Dairy Rule to establish requirements that define a functional ground water monitoring system?

The current Dairy Rule will need to be amended to provide sufficient flexibility in the location and installation of ground water monitoring wells. The Permittee, based on the hydrogeological characterization, should have the flexibility to locate the ground water monitoring wells appropriately. The installation of a monitoring well should not be limited by a prescriptive standard that arbitrarily defines the well location based solely on distance and gradient. It should provide flexibility that also considers the hydrogeology of a location and provide the flexibility to locate the monitoring well where it will provide the most representative evaluation of ground water flowing under the dairy facility. This flexibility should be provided in the Rule, without the requirement to seek a variance from this Commission for every monitoring location that does not fit the prescription within the current Rule.

4.2. Turning to DIGCE's Petition, Attachment A, on page 24, please explain the reason for deleting "hydrologically downgradient of each source of ground water contamination: wastewater, stormwater, and combination wastewater/stormwater impoundments, and fields within the land application area" and replacing it with "at the dairy facility with at least one hydrologically upgradient and two hydrologically downgradient wells."

The Petition focuses on providing a ground water monitoring system that requires the Permittee (supported by the services of a qualified professional familiar with the geotechnical and hydrogeological characteristics of the area) to evaluate the geologic and hydrological setting in order to design an efficient monitoring well layout that captures the necessary information to evaluate accurately the ground water condition downgradient from the potential contamination sources. By prescribing the well location distance from the monitored feature, the Rule limits the flexibility of the Permittee to rely on the site-specific hydrogeologic information available for the optimal placement of the monitoring well, without the requirement for a variance. The current Rule (20.6.6.23 NMAC) provides a prescriptive formula that requires a Permittee ostensibly to install a ground water monitoring system without developing an understanding of the hydrogeology of the site. It should be noted that a prescriptive monitoring system installation under this Rule could have the adverse effect of not accurately identifying the exceedances that may be present as a result of the inappropriate positioning of monitoring wells.

The current Dairy Rule ignores the accepted principles and practices established by the EPA (originally outlined in the ***RCRA Ground-Water Monitoring Technical Enforcement Guide, September 1986****, and expanded upon in the* ***RCRA Ground-Water Monitoring Draft Technical Guidance, November 1992)*** *by prescribing an arbitrary approach to ground water monitoring. Both the Solid Waste Bureau and the Hazardous Waste Bureau at NMED, as well as other state agencies (i.e., New Mexico Energy, Minerals and Natural Resources), have embraced the EPA guidance incorporating the accepted and proven approach that results in a ground water monitoring system that provides accurate and reliable results for the life of the facility. The regulatory approach to ground water monitoring outlined in 20.6.6.23 NMAC is flawed by failing to outline the basic requirement to characterize the ground water hydrogeology of the location. Without this information, a ground water gradient cannot be defined. Without a physical*

definition of gradient at the facility, none of the rest of this section of the Rule makes any sense. Ultimately, the Rule, as implemented, potentially exposes the regulated facility to a false sense of environmental security by installing a ground water monitoring system that does not necessarily address the site-specific hydrogeology present at the facility location.

4.3. What is the basis for requiring at least one hydrologically upgradient and two hydrologically downgradient wells?

A hydrologically upgradient ground water monitoring well provides the background or benchmark for the quality of the ground water passing under the regulated facility. This typically represents the minimum number of wells that will be required to characterize properly the ground water hydrogeology for a typical dairy. The requirement for an upgradient ground water monitoring well represents no change from the current Rule (20.6.6.23(A)(5) NMAC).

The Rule proposed by DIGCE would allow the regulated facility the flexibility to rely on the ground water hydrogeological characterization, typically conducted to identify the appropriate number of downgradient ground water monitoring wells (minimum two) to provide spatial coverage for the potential contamination sources. Instead, the current Rule (20.6.6.23(A)(1, 2, 3, & 4) NMAC) prescriptively details the precise distance from the inside edge of the contamination source, and defines the number of monitoring wells per potential contamination source or acreage of land application field. This prescription does not take into account the total characterization of the hydrogeology that might identify monitoring well locations better suited to monitor the geology under the facility. By following the prescriptive requirements of the Rule, the facility owner may inadvertently place the monitoring well in a downgradient location that does not intercept the downgradient ground water flowing under the potential contamination source, providing a false sense of security and not fulfilling the intention of the Rule to..."detect an exceedance or a trend toward exceedance of the ground water standards...". Without flexibility in the Rule regarding the placement of ground water monitoring wells, a Permittee is forced to seek a variance from the Commission to rely on the detailed information available in a hydrogeological characterization to design an optimal ground water monitoring system.

The current Rule ignores critical information available from a hydrogeological evaluation. Instead, this Rule relies on a prescriptive, "easy to follow, easy to permit" approach to ground water monitoring system design that assumes the optimal location for all monitoring wells will be within a prescribed distance from the monitored unit (i.e., 75 feet from a wastewater lagoon). Unfortunately, this approach will result in the inappropriate placement of monitoring wells and a false sense of environmental security. The only relief from this prescriptive placement requirement is for the Permittee to seek a variance from this Commission. The required variance would allow a Permittee to undertake the optimal placement of ground water monitoring wells based on a hydrogeological characterization. Considering that just about every dairy will have ground water monitoring well locations that require a variance, this Commission will

constantly face variance requests that could be avoided by providing flexibility within this Rule. It is for this reason that DIGCE requests the revision of this Rule.

4.4. Under this language, would it ever be necessary to have more than one hydrologically upgradient well? Under what types of circumstances?

Yes. Based on a ground water characterization, circumstances in the hydrogeology of the area may identify upgradient ground water conditions that require more than one upgradient monitoring well to represent adequately the quality of more than one source of ground water. The objective of ground water monitoring is to compare the upgradient and downgradient ground water from the same source to determine if the facility has impacted water quality as it flows underneath. If the upgradient source is not the same source supplying water to the downgradient monitoring well, there may be naturally occurring differences in quality from the various source that would be interpreted as contamination when none may be present.

4.5. Under this language, would it ever be necessary to have more than two hydrologically downgradient wells? Under what types of circumstances?

Yes. Given a facility's size and the distribution of potential contamination sources within the facility, it may be necessary to have more monitoring wells to monitor adequately various downgradient locations when the potential contamination sources are separated; and potential migration pathways from these potential contamination sources cannot be adequately monitored by only two wells.

4.6. How would the necessary number of monitoring wells be established under the rule if the Commission adopts the proposed amendment?

A professional qualified in the characterization of ground water hydrogeology and the design of ground water monitoring systems, would be engaged to evaluate the geological and hydrogeological setting of the facility to determine the upper-most aquifer and ground water gradient at the facility. Based on this information and the existing or proposed facility potential contamination sources, the qualified professional would develop a ground water investigation plan that would consist of at least three geotechnical borings extending to a depth where ground water is anticipated. Based on the depth at which ground water is encountered, the qualified professional would define the ground water gradient, thereby identifying the proper locations and numbers of upgradient monitoring wells and downgradient monitoring wells required to provide adequate monitoring coverage for potential contamination sources within the facility.

4.7. What is the reason for the addition of the language "in a location that is protective of the well" to 20.6.6.23(A) NMAC?

The physical location of a monitoring well is critical to ensure the well is situated where it is protected from damage by facility operations; and is not subject to inundation from flooding or irrigation. Identifying this secure location is a critical component of the

qualified professional's responsibility in the design and development of the ground water monitoring well system. Having the flexibility, under the Rule, to place the monitoring well in a secure location, without having to request a variance from the Commission is crucial.

4.8. What are the reasons to strike the first sentences of the current 20.6.6.23(A)(1), (2) and (3) NMAC?

Establishing an arbitrary distance (i.e., 75 feet) within which a ground water monitoring well must be installed will require the inappropriate installation of monitoring wells. Examples may include installation on a levee between two lagoons, on a levee side slope, within a drainage feature, in a roadway, etc. In addition, the 75-foot setback may not be a sufficient distance to address geological features where a deep water table, combined with interbedded materials deposited in horizontal layers, could divert a potential discharge from the potential contamination source across the monitoring well and above the screened interval, thereby rendering the monitoring well useless.

4.9. Do you know any scientific basis for a 75 foot maximum distance as specified in 20.6.6.23(A)(1)? Any basis in other regulations or guidance?

No. While there is guidance to minimize the separation distance between a monitoring well and the potential contamination source, none of the regulatory guidance reviewed prescribes a minimum distance from a potential contamination source to the monitoring well installation. The required practice in other regulations and guidance is to defer to the qualified professional, relying on their expertise and knowledge of the geologic and hydrogeologic settings. The qualified professional acquires their knowledge by conducting a characterization to determine the appropriate location and spacing of the monitoring well from the potential source of contamination (RCRA Ground-Water Monitoring Draft Technical Guidance, November 1992). Without relying on this level of information (i.e., deferring exclusively to a prescriptive 75-foot maximum distance down gradient), the Permittee is handicapped to install an optimal ground water monitoring system without a variance.

4.10. What are the reasons to strike the second sentences of the current 20.6.6.23(A)(1), (2) and (3) NMAC?

The second sentence in §(A)(1), (2), and (3) applies the requirement for existing facilities, and would require the Permittee to relocate existing wells and/or install new monitoring wells within 75 feet of the identified potential contamination source (i.e., wastewater, combination wastewater/stormwater, or stormwater impoundments). DIGCE proposes to strike this section because it would negate previous monitoring system approvals, even if an existing system was still functioning properly; and providing quality, representative results. In addition, this requirement would mandate the installation of additional monitoring wells for the identified potential contamination sources without any site-specific characterization confirming that the relocated or new monitoring wells would provide additional beneficial (quality) information. This Rule is being implemented even

though the existing, previously approved ground water monitoring system may already provide quality monitoring. In addition, without this revision, the Commission would be required to evaluate variance requests for any monitoring well that could not be situated within the 75-foot perimeter of potential contamination sources.

4.11. What are the reasons to strike subparagraph (c) of 20.6.6.23(A)(1) and 20.6.6.23(A)(2) and (3) NMAC relating to monitoring well installation?

The proposed DIGCE revisions to §(A)(1-3) address the minimum number of ground water monitoring wells and the timeframe in which new wells monitoring a dairy facility must be installed. The proposed revision of requirement in §(A)(1-3) negates the need to repeat the requirement in §(A)(1)(c), §(A)(2) and §(A)(3).

4.12. What are the reasons to strike 20.6.6.23(A)(4)(a) and (b) NMAC?

The requirements of § (A)(4)(a) and (b) relating to the installations of monitoring wells based on the number of acres subject to land application of effluent is being struck based on the absence of an apparent nexus between the acreage per well and the geologic or hydrologic setting There is no identifiable relationship between the potential impact from the land application of wastewater and the number of monitoring wells required when the ground water hydrogeology is not taken into consideration. The number of acres in the land application footprint has virtually no impact on the potential for contamination. The current approach will result in the installation of monitoring wells in locations where their positioning may not be prudent from an operational perspective (i.e., within fields, roads, drainage features, etc.). Their presence in these locations provide no significant improvement in facility compliance monitoring over monitoring wells situated along the downgradient dairy facility perimeter. A hydrological characterization should be completed for the facility prior to determining the appropriate location for the ground water monitoring wells.

4.13. Do you know of any scientific basis for the 40 acre provision for flood irrigated fields as specified in 20.6.6.23(A)(4)(a)? For the 50 foot provision in the same subparagraph? For the 160 acre provision in 20.6.6.23(A)(4)(b)?

No. There appears to be no technical basis for locating ground water monitoring wells within 50 feet of every 40 acres of flood irrigated fields; or within 50 feet of every 160 acres of sprinkler/drip irrigated fields. Arbitrarily prescribing a downgradient distance within which all ground water monitoring must be accomplished represents a problem because no prescribed distance will work for every hydrogeologic setting Relying on a hydrogeologic characterization to locate the ground water monitoring well locations properly is the accepted practice and will result in an optimal ground water monitoring system. This is the reason DIGCE has proposed deleting this section of the current Rule.

4.14. What are the reasons to strike 20.6.6.23(A)(4)(c) NMAC?

Once again, there appears to be no technical basis for locating ground water monitoring wells downgradient from a field when grazing is used in lieu of mechanical harvesting. The concern appears to be that livestock consuming a crop directly from the field (i.e., grazing) will result in a greater potential for contamination when compared to harvesting the crop with machines and feeding it to the livestock in pens. There does not appear to be a significant potential contamination source here that requires monitoring, raising the question why this type of field would even require monitoring. In addition, there does not appear to be any significant benefit to this level of monitoring that would not be addressed by a ground water monitoring system design based on a hydrogeological characterization. This approach would identify the optimal location for ground water monitoring well placement. DIGCE proposes to strike the requirement §(A)(4)(c) and rely on a hydrogeologic characterization to locate properly the ground water monitoring well locations.

4.15. What are the reasons to strike 20.6.6.23(A)(5) NMAC?

The requirement §(A)(5) to install an upgradient well is being struck as redundent of the requirements proposed by DIGCE in the proposed revisions to §(A) relating to dairy facility monitoring.

4.16. What are the reasons for the amendments to 20.6.6.23(A)(6) NMAC?

The DIGCE proposed amendments to §(A)(6) are designed to allow an existing permitted facility the ability to continue to use a previously approved ground water monitoring system that is currently in place and providing quality results for a dairy reporting compliance with the ground water standards. As a result of these proposed amendments, the remaining requirements of this Subparagraph are deleted because they are no longer applicable to existing ground water monitoring systems.

4.17. Will NMED ever be able to require replacement of an existing monitoring well that is not effectively monitoring ground water as intended if the Commission decides to amend 20.6.6.23(A)(6) NMAC as proposed in the petition,?

Yes. NMED retains the right to address the effectiveness of a ground water monitoring system through the provisions of 20.6.6.27 NMAC. Allowing for the continued use of previously approved ground water monitoring wells that continue to provide representative ground water monitoring (as proposed by DIGCE in 20.6.6.23(A)(6) NMAC), even though a well may not meet every requirement of the current Rule, has technical merit. The historical record established by an existing well is invaluable to the understanding of the ground water hydrogeology. Replacing an existing well in the same location requires the re-establishment of ground water quality parameters for this location, given the fact that no two monitoring points will provide identical results no matter how close they are physically located. In addition, the financial burden for the dairy to decommission (i.e., plug) a typical 100 foot existing well at an average cost of

$2,000 and install/develop a new well at an average cost of $15,000 is a concern. The effectiveness of the ground water monitoring system remains subject to the provisions of 20.6.6.27(C) NMAC which specifically allows for the replacement of a ground water monitoring well if it is determined that the identified well is not effectively monitoring ground water as intended. NMED retains the necessary authority to address any concerns that may arise regarding the continued use of an existing well.

4.18. What are the reasons for the proposed amendments to 20.6.6.23(A)(7) NMAC?

The DIGCE proposed amendment to §(A)(7) continues to reinforce the reliance on a hydrogeologic characterization. DIGCE once again proposes developing a ground water monitoring system that relies on the optimum location for monitoring wells for the entire dairy facility rather than prescriptively monitoring each potential contamination source.

4.19. What are the reasons to strike 20.6.6.23(A)(7)(c) NMAC?

DIGCE concurs with the desired goal to reduce the number of duplicate sample results and the associated sampling, analysis and monitoring costs of approximately $3,000 per well, per event. By relying on a hydrogeologic characterization, DIGCE once again proposes developing a ground water monitoring system that identifies the optimum location for monitoring wells. The requirements of §(A)(7)(c) that established ground water monitoring criteria exempting adjacent or adjacent groupings of contiguous sprinkler or drip irrigated fields are struck because they are redundant. The DIGCE proposed revisions to §(A) relating to dairy facility monitoring based on the findings of a hydrogeologic characterization will provide better definition for the appropriate location of ground water monitoring wells.

4.20. What are the reasons to strike 20.6.6.23(A)(8) NMAC?

The requirements of §(A)(8) providing for a third downgradient monitoring well are struck because they are duplicative of the requirements in the DIGCE proposed revisions to §(A) relating to dairy facility ground water monitoring and which requires at least two hydraulically downgradient wells. Once again, the DIGCE proposed revisions to §(A) relating to dairy facility monitoring based on the findings of a hydrogeologic characterization will provide better definition for the appropriate location of ground water monitoring wells.

4.21. If the Commission accepts the proposed amendments to delete the prescriptive requirements for monitoring well locations, how will locations be determined and proposed under 20.6.6.23(B) NMAC?

A professional, qualified in the study of ground water hydrogeology and design of monitoring systems, would be engaged to evaluate and characterize the geological and hydrogeological setting of the facility to determine the upper-most aquifer and ground water gradient at the facility. Based on this information and the potential contamination

sources on an existing or proposed facility, the qualified professional would develop a ground water investigation plan that would consist of at least three geotechnical borings extending to a depth where ground water is anticipated and a confining bottom formation is identified. Based on the depth at which ground water is encountered, the qualified professional would define the ground water gradient and identify the upgradient and downgradient ground water monitoring well locations required to provide the facility with optimal monitoring coverage for potential contamination sources within the facility.

4.22. What are the reasons for the proposed amendment to 20.6.6.23(B)(1) NMAC?

The proposed amendment revises §(B)(1) to strike the specific reference to "contamination source", and replace it with "dairy facility" to be consistent with the monitoring description presented in the proposed amendment of §(A). This proposed change also reflects the DIGCE philosophy that the development of a hydrogeologic characterization of the facility location represents the optimum basis for the ground water monitoring system proposed.

4.23. What are the reasons to amend the heading to 20.6.6.23(D) NMAC?

The DIGCE proposed heading for §(D) is revised to focus the section on "new monitoring wells", when identifying the applicability of this section. DIGCE concurs that all "new" monitoring wells should meet this standard. With this proposed amendment, DIGCE rejects the position that existing, previously approved monitoring wells that are effectively monitoring ground water at a facility should be replaced if they do not meet this standard. In addition, the financial burden for the dairy to decommission (i.e., plug) a typical 100 foot existing well at an average cost of $2,000 and install/develop a new well at an average cost of $15,000 is a concern. The effectiveness of the ground water monitoring system remains subject to the provisions of 20.6.6.27(C) NMAC which specifically allows for the replacement of a ground water monitoring well if it is determined that the identified well is not effectively monitoring ground water as intended. NMED retains the necessary authority to address any concerns that may arise regarding the continued use of an existing well.

4.24. What are the reasons to amend 20.6.6.23(H)(3) NMAC?

The proposed DIGCE amendment to §(H)(3) provides the department with the flexibility to grant an extension of time for a Permittee to develop and deliver the monitoring well survey report when good cause for the delay is provided.

4.25. What are the reasons to amend 20.6.6.23(I) NMAC?

The DIGCE proposed amendment to §(I) adds the requirement to provide State Plane coordinates to define more accurately the ground water monitoring well locations.

4.26. What are the reasons to amend 20.6.6.23(K) NMAC?

The DIGCE proposed amendment to §(K) provides the department with the flexibility to grant an extension of time for a Permittee to develop and deliver the monitoring well survey report when good cause for the delay is provided.

4.27. What are the reasons to strike 20.6.6.23(M) NMAC?

The DIGCE proposal to strike §(M) questions why this type of guidance for an optional procedure would be codified within the Rule. Considering the limited value of the information derived from this requirement to perform downhole inspections of ground water monitoring wells, including this level of prescriptive guidance within the Rule is unnecessary. This type of information is more appropriately provided in department guidance documents.

4.28. What are the benefits of the overall amendments to 20.6.6.23 NMAC as proposed by DIGCE?

The benefits of the DIGCE proposed amendments to 20.6.6.23 NMAC relate primarily to providing the Permittee with the ability to develop a ground water monitoring system for the dairy facility that optimizes the ability to evaluate ground water conditions on a site–specific basis. Under the prescriptive constraints of the current Rule, this goal is unachievable. The ability to optimize the location of a particular ground water monitoring well to monitor the facility effectively is in conflict with the Rule's prescription for well location, and will require a variance from the Commission. The ability to rely on the information acquired through a hydrogeological characterization is muted by the singular focus on gradient and distance from a potential contamination source. By prescribing these two parameters for the location of monitoring wells to the exclusion of other relevant information available from the hydrogeological characterization establishes a false sense of environmental security that exposes the Permittee to environmental liability. The DIGCE proposed relief from the constraints imposed on the prescriptive location of monitoring wells relative to the potential contamination sources allows the Permittee (with the guidance of a qualified professional) the flexibility to locate a ground water monitoring well properly, based on surface and sub-surface conditions defined in a characterization of the hydrogeology. The result of allowing this flexibility provides effective monitoring of the ground water without the requirement to seek a variance from the Commission to allow proper monitor well placement.

4.29. In your opinion, if the Commission accepts the amendments proposed by DIGCE to 20.6.6.23 NMAC, will monitoring well systems still be required that will meet the purpose for monitoring well systems as set forth in 20.6.6.23(A)? State the reasons for your opinion.

Yes. The Permittee, with the support of their qualified professional, will still have the responsibility to characterize the ground water hydrogeology. This requirement to

understand the hydrogeology as it relates to the appropriate placement of ground water monitoring wells is imperative for the success of a detection monitoring program. Locating wells solely on the prescriptive requirements of gradient and proximity to a potential contamination source leaves the facility vulnerable to the potential hydrogeological variations and inconsistencies that may be present if the hydrogeological characteristics of the facility are not thoroughly understood. Positioning a monitoring well downgradient and within a prescribed distance from a potential contamination source does not ensure that the well is in the optimal location to evaluate properly the ground water quality beneath the facility. It is imperative to identify properly ground water monitoring well locations upgradient of the facility to benchmark the incoming water quality. It is equally important to define ground water monitoring locations downgradient of the facility in locations appropriately selected to detect exceedances, or a trend toward exceedances, at the earliest possible occurrence. This is the purpose of the proposed DIGCE revisions to this section of the current Rule.

4.30. If the Commission accepts the amendments proposed by DIGCE to 20.6.6.23 NMAC, will there be any reduction in the effectiveness of ground water monitoring from those changes compared to the existing requirements?

No. In fact, the effectiveness of the ground water monitoring system will improve the quality of detection by optimizing the location of monitoring wells to detect an exceedance or trend toward an exceedance. By eliminating the prescriptive location standards for monitoring well locations and giving the permittee the opportunity to rely fully on their qualified professional's judgment in assessing the hydrogeological characteristics of a facility, the effectiveness of the ground water monitoring system will improve. This is the accepted practice for every regulatory ground water compliance program evaluated. Properly identifying the appropriate location of ground water monitoring wells will reduce the potential that a prescribed monitoring well installation might be required in an unacceptable location such as a road, drainage feature a lagoon embankment, etc. This flexibility will result in a ground water monitoring system that effectively reports the water quality present at the facility being monitored. Additionally, removal of the prescriptive monitoring well location requirements will reduce the number of variances that will come before the Commission requesting relief to optimize the ground water monitoring system at a facility. Having a Rule that routinely requires a variance is not productive. Implementing a Rule that significantly reduces the number of variance requests that must be heard by the Commission is justification enough to support these proposed changes, especially when the proposed amendments enhance ground water quality monitoring compliance and reduce environmental liability.

4.31. What are the reasons to amend the heading to 20.6.6.27(A) NMAC?

The proposed heading for §(A) is amended to make the contingency requirements for an exceedance of ground water standards applicable to all monitoring wells installed at a dairy facility. This proposed amendment simplifies the Rule by providing one section that addresses what actions are required when a ground water standard is exceeded. This simplification of the Rule removes the confusion represented by the various conditions

that may contribute to an exceedance of the standards, focusing attention on the required actions rather than the multitude of contributing conditions. DIGCE would also propose to strike the reference "...other than an impoundment ..." in the first sentence to make this section generically applicable to the all aspects of the entire dairy facility.

4.32. What are the reasons to strike 20.6.6.27(B) NMAC?

The DIGCE proposal to strike §(B), related to the exceedance of ground water standards for impoundment monitoring wells is based on the fact that the proposed amendment of §(A) makes it applicable to all monitoring wells, thus eliminating the need for §(B) relating specifically to impoundment monitoring wells. This proposed amendment simplifies the Rule by providing one section (§(A)) that addresses what actions are required when a ground water standard is exceeded. This simplification of the Rule removes the confusion represented by the various conditions that may contribute to an exceedance of the standards, focusing attention on the required actions rather than the multitude of contributing conditions.

4.33. If the Commission adopts the proposed amendment to strike 20.6.6.27(B) NMAC, will contingency action still be required under 20.6.6.27(A) NMAC if monitoring well data shows an exceedance of ground water quality standards?

Yes. If the Commission adopts the proposed amendment to strike §(B), the contingency action requirements of §(A) will still apply if monitoring well sampling data show an exceedance of ground water quality standards in any monitoring well on the dairy facility. Having several similar contingency requirements differentiated only by the source of an exceedance is confusing. Focusing all of the attention to one section (§(A)) that addresses what contingency actions are required when a ground water standard is exceeded reduces the confusion. This simplification of the Rule removes the confusion represented by the various conditions that may contribute to an exceedance of the standards, focusing attention on the required actions rather than the multitude of contributing conditions.

4.34. How will the necessary action be determined?

Upon confirming an exceedance from any source within the dairy facility (as outlined in 20.6.6.27(A) NMAC), the Permittee is required to develop and submit a corrective action plan as outlined in 20.6.6.27 (A)(1). This section defines the timeline and necessary action that will be taken to address the exceedance, or to identify other data relevant to the investigation. DIGCE proposed no changes to this section, finding that it can be applied universally to the entire dairy facility as previously proposed.

4.35. Will additional investigation be required to determine what corrective action is necessary, compared to the operation of the existing dairy rule under 20.6.6.23 and .27(A) NMAC?

Yes. 20.6.6.27(A)(2) NMAC continues to provide the Permittee with the opportunity to initiate an investigation of potential contamination sources to determine which source

may be causing the exceedance. Once again, DIGCE proposed no changes to this section, finding that it can be applied universally to the entire dairy facility as previously proposed.

4.36. What are the reasons for the proposed amendments to 20.6.6.27(C) NMAC (renumbered as subsection (B) under DIGCE's proposal)?
The DIGCE proposed amendments (replacing contamination source with dairy facility) are made in §(C) (renumbered as §(B) under DIGCE's proposal) to maintain consistency with the revisions made in 20.6.6.23(A) NMAC. In both cases, the revision refocuses attention on the development of a hydrogeological characterization of the entire location, and implementing an optimal ground water monitoring system that confirms facility compliance.

In addition, DIGCE proposes amendments that provide flexibility to the department to grant an extension of time for a Permittee to perform additional studies, provide replacement monitoring wells, perform surveys of the wells and provide monitoring well completion reports when good cause for the delay is provided.

4.37. What are the reasons for the proposed striking of 20.6.6.30(D) NMAC?

The DIGCE proposal to strike §(D) is based on the conclusion that the requirements of §(A) adequately address the actions associated with the discontinuance of ground water monitoring at a former impoundment. This section (§(D)) is repetitive and confusing with respect to its applicability. The deletion of this section will focus attention for the closure of former impoundment monitoring wells to §(A), where clear and concise requirements for all monitoring well closure activities are provided.

4.38. If the Commission strikes this section, will that adversely affect protection of ground water during and following closure of a dairy facility? If not, why not?

No. The requirements outlined in §(D) for post-closure monitoring are adequately addressed in §(B), providing the same level of compliance. Duplication of regulatory requirements, as observed in these two sections of the Rule, is confusing. The elimination of redundant regulatory requirements improves the potential for compliance.

4.39. What are the reasons for the proposed striking of 20.6.6.30(E) NMAC?

Once again, the DIGCE proposal to strike §(E) is based on the conclusion that the requirements of §(A) adequately address the requirements associated with the discontinuance of ground water monitoring at former land application fields. As with §(D), §(E) is also repetitive and confusing with respect to its applicability. The deletion of this section will focus attention for the closure of former land application monitoring wells to §(A), where clear and concise requirements for all monitoring well closure activities are provided.

4.40. If the Commission strikes this section, will that adversely affect protection of ground water during and following closure of a dairy facility? If not, why not?

No. The requirements outlined in §(E) for post-closure monitoring are adequately addressed in §(B), providing the same level of compliance. Duplication of regulatory requirements, as observed in these two sections of the Rule, is confusing. The elimination of redundant regulatory requirements improves the potential for compliance.

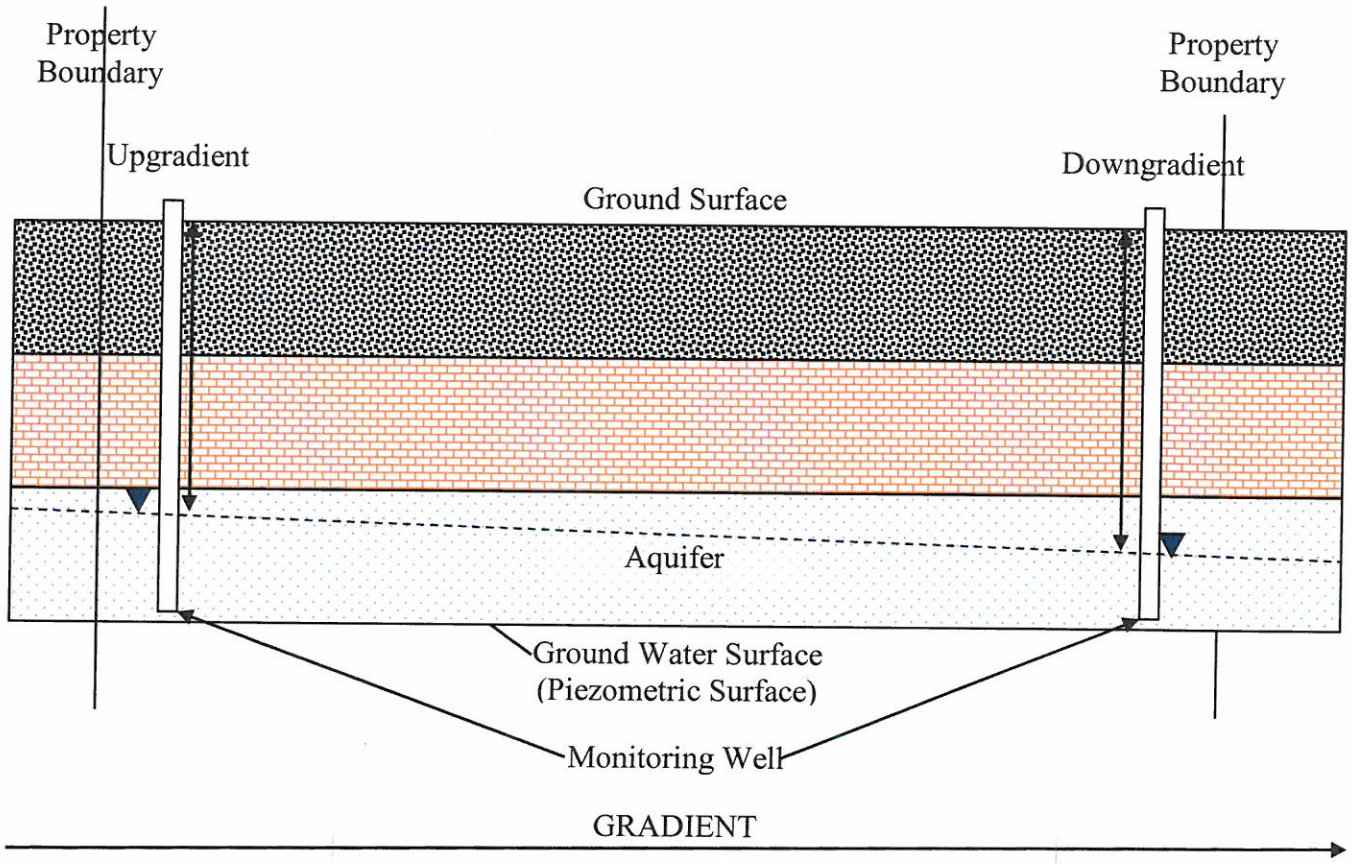
4.41. Is there any other information that the Commission should consider with respect to DIGCE's proposed amendments to the dairy rule provisions regarding ground water monitoring?

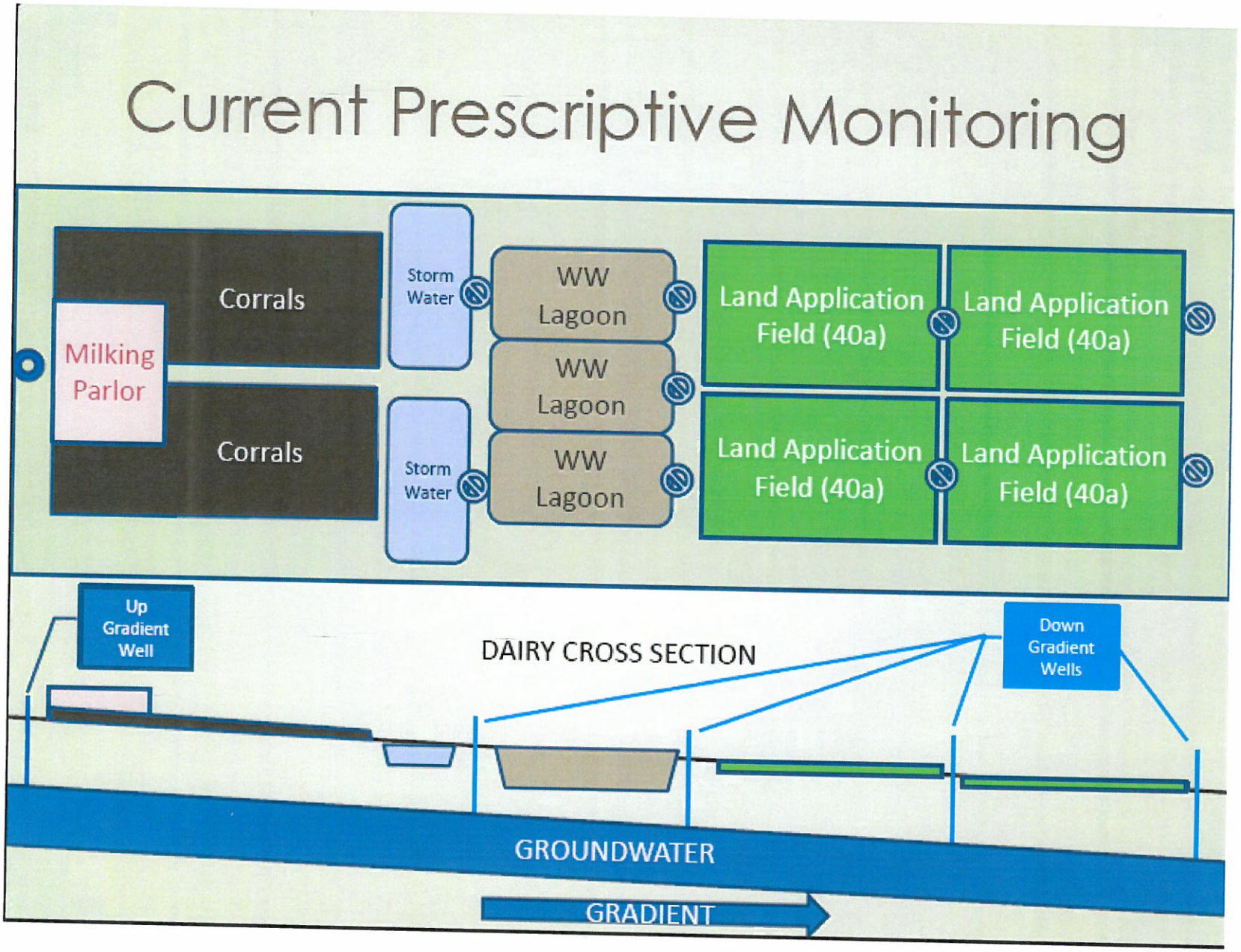
Yes.

- *The Commission should consider the DIGCE's proposed amendments to the current Dairy Rule as constructive criticism focused on the ground water monitoring requirements that are designed to provide improved compliance with the ground water standards, as this portion of the Rule was implemented to protect.*
- *DIGCE has proposed providing flexibility in the development of a ground water monitoring system designed to provide optimum performance in identifying exceedances or trends toward exceedances. This proposed flexibility is based on over thirty years of regulatory experience refining how to accomplish the task of characterizing the hydrogeological conditions at a location.*
- *I evaluated similar regulatory programs to assess their approach to ground water monitoring and found great similarity in their approaches which support many of the proposed enhancements presented.*
- *I have serious concerns with the prescriptive nature of the current Dairy Rule which leaves little opportunity for the Permittee to optimize the efficiency of their ground water monitoring system.*
- *My testimony focuses on developing a hydrogeologic characterization as the basis of all ground water monitoring system installations, providing for optimal monitoring well placement that provides the Permittee the level of confidence that their dairy is adequately protecting the ground water quality.*
- *DIGCE's proposed changes would simplify the Rule, striking sections that provided redundant requirements with no perceived additional benefit.*

Charles W. Fiedler, P.E.

GROUND WATER GRADIENT




Current Prescriptive Monitoring
Corrals
Milking Parlor
Corrals
Storm Water
Storm Water
WW Lagoon
WW Lagoon
WW Lagoon
Land Application Field (40a)
Land Application Field (40a)
Land Application Field (40a)
Land Application Field (40a)
Up Gradient Well
DAIRY CROSS SECTION
Down Gradient Wells
GROUNDWATER
GRADIENT

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