

**From:** [Jay Gordon -wsdf](#)  
**To:** [Jennings, Jonathan \(ECY\)](#)  
**Subject:** WSDF CAFO comments in Word  
**Date:** Thursday, October 01, 2015 7:55:56 PM  
**Attachments:** [Comments from WSDF on NPDES Prelim Draft.doc](#)  
[Devries Lagoon 2010.pdf](#)  
[Haak lagoon Data.pdf](#)  
[Storman comments 2004 on NRCS 313.pdf](#)

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Jon,

I attached our comments in Word so color highlights come through...also so that the links referenced will work.

also the attachments are included in this version as well.

*Jay Gordon*

*Director, Policy & Government Affairs*

Washington State Dairy Federation

Elma, Washington

360-482-3485



## Washington State Dairy Federation

October 1, 2015

Heather Bartlett, Water Quality Program Manager  
Washington Department of Ecology  
c/o Jon Jennings  
PO Box 47696  
Olympia, WA 98504-7696

Re: Comments on Preliminary Draft Concentrated Animal Feeding Operation (CAFO) General Permit

Dear Ms. Bartlett,

Thank you for the time and work that you and your staff have put into this preliminary draft of the NPDES CAFO Permit. Please accept the following comments and suggestions on behalf of the Washington State Dairy Federation. We have marked the page number and section of each comment. If there are any questions about the comments we are glad to clarify with you or your staff.

We start with some general observations before we get into the line-by-line comments.

Your staff indicated in a meeting this summer there might be concerns with this permit and they wanted those flaws pointed out. There are several issues with this permit. Broadly and top of mind they are:

- The determination that all manure lagoons are polluting groundwater is a stunning assumption and especially problematic in the absence of data to support that conclusion. The basis as we understand it from conversations with your staff is this determination is made in accord with 90.48.160 such that any disposal of any amount of solid or liquid waste, at any time, by any commercial or industrial operation to any waters, anywhere in the state constitutes a discharge. To be judged guilty based on theoretical design standards, or de minimus molecular level potentialities has left our farmers feeling like this is regulation for regulation sake.

We ask that the department share all available science and data that was used to support the conclusion that lagoons pollute groundwater.

Then from that lagoon determination, Ecology proposes all livestock farms with lagoons be required to get a permit, thus triggering permit coverage for hundreds of farms across the state. That will lead to a huge volume of paperwork, new reporting, new rules, new conditions, new planning, new engineering requirements, innumerable areas of duplication with WSDA and RCW 90.64. All this permit work overlaps and duplicates much of the existing conservation work done by farmers via NRCS, Conservation Districts and Washington State Department of Agriculture. We question if the department is even capable - from a staffing perspective of handling such workload.

We are especially critical of the new buffering requirements. Such requirements as this draft contains will create regulatory buffers on thousands and thousands of acres of currently productive farmland. This farmland will be lost to a farmer simply because they choose to own cows in barns. They made the investment to store their

manure in lagoons systems for spring and summer application. The very same lagoons systems that your agency insisted dairy farms must install in the 1980' and 1990's.

Based on conversations with dairy farmers across the state, we are gravely concerned about losing a significant percentage of farmers who simply cannot comply with the terms and conditions of this permit as drafted. Many have simply had enough; they are tired, they have worked hard, made huge investments to protect the environment. This permit gives no credit, grants no recognition and conveys no respect for the work our dairy farmers have done. Many will simply not play this game anymore.

We do not believe the environment or water quality will benefit or improve ANYWHERE if dairy farms choose to exit the business. Many of our dairy farms – especially those close to urban areas- are under financial pressure to sell to developers. Conversion of dairy farms to urban sprawl means the accompanying loss of local food producers, jobs, organic nutrient suppliers, and protectors of a significant percentage of wildlife habitats, especially waterfowl habitat. We are not being irrationally alarmist: land conversion out of dairy is a very real option that producers are already pondering and one your agency MUST consider according to RCW 90.48.450.

Our specific concerns are as follows:

Our suggested changes are *in blue italics*.

Page 5.

S1.A – In several places including the opening paragraph of S1.A - field applications are mentioned, yet WAC 173-200-010 (3) (a, b) has specific exemption language for Agricultural application or treatment of nutrients. The draft permit makes no reference to these exemptions in WAC 173-200-010 (3) a, b  
*Please consider referencing the agricultural exemption in 173-200, and explain how this exemption applies in the context of the permit coverage.*

S1.A - It is mentioned in the margin that WAC 173-226 applies to any general permit holder in Washington State. These rules governing General permits in Washington State total 21 pages of additional rules for the development, implementation and operation of General Permits in Washington State.

- *First suggestion is that future communications regarding this permit should include a link to those rules and printed materials should include all sections of this rule that Ecology will be requiring farmers to comply with. These rules appear to be absolutely included by reference as part of the terms and conditions that must be followed by all CAFO permit holders.*
- *Language should clarify that hearings and other provisions relate to general permits and not individual farm operations.*

Questions-

What are all the relevant and applicable sections of WAC 173-226?

What sections do not apply or are discretionary?

- *If in fact all appropriate sections of WAC 173-226 must be applied and followed by every farm permit holder then it needs to clearly state that in the permit – not in the margin.*

We have concerns and questions about WAC 173-226 apparently included in this rule:

- a. When must permit holders or applicants publish Notice of Public Notification by Permittee (2 Notices in local newspaper)? Is this only at initial application or more often?

- b. Regarding the public hearing for new individual applications for general permit or previous permit holders with an increase in effluent. Any person may request that Ecology hold a public hearing on any permit application. Is it automatic that there will be a public hearing? Are there limitations on scope and subject matter at these public hearings? Where are the public hearings typically held?
- c. Regarding the section allowing individual general permit appeals (terms and conditions appealable within 30 Days) If Ecology approves a general permit and the terms and conditions, then does Ecology provide any supporting communication on behalf of the permit holder to the courts about the validity and reasoning for approval? Please explain how the Department of Ecology supports its decisions if their decision is appealed.
- d. Regarding SEPA requirement (New applicants must certify they have met “ applicable SEPA requirements” under State Environmental Policy Act (SEPA) WAC 197-11) in their initial application or for operations previously covered with an increase in effluent volume.)
  - Please explain what terms and conditions farmers must “certify” they have complied with? How is a farmer supposed to effectively retroactively certify they have followed all SEPA conditions in the past when SEPA may not even have applied to the farmer?
- e. Regarding section 173-226-250 enforcement that appears to be included in the permit by reference.
  - Does inclusion of this enforcement section in the NPDES permit then also allow third party enforcement because it is part of a federal permit system? This WAC enforcement and right of entry section is intimidating enough to make many farms reevaluate their future alone. Inclusion of provisions subject to third party litigation on all those potential terms, conditions and penalties that Ecology has not acted on makes this permit a litigation weapon.
  - *We suggest clarifying language that the SEPA conditions must be met only if they apply to the situation.*

Page 5

S2.A

How precisely did Ecology “determine” that all lagoons - other than double lined – discharge pollutants into waters of the state in violation of state law? This determination seems based on an engineering document.

*Please supply any data to support the assumption that lagoons actually discharge pollutants to waters of the state.*

*Please supply data/ evidence to support the conclusion that double lined lagoons are a protective BMP specifically when used in livestock lagoons.*

Soil lined lagoons offer excellent environmental protection.

- Thick layers of soil and compacted soil liners resist mechanical damage unlike plastic.
- Hydrated soil maintains exceptionally low permeability, and
- Saturated soils are anoxic. Anaerobic soils convert nitrates to N<sub>2</sub> gas.

For a science study with data on groundwater monitoring next to a dairy lagoon, please consider–  
Effects of Land Application of Dairy Manure and Wastewater on Groundwater Quality: Pre- and Post-Animal Waste Holding Pond Monitoring <https://fortress.wa.gov/ecy/publications/SummaryPages/0203002.html>

This study conducted by the Department of Ecology, included a test sampling well adjacent to a dairy lagoon (pre and post installation). Especially refer to Appendix E-2 and note the data for test well MW-7 – the well located down gradient from Lagoon.

See this link to Journal of Environmental Quality study by S. Baram.

[http://www.researchgate.net/publication/232705522\\_Infiltration\\_Mechanism\\_Controls\\_Nitrification\\_and\\_Denit\\_rification\\_Processes\\_under\\_Dairy\\_Waste\\_Lagoon](http://www.researchgate.net/publication/232705522_Infiltration_Mechanism_Controls_Nitrification_and_Denit_rification_Processes_under_Dairy_Waste_Lagoon)

This study indicates that lagoons designed to 10-minus 7 and managed to maintain hydration, result in Coupled Nitrification and Denitrification (CND) in the saturated soil layer under a lagoon due to saturated and unsaturated soil conditions in and immediately under the lagoon soil layer/liner. This achieves 90-100% denitrification (conversion of nitrate to N<sub>2</sub> gas). Note the discussion on the need for saturation in soils to achieve conditions for denitrification. This science shows that saturation of soil in and under a soil lined lagoon is essential to this process.

Please see attachments included with these comments on two lagoon systems in Eastern Washington. One attachment is groundwater-monitoring data that shows no evidence that the seepage around the lagoon (again such water seepage is necessary to keep soils impermeable) is traveling beyond the immediate vadose zone immediately below the lagoon liner.

Second data is core sample data for soils through the bottom of a lagoon to 45 feet on a dairy that went out of business. There is no evidence of nitrates to groundwater.

The studies and data, from Washington State, that shows precisely the findings that the science referenced above says you should find. That is:

A. Seepage of water is essential to keep soils hydrated and anoxic - is so minor that monitoring shows it doesn't move into groundwater and just as importantly even if it did then

B. under lagoon soil test data shows that nitrification then denitrification works to convert ammonium to nitrate to inert N<sub>2</sub> gas.

### **So where is the discharge? Of what?**

We are concerned about synthetic liners, including double liners, providing the needed protection. Recently we were informed that two poly-lined lagoons in Washington State were performing so poorly the plastic was removed and clay was installed. Plastic ages – clay does not. Plastic tears, clay does not. Simply we question if single or double poly-lined lagoons is the best use of this technology for dairy lagoons, especially when clay soil lined seems to function perfectly fine.

Clay and soil - measured in feet - is not as susceptible to mechanical damage as a plastic layer measured in hundredths of inches. Soil filtering properties were highlighted in above study were also highlighted in a recent Skagit County Herald article. ([http://www.goskagit.com/all\\_access/cleaner-water-the-focus-of-coming-development-rules/article\\_7aaddb60-ee49-591a-b02d-0688b7e9422c.html](http://www.goskagit.com/all_access/cleaner-water-the-focus-of-coming-development-rules/article_7aaddb60-ee49-591a-b02d-0688b7e9422c.html))

The standard in Washington for a discharge of pollutant is found in RCW 90.48.020 is not one molecule, or a bunch of molecules, or a trace – it is:

*...as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to the public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life. RCW 90.48.020*

**Please supply the scientific evidence that any lagoons on livestock farms are “creating a nuisance” in waters of the state or actually discharging pollutants that cause harm or nuisance in waters of the state. (Referencing RCW 90.48.160)**

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Federal Designation questions

The determination that all CAFO's are discharging appears also to be contradictory to clear language regarding designating AFOs as CAFOs in the Clean Water Act.

The following is from “Compiled CAFO Final Rule. Published on July 30, 2012.  
([http://water.epa.gov/polwaste/npdes/upload/cafo\\_final\\_rule2008\\_comp.pdf](http://water.epa.gov/polwaste/npdes/upload/cafo_final_rule2008_comp.pdf))

SS 122.23 (c)

(c) How may an AFO be designated as a CAFO? The appropriate authority (i.e., State Director or Regional Administrator, or both, as specified in paragraph (c)(1) of this section) may designate any AFO as a CAFO upon determining that it is a **significant contributor of pollutants** to waters of the United States.

(1) Who may designate?

(i) Approved States. In States that are approved or authorized by EPA under Part 123, CAFO designations may be made by the State Director. The Regional Administrator may also designate CAFOs in approved States, but only where the Regional Administrator has determined that one or more pollutants in the AFO’s discharge contributes to an impairment in a downstream or adjacent State or Indian country water that is impaired for that pollutant.

(2) In making this designation, the State Director or the Regional Administrator shall consider the following factors:

- (i) The size of the AFO and the amount of wastes reaching waters of the United States;
- (ii) The location of the AFO relative to waters of the United States;
- (iii) The means of conveyance of animal wastes and process waste waters into waters of the United States;
- (iv) The slope, vegetation, rainfall, and other factors affecting the likelihood or frequency of discharge of animal wastes manure and process waste waters into waters of the United States; and
- (v) Other relevant factors.

(3) **No AFO shall be designated** under this paragraph unless the State Director or the Regional Administrator **has conducted an on-site inspection** of the operation and determined that the operation should and could be regulated under the permit program. **In addition, no AFO with numbers of animals below those established in paragraph (b)(6) of this section may be designated as a CAFO unless:**

- (i) Pollutants are discharged into waters of the United States through a manmade ditch, flushing system, or other similar manmade device; or
- (ii) Pollutants are discharged directly into waters of the United States, which originate outside of the facility and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

Given the federal rules we have the following questions:

1. The Director has not conducted on-site inspections on any dairy farms with the intention of determining if the AFO is a CAFO. So how is it that an undesignated AFO can arbitrarily now become a CAFO under this federal permitting scheme?
2. What and where is the “significant discharge” to WOTUS or Waters of the State?
3. Based on what evidence associated with lagoons has the Director determined that AFO and CAFO with lagoons are discharging?
4. The federal language above indicates that the AFO must be discharging to WOTUS. Why does the “designation” process outlined above not need to be followed?

5. Can Ecology simply delete portions of the federal rule – like the designation procedure – as it sees fit?
6. Do permit requirements like “on-site inspections”, or “actual discharges”, or “determinations of significant discharge” still apply to the state to follow? Eliminating these sections seems contrary to protecting everyone’s rights and renders the federal rule and rulemaking process a useless waste of time.
7. It appears the state is trying to make the federal CAFO rules fit into a new state regulatory scheme. It seems to miss the point of being a “combined” permit by deleting sections of federal rule.

We must ask the extent to which Ecology will apply their determination of discharges under 90.48.160. Will the department next determine that all soil-applied fertilizer is discharging either under RCW 90.48.160 or 90.48.080? How does a determination under 90.48.160 relate to the exemptions found in WAC 173-200?

The process and conclusion of such reasoning raise questions far beyond the operation of lagoons.

- If a theoretical leakage factor [such as 10 x -7] is considered actual leakage,
- and the leakage is then assumed to reach Waters of the State (without evidence to support that assumption)
- and the leakage is then assumed to have contaminants –without evidence of that either
- and this is then considered a discharge of pollutants. Where does that reasoning stop?

Concrete and double synthetic liners have theoretical leakage rates. Fertilizer on golf courses, yards and gardens leaks through soil. Septic tanks are designed to leak (they have drain or “leach” fields). The catch basins around every new development and road are designed to leak? According to the proposed application of RCW 90.48.160 any commercial or industrial operation that disposes pollutants into Waters of the state must get a permit. Therefore every commercial or industrial business (operation) that has a septic tank must get a permit. (There is an exemption for “domestic sewage only”, but not for sewage for commercial or industrial septic systems.)

Given the conclusion of Ecology’s logic-

Any “commercial or industrial source” (see RCW 90.48.160) that allows water or dust, or sediment with any contaminant, any pollutant in any amount, to get in any water of the state at any level at any time. Would need a general permit.

**Ecology seems to be using the opportunity of updating the federal/state CAFO permit under state and federal law to make an unsupported determination that one sector of our society needs a permit. And it seems clear that the steps to reach this determination would easily be applied to nearly any agricultural or rural activity that is not part of a municipal wastewater treatment service.**

Ecology participated with NRCS in 1994 and 2204 and agreed on update language to NRCS 313 Lagoon standards. How can Ecology arbitrarily determine that standards they agreed to NOW require a permit?

(See attached September 14, 2004 letter from John Storman)

**Please supply all scientific data, studies and references used in the determination that the seepage rates to hydrate the lagoon soil liner actually results in movement to the vadose zone and then soil water actually moves through that vadose into waters of the state and that that water actually contains pollutants.**

***Change Farms needing permit coverage are those farms that opt for coverage or those farms that propose to discharge and have actual, significant, verified evidence based discharges to waters of the state as determined by actual inspections by the Director of Ecology or designee or WSDA under a Memorandum of Understanding. All CAFO determinations should be conducted according to at least the minimum conditions for determining that an AFO is a CAFO under federal CAFO rules.***

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Page 6

S2.B

Permit applicants must publish notice of application in public paper once a week for two weeks. This is burdensome to the applicants and does not appear to serve a purpose of protecting environmental attributes or any public interest.

Please explain why this is proposed.

S2.C .2 –

*Change- Clarify that public hearings and comment section only apply to applications for coverage by new operations or increased discharges (as per WAC 173.226.130)*

Page 8

S2.F (1) b.

As a condition to terminate permit coverage the “Permittee must demonstrate that there is no longer a discharge to waters of the state.”

How are farmers supposed to demonstrate there is no discharge to waters? Ecology didn’t find it necessary to show proof/evidence a farm had a discharge in the first place! So how can a farm attest that they no longer have a discharge?

Everything has a theoretical permeability rate and might theoretically get to waters of the state. There is simply no scientific or legal standard to support how we then prove we are innocent.

Attached is data from a Yakima farm that did core drilling. The data shows a massive drop in nitrate between first foot and second and then to minute levels at third foot and beyond. The nitrate level immediately below the lagoon simply shows they had no discharge possibility– zero. But the farm had to go out of business, dry and clean out the lagoon and then have the core sample taken that showed they were not discharging.

**To terminate coverage under this permit you give us the option of:**

**A. Get out of the confined livestock business or,**

**B. Require us to prove absolute zero. Which is not possible!**

S3.A

Discharges authorized must not cause or contribute to violations of four more sets of rules that must be complied with

- WAC 173-201A – Surface Water Quality Standards (State)
- WAC 173-200 – Groundwater Quality standards (State)
- WAC 173-204 – Sediment Management Standards (State)
- 40 CFR 131.36 – National Toxics Rule (Federal)

*Please explain how and where farms will need to comply with each of these rules, and how this will be applied to farms with permits.*

*Please explain - given the last sentence of S3.A (1) – How does either Ecology or a farmer prove if any non-allowed discharges are occurring or not occurring? (This section could be viewed as requiring a surface or groundwater monitoring system to prove compliance.)*

Page 9 S3.A (2)

Stipulates AKART - The permit needs to clarify the differences or similarities between AKART and BMP's. Farmers, NRCS, WSU Extension, conservation districts, state and federal conservation programs, farm plans and the 2006 permit all use the term BMPs to refer to not only management practices but also physically constructed things and actions.

***Change – The previous permit stipulated NRCS FOTG or alternative, equally effective BMPs. Federal Rule stipulates BMPs in a farm plan. Revert to previous and current Federal conditions referencing BMPs. Please reference NRCS FOTGs as acceptable.***

Page 9 S3.B

Compliance with local TMDL-

Why is this section in there? TMDLs are a surface water program for point sources and yes CAFOs are point sources BUT in this case the compliance standard for a CAFO operation regarding surface water is “no discharges except for beyond 24 hr/25 year events.”

S3.B (1) adds paperwork and reporting that will be confusing for our farmers especially given the second sub section.

S3.B (2) says that compliance in a TMDL area *is the terms of the permit*.....so again why do dairy farmers need to follow the activities of a TMDL to report on the fact that they are in compliance and have already done their part?

This appears to do nothing more than to add paperwork.

***Change – Delete this unnecessary section.***

S3.C

- The term “Wastewater water control facilities” is not defined and term is not really appropriate for a CAFO permit.

***Change – to lagoon (which is defined but needs clarified. See comment on lagoons in definition section page 41.)***

-Ecology review of Engineering documents - WAC 173-240

Adds an unbelievable complex set of rules and requirements on a farm. Additionally it starts with a vague term “prior **to constructing or modifying...**” then adds the WAC requirement a farmer must undergo every time they “modify” their facilities.

- What does “constructing or modifying,” mean?
- Ecology does not specify what standards we must use or what standards Ecology will use to review plans, designs and engineering reports. What changes will Ecology seek and what standards will be used for such demands?
- Why is Ecology ignoring NRCS and Conservation District standards and resources?
- Does Ecology even have staff available and trained to perform the functions in WAC 173-240-110 through 173-240-180? If so, when and where have these staff been trained for this purpose? Does Ecology have engineers, farm planners, and technicians capable of reviewing and approving hundreds of construction or modification plans and operation manuals?
- Can Ecology change or modify a plan that has been stamped by an engineer?

- Why is this necessary?
  - It is utterly ridiculous to require an engineer to do an engineering report (173-240-160) 180 days prior to (apparently any) modification or construction on our manure systems (unless ecology waives the engineer requirement).
  - Why, what is and when is an operation and maintenance manual required?

This is illogical, complex, expensive, and vague. It is potentially a violation of engineering laws and an unacceptable bureaucratic waste of time.

Permittees already certify in the permit that they are operating, managing and maintaining the manure system in good working order to **prevent pollution** by using BMP's. An engineer, or NRCS staff or trained Conservation District staff currently oversee, design, monitor or certify construction on many practices.

*Change –Delete the section on engineering.*

Page 10

S4

General observations – The requirement to develop a Manure Pollution Prevention Plan (MPPP) within 6 months as outlined in S4 is onerous. Every dairy farm in the state has developed Nutrient Management Plans at least over the past 17 years - many completely rewritten several times. The provisions included in this draft for a MPPP includes some similarities, but also numerous additional requirements.

The current Nutrient Management Plans that dairy farms have implemented have PROVEN to be effective in controlling pollution. No other sector of agriculture or rural land use is required to do farm plans. Adding a new second set of plans and paper work is simply unacceptable. Such requirements are not placed on crop farms, cattle ranches, orchards, lawn maintenance and hobby farms, just to name a few.

In essence, Ecology is proposing that the MPPP plans duplicate and exceed the requirements that are met by the most highly regulated sector of Washington agriculture. Rather than improve environmental outcomes, this requirement is likely to result in dairies converting to other less-regulated agriculture or – worse yet – take their land completely out of agricultural use.

The goal that was expressed to us was to keep the time and expense of this permit to the minimum necessary. The requirement to develop a MPPP fails the test of keeping complications to a minimum.

*Change Replace the MPPP requirement with a current “Farm Plan” - designed for current land and animals on the operation.*

*Change- Ecology must work with the State Department of Agriculture, the State Conservation Commission and the US Natural Resources Conservation Service (NRCS) to eliminate the duplications and unnecessary additions.*

These conditions are an over-reach (see following specifics regarding S4). We have farm plans already. They work! They are effective! There are a few additional federal CAFO requirements that need to be added to existing farm plans.

We are gravely concerned about the loss of farms that simply cannot tolerate this wasteful, bureaucratic duplication and lack of coordination between Ecology and other state agencies as well as federal partner NRCS.

S4.A (3) Again, replace the term AKART with the term BMP and/or FOTGs. The previous permit used the term BMP, also referenced use of NRCS FOTG or equivalent BMP. The use and references to the Field Office

Tech Guide practices and BMP are synonyms in farm country. We know of no list of AKART practices for agriculture. Federal CAFO guidelines use term BMP.

*Change – Replace with language referencing BMPs, Farm Plans and NRCS FOTGs and consistent with Federal CAFO guidelines.*

S4.B (1) “The permittee must modify the MPPP whenever there is a change in design, construction, operation or maintenance of the CAFO.” This is very vague –“whenever” is a huge word.

*Change See previous permit (July 21, 2006) {page 15 D.(1)} for better wording on when the farm plan (MPPP) should be updated. Generally update only when a change is significant enough it will substantially affect the ability of producer to prevent pollution. Reporting for reporting sake is a waste of time for both the farmer and the department. NRCS farm plans are generally designed to 110% of producer capacity. Please check with NRCS on when they recommend updates. WSDA and Conservation Districts all design to 110%. Farms with changes beyond that level should update.*

*Contact Department of Agriculture for confirmation and guidance on when they tell producers to get an update for other reasons.*

S4.B (2) “MPPP narrative must include documentation to explain and justify the pollution prevention decisions made for the facility.” We have no idea what this means or how farmers will do this.

*Change Remove this sentence and replace whole MPPP reference with Farm plan language similar to previous permit and federal CAFO guideline language.*

S4.B (3)

What is an example of a local regulatory agency? Where is there an MOU or delegated authority to any local agency to inspect farms for the terms and conditions of this permit?

(3)a. Seven days is extremely short if the revisions are major and violations non existent.

*Change - Develop ranges or guidance to allow more time if FARM PLAN revisions are needed post inspection and there is no threat of significant discharge.*

Page 11

S4.C Minimum Components of a MPP

This goes way beyond minimum federal elements. Mapping is likely impossible and unachievable.

*Change - Replace with language consistent with FEDERAL guidelines.*

Page 12

S4.C1. (b) What if there are no engineering plans for structures? There are dairy farms that have been in operation for over 100 years in this state. Blueprints, design plans will not likely be available for every structure. It appears that a farmer will be in violation if plans are not found for everything.

*Change - Eliminate*

A requirement to measure actual flow rates on all pumps is a waste of time. Some farms have flow meters - some do not, actual flow rates can and do vary on the same pump depending on pressure, manure consistency, temperature, water content, etc.

***Change - Eliminate***

S4.C2 The prohibition on manure tracked on roadways is impossible. I.E. If a farmer and his tractor drives out on road way in the middle of no where, miles from running water and one piece of manure falls off the tractor. That is a permit violation - punishable with a \$10,000 per day or subject to a citizen suit even if there was no chance of ever discharging anything to any waters, ever. Regardless of the lack of harm or risk, the farmer could still end up in court. This is a pollution discharge elimination permit! This section is impossible and creates an enforcement nightmare for farmers.

***Change- Either eliminate this language or reference the requirements of existing farm plans to keep manure out of waters of the state.***

Page 13

S4.C. 3 a (2) Vegetation Control. – Caution and clarification is needed here. Bare dirt around a lagoon in eastern Washington is common practice; bare dirt in western Washington is a bad practice that will increase erosion of lagoon sides.

***Change to “Vegetation must be “managed” to prevent damage to lagoon integrity.”***

S4.C 3. a. (5) No “solids” on lagoon surface is an impossible requirement.

***Change. Eliminate “solids on lagoon surface” reference. This is an impossible standard and in some cases is contrary to best management practice to improve air quality.***

(6) Emergency procedures plan. – More bureaucracy. There has been one lagoon breach in the past umpteen years. It was a breach due to an engineering oversight of a historical drainage system. Why should every permitted farm in the state undergo this exercise?

***Change. Eliminate this section.***

Page 14

S4.C 3 a (9)

***Change: Define natural background levels. Is it in reference to normal agricultural areas locally or pre-Columbian in exact location, or native local undisturbed soils, or under alder trees? This requires a change to provide clarity.***

S4. C 3 b (1.) & d. (1) solid manure storage and Feed storage – Many farms use filter strips, treatment and uptake areas below compost and feed storage areas.

***Change: Feed storage and compost area options should include allowing for filter strips, uptake zones or created wetlands, etc. around compost and feed storage areas.***

Page 15

S4.c (6) Prohibits grazing within 35 feet of Waters of the state. This goes beyond Federal definition 1. The federal permit says confined animals must not come in contact with WOTUS or a “conveyance” to WOTUS or Waters of State.

2. Ecology includes Wetlands in Waters of State. Ecology has, as far as we know, refused to recognize the federal determinations of “prior converted” pastured and farmed wetlands...so this could/will be 35 feet from the edge of historical wetlands that have been farmed or pastured since before December 1985. This would include lands that have been farmed or pastured for the past 30-100 years.

Change –

- *Eliminate this 35 foot requirement. Use Federal Language in CAFO guidance: “Confined animals shall not have direct contact with waters of the state.”*
- *Define conveyance*
- *Please clarify - explicitly – any and all existing policy, rulings, and determinations of the Department of Ecology with respect wetlands and more specifically with respect to USDA NRCS determinations of “prior converted farmed or pastured wetlands.”*

*ARE “PRIOR CONVERTED WETLANDS” - WATERS OF THE STATE ACCORDING TO ECOLOGY?*

Page 15

S4.C (7) Chemical handling-

( a.) This language goes beyond federal CAFO guidance and references “cleaning agents.” Why ?

We use cleaners in parlors every day. Does FIFRA even apply to cleaning products used on dairy equipment?

Change to language mirroring federal CAFO rule language.

Page 16

S4.C (7) (e) Emergency procedures for chemical spills.

Where is the authority to require this? No such section in Federal CAFO rule.

Change - Eliminate

Page 17

S4.c (9) Manure nutrient testing

No reference to how often. Most farms conduct at least annual testing.

Change – Clarify testing at least annually

S4.c(10) Soil testing.

Lacks clarity and creates an unbelievable and useless testing paradigm given the testing requirements of S5.C. Spring tests to three feet in Western Washington and Eastern Washington are a waste of time, expensive and of no value in determining anything.

Change to an annual Fall test to 1 foot on similar cropped and managed fields with similar soil types.

S4.c (11) Land application

Why written permission to apply manure to neighboring land?

Change – Delete this

“Nutrient budgets developed by Ecology” Why is Ecology developing nutrient budgets? There are plenty of them out there. Why not allow farmers to use existing tools?

Change to - follow nutrient budgets calculated to show and achieve agronomic fertilization rates.

“Manure may not be applied to ...dormant crops or bare fields ...generally from October 15 to TSum 200.” The goal is to not pollute. Fixed, prescriptive dates based on opinion like this one do not help.

Grass based winter applications are appropriate on field-by-field basis. Conservation Districts and NRCS have a standard for these applications that dairy producers have use successfully for years to both not pollute and to grow better crops. Eastern Washington some years has weeks or whole months in late winter and early spring before Tsum 200 in which field preparations are appropriate and a blessing. Very careful, precise late summer and fall applications before soil and air temperatures decline are essential good forage production but also to prevent excess fall soil nitrate levels... Arbitrary blanket prohibitions do not work and in this case are just wrong in many situations.

*Change – Delete dormant crops and bare field language. (There are plenty of times when it is a best management practice to apply to dormant crops like in February or March on alfalfa fields or grass fields.*

*Change -- Delete October 15 – TSUM 200.*

“Manure incorporated within 24 hours of application” doesn’t work for no-till and doesn’t work in many cases on a farm. Obviously it cannot be incorporated into a permanent crop like grass. The goal is to not pollute. This arbitrary prescription is unnecessary.

*Change – Delete*

“Prior to applying manure to fields manure and soil samples must be collected.”  
Vague – how often, every field, each time?

*Change – Annual Fall tests sufficient to help inform, and prove or improve agronomic rate applications.*

“No manure applied until after 24 hours” of ANY previous rain. Why? What if it is a .01 inch rain in the summer after a long drought? (This is nonsense, as it already says no applications to saturated fields above).

*Change – Delete*

No applications within 3 days of forecasted precipitation event of ½ inch.  
This is again a prescriptive, unworkable edict.

*Change – replace with “ manure shall not be applied to fields when immediate weather forecast indicates rain is expected to cause significant risk of runoff from fields.”*

Page 19

S4.C (11)

Matrix for Nitrates

3 foot Nitrate benchmark.

This is horribly expensive and it penalizes farms that may have no way of affecting a nitrate level in lower soil profile.

It is useless in many cases. (Spring tests on west side will always show little residual Nitrate due to leaching and/or anoxic – denitrifying conditions at 2-3 feet, ...even if you can get to three feet.)

-East side under proper management will show the same nitrate levels for years because the nitrates don’t move and farmers will be measuring the same nitrates, but still paying for more testing and having to farm according to a matrix that won’t result in any changes to those nitrate levels.

- This matrix penalizes a producer that may have higher levels in soil but has good management practices that prevent movement (irrigation water management).
- We are also very concerned about high organic matter soils and the variability in fall tests due to varying mineralization on these high organic matter fields.
- This matrix also penalizes a producer that rents or recently has purchased farmland that may have high nitrate levels.

***Change** – Completely re-write. Consult with WSU, WSDA, Conservation Districts, private consultants for a more useful, possible and practical set of soil testing conditions that farmers can use to make informed useful decisions.*

Page 21

S4.C.13

Field run-off Prevention Management

- What is a conduit?
- There appears to be a mistaken reference to S4 C.14.a &b.
- Given the above reference it is confusing language as to if it is one or both of the buffers on all application fields adjacent to waterways, wetlands or conveyance.
- You did not include federal language allowing alternatives to standard buffer distances.
- Failure to include alternative buffer as included in Federal Rule, makes this an arbitrary distance based buffer that does not recognize diked fields; reverse sloped fields; bmp’s such as injection or incorporation or seasonal adjustment factors.

**Clarify** - What is top of bank from Wetlands? Which Wetlands (waters of the state) does Ecology require “buffers” on? (This is same jurisdictional question – Does Ecology recognize “USDA NRCS determinations of prior converted farmed or pastured wetlands” or not?)

▪

***Change** – correct reference and clarify that the language is meant to read “or”*

***Change** – Add back in the language from federal rules to allow the following “**alternative practices compliance alternative. As a compliance alternative, the CAFO may demonstrate that a setback or buffer is not necessary because implementation of alternative conservation practices or field specific conditions will provide pollutant reductions equivalent or better than the reductions that would be achieved by the 100 foot setback.**”*

Page 22

Monitoring

S5.A Operations

Adds monthly inspection of buffers to list of monitoring – *More regulation beyond federal rules!*

***Change** – Delete*

Page 22-23

S5.B Manure Sampling – Describes a prescriptive sampling procedure developed by Ecology based on what guidance? No consistency with conservation districts, private firms? Why? We also understand that it is the wrong sampling procedure according to EPA guidance.

***Change** – Manure must be sampled and tested using appropriate sampling procedures as outlined in federal rules and the NRCS 590, as well as following the training or guidance from WSDA, and/or land grant publications as referenced in NRCS 590 FOTG guidance for sampling protocols. Consult Washington State testing laboratories for commercially standardized manure (and soil) testing protocols.*

S5 B. (3) Uses the wrong EPA test method. Why this method? What is the basis of this? Why not pounds of N or nitrate or ammonium per 1000 gallons for slurry? Why not Nitrate Tests?

It is our understanding that TKN – Total Kjeldahl Nitrogen is not used by anyone in agriculture.

***Change** – Consult first with WSDA and please stay consistent with their current requirements as advised by land grant universities, NRCS, conservation districts and private consultants (such as certified crop advisors) for appropriate manure test methods and protocols (including actual sampling as discussed earlier). Specifically remove requirement for TKN, Ph and organic matter as those are non-standard and of no value. May also want to consult EPA “Soil Plant and Water Reference methods for the Western Region 2003 2<sup>nd</sup> Edition.”*

#### S5.C (1) Soil sampling

Needs clarification, wording seems to imply that Ecology wants soils tests on every field before every application. And fall tests as well on every field. This is way beyond anything currently required anywhere in the US.

Why test every field to three feet in the spring and fall if the tests show nitrates are low or if a trend line doesn't change over time? This section needs to be informed by agronomists and soil scientists.

A spring three-foot sample for nitrate in Western Washington is useless. Suggest field trials to learn what value a three foot sample has rather than forcing every permittee to engage in a very expensive, mostly worthless set of testing. Discussions are need with soil scientists and agronomists that understand soils and leaching, nitrification, denitrification and mineralization in eastern and western WA/Oregon and BC.

A fall baseline and trends might be helpful. But 3-foot sample in the Spring and Fall will also be inconclusive, exorbitantly expensive and difficult to pull to get information that may not be actionable or result in any change when on the eastside there is little to no downward migration and on westside where soil water conditions can change rapidly.

***Change** – Need to work with WSDA, CDs, WSU, NRCS to get achievable, realistic and affordable testing procedures that producers can actually use to act upon. Please keep same as WSDA current requirements or explain rational for reinvention.*

*(We also suggest collaboration with WSU and maybe the Yakima GWMA on trials to better understand when, how where deeper soil sampling might be informative and helpful for farmers to better understand fertilization and irrigation water management practices and procedures.)*

#### S5. C (2) – Soil sample analysis.

Why are you using these EPA test methods? (See “Soil Plant and Water Reference methods for the Western Region 2003 2<sup>nd</sup> Edition.”) Why not WSU or NRCS? Analysis should be done after learning what WSU, OSU and British Columbia guidelines suggest, along with what commercial agronomists and labs are doing. EPA guidance does not require or reference this specific test. There are standard protocols amongst the land grant universities, NRCS, alternative EPA standards (see above), the Conservation Districts and private consultants.

***Change** – Allow farmers to use standard protocols from above sources. See previous 2006 permit and current Federal Rules for specific language.*

#### S5.D Monitoring beyond Permit requirements.

Why is this section in the permit? We find no mention of this in Federal CAFO rules.

*Change – Explain or eliminate.*

Page 27

S6. A Operations and maintenance

The first two bulleted points on top of page 27 are repetitive.

*Change - Eliminate one of them*

Why the addition of requiring mortality numbers? This is not required in Federal rules.

*Change – Delete*

Manure Export Records.

Why the assessors parcel number and acreages and crops grown? What is the purpose for recoding this data?

What is the intended use of the data?

Farmers do not carry around parcel numbers. This will make export, and therefore recycling of these nutrients, more difficult. These are public records and many neighbors will not take manure if this information is believed to be harmful or detrimental to their farms. Given the litigation and the behavior of EPA over the past five years, these fears are not unfounded. This will make neighboring crop farmers very reluctant to use manure-sourced nutrients.

This is beyond federal CAFO rules and may have the effect of making exporting and recycling our nutrients more difficult.

*Change – Delete the requirement for parcel number, acreage and crops grown. Stick with federal CAFO rule language. Name, tests, volume; the agreement to use” at agronomic rate and not cause run off” is appropriate.*

Page 28 S7.A & B.

What is the basis of requiring the permitted farmer to provide a copy of the MPPP (FARM PLAN) to anyone who asks? Where in federal or state law is this required of an NPDES holder? What are the rules and laws that require a private farmer to now be responsible for performing as a public entity and supplying public records to anyone who wants?

Where is there a reference, allowance and clear guidance for a farmer to protect confidential business information?

*Change – Open Public Record Act applies to NPDES permit but with the allowance for protection of confidential business information. Please clarify language in the permit as to when and from whom the public may request information and clarify what information is confidential business information.*

Page 29

S7.B

Mapping requirement in this section seems duplicative to other mapping requirements.

*Change – Delete*

Ecology should **not** develop a nutrient budgeting tool. There are tools already available from land grant universities, NRCS, conservation districts, WSDA, private firms, and other states.

***Change** – Allow farmers to identify, choose and use existing or available nutrient budgeting tools. Ecology should not limit it; examples include Idaho 1 plan, CAFOWeb, NRCS tools, the Oregon Department of Ag. template – ODARK.ORG, etc.*

S7.C One Time Lagoon Report.

Why not allow producers to report with NRCS or CD or consulting engineer records on construction and design plans if those records are available to a producer? In this draft, there is no recognition of NRCS FOTG practices that Ecology consulted and agreed to.

***Change** – Delete*

Page 36-37  
G 16 Appeals –

***Change** – Remove the references to Mosquito Control general permit and replace with CAFO terminology.*

Page 38

Appendix A Definitions.

Missing in the definition of BMP is how the term BMP is different than the use of AKART. Using both AKART and BMP is confusing but they are used interchangeably with this draft. The previous permit and current EPA CAFO rules use the term BMP.

***Change** – Stay consistent with other agencies and drop the use of AKART. (EPA, NRCS, WSDA, Conservation Districts, Conservation Commission, land grant universities and farmers across the US use the term BMP.)*

***Change** – the permit must recognize and allow for NRCS FOTG practice standards or equivalent alternatives.*

***\*\* (Specifically in this section but missing overall and notably absent from this permit is any reference to the NRCS FOTG. Total abandonment and lack of recognition of NRCS standards is very disappointing. NRCS and conservation districts have been helping farmers develop farm plans and conservation systems for 8 decades. The work we have done with them should be considered in this process. Yet there is nothing but silence as to recognition of the BMP's and FOTG's that dairy farmers have implemented for many years.)***

Page 41- Lagoon – Current definition of lagoon is vague. It could be read to include a barn, a bin, a container, or concrete or metal tanks. It also could be read to include catch basins at the bottom of fields that catch irrigation runoff for pump-back.

Federal rule uses term “process wastewater”. Please clarify what lagoons are and are not.

***Suggested Change**- “Lagoons are earthen containment structures used to store liquids, such as manure and process waste waters from confinement area.”*

Page 43.

Please explain what a sanitary control area is in plain English. The WAC language is jargonistic.

Page 44-

Waters of the state definition seems incomplete. We have numerous questions that need clarification:

- Does Ecology consider wetlands waters of the state?
- What is the current Ecology definition of a wetland?
- Does Ecology recognize “Prior Converted Wetlands” as defined and delineated by NRCS under Federal Swamp-buster rules?
- If not, then when is a historical wetland no longer considered part of the waters of the state?

- How far back in time must a wetland have been farmed or pastured for it to no longer be a wetland (and therefore Waters of the state) for regulatory purposes?
- Is water standing in a field after a rain considered to be part of the waters of the state?
- How much and for how long must water stand in field depressions to constitute waters of the state?
- Does Ecology consider snow waters of the state?
- How small a water body is considered waters of the state?

*Change – to provide clarification on Ecology definition, policies and jurisdiction regarding scope of Waters of the State.*

The definition of Waste is very broad. It appears that a permitted farm with a garbage can with paper towels in it would be included in the broad definition of a structure to store waste materials (see current draft definition of a lagoon and concerns above).

*Change – Please clarify this definition.*

That concludes our specific comments.

In reading this draft permit, we cannot help but notice the lack of acknowledgement by Ecology of the standards and the people and programs at NRCS, at the Conservation Commission, the local Conservation Districts, the land grant universities and the Department of Agriculture.

There are tremendously knowledgeable people at these agencies and departments. Ecology simply does not have the staff nor expertise to implement this permit without the assistance and reliance on the programs, standards and human resources available from those organizations.

The Department of Agriculture is obligated by state law to perform many of the functions that Ecology duplicates, replicates or embellishes in this draft permit. Yet there are only two passing references in margins about coordination with WSDA. Why?

Failure to recognize the technical capacity and enforcement capacity of WSDA to oversee, implement and regulate dairy farms in the past and the future under this permit is very disconcerting.

The Dairy Nutrient Management Program has clearly been a stellar success in helping dairy farms comply, improve, maintain and become leaders in protecting water quality in the agricultural areas of our state.

Dairy farms are protecting water quality in our state while providing food, jobs, habitat, paying taxes, etc.

We recognize there are always ways to improve operations, embrace new understandings, and develop new technologies. In fact, Washington dairy farms have been recognized with national innovation awards in recent years for their work to use less energy on the farm and turn dairy nutrients into sources of renewable energy, fertilizer, fiber and other products.

Our dairy farmers continue to support research on efficient buffers, creating more uses for dairy nutrients, generation of clean energy, and more.

The data bears out the fact that Washington has dairy farmers who are excellent stewards of the land and water upon which they farm and live. Not only are our farmers stewards of the environment in which they operate, they LIVE in the environment in which they operate.

We have lost farms in the past because of the cost of implementing upgrades on their farms.

We share Ecology's goal of protecting water quality, but we also want to make protecting water quality possible for a dairy farmer that wants to continue operating.

Keeping this permit as simple as possible means relying upon, and coordinating with, existing successful programs, practices and people.

This permit should allow a farm that chooses to get it the opportunity to build on their existing practices and the historically successful aspects of their conservation work.

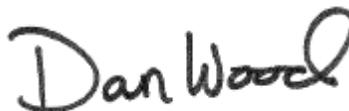
The current draft doesn't give enough recognition to the successful foundation already built on farms by many fine folks over many, many years.

We are as always ready to assist in any way to answer questions, help build understanding as we develop a permit that is protective and possible to implement.

Sincerely,



Jay Gordon  
Director of Policy & Government Relations  
Washington State Dairy Federation



Dan Wood  
Executive Director  
Washington State Dairy Federation

Attachments:

Moxee dairy ground water sampling results  
Haak dairy lagoon soil tests  
John Storman Letter 2004



December 23, 2010

DeVries Family Farms, LLC.  
Tom DeVries/Tim Dennis  
15720 Highway 24  
Moxee, Washington 98936

**RE: Analytical Results for Monitoring Well Sampling, October 2010**

Per the agreement between Tim Dennis and DeVries Family Farms, LLC (Dennis et al) and Washington Families Against Rural Mess (Washington FARM), monthly water level measurements for each monitoring well at the DeVries Family Farms site in Moxee, Washington were collected from December 2001 to December 2002. Procedures for water level sampling were written by Ryan Mathews of Fulcrum Environmental Consulting, Inc. (Fulcrum) and proper techniques demonstrated to Tim Dennis prior to the first measurement event. With the exception of water levels collected by Fulcrum during groundwater sampling events since December 2001, all other water level measurements have been collected by Tim Dennis. Results from these measurements have been reviewed by Fulcrum for groundwater fluctuation trends. See Attachment A for water level measurements.

**Previous Sampling Events**

The following is a summary of groundwater sampling events that have been conducted as part of the Dennis et al agreement with Washington FARM:

Sampling Event	Results
March 2002	Routine
August 2002	Routine
February 2003	Routine
September 2003	Routine
March 2004	Routine
November 2004	Routine
April 2005	Routine
December 2005	Routine
April 2006	Routine
August 2007	Routine
April 2008	Routine
October 2008	Routine
April 2009	Routine
October 2009	Wells not sampled due to insufficient static groundwater level.
April 2010	



## Current Sampling Event

On October 29, 2010, Jeremy Lynn with Fulcrum collected semi-annual monitoring well samples as required under the Dennis et al agreement with Washington FARM. Water samples were collected for the following:

- Fecal Coliform
- Nitrates
- Total Chlorides
- Specific Conductance

Water samples and field parameters were collected from MW-02 and 04 only due to insufficient static groundwater levels in MW-01 and MW-03. A duplicate sample was collected from MW-04 and labeled MW-05. Groundwater samples were submitted to Valley Environmental Laboratory located in Yakima, Washington for analysis.

## Sample Results

Sample results from each of the four wells are as follows:

**Table 1: Laboratory Results**

Analysis	Units	MW-02	MW-04
Fecal Coliform	CFU <sup>1</sup> /100 mL	<1	<1
Nitrates (as nitrogen)	mg/L	ND	ND
Total Chlorides	mg/L	7	5
Specific Conductance	μS/cm	312	288

1 – Colony forming units

ND = Not Detected

Laboratory results from MW-05, a duplicate of MW-04, confirmed adequate sample Quality Assurance.

As stated in the agreement between Dennis et al and Washington FARMS, results for a sampling event are routine if the following conditions are met:

- Specific conductivity and concentration of chloride and nitrate in any down-gradient monitoring well are not more than 20 percent greater than in the up-gradient monitoring well (MW-01).
- Fecal coliform counts in the down-gradient wells are not more than one (1) order of magnitude (10 times) greater than in the up-gradient monitoring well (MW-01).



Due to the insufficient static groundwater levels in MW-01 and MW-03, the sampling event was completed as a partial set. Fulcrum compared current constituent concentrations and determined that water quality is consistent with previous sampling events. While an upgradient sample was not collected from MW-01 for comparative purposes, Fulcrum has determined that the data is valid. Additionally, Fulcrum has determined that impact of groundwater by site operations is not evidenced by current sampling event results.

Therefore, the sample results for the October 2010 sampling event are satisfactory. No further action is necessary until the next scheduled semi-annual sampling event.

If you should have any questions concerning the sampling event or this letter, please contact me at 509.574.0839.

Sincerely,

Jeremy M. Lynn, GIT  
Environmental Geologist

Attachments

**Table 1: Water Level Measurements**

<b>Date</b>	<b>MW 01<sup>1</sup></b>	<b>MW 02<sup>1</sup></b>	<b>MW 03<sup>1</sup></b>	<b>MW 04<sup>1</sup></b>
12/20/01	158.60	145.80	142.60	157.15
01/09/02	159.20	145.40	143.20	157.81
01/31/02	158.32	145.50	142.30	156.80
02/25/02	158.40	145.51	142.35	156.11
03/06/02 <sup>2</sup>	157.82	144.85	141.71	156.26
03/22/02	157.93	144.96	141.78	157.13
05/01/02	158.70	145.82	142.71	156.92
06/04/02	158.85	145.71	142.87	158.92
07/11/02	159.48	146.96	143.65	158.35
08/06/02 <sup>2</sup>	159.70	147.23	144.00	159.63
08/13/02	160.00	147.38	144.46	159.36
09/20/02	160.60	147.90	145.01	159.73
11/25/02	160.15	147.51	144.35	159.71
12/21/02	159.30	147.81	143.26	157.91
02/05/03	159.00	147.31	143.01	157.21
02/25/03 <sup>2</sup>	159.12	146.19	143.00	157.42
09/25/03 <sup>2</sup>	160.66	148.03	144.88	159.21
03/10/04 <sup>2</sup>	156.60	146.59	143.42	157.84
11/03/04 <sup>2</sup>	161.58	149.10	149.01	160.22
04/01/05 <sup>2</sup>	160.86	147.86	145.45	159.46
12/19/05 <sup>2</sup>	161.88	149.90	149.25	160.40
04/04/06 <sup>2</sup>	161.85	149.61	146.32	160.65
03/01/07	163.420	150.939	147.810	161.953
08/14/07 <sup>2</sup>	166.770	154.856	151.426	166.240
04/03/08 <sup>2</sup>	166.340	154.195	150.800	165.350
10/30/08 <sup>2</sup>	168.460	156.620	156.560	167.689
4/29/09 <sup>2</sup>	161.455	156.823	153.530	167.910
5/04/10	170.169	158.573	<154.5 <sup>3</sup>	169.675
10/29/10 <sup>2</sup>	-	162.610	<154.5 <sup>3</sup>	173.783

- 1 Depth measurements from well casing in feet and have not been corrected to actual well head elevation.
- 2 Depth measurements collected during a well monitoring event.
- 3 Depth measured at top of pump. No water present at top of pump.
- No measurable water in well casing.

SAMPLE No. 102809-MW02  
 Date Collected 10/29/10 Time 12:05  
 Weather Rain, Cool Collectors J.Lynn

**Groundwater/Surface Water  
 Sample Collection Form**

**WATER LEVEL/WELL/PURGE DATA**

Sample Type:  Groundwater  Surface Water  Other \_\_\_\_\_

Sample Location: MW-02 – Biannual Sampling

Depth to Water (ft): 162.610 Time: 11:13 Measured from:  Top of protective casing  Top of well casing

Well Casing Type:  PVC  Stainless Steel  Fiberglass Casing Diameter: 2-inches

Well Condition: Secure ( Yes /  No ) Damaged ( Yes /  No ) Describe: \_\_\_\_\_

Begin Purge: Date/Time: 10/29/10 11:18 Casing Volume (gal): 1.59

End Purge: Date/Time: 10/29/10 11:58 Purge Volume (gal): 4.77

Total Depth of Well (ft. below top of well casing): 171.990

Purge Volume Calculation: 171.990-162.610=9.980, 9.980x0.17=1.59, 1.59x3 = 4.77

VOLUME OF SCHEDULE 40 PVC PIPE				
Casing Volume (gal) = $\pi r^2 h * 7.48$				
Where: $\pi = 3.1416$ ; r = radius in ft.; h = ft. of water column				
Diameter (inch)	O.D. (inch)	I.D. (inch)	Volume (gal/linear ft.)	Wt. Water (lbs/linear ft.)
2	2.375	2.067	0.17	1.45
4	4.500	4.026	0.66	5.51

Purge Water Disposal to:  55-gal Drum  Storage Tank  Ground  Other \_\_\_\_\_ Gallons Purged: ~5.50

Time	Vol. Purged (gal)	pH	Temperature (°F/°C)	Conductivity (µS)	Comments/Observations
11:30	1.75	7.40	56.5/13.6	260	See Comments Below
11:44	3.50	7.67	56.7/13.7	250	See Comments Below
11:58	5.25	7.67	56.3/13.5	250	See Comments Below

**SAMPLE COLLECTION DATA**

Sample Collected With:  Bailer  Pump/Pump Type Air Bladder Dedicated Tubing ( Yes /  No )

Made of:  Stainless Steel  PVC  Teflon  Polyethylene  Other \_\_\_\_\_

Decon Procedure:  Alconox Wash (1)  Tap Rinse  DI Water (2)  Discharge water (3)  Other \_\_\_\_\_

Replicate	pH	Temperature (°F/°C)	Conductivity	Other
1	7.66	56.3/13.5	250	
2	7.66	56.3/13.5	250	
3	7.66	56.3/13.5	250	
4	7.66	56.3/13.5	250	

pH Meter: pH Tester 1 Cond. Meter: EC Tester 1 Cond. Range: 0-1990 µS ATC:  On  Off

Meter Calibration Check: pH meter reads 7.05 at 13.8 °C Before Sample Collection

Conductivity meter reads 350 at 14.3 °C Before Sample Collection

Ferrous Iron Level: <2 ppm  Present  Absent

Sample Description (color, turbidity, odor, sheen, etc.): Sample water was clear in color, with no particulate and no odor.

QTY	SIZE	TYPE	FIELD FILTERED	PRESERVATIVE	LABORATORY ANALYSIS
1	500-mL	<input type="checkbox"/> Glass <input checked="" type="checkbox"/> Plastic	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (____) <input checked="" type="checkbox"/> No	Specific Cond., Cl, NO <sub>3</sub>
1	100-mL	<input type="checkbox"/> Glass <input checked="" type="checkbox"/> Plastic	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes (C <sub>6</sub> H <sub>8</sub> O <sub>6</sub> ) <input type="checkbox"/> No	Fecal Coliform
		<input type="checkbox"/> Glass <input type="checkbox"/> Plastic	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes (____) <input type="checkbox"/> No	
		<input type="checkbox"/> Glass <input type="checkbox"/> Plastic	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes (____) <input type="checkbox"/> No	

Duplicate Sample No(s). \_\_\_\_\_

Comments: Purge water was clear with no odor and no particulate.

Signature 

Date 10/29/10

SAMPLE No. 102910-MW04  
 Date Collected 10/29/10 Time 11:00  
 Weather Rain, cool Collectors J.Lynn

**Groundwater/Surface Water  
 Sample Collection Form**

**WATER LEVEL/WELL/PURGE DATA**

Sample Type:  Groundwater  Surface Water  Other \_\_\_\_\_

Sample Location: MW-04 – Biannual Sampling

Depth to Water (ft): 173.783 Time: 9:56 Measured from:  Top of protective casing  Top of well casing

Well Casing Type:  PVC  Stainless Steel  Fiberglass Casing Diameter: 2-inches

Well Condition: Secure ( Yes /  No ) Damaged ( Yes /  No ) Describe: \_\_\_\_\_

Begin Purge: Date/Time: 10/29/10 10:15 Casing Volume (gal): 0.92

End Purge: Date/Time: 10/29/10 10:51 Purge Volume (gal): 2.76

Total Depth of Well (ft. below top of well casing): 179.215

Purge Volume Calculation: 179.215-173.783=5.432, 5.432x0.17=0.92, 2.76x3 = 2.76

Purge Water Disposal to:  55-gal Drum  Storage Tank  Ground  Other \_\_\_\_\_ Gallons Purged: 3.00

VOLUME OF SCHEDULE 40 PVC PIPE				
Casing Volume (gal) = $\pi r^2 h * 7.48$				
Where: $\pi = 3.1416$ ; r = radius in ft.; h = ft. of water column				
Diameter (inch)	O.D. (inch)	I.D. (inch)	Volume (gal/linear ft.)	Wt. Water (lbs/linear ft.)
2	2.375	2.067	0.17	1.45
4	4.500	4.026	0.66	5.51

Time	Vol. Purged (gal)	pH	Temperature (°F/°C)	Conductivity (µS)	Comments/Observations
10:26	1.00	7.88	56.3/13.5	250	See Comments Below
10:38	2.00	8.10	56.5/13.6	250	See Comments Below
10:51	3.00	8.10	56.5/13.6	250	See Comments Below

**SAMPLE COLLECTION DATA**

Sample Collected With:  Bailer  Pump/Pump Type Air Bladder Dedicated Tubing ( Yes /  No )

Made of:  Stainless Steel  PVC  Teflon  Polyethylene  Other \_\_\_\_\_

Decon Procedure:  Alconox Wash (1)  Tap Rinse  DI Water (2)  Discharge water (3)  Other \_\_\_\_\_

Replicate	pH	Temperature (°F/°C)	Conductivity	Other
1	8.10	56.5/13.6	250	
2	8.10	56.5/13.6	250	
3	8.11	56.7/13.7	250	
4	8.10	56.7/13.7	250	

pH Meter: pH Tester 1 Cond. Meter: EC Tester 1 Cond. Range: 0-1990 µS ATC:  On  Off

Meter Calibration Check: pH meter reads 7.05 at 15.1 °C Before Sample Collection

Conductivity meter reads 370 at 15.8 °C Before Sample Collection

Ferrous Iron Level: <2 ppm  Present  Absent

Sample Description (color, turbidity, odor, sheen, etc.): Sample water was clear in color, with no particulate and no odor.

QTY	SIZE	TYPE	FIELD FILTERED	PRESERVATIVE	LABORATORY ANALYSIS
1	500-mL	<input type="checkbox"/> Glass <input checked="" type="checkbox"/> Plastic	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (____) <input checked="" type="checkbox"/> No	Specific Cond., Cl, NO <sub>3</sub>
1	100-mL	<input type="checkbox"/> Glass <input checked="" type="checkbox"/> Plastic	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes (C <sub>6</sub> H <sub>8</sub> O <sub>6</sub> ) <input type="checkbox"/> No	Fecal Coliform
		<input type="checkbox"/> Glass <input type="checkbox"/> Plastic	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes (____) <input type="checkbox"/> No	
		<input type="checkbox"/> Glass <input type="checkbox"/> Plastic	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes (____) <input type="checkbox"/> No	

Duplicate Sample No(s). Duplicate sample collected concurrent with MW-04 and labeled MW-05 with a collection time of 10:00.

Comments: Purge water was clear with no odor and no particulate.

Signature  Date 10/29/10



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Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

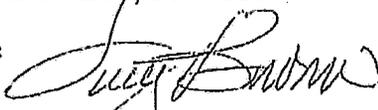
Lab Number: 14-S011223

Sample Id: HD-SB-01-0-1

Test Requested	Results	Relative Level	Optimum Range
pH	8.1	Excess	6.0-7.0
Phosphorus	69.7 ppm	Excess	8-20
Nitrate	94.5 ppm	Excess	5-15
Ammonium-N	750 ppm		
Total Nitrogen/Solid	1310 mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

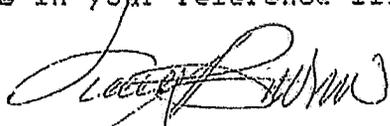
Lab Number: 14-S011225

Sample Id: HD-SB-01-1-2

Test Requested	Results	Relative Level	Optimum Range
pH	8.4	Excess	6.0-7.0
Phosphorus	12.7 ppm	Optimum	8-20
Nitrate	8.4 ppm	Optimum	5-15
Ammonium-N	300 ppm		
Total Nitrogen/Solid	428. mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



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Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011224

Sample Id: HD-SB-01-2-3

Test Requested	Results	Relative Level	Optimum Range
pH	8.1	Excess	6.0-7.0
Phosphorus	8.1 ppm	Optimum	8-20
Nitrate	1.4 ppm	Deficient	5-15
Ammonium-N	16. ppm		
Total Nitrogen/Solid	131. mg/Kg		ADAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



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Batch: 495319  
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PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011226

Sample Id: HD-SB-01-3-4

Test Requested	Results	Relative Level	Optimum Range
pH	7.8	Excess	6.0-7.0
Phosphorus	6.8 ppm	Below Optimum	8-20
Nitrate	1.5 ppm	Deficient	5-15
Ammonium-N	6.2 ppm		
Total Nitrogen/Solid	124. mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



Calcium & Magnesium Ratio: Heavy (Clay) 16:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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SOIL ANALYSIS RESULTS

WET  
J Downey  
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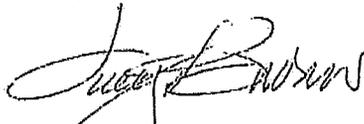
Lab Number: 14-S011227

Sample Id: HD-SB-01-4-5

Test Requested	Results	Relative Level	Optimum Range
pH	7.4	Excess	6.0-7.0
Phosphorus	3.6 ppm	Deficient	8-20
Nitrate	0.8 ppm	Deficient	5-15
Ammonium-N	16. ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



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Account: 15176  
Sampler: Jonathan Bell  
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Butte, MT 59701

Report Date: 6/13/14  
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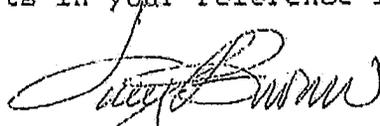
Lab Number: 14-S011228

Sample Id: HD-SB-01-5-6

Test Requested	Results	Relative Level	Optimum Range
pH	7.0	Optimum	6.0-7.0
Phosphorus	5.5 ppm	Below Optimum	8-20
Nitrate	1.2 ppm	Deficient	5-15
Ammonium-N	52. ppm		
Total Nitrogen/Solid	163. mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



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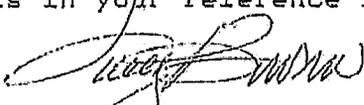
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011229

Sample Id: HD-SB-01-6-7

Test Requested	Results	Relative Level	Optimum Range
pH	7.2	Excess	6.0-7.0
Phosphorus	4.6 ppm	Deficient	8-20
Nitrate	1.7 ppm      7. lbs	Deficient	5-15
Ammonium-N	33. ppm		
Total Nitrogen/Solid	172. mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

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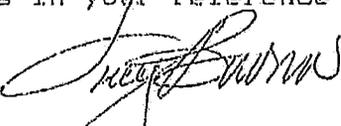
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-5011230

Sample Id: HD-SB-01-7-8

Test Requested	Results	Relative Level	Optimum Range
pH	7.1	Excess	6.0-7.0
Phosphorus	4.5 ppm	Deficient	8-20
Nitrate	1.4 ppm      6. lbs	Deficient	5-15
Ammonium-N	4.9 ppm		
Total Nitrogen/Solid	105. mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

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Batch: 495319  
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Sampler: Jonathan Bell  
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Butte, MT 59701

Report Date: 6/13/14  
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Lab Number: 14-S011211

Sample Id: HD-SB-01-8-9

Test Requested	Results	Relative Level	Optimum Range
pH	7.4	Excess	6.0-7.0
Phosphorus	2.5 ppm	Deficient	8-20
Nitrate	16.1 ppm	Above Optimum	5-15
Ammonium-N	2.1 ppm		
Total Nitrogen/Solid	115. mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



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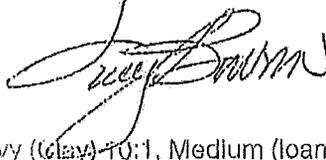
Lab Number: 14-S011212

Sample Id: HD-SB-01-9-10

Test Requested	Results	Relative Level	Optimum Range
pH	7.6	Excess	6.0-7.0
Phosphorus	3.0 ppm	Deficient	8-20
Nitrate	3.7 ppm 15. lbs	Below Optimum	5-15
Ammonium-N	2.6 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AQAC 993.13

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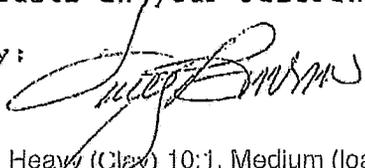
Lab Number: 14-S011213

Sample Id: HD-SB-01-10-11

Test Requested	Results	Relative Level	Optimum Range
pH	7.4	Excess	6.0-7.0
Phosphorus	4.5 ppm	Deficient	8-20
Nitrate	1.7 ppm      7. lbs	Deficient	5-15
Ammonium-N	1.8 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

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Approved By:



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Batch: 495319  
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SOIL ANALYSIS RESULTS

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Butte, MT 59701

Report Date: 6/13/14  
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Date Sampled: 5/23/14

Lab Number: 14-S011214

Sample Id: HD-SB-01-11-12

Test Requested	Results	Relative Level	Optimum Range
pH	7.4	Excess	6.0-7.0
Phosphorus	3.8 ppm	Deficient	8-20
Nitrate	1.8 ppm 7. lbs	Deficient	5-15
Ammonium-N	1.3 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

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Report Date: 6/13/14  
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Date Sampled: 5/23/14

Lab Number: 14-S011215

Sample Id: HD-SB-01-12-13

Test Requested	Results	Relative Level	Optimum Range
pH	7.2	Excess	6.0-7.0
Phosphorus	4.7 ppm	Deficient	8-20
Nitrate	1.6 ppm      6. lbs	Deficient	5-15
Ammonium-N	2.7 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

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Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

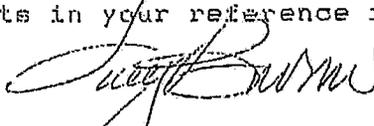
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011216

Sample Id: HD-SB-01-13-14

Test Requested	Results	Relative Level	Optimum Range
pH	7.2	Excess	6.0-7.0
Phosphorus	3.8 ppm	Deficient	8-20
Nitrate	1.5 ppm      6. lbs	Deficient	5-15
Ammonium-N	1.6 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

Cascade Analytical uses procedures established by WSLPTP for soil analysis. Cascade Analytical makes no warranty of any kind and client assumes all risk & liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis.

3019 G. S. Center Rd.  
Wenatchee, WA 98801  
(509) 662-1888  
Fax: (509) 662-8183  
1-800-545-4206

1008 W. Antelope Rd.  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

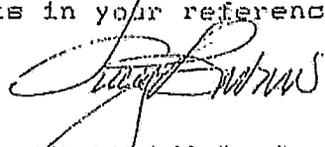
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011217

Sample Id: HD-SB-01-14-15

Test Requested	Results	Relative Level	Optimum Range
pH	7.6	Excess	6.0-7.0
Phosphorus	5.9 ppm	Below Optimum	8-20
Nitrate	1.7 ppm	Deficient	5-15
Ammonium-N	1.5 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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Wenatchee, WA 98801  
(509) 662-1800  
Fax: (509) 662-6183  
1-800-546-4208

1000 W. Abitama Rd  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

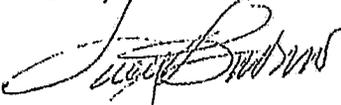
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011218

Sample Id: HD-SB-01-15-18

Test Requested	Results	Relative Level	Optimum Range
pH	7.3	Excess	6.0-7.0
Phosphorus	4.9 ppm	Deficient	8-20
Nitrate	1.6 ppm      6. lbs	Deficient	5-15
Ammonium-N	1.7 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using as guidelines for fertilizer application.

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3019 S. Center Rd  
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Fax: (509) 662-8183  
1-800-545-4206

1000 W. Antenna Rd.  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

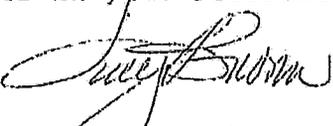
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011219

Sample Id: HD-SB-01-18-20

Test Requested	Results	Relative Level	Optimum Range
pH	7.6	Excess	6.0-7.0
Phosphorus	4.9 ppm	Deficient	8-20
Nitrate	1.7 ppm    7. lbs	Deficient	5-15
Ammonium-N	1.3 ppm		
Total Nitrogen/Solid	113. mg/Kg		AQAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

Calcium & Magnesium Ratio: Heavy (clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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Wenatchee, WA 98801  
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1-800-545-4206

1008 W. Altatum Rd  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011221

Sample Id: HD-SB-01-20-22

Test Requested	Results	Relative Level	Optimum Range
pH	7.5	Excess	6.0-7.0
Phosphorus	5.7 ppm	Below Optimum	8-20
Nitrate	1.9 ppm	Deficient	5-15
Ammonium-N	1.3 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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3019 G. S. Center Rd.  
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1-800-545-4206

1008 W. Ahtanum Rd.  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

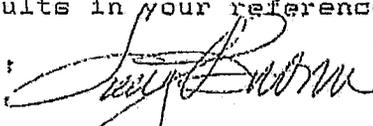
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011220

Sample Id: HD-SR-01-22-24

Test Requested	Results	Relative Level	Optimum Range
pH	7.5	Excess	6.0-7.0
Phosphorus	4.0 ppm	Deficient	8-20
Nitrate	2.2 ppm	Deficient	5-15
Ammonium-N	1.5 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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3019 E. S. Center Rd.  
Wenatchee, WA 98801  
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Fax: (509) 662-0183  
1-800-545-4206

1008 W. Antiarum Rd.  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

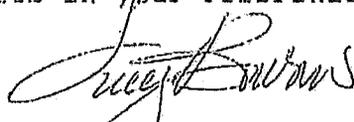
Lab Number: 14-S011222

Sample Id: HD-SB-01-26-28.5

Test Requested	Results	Relative Level	Optimum Range
pH	7.5	Excess	6.0-7.0
Phosphorus	4.7 ppm	Deficient	8-20
Nitrate	2.8 ppm      11. lbs	Deficient	5-15
Ammonium-N	1.5 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AQAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



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Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

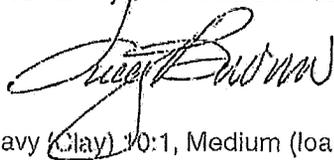
Lab Number: 14-S011231

Sample Id: HD-SB-01-30-32

Test Requested	Results	Relative Level	Optimum Range
pH	7.2	Excess	6.0-7.0
Phosphorus	5.0 ppm	Below Optimum	8-20
Nitrate	2.3 ppm      9. lbs	Deficient	5-15
Ammonium-N	2.6 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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Wenatchee, WA 98801  
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1-800-545-4206

1008 W. Ahtanum Rd.  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

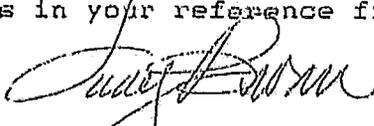
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/29/14

Lab Number: 14-S011232

Sample Id: HD-SB-01-34-37

Test Requested	Results	Relative Level	Optimum Range
pH	7.2	Excess	6.0-7.0
Phosphorus	5.2 ppm	Below Optimum	8-20
Nitrate	3.1 ppm      12. lbs	Below Optimum	5-15
Ammonium-N	2.6 ppm		
Total Nitrogen/Solid	106. mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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1008 W. Abnham Rd.  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonethen Bell  
PO Number:

--- SOIL ANALYSIS RESULTS ---

WET  
J Downey  
480 E Park St  
Butte, MT 59701

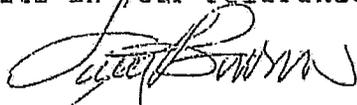
Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

Lab Number: 14-S011233

Sample Id: HD-SB-01-41-43

Item Requested	Results	Relative Level	Optimum Range
pH	7.2	Excess	6.0-7.0
Phosphorus	3.9 ppm	Deficient	8-20
Nitrate	2.1 ppm	Deficient	5-15
Ammonium-N	1.7 ppm		
Total Nitrogen/Solid	< 100 mg/Kg		ADAC 993.13

Please keep results in your reference files. Test every other year.

Approved By: 

Calcium & Magnesium Ratio: Heavy (Clay) 10:1, Medium (loam) 5:1, Light (sandy) 2:1 The relative levels and optimum ranges are suggestions that have been established for tree fruits. Please consult your fieldstaff or county extension agent before using the guidelines for fertilizer application.

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1-800-545-4206

1008 W. Ahtanum Rd.  
Union Gap, WA 98903  
(509) 452-7707  
Fax: (509) 452-7773

Batch: 495319  
Grower: WET  
Account: 15176  
Sampler: Jonathan Bell  
PO Number:

SOIL ANALYSIS RESULTS

WET  
J Downey  
480 E Park St  
Butte, MT 59701

Report Date: 6/13/14  
Date Received: 5/28/14  
Date Sampled: 5/23/14

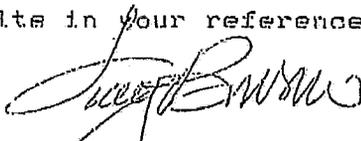
Lab Number: 14-5011234

Sample Id: HD-SB-01-43-45

Test Requested	Results	Relative Level	Optimum Range
pH	7.3	Excess	6.0-7.0
Phosphorus	3.6 ppm	Deficient	8-20
Nitrate	3.1 ppm 12. lbs	Below Optimum	5-15
Ammonium-N	3.9 ppm		
Total Nitrogen/Solid	108. mg/Kg		AOAC 993.13

Please keep results in your reference files. Test every other year.

Approved By:



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**AGRICULTURAL & ENVIRONMENTAL ANALYSIS**

3019 G.S. Center Rd.  
Wenatchee, WA 98801

(509) 662-1888  
Fax: (509) 662-8183  
1-800-545-4206

**SPECIAL SERVICE ORDER FORM**

	SAMPLE #	1	2	3	4
SEND RESULTS TO 1) Client 2) Billing 3) Both					
SAMPLE REPRESENTS 1) Food 2) Water 3) Soil 4) Plant Tissue 5) Other					
SAMPLER'S NAME Jonathan Ball					

CLIENT NAME/ADDRESS **WET**  
480 E Park Street  
Butte, MT 59701  
PHONE NO. 406-782-5220

BILLING NAME/ADDRESS **Same**  
PHONE NO.

EMAIL **SNicholls@WET-llc.com**

EMAIL **JDowney@WET-llc.com**

FORM MUST BE COMPLETED BEFORE ANALYSIS WILL BE PERFORMED.

RELINQUISHED BY: (Signature) [1]	DATE	RELINQUISHED BY: (Signature) [2]	DATE	RELINQUISHED BY: (Signature) [3]	DATE
<i>Jonathan Ball</i>	5/23				
(Printed) Jonathan Ball	TIME 1545	(Printed)	TIME	(Printed)	TIME
RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature)	DATE
		<i>[Signature]</i>		<i>Sarah Thamer</i>	5/23/14
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME
				<i>Sarah Thamer</i>	4:55

SAMPLE I.D. <b>HD-SB-01-0-1</b>	Sample Date <b>5/23</b>	Sample Time <b>28:52</b>
ANALYSIS REQUESTED <b>Per attached list</b>		
COMMENT		
SAMPLE I.D. <b>HD-SB-01-2-3</b>	Sample Date <b>5/23</b>	Sample Time <b>0705</b>
ANALYSIS REQUESTED		
COMMENT		
SAMPLE I.D. <b>HD-SB-01-1-2</b>	Sample Date <b>5/23</b>	Sample Time <b>0903</b>
ANALYSIS REQUESTED		
COMMENT		
SAMPLE I.D. <b>HD-SB-01-3-4</b>	Sample Date <b>5/23</b>	Sample Time <b>0903</b>
ANALYSIS REQUESTED		
COMMENT		

a. Sample container received by client was sealed Yes  No   
 b. Sample container received by laboratory was sealed Yes  No

**Disclaimer:**  
 Cascade Analytical, Inc. makes no warranty of any kind, expressed or implied, and customer assumes all risk and liability from use of Cascade Analytical test results. Cascade neither assumes nor authorizes any person to assume for Cascade any other liability in connection with the testing done by Cascade Analytical, Inc., and there are not other oral agreements or warranties collateral to or affecting this agreement.  
 Cascade Analytical, Inc.'s liability to customer as a result of customer's use of Cascade's tests results shall be limited to a sum equal to the fees paid by customer to Cascade Analytical, Inc. for the testing work.

Customer Signature *Jonathan Ball* Date **5/23/14**



AGRICULTURAL & ENVIRONMENTAL ANALYSIS

3019 G.S. Center Rd.  
Wenatchee, WA 98801

(509) 662-1888  
Fax: (509) 662-8183  
1-800-545-4206

SPECIAL SERVICE ORDER FORM

SEND RESULTS TO		SAMPLE #			
1) Client 2) Billing 3) Both		1	2	3	4
SAMPLE REPRESENTS					
1) Food 2) Water 3) Soil 4) Plant Tissue 5) Other					
SAMPLED BY:					
1) Client 2) Field Rep. 3) Quality Control 4) Cascade 5) Other					
SAMPLER'S NAME		Jonathan Ball			

CLIENT NAME/ADDRESS **WET**  
480 E Park Street  
Butte, MT 59701  
PHONE NO. 406-782-5220

BILLING NAME/ADDRESS **Same**  
PHONE NO.

EMAIL **SNicholls@WET-llc.com**

EMAIL **JDowney@WET-llc.com**

FORM MUST BE COMPLETED BEFORE ANALYSIS WILL BE PERFORMED.

RELINQUISHED BY: (Signature) 1	DATE	RELINQUISHED BY: (Signature) 2	DATE	RELINQUISHED BY: (Signature) 3	DATE
<i>J. Ball</i>	5/23				
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME
Jonathan Ball	1545				
RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature)	DATE
		<i>[Signature]</i>		<i>Sarah Elmer</i>	5/23/14
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME
				Sam Elmer	4:55

SAMPLE I.D. <b>HD-58-01-4-5</b>	Sample Date	Sample Time
ANALYSIS REQUESTED	5/23	0915
COMMENT	Per attached list	
SAMPLE I.D. <b>HD-58-01-5-6</b>	Sample Date	Sample Time
ANALYSIS REQUESTED	5/23	0916
COMMENT		
SAMPLE I.D. <b>HD-58-01-6-7</b>	Sample Date	Sample Time
ANALYSIS REQUESTED	5/23	0917
COMMENT		
SAMPLE I.D. <b>HD-58-01-7-8</b>	Sample Date	Sample Time
ANALYSIS REQUESTED	5/23	0920
COMMENT		

Sample container received by client was sealed Yes  No   
 Sample container received by laboratory was sealed Yes  No

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Customer Signature *J. Ball* Date 5/23/14



AGRICULTURAL &  
ENVIRONMENTAL ANALYSIS

3019 G.S. Center Rd.  
Wenatchee, WA 98801

(509) 662-1888  
Fax: (509) 662-8183  
1-800-545-4206

SPECIAL SERVICE ORDER FORM

		SAMPLE #			
		1	2	3	4
SEND RESULTS TO					
1) Client		2) Billing		3) Both	
SAMPLE REPRESENTS					
1) Food 2) Water 3) Soil 4) Plant Tissue 5) Other					
SAMPLE BY:					
1) Client 2) Field Rep. 3) Quality Control 4) Cascade 5) Other					
SAMPLER'S NAME <i>Jonathan Ball</i>					

CLIENT NAME/ADDRESS **WET**  
480 E Park Street  
Butte, MT 59701  
PHONE NO. 406-782-5220

BILLING NAME/ADDRESS **Same**  
  
  
PHONE NO.

EMAIL **SNicholls@WET-llc.com**

EMAIL **JDowney@WET-llc.com**

FORM MUST BE COMPLETED BEFORE ANALYSIS WILL BE PERFORMED.

RELINQUISHED BY: (Signature) <b>1</b> <i>Jonathan Ball</i>	DATE <b>5/23</b>	RELINQUISHED BY: (Signature) <b>2</b> <i>[Signature]</i>	DATE	RELINQUISHED BY: (Signature) <b>3</b> <i>[Signature]</i>	DATE
(Printed) <b>Jonathan Ball</b>	TIME <b>1545</b>	(Printed)	TIME	(Printed)	TIME
RECEIVED BY: (Signature) <i>[Signature]</i>	DATE	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE	RECEIVED BY: (Signature) <i>Sarah Ehrmer</i>	DATE <b>5/23/14</b>
(Printed)	TIME	(Printed)	TIME	(Printed) <i>Sarah Ehrmer</i>	TIME <b>4:55</b>

SAMPLE I.D. <b>HD-58-01-8-9</b>	Sample Date <b>5/23</b>	Sample Time <b>0925</b>
ANALYSIS REQUESTED <b>Per attached list</b>		
COMMENT		
SAMPLE I.D. <b>HD-58-01-9-10</b>	Sample Date <b>5/23</b>	Sample Time <b>0928</b>
ANALYSIS REQUESTED		
COMMENT		
SAMPLE I.D. <b>HD-58-01-10-11</b>	Sample Date <b>5/23</b>	Sample Time <b>0943</b>
ANALYSIS REQUESTED		
COMMENT		
SAMPLE I.D. <b>HD-58-01-11-12</b>	Sample Date <b>5/23</b>	Sample Time <b>0945</b>
ANALYSIS REQUESTED		
COMMENT		

Sample container received by client was sealed Yes  No   
Sample container received by laboratory was sealed Yes  No

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Customer Signature *Jonathan Ball* Date **5/23/14**



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1-800-545-4206

**SPECIAL SERVICE ORDER FORM**

SEND RESULTS TO 1) Client 2) Billing 3) Both	SAMPLE #	1	2	3	4
SAMPLE REPRESENTS 1) Food 2) Water 3) Soil 4) Plant Tissue 5) Other					
SAMPLE BY: 1) Client 2) Field Rep. 3) Quality Control 4) Cascade 5) Other					
SAMPLER'S NAME	Jonathan Ball				

CLIENT NAME/ADDRESS **WET**  
480 E Park Street  
Butte, MT 59701  
PHONE NO. 406-782 5220

BILLING NAME/ADDRESS **Same**  
PHONE NO.

EMAIL **SNicholls@WET-llc.com**

EMAIL **JDowney@WET-llc.com**

**FORM MUST BE COMPLETED BEFORE ANALYSIS WILL BE PERFORMED.**

RELINQUISHED BY: (Signature) 1 <i>J. Ball</i>	DATE 5/23	RELINQUISHED BY: (Signature) 2	DATE	RELINQUISHED BY: (Signature) 3	DATE
TIME 15:45	(Printed)	TIME	(Printed)	TIME	(Printed)
RECEIVED BY: (Signature) <i>Jonathan Ball</i>	DATE	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE	RECEIVED BY: (Signature) <i>Sarah Shuman</i>	DATE 5-23-14
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME 4:55

1128/13/14

SAMPLE I.D. <b>HD-SB-01-12-13</b>	Sample Date 5/23	Sample Time 0947
ANALYSIS REQUESTED <b>Per attached list</b>		
COMMENT		
SAMPLE I.D. <b>HD-SB-01-13-14</b>	Sample Date 5/23	Sample Time 0951
ANALYSIS REQUESTED		
COMMENT		
SAMPLE I.D. <b>HD-SB-01-14-15</b>	Sample Date 5/23	Sample Time 0955
ANALYSIS REQUESTED		
COMMENT		
SAMPLE I.D. <b>HD-SB-01-15-18</b>	Sample Date 5/23	Sample Time 1133
ANALYSIS REQUESTED		
COMMENT		

Sample container received by client was sealed Yes  No   
 Sample container received by laboratory was sealed Yes  No

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Customer Signature *J. Ball*

Date **5/23/14**



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1-800-545-4206

**SPECIAL SERVICE ORDER FORM**

SEND RESULTS TO		SAMPLE #			
1) Client 2) Billing 3) Both Both		1	2	3	4
SAMPLE REPRESENTS					
1) Food 2) Water 3) Soil 4) Plant Tissue 5) Other Soil					
CASCADABLE BY					
1) Client 2) Field Rep. 3) Quality Control 4) Cascade 5) Other					
SAMPLER'S NAME		Jonathan Ball			

CLIENT NAME/ADDRESS	WET
	480 E Park Street
	Butte, MT 59701
	406-782-5220

BILLING NAME/ADDRESS	Same
PHONE NO.	

EMAIL	SNicholls@WET-llc.com
-------	-----------------------

EMAIL	JDowney@WET-llc.com
-------	---------------------

FORM MUST BE COMPLETED BEFORE ANALYSIS WILL BE PERFORMED.

RELINQUISHED BY: (Signature) 1	DATE	RELINQUISHED BY: (Signature) 2	DATE	RELINQUISHED BY: (Signature) 3	DATE
<i>JR Ball</i>	5/23				
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME
Jonathan Ball	1545				
RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature)	DATE
		<i>JR Ball</i>			
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME

11271391120	SAMPLE I.D.	HD-58-01-18-20	Sample Date	5/23	Sample Time	1135
	ANALYSIS REQUESTED	Per attached list				
	COMMENT					
11271391120	SAMPLE I.D.	HD-58-01-22-24	Sample Date	5/23	Sample Time	1147
	ANALYSIS REQUESTED					
	COMMENT					
11271391120	SAMPLE I.D.	HD-58-01-20-22	Sample Date	5/23	Sample Time	1140
	ANALYSIS REQUESTED					
	COMMENT					
11271391120	SAMPLE I.D.	HD-58-01-2628.5	Sample Date	5/23	Sample Time	1150
	ANALYSIS REQUESTED					
	COMMENT					

Sample container received by client was sealed Yes  No

Sample container received by laboratory was sealed Yes  No

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Customer Signature *JR Ball* Date 5/23/14



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Wenatchee, WA 98801

(509) 662-1888  
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1-800-545-4206

SPECIAL SERVICE ORDER FORM

	SAMPLE #	1	2	3	4
SEND RESULTS TO: 1) Client 2) Billing 3) Both	Both				
SAMPLE REPRESENTS: 1) Food 2) Water 3) Soil 4) Plant Tissue 5) Other	Soil				
SAMPLE BY: 1) Client 2) Field Rep. 3) Quality Control 4) Cascade 5) Other					
SAMPLER'S NAME	Jonathan Ball				

CLIENT NAME/ADDRESS	WET
	480 E Park Street
	Butte, MT 59701
PHONE NO.	406-782-5220

BILLING NAME/ADDRESS	Same
PHONE NO.	

EMAIL	SNicholls@WET-llc.com
-------	-----------------------

EMAIL	JDowney@WET-llc.com
-------	---------------------

FORM MUST BE COMPLETED BEFORE ANALYSIS WILL BE PERFORMED.

RELINQUISHED BY: (Signature) 1	DATE	RELINQUISHED BY: (Signature) 2	DATE	RELINQUISHED BY: (Signature) 3	DATE
<i>[Signature]</i>	5/23				
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME
Jonathan Ball	15:15				
RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature)	DATE
		<i>[Signature]</i>		<i>[Signature]</i>	5/23/11
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME
				Sarah Farmer	4:55

SAMPLE I.D.	HD-58-01-30-32	Sample Date	5/23	Sample Time	11:55
ANALYSIS REQUESTED	Per attached list				
COMMENT					
SAMPLE I.D.	HD-58-01-34-37	Sample Date	5/23	Sample Time	12:00
ANALYSIS REQUESTED					
COMMENT					
SAMPLE I.D.	HD-58-01-41-43	Sample Date	5/23	Sample Time	13:17
ANALYSIS REQUESTED					
COMMENT					
SAMPLE I.D.	HD-58-01-43-45	Sample Date	5/23	Sample Time	13:25
ANALYSIS REQUESTED					
COMMENT					

Sample container received by client was sealed Yes  No   
 Sample container received by laboratory was sealed Yes  No

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Customer Signature *[Signature]* Date 5/23/11

Media	Number	Analysis	Method	RL	Bottle Type	Preservation	Hold times
Priorities on Side Soil	<del>220</del>	<del>Chloride</del>	<del>NAPT S-12.10</del>	<del>4.0 ppm</del>	1- 2 cup soil bag	<del>4° C</del>	<del>N/A</del>
	2	Nitrogen, Ammonia as N	NAPT S-3.50	0.4 ppm		4° C	N/A
	1	Nitrogen, Nitrate + Nitrite N	NAPT S-3.10	0.4 ppm		4° C	N/A
	3	Nitrogen, Total Kjeldahl as N	NAPT S-8.10	5.0 ppm		4° C	N/A
	5	Soil pH	NAPT S-2.20	NA		4° C	N/A
	4	Phosphorus	NAPT S-4.10	1.4 ppm		4° C	N/A
GW	10	Alkalinity, Total as CaCO3	SM 2320-B	10 ppm	See below	4° C	14 days
	10	Chloride	EPA 300.0	0.1 ppm		4° C	28 days
	10		EPA 200.7	0.4 ppm		HNO <sub>3</sub>	6 months
	10	Magnesium	EPA 200.7	0.06 ppm		HNO <sub>3</sub>	6 months
	10	Sodium	EPA 200.7	0.7 ppm		HNO <sub>3</sub>	6 months
	10	Potassium	EPA 200.7	0.62 ppm		HNO <sub>3</sub>	6 months
	10	pH	SM 4500 H-B	NA		4° C	N/A
	10	Nitrogen, Ammonia as N	SM 4500 NH3-G	0.07 ppm		H <sub>2</sub> SO <sub>4</sub>	28 days
	10	Nitrogen, Nitrate as N	EPA 300.0	0.05 ppm		4° C	48 hours
	10	Nitrogen, Nitrite as N	EPA 300.0	0.05 ppm		4° C	48 hours
	10	Nitrogen, Total Kjeldahl as N	SM 4500 Norg-C	0.3 ppm		H <sub>2</sub> SO <sub>4</sub>	28 days
	10	Phosphorus, Total	SM 4500 P-E	0.07 ppm		H <sub>2</sub> SO <sub>4</sub>	28 days
	10	Sulfate	EPA 300.0	0.1 ppm		4° C	28 days
	10	Total Dissolved Solids	SM 2540 C	7 ppm		4° C	7 days
10	Total Suspended Solids	SM 2540 D	1 ppm	4° C	7 days		

Groundwater bottle set

- 1-1L plastic: Alkalinity, TDS, TSS, pH
- 1-125ml plastic: Chloride, Nitrate-N, Nitrite-N, Sulfate
- 1-125ml plastic: Ammonia-N
- 1-500ml plastic: TKN, T. Phosphorus
- 1-500ml plastic: Ca, Mg, Na, K

Sample Receipt Form

Date Received: 5.23.14 Time Received: 4:55 Initials: SE

Client Name: MET Project Name: \_\_\_\_\_

Temperature of cooler upon receipt: 13 °C Thermometer ID: DR-1

Custody seals: Intact Broken None N/A

Chain of Custody Completed:

Client name, address, and phone number;	<u>Yes</u>	No
Date and time of sampling; <u>2 Sample dates missing</u>	Yes	<u>No</u>
Test requests clear; <u>A.S. 5/23</u>	<u>Yes</u>	No
Completed in ink;	<u>Yes</u>	No
Signed by client;	<u>Yes</u>	No

All samples received: Yes No

All samples intact: Yes No

Sample ID's match COC form: Yes No

Appropriate containers used: Yes No

Sufficient amount of sample for analysis: Yes No

Correct preservative verified: N/A Yes No

Air bubbles in VOC, TTHM, or HAA5 samples: N/A Yes No

Sample(s) exceed hold time: Yes No

Type of coolant: Ice Blue Ice None Other Comment: \_\_\_\_\_

Shipping Method: FedEx UPS USPS Brett & Sons Hand Delivered CAI Sampled

Shipping Container: CAI Cooler CAI Cooler Box Client's Cooler None Other \_\_\_\_\_

Samples accepted for analysis: Yes No

Reason for Rejection: \_\_\_\_\_

Name of Person Contacted: \_\_\_\_\_ Date Contacted: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY  
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000  
TTY 711 or 800-833-6388 (For the Speech or Hearing Impaired)

September 14, 2004

Ms. Sally Bredeweg  
Natural Resources Conservation Service  
316 W. Boone Ave, Suite 450  
Spokane, WA 99201

RE: Draft NRCS Washington Conservation Practice Standard #313, Waste Storage Facility.

Dear Sally:

Please accept these written comments on the Washington Waste Storage Facility Conservation Practice #313, dated September 2004. I cannot attend the 9/15/04 meeting to discuss this draft standard due to a previously scheduled commitment.

The draft Conservation Practice #313, September 2004, if implemented, will help those who operate waste storage facilities to meet the requirements of the Washington Water Quality Standards. The highlighted sections in red and blue help to ensure that Washington's regulatory standards are met. The federal standard, without these additions, will not ensure that Washington's requirements for water quality or dam safety are met.

### **Washington Water Quality Standard for Waste Storage Facilities**

The Water Quality Standards for Ground Waters of the State of Washington, Chapter 173-200 WAC, require the protection of the ground water quality to protect a variety of current and future beneficial uses. Shallow ground water is frequently used as the source for private domestic water supply wells, especially in rural areas; therefore, the appropriate beneficial use standard for the protection of shallow ground water is drinking water. In addition to the specific standards for drinking water, the State's anti-degradation policy [WAC 173-200-030] requires that existing ground water quality be protected. Waste storage facilities must be designed, built and operated to protect existing ground water quality.

### **Permeability vs. Specific Discharge**

Misunderstandings of the difference between permeability and specific discharge may contribute to some confusion. The Department of Ecology uses soil permeability as the performance standard for lagoon liners. Many NRCS practices refer to specific discharge in their criteria. Both permeability and specific discharge are frequently reported in units of cm/sec. Permeability is a measure of the soil/liner's properties as liquid passes through. Specific discharge includes liner thickness and head on the liner along with the permeability to predict the amount of water that would pass through. The NRCS Agricultural Waste Management Field Handbook, Appendix 10D provides a conversion between the two on page 10D-7. This conversion



calculates that a liner with a permeability of  $1 \times 10^{-7}$  cm/sec, in a pond with liquid 9 feet deep and a 1 foot thick liner, the specific discharge would be  $1 \times 10^{-6}$  cm/sec. If the depth of liquid is greater, or the liner thinner, the specific discharge would be larger though the permeability would remain the same.

### **Manure Lagoon Standards**

For your reference, I have attached a copy of a letter outlining dairy lagoon standards that Ecology sent to Larry Johnson, NRCS, on January 23, 2002. Modeling results presented at the Manure Lagoon Workgroup meeting, on March 29, 2004, suggest that the standards outlined in this letter may not always be protective of ground water quality, though Ecology does not suggest that the standards be reexamined at this time. Below I will briefly touch on the points in the letter.

1. The maximum recommended lagoon liner permeability for manure lagoons should be  $1 \times 10^{-6}$  cm/sec, with the assumption that manure sealing will provide approximately an order of magnitude of additional protection resulting in a liner permeability of  $1 \times 10^{-7}$  cm/sec.
2. Manure lagoons with a single liner must have a minimum of 2 feet of vertical separation between the bottom of the lagoon and the top of the highest seasonal water table. In areas with high seasonal ground water, additional soil should be used to create an above ground lagoon which maintains this 2 foot separation.
3. A lagoon with a double liner, including a collection layer between the liners and a system to return any leakage to the lagoon, would be considered a non-discharging design that could be constructed with less than 2 feet of separation or with a base below the seasonal high water table. Design considerations for lagoons constructed below seasonal high water must include protection of the liner from uplift during times of high water table. A more thorough description of the design considerations is included in Ecology's January 23, 2002 letter.
4. The importance of construction quality control and quality assurance cannot be overstated. The only way to ensure that a facility will perform as designed is to include an inspection and testing program during construction. The EPA guidance document, *Quality Assurance and Quality Control for Waste Containment Facilities* (EPA/600/R-93/182) presents the state of the practice for construction quality assurance at these facilities and should be followed.

Ms. Sally Bredeweg  
Page 3  
September 14, 2004

Thank you for the opportunity to comment on this draft conservation practice. It is unfortunate that the meeting to discuss this standard was scheduled for a time when I am not available. I will be happy get together at some time when I am available to discuss these comments further. Please contact me at 360-407-7221 if you have any questions or if I can provide additional assistance.

Sincerely,

A handwritten signature in cursive script that reads "John Stormon".

John Stormon  
Hydrogeologist  
Water Quality Program

cc: Nora Mena, WSDA