

EAP Exhibit 6

Regulatory Analysis of the Proposed Changes to the Animal Feeding Operations Control Regulation

Regulation No. 81

April 2008

**REGULATORY ANALYSIS
OF THE PROPOSED CHANGES TO THE
ANIMAL FEEDING OPERATIONS CONTROL REGULATION**

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I. Introduction

On February 21, 2008, the Environmental Agriculture Program (Program) received from Mr. Nels Nelson via electronic mail a request for a regulatory analysis of changes to Regulation No. 81 (“Animal Feeding Operations Control Regulation”, 5 CCR 1002-81) currently proposed by the Program. The rulemaking hearing regarding the proposed changes is scheduled before the Colorado Water Quality Control Commission (Commission) on April 14, 2008.

This regulatory analysis was prepared pursuant to the Commission’s Procedural Rules (Regulation No. 21, 5 CCR 1002-21), subsection 21.3.J. The analysis follows the format of subsection 21.3.J, with discussions of each of the points in turn.

Mr. Nelson’s request included a number of questions that are not associated with information required by subsection 21.3.J. Responses to these questions are provided in Appendix B.

Summary of Proposed Revisions

The Program’s proposal regarding changes to Regulation No. 81 is the result of eleven (11) meetings with Animal Feeding Operation (AFO) stakeholders (“Stakeholders Group”), beginning on March 7, 2007 and ending on March 20, 2008. Appendix A provides the minutes of all of the 11 meetings. The minutes show who attended each meeting, the affiliation of each attendee, the dates of each meeting, and a synopsis of discussions that occurred at each meeting.

A general overview of the proposed changes is provided below. Please refer to Table 1 for specific changes.

- Clarify the “incorporation by reference” language in the introductory paragraph.
- Update section 81.1 (“Applicability”) in response to the decisions by the U.S. Second Circuit Court of Appeals in Waterkeeper Alliance et al., v. EPA, 399 F. 3d 486 (2nd Cir. 2005) (“Waterkeeper decision”).
- Revise section 81.2 (“Purpose”) for clarity and to add the requirements that non-permitted CAFOs protect surface waters and register with the Program.
- Revise section 81.3 (“Definitions”) to add and delete some defined words.
- Revise section 81.4 (“Designation of an Animal Feeding Operation as a Concentrated Animal Feeding Operation”) for clarity and in response to the Waterkeeper decision.

- Insert a new section 81.5, which requires that non-permitted CAFOs register with the Program.
- Insert a new section 81.6, which requires non-permitted CAFOs to have a Facility Management Plan (“FMP”) and to protect surface water.
- Move the existing section 81.5 (“Ground water protection requirements”) to be a new section 81.8. Revise the existing language in the section and add a new subsection requiring ground water remediation.
- Move the existing section 81.6 (“Animal Feeding Operations – Best Management Practices”) to be a new section 81.9, revise some existing language, and add some new language.

Regulatory Analysis

1. A description of the classes of persons who will bear the cost and/or benefit from the proposed rule.

Following are listings of classes of persons and entities that will bear the cost and/or benefit from the proposed rule. Please refer to Table 1 for information regarding which classes are anticipated to bear the cost and/or benefit from each of the proposed rule changes.

Classes that will bear the cost

- Non-permitted CAFOs
- Regarding ground water protection changes, all CAFOs
- Some AFOs
- Regarding changes to the CAFO designation section, some citizens/neighbors

Classes that will accrue the benefit

- Permitted CAFOs
- Some non-permitted CAFOs
- Some AFOs
- The Program
- Some neighbors of AFO or CAFO facilities
- Other citizens
- State of Colorado

2. To the extent practicable, a description of the probable quantitative and qualitative impact of the proposed rule, economic or otherwise, upon the affected class.

Quantitative impacts are presented in Table 1. Qualitative impacts are presented below in terms of negative and positive impacts, and in Table 1.

Positive Qualitative Impacts of Proposed Rule

Qualitative impacts are presented briefly in Table 1. Discussions of some of these impacts relative to CAFOs are presented below.

Regarding reduced discharges from the CAFO production area, benefits will accrue to surface waters of the state and citizens and neighbors of facilities that are not currently designed and operated to discharge only as the result of a storm in excess of a 25-year, 24-hour storm or Chronic Storm, whichever is greater. Examples of benefits include:

1. A reduction in pollutant loading to surface waters of the state, principally in the form of the conventional pollutants in manure and process wastewater, including nitrogen, phosphorus, total suspended solids (TSS), fecal coliform, and biochemical oxygen demand (BOD). In addition, a reduction is expected in the deposition of the following emerging pollutants: antibiotic resistant genes and hormones.

Antibiotic resistant genes: Colorado State University researchers found antibiotic resistant genes in Colorado dairy lagoons and in some Colorado surface waters, including irrigation ditches.¹ The introduction of the research paper notes that: 1) The spread of antibiotic resistant pathogens is a growing problem in the U.S. and around the world; and, 2) The rise of antibiotic resistance is considered to be closely linked with the widespread use of antibiotic pharmaceuticals in humans and animals. In particular, more than one-half of the antibiotics used in the U.S. are administered to livestock for purposes of growth promotion or infection treatment.

Recent University of Kansas research studied the abundance of six tetracycline resistant genes in wastewater lagoons at five Midwest CAFOs.² The results showed that antibiotic use strategy strongly affects both the abundance and seasonal distribution of resistance genes in associated lagoons, which has implications on water quality and feedlot management practices.

Hormones: A 2004 journal article reported the endocrine-disrupting effects of cattle feedlot effluent on the flathead minnow.³ Male fish were demasculinized and female fish had a decreased ratio of estrogen to androgen. The literature

¹ Pruden, A., Pei, R., Storteboom, H., and Carlson, K.H. (2006) Antibiotic resistant genes as emerging contaminants. *Environ. Sci. Technol.* 40(23): 7445-7450.

² Peak, N., Knapp, C.W., Yang, R.K., Hanfelt, M.M., Smith, M.S., Aga, D.S., and Graham, D.W. (2007) Abundance of six tetracycline resistant genes in wastewater lagoons at cattle feedlots with different antibiotic use strategies. *Environmental Microbiology* 9(1): 143-151.

³ Orlando, E.F., Kolok, A.S., Binzick, G.A., Gates, J.L., Horton, M.K., Lambright, C.S., Gray, Jr., L.E., Soto, A.M., and Guillette, Jr., L.J. (2004) Endocrine-disrupting effects of cattle feedlot effluent on an aquatic sentinel species, the flathead minnow. *Environmental Health Perspectives* 112(31): 353-358.

review section of the article notes that studies have begun to focus on natural hormones released from animal waste used to fertilize agricultural fields. Significant concentrations of estrogens and androgens have been reported in ponds or streams receiving runoff from fields fertilized with chicken litter. In addition, natural hormones, such as estradiol, have been reported in ponds below cattle holding facilities.

2. Indirect benefits of clean water in the environment will be experienced by the people of Colorado and perhaps even farther afield. The benefits will accrue from less pollutant loading, resulting in, for example, fewer algae blooms in aquatic communities, reduced degradation of irrigation canals, and improved water quality for water supplies and recreation. The extent of the benefits will vary with the location of surface waters relative to the location of an AFO or CAFO that does not currently meet the requirements of the proposed rule.

Environmental economists use several tools/methods to quantify the value people place on clean water in the environment. One of these methods is a travel-cost survey that analyzes individual trip-making behavior to water bodies. Another is the contingent valuation method that uses “structured conversations” to determine factors like “willingness to pay.”

North Carolina: In a travel-cost study, a researcher in North Carolina found that people are willing to pay additional money, in the form of increased travel expenses, in order to enjoy higher levels of water quality.⁴ He further found that North Carolina residents’ annual benefits from reduced nutrient pollution in the Neuse River basin would be approximately \$119 million per year. The study showed that people value clean water.

Colorado: A study was conducted regarding the South Platte River between Kersey and Fort Morgan wherein the researchers used the contingent valuation method to estimate the nearby population’s willingness to pay (“WTP”) for expanded “ecosystem services” of the corridor (five miles on either side of the river for 45 miles).⁵ Ecosystem services included: water purification, erosion control, habitat provision for fish and wildlife, recreation, and wastewater dilution. The WTP study estimated that the benefit ranged from a \$29 million to \$79 million annually for all the households living along the South Platte River,

⁴ Phaneauf, F. 2001. A random utility model of TMDLs: Estimating the benefits of watershed based ambient water quality improvements. North Carolina State University Department of Agriculture and Resource Economics working paper.

⁵ Loomis, J. (2000). This research is summarized as a case study in “Values of Instream Flows in the West: From the Platte River to the Pacific Northwest.” Department of Agricultural and Resource Economics, Colorado State University.

depending on the degree of conservatism of the assumptions. This study shows that Coloradoans value clean water.

California: A statewide study in California using contingent valuation methods estimated that Californians as a whole were willing to pay \$15.46 per month (which aggregate to about \$2.24 billion per year) to remove impairments to water quality from all California water bodies.⁶

Nationwide: A recent national poll by Luntz Research and Penn, Shoen & Berland Associates found that eight in ten Americans believe that clean and safe water is a national issue that deserves federal investment.⁷ By 67 percent to 26 percent, Americans prefer spending to guarantee clean and safe water over tax cuts.

And finally, the high quality living environment is an important part of a vibrant economy. As discussed in the paper “Economic Well-being and Environmental Protection in the Pacific Northwest [PNW]”, (Powers 1996)⁸:

The most obvious benefits [of environmental protection] are the improvements in the living environment. As discussed earlier, the higher quality living environments in the PNW have been one of the driving forces behind its economic vitality. Because people care where they live, and because businesses care where people choose to live, environmental quality has a positive impact on the local economy. Put negatively, degraded environments are associated with lower incomes and depressed economic conditions.

3. **The probable costs to the Commission, the Division, or any other state agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues.**

Costs to the Commission: There should be no significant increased cost to the Commission caused by the proposed rule changes. A relatively insignificant increase in time demand may occur as the rule is reviewed during the triennial review of the approved changes and during subsequent regulatory reviews. However, this should not affect the number of required Commission meetings.

⁶ Lew, L.M., and Lew, D.K. (2001) Clean water in California: What is it worth? Department of Agricultural and Resource Economics, University of California at Davis.

⁷ Environment News Service (ENS) (2004). As posted on the Water Infrastructure Network website: http://win-water.org/win_news/030705article.html

⁸ Powers, T.M. (1996) Economic well-being and environmental protection in the Pacific Northwest: A consensus report by Pacific Northwest economists. Available on the web at: <http://www.uidaho.edu/~joelh/PNWEcon/pnwconse.htm>

Costs to the Environmental Agriculture Program (Division): The proposed changes will result in some additional, occasional time demands on Program staff.

Examples of such demands are outreach and implementation for the new rules, stakeholder's meetings, and document preparation and reproduction in anticipation of subsequent regulatory reviews. It is not anticipated that these additional demands will result in an additional cost to the Program; for example, an additional employee will not be hired to address the proposed rule changes.

The proposed changes likely will increase the time involved in doing inspections of non-permitted CAFO facilities. Extra time will be needed to review, for example, the Facility Management Plan, wastewater structures, and additional records, and to write expanded inspection reports. It is estimated that the additional time needed for inspections is three hours per facility. Currently, the Division hires a contractor to do 40 CAFO inspections per year. The hourly rate for a contractor is about \$68.06. This rate multiplied by three additional hours per each of the 40 facilities results in an extra inspection cost per year of \$8,167.

Costs to any other state agency: It is not anticipated that any other state agency will be affected by the proposed changes. Therefore, increased costs to any other state agency are not expected.

4. **A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction**

Table 2 provides a comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction.

5. **A determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule**

The Program and Stakeholders Group discussed a number of methods and options for achieving the stated purposes of the proposed revisions. The discussions were memorialized in minutes of each of the eleven CAFO Stakeholder meetings. All of the meeting minutes are provided in Attachment A. Based on significant feedback from the Stakeholder's Group since March of 2007, the Program believes the current proposal provides the most cost effective means for achieving the stated purposes of the proposed revisions.

6. **A description of any alternative methods for achieving the purpose of the proposed rule that were seriously considered by the Commission or petitioner and the reasons the alternative methods were rejected in favor of the proposed rule.**

The Program and Stakeholders Group considered a number of rule changes and method options at the eleven stakeholder meetings. All stakeholder discussions were memorialized in the meeting minutes (Appendix A). In addition, revised drafts of proposed regulations were made by the Program, as appropriate, and were the result of discussions with the Stakeholders Group. These drafts were provided to the Stakeholders Group and discussed at applicable meetings. Please refer to the minutes for alternative methods discussed and the reasons why alternative methods were rejected or changed. For example, the Program proposed to the Stakeholders Group in April 2007 that the CAFO surface water protection requirements pertain to discharges to waters of the state that are not waters of the U.S. Based on stakeholder discussions, the applicable waters were changed to be all surface waters.

Table 1. Descriptions of the classes of persons who will bear the cost and or benefit from the proposed changes of Regulation No. 81, and qualitative and quantitative impacts of the proposed changes on the classes.

PROPOSED REGULATORY CHANGE	CLASSES THAT WILL BEAR THE COST	CLASSES THAT WILL BENEFIT	QUANTITATIVE IMPACT OF THE PROPOSED CHANGES
<i>Designation of an AFO as a CAFO section (81.4)</i>			
Providing the option for an AFO at risk of being designated a CAFO to comply with the CAFO provisions of Regulation No. 81	AFOs at risk of being designated a CAFO	The same class that will bear the cost. This option should be less costly than applying for and operating under a CAFO permit.	Where an AFO elects to comply with the non-permitted CAFO requirements, please refer to the applicable CAFO section(s) below for quantitative impacts.
Change 'surface water' to 'waters of the U.S.'	Citizens affected by significant contributions of pollutants from an AFO to surface waters of the state that are not waters of the U.S.	AFOs at risk of discharging to surface waters of the state, but not waters of the U.S.	No change in quantitative impacts for AFOs that need to continue to comply with proposed changes.
<i>Concentrated Animal Feeding Operation (CAFO) sections</i>			
Register with Division (81.5)	Non-permitted CAFOs	1. The Environmental Agriculture Program (Program) (please see the proposed Statement of Basis for a discussion of the benefits to the Program). 2. Citizens who have a need or desire to know CAFO names and locations.	Time/effort + postage; Based on \$100/hour and 0.5 hours, cost estimate would be \$50.00 ⁵
Facility Management Plan (FMP) document (81.6)	Non-permitted CAFOs.	1. Citizens of the state that have an interest in protection of surface and ground water quality. 2. The same class that will bear the cost. Non-permitted CAFOs will have most of its compliance documents in one discrete place. 3. State of Colorado – protection of the state's natural resources.	Time/effort for compiling FMP; Based on \$100/hour and 1 hour, cost estimate would be \$100.00 ⁵

PROPOSED REGULATORY CHANGE	CLASSES THAT WILL BEAR THE COST	CLASSES THAT WILL BENEFIT	QUANTITATIVE IMPACT OF THE PROPOSED CHANGES
FMP- Develop and implement surface water protection elements – Production Area	Non-permitted CAFOs. Cost will be borne unequally on a per animal basis: 1) CAFOs vary greatly in size; 2) facilities vary in what wastewater retention structures currently exist.	1. Permitted CAFOs – Non-permitted CAFOs will have fixed costs for structures approaching parity with permitted facilities. 2. Citizens/neighbors – will benefit from reduction in discharges into surface waters, e.g., borrow ditches (discharges could occur only as result of storm exceeding 25-yr, 24-hr or Chronic). 3. Users of surface waters – persons who partake of the beneficial uses of surface waters in the state will benefit from reduction in number and pollutant concentration of discharges downgradient of non-permitted CAFOs. 4. State of Colorado – protection of the state's natural resources.	Varies by site, type of operation and the number of ponds needed. EPA estimated 168 discharging CAFOs in Colorado – 85% of beef cattle feedlots, 100% of dairies, and 10% of dry layers, broilers and turkeys ¹ , may require construction of berms and impoundments. Example - feedlot with 20,000 cattle, 200 sq. ft/head of space, 200 animals/acre, ½ gallon water/animal/day, 0.34 ac-ft/acre runoff from 25- year 24-hour storm. Impoundment cost: would need 40 ac-ft pond, \$2.00/cubic yard of cut, cost estimate for impoundment would be \$160,000 (or \$1,600/acre of drainage area) ⁴ . Berm cost: cost estimate for typical berm for EPA Large1 (1,000 – 8,000 head beef, greater than 700 head dairy) facility ² (4,398 ft long x 6 ft wide x 3 ft tall and \$2.43/cubic yard of soil) would be \$9,351. Engineering cost: includes design, application, installation and specifications, would be approximately 20% of impoundment/berm construction costs ⁴ . Total cost estimate for engineering costs for the above example would be \$33,870.
FMP – Implementing surface water protection elements – Land Application Sites	Non-permitted CAFOs. Costs will be borne unequally between facilities, depending on land application practices or plans (e.g., Comprehensive Nutrient Management Plan) currently in place.	1. Citizens of the state that have an interest in protection of surface water quality. 2. State of Colorado – protection of the state's natural resources.	For CAFOs with land application sites, cost estimate is \$3.00 - \$4.00/acre for nutrient management plan (NMP) development; annual maintenance cost estimate would be \$1.00/acre; Sampling cost – soils \$1.50/acre (2 ft. sample), effluent/manure – time/effort \$100/hour for 1 hour - \$100; Analysis Costs – soils \$40/field, effluent \$50/sample, manure \$25/sample ⁴ . For CAFOs without land application sites, \$100/hour and 3 hours, cost estimate would be \$300 for NMP development.
Additional Requirements (81.7)	Non-permitted CAFOs. Costs will be associated with the recordkeeping and discharge reporting requirements.	1. Citizens of the state that have an interest in protection of surface water quality. 2. State of Colorado – protection of the state's natural resources.	Time/effort; Based on \$100/hour and 2 hours, cost estimate would be \$200 ⁵

PROPOSED REGULATORY CHANGE	CLASSES THAT WILL BEAR THE COST	CLASSES THAT WILL BENEFIT	QUANTITATIVE IMPACT OF THE PROPOSED CHANGES
Ground Water Protection: liner certification available prior to wastewater entering the impoundment, instead of 30 days prior to wastewater entering the impoundment.	CAFOs that construct a new impoundment on or after June 30, 2004 and before February 27, 2009. No additional cost is expected; certifications were previously required by Regulation No. 81	The same class that will bear the cost. The change should result in less cost as the result of having 30 days more to complete the certification and 30 days less time of not having use of the new impoundment.	Where CAFOs need to install an impoundment liner: 40 mil HDPE - \$25,000/acre of pond surface; clay 18" thick - \$15,000/acre of pond surface (including over-excavation). Engineering costs (includes design, application, installation and specifications) would be approximately 20% of impoundment liner construction costs ⁴
Ground Water Protection: Have seepage rate calculations available.	CAFOs that construct a new impoundment on or after February 27, 2009. The cost should be minimal as seepage rate calculations were previously required, but not required to be available.	The Program and citizens will have complete information regarding how seepage rate was calculated.	No additional cost to make available. Calculations needed to be done prior to the proposed changes.
Ground Water Protection: submit liner certifications to the Program.	CAFOs that construct a new impoundment after February 1, 2007.	The Program and citizens will have information regarding if impoundments meet the seepage rate.	Time/effort + postage; Based on \$100/hour and 0.25 hours, cost estimate would be \$25 ⁵
Ground Water Protection: Submit for approval a revised Standard Operating Procedure (SOP).	CAFOs that revise their SOP.	The Program and citizens will be provided reasonable assurance that the seepage standard for impoundments is being maintained.	Time/effort + postage; Based on \$100/hour and 0.25 hours, cost estimate would be \$25 ⁵
Ground Water Protection: Drain, clean, certify, and repair concrete impoundments every 5 years.	CAFOs that do not do a certification for each event of manure removal from a concrete impoundment.	1. The same class that will bear the cost. The change provides the class an option that could result in less cost versus doing a certification multiple times per day or week for manure removal. 2. The Program and citizens will be provided reasonable assurance that the seepage standard for concrete impoundments is being monitored and maintained.	For CAFOs that have concrete impoundments and do not do a certification for each removal event: Time/effort every 5 years (based on \$100/hour and 16 hours), cost estimate would be \$1,600 ⁵
Ground Water Protection: Revised liner setbacks for all new and expanded impoundments, in addition to impoundments at new source facilities.	CAFOs that construct a new or expanded impoundment after June 30, 2008.	1. The same class that will bear the cost. The change expands the locations for where new impoundments can be placed; e.g., the prohibition was removed of constructing an impoundment where ground water is located within 20 feet of the soil surface. 2. The Program and citizens will benefit from the added language requiring that liners be protected from ground water that will exist within 4 feet of the liner. 3. State of Colorado – protection of the state's natural resources.	Where a CAFO chooses to install an impoundment within 4 feet of the seasonally high ground water level, cost estimate would be \$2,000 - \$8,000 per impoundment, varies depending upon size of pond and grade of site (gravity flow vs. a pump needed for dewatering). ⁴

PROPOSED REGULATORY CHANGE	CLASSES THAT WILL BEAR THE COST	CLASSES THAT WILL BENEFIT	QUANTITATIVE IMPACT OF THE PROPOSED CHANGES
Ground Water Protection: Ground water remediation	CAFOs determined by the Division to have caused or contributed to the exceedance of ground water quality standards.	1. Citizens will benefit from clean up of ground water contaminated by a CAFO. 2. State of Colorado – protection of the state’s natural resources.	Costs will be incurred only where an operator has not complied with the regulation. Investigation Plan - \$22,000 ⁶ ; will vary depending on contamination, ground water characteristics, etc. Remediation Plan - \$8,000 ⁶ ; will vary depending on contamination, ground water characteristics, etc. Remediation - The cost will vary depending on contamination extent, ground water characteristics, costs of treatment options, depth of ground water, etc. Remediation options include: pump and treat, permeable reactive barriers, in-situ bioremediation. Pump and treat can cost about \$10.00 to \$60.00 per 3,780 liters treated. In-situ bioremediation can cost can be \$1.50 per 3,780 liters treated. ³
Ground Water Protection: Having impoundment closure standards apply to any closed impoundment, not just those at a closed facility.	CAFOs that close an impoundment.	1. The same class that will bear the cost. While the change expands the universe of impoundments subject to closure standards, the language allows for flexibility in how closure is accomplished. 2. Citizens will be provided added assurance that ground water will be protected by properly closed impoundments. 3. State of Colorado – protection of the state’s natural resources.	Where a CAFO has to close an existing impoundment, costs will vary depending upon closure method and size of impoundment. Example: 1 ac-ft pond with solids/wastewater removed, 2,000 cubic yards of soil to fill-in, \$2.00/cubic yard of soil, cost estimate would be \$4,000 to close this pond. ⁴
<i>Animal Feeding Operation (AFO) section (81.9)</i>			
Limiting evaporative impoundments to process-generated wastewater	N/A	1. Fewer AFOs would be subject to evaporative impoundments. Estimated number cannot be determined. 2. Some surface water rights owners: stormwater runoff will not be retained and evaporated.	Less cost since stormwater runoff will no longer be subject to evaporation.

PROPOSED REGULATORY CHANGE	CLASSES THAT WILL BEAR THE COST	CLASSES THAT WILL BENEFIT	QUANTITATIVE IMPACT OF THE PROPOSED CHANGES
Medium AFOs have an impoundment(s) that stores process-generated wastewater for 180 days	Medium AFOs that are required to install such an impoundment(s) as a BMP.	1. Some citizens/neighbors would benefit from reduction of discharges. 2. State of Colorado – protection of the state’s natural resources.	Where an AFO chooses or Program requires this BMP option - varies depending upon type and size of operation. Example #1 - feedlot with 600 cattle, 200 sq. ft/head of space, 200 animals/acre, ½ gallon water/animal/day, 0.34 ac-ft/acre runoff from 25- year 24-hour storm. Impoundment cost: would need 1.2 ac-ft pond, \$2.00/cubic yard of cut, cost estimate would be \$4,800 (or \$1,600/acre of drainage area). Engineering costs: includes design, application, installation and specifications, would be approximately 20% of impoundment construction costs ⁴ . Total cost estimate for engineering costs for the above example would be \$960. Example #2 – dairy with 300 mature dairy cows, 75 cows/acre, 36 gallons water/cow/day, 0.83 ac-ft/acre treatment, 0.34 ac-ft/acre runoff from 25-year 24-hour storm. Impoundment cost: would need 10.68 ac-ft pond, \$2.00/cubic yard of cut, cost estimate would be \$42,720 (or \$10,680/acre of drainage area). Engineering costs: includes design, application, installation and specifications, would be approximately 20% of impoundment construction costs ⁴ , total cost estimate for engineering costs for the above example would be \$8,544.
Medium AFOs have an impoundment(s) that stores process-generated wastewater for 120 days	Medium AFOs that are required to install such an impoundment(s) as a BMP.	1. Some citizens/neighbors would benefit from reduction of discharges. 2. State of Colorado – protection of the state’s natural resources.	Where an AFO chooses or Program requires this BMP option - varies depending upon type and size of operation. Example #1 – feedlot with 600 cattle, 200 sq. ft/head of space, 200 animals/acre, ½ gallon water/animal/day, 0.34 ac-ft/acre runoff from 25- year 24-hour storm. Impoundment cost: would need 1.14 ac-ft pond, \$2.00/cubic yard of cut, cost estimate would be \$4,560 (or \$1,520/acre of drainage area). Engineering costs: includes design, application, installation and specifications, would be approximately 20% of impoundment construction costs ⁴ . Total cost estimate for engineering costs for the above example would be \$1,326. Example #2 – dairy with 300 mature dairy cows, 75 cows/acre, 36 gallons water/cow/day, 0.83 ac-ft/acre treatment, 0.34 acft/acre runoff from 25-year 24-hour storm. Impoundment cost: would need 8.64 ac-ft pond, \$2.00/cubic yard of cut, cost estimate would be \$34,560 (or \$8,640/acre of drainage area). Engineering costs: includes design, application, installation and specifications, would be approximately 20% of impoundment construction costs ⁴ . Total cost estimate for engineering costs for the above example would be \$6,912.

PROPOSED REGULATORY CHANGE	CLASSES THAT WILL BEAR THE COST	CLASSES THAT WILL BENEFIT	QUANTITATIVE IMPACT OF THE PROPOSED CHANGES
Keep records that wastewater and manure was applied at an agronomic rate.	AFOs that land apply to a land application site.	1. Some citizens/neighbors/complainants would benefit from having evidence of whether applications are at an agronomic rate. Could be used, for example, as evidence that state waters are being protected. 2. The Program will have the same benefit.	Where an AFO applies manure/wastewater - Time/effort; Based on \$100/hour and 2 hours, cost estimate would be \$200 ⁵
Treat wastewater	AFOs that are required to treat wastewater as a BMP.	1. AFOs that can use this method to manage wastewater instead of installing and maintaining an impoundment(s), which typically is more expensive. 2. Some citizens: reduced risk of pollutant seepage to ground water versus an impoundment(s)	Where an AFO chooses to use a wastewater treatment strip - \$6.00/head including survey, design, installation, settling basins, upkeep ⁴
No direct access to surface water; use stock watering point if necessary	AFOs that currently allow access of animals to surface water	1. Some citizens and entities that use surface water downstream from an AFO that allows access of animals to the water. Uses include recreation and drinking water. 2. AFOs that can use a stock watering point(s), where necessary, to water its animals, instead of having to move the facility.	Where an AFO does not have access to any other source of drinking water – general cost estimate would be \$8,000, including installation of fence and hard surface at stock watering point ⁴
Manage mortalities to prevent a discharge to surface water	All AFOs	1. Some citizens and entities that use surface water downstream from an AFO. 2. State of Colorado – protection of the state's natural resources for multi-use purposes such as recreation and drinking water.	Varies depending upon management method; Example: 10 ft x 10 ft bermed area that is 3 ft tall, dirt berm cost is \$2.43/cubic yard ² , cost estimate would be \$36.00
Avoid applications of manure on saturated soils and lands subject to excessive erosion	AFOs that encounter these conditions.	Some citizens and entities that would be affected by runoff from land application sites having these conditions.	Inconvenience of not applying/finding other land application sites
Medium AFOs line impoundments to seep not more than 1×10^{-6} cm/sec	All Medium AFOs. An estimated number cannot be determined.	1. Citizens of the state that have an interest in protection of ground water quality. 2. State of Colorado – protection of the state's natural resources.	40 mil HDPE - \$25,000/acre of pond surface; clay 18" thick - \$15,000/acre of pond surface (including over-excavation). Engineering costs (includes design, application, installation and specifications) would be approximately 20% of impoundment liner construction costs ⁴

¹ U.S. Environmental Protection Agency. February 2008. *Concentrated Animal Feeding Operations National Pollutant Discharge Elimination System Permitting Implementation Information Package*. Office of Water, Washington, D.C.

² U.S. Environmental Protection Agency. January 2001. *Cost Methodology report for beef and dairy animal feeding operations*. Office of Water, Washington D.C. EPA-821-R-01-019.

³ "Emerging Technologies for Enhanced In Situ Biotransformation (EISBD) of Nitrate-Contaminated Ground Water." (2000) Interstate Technology and Regulatory Cooperation Work Group - Enhanced In Situ Biotransformation Work Team

⁴ In an effort to derive reasonable, relevant costs, this cost was derived via personal communication with persons that the Program believes to be knowledgeable experts for this activity/structure.

⁵ Program estimate based on reasonable hourly rate for a consultant or business owner.

⁶ Water Quality Control Division best professional judgment.

Table 2. A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction.

Proposed Regulatory Change	Probable Cost of Inaction	Probable Benefit of Inaction
Designation of an AFO as a CAFO section (81.4)	An AFO would not be provided the option of complying with the CAFO provisions of Regulation No. 81, instead of applying for a permit.	An AFO at risk of being designated as a CAFO may be required to apply for a permit.
Non-permitted CAFOs register with Program (section 81.5)	1. The universe of non-permitted CAFOs may not be known. As a result, it may not be possible to ensure that all such CAFOs are complying with Regulation No. 81. Also, in the event of a discharge, the Program may not be able to respond quickly and not know who to contact.	Non-permitted CAFOs will not need to register.
Facility Management Plan (FMP) (section 81.6)	1. Discharge of manure or wastewater from CAFOs into surface water will not likely be reasonably prevented, in opposition to the “Statement of Basis, Specific Statutory Authority, and Purpose” for the 1992 revisions of Regulation No. 81 2. Manure and wastewater may not be retained and utilized beneficially on agriculture land, in opposition to the “Statement of Basis, Specific Statutory Authority, and Purpose” for the 1992 revisions of Regulation No. 81	Non-permitted CAFOs will not need to fund the cost of meeting the production area and land application standards specified by the proposed changes.
Non-permitted CAFOs: additional requirements	1. Facilities will be allowed to discharge to surface waters of the state that are not also waters of the U.S., which could result in impairment of water quality. 2. Facilities will not be provided the agricultural storm water discharge exemption. 3. A discharge may not be required to be reported to the Program.	1. Facilities will not be required to keep and maintain the records specified by the proposed rule changes. 2. Facilities will not be required to report a discharge, thereby possibly avoiding getting a permit or other regulatory consequences. 3. Facilities could benefit economically by being able to apply wastewater or manure to surface waters of the state that are not also waters of the U.S.

Proposed Regulatory Change	Probable Cost of Inaction	Probable Benefit of Inaction
CAFOs: ground water protection provisions (section 81.8)	<ol style="list-style-type: none"> 1. Ground water contaminated by a CAFO may not be remediated. 2. Liners for new impoundments at existing facilities may not be protected from hydrostatic pressure from nearby ground water, resulting in increased risk to ground water quality. 3. All impoundments may not be properly closed, resulting in increased ground water quality risk. 	<ol style="list-style-type: none"> 1. The Program will not need to ask facilities to self-certify that they have liner certifications. 2. Facilities may not need to submit revised manure removal SOPs. 3. No increase in costs to facilities to comply with the proposed rule changes.
Animal Feeding Operation section (81.9)	<ol style="list-style-type: none"> 1. Facilities will have fewer BMP options to use. 2. Facilities that retain and evaporate storm water runoff may cause material injury to state surface water rights. 3. Evidence may not exist verifying that manure or wastewater has been applied at an agronomic rate. Such evidence is important towards ensuring protection of waters of the state from pollutants. 4. Surface waters may not be protected from improper management of mortalities. 5. Ground water may be at an increased risk from impoundments at medium-sized facilities being properly lined. 	<ol style="list-style-type: none"> 1. Some facilities will not have the additional cost of complying with some of the proposed rule changes.

Appendix B

Responses to Mr. Nelson Questions that are not Associated with the Regulatory Analysis of the Proposed Changes to Regulation No. 81

On February 21, 2008, the Environmental Agriculture Program (Program) received from Mr. Nels Nelson via electronic mail a request for a regulatory analysis of currently proposed changes to Regulation No. 81. The request included numerous questions that are not associated with information required to be included in a regulatory analysis, pursuant to subsection 21.3.J of the Colorado Water Quality Control Commission's (Commission) Procedural Rules (Regulation No. 21, 5 CCR 1002-21).

Upon review of the questions that are not associated with a regulatory analysis pursuant to subsection 21.3.J, the Program grouped the questions into the following categories:

- A. Questions for which information is included in the proposed Statement of Basis, Specific Authority and Purpose (SBP) provided in EAP Exhibit 1 submitted to the Commission on February 5, 2008. For these questions, the Program refers Mr. Nelson to the SBP. For example, the SBP addresses the purpose and intent of the proposed changes.
 - B. Questions for which information is not practicably or reasonably available to the Program and, therefore, are not able to reasonably be answered by the Program. An example of such a question is: "The expected quality of the surface water and ground water with this regulation compared to the baseline water quality that existed prior to any regulation, and a comparison to that quality that would occur if no regulation took place."
 - C. Questions for which information is practicably and reasonably available to the Program. Responses to these questions are provided below.
- 1. Question: The other purposes that the registration information may serve.
Response: No other purposes are planned at this time. Another purpose(s) for the information may be found in the future, but specifics are not known at this time.
 - 2. Question: The current and alternative sources of information required for a CAFO registration.
Response: Regarding public sources, the current and alternative sources are Program files/spreadsheets, counties, trade publications, some maps.
 - 3. Question: The number of AFOs, small CAFOs, Medium CAFOs, and Large CAFOs that will be subject to the proposed changes.
Response: The same number of AFOs will be subject to the proposed changes in section 81.9 as to the current regulation. The number of AFOs in the state is estimated to be over 10,000. There are no known Small or Medium CAFOs in the

state. Approximately 160 non-permitted CAFOs are in the state, which will be subject to proposed sections 81.5, 81.6, and 81.7. All CAFOs (about 200) will be subject to the proposed ground water protection provisions in 81.8.

4. Question: The number of producers who currently operate with or without a FMP.
Response: As the FMP is newly proposed, no non-permitted CAFO is likely operating with a FMP.
5. Question: The expected pollutants that will be regulated by the proposed changes.
Response: Biological nutrient, biological material, and agricultural waste. These elements are defined as pollutants by the Colorado Water Quality Control Act (Act).
6. Question: The expected sources of funds to be used in the implementation of this regulation, outlining the grants, loans, and other assistance that the Department, Commission, or Division expects to be available.
Response: The Program assumes that this question is in reference to nonpoint sources of pollution as addressed in section 25-8-205(5), C.R.S. of the Act. This section of the Act provides, in part, that “control regulations related to agricultural practices [for “nonpoint source dischargers”] shall be promulgated [by the Commission] only if incentive, grant and cooperative programs are determined by the Commission to be inadequate and such regulations are necessary to meet state law of the federal act.”

The Commission previously addressed this statutory section by including the following language in the SBP for the Regulation No. 81 provisions adopted in 1992 (section 81.15 of the regulation):

...no grant or incentive programs are currently in place to address the water quality impacts which may be associated with confined animal feeding operations. The Commission heard testimony from the Colorado Cattle Feeders Association, to the effect that efforts are under way to develop a program which would offer technical assistance to its membership. The Commission feels that while such program, if developed may prove to be of valuable assistance to the Division in furtherance of the purposes of the amended regulation, such program alone would be inadequate to achieve the regulation's purposes. Given the limited scope of the program and the nature of the regulation and sources affected, the Commission has determined that the self-implementing regulations, as adopted, is the appropriate means to address potential impacts from confined animal feeding operations.

As an update, the Colorado Livestock Association has sponsored the “AFO Program”, which has the goal of “Improving or protecting water quality by installing best management practices at AFOs.” This program has been funded by a Clean Water Act “319 funds” grant; which is projected to expire at the end of 2008.

The United States Department of Agriculture – Natural Resources Conservation Service administers the Environmental Quality Incentives Program (EQIP), which can provide up to \$450,000 of cost-share funds per AFO, regardless of size. An application/qualification process needs to be accomplished.

7. Question: The expected costs for ground water monitoring.
Response: As clarification, ground water monitoring is not a proposed change for Regulation No. 81. Typical costs for a ground water monitoring system are provided in EPA publication EPA-821-R-01-019 (“Cost Methodology Report for Beef and Dairy Animal Feeding Operations”). The full citation for this publication is part of the regulatory analysis.
8. Question: What will be expected as a show of “good faith” for an operator to be granted an extension time for a ground water remediation deadline.
Response: A show of “good faith” will be evaluated by the Program on a case by case basis using best professional judgment, and will include consideration of the reasons for the deadline extension request, the progress made to date, and the proposed new deadline.
9. Question: The probable impacts to revenue of the State.
Response: It is not known whether an increase in the amount of civil penalties will result from the proposed changes. Civil penalties can result from a violation(s) of Regulation No. 81 and penalties for violations after May 26, 2006 are deposited into the Water Quality Improvement Fund. In 2006 the Colorado General Assembly created the Water Quality Improvement Fund (WQIF) codified in section 25-8-608, C.R.S., of the Colorado Water Quality Control Act (Act). The purpose of the WQIF is to improve water quality in Colorado by providing grant funds for water quality improvement projects using civil penalties from water quality violations. The Water Quality Control Commission (Commission) adopted the WQIF Rules (5 CCR 1002-55) in May 2007. The Rules provide for the eligibility and prioritization criteria that will be used to award grants from the WQIF. Funding is dependent upon annual appropriations of the Colorado General Assembly and is based on violations that were committed on or after May 26, 2006 and penalties paid into the fund as of July 1, 2007.
10. Question: The costs that each citizen of the State of Colorado will bear.
Response: It is not anticipated that costs will be incurred by citizens other than those identified in the regulatory analysis.