

## GROUNDWATER QUALITY MANAGEMENT CONTROLS

The following controls shall be utilized in the appropriate phase areas in order to manage those activities having an effect on groundwater quality.

### **1. PHASE I AREAS:**

Average nitrate level between 0 and 7.5 ppm and no municipal supply potentially adversely impacted, and no vadose zone nitrates that indicate strong potential for future groundwater quality problems. The following controls shall be utilized in the Phase I areas on fields growing corn, sorghum or potatoes, unless otherwise noted.

- 1.1 Fall and winter applications of commercial nitrogen fertilizer shall be banned on sandy soils
- 1.2 Fall and winter applications of commercial nitrogen fertilizer on non-sandy soils permitted only after November 1.

### **2. PHASE II AREAS:**

Average nitrate level between 7.6 and 15.0 ppm or areas with a municipal supply within a sub-region that is potentially impacted, or areas where vadose zone nitrates indicate strong potential for future groundwater quality problems. The following controls shall be utilized in the Phase II areas on fields growing corn, sorghum or potatoes, unless otherwise noted. Because the NRDs do not have the authority to regulate surface water, surface water irrigators are not required to take water samples or monitor water applications.

- 2.1 Fall and winter applications of commercial nitrogen fertilizer are banned on all soils until after March 1 of each year.
- 2.2 An annual analysis of groundwater from each irrigation well for nitrate/nitrogen levels in parts per million (ppm) with the analysis to be made by a laboratory utilizing EPA approved methods.
- 2.3 An annual deep soils analysis for residual nitrate/nitrogen on each field or 80 acre tract, whichever is smaller, with the analysis to be conducted by a laboratory participating in the University of Nebraska Soil Testing Program. Each composite sample tested must consist of a mixture from no less than one three-foot probe every five acres.
- 2.4 If manure or sludge is used, a credit for the nitrogen in the manure or sludge must be used in the calculation for the nitrogen recommendation. A laboratory analysis must be conducted for each source of manure or sludge and attached to the report form.
- 2.5 A credit for previous year's crop if the previous year was in a legume crop (beans, alfalfa, etc.) must be used in the calculation for the nitrogen recommendation for corn and sorghum.
- 2.6 Certification by a district developed or approved educational program designed to acquaint landowners and operators with best management practices in the operation of their irrigation and cropping systems, with certification good for a period of 4 years.
- 2.7 In order for the operator to better manage fertilizer applications and control leaching of nutrients below the root zone, continuous monitoring of the inches of groundwater applied per acre on each field shall be required. No groundwater shall be withdrawn from any well located within a Phase II Water Quality Management Area for irrigation use on land growing crops not exempted from the Management Program prior to having in place and operational, an approved method of continuous monitoring. Approved methods of continuous monitoring shall include:

- 2.7.1 Request and obtaining certification, from the District, of the well's pumping capacity, and either
  - 2.7.1.1 Utilize the meter on electric pumps, or
  - 2.7.1.2 Install an approved hour meter, in order to continuously measure the length of time the well operates during each year, or
- 2.7.2 Installation of an approved flow meter in order to continuously measure the quantity of groundwater pumped during each year. Any well withdrawing irrigation water for use on land growing corn, sorghum or potatoes which does not have in place and operational, an approved method of continuous monitoring (Method 2.7.1 or Method 2.7.2 above) shall be in violation and deemed to be an illegal well.
- 2.8. Where Method 2.7.1 is selected as the method of continuously monitoring the well, and where it is necessary to install an hour meter, the hour meter installed on any such well within the Management Area must
  - 2.8.1 be of a type approved by the Board, and
  - 2.8.2 be mounted off the power unit. The District will maintain a list of hour meters which are known to meet District approval.
  - 2.8.3 All groundwater users shall within 30 days of the installation of a new or different hour meter on any well located within the Management Area, certify such installation on a form supplied by the District,
  - 2.8.4 The District staff may periodically check hour meters on a random basis for proper operation.
  - 2.8.5 When hour meters are removed for servicing or replacement, records of the hour meter reading shall be kept. Meters may be removed for off season storage.
  - 2.8.6 Any malfunctioning hour meter must be repaired or replaced within 72 hours after discovery.
- 2.9. Wherever Method 2.7.1 is not selected as the method of continuously monitoring the well, then Method 2.7.2 shall be required. Any flow meter installed on any such well within the Management Area must (1) meet the specifications for flow meters adopted by the Board (attached hereto as Appendix A and incorporated herein by reference) and (2) be installed according to the manufacturer's specifications. Flow meters installed before the specifications are adopted by the Board which do not comply with such specifications shall be inspected by a representative of the District and approved for use by the District if such meters are accurate. The District will maintain a list of flow meters which are known to meet District specifications.
  - 2.9.1 All groundwater users shall within 30 days of the installation of a new or different flow meter on any well located within the Management Area certify such installation on a form supplied by the District.
  - 2.9.2 The District staff shall periodically check flow meters on a random basis for readings and proper operation.
  - 2.9.3 When flow meters are removed for servicing or replacement, records of the flow meter reading shall be kept. Meters may be removed for off season storage.
  - 2.9.4 Any malfunctioning flow meter must be repaired or replaced within 96 hours after discovery.
- 2.10. Submission by each operator on or before March **31** of an annual report to the District on forms furnished by or approved by the District showing the following data for the upcoming year:
  - 2.10.1 All crops must be reported, which would include corn, sorghum, potatoes, beans, alfalfa, small grains, and any other commodity crop.
  - 2.10.2 The legal description, type of irrigation system, and number of wells if greater than 1 well, total unregulated crop acres and crop to be planted.

- 2.10.3 Crops other than corn, sorghum or potatoes do not require soil and water tests.
- 2.10.4 In addition to the above requirements, the report shall also include the following requirements for corn, sorghum and potatoes:
- 2.10.5 The number of acres in corn, sorghum and/or potatoes and the number of field acres irrigated.
- 2.10.6 The results of the groundwater nitrate/nitrogen analysis in ppm for each well, with each well identified by legal location to the nearest 10 acre tract,
- 2.10.7 The results of the residual nitrate/nitrogen deep soils analysis on each field or 80 acre tract, whichever is less, identified by locations using legal description and showing the irrigation well(s) identified in ~~(b)~~ 2.10.2 above used to irrigate that field,
- 2.10.8 Credit for legume crop (beans, alfalfa, etc) and/or manure or sludge applied.
- 2.10.9 The crop to be grown and the per acre expected yield used as the basis for determining nitrogen needs on each field,
- 2.10.10 The recommended commercial nitrogen fertilizer application rate utilizing the University of Nebraska's formula for commercial nitrogen fertilizer recommendations, and
- 2.11.. Submission by each operator on the same annual report to the District due March 31 showing the following data for corn, sorghum, and potatoes for the previous crop year:
  - 2.11.1 the actual commercial nitrogen fertilizer applied per acre on each field, the timing of the application(s), and if an inhibitor was used,
  - 2.11.2 the actual inches of groundwater applied per acre on each field,
  - 2.11.3 the actual yield achieved per acre on each field, and
  - 2.11.4 certification by the operator.

### **3. PHASE III AREAS:**

Average nitrate level 15.1 or greater ppm or areas with a municipal supply within a sub-region that is potentially impacted, or areas where vadose zone nitrates indicate strong potential for future groundwater quality problems. The following controls shall be utilized in the Phase III areas on fields growing corn, sorghum or potatoes, unless otherwise noted. Because the NRDs do not have the authority to regulate surface water, surface water irrigators are not required to take water samples or monitor water applications.

- 3.1. Fall and winter applications of commercial nitrogen fertilizer are banned on all soils until after March 1 of each year.
- 3.2. Spring applications (after March 1) of commercial nitrogen fertilizer shall be either:
  - 3.2.1 applied in split (pre-plant or pre-emergent/post-emergent) applications with no more than 50% applied as pre-plant or pre-emergent, or
  - 3.2.2 applied with a District approved inhibitor at the manufacture's recommended rate, if more than 50% is applied as pre-plant or pre-emergent, and operators shall be required to furnish certification from dealer that inhibitor was used and at recommended rate, unless the total pre-plant application is 80 pounds per acre of actual nitrogen or less, in which case the 50 percent rule above would not apply, or;
  - 3.2.3 all applied as side dress post-emergent.
- 3.3. An annual analysis of groundwater from each irrigation well for nitrate/nitrogen levels in parts per million (ppm) with the analysis to be made by a laboratory utilizing EPA approved methods.

- 3.4. An annual deep soils analysis for residual nitrate/nitrogen on each field or 80 acre tract, whichever is smaller, with the analysis to be conducted by a laboratory participating in the University of Nebraska Soil Testing Program. Each composite sample tested must consist of a mixture from no less than one three-foot probe every five acres.
- 3.5. If manure or sludge is used, a credit for the nitrogen in the manure or sludge must be used in the calculation for the nitrogen recommendation. A laboratory analysis must be conducted for each source of manure or sludge and attached to the report form.
- 3.6. A credit for previous year's crop if the previous year was in a legume crop (beans, alfalfa, etc.) must be used in the calculation for the nitrogen recommendation for corn and sorghum.
- 3.7. Certification by a district developed or approved educational program designed to acquaint landowners and operators with best management practices in the operation of their irrigation and cropping systems, with certification good for a period of 4 years.
- 3.8. In order for the operator to better manage fertilizer applications and control leaching of nutrients below the root zone, continuous monitoring of the inches of groundwater applied per acre on each field shall be required. No groundwater shall be withdrawn from any well located within a Phase III Water Quality Management Area for irrigation use on land growing crops not exempted from the Management Program prior to having in place and operational, an approved method of continuous monitoring. Approved methods of continuous monitoring shall include:
  - 3.8.1 Request and obtaining certification, from the District, of the well's pumping capacity, and either:
    - 3.8.1.1 Utilize the meter on electric pumps, or
    - 3.8.1.2 Install an approved hour meter, in order to continuously measure the length of time the well operates during each year, or
  - 3.8.2 Installation of an approved flow meter in order to continuously measure the quantity of water pumped during each year. Any well withdrawing irrigation water for use on land growing corn, sorghum or potatoes which does not have in place and operational, an approved method of continuous monitoring (Method 3.8.1 or Method 3.8.2 above) shall be in violation and deemed to be an illegal well.
- 3.9. Where Method A (8. above) is selected as the method of continuously monitoring the well, and where it is necessary to install an hour meter, the hour meter installed on any such well within the Management Area must (1) be of a type approved by the Board, and (2) be mounted off the power unit. The District will maintain a list of hour meters which are known to meet District approval.
  - 3.9.1 All groundwater users shall within 30 days of the installation of a new or different hour meter on any well located within the Management Area, certify such installation on a form supplied by the District,
  - 3.9.2 The District staff may periodically check hour meters on a random basis for proper operation.
  - 3.9.3. When hour meters are removed for servicing or replacement, records of the hour meter reading shall be kept. Meters may be removed for off season storage.
  - 3.9.4 Any malfunctioning hour meter must be repaired or replaced within 72 hours after discovery.
- 3.10. Wherever Method 3.8.1 is not selected as the method of continuously monitoring the well, then Method 3.8.2 above shall be required. Any flow meter installed on any such well within the Management Area must (1) meet the specifications for flow meters adopted by the Board (attached Hereto as Appendix A and incorporated herein by reference) and (2) be installed according to the manufacturer's specifications. Flow meters installed before the specifications are adopted by the Board which do not comply

with such specifications shall be inspected by a representative of the District and approved for use by the District if such meters are accurate. The District will maintain a list of flow meters which are known to meet District specifications.

- 3.10.1 All groundwater users shall within 30 days of the installation of a new or different flow meter on any well located within the Management Area certify such installation on a form supplied by the District.
- 3.10.2 The District staff shall periodically check flow meters on a random basis for readings and proper operation.
- 3.10.3 When flow meters are removed for servicing or replacement, records of the flow meter reading shall be kept. Meters may be removed for off season storage.
- 3.10.4 Any malfunctioning flow meter must be repaired or replaced within 96 hours after discovery.
- 3.11. Submission by each operator on or before March **31** of an annual report to the District on forms furnished by or approved by the District showing the following data for the upcoming year:
  - 3.11.1 All crops must be reported, which would include corn, sorghum, potatoes, beans, alfalfa, small grains, and any other commodity crop.
  - 3.11.2 The legal description, type of irrigation system, and number of wells if greater than 1 well, total unregulated crop acres and crop to be planted.
  - 3.11.3 Crops other than corn, sorghum or potatoes do not require soil and water tests.
  - 3.11.4 In addition to the above requirements, the report shall also include the following requirements for corn, sorghum and potatoes:
  - 3.11.5 The number of acres in corn, sorghum and/or potatoes and the number of field acres irrigated.
  - 3.11.6 The results of the groundwater nitrate/nitrogen analysis in ppm for each well, with each well identified by legal location to the nearest 10 acre tract,
  - 3.11.7 The results of the residual nitrate/nitrogen deep soils analysis on each field or 80 acre tract, whichever is less, identified by locations using legal description and showing the irrigation well(s) identified in ~~(b)~~ 3.11.2 above used to irrigate that field,
  - 3.11.8 Credit for legume crop (beans, alfalfa, etc) and/or manure or sludge applied.
  - 3.11.9 The crop to be grown and the per acre expected yield used as the basis for determining nitrogen needs on each field,
  - 3.11.10 The recommended commercial nitrogen fertilizer application rate utilizing the District's University of Nebraska's formula for commercial nitrogen fertilizer recommendations, and
- 3.12. Submission by each operator on the same annual report to the District due March 31 showing the following data for corn, sorghum, and potatoes for the previous crop year:
  - 3.12.1 the actual commercial nitrogen fertilizer applied per acre on each field, the timing of the application(s), and if an inhibitor was used,
  - 3.12.2 the actual inches of groundwater applied per acre on each field,
  - 3.12.3 the actual yield achieved per acre on each field, and
  - 3.12.4 certification by the operator.

#### **4. PHASE IV AREAS:**

Areas where nitrate levels are not declining at an acceptable rate as determined by the Board of Directors. A determination will be made by reviewing the running 5-year average of a well or set of wells; the severity of the level; and the anticipated time that would be required to reach a level

of 10 ppm. The nitrogen levels would be established by the District using the source well and adjacent wells relevant to the groundwater movement. The following controls shall be utilized in the Phase IV areas on fields growing corn, sorghum or potatoes, unless otherwise noted. Because the NRDs do not have the authority to regulate surface water, surface water irrigators are not required to take water samples or monitor water applications.

- 4.1. Fall and winter applications of commercial nitrogen fertilizer are banned on all soils until after March 1 of each year.
- 4.2. Spring applications (after March 1) of commercial nitrogen fertilizer on cropland growing corn and sorghum shall be either:
  - 4.2.1 applied in split (pre-plant or pre-emergent/post-emergent) applications with no more than 50% applied as pre-plant or pre-emergent, or
  - 4.2.2 applied with a District approved inhibitor at the manufacture's recommended rate, if more than 50% is applied as pre-plant or pre-emergent, and operators shall be required to furnish certification from dealer that inhibitor was used and at recommended rate, unless the total pre-plant application is 80 pounds per acre of actual nitrogen or less, in which case the 50 percent rule above would not apply, or;
  - 4.2.3 all applied as side dress post-emergent.
- 4.3. An annual analysis of groundwater from each irrigation well for nitrate/nitrogen levels in parts per million (ppm) with the analysis to be made by a laboratory utilizing EPA approved methods.
- 4.4. An annual deep soils analysis for residual nitrate/nitrogen on each field or 80 acre tract, whichever is smaller, with the analysis to be conducted by a laboratory participating in the University of Nebraska Soil Testing Program. Each composite sample tested must consist of a mixture from no less than one three-foot probe every five acres.
- 4.5. If manure or sludge is used as a supplement, or in place of, commercial fertilizer, a credit for the nitrogen in the manure or sludge must be used in the calculation for the nitrogen recommendation. A laboratory analysis must be conducted for each source of manure or sludge and attached to the report form.
- 4.6. A credit for previous year's crop if the previous year was in a legume crop (beans, alfalfa, etc.) must be used in the calculation for the nitrogen recommendation for corn and sorghum.
- 4.7. The expected yield will be set by the District using the last 5 year average of regulated crop plus five percent.
- 4.8. Nitrogen applications must not exceed the District's recommendations. A copy of a fertilizer receipt showing the amount of fertilizer purchased for the regulated fields will be submitted to the District with the annual report.
- 4.9. Certification by a district developed or approved educational program designed to acquaint landowners and operators with best management practices in the operation of their irrigation and cropping systems, with certification good for a period of 4 years.
- 4.10. In order for the operator to better manage fertilizer applications and control leaching of nutrients below the root zone, continuous monitoring of the inches of groundwater applied per acre on each field shall be required. No groundwater shall be withdrawn from any well located within a Phase IV Water Quality Management Area for irrigation use on land growing crops not exempted from the Management Program prior to having in place and operational, an approved method of continuous monitoring. Approved methods of continuous monitoring shall include:
  - 4.10.1 Request and obtaining certification, from the District, of the well's pumping capacity, and either:
    - 4.10.1.1 Utilize the meter on electric pumps, or

- 4.10.1.2 Install an approved hour meter, in order to continuously measure the length of time the well operates during each year, or
- 4.10.2 Installation of an approved flow meter in order to continuously measure the quantity of water pumped during each year. Any well withdrawing irrigation water for use on land growing corn, sorghum or potatoes which does not have in place and operational, an approved method of continuous monitoring (Method 1.10.1 or Method 4.10.2 above) shall be in violation and deemed to be an illegal well.
- 4.11 Where Method 4.10.1 is selected as the method of continuously monitoring the well, and where it is necessary to install an hour meter, the hour meter installed on any such well within the Management Area must (1) be of a type approved by the Board, and (2) be mounted off the power unit. The District will maintain a list of hour meters which are known to meet District approval.
  - 4.11.1 All groundwater users shall within 30 days of the installation of a new or different hour meter on any well located within the Management Area, certify such installation on a form supplied by the District,
  - 4.11.2 The District staff may periodically check hour meters on a random basis for proper operation.
  - 4.11.3 When hour meters are removed for servicing or replacement, records of the hour meter reading shall be kept. Meters may be removed for off season storage.
  - 4.11.4 Any malfunctioning hour meter must be repaired or replaced within 72 hours after discovery
- 4.12. Wherever Method 4.10.1 is not selected as the method of continuously monitoring the well, then Method 4.10.2 shall be required. Any flow meter installed on any such well within the Management Area must (1) meet the specifications for flow meters adopted by the Board (attached hereto as Appendix A and incorporated herein by reference) and (2) be installed according to the manufacturer's specifications. Flow meters installed before the specifications are adopted by the Board which do not comply with such specifications shall be inspected by a representative of the District and approved for use by the District if such meters are accurate. The District will maintain a list of flow meters which are known to meet District specifications.
  - 4.12.1 All groundwater users shall within 30 days of the installation of a new or different flow meter on any well located within the Management Area certify such installation on a form supplied by the District.
  - 4.12.2 The District staff shall periodically check flow meters on a random basis for readings and proper operation.
  - 4.12.3 When flow meters are removed for servicing or replacement, records of the flow meter reading shall be kept. Meters may be removed for off season storage.
  - 4.12.4 Any malfunctioning flow meter must be repaired or replaced within 96 hours after discovery.
- 4.13. Submission by each operator on or before March **31** of an annual report to the District on forms furnished by or approved by the District showing the following data for the upcoming year:
  - 4.13.1 All crops must be reported, which would include corn, sorghum, potatoes, beans, alfalfa, small grains, and any other commodity crop.
  - 4.13.2 The legal description, type of irrigation system, and number of wells if greater than 1 well, total unregulated crop acres and crop to be planted.
  - 4.13.3 Crops other than corn, sorghum or potatoes do not require soil and water tests.

- 4.13.4 In addition to the above requirements, the report shall also include the following requirements for corn, sorghum and potatoes:
- 4.13.5 The number of acres in corn, sorghum and/or potatoes and the number of field acres irrigated.
- 4.13.6 The results of the groundwater nitrate/nitrogen analysis in ppm for each well, with each well identified by legal location to the nearest 10 acre tract,
- 4.13.7 The results of the residual nitrate/nitrogen deep soils analysis on each field or 80 acre tract, whichever is less, identified by locations using legal description and showing the irrigation well(s) identified in ~~(b)~~ 4.13.2 above used to irrigate that field,
- 4.13.8 Credit for legume crop (beans, alfalfa, etc) and/or manure or sludge applied.
- 4.13.9 The crop to be grown and the per acre expected yield used as the basis for determining nitrogen needs on each field,
- 4.13.10 The recommended commercial nitrogen fertilizer application rate utilizing the University of Nebraska's formula for commercial nitrogen fertilizer recommendations, and
- 4.14. Submission by each operator on the same annual report to the District due March 31 showing the following data for corn, sorghum, and potatoes for the previous crop year:
  - 4.14.1 the actual commercial nitrogen fertilizer applied per acre on each field, the timing of the application(s), and if an inhibitor was used,
  - 4.14.2 the actual inches of groundwater applied per acre on each field,
  - 4.14.3 the actual yield achieved per acre on each field, and
  - 4.14.4 certification by the operator.