

United States Department of Agriculture



Natural Resources Conservation Service
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February 10, 2010

CONSERVATION PROGRAMS MANUAL

SUBJECT: PGM – Amendment Conservation Planning and Conservation Practices Subpart B – Conservation Practices

Purpose. Transmit the updated Oregon Policy OR Title 404 Part 505.11 Amendment OR-1.

Effective Date. This directive is effective upon receipt.

Filing Instructions. Place this Oregon amendment after national section 505.11 – Eligible Conservation Practices and print in GREEN.

A handwritten signature in black ink, appearing to read "Ronald Alvarado".

RONALD ALVARADO
State Conservationist

Attachments
a/s

Helping People Help the Land

An Equal Opportunity Provider and Employer



Part 505 – Conservation Planning and Conservation Practices

Subpart B – Conservation Practices

OR 505.11 Eligible Conservation Practices

(a) Introduction

Eligible conservation practices are:

- In order to be eligible for financial assistance for an irrigation system upgrade or replacement, an increase in irrigation system efficiency of 15% or more must be realized. A required increase greater than 15% and/or additional criteria may be established by the NRCS District Conservationist if, after consultation with, and consideration of their Local Work Group's recommendation it is determined that a higher increase in efficiency is warranted. Irrigation Water Management will be required to assure the effective operation of the system upgrade.

1. Definition of System Upgrade and System Replacement

- i) System Upgrade - Replace components of an existing system with components that utilize the latest in sprinkler technology and result in increased irrigation system efficiency and associated water savings.

Items that can be included in a system upgrade:

- **Hand-line sprinkler laterals:** sprinkler nozzles, sprinkler heads, sprinkler risers
- **Side-roll sprinkler laterals:** sprinkler nozzles, sprinkler heads, counter-balance sprinkler levelers
- **Center-pivot sprinkler laterals:** low-pressure sprinkler heads, pressure regulators, drop tubes
- **Pumps:** Impeller overhaul or replacement necessary for high- to low-pressure sprinkler conversion
- **Pump motors:** Overhaul or replacement if power requirement is less than 70 percent of original.

Items that can not be included in a system upgrade:

Other components including seals, gaskets, drain valves, bent pipe sections, and mover components are considered to be part of normal maintenance and are not eligible for payment as system upgrade components.

- 2. System Replacement - Replace an existing irrigation system with a system which will result in improved irrigation system efficiency and associated water savings.

3. Irrigation System Proof of Purchase

- i) If the irrigation system was originally purchased with financial assistance from the NRCS (SCS) it must be more than 15 years old to be eligible for replacement or upgrade. The system age shall be documented by one of three ways:
 - System proof of purchase information provided to the landowner at the time of purchase by the irrigation equipment dealer.
 - Government system payment information that is typically found in a Cooperator File.
 - If neither of the above is available, the landowner can sign a sworn statement that the system he/she is requesting an upgrade or replacement for is more than 15 years old. Appendix A contains a Landowner Affidavit Of Irrigation System Age.
- ii) If the irrigation system was purchased independent of NRCS (SCS) financial assistance the 15 year requirement will not apply.

4. Upgraded or Replaced System Extended Life Span

- i) The improvements (upgrades or replacements) must result in a system, including all associated component, with a expected 15 year service life. Once a system has received NRCS funds for upgrade or replacement it will not be eligible for another upgrade or replacement for 15 years after the replacement/upgrade is implemented.

5. System Condition and Related Efficiency Determination and Documentation

- i) System condition and the related efficiency increase that would result from upgrade or replacement will be determined and documented using 1.) an on-site system evaluation which will be performed in order to determine the condition of the existing system (see Appendix B for the evaluation form) and 2.) the Oregon NRCS Water Savings Estimator (see Oregon Bulletin OR 210-2009-5). The system evaluation will be performed by a person experienced in the design and installation of the type of irrigation system being evaluated. Eligibility requires that both the site evaluation and the Water Savings Estimator indicate upgrade or replacement.
- ii) If, due to a system upgrade, the resulting change in system flow rate and/or operating pressure will affect pump performance, a pump upgrade may be required. Irrigation system and/or pump evaluations may be paid for by the landowner or the NRCS through the Conservation Activity Plan process.

6. System Upgrade or Replacement Payment

- i) The Practice Payment Schedule (PPS) will reflect different payments for system upgrades and system replacement. The PPS may reflect a greater payment percentage for a system upgrade than for system replacement.

7. Disposal of Replaced Systems

- i) Systems that are replaced with financial assistance from NRCS (SCS) based on the fact that they have exceeded their service life and are no longer functioning properly may not be moved for use on other fields but useable parts may be harvested..

Appendix A: Oregon NRCS Certification of Sprinkler System Age

Landowner/Operator: _____		
Job Location: _____		
County: _____	SWCD: _____	Farm/Tract No.: _____
Field ID: _____	Prepared by: _____	Date: _____

The purpose of this form is to certify sprinkler irrigation system age. NRCS funded irrigation systems must be a minimum of 15 years old to be eligible for replacement or upgrade. Sprinkler System Inspection Worksheets and the Oregon Water Savings Estimator shall be used to determine qualification of a system for system replacement and/or upgrade.

The following sprinkler irrigation systems are proposed for consideration for replacement and/or upgrade:

Farm/ Tract	Field ID	Acres	Check Existing System Type			Date Installed	Check Type of Documentation			Check if pump is to be considered replacement or upgrade
			Hand line/ solid set	Side Roll	Center Pivot		Receipts*	NRCS File	Self**	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I certify that the irrigation systems listed above were installed on the dates as given above, and the checked documentation is attached. I request that pumps for those fields checked be considered for upgrade and/or replacement.

Landowner/Operator

Date

Approved by:

NRCS Representative

Date

*Copies of receipts attached

**Landowner signature required

Appendix B Sprinkler System Inspection Worksheets

Landowner/Operator: _____		
Job Location: _____		
County: _____	SWCD: _____	Farm/Tract No.: _____
Field ID: _____	Prepared by: _____	Date: _____

The purpose of this form is to document sprinkler system condition and associated recommendations of components as candidate items for irrigation system upgrade and/or replacement and support, including NRCS cost-share. Sprinkler systems must be at least 15 years old to be considered for replacement or upgrade as verified by the Oregon NRCS Certification of Sprinkler System Age form (Appendix A).

The following components can be considered for NRCS Practice Payment as system upgrades in order to achieve increased irrigation system efficiency and associated water savings:

- **Hand-line sprinkler laterals:** sprinkler nozzles, sprinkler heads, sprinkler risers
- **Side-roll sprinkler laterals:** sprinkler nozzles, sprinkler heads, counter-balance sprinkler levelers
- **Center-pivot sprinkler laterals:** low-pressure sprinkler heads, pressure regulators, drop tubes
- **Pumps:** Impeller overhaul or replacement necessary for high- to low-pressure sprinkler conversion
- **Pump motors:** Overhaul or replacement if power requirement is less than 70 percent of original
- **Variable-speed pump motor controller (VFD)** if variable-speed pump is required

Other components including seals, gaskets, drain valves, bent pipe sections, and mover components are considered to be operation and maintenance items and are not eligible for payment as system upgrade components.

Estimated water savings associated with recommended component upgrades are documented by the Oregon Irrigation Water Savings Estimator.

All sprinkler systems considered for upgrade must be inspected by a person experienced in the design and installation of the type of irrigation system being inspected. The purpose of the inspection is to determine if the system is suitable for system replacement and/or system upgrade. Landowners/operators are encouraged to review the Inspection Forms in order to become familiar with the items to be reviewed and associated expectations. All system upgrades and replacements must result in the irrigation system meeting criteria of Oregon NRCS Practice Standard 442, *Irrigation System, Sprinkler*.

Pumps and motors may be considered for upgrade and/or replacement due to changes in irrigation system operating pressure and/or flow.

The system inspection sheets for the sprinkler components and pumps have been reviewed and approved, and they are attached to this application.

NRCS Representative

Date

Hand-line and solid-set sprinkler lateral inspection for system replacement or upgrade

Date inspected: _____ Date installed: _____
 Farm/Tract:* _____ Field ID:* _____ * Corresponds to Tract and Field nos. in Appendix A

Sprinkler lateral

Configuration: Lateral spacing on mainline: _____ ft Sprinkler spacing on lateral: _____ ft
 Number of sprinklers per lateral: _____ Lateral length: _____ ft
 Lateral pipe size: _____ in
 Elevation change of lateral (estimated): _____ ft Note Uphill or Downhill from inlet

Pipe condition including evidence of **two or more** pipe sections with identified problems:

- Lateral size is inadequate Yes No
- Bent or dented pipes (dents greater than 1/2 inch deep) Yes No
- Split seams Yes No
- Bullet holes or other non-repairable punctures Yes No
- Non-repairable pipe corrosion Yes No
- Non-repairable broken couplers Yes No

Document problems with pictures to be included in the inspection file.

If any answer to above is **YES**, replace sprinkler lateral with a new lateral, risers, and sprinkler heads. **Replace sprinkler lateral?** Yes No

Sprinklers and nozzles

Sprinkler type: Impact Rotator

Is the system operating during inspection? Yes No

If operating: Pressure at lateral inlet: _____ psi Pressure at distal end of lateral: _____ psi
 Sprinkler flow at lateral inlet: _____ gpm Sprinkler flow at end of lateral: _____ gpm

Sprinkler nozzles (Check type of nozzles on line)

Standard nozzles – Nozzle size _____ in

- Different size nozzles present on line Yes No
- Nozzles show wear [Refer to p. 57 of Oregon Irrigator's Pocket Guide.] Yes No
- Flow Control nozzles are needed (if sprinkler flow rate variation exceeds 10% of sprinkler flow rate). Yes No

Flow Control Nozzles – Flow rate _____ gpm

- Nozzles have different flow rates Yes No
- Nozzles show wear or deterioration Yes No

If any answer to above is **YES**, replace nozzles **Replace nozzles?** Yes No

Sprinkler condition and operation:

- Different types/makes of sprinklers along the lateral Yes No
- More than 10% of sprinkler heads with broken or worn parts Yes No
- More than 10% of sprinkler heads do not rotate smoothly and have observed sprinkler bearing wear? Yes No

If any answer to above is **YES**, replace sprinkler heads and nozzles **Replace sprinklers?** Yes No

Sprinkler lateral risers:

- More than 10% of sprinkler risers non-uniform in height, missing or broken Yes No

If the answer to above is **YES**, replace risers. **Replace risers?** Yes No

If the complete lateral is **NOT** replaced with a new lateral, can the existing lateral perform per NRCS Practice Standard 442 (assuming proper Operation and Maintenance) with an expected life of 15 years from present if checked sprinkler/nozzle/riser items are replaced as noted? If **NO**, the lateral must be replaced. Yes No

RECOMMENDATION: Replace complete lateral Replace nozzles Replace sprinklers Replace risers

Notes:

Recommended by: _____ Date: _____

Side-roll (wheel-line) sprinkler lateral inspection for system replacement or upgrade

Date inspected: _____

Date installed: _____

Farm/Tract:* _____ Field ID:* _____

* Corresponds to Tract and Field nos. in Appendix A

Sprinkler lateral

Configuration: Lateral spacing on mainline: _____ ft Sprinkler spacing on lateral: _____ ft
 Number of sprinklers per lateral: _____ Lateral length: _____ ft
 Lateral pipe size: _____ in
 Elevation change of lateral (estimated): _____ ft Note Uphill or Downhill from inlet

Pipe condition including evidence of **two or more** pipe sections with identified problems: Yes No

Document problems with pictures to be included in the inspection file.

- Lateral size is inadequate Yes No
- Bent, twisted, or dented pipes (dents greater than 1/2 inch deep) or split seams Yes No
- Bullet holes or other non-repairable punctures Yes No
- Non-repairable pipe corrosion Yes No
- Non-repairable broken couplers Yes No
- Wheels bent rusted, non-repairable Yes No
- Drive unit with broken/non-repairable components Yes No

If any answer to above is YES, replace sprinkler lateral with a new lateral, risers, and sprinkler heads. **Replace sprinkler lateral?** Yes No

Sprinklers and nozzles

Sprinkler type: Impact Rotator

Is the system operating during inspection? Yes No

If operating: Pressure at lateral inlet: _____ psi Pressure at distal end of lateral: _____ psi
 Sprinkler flow at lateral inlet: _____ gpm Sprinkler flow at end of lateral: _____ gpm

Sprinkler nozzles (Check type of nozzles on line)

- Standard nozzles – Nozzle size _____ in
- Different size nozzles present on line Yes No
 - Nozzles show wear [Refer to p. 57 of Oregon Irrigator's Pocket Guide.] Yes No
 - Flow Control nozzles are needed (if sprinkler flow rate variation exceeds 10% of sprinkler flow rate). Yes No
- Flow Control Nozzles – Flow rate _____ gpm
- Nozzles have different flow rates Yes No
 - Nozzles show wear or deterioration Yes No

If any answer to above is YES, replace nozzles **Replace nozzles?** Yes No

Sprinkler condition and operation:

- Different types/makes of sprinklers along the lateral Yes No
- More than 10% of sprinkler heads with broken or worn parts Yes No
- More than 10% of sprinkler heads do not rotate smoothly and have observed sprinkler bearing wear? Yes No

If any answer to above is YES, replace sprinkler heads and nozzles **Replace sprinklers?** Yes No

Sprinkler lateral risers:

- Lateral is not equipped with self-leveling risers Yes No
- More than 10% of the self-leveling risers worn beyond practical repair Yes No

If the answer to above is YES, replace risers. **Replace risers?** Yes No

If the complete lateral is NOT replaced with a new lateral, can the existing lateral perform per NRCS Practice Standard 442 (assuming proper Operation and Maintenance) with an expected life of 15 years from present if checked sprinkler/nozzle/riser items are replaced as noted? If NO, the lateral must be replaced. Yes No

RECOMMENDATION: Replace complete lateral Replace nozzles Replace sprinklers Replace risers

Notes:

Recommended by: _____

Date: _____

Center-pivot sprinkler lateral inspection for system replacement or upgrade

Date inspected: _____

Date installed: _____

Farm/Tract:* _____

Field ID:* _____

* Corresponds to Tract and Field nos. in Appendix A

Is the system operating during inspection? Yes No

If operating, pressure at the pivot point: _____ psi

Lateral pipe size: _____ in

Lateral length: _____ ft

Elevation change of pivot lateral (estimated): _____ ft uphill and _____ ft downhill from pivot point

Center-pivot lateral – Condition of pipe, pivot structure, and drive train:

- Deterioration in pivot point including structure, bearing, and collector ring Yes No
- Structural deterioration of pivot towers Yes No
- Deterioration of pivot span truss structures Yes No
- Non-repairable pipe punctures and/or corrosion Yes No
- Non-repairable and worn pipe couplers Yes No
- Drive train components (motors, gearboxes, shafts, wheels, tires) showing fatigue and wear Yes No
- Electrical control panel with signs of corrosion and water inside the box Yes No
- Misalignment of towers and improperly operating tower controls Yes No
- Wiring shows signs of deterioration Yes No

Document problems with pictures to be included in the inspection file.

If any answer to above is **YES**, replace pivot lateral with a new pivot lateral and sprinkler package.

Replace pivot lateral? Yes No

Sprinkler type: Impact Overhead spray/rotator Spray/rotator on drop tube LEPA

Sprinkler nozzles:

- Sprinkler nozzles more than 5 years old Yes No
- Nozzles deviate from specified sprinkler package Yes No
- Nozzles show wear or deterioration Yes No

If any answer to above is **YES**, replace nozzles

Replace nozzles? Yes No

Sprinklers:

- Sprinklers deviate from specified sprinkler package Yes No
- Sprinklers show wear or deterioration Yes No

If any answer to above is **YES**, replace sprinklers and nozzles

Replace sprinklers and nozzles? Yes No

Pressure regulators Pressure _____ psi

- Pressure regulators more than 5 years old Yes No
- Pressure regulators mismatched and/or do they deviate from those specified for the sprinklers Yes No

If the answer to above is **YES**, replace regulators

Replace regulators? Yes No

Drop tubes (if included)

- 10% or more of the drop tubes and/or fittings show signs of deterioration and failure Yes No

If the answer to above is **YES**, replace drop tubes and fittings

Replace drop tubes? Yes No

Low pressure conversion for current high pressure system

Convert existing system to low pressure with drop tubes, pressure regulators, and spray heads Yes No

If the complete lateral is NOT replaced with a new lateral, can the existing lateral perform per NRCS Practice Standard 442 (assuming proper Operation and Maintenance) with an expected life of 15 years from present if checked sprinkler/regulator/drop-tube items are replaced as noted? If **NO**, the pivot lateral must be replaced.

Yes No

RECOMMENDATION: Replace complete pivot Replace sprinkler nozzles Replace sprinklers and nozzles
 Replace pressure regulators Replace drop tubes and fittings

Notes:

Recommended by: _____

Date: _____

Pump inspection for replacement or upgrade

Date inspected: _____

Date installed: _____

Farm/Tract:* _____

Field ID:* _____

* Corresponds to Tract and Field nos. in Appendix A

Irrigation system requirements:

Flow rate to be supplied to irrigation system: Minimum flow = _____ gpm Maximum flow = _____ gpm

Pressure required at pump: Minimum pressure = _____ psi Maximum pressure = _____ psi

Pump flow and pressure requirements have changed due to changes in the irrigation system Yes No

If flow and/or pressure requirements have changed, check pump operating points to assure that

1. the pump can supply proper flow and pressure to the irrigation system and that
2. the pump operates efficiently.

Pump operating point(s) for flow and pressure:

Pump pressure = _____ psi

• Pump operating pressure is unknown Yes No

Pumping lift = _____ ft

• Pumping lift is unknown Yes No

Pump flow rate = _____ gpm

• Pump flow rate is unknown Yes No

A pump test is required if any answer above is **Yes**, about missing pump pressure, lift and/or flow rate.

Missing pump pressure, lift, flow rate information? Yes No

Check pump operating points on published pump characteristic curves. If pump curves are unavailable, a complete pump test is required to determine the operating characteristics of the pump including flow, total dynamic head, and efficiency.

Pump output and efficiency

• Pump flow and pressure output are different from irrigation system requirements Yes No

• Is the pump efficiency less than 72% or wire-to-water efficiency less than 65% (from test or pump curves) Yes No

If any answer above is **Yes**, upgrade or replace the pump.

Upgrade or replace pump? Yes No

If the pump is recommended for upgrade or replacement, consult Basin Engineer and/or a pump professional to determine if the pump can be upgraded or if a replacement is required, including the need for a variable-frequency drive (VFD).

Pump Condition

– for pumps considered for upgrade:

[Refer to pp. 2-8 of Oregon Irrigator's Pocket Guide.]

Document problems with pictures to be included in the inspection file.

• Unstable pump base and mounting of pump unit on pad or well Yes No

• Pump suction problems including undersized or collapsed pipe, leaks, unnecessary fittings Yes No

• Pump discharge with improperly sized pipe, and/or improperly sized or missing appurtenances Yes No

• Evidence of pumping air Yes No

• No operating pressure gage Yes No

• Motor and pump do not rotate freely Yes No

• Motor shows signs of excess heat due to overload Yes No

• Motor not properly screened Yes No

• Signs of rodent activity in motor or pump controls Yes No

• Signs of deterioration or safety concerns with wiring and/or pump controls Yes No

RECOMMENDATION: No upgrade or replacement required

Address all above items marked "Yes"

Upgrade pump to meet irrigation system requirements

Trim impeller Install new impeller Replace motor Other (note below)

Replace pump with new unit, including controls and necessary fittings

Notes:

Recommended by: _____

Date: _____

Pump Performance Characteristics

Pump performance characteristics must be measured for pumps with more than five years service and for all pumps for which pump characteristic curves are not available. Data for a minimum of two operating points should be obtained.

Type of pump Above-ground centrifugal Turbine

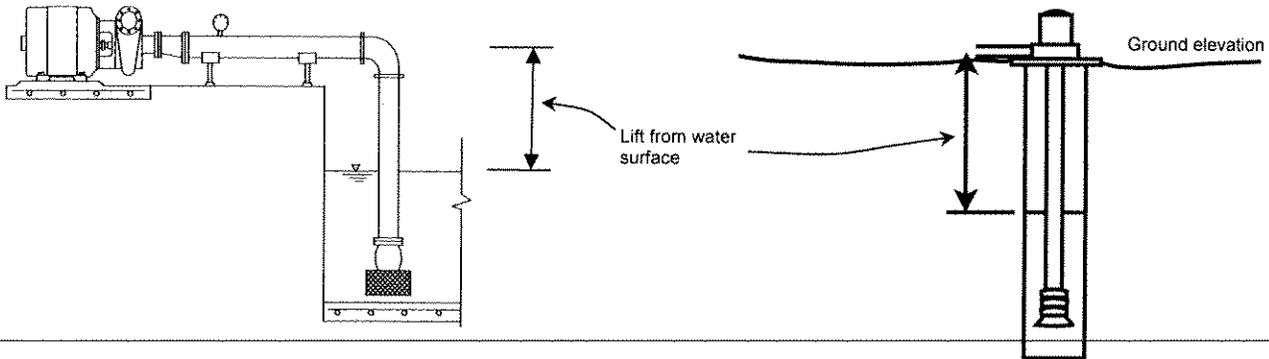
Pump Manufacturer: _____ Model: _____

Pump Test Results	Test 1	Test 2	Test 3	Notes
Measured flow rate (gpm)				
a. Lift from inlet water surface (ft)				
b. Friction losses in pump piping (ft)				
c. Outlet pressure (psi)				
Total dynamic head (TDH) in ft = a + b + 2.31 x c				
Water Horsepower = $\frac{TDH \times gpm}{3960}$ (hp)				
Input power from electric meter (kW)				
Input horsepower from electric meter (hp = 1.34 x kW)				
Wire - to - Water Eff = $100 \times \frac{\text{Water Horsepower}}{\text{Input Horsepower}}$				
Motor nameplate horsepower (hp)				

Irrigation System Requirements at Pumping Plant Discharge:

Flow Required: _____ gpm

Pressure Required: _____ psi



Notes and Recommendations:

Pump Test Completed by: _____ Date: _____