Sprinkler Irrigation System
Detailed Evaluation Periodic Move and Fixed Set Sprinkler System

Land user _____ Prepared by _____
District _____ County _____ Engineer job class_____

Irrigation system hardware inventory:
Type of system (check one) : Side- roll _____ Handmove _____ Lateral tow _____ Fixed set _____
Sprinkler head: make _____, model _____, nozzle size(s) _____ by _____ inches
Spacing of sprinkler heads on lateral, S_1 _____ feet
Lateral spacing along mainline, S_m _____ feet, total number of laterals _____
Lateral lengths: max _____ feet, minimum _____ feet, average _____ feet
Lateral diameter: _____ feet of _____ inches, _____ feet of _____ inches
Manufacturer rated sprinkler discharge, _____ gpm at _____ psi giving _____ feet wetted diameter
Total number sprinkler heads per lateral _____, lateral diameter _____ inches
Elevation difference between first and last sprinkler on lateral (=/-) _____ feet
Sprinkler riser height _____ feet, mainline material _____
Spray type: _____ fine (>30psi), _____ coarse (<30psi)

Field observations:
Crop uniformity _____
Water runoff _____
Erosion _____
System leaks _____
Fouled nozzles _____
Other observations _____

Field data inventory & Computations:
Crop _____, root zone depth _____ feet, MAD 1/ _____ %, MAD 1/ _____ inches
Soil-water data (typical):
(Show locations of sample on soil map or sketch of field)
Moisture determination _____
Soil series and surface texture _____

Depth	Texture	AWC 1/ (in)	SWD 1/ (%)	SWD 1/ (in)
	Totals			

1/ MAD = Management allowable depletion, AWC = Available water capacity, SWD = Soil water deficit

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Comments about soils (including restrictions to root development and water movement):

Present irrigation practices:

Typical irrigation duration _____ hr, irrigation frequency _____ days

Typical number irrigations per year _____

Distance moved per set _____ ft, Alternate sets? _____

Measured nozzle diameters (using shank of high speed drill bit)

Sprinkler no.	_____	_____	_____	_____	_____
Diameter	_____	_____	_____	_____	_____
Size check	_____	_____	_____	_____	_____

(state whether t = tight, m = medium, l = loose)

Actual sprinkler pressure and discharge data:

Sprinkler number on test lateral

	1st				end
Initial pressure (psi)	_____	_____	_____	_____	_____
Final pressure (psi)	_____	_____	_____	_____	_____
Catch volume (gal)	_____	_____	_____	_____	_____
Catch time (sec)	_____	_____	_____	_____	_____
Discharge (gpm)	_____	_____	_____	_____	_____

Test:

Start _____ stop _____ duration _____ = _____ hours

Atmospheric data:

Wind: Direction: Initial _____ during _____ final _____

Speed (mph): initial _____ during _____ final _____

Temperature: initial _____ final _____ Humidity: _____ low _____ med _____ high

Evaporation container: initial _____ final _____ loss _____ inch

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Lateral flow data:

Flow meter reading _____gpm

Average discharge of lateral based on sprinkler head discharge

= [1st gpm - .75 times (1st gpm - last gpm)] times (number of heads)

= _____ = _____ gpm (ave flow per head)

= _____ heads x _____ gpm/head = _____gpm

Calculations:

Gross application per test = $\frac{\text{(flow, gpm) x (time, hr) x 96.3}}{\text{(lateral length) x (lateral spacing)}}$

= $\frac{\text{(}\_\_\_\_\text{ gpm) x (}\_\_\_\_\text{ hours) x 96.3}}{\text{(}\_\_\_\_\text{ feet) x (}\_\_\_\_\text{ feet)}}$ = _____ inches

Gross application per irrigation = $\frac{\text{(gross application per test, in) x (set time, hour)}}{\text{(time, hour)}}$

= $\frac{\text{(}\_\_\_\_\text{ inches) x (}\_\_\_\_\text{ hour)}}{\text{(5.95 hour)}}$ = _____ inches

Catch container type _____

_____ cc (mL) or in, measuring container = _____ inches in container

Total number of containers _____

Composite number of containers = $\frac{\text{Total number of containers}}{2}$ = _____ = _____

Total catch, all containers = _____ cc (mL)= _____ inches
cc/in

Average total catch = $\frac{\text{Total catch}}{\text{composite no. containers}}$ = _____ = _____ inches

Number of composite containers in low 1/4 = $\frac{\text{composite no. containers}}{4}$ = _____ = _____

Total catch in low 1/4 composite containers = _____ cc(mL) = _____ inches
cc/in

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Average catch of low 1/4 composite containers = $\frac{\text{total catch in low 1/4}}{\text{no. composite low 1/4 containers}}$

= _____ = _____ inches

Average catch rate = $\frac{\text{Average total catch, inches}}{\text{Test time, hour}}$ = _____ = _____inch/hour
hour

NOTE: Average catch rate is application rate at plant canopy height.

Distribution uniformity low 1/4 (DU):

DU = $\frac{\text{(Average catch low 1/4 composite containers)}}{\text{Average total catch}}$ x 100 = _____ inches x 100 = _____%
inches

Approximate Christiansen Uniformity (CU):

CU = 100 - [0.63 x (100 - DU)] = 100 [0.63 x (100 - _____)] = _____ %

Effective portion of applied water (R_e):

R_e = $\frac{\text{Average total catch, inch}}{\text{Gross applications/test, inches}}$ = _____ inches = _____ inches
inches

Application efficiency of low 1/4 (E_q):

E_q = DU x (R_e) = _____ x _____ = _____ %

NOTE: Use for medium to high value crops.

Approximate application efficiency low 1/2 (E_h):

E_h = CU x (R_e) = _____ x _____ = _____ %

NOTE: Use for lower value field and forage crops.

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Application efficiency, (E_a):

F_n = (gross application per irrigation) / 100 x E_q = (_____ inches) x _____ / 100 = _____ inches

E_a = (water stored in root zone) / (gross application per irrigation) x 100 = (_____ inches) x 100 / (_____ inches) = _____ %

Losses = (runoff, deep percolation) = gross application per irrigation minus SWD

= (_____ = _____ inches

Potential Water and Cost Savings:

Present management:

Gross applied per year = (gross applied per irrigation) x (number of irrigations) =

= (_____ inches) x (_____) = _____ inches/year

Potential management:

Annual net irrigation requirement _____ inches/year, for _____ (crop)

Potential application efficiency (E_q or E_h) _____ % (from NEH, Part 623, Ch 11)

Potential annual gross applied = (annual net irrigation requirement) / Potential E_q or E_H x 100

= (_____ inches) x 100 = _____ inches

Total annual water conserved

= (Present gross applied - potential gross applied) x (area irrig. (ac)) / 12 = _____ acre/feet

= (_____ inches) - (_____ inches) x (_____ acres) / 12 = _____acre/feet

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Cost savings:

Pumping plant efficiency _____ Kind of fuel _____

Cost per unit of fuel $ _____ Fuel cost per acre/foot $ _____

Cost savings = (fuel cost per acre-foot) x (acre-feet conserved per year) = $ _____

= (_____) x (_____) = $ _____

Water purchase cost:

= (Cost per acre-foot) x (acre-feet saved per year) = _____ x _____ = $ _____

Cost Savings:

= Pumping cost + water cost = _____ + _____ = $ _____

Recommendations: