Conservation Plan Map supplied to cooperator.

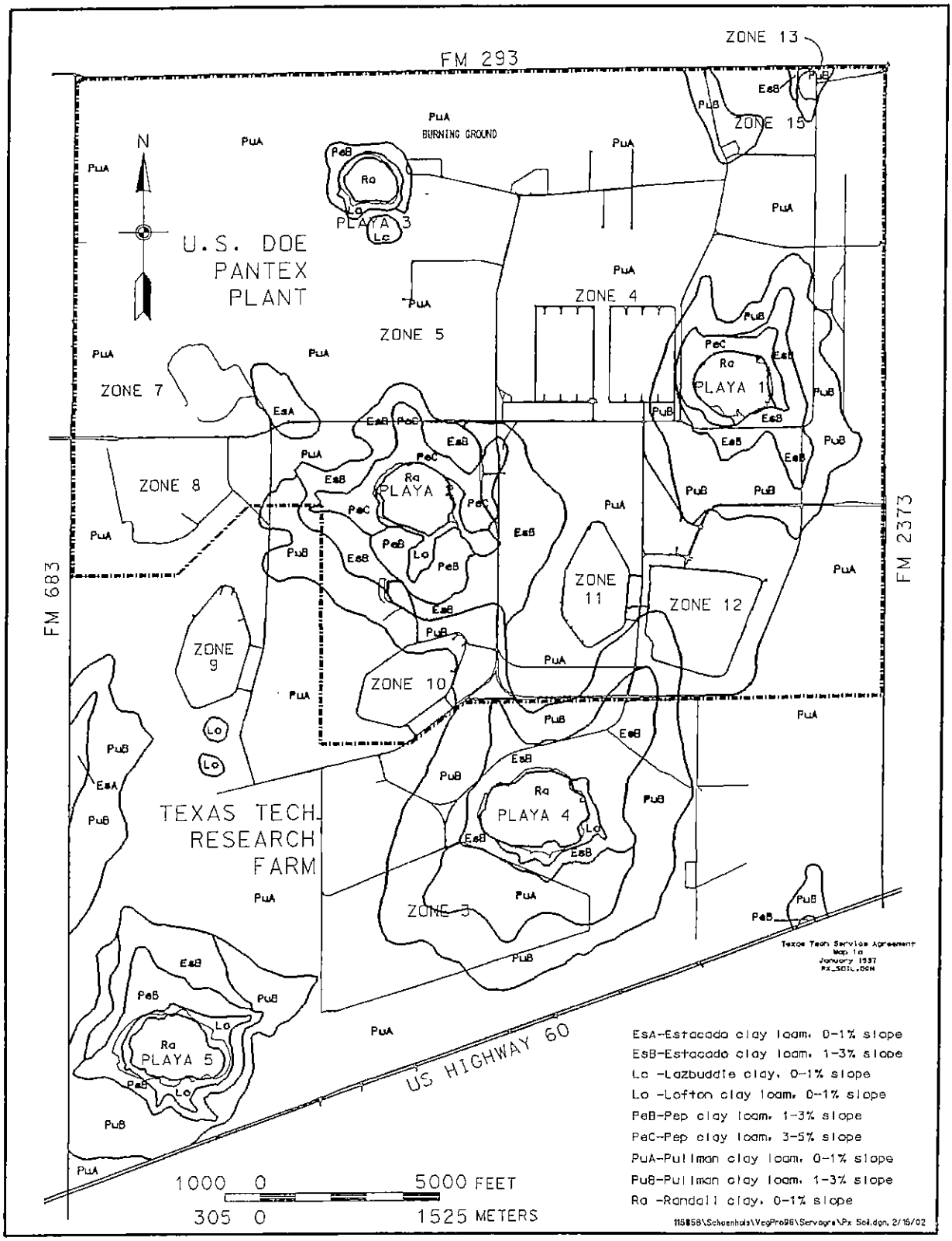


Figure 1. Soil Map, Main Plant

United States Department of Energy
Pantex plant
156-02-044

NONTECHNICAL SOIL DESCRIPTIONS

SOIL MAP SYMBOL	SOIL NAME AND DESCRIPTION
EsA	ESTACADO CLAY LOAM, 0 TO 1 PERCENT SLOPES Map Unit EsA, Component ESTACADO IS > 60 inches thick. Permeability is MODERATE and available water holding capacity is HIGH. A water table when present is greater than 6 feet. The soil has a capability subclass of 3E nonirrigated and 2E irrigated.
EsB	ESTACADO CLAY LOAM, 1 TO 3 PERCENT SLOPES Map Unit EsB, Component ESTACADO IS > 60 inches thick. Permeability is MODERATE and available water holding capacity is HIGH. A water table when present is greater than 6 feet. The soil has a capability subclass of 3E nonirrigated and 3E irrigated.
Lc	LAZBUDDIE CLAY LOAM, 0 TO 1 PERCENT SLOPES Map Unit Lc, Component LAZBUDDIE is >60 inches thick. Permeability is VERY SLOW and available water holding capacity is MODERATE. A water table when present is greater than 6 feet. The soil has a capability subclass of 3S nonirrigated and 2S irrigated.
Lo	LOFTON CLAY LOAM, Map Unit Lo, Component LOFTON, is > 60 inches thick. Permeability is VERY SLOW and water-holding capacity is HIGH. A water table when present is greater than 6 feet. The soil has a capability subclass of 3E nonirrigated and 2S irrigated.
PeB	PEP CLAY LOAM, 1 TO 3 PERCENT SLOPES Map Unit PeB, Component PEP IS > 60 inches thick. Permeability is MODERATE and available water holding capacity is HIGH. A water table when present is greater than 6 feet. The soil has a capability subclass of 3E nonirrigated and 3E irrigated.
PeC	PEP CLAY LOAM, 3 TO 5 PERCENT SLOPES Map Unit PeC, Component PEP IS > 60 inches thick. Permeability is MODERATE and available water holding capacity is HIGH. A water table when present is greater than 6 feet. The soil has a capability subclass of 4E nonirrigated and 3E irrigated.
PuA	PULLMAN CLAY LOAM, 0 TO 1 PERCENT SLOPES Map Unit PuA, Component PULLMAN is > 60 inches thick. Permeability is SLOW and available water holding capacity is HIGH. A water table when present is greater than 6 feet. The soil has a capability subclass of 3E nonirrigated and 2S irrigated.

PuB PULLMAN CLAY LOAM, 1 TO 3 PERCENT SLOPES
Map Unit PuB Component PULLMAN is > 60 inches thick. Permeability is SLOW and available water holding capacity is HIGH. a water table when present is greater than 6 feet. The soil has a capability subclass of 3E nonirrigated and 3E irrigated.

Ra RANDALL CLAY
Map Unit Ra, Component RANDALL is deep and poorly drained. Permeability is VERY SLOW and available water holding capacity is HIGH. A water table when present is greater than 6 feet but the soil often is inundated by water following large rains. The soil has a capability subclass of 6W nonirrigated and 4S irrigated.

RANGE SITE DESCRIPTIONS

DEEP HARDLAND SITE – The natural plant community for this site is short grass dominant with a few midgrasses and a few forbs. There are few shrubs present and no trees. The dominant is blue grama, which makes up from 50 to 60% of the total composition. Buffalograss will make up from 15 to 25% of the composition. Vinemesquite and western wheatgrass will make up 10 to 15% in climax. On the more loamy soils of this site sideoats grama will likely occur. Other species occurring in minute amounts and comprising less than 10% of the entire composition are sand dropseed, gummy lovegrass, tumble windmillgrass, sand muhly, silver bluestem, galleta and bottlebrush squirreltail. Forbs are moisture dependent and are less than 5% of the total composition. This is a site preferred by livestock. It is not vegetatively diverse. The main factors limiting plant growth are heavy textured subsoils and the high tension with which water is held in the soil. The plant community described here is believed to be the approximate historical climax present prior to European colonization. Soils present on this unit that are included in this site are Estacado, Pep and Pullman.

PLAYA SITE – The natural plant community is highly variable and depends on the hydrology of the particular playa. There is usually a mixture of hydrophytic plants such as rushes, sedges smartweed and curly dock with upland plants such as western wheatgrass and vinemesquite. This composition depends greatly on degree and frequency of inundation making it difficult to describe a true climax community. Soils present on this unit that are included in this site are Lazbuddie, Lofton and Randall.

LAND CAPABILITY CLASSIFICATION

The soil and capability map has a map symbol that shows the kind of soil present on a particular cropland area. This information has been used to place your soils into groups called capability subclasses. these are shown on your soil and capability map in green ink and briefly defined on this sheet. Each map symbol has planned treatment outlined in section III of the FOTG.

The capability subclass symbol on your map has two parts, for example, 2e. The first number shows the capability class, The e, w, or s designates the subclass.

The capability subclass indicates the nature of the major conservation problems, such as (e) for erosion and sloping lands or land subject to blowing, (w) for wet areas or excess water, (s) for limitations inherent to the soil type such as clayey or sandy soils.

Land capability classes show the general suitability of soils for agricultural use. The land capability classes are as follows:

LAND SUITED FOR CULTIVATION AND OTHER USES

Class 1: Little or no limitations that limit the choice of plants or land use. No subclass used.

Class 2.: Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.

Class 3: Soils that have severe limitations that reduce choice of plants or require special conservation practices or both.

Class 4: Soils have very severe restrictions on the choice of plants or require very careful management, or both.

LAND LIMITED IN USE - GENERALLY NOT SUITED FOR CULTIVATION

Class 5: Soils with overflow or wetness that limits the choice of land use to pasture, range, or wildlife.

Class 6: Soils have severe limitations that make them unsuited for cultivation and limit their use to pasture, range, or wildlife.

Class 7: Soils with very severe limitations that make them unsuited for cultivation and restrict their use to pasture, range or wildlife.

Class 8: Soils and land forms whose use is restricted to recreation, wildlife, water supply or aesthetic purposes. Has no value for commercial plant production.

Example

Map Symbol	Soil Type
AfA	Amarillo Fine Sandy Loam, 0 to 1 % slopes
or	
10	Acuff Loam, 1 to 3 % slopes

 from County Soil Survey Map

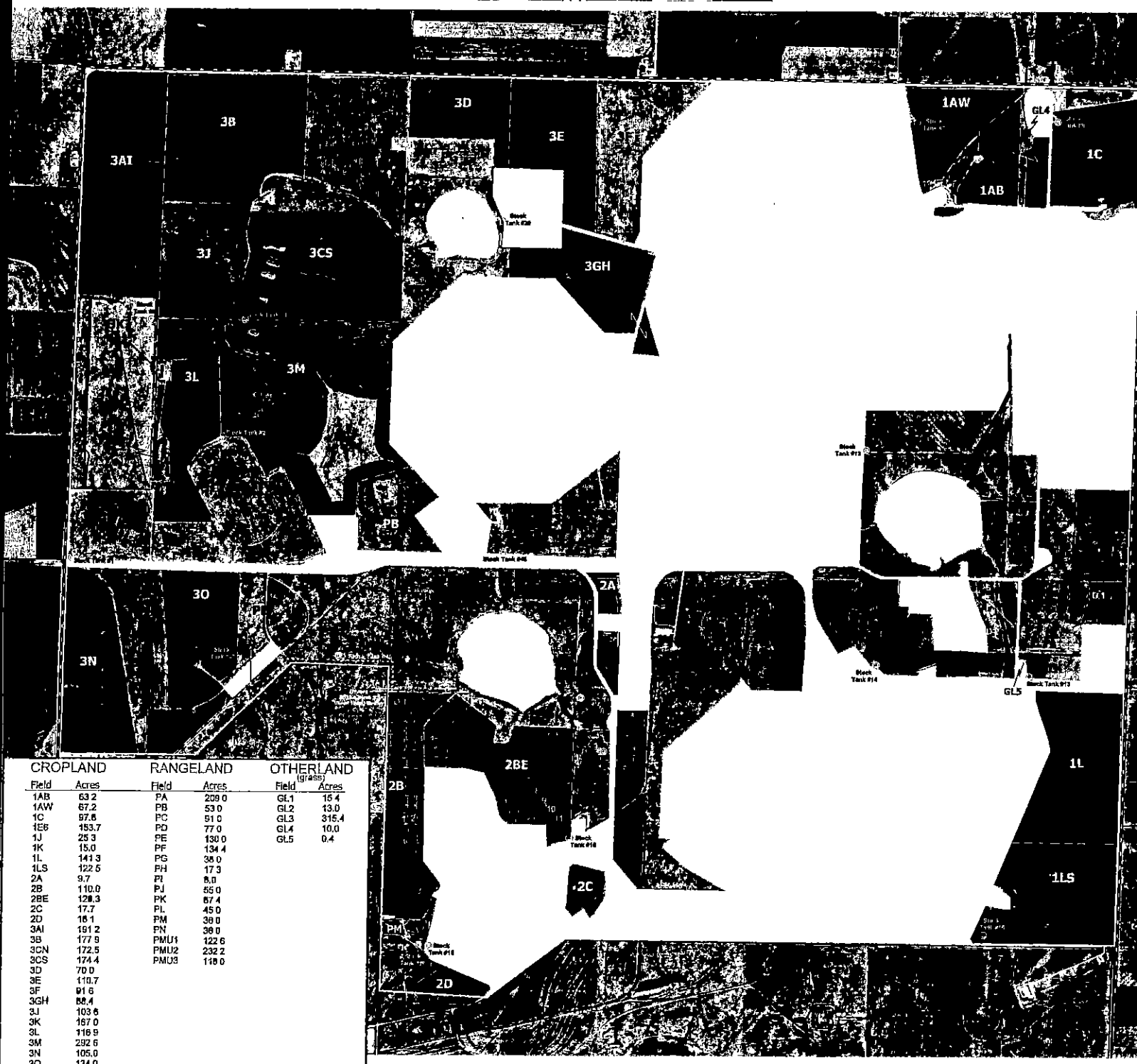
UNITED STATES DEPARTMENT OF ENERGY/ NATIONAL NUCLEAR SECURITY ADMINISTRATION PANTEX PLANT

Operator: Texas Tech University under Service Agreement with Department of Energy/NNSA
McClellan Creek SWCD
WQMP 156-03-044
Approximate Acres: 4809.7

Prepared by Chad Reed - TSSWCB
In conjunction with
Monty Schoenhals - BWXT Pantex

1320 0 1320 2640 3960 5280 Feet

Pantex Industrial areas and permitted facilities including TNRCC Hazardous Waste and/or Multi-Sector Storm Water Permit sites



CROPLAND		RANGELAND		OTHERLAND (grass)	
Field	Acres	Field	Acres	Field	Acres
1AB	63 2	PA	209 0	GL1	15 4
1AW	67.2	PB	53 0	GL2	13.0
1C	97.8	PC	91 0	GL3	315.4
1E6	153.7	PD	77 0	GL4	10.0
1J	25 3	PE	130 0	GL5	0.4
1K	15.0	PF	134 4		
1L	141 3	PG	38 0		
1LS	122 5	PH	17 3		
2A	9.7	PI	8.0		
2B	110.0	PJ	55 0		
2BE	128.3	PK	67 4		
2C	17.7	PL	45 0		
2D	16 1	PM	38 0		
3AI	191 2	PN	38 0		
3B	177 9	PMU1	122 6		
3CN	172.5	PMU2	232 2		
3CS	174.4	PMU3	118 0		
3D	70 0				
3E	110.7				
3F	91 6				
3GH	88.4				
3J	103 6				
3K	167 0				
3L	116 9				
3M	292 6				
3N	105.0				
3O	134 0				

CONSERVATION PLAN

United States Department of Energy/National Nuclear Security Administration
Pantex Plant

Monty Schoenhals – BWXT Pantex
Assisted by: TSSWCB
WQMP 156-03-044

LAND UNITS	PLANNED			
1AB,1AW,1C 1E6,1J,1K,1L 1LS,2A,2B 2BE,2C,2D 3AI,3B,3CN 3CS,3D,3E 3F,3GH,3J 3K,3L,3M,3N 3O	2965.6 Ac			**Cropland (dry)**
1AB	63.2 Ac	10	2002	CONSERVATION CROPPING ROTATION – (328) Consists of high residue crops such as wheat or sorghum in rotation with fallow land. This practice provides for adequate amounts of crop residues to be returned to the soil to maintain or improve soil organic matter content, to manage plant nutrients, to improve water use efficiency and to reduce wind and water erosion.
1AW	67.2 Ac	10	2002	
1C	97.8 Ac	10	2002	
1E6	153.7 Ac	10	2002	
1J	25.3 Ac	10	2002	
1K	15.0 Ac	10	2002	
1L	141.3 Ac	10	2002	
1LS	122.5 Ac	10	2002	
2A	9.7 Ac	10	2002	
2B	110.0 Ac	10	2002	
2BE	128.3 Ac	10	2002	
2C	17.7 Ac	10	2002	
2D	18.1 Ac	10	2002	
3AI	191.2 Ac	10	2002	
3B	177.9 Ac	10	2002	
3CN	172.5 Ac	10	2002	
3CS	174.4 Ac	10	2002	
3D	70.0 Ac	10	2002	
3E	110.7 Ac	10	2002	
3F	91.6 Ac	10	2002	
3GH	88.4 Ac	10	2002	
3J	103.6 Ac	10	2002	
3K	167.0 Ac	10	2002	
3L	116.9 Ac	10	2002	
3M	292.6 Ac	10	2002	
3N	105.0 Ac	10	2002	
3O	134.0 Ac	10	2002	
1E6	153.7 Ac			CONTOUR FARMING – (330) All tillage operations will be performed on the contour each year using terraces as guidelines (where applicable) to control water erosion.
1J	25.3 Ac			
2B	110.0 Ac			
2BE	128.3 Ac			

CONSERVATION PLAN

United States Department of Energy/National Nuclear Security Administration
Pantex Plant

Monty Schoenhals – BWXT Pantex
Assisted by: TSSWCB
WQMP 156-03-044

LAND UNITS		PLANNED		
1AB 1AW 1C 1E6 1J 1K 1L 1LS 2A 2B 2BE 2C 2D 3AI 3B 3CN 3CS 3D 3E 3F 3GH 3J 3K 3L 3M 3N 3O	63.2 Ac 67.2 Ac 97.8 Ac 153.7 Ac 25.3 Ac 15.0 Ac 141.3 Ac 122.5 Ac 9.7 Ac 110.0 Ac 128.3 Ac 17.7 Ac 18.1 Ac 191.2 Ac 177.9 Ac 172.5 Ac 174.4 Ac 70.0 Ac 110.7 Ac 91.6 Ac 88.4 Ac 103.6 Ac 167.0 Ac 116.9 Ac 292.6 Ac 105.0 Ac 134.0 Ac	04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04 04	2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003 2003	RESIDUE MANAGEMENT, SEASONAL – (344) Manage residues from the preceding high residue crop. As a minimum 750 lbs. per acre of flat small grain equivalent will be maintained on the soil surface until April 1 for wind erosion protection. This practice is scheduled each year to control wind and water erosion.
1E6 1J 2B	3880' 1296' 1580'	03 03 03	2003 2003 2003	DIVERSION – (362) Perform routine maintenance on existing diversion terrace(s) to prevent runoff water from damaging cropland. See attached *NRCS Design and Specification Package* for detailed information concerning existing diversions.
1AB 1AW 1C 1E6 1J 1K 1L 1LS	63.2 Ac 67.2 Ac 97.8 Ac 153.7 Ac 25.3 Ac 15.0 Ac 141.3 Ac 122.5 Ac	10 10 10 10 10 10 10 10	2002 2002 2002 2002 2002 2002 2002 2002	NUTRIENT MANAGEMENT – (590) Manage the amount, form, placement and timing of application of plant nutrients to minimize entry of nutrients into surface and ground water. When/if commercial fertilizer is applied to meet vegetative requirements a baseline soil test will be performed prior to application to assess crop requirements for targeted yield considering residual nutrients available in the soil. Follow-up soil testing will be conducted as described above, i.e., testing will be performed before any fertilizer

CONSERVATION PLAN

United States Department of Energy/National Nuclear Security Administration
Pantex Plant

Monty Schoenhals – BWXT Pantex
Assisted by: TSSWCB
WQMP 156-03-044

LAND UNITS	PLANNED			
2A	9.7 Ac	10	2002	application. See attached *Nutrient Management Specification Sheet(s)* for specific guidance.
2B	110.0 Ac	10	2002	
2BE	128.3 Ac	10	2002	
2C	17.7 Ac	10	2002	
2D	18.1 Ac	10	2002	
3AI	191.2 Ac	10	2002	
3B	177.9 Ac	10	2002	
3CN	172.5 Ac	10	2002	
3CS	174.4 Ac	10	2002	
3D	70.0 Ac	10	2002	
3E	110.7 Ac	10	2002	
3F	91.6 Ac	10	2002	
3GH	88.4 Ac	10	2002	
3J	103.6 Ac	10	2002	
3K	167.0 Ac	10	2002	
3L	116.9 Ac	10	2002	
3M	292.6 Ac	10	2002	
3N	105.0 Ac	10	2002	
3O	134.0 Ac	10	2002	
1AB	63.2 Ac	10	2002	PEST MANAGEMENT – (595)
1AW	67.2 Ac	10	2002	Pests such as weeds, insects and diseases will be managed to reduce the effects on plant growth and crop production. Selection and application of all chemical control agents will be according to current product label and all applicable TDA rules and regulations as well as treatment thresholds determined through the integrated pest management program employed here.
1C	97.8 Ac	10	2002	
1E6	153.7 Ac	10	2002	
1J	25.3 Ac	10	2002	
1K	15.0 Ac	10	2002	
1L	141.3 Ac	10	2002	
1LS	122.5 Ac	10	2002	
2A	9.7 Ac	10	2002	
2B	110.0 Ac	10	2002	
2BE	128.3 Ac	10	2002	
2C	17.7 Ac	10	2002	
2D	18.1 Ac	10	2002	
3AI	191.2 Ac	10	2002	
3B	177.9 Ac	10	2002	
3CN	172.5 Ac	10	2002	
3CS	174.4 Ac	10	2002	
3D	70.0 Ac	10	2002	
3E	110.7 Ac	10	2002	
3F	91.6 Ac	10	2002	
3GH	88.4 Ac	10	2002	
3J	103.6 Ac	10	2002	

CONSERVATION PLAN

United States Department of Energy/National Nuclear Security Administration
Pantex Plant

Monty Schoenhals – BWXT Pantex
Assisted by: TSSWCB
WQMP 156-03-044

LAND UNITS		PLANNED		
3K	167.0 Ac	10	2002	
3L	116.9 Ac	10	2002	
3M	292.6 Ac	10	2002	
3N	105.0 Ac	10	2002	
3O	134.0 Ac	10	2002	
1E6	8593′	03	2003	TERRACES – (600)
1J	1012′	03	2003	Perform routine maintenance on existing terraces (including all blocks)
2B	7334′	03	2003	to prevent over-topping. Repair all breaks prior to planting of the next
2BE	12008′	03	2003	crop. See attached *NRCS Design and Specification Package* for detailed information concerning existing terraces.
1AB	63.2 Ac	04	2003	SURFACE ROUGHENING – (609)
1AW	67.2 Ac	04	2003	Tillage to roughen the soil surface will be performed when inadequate
1C	97.8 Ac	04	2003	residues are produced to reduce wind erosion. This practice is
1E6	153.7 Ac	04	2003	considered each year.
1J	25.3 Ac	04	2003	
1K	15.0 Ac	04	2003	
1L	141.3 Ac	04	2003	
1LS	122.5 Ac	04	2003	
2A	9.7 Ac	04	2003	
2B	110.0 Ac	04	2003	
2BE	128.3 Ac	04	2003	
2C	17.7 Ac	04	2003	
2D	18.1 Ac	04	2003	
3AI	191.2 Ac	04	2003	
3B	177.9 Ac	04	2003	
3CN	172.5 Ac	04	2003	
3CS	174.4 Ac	04	2003	
3D	70.0 Ac	04	2003	
3E	110.7 Ac	04	2003	
3F	91.6 Ac	04	2003	
3GH	88.4 Ac	04	2003	
3J	103.6 Ac	04	2003	
3K	167.0 Ac	04	2003	
3L	116.9 Ac	04	2003	
3M	292.6 Ac	04	2003	
3N	105.0 Ac	04	2003	
3O	134.0 Ac	04	2003	

CONSERVATION PLAN

United States Department of Energy/National Nuclear Security Administration
Pantex Plant

Monty Schoenhals – BWXT Pantex
Assisted by: TSSWCB
WQMP 156-03-044

LAND UNITS	PLANNED			
PA,PB,PC PD,PE,PF PG,PH,PI PJ,PK,PL PM,PN,PMU1 PMU2,PMU3	1489.9 Ac			**Rangeland**
PA	209.0 Ac	06	2002	BRUSH MANAGEMENT – (314) Mesquite, prickly pear, Siberian elm, eastern red cedar, Russian olive, salt cedar and baccharis will be managed where and as needed with chemical treatment using the appropriate herbicide. The Individual Plant Treatment method (IPT) will be utilized whenever plant densities are within economical ranges. When IPT applications are not feasible, chemical broadcast or mechanical control measures may be employed. All product label recommendations and directions as well as TDA rules and regulations will be followed when applying herbicides.
PB	53.0 Ac	06	2002	
PC	91.0 Ac	06	2002	
PD	77.0 Ac	06	2002	
PE	130.0 Ac	06	2002	
PF	134.4 Ac	06	2002	
PG	38.0 Ac	06	2002	
PH	17.3 Ac	06	2002	
PI	8.0 Ac	06	2002	
PJ	55.0 Ac	06	2002	
PK	87.4 Ac	06	2002	
PL	45.0 Ac	06	2002	
PM	36.0 Ac	06	2002	
PN	36.0 Ac	06	2002	
PMU1	122.6 Ac	06	2002	
PMU2	232.2 Ac	06	2002	
PMU3	118.0 Ac	06	2002	
PA	209.0 Ac	01	2003	PRESCRIBED BURNING – (314) A comprehensive burning plan will be prepared when/if prescribed burning is employed as a tool to maintain and/or improve the vegetative characteristics of the Playa Management Units (PMU) and range pastures. As a minimum this plan will include: a description of the burn area including present vegetative cover; objective and timing of the burn; acceptable conditions for the burn; preparation of the area for burning; equipment/safety requirements; special precaution areas; firing technique.
PB	53.0 Ac	01	2003	
PC	91.0 Ac	01	2003	
PD	77.0 Ac	01	2003	
PE	130.0 Ac	01	2003	
PF	134.4 Ac	01	2003	
PG	38.0 Ac	01	2003	
PH	17.3 Ac	01	2003	
PI	8.0 Ac	01	2003	
PJ	55.0 Ac	01	2003	
PK	87.4 Ac	01	2003	
PL	45.0 Ac	01	2003	
PM	36.0 Ac	01	2003	
PN	36.0 Ac	01	2003	
PMU1	122.6 Ac	01	2003	
PMU2	232.2 Ac	01	2003	

CONSERVATION PLAN

United States Department of Energy/National Nuclear Security Administration
Pantex Plant

Monty Schoenhals – BWXT Pantex
Assisted by: TSSWCB
WQMP 156-03-044

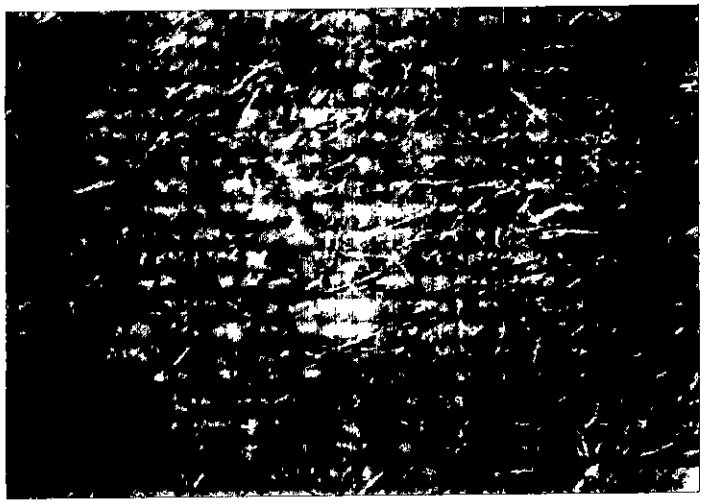
LAND UNITS		PLANNED		
PMU3	118.0 Ac	01	2003	
PMU2	10.4 Ac (S-1 area)	06	2002	WINDBREAK/SHELTERBELT ESTABLISHMENT – (380) Maintain visual living barrier as established in 2000 to minimize prairie dog migration into cultivated and Texas Tech Research Farm lands. See attached *Prairie Dog Management Plan* for more information concerning the visual living barrier. Note: A small portion of this S-1 Area lies in field PE as shown on plan map.
PA	209.0 Ac	09	2002	PRESCRIBED GRAZING – (528A) To ensure health and vigor of rangeland vegetation, grazing will be limited to no more than 50% (by weight) of the total annual production of the forage plants. Key forage species have been selected and are currently being used as indicators for grazing management as described in the attached *grazing management plan.*
PB	53.0 Ac	09	2002	
PC	91.0 Ac	09	2002	
PD	77.0 Ac	09	2002	
PE	130.0 Ac	09	2002	
PF	134.4 Ac	09	2002	
PG	38.0 Ac	09	2002	
PH	17.3 Ac	09	2002	
PI	8.0 Ac	09	2002	
PJ	55.0 Ac	09	2002	
PK	87.4 Ac	09	2002	
PL	45.0 Ac	09	2002	
PM	36.0 Ac	09	2002	
PN	36.0 Ac	09	2002	
PMU1	122.6 Ac	11	2002	PRESCRIBED GRAZING – (528A) Grazing in these Playa Management Units is managed in accordance with the attached *Integrated Plan for Playa Management at Pantex Plant.*
PMU2	232.2 Ac	11	2002	
PMU3	118.0 Ac	11	2002	
PA	209.0 Ac	09	2002	WILDLIFE UPLAND HABITAT MANAGEMENT – (645) These range pastures will be maintained in native vegetation providing an excellent source of food, shelter and escape cover for many species of amphibians, birds, insects, mammals and reptiles. Weedy forbs, e.g., western ragweed, along fence lines and drainage courses should be maintained as these areas provide an especially attractive loafing and foraging area for quail. Special management considerations for black-tailed prairie dog are described in the attached *Prairie Dog Management Plan.* Special wildlife management considerations and common fauna species composition for the Playa Management Units (PMU) are described in the attached *Integrated Plan for Playa Management at Pantex Plant.*
PB	53.0 Ac	09	2002	
PC	91.0 Ac	09	2002	
PD	77.0 Ac	09	2002	
PE	130.0 Ac	09	2002	
PF	134.4 Ac	09	2002	
PG	38.0 Ac	09	2002	
PH	17.3 Ac	09	2002	
PI	8.0 Ac	09	2002	
PJ	55.0 Ac	09	2002	
PK	87.4 Ac	09	2002	
PL	45.0 Ac	09	2002	
PM	36.0 Ac	09	2002	

CONSERVATION PLAN

United States Department of Energy/National Nuclear Security Administration
Pantex Plant

Monty Schoenhals – BWXT Pantex
Assisted by: TSSWCB
WQMP 156-03-044

LAND UNITS		PLANNED		
PN PMU1 PMU2 PMU3	36.0 Ac 122.6 Ac 232.2 Ac 118.0 Ac	09 09 09 09	2002 2002 2002 2002	
GL1,GL2,GL3 GL4,GL5	354.2 Ac			**Otherland** **(grass)**
GL1 GL2 GL3 GL4 GL5	15.4 Ac 13.0 Ac 315.4 Ac 10.0 Ac 0.4 Ac	07 07 07 07 07	2002 2002 2002 2002 2002	CONSERVATION COVER – (327) Maintain existing grass cover on these non-cropped, non-grazed areas to control both wind and water erosion.
GL1 GL2 GL3 GL4 GL5	15.4 Ac 13.0 Ac 315.4 Ac 10.0 Ac 0.4 Ac	07 07 07 07 07	2002 2002 2002 2002 2002	PEST MANAGEMENT – (595) Undesirable vegetation may be controlled by mowing or by application of approved herbicides. Any application of chemical control agents will be made according to current product labels and TDA regulations.
GL1 GL2 GL3 GL4 GL5	15.4 Ac 13.0 Ac 315.4 Ac 10.0 Ac 0.4 Ac	03 03 03 03 03	2003 2003 2003 2003 2003	WILDLIFE UPLAND HABITAT MANAGEMENT – (645) Existing grass cover will be maintained providing upland wildlife food and cover. Shredding or spraying will be restricted during primary nesting season for ground nesting bird species. This period covers April 1 to August 1 of each year.



25% Residue

50% Residue

75% Residue

Attachment 1A – Photo comparison of wheat residue.

Estimating Wheat Residue

Maintaining crop residue is an integral component of practices to control soil erosion and will be part of most conservation plans written for the conservation compliance provision of the 1985 Farm Bill.

Residue amount can be reported in three ways: percent cover, pounds per acre (lbs/A) and small grain equivalent (SGe).

Percent cover: the percentage of soil surface covered with crop residue; commonly used where sheet and rill erosion (water erosion) is the primary concern and usually evaluated immediately after planting.

Pounds per acre: the weight of clean, dry residue expressed on a per acre basis; can be used where water and/or wind erosion is the primary concern.

Small grain equivalent (SGe): relates the type, amount, and orientation of residue to its equivalent in pounds per acre of small grain residue in a reference condition. (Reference condition is defined as 10-inch-long stalks of small grain parallel to the wind direction lying flat in rows spaced 10 inches apart). Small grain equivalent is commonly used where wind erosion is the primary erosion concern and is evaluated during the critical wind erosion period, usually November through April. The SGe of various residues or crops can be determined by using SGe charts (see Fig. 1 for wheat). To use the chart, find lbs/A of wheat residue on the x-axis, locate the plot of interest, and read the SGe from the y-axis. Example: 600 lbs/A of flat wheat residue is equivalent to 1,050 lbs/A of SGe.

Methods for estimating residue

Estimating residue can be useful in planning field operations to control soil erosion or to determine whether adequate residue remains to qualify for conservation compliance programs. Three methods to estimate residue are described.

Line-transect method: This is an easy, reliable method to determine percent cover. It involves stretching a 50- or 100-foot tape (or string with knots) diagonally across crop rows. Check residue *directly under* every 1-foot mark or knot. Percent cover is equal to the percentage of marks over residue "hits" compared to the total number of marks evaluated. Example: if 19 out of 50 marks are over residue, percent cover would equal 38. If there is any doubt that residue under a mark could absorb the impact of a raindrop, do not count it as a "hit."

Photo-comparison method: Comparing residue in the field to photographs of known amounts can be used to estimate residue expressed as percent cover, lbs/A, or SGe (see over). Visual estimates must be made looking straight down at the soil surface for flat residue and at an angle for standing residue. Scanning the residue from the road is not adequate and will overestimate residue amounts.

Calculation method: The initial amount of residue after harvest (lbs/A) is calculated by multiplying the wheat residue coefficient (100 lbs residue/bushel grain) by the long-term yield (ex. 35 bu/A wheat is equivalent to 3,500 lbs/A residue after harvest). Percent cover after harvest can be assumed at 95, although actual amount will vary by year, with production practices, and geographically, and should be adjusted accordingly. The initial amount of wheat residue in lbs/A or percent cover can be reduced for overwinter weathering, grazing, tillage and planting operations by the following amounts.

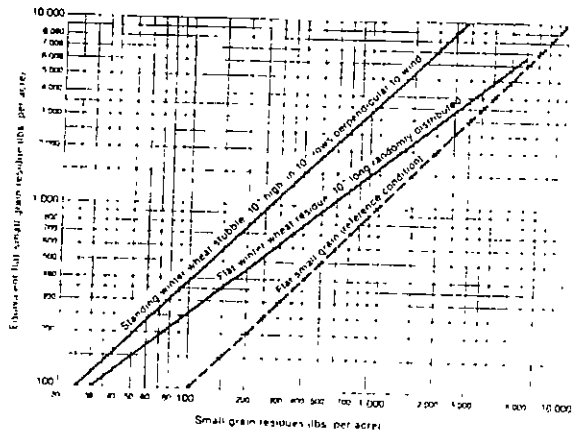
Tillage and planting implements	Percent of residue remaining after each operation
Moldboard plow	10
Chisel plow	
Straight shovel points	75
Twisted shovel points	60
Knife-type fertilizer applicator	80
Disk (tandem or offset)	
3 inches deep	70
6 inches deep	60
Field cultivator	80
Sweep	90
V-blade	95
Rodweeder	90
Planters	
No coulter or smooth coulter	95
Narrow ripple coulter	90
Wide fluted coulter	85
Sweeps or double disk furrowers	80
Drills	
Disk openers	95
Hoe openers	80
Winter weathering	90

Following is an example using the calculation method. This method gives only a rough estimate of residue cover because of the many assumptions involved.

Operation	Residue cover	Residue weight and SGe
After harvest	95%	3,500 lbs/A
Overwinter	x0.90	x0.90
Chisel (straight points)	x0.75	x0 75
Disk (3 inches deep)	x0.70	x0.70
Field cultivate	x0.80	x0 80
Drill (disk opener)	x0.95	x0.95
After planting	34%	1,250 lbs/A (2,000 lbs/A SGe)

[1]Assuming 35 bu/A wheat (35 bu/A × 100 lb/bu = 3,500 lbs/A)

Figure 1: Small grain equivalents of wheat residues.



John S Hickman
Extension Specialist
Soil and Water Conservation

Daryl L. Schoenberger
Extension Assistant
Agronomy

Funds for this project were contributed by the Kansas Soil Conservation Service and the Kansas State Conservation Commission.

KSU KANSAS STATE UNIVERSITY

COOPERATIVE EXTENSION SERVICE, MANHATTAN, KANSAS

L-781

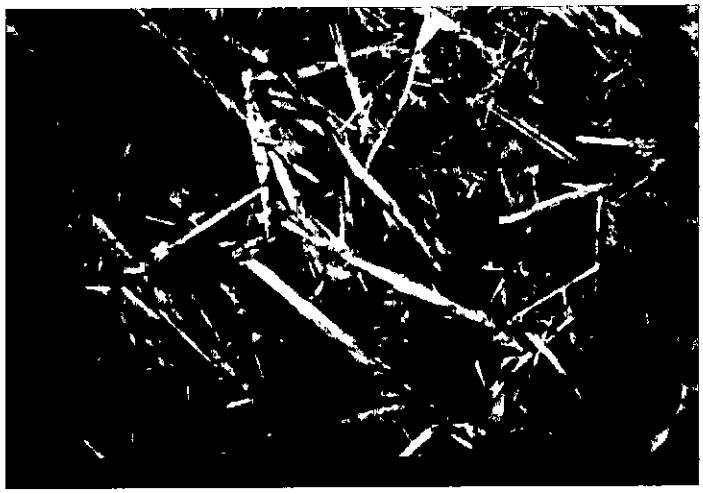
May 1989

Issued in furtherance of Cooperative Extension Work, acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, and United States Department of Agriculture Cooperating. Walter R. Woods, Director. All educational programs and materials available without discrimination on the basis of race, color, national origin, sex, age, or handicap.

5-89—90M, 9-89—60M

File Code: Crops and Soils 4-5 (Soil Conservation)

25% Residue



50% Residue

75% Residue

Attachment 1B – Photo comparison of sorghum residue.

Grazing Management

Pantex Plant
WQMP 156-03-044
September 2002
SCR

To ensure health and vigor of rangeland vegetation, grazing will be limited to no more than 50% (by weight) of the total annual production of the forage plants. The key species selected as an indicator for grazing management on the upland or Deep Hardland range site is blue grama (*Bouteloua gracilis*). In an average year with appropriate prior management 1300–1700 lbs/ac total production may be expected on this site providing a stocking rate of 1 AU/16-20 Ac. The key indicator species for the sites associated with the playa management units (PMU) is western wheatgrass (*Agropyron smithii*). Detailed considerations and plans for grazing of the playa management units are described in the attached *Integrated Plan for Playa Management at Pantex Plant.* Grazing in all pastures is deferred for a minimum of 90 consecutive days during the growing season at least once every three years. The operator's ability to provide supplemental feed and/or move animals to annual forage (wheat or haygrazer fields), or off of this unit entirely is the primary factor determining the actual number of head grazing here at any particular time. Thus stocking rates on the rangeland pastures may be easily adjusted down should drought conditions persist. As a general rule, when production of native grasses is 25% below normal on June 1, cattle numbers should be reduced by at least 25%. If production remains below normal, cattle numbers should be further reduced to maintain the health and vigor of the range grass. Vegetation inventories are monitored regularly utilizing grazing exclosures and grazing over the entire unit is well managed.

Manage grazing on annually cultivated small grain crops so that residues adequate to prevent wind erosion are maintained through the critical erosion period, i.e., until April 1. As a general rule, wheat grazing should be initiated when plants reach a four inch height and managed so that a minimum stubble height of two and one half inches is maintained providing for plant vigor during the coldest part of the winter (mid December through mid January). Dryland acreages are dependent on weather conditions with respect to carrying capacities, but can commonly be expected to support 0.4 to 0.5 animal units per acre during the 120-day cool-season grazing period.

Grazing access across the entire unit is controlled with permanent barbed-wire fence lines with portable power fencing utilized as and where needed. All livestock water is provided by permanently installed troughs fed by underground lines from the plant's potable water supply. The locations of these livestock water facilities are shown on the conservation plan map.

An Individual Plant Treatment (IPT) program is utilized for management of mesquite, prickly pear, Siberian elm, eastern red cedar, Russian olive, salt cedar and baccharis in the range pastures. Suppression efforts have been successful and it is doubtful that chemical broadcast or mechanical control measures will ever be warranted considering the level of management realized under the current resource management regime.

Prescribed burning has not been carried out in recent history, but remains a year-to-year consideration to maintain and/or improve the vegetative characteristics of the Playa Management Units (PMU) and rangeland pastures.

Estimating Grain Sorghum Residue

Maintaining crop residue is an integral component of practices to control soil erosion and will be part of most conservation plans written for the conservation compliance provision of the 1985 Farm Bill.

Residue amount can be reported in three ways: percent cover, pounds per acre (lbs/A) and small grain equivalent (SGe).

Percent cover: the percentage of soil surface covered with crop residue; commonly used where sheet and rill erosion (water erosion) is the primary concern and usually evaluated immediately after planting.

Pounds per acre: the weight of clean, dry residue expressed on a per acre basis; can be used where water and/or wind erosion is the primary concern.

Small grain equivalent (SGe): relates the type, amount, and orientation of residue to its equivalent in pounds per acre of small grain residue in a reference condition. (Reference condition is defined as 10-inch-long stalks of small grain parallel to the wind direction lying flat in rows spaced 10 inches apart) Small grain equivalent is commonly used where wind erosion is the primary erosion concern and is evaluated during the critical wind erosion period, usually November through April. The SGe of various residues or crops can be determined by using SGe charts (see Fig. 1 for grain sorghum). To use the chart, find lbs/A of wheat residue on the x-axis, locate the plot of interest, and read the SGe from the y-axis. Example: 2,000 lbs/A of flat grain sorghum residue with leaves is equivalent to 1,025 lbs/A of SGe.

Methods for estimating residue

Estimating residue can be useful in planning field operations to control soil erosion or to determine whether adequate residue remains to qualify for conservation compliance programs. Three methods are described.

Line-transect method: This is an easy, reliable method to determine percent cover. It involves stretching a 50- or 100-foot tape (or string with knots) diagonally across crop rows. Check *directly* under every 1-foot mark or knot for residue. Percent cover is equal to the percentage of marks over residue "hits" compared to the total number of marks evaluated. Example: if 19 out of 50 marks are over residue, percent cover would equal 38. If there is any doubt that residue under a mark could absorb the impact of a raindrop, do not count it as a "hit."

Photo-comparison method: Comparing residue in the field to photographs of known amounts can be used to estimate residue expressed as percent cover, lbs/A, or SGe (see over). Visual estimates must be made looking straight down at the soil surface for flat residue and at an angle for standing residue. Scanning the residue from the road is not adequate and will overestimate residue amounts.

Calculation method: The initial amount of residue after harvest (lbs/A) is calculated by multiplying the grain sorghum residue coefficient (60 lbs residue/bushel grain) by the long-term yield (ex. 80 bu/A grain sorghum is equivalent to 4,800 lbs/A residue after harvest). Percent cover after harvest can be assumed at 90, although actual amount will vary by year, with production practices, and geographically, and should be adjusted accordingly. The initial amount of grain sorghum residue in lbs/A or percent cover can be reduced for overwinter weathering, grazing, tillage and planting operations by the following amounts.

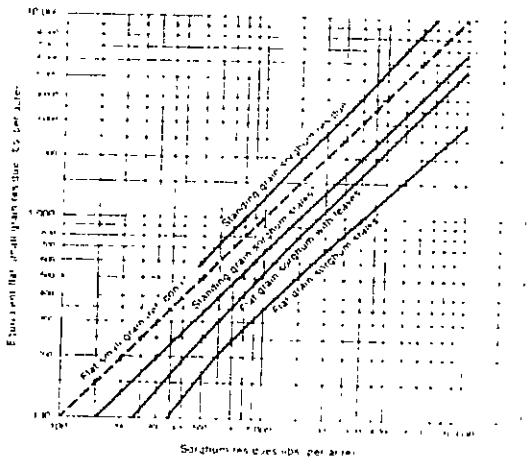
Tillage and planting implements	Percent of residue remaining after each operation
Moldboard plow	10
Chisel plow	
Straight shovel points	75
Twisted shovel points	60
Knife-type fertilizer applicator	80
Disk (tandem or offset)	
3 inches deep	70
6 inches deep	60
Field cultivator	80
Sweep	90
V-blade	95
Rodweeder	90
Planters	
No coulter or smooth coulter	95
Narrow ripple coulter	90
Wide fluted coulter	85
Sweeps or double disk furrowers	80
Drills	
Disk openers	95
Hoe openers	80
Winter weathering	90

Following is an example using the calculation method. This method gives only a rough estimate of residue cover because of the many assumptions involved.

Operation	Residue cover	Residue weight and SGe
After harvest	90%	4,800 lbs/A
Overwinter	x0.90	x0.90
Chisel (straight points)	x0.75	x0.75
Disk (3 inches deep)	x0.70	x0.70
Field cultivate	x0.80	x0.80
Plant (no coulter)	x0.95	x0.95
After planting	32%	1,700 lbs/A (950 lbs/A SGe)

'Assuming 80 bu/A grain sorghum (80 bu/A × 60 lb/bu = 4,800 lbs/A)

Figure 1: Small grain equivalents of sorghum residues.



John S Hickman
Extension Specialist
Soil and Water Conservation

Daryl L. Schoenberger
Extension Assistant
Agronomy

Funds for this project were contributed by the Kansas Soil Conservation Service and the Kansas State Conservation Commissic

KSU KANSAS STATE UNIVERSITY | COOPERATIVE EXTENSION SERVICE, MANHATTAN, KANSAS

L-782

May 1989

Issued in furtherance of Cooperative Extension Work, acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, and United States Department of Agriculture Cooperating, Walter R. Woods, Director. All educational programs and materials available without discrimination on the basis of race, color, national origin, sex, age, or handicap.

5 89—60M 9 89 20M

File Code: Crops and Soils 4-5 (Soil Conservation)

Nutrient Management - Specification Sheet

Landuser: Pantex Plant
Assisted by: SCR
Field: All cropland fields
Date: 5/30/02

Purpose (Check all that apply)	
☑ Supply plant nutrients for optimum forage and crop yields	☐ Supply nutrients to quickly obtain vegetative cover on disturbed sites
☑ Minimize entry of nutrients to surface and ground water	☑ Maintain or improve chemical and biological condition of the soil

Table 1. Field Conditions and Recommendations

Crop Sequence/Rotation for 5 years				
Two Years Ago	Last Year	Year1/Yield Goal	Year2/Yield Goal	Year3/Yield Goal
haygrazer/wheat	haygrazer/wheat	haygrazer/wheat	haygrazer/wheat	haygrazer/wheat

Current Soil Test Levels (ppm)					
N	P	K	pH	S.O.M. %	Other

Recommended Nutrients/Amendments to meet Desired Yield					
N	P_2O_5	K_2O	LIME	Other	Other

Table 2. Nutrient Sources

Credits		N	P_2O_5	K_2O
		pounds per acre		
1. Nitrogen from previous legume crop (AWMFH)				
2. Residual from long-term manure application				
3. Irrigation water (Inches x ppm N x .226)				
4. Other sources (e.g., atmospheric deposition)				
5 **Total Credits**		0	0	0
Plant-Available Nutrients Applied to Field		N	P_2O_5	K_2O
6. Credits (From Row 5, above)		0	0	0
7. Fertilizer	Starter:			
	Other:			
8. Manure / Organic Materials				
9. Subtotal (Sums of Lines 6, 7, and 8)		0	0	0
10. Nutrients Recommended (From Table 1)		0	0	0
11. Nutrient Status (Subtract line 10 from line 9		0	0	0

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendations.
If line 11 is a positive number, this is the amount of by which the available nutrients exceed the crop recommendations.

Specifications

	N	P_2O_5	K_2O
Amount to be Applied (lb./ac)	**0**	**0**	**0**

Landuser: Pantex Plant Field: All cropland fields

Specifications (continued)

Method, Form, and Timing of Application:

Commercial fertilizer is not regularly applied. When an application is made it is *always* preceeded by a soil test to determine residual nutrients available in the soil. All applications are conducted in compliance with the Pantex Land Applied Chemical Use plan.

Additonal Specifications and Notes (Including Sensitive Areas)

Operation and Maintenance

Plan will be reviewed by the producer annually. A thorough review by a Certified Nutrient Management Specialist will be made after soil test samples have been obtained.

Normal rainfall for this county is: 20-22"

Revise the plan when:

- Crop rotation or crop sequence changes.
- Change in farming operation.
- Change occurs in sample data.
- New or different technology becomes available.

Maintain field records for 5 years.

Calibrate application equipment to apply with +/- 10% of the recommended rate.

Handle all nutrient material with caution. Wear appropriate protective clothing.

Clean up residual materials from equipment and dispose of properly.

Nutrient Management - (Field Sketch Including sensitive areas)

See conservation plan map for field locations.

Plan Prepared by: _____ Date _____

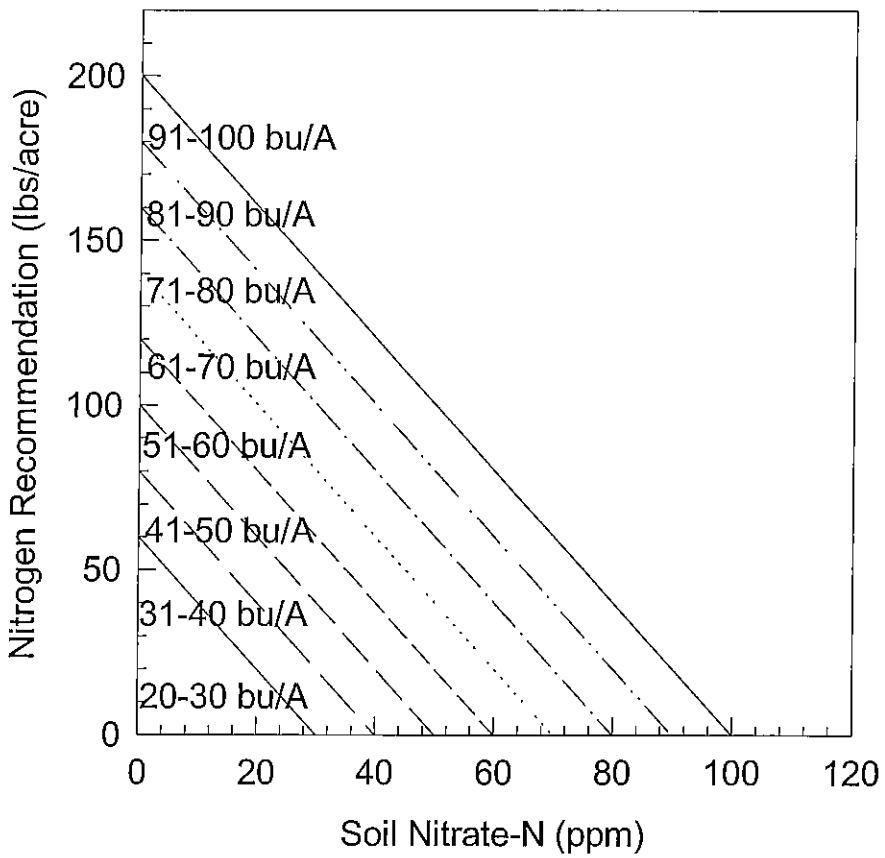
Plan Approved by: _____ Date _____

Producer's Signature _____ Date _____

Texas Agricultural Extension Service
THE TEXAS A&M UNIVERSITY SYSTEM

Soil, Water and Forage Testing Laboratory
979-845-4816 http://soil-testing.tamu.edu

Wheat-Grain plus Grazing Nitrogen Recommendation

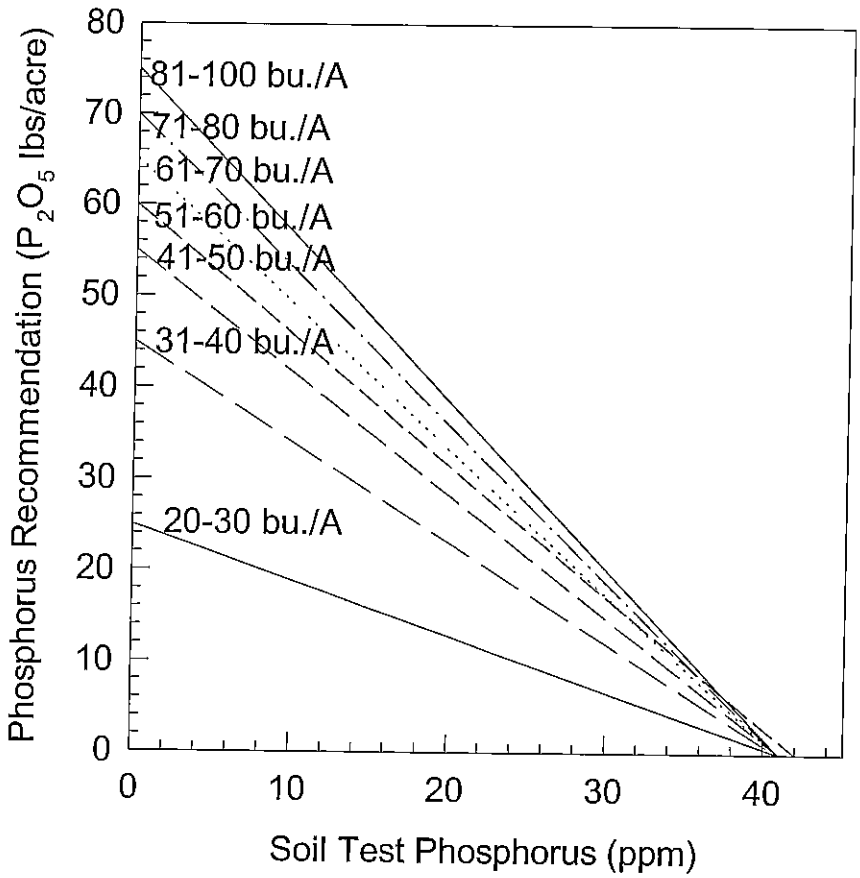


Date:7-13-2000
File: N101

Texas Agricultural Extension Service
THE TEXAS A&M UNIVERSITY SYSTEM

Soil, Water and Forage Testing Laboratory
979-845-4816 http://soil-testing.tamu.edu

Wheat-Grain plus Grazing
Phosphorus Recommendation

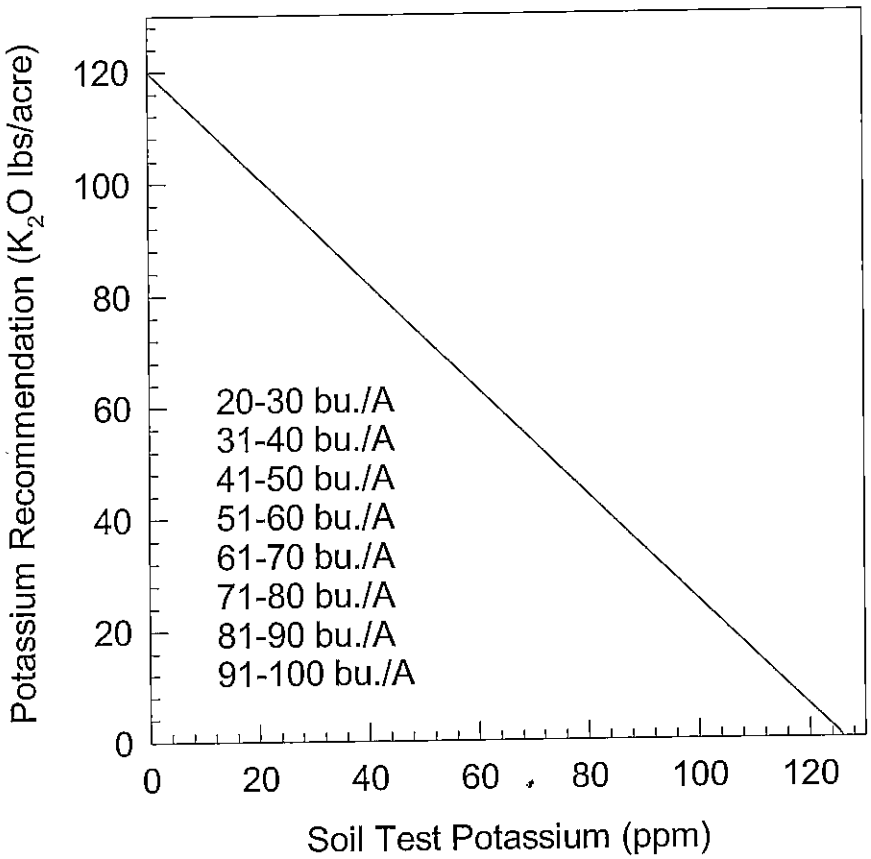


Date: 7-13-2000
File: P101

Texas Agricultural Extension Service
THE TEXAS A&M UNIVERSITY SYSTEM

Soil, Water and Forage Testing Laboratory
979-845-4816 http://soil-testing.tamu.edu

Wheat-Grain plus Grazing Potassium Recommendation

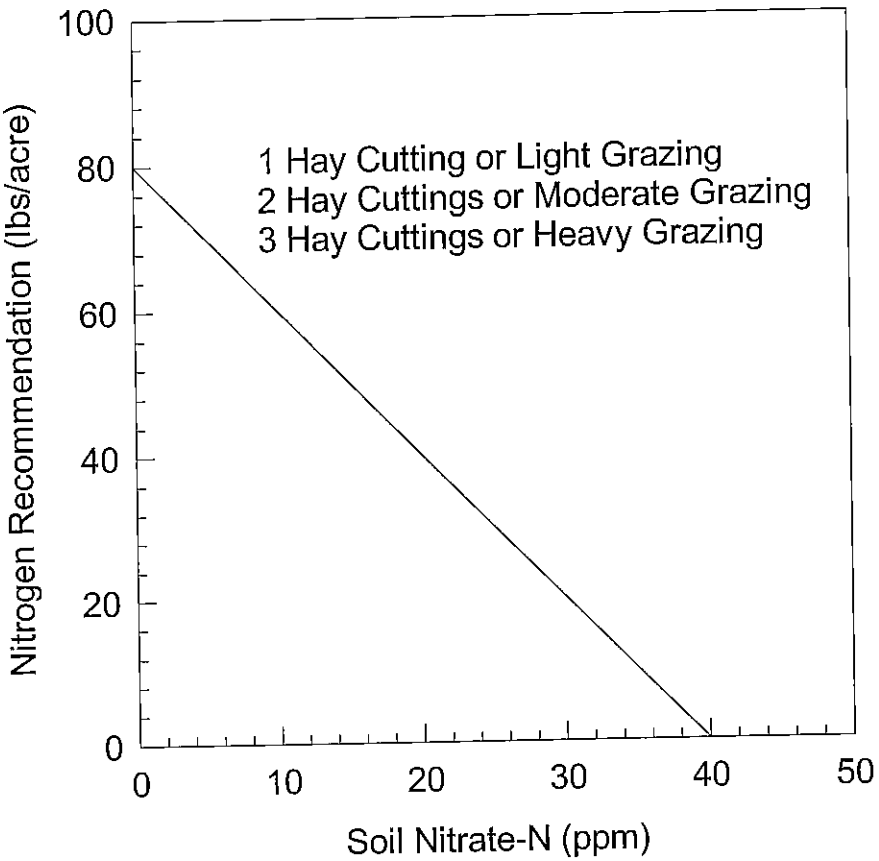


Date:7-13-2000
File: K101

Texas Agricultural Extension Service
THE TEXAS A&M UNIVERSITY SYSTEM

Soil, Water and Forage Testing Laboratory
979-845-4816 http://soil-testing.tamu.edu

Hay Grazer (Sorghum Sudangrass) Nitrogen Recommendation

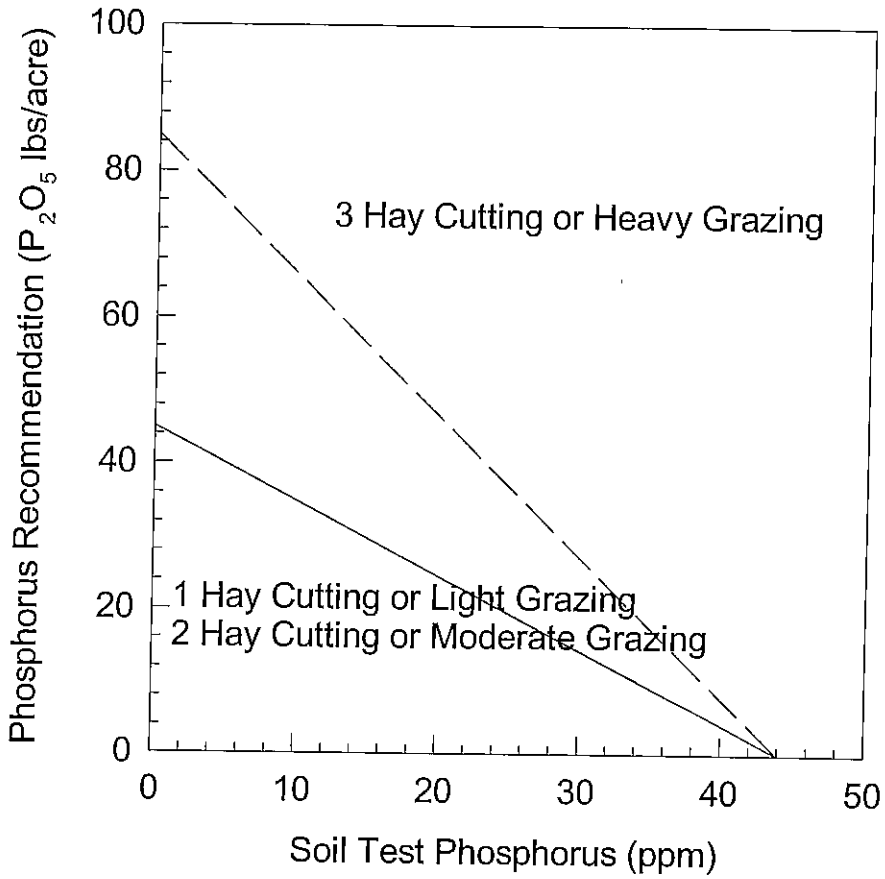


Date:7-13-2000
File: N41

Texas Agricultural Extension Service
THE TEXAS A&M UNIVERSITY SYSTEM

Soil, Water and Forage Testing Laboratory
979-845-4816 http://soil-testing.tamu.edu

Hay Grazer Phosphorus Recommendation

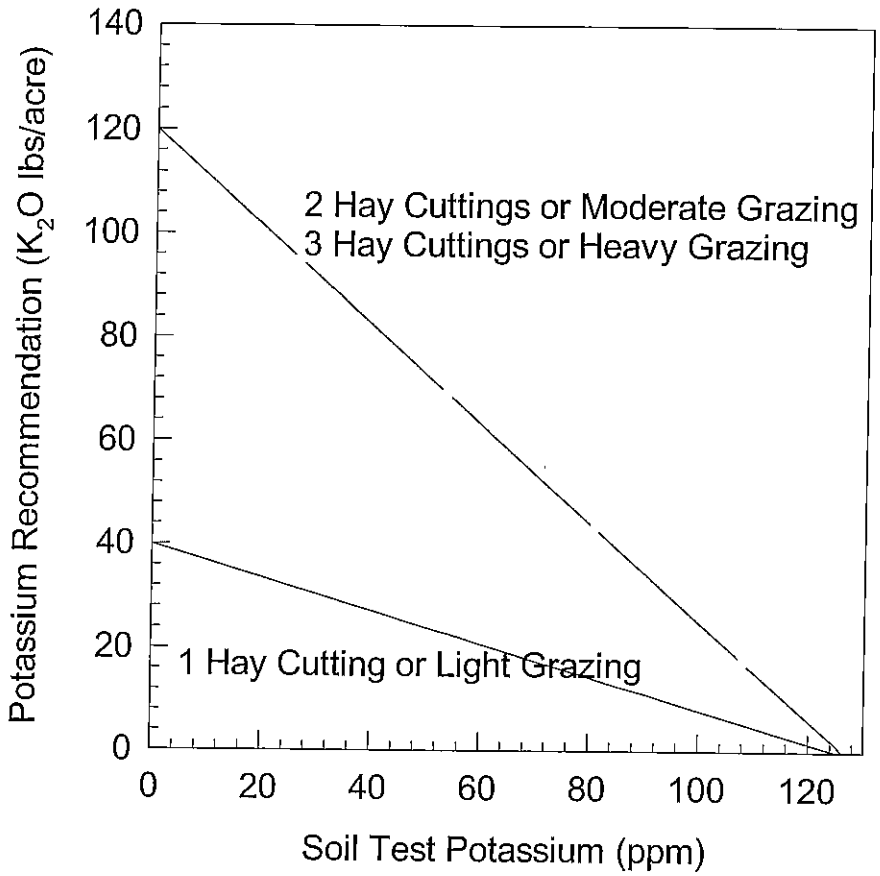


Date: 7-13-2000
File: P41

Texas Agricultural Extension Service
THE TEXAS A&M UNIVERSITY SYSTEM

Soil, Water and Forage Testing Laboratory
979-845-4816 http://soil-testing.tamu.edu

Hay Grazer Potassium Recommendation



Date:7-13-2000
File: K41

2000 Prairie Dog Management Plan Annual Review and Report

Pantex Plant

July 2000 - June 2001

July 2001

Soils Programs Section
Environmental Protection/Restoration Department
Environment, Safety and Health Division
BWXT Pantex, L.L.C.

Amarillo, Texas

CONTENTS

1. INTRODUCTION

Planned control of black-tailed prairie dogs (*Cynomys ludovicianus*) at Pantex Plant began in early 1995 with an interim plan to control expanding populations in several critical training and industrial areas. After concurrence from the U.S. Fish and Wildlife Services (USFWS), control measures were taken under this interim plan to eliminate prairie dogs from Security Range 1. By June 1995, the area had been recolonized, and the need for a comprehensive approach to prairie dog management for the entire Plant was recognized. Interim management was continued as required until approval of a Prairie Dog Management Plan (the Plan) in July 1996, which stipulated an annual review, and consideration for a revision of the Plan every other year. The Plan was revised in 1998 and was reviewed for revision again in 2000. On 21 June 2000, the U.S. Department of Energy's (DOE) Amarillo Area Office (AAO) affirmed its concurrence, by letter, to Mason & Hanger Corporation's Environmental Protection/Restoration Department (EP/RD) for continuing under the 1999 Plan (Appendix A). BWXT Pantex's EP/RD intends to revise the Plan as new information dictates.

The primary objective of the Plan is to ensure that sound methods are used to maintain a sustainable population of prairie dogs as an important component of the short-grass prairie ecosystem at Pantex Plant. Underlying this objective are four important philosophies: coordination and compliance with Plant operations and standards; maintenance of Plant security; health, safety, and sound ecosystem management; and integration of natural and cultural resources management. These philosophies have provided useful direction since 1996, and continue to be the basis for prairie dog management.

The Plan identifies four primary prairie dog management goals: population characterization, population control and colony management, plant safety and security, and environmental monitoring (radionuclide surveillance and prairie dog health.) The Plan initially identified five prairie dog towns, or colonies, on DOE- and Texas Tech-owned lands, plus a town located at Buffalo Lake National Wildlife Refuge (BLNWR), southwest of Canyon, Texas, that served as a control. The Pantex towns were associated with playas, and were so designated; Playas 2, 3, 4, 5, and Pantex Lake. In 1998, a small new town northeast of Building 12-36, between Zones 4 and 12 North, was identified and added to those areas managed under the Plan. Extensive treatment of towns on Texas Tech Research Farm (TTRF) by Texas Tech occurred in late 1999 and early 2000, and all work under this Plan has been discontinued on that property.

All Pantex prairie dog towns have been designated for population characterization; all but Pantex Lake and the area north of 12-36 have been included in environmental monitoring.
Six "areas of special concern," some of which are currently free of prairie dogs, have been designated for treatment using Phostoxin for security, safety, and health concerns:

1. The Playa 2 town extension northward across Pantex Drive, including Security Range 1.

2. The Playa 2 town extension northeast into areas west of Zone 4 (Zone 4 West).

3. The Playa 3 town extension eastward into the Burning Ground.

4. The Playa 4 (TTRF) town extension northward across Pershing Drive near the Zone 12 South PIDAS beds (currently free of prairie dogs.)

5. The town in the northwest corner of Zone 12 South that is probably a northward extension of the Playa 4 town (currently free of prairie dogs.)

6. The town north of 12-36.

Prairie dogs in the Playa 2 colony west of the Zone 8 road are treated annually, at the request of TTRF.

The extent of prairie dog towns as of 1999 is mapped in Figures 1-3. The town on the west edge of Zone 4 has not been mapped in the past due to its designation for annual treatment, and thus is not shown in Figure 1. However, due to it persistence, plans for annual mapping of this town were initiated in 2000.

The core of this annual report, which is required by the Plan, is to summarize: (1) the status of each of these planned management activities between July 1, 2000, and June 30, 2001, (2) the most recent legal status of prairie dogs, and (3) changing data needs necessary for management decisions.

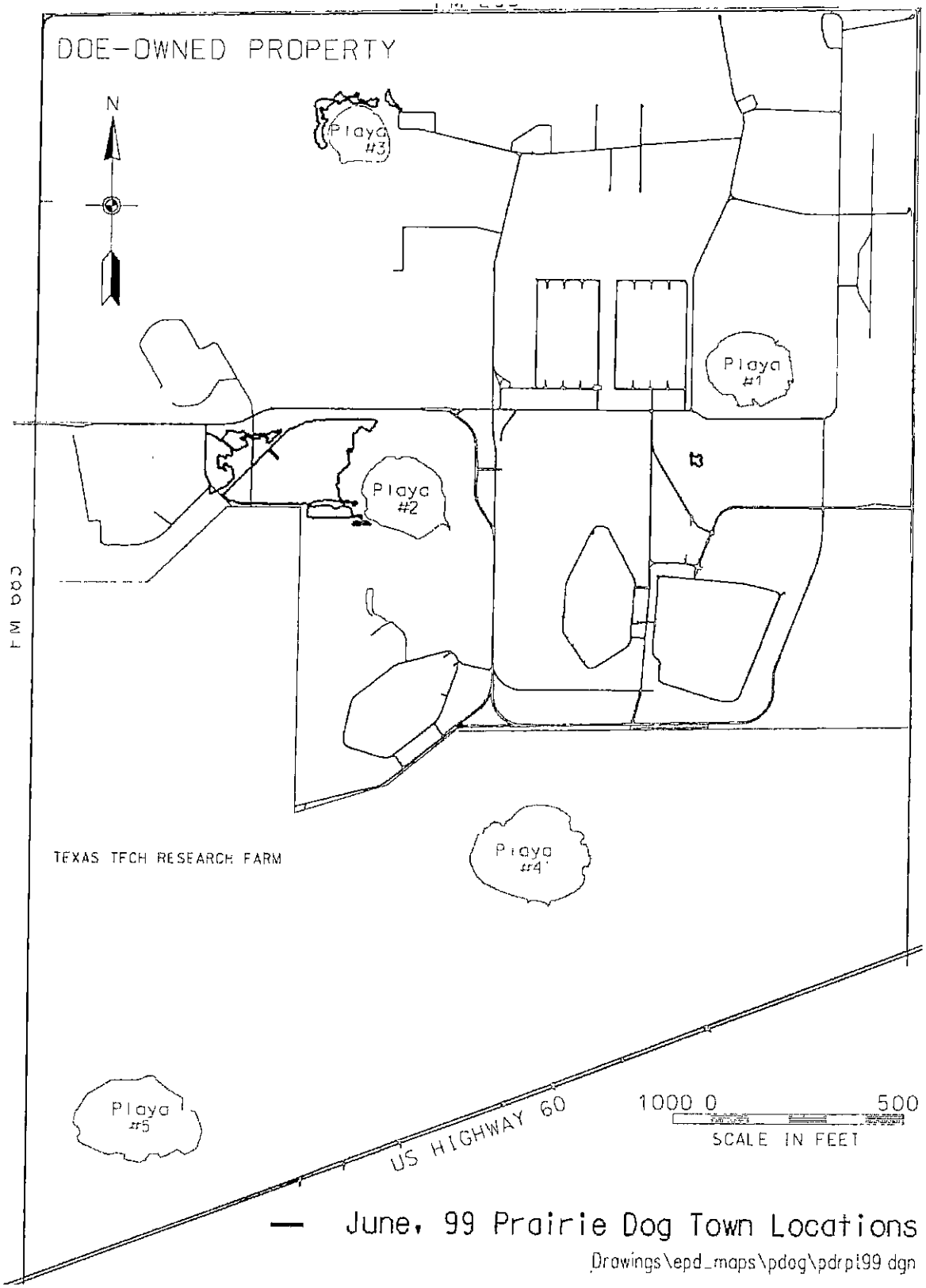


Figure 1. Prairie Dog Distribution at Pantex Plant (1999)

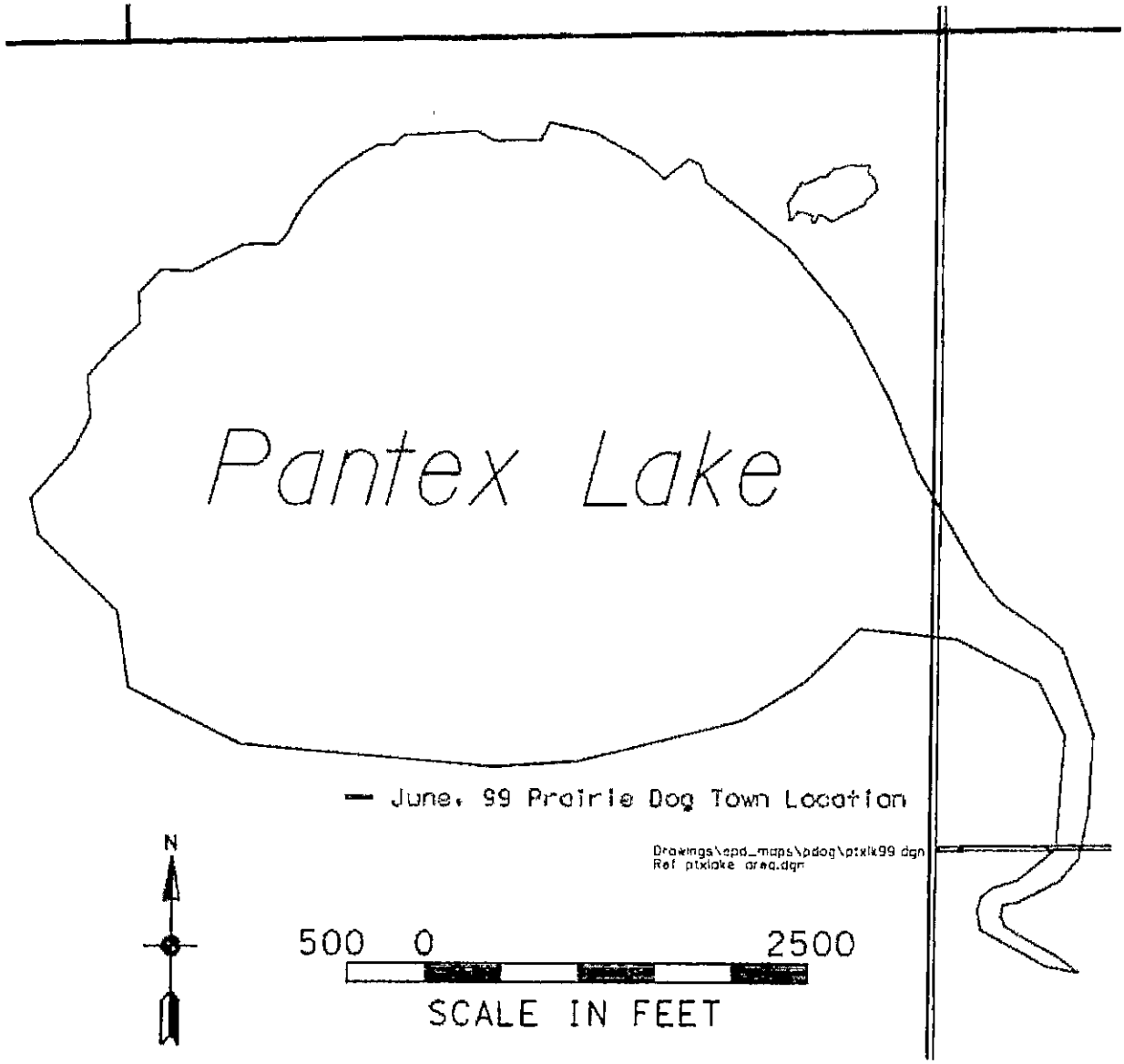


Figure 2. Prairie Dog Town at Pantex Lake (1999)

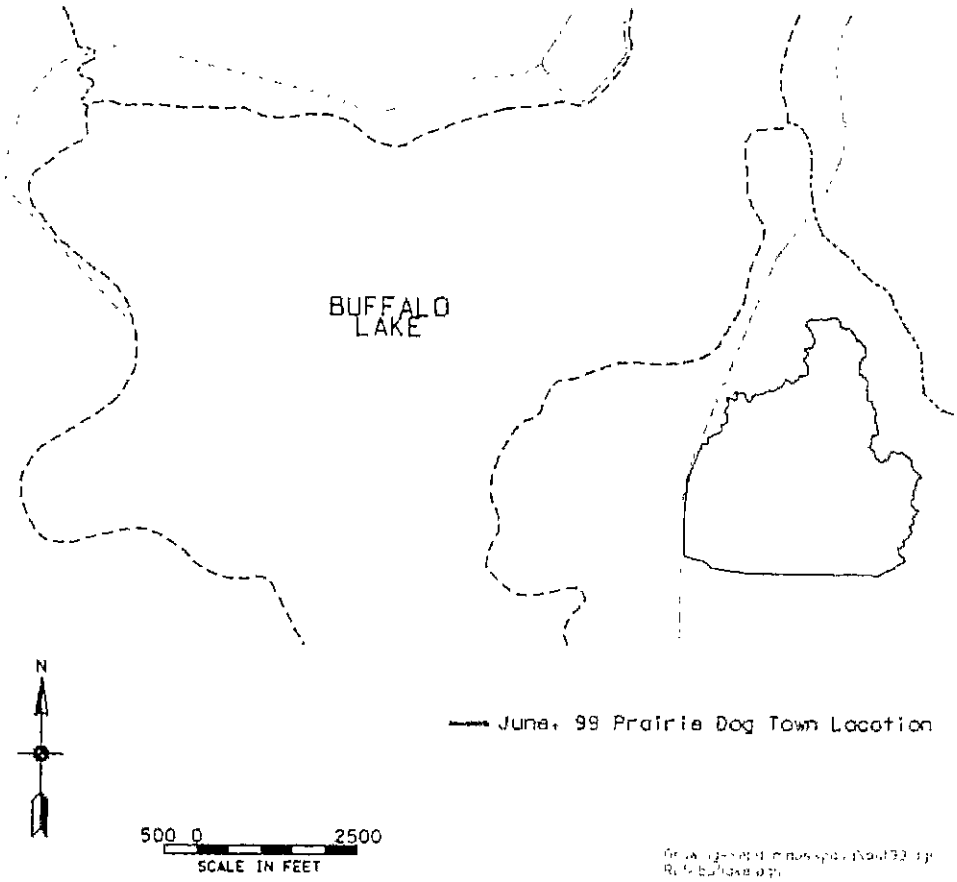


Figure 3. Prairie Dog Town at Buffalo Lake National Wildlife Refuge (1999)

2. 2000-2001 ACTIONS

Population Characterization

The perimeter of each prairie dog town was mapped initially with a Global Positioning System (GPS) in 1997 to determine baseline sizes of the towns. Mapping of town sizes is repeated annually, and is scheduled to be mapped during June through August to coincide with population estimation data scheduled for the same time period. Data are included in annual reports and in Plan revisions. Data are mapped in a manner to document annual changes in town sizes between years, and also compared to the 1997 baseline. Data collected in 2000 were lost due to failure of G.P.S. equipment. EP/RD ordered new equipment in 2001, but this was not received during the current reporting period.

In 1997, two-acre representative plots were established in the larger prairie dog towns for use in population estimation. Both adult and juvenile prairie dogs in each representative plot were counted and these density numbers were used to extrapolate populations for 1997 and 1998. All active burrows and prairie dogs were counted in the smaller towns. During the June 1999 mapping it was determined that the population distribution had become very heterogenous across the towns and that populations in the established sample plots no longer represented the entire towns. In some cases, there were very few prairie dogs within the plots. As a result of the obvious changes in the population distributions, it was concluded that any population information based on data from the sample plots would be very inaccurate; therefore no such data were collected from the plots after 1998.

A 1998 journal article on estimating populations of prairie dogs (Comparison of methods to estimate population densities of black-tailed prairie dogs, K.E. Severson and G.E. Plumb, *Wildlife Society Bulletin*, Vol. 26, pp. 859-866, December 1998) concludes that the number of burrows should not be used to estimate or index prairie dog numbers. Instead, visual counts utilizing carefully designed protocol should be made at least three times a day for at least three consecutive days in order to obtain valid population numbers. Based on this information, it was determined that the population data reported in previous prairie dog annual reports were not valid. EP/RD developed population estimation procedures adapted from Severson and Plumb (1998), which were implemented in June-August 2001. These are actual numbers of prairie dogs consisting of visual counts across their towns, made four times per day for three days. The highest number from any of the 12 replications is used as the estimated population. The counts are made from elevated deer stands at larger towns (Playa 2 and 3), and from pickup trucks at smaller towns (Zone 4 West, northeast of 12-36, and Pantex Lake). A crude productivity index is calculated, based on the number of young per adult.

In 2000, the estimated population of prairie dogs at Pantex was 463 (Table 2). This is considerably lower than previous estimates in 1997 (10,000) and 1998 (13,000) that were based on burrows, rather than actual counts of prairie dogs. Low estimated populations at the Zone 12-36 and Zone 4 West sites, both isolated locations, were due to the annual control of prairie dogs in these areas, including in 2000. The largest population of prairie dogs occurred at Playa 2 (N=338), and comprised 73% of the prairie dogs at Pantex.

Productivity, based on individuals that could be confidently assigned to an age class (young, adult), averaged 1.67 young per adult across the Plant. Productivity was slightly higher at Pantex than that observed at the control site at Buffalo Lake National Wildlife Refuge (1.20; Table 2). Productivity varied among towns on the Plant, and was highest at Playa 2 (2.07.)

Table 2. Populations and Productivity of Prairie Dogs and Burrowing Owls at Pantex Plant and a Control Site at Buffalo Lake National Wildlife Refuge, 2000.

Location	Prairie Dog: Estimated Population	Prairie Dog Productivity*	Burrowing Owl: Estimated Population
12-36	18	0.57	41
Zone 4 West	25	1.60	22
Playa 2	338	2.07	12
Playa 3	40	2.40	26
Pantex Lake	42	0.65	14
Pantex Total	463	1.67	115
Buffalo Lake NWR	504	1.20	9

* Crude index based only on individuals assigned to an age class.

Prairie dog population control actions were administered by the Pantex Plant during July 2000 to reduce their impacts on a recently planted living visual barrier (shrub belt), and in February and March 2001 for safety and security purposes and to reduce their impacts on TTRF agricultural production activities. Areas where these actions were conducted are included in Table 3.

Burrowing owl populations are estimated during prairie dog population surveys. Burrowing owls display a heavy reliance on burrows and clipping of vegetation by prairie dogs. In 2000, the estimated population of burrowing owls at Pantex was 115 (Table 2). The largest population of burrowing owls occurred at the relatively small Zone 12-36 site (N= 41), where they out-numbered prairie dogs (N=18.) A similarly high density of burrowing owls occurred at the Zone 4 West site (N= 22). These high populations observed at these sites were probably enhanced by the following factors: (1) increased availability of unoccupied burrows following Phostoxin applications, (2) increased availability of burrows following the opening of treated burrows by

Texas Tech University researchers, and (3) continued control of vegetation height by surviving prairie dogs, as well as drought conditions.

Table 3. 1999-2001 Prairie Dog Treatment Schedule in Areas of Special Operational Concern and for Agricultural Interests

Location	1999 Treatments	2000 Treatments	2001 Treatments
Firing Range 1	March	N/A	March
Pantex Drive	March	N/A	March
West of Zone 4	March	February	February, March
Burning Ground	March	February	February
Area near Bldg. 12-103	N/A	N/A	N/A
Zone 12 South	N/A	N/A	N/A
Zone 8	March	April, May	N/A*
Area West of Playa 2	March	N/A	N/A
Area Southwest of Playa 2	March	N/A	N/A
Living Visual Barrier	—	July	N/A
Northeast of 12-36	—	April	N/A*

* Scheduled treatments were not accomplished due to the continued presence of burrowing owls.

Population Management

Attempts to eliminate prairie dogs from identified areas of special operational concern began on an interim basis in March 1995 and is continuing as identified in the Plan. A specific treatment protocol using Phostoxin was developed and approved by the USFWS and DOE/AAO. All Phostoxin use at Pantex Plant has been documented and is summarized for 1998–2001 in Table 3. Critical areas are treated each year in late fall through early spring, with follow-up, if necessary, to attempt to keep them free of prairie dogs.

The protocol for Phostoxin use at Pantex continues to be successful. There have been no incidents involving misuse, or of the accidental exposure of non-target species, including burrowing owls. However, recent cases in Portales, New Mexico, and Lubbock, Texas, involving "take" of burrowing owls during Phostoxin applications have reemphasized the need for Pantex to use extreme caution prior to and during future applications. Protocol for protecting burrowing owls were outlined in the 1998 Plan and 1999 Annual Review and Report, and additional safeguards were employed in the spring of 2000. These protocol were reviewed and approved by the U.S. Fish & Wildlife Service (Appendix B) in 2001, and are as follows:

1. Under most circumstances, applications will be conducted during winter months, following the Fall-departure of, but prior to the Spring-arrival of burrowing owls.

2. Surveillance will be performed for burrowing owls in areas to be treated, several times within three days of, but including, the day of treatment. Treatments will not occur within areas, if owls are observed within that area to be treated.

3. Phostoxin applications will be performed by the Yard Group or subcontractors (applicator) of EP/RD, but only in the presence of the EP/RD.

4. On day of treatment, while in the presence of the applicator, EP/RD will inspect and mark individual burrows to be treated. No burrow entrances or mounds containing the following burrowing owl sign will be flagged or treated: 1) presence of owl fecal sign, 2) regurgitated pellets, or 3) beetle parts.

5. During summer months, EP/RD will flag and monitor suspected burrowing owl natal dens. Treatment of these natal dens will be avoided, regardless of the time of the year.

Treatment plans for 2001 will continue to focus on keeping prairie dogs excluded from areas of special operational concern, west of the Zone 8 road near Playa 2, north of 12-36, and if necessary, the area at Playa 2 where the living visual barrier has been established. These areas are scheduled for retreatment in the winter of 2001-2002, after the burrowing owls have migrated south for the winter. It is anticipated that the need for treatment at the site of the living visual barrier will decrease as the shrubs grow and begin to function as a barrier.

To discourage recolonization of areas treated for prairie dogs, mowing practices allowing taller vegetation have been recommended. The recommendations are intended especially for Zone 4 West, along Pershing Drive on the north side of Playa 4; and along Pantex Drive. Grass is not to be mowed until it reaches a height of 12 inches, except for narrow strips on each side of the road, and cutting height will be approximately 6-7 inches. When implemented, vegetative cover is improved substantially in both quantity and quality, and extensive recolonization in these areas is discouraged. Unfortunately, the recommendations have not been followed on a consistent basis. Mowing height cannot be altered at the Burning Ground; prairie dog management there will continue to rely on other control measures.

Visual barriers made of plastic mesh previously were installed at Pantex Plant in several locations where directional spread of the towns was to be discouraged. Their effectiveness has increased as associated vegetation grows, which serves as additional visual deterrents. These barriers alone are not adequate to stop the spread of prairie dogs, but they appear to slow their spread. No new mesh visual barrier has been installed in the past year; however, a supply is available for installation if needs arise.

A living visual barrier of native shrubs was established in May 2000 to help minimize prairie

dog migration to the south of the Playa 2 Playa Management Unit (PMU) on to TTRF land. Approximately 3,200 four-winged saltbush (*Atriplex canescens*) and aromatic sumac (*Rhus aromatica*) shrubs were planted according to guidelines established by the Texas Forest Service and the Texas Parks and Wildlife Department. The two shrub species were carefully selected for best management of the native shortgrass prairie ecosystem. The barrier was established using weed barrier fabric, within fencing to offer protection of the shrubs from livestock, rabbits and rodents. The fabric helps conserve soil moisture by suppressing weeds that rob moisture from the shrubs, and reducing evaporation of stored soil moisture.

The over-all September 18, 2000 calculated survival rate for shrubs in the living visual barrier was 77.9%. This survival rate is approximately 12-15 points below most first-year plantings in the Texas Panhandle. This may be attributed to the extremely hot dry weather conditions in July, August, and September. Rainfall for these months in 2000 were 0.16, 0.29, and 0.03 respectively, while average expected rainfall rates for these months are 3.06, 2.44, and 1.37 inches.

Replacement shrubs were ordered and planted in the living visual barrier in April, 2001. Four-hundred four-winged salt bush and 300 aromatic sumac were inserted where needed. Annual surveillance and routine maintenance will continue. During the June 2001 Texas Tech University/DOE/AAO Biannual Service Agreement Meeting the Texas Tech Farm Manager stated that the living visual barrier has helped minimize prairie dog migration to the south and southwest of the Playa 2 PMU.

A total of 12 raptor perch poles were previously installed approximately 300 to 400 yards apart in prairie dog towns at Playas 2, and 3. Hawks and eagles are regularly observed during the winter using the perch poles. Prairie dog bones have been observed beneath the poles. Although predation from raptors using the poles may provide a low level of population control, it has not been effective in limiting the spread of prairie dogs.

Environmental Monitoring

Because of their abundance, distribution, and dietary habits, prairie dogs were selected as the biological medium in EP/RD's faunal monitoring program for radionuclides, pesticides, and epidemiological factors. In 1996, four animals were trapped monthly at each of five trapping locations. In 1997, this sampling level was reduced to three animals per quarter at each of the five locations. Because these baseline data indicated that radionuclide concentrations in prairie dogs were similar to, or lower than, values in other environmental media, and because all organochloride pesticide results were negative, sampling of prairie dogs for radionuclide and health analyses was, with AAO's concurrence, reduced to semi-annually beginning in 1998, and sampling for pesticide analysis was eliminated. Thirteen of 15 scheduled samples were taken and analyzed during the report period. Two samples, scheduled to be taken from the Burning Ground, were not taken, due to the lack of prairie dogs there, following their control with Phostoxin. The results were consistent with those of previous years and indicate that uptake of radionuclides from Plant activities is minimal in prairie dogs. The analytical results from all tests are documented in the annual *Environmental Report for Pantex Plant.*

Health Monitoring

Prairie dog populations have been monitored for epidemiological factors of concern for human health since 1996. Blood samples are analyzed by Texas Veterinary Medical Diagnostic Laboratory (TVMDL). Complete blood counts are performed on all animals sampled for disease and health analysis. These data are being compiled as a baseline for comparison with future results. Thirteen of 15 scheduled samples were taken and analyzed during the report period. Two samples, scheduled to be taken from the Burning Grounds, were not taken, due to the lack of prairie dogs there, following their control with Phostoxin.

Antibodies of eastern and western equine encephalitis were detected in four and one animals, respectively. Two of these animals were collected at Pantex, while three were from the control site. Actual viruses of these two diseases were not detected, and their antibodies are not uncommon in prairie dogs. Three of the 13 individuals analyzed, including two from the control site, tested positive for herpesvirus; however, this appears normal and reportedly affects only its host species. No other diseases were detected during the report period. This information is presented in the annual *Environmental Report for Pantex Plant.*

Necropsies and histopathological examinations of major organs were completed on all prairie dogs sampled for disease, with few deviations from expectations for a healthy population. Two individuals had apparent minor bacterial infections in one or more internal organs. This is not unusual in prairie dogs.

3. REGULATORY STATUS OF PRAIRIE DOGS

On 30 July 1998 the National Wildlife Federation (NWF) petitioned the USFWS to emergency list the black-tailed prairie dog as threatened throughout its historic range (portions of Montana, Wyoming, Colorado, New Mexico, Oklahoma, Texas, Kansas, Nebraska, North Dakota, South Dakota, and Canada and Mexico; it has been extirpated from Arizona.) The petition cited continued declines in prairie dog populations due to control efforts by landowners, loss of shortgrass prairie habitat, recreational shooting, and declines due to an exotic disease, sylvatic plague. Also, included was information on the importance of prairie dogs for other species, including threatened and endangered species, and species of concern that use prairie dog towns as habitat. This includes swift fox, black-footed ferret, burrowing owls, and mountain plovers.

On March 25, 1999, the USFWS published its 90-day petition finding. The finding states that substantial scientific and commercial information exists that may warrant listing the black-tailed prairie dog as a threatened species under the Endangered Species Act (ESA). However, the USFWS did not list the prairie dog, but served notice that all scientific and commercial data would be reviewed to make a 12-month finding on the petition. In February 2000, the USFWS ruled that "Federally Threatened" status was "Warranted, But Precluded," based on higher priority species under consideration at the time. This designation, however, officially provided them status as a "Candidate Species" under the ESA.

The regulatory status of black-tailed prairie dogs, in terms of legality of treating them with Phostoxin, remains unchanged, and will likely not change unless or until the USFWS upgrades the species' status to "Federally Threatened." The State of Texas has the authority to protect or restrict harvest on prairie dogs; however, indications are that this will not occur unless regulatory actions are taken by the USFWS.

Within the current regulatory climate, short-term management decisions should be carefully considered, and should not preclude long-term options. One thing is certain: substantial management and regulatory attention will be focused on prairie dogs over the next several years. This is evidenced by the development of a "Black-Tailed Prairie Dog Conservation Assessment and Strategy" document by the USFWS in late 1999, and the subsequent formation of the Black-Tailed Prairie Dog Conservation Team (BTPDCT), and state working groups for each state within the range of this species. A Conservation Agreement is a key element of the Conservation Strategy, officially committing participating state and federal agencies, as well as private conservation groups, to conservation of the black-tailed prairie dog. This is accomplished through the BTPDCT, which was formed to guide the development of prairie dog conservation measures across the range of the black-tailed prairie dog. It is comprised of one representative from each signatory to the Conservation Agreement. State wildlife agencies are refining and coordinating the Conservation Strategy, which calls for the development of the state working groups and management plans. EP/RD staff have represented Pantex at one meeting of the BTPDCT (Phoenix, Arizona; 30 November 1999).

Texas's state working group, the Texas Black-Tailed Prairie Dog State Working Group (TBTPDSWG), is represented by many state and federal agencies, as well as private conservation groups and the agricultural community. This group meets approximately every other month, and is developing management and research strategies that will guide prairie dog management in Texas in lieu of, or as part of, the designation of the species as "Federally Threatened" under the ESA. Following DOE/AAO approval on 6 January 2000, EP/RD staff have regularly attended these meetings, which are the best and most up-to-date source of information on the listing process and status, as well as management of this species. In March 2001, a meeting was held for an expanded audience of participating agencies. Pantex was represented by two DOE/AAO and two EP/RD employees. Public meetings are planned for the Fall of 2001.

4. INFORMATION NEEDS

Data used for making prairie dog management decisions on the Pantex Plant has, since 1996, included field observations of prairie dog colony health, burrow counts, animal counts with extrapolation of population and density for each colony, and colony perimeter mapping using GPS equipment. The quality of population data for prairie dogs was greatly enhanced in 2000 through improved techniques. Information on the use of prairie dog towns by birds is available from the surveys conducted under the Comprehensive Playas Management Plan, and additional bird information, particularly on burrowing owls, is gathered during prairie dog population surveys.

Management of prairie dogs and their habitats shall be refined based on the new scientific information as it becomes available from various sources (EP/RD, Texas Tech, state and federal agencies). Work continued under a subcontract secured for FY00 and 01 for studying the diversity of vertebrate and macroinvertebrate life associated with prairie dog colonies, as well as the impacts of the Plant's Phostoxin treatment program on non-target species. The subcontractor, Texas Tech University's Department of Range, Wildlife, and Fisheries Management, are comparing biodiversity seasonally between treated and non-treated prairie dog towns, as well as non-prairie dog habitats. Data are recorded for observed impacts of Phostoxin on other species. The need for this information has been intensified by the proposed listing of the black-tailed prairie dog. A report will be submitted by Texas Tech prior to the end of FY01.

Information needs identified by EP/RD in 2000 include determining the effects of prairie dogs on contamination characterization and treatment processes, as well as on vegetation and, related influences on faunal communities. Additionally, EP/RD needs to have technology developed that will indicate occupancy of burrows by species other than prairie dogs (e.g., burrowing owls). A statement of work, for some or all of these needs, is in preparation, and will be issued for procurement in the near future.

Information is also needed on ecology of burrowing owls at Pantex, especially related to prairie dog control. Prairie dogs are known to provide habitat through burrow availability and maintenance of low vegetation through herbivory and clipping. In addition, prairie dogs serve as a buffering food source for predators of burrowing owls, especially badgers, and serve as extra eyes and ears for predator detection. Comparisons in burrowing owl nest densities, and nest and brood survival, between treated and non-treated towns are needed to determine impacts of prairie dog control on burrowing owls. Related to this, information is needed for development of management strategies (e.g. opening of holes following Phostoxin applications, mowing of vegetation, etc.) for burrowing owls in the absence of burrowing, and vegetation clipping by prairie dogs. Banding/color marking should be initiated to determine burrowing owls affinity to burrows and towns, where prairie dogs are controlled. This information will assist in demonstrating that Pantex is in full cooperation/spirit with the 2001 Executive Order "Responsibilities of Federal Agencies to Protect Migratory Birds," (Appendix B).

Prairie dog management will continue to be both an emotional and scientific issue at Pantex, as well as among landowners/managers on the High Plains. Sound ecosystem management decisions must be based on scientific information. Adaptive management practices must be altered as new information is acquired that may warrant a change in management strategy or action, particularly if the legal status of the prairie dog changes.

EP/RD staff have, over the past several years, noticed changing vegetative composition occurring both in and outside of prairie dog towns within the various Playa Management Units (PMUs). Grazing has been used as the primary method of vegetation management in the PMUs. However, prescribed fire management may be more effective for enhancing vegetative diversity and richness within the PMUs, including in prairie dog towns. A prescribed burning program is being discussed by EP/RD.

Selective reduction in densities of prairie dogs should remain a management option at Pantex. Both Playa 2 and 3 towns have in the past developed very high densities of prairie dogs that have caused serious overgrazing within the colony. This has resulted in prairie dogs either dying off or abandoning large areas of both towns that are devoid of useful vegetation. A selectively managed population could provide continuing long-term benefits for other species and the shortgrass ecosystem, and maintain a healthy vegetational structure that would allow sustainable grazing opportunities and reduce the need for intensive vegetation management.

Coordination between prairie dog management and playa management is becoming increasingly important. Needed vegetation management in the PMUs through controlled cattle grazing may be impacting prairie dog distribution in towns located in those PMUs. EP/RD will continue to examine such coordination and provide recommendations to DOE/AAO.

5. CONCLUSIONS

Information presented in previous annual reports indicate that the Pantex Plant's prairie dog management program is generally successful in controlling prairie dog populations, where needed, while maintaining this important species and its associated ecosystem. Recent issues surrounding protection of burrowing owls intensifies challenges associated with Phostoxin applications. However, in most cases, required control of prairie dogs should occur.

On-going and future studies will strengthen baseline information on the prairie dog ecosystem at the Plant, and facilitate comprehensive planning for prairie dog management. Continued involvement with the TBTPDSWG will allow EP/RD to keep up with the latest developments concerning the management and potential listing of this species. As information becomes available, and when the regulatory context becomes more settled, EP/RD will make additional recommendations to DOE/AAO for prairie dog management at Pantex Plant. In the meantime, EP/RD will continue informal discussions with DOE/AAO counterparts on this issue and its coordination with broader ecosystem management.

APPENDICES

United States Government | Department of Energy

memorandum

Albuquerque Operations Office
Amarillo Area Office

DATE: JUN 21 2000

REPLY TO ATTN OF: AAO:EPT:PAM

SUBJECT: Prairie Dog Management Plan Biannual Review

TO: P. J. Selde, Director, Environmental, Safety, Health and Quality, MHC

In reference to your letter dated June 14, 2000, the Amarillo Area Office (AAO) concurs with MHC's recommendation to continue under the current "Management Plan for Prairie Dogs at Pantex Plant." Please continue to keep the AAO staff informed of any new information regarding the listing status of the black-tailed prairie dog.

If you have any questions, please contact Patricia Mattingly of my staff at extension 6640.

Jerry S. Johnson
Assistant Area Manager for Engineering
& Environmental Management

cc:
B. Deaver, EPRD, MHC, T9-061
J. Childress, EPRD, MHC, T09-061
J. Ray, EPRD, MHC, T09-060

Appendix A. Letter from AAO: Prairie Dog Management Plan Biannual Review

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Division of Law Enforcement
P.O. Box 2836
Lubbock, Texas 79408

Tel: 806-472-7273 **Fax: 806-472-7226**

Mr. James D. Ray
Wildlife Biologist
BWXT Pantex
Pantex Plant, Bld. T-9061
Amarillo, Texas 79120-0020

February 12, 2001

Dear Mr. Ray;

I reviewed the protocol for prairie dog control and Burrowing Owl protection you sent me. I am pleased that Pantex is taking a proactive approach to these issues. Your combination of surveillance, marking burrows, and using trained observers is the best method to minimize impacts on Burrowing Owls while conducting any necessary prairie dog control. Using this protocol is the best way to insure that Pantex abides by the Migratory Bird Treaty Act and the January 11, 2001 Executive Order "Responsibilities Of Federal Agencies to Protect Migratory Birds".

I know that your duties are complex and you may be concerned about prosecution for some unforeseen set of circumstances. While I could not possibly address every possible scenario, I believe that strict adherence to this plan will insure that Pantex is not exposed to criminal liability under Federal law in the unlikely event that a Burrowing Owl is accidentally killed during prairie dog control.

Again, thanks for considering migratory bird protection while solving this dilemma.

Robert C. Lee
Special Agent

Appendix B. Letter from U.S. Fish and Wildlife Service: Protocol for Protecting Burrowing Owls During Phostoxin Applications

LIST OF FIGURES

Review and Report on the Integrated Plan for Playa Management at Pantex Plant

U.S. Department of Energy
Amarillo Area Office

Prepared by

Soils Programs Section
Environmental Protection/Restoration Department
Environment, Safety & Health
BWXT Pantex, L.L.C.

February 1, 2001

Review and Report on the Integrated Plan for Playa Management at Pantex Plan

1. Introduction

This document is the annual review of, and report on, 2000 activities taken under the Integ Plan for Playa Management at Pantex Plant (the Plan). The structure of this report parallels of Section 5 (Work Plan and Monitoring Schedule) of the Plan, and reference is made throughout this report to information in that section, as well as to amendments to the Plan in subsequent annual Reviews and Reports (henceforth referred to as annual reports). Over the p year, the Plan has proved to be a very effective tool for coordinating a wide range of management activities at Playa Management Units (PMUs) and Pantex Lake by several Plant groups, and by Texas Tech University (TTU).

The original 1996 Plan stipulated an annual report of activities, plus a comprehensive review and revision every two years. However, discussions with the Department of Energy's Amarillo Area Office (DOE/AAO) in 1998 and 1999 have resulted in an understanding that the Soils Programs Section (SPS) planning documents, including the Integrated Plan for Playa Management at Pantex Plant, should be reviewed and updated every three-to-five years, or as needed to provide effective management. In addition, annual reports of activities taken under these plans should be only as detailed as is necessary to effectively summarize management results. The Plan was reviewed for revision in early 2001. Minor revisions will be made to the Plan and submitted to DOE/AAO in FY01 or with the 2001 annual report.

Consistent with this understanding, some sections within annual reports have reduced level of detail, consolidated maps and figures, and specified new actions that will increase the Plan's short-term flexibility in responding to the Plant's changing administrative needs, as well as to environmental variability. The suspension of some actions are included in these reports, as indicated in Section 4 (Management Issues) of the Plan. All proposed changes to the administrative structure of the Plan are consistent with the Pantex Plant Comprehensive Natural Resource Management Strategy (CNRMS), initially approved by DOE/AAO in September 1998.

2. Background

Background information on the development of the Integrated Plan for Playa Management at Pantex Plant may be found within the Plan, and in the December 1997, and subsequent, annual reports.

3. Goals and Philosophies

The primary goal of the Plan was identified as --and remains-- providing ecosystem-based management that supports full compliance with applicable environmental resource protection regulations, Executive Orders, DOE Orders, and initiatives of the Secretary of Energy. This primary goal is still appropriate, and no change is recommended. Management of the playas is

guided by three philosophies: coordination with Plant operations, ecosystem management, and integrated natural and cultural resource management.

Each PMU requires special attention and integrated management to develop a sustainable ecosystem in a way that does not interfere with the Plant's operational mission. Under the terms of a Service Agreement, Texas Tech University Research Farms (TTRF) and its local cooperators, graze DOE-owned lands surrounding the PMUs and Pantex Lake, and have agreed to abide by disturbance and chemical restrictions to protect the natural and cultural resources and water quality.

The following Plant documents have a direct impact on coordination of the Plant's operational mission with TTRF's farming activities in regard to the PMUs and Pantex Lake:

- The revision to the Land-Applied Chemical Use Plan for Pantex Plant, initially approved by DOE/AAO on March 26, 1998, provides guidelines for the use of land-applied chemicals (pesticides, herbicides, etc.) at Pantex Plant.

- The Management Plan for Prairie Dogs at Pantex Plant, initially approved by DOE/AAO on July 9, 1996, provides a management approach that ensures a sustainable prairie dog population at Pantex Plant, while protecting employee health and safety, and resolving security concerns.

Each of these documents has contributed, specifically through its implementation, to a positive shift towards long-term ecosystem management of the PMUs. This encourages the development of sustainable, biotically diverse, playa-centered ecosystems in the most natural way possible under current and projected Plant operating conditions. The Plan represents a change in strategy from management for agricultural production to adaptive management for species diversity that is consistent with the natural short-grass prairie ecosystem of the Southern High Plains.

Because the PMUs are now fenced and are areas of restricted activity, the protection of the cultural resources associated with the playas is also integrated into the Plan. Only two cultural resource (archeological) sites, both located at Pantex Lake, are potentially eligible for the National Register of Historic Places. The specific protection measures for these two sites are covered in Section 5.4 of this report. Other archeological sites, which are not eligible for the National Register, are monitored in conjunction with other surveillance activities in the PMUs.

4. Management Issues

Five management issues were initially identified in the Plan: floodplain and wetland management, agriculture, erosion and soil compaction, cultural resource protection, and biotic community conservation. These issues remain relevant for this report and form the core of the Work Plan and Monitoring Schedule section of the Plan, with objectives and actions assigned for each of the management issues.

5. Work Plan and Monitoring Schedule

This section of the report identifies (in bold type) the Plan's initial management issues and incorporates initial and later actions from the 1997 through 1999 annual reports. Completed and proposed actions and their roles are assessed in achieving the objectives, and new actions proposed, as needed.

Section 5.1 Floodplain and Wetland Management

In the December 1997 annual report, the incorporation of Playa 3a (Appendix A, Figure 3) was determined not to be feasible due to its inclusion in the safety buffer of the new Firearms Tactical Training Facility (FTTF). Two new actions, visual monitoring of vegetation and monitoring of bird activity, were added in 1998 (February 1999 annual report) to improve baseline characterization of Playa 3a. However, primarily due to scheduling conflicts with the FTTF, these two actions have been suspended.

Management of cattails in Playa 1 was suspended in 1998, as outlined in the 1998 annual report, due to administrative issues associated with upgrading the Wastewater Treatment Facility (WWTF), which provides effluent water to Playa 1. However, an approved herbicide was used to control cattails in 2000 in order to maintain the effluent flow from the WWTF. This will continue as needed until the upgrade of the WWTF is in place.

The proposed upgrade involves the use of effluent for irrigation rather than discharge to Playa 1. Should this occur as expected, then all discharges to Playa 1 from the WWTF would cease, the Playa would revert to a more natural ephemeral playa, and the cattails would gradually decline without aggressive chemical management. An example of this reduction occurred during the 1998 drought, which reduced the available wet areas in Playa 1. To facilitate the conversion of vegetative cover from cattails to ephemeral vegetation, the SPS recommends the removal of cattail stubble and litter through a prescribed burn, once the effluent is diverted to irrigation.

Section 5.2 Agriculture

The Management Plan for Revegetation of Playa Buffer Areas and Formerly Cultivated Areas was implemented during the summer of 1996. Native grasses were planted in playa buffer zones and in previously cultivated land near the playas (Appendix A, Figures 1 through 3) to prevent soil erosion, protect cultural resources, provide improved habitat for wildlife, and protect the playas from agricultural pesticides.

Weed control is no longer required in these areas because the grass is well established and competes with weeds, some of which provide food or cover for wildlife. The revegetated area north of Playa 1 was grazed in 2000. Additional information on managed grazing in the PMUs is provided in Section 5.5, where plans on future grazing are also discussed.

Section 5.3 Erosion and Soil Compaction

A concrete liner was installed the length of the ditch that drains towards the Playa 1 Management Unit (PMU1) on the South side of Zone 4 East. Completion of this project met requirements identified in the Plant's Comprehensive Strategy for Erosion Control and Storm Water Management document. No action for soil stabilization was taken within this ditch inside PMU1. The north-flowing Outfall 003 ditch in the southwest corner of PMU1 continues to show evidence of slow headward erosion to the south, toward the outfall. Both ditches in PMU1 will be monitored for possible action in the future. Continuing photo documentation at this location will monitor severity of the erosion. Removal of the inactive weir in the southwest ditch to the south of PMU1 may be recommended if erosion becomes severe.

Terraces in cultivated land south of Playa 2 functioned as designed during the 2000 growing season. The west side of this field was planted to dryland grain sorghum in the summer of 2000. Dry conditions persisted most of the summer with one large storm event in October. Storm water was channeled by the terraces out of the cultivated field into the PMU native grassland with little soil sediment being deposited. The east side of this field was planted to winter wheat in November. The condition and functionality of all terraces located at Playa 2 will continue to be monitored after major precipitation events in the future.

Section 5.4 Cultural Resource Protection

Most of the Plant's archeological sites occur within the PMUs, and two (41CZ23 and 41CZ66) have been determined potentially eligible for the National Register of Historic Places. Both sites require protection, along with regularly scheduled monitoring. Exposed artifacts are mapped and collected, and any exposed features are appropriately excavated if they cannot be adequately protected *in situ*. A complete report of protection activities is made annually to the State Historic Preservation Officer (SHPO).

Site 41CZ23 is located in natural grasslands at Pantex Lake, and is being grazed under a grazing management plan developed by TTRF and approved by DOE/AAO; it is not being adversely impacted by the grazing, or by erosion. Site 41CZ66, however, has been heavily disturbed in the past by both grazing and erosion from adjacent irrigation, exposing artifacts and buried cultural features. These exposed materials have been mapped; collected or excavated, cataloged, and analyzed; and some have been prepared for public interpretation. Cattle have been excluded from site 41CZ66 since 1997, and rip-rap was installed at the upper end of the drainage ditch through the site about the same time to retard erosional downcutting. These protective measures have significantly improved the vegetative cover and reduced erosion, so that bare ground is virtually absent at the site except for the vertical ditch walls. Scheduled site monitoring during 2000 revealed several stone artifacts and major portions of the skull of an *(Bison bison)*. This was excavated June 22 - July 6, 2000.

Photo surveillance and documentation, and GIS topographic mapping were accomplished in 2000. SPS will continue to explore methods for improving soil stabilization at archaeological sites.

Section 5.5 Biotic Community Protection

Vegetation Management and Monitoring

Managed grazing to reduce biomass and improve biodiversity is used as appropriate in the PMUs. A rotational grazing system among PMUs was developed in December 1999. This rotation is comprised of 1) an intensive grazing treatment of 50-80 percent removal of biomass, 2) a moderate grazing treatment of the standard NRCS 50 percent reduction rule, and 3) a deferred grazing treatment (Table 1). Prescribed burning may be cycled into this rotation in the future. In 2000, grazing was accomplished only at PMU1. The Playa 2 Management Unit (PMU2) was not grazed in 2000 due to the establishment of a living visual barrier along the cultivated area and TTRF property on the south side of PMU2. Establishment of this barrier displaced access to the only livestock water tank at Playa 2. The Playa 3 Management Unit (PMU3) could not be grazed in 2000 because of maintenance to the fence that separates it and Firing Site 21. Fencing and water projects should be completed by April 2001 at these two PMUs allowing rotational grazing to resume (Table 1).

Vegetation monitoring at the PMUs consisted of visual evaluations of percentage of vegetation removed. Visual evaluations are accomplished with exclusion areas in each PMU that allow for visual comparisons of percent vegetation removed by grazing versus that not grazed. Visual evaluation at PMU1 depicted a 70 to 80 percent removal of vegetation this year.

Table 1. Planned Grazing Treatments of Playa Management Units, 2000-2003.

	Grazing Treatment (% Vegetation Removal)		
Year	**Playa 1**	**Playa 2**	**Playa 3**
2000	50-80%	50% (east half)	50% (shortgrass only)
2001	None	50% (east half)	50-80%
2002	50%	50-80% (east half)	None
2003	50-80%	None	50%

Five-strand barbed-wire fence with chicken wire attached to the second from the bottom wire and then buried underground was installed on the south side of PMU2 where the living visual barrier was established. Five-strand barbed-wire fence was replaced along the south boundary of PMU3, separating the PMU from Firing Site 21.

Vegetation monitoring along established transects (Appendix A, Figures 1 through 4) was not conducted in 2000 due to competing priorities. Some vegetation monitoring may resume in the

future in conjunction with planned black-tailed prairie dog studies.

Monitoring continued for salt cedar (*Tamarisk gallica*) and honey mesquite (*Prosopis glandulosa*) at PMU1. In addition, Siberian elm (*Ulmus pumila*) and eastern red cedar (*Juniperus virginiana*) have established in some areas. No herbicide applications were made in 2000. These four exotic species will be monitored in 2001 with the intention of removing them with an approved herbicide when growing conditions are favorable for treatment.

Native forbs (wildflowers) have been established on the northern boundary of PMU2, and in the area between the railroad tracks and Pantex Drive, to help contain black-tailed prairie dogs within the PMU (Appendix A, Figure 2). Normal winter and spring precipitation resulted in further establishment and growth of the forbs. These measures, along with a modified mowing schedule, have been partially successful in reducing prairie dog expansion into these areas. They will continue to be monitored in 2001. Detailed prairie dog management information is provided in the Management Plan for Prairie Dogs at Pantex Plant.

A living visual barrier of native shrubs was established in May 2000 to help minimize prairie dog migration to the south of PMU2 into cultivated and TTRF land. Approximately 3,200 four-winged saltbush (*Atriplex canescens*) and aromatic sumac (*Rhus aromatica*) shrubs were planted in May according to guidelines established by the Texas Forest Service and the Texas Parks and Wildlife Department. The two shrub species were carefully selected for best management of the native shortgrass prairie ecosystem. The barrier was established using weed barrier fabric, within special fencing to offer protection of the shrubs from livestock, rabbits and rodents. Supplemental watering was required during the 2000 growing season due to extreme drought conditions in the late summer.

Wildlife Management and Monitoring

Bird survey transects (Appendix A, Figures 1 through 4) established in 1997, and modified in the February 1999 annual report, were followed in 2000. The surveys were completed at least quarterly, but monthly when possible. Once per quarter, counts were expanded to include all transect points and this data was provided to Texas Tech University as part of ongoing cooperative prairie dog studies. Reduced staffing, cancellations due to weather, and scheduling conflicts prevented surveys in some months. Bird transect data are supplemented by casual observations taken during non-routine trips to the playas (Appendix B, Table 1).

During 2000 transect surveys, 60 bird species were observed on transects, and 101 species were observed during casual observations (Appendix B, Table 1). Three species of birds observed during transect surveys were new to the Plant. These were common yellowthroat (*Geothylpis trichas*), Ross' goose (*Chen rossii*), and scrub jay (*Aphelocoma coerulescens*). Six new species of birds were identified during casual observations at the playas and at other locations on the Plant. These were black-chinned hummingbird (*Archilochus alexandri*), black-throated green warbler (*Dendroica virens*), curve-billed thrasher (*Toxostoma curvirostre*), long-eared owl (*Asio otus*), rock wren (*Salpinctes obsoletus*), and scrub jay. These species have been recorded in other areas of the Panhandle.

The number of bird species documented at the playas during transects and casual observations, combined, varied between 1999 (N=88) and 2000 (N=112). Variation in the number of bird species did occur between years and individual playas (Table 2). Species composition variation between years was likely influenced by a combination of several factors including the weather, reduction in the number of surveys accomplished, and an influx of a few bird species that are not commonly observed in habitats found at Pantex (e.g., scrub jays and long-eared owls). Drought conditions during the summer months resulted in the gradual drying of playas, except for Playa 1 which receives treated effluent, and declining upland range conditions through the summer months. Some variation between years can be explained by a reduced number of transect surveys performed; prioritization of activities resulting from staff reductions allowed only five of twelve monthly surveys to be performed at Pantex Lake, and the PMUs 1 and 2. Additionally, transect surveys at PMU3 were accomplished only quarterly, usually due to conflicts with operations of the FTTF. Fall migration surveys for "woodland" birds at tree rows on the Plant were increased in 2000. Variation of species between years were comprised primarily of the addition of new species (N=9) observed at the Plant, as well as increases in warblers and other "woodland birds" in 2000. Decreases were observed in wading birds, waterfowl (ducks and geese), and shorebirds.

Table 2. Numbers of Bird Species Observed By Area During 1999 and 2000 at the Pantex Plant.

	Species Observed				
Location	**1999**	**2000**	**1999 and/or 2000**	**1999, but not 2000**	**2000, but not 1999**
Playa 1	68	56	84	28	16
Playa 2	45	42	61	19	16
Playa 3	36	32	48	16	12
Pantex Lake	38	44	59	15	21
Other Areas	75	85	112	27	37

An electronic database of bird observations is updated on a monthly basis as data are acquired. Data are used to evaluate changes in species presence from year to year, calculate the species diversity, and document all species observed at Pantex. These cumulative data already suggest that bird diversity at the playas is greater than previously thought, that each PMU is a unique ecosystem, and that bird diversity may be a good indicator of ecosystem health and annual variation in habitat quality relative to precipitation.

Wildlife other than birds was monitored during bird transects and during casual observations made during non-routine visits to the playas. Table 3 provides a list of species seen, with location. At least ten wildlife species were seen at the playas in 2000. At least 20 non-bird

species were observed across the entire Plant. All of these species are commonly found in area.

Table 3. Wildlife Observed at Pantex Playas* in 2000.

COMMON NAME	SCIENTIFIC NAME	Playa 1	Playa 2	Playa 3	Pantex Lake	Other Area
Badger	*Taxidea taxus*					X
Black-tailed jackrabbit	*Lepus californicus*				X	X
Black-tailed prairie dog	*Cynomys ludovicianus*		X	X	X	X
Brazilian free-tailed bat	*Tadarida brasiliensis*					X
Bullsnake	*Pituophis melanoleucus sayi*					X
Checkered garter snake	*Thamnophis marcianus marcianus*					X
Cottontail	*Sylvilagus spp.***		X	X	X	X
Coyote	*Canis latrans*		X			X
Desert kingsnake	*Lampropeltis getulus splendida*					X
Eastern fox squirrel	*Sciurus niger*					X
Eastern yellowbelly racer	*Coluber constrictor flaviventris*		X			
Hispid cotton rat	*Sigmodon hispidus*		X			X
Plains hognose snake	*Heterodon nasicus nasicus*					X
Prairie rattlesnake	*Crotalus viridis viridis*	X	X			X
Raccoon	*Procyon lotor*					
Striped skunk	*Mephitis mephitis*				X	X
Texas horned lizard	*Phrynosoma cornutum*	X				X
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*					X
White-tailed deer	*Odocoileus virginianus*		X			X
Woodrat	*Neotoma spp.****					X

* Does not include observations by wildlife subcontractors.

** Desert (*S. audubonii*) and eastern (*S. floridanus*) cottontails occur on the Plant.

*** Southern plains (*N. micropus*) and white-throated (*N. albigula*) woodrats occur on the Plant.

SPS did not conduct any small mammal surveys in 2000; however, some small mammal trapping was accomplished as part of prairie dog studies being performed by Texas Tech University. Small mammal surveys in 2001 will be limited to those performed by Texas Tech.

A subcontract was secured with West Texas A&M University for FY00 and FY01 for studying the diversity and abundance of terrestrial macroinvertebrates within the various habitat types on the Plant. The Plant has a fairly strong information baseline for aquatic invertebrates as a result of the Macroinvertebrate Study of Pantex and Selected Offsite Playas, which was completed in 1996. However, a similar baseline for terrestrial macroinvertebrates did not exist. Invertebrates,

especially lepidopterans (moths and butterflies), are sensitive indicators of biotic diversity and ecosystem health. Many invertebrates possess a specific relationship with particular groups of host plants (e.g., monarch butterflies and milkweeds). These relationships in general may be used as sensitivity markers for monitoring ecosystem health, and success of the Plant's ecosystem management. Pending funding, the contract will be extended into FY02, ending at the end of December 2001.

Black-tailed prairie dogs are managed under the Management Plan for Prairie Dogs at the Pantex Plant (1999). This Plan, with subsequent documentation to AAO concerning the "Warranted, but Precluded" and "Candidate" status of the black-tailed prairie dog as a "Federally Threatened Species," identified the need for additional studies and characterization within prairie dog colonies at the Plant. A subcontract was secured with Texas Tech University for FY00 and FY01 to study the diversity of vertebrate and macroinvertebrate life associated with prairie dog colonies, as well as the impacts of the Plant's phostoxin treatment program on non-target species. In addition, SPS staff, through collaboration with the subcontractor, collects data annually on populations, and sizes of individual prairie dog towns on the Plant.

To determine if swift fox (*Vulpes velox*), a federal C1 status species, occurs on the Plant, SPS initiated spotlight surveys for the species, which are conducted during three evenings in October, November, and/or December. If swift fox are detected, surveys will be expanded to include livetrap techniques perfected by the Texas Parks and Wildlife Department. Additionally, SPS would incorporate management considerations for this species of concern as part of the overall management of the PMUs. No swift fox were observed along the 25-mile route. Other nocturnal animals seen during the 2000 surveys included badgers, black-tailed jackrabbits, cottontails, coyotes, and striped skunks.

6. Scheduled Activities for 2001

The work schedule proposed for 2001 is shown in Table 4, below.

Table 4. Scheduled Activities for Calendar Year 2001

Activity	PMU1	PMU2	PMU3	Pantex Lake	FY 2001 Funding
Photo Documentation	As necessary	As necessary	As necessary	As necessary	WAD
Vegetation Monitoring	As necessary	As necessary	As necessary	As necessary	WAD
Wildflower Monitoring	--	Early spring thru late fall	--	--	WAD
Managed Grazing	Rest	E. half; 50% rule	50-80% rule	--	WAD
Erosional Documentation	As necessary	As necessary	As necessary	As necessary	WAD
Cattail Management	As necessary	--	--	--	
Wildlife Monitoring	As seen	As seen	As seen	As seen	WAD
Waterfowl Monitoring	As possible	As possible	As possible	As possible	WAD
Living Visual Barrier Monitoring	--	As possible	--	--	WAD
Bird Survey	Monthly	Monthly	Monthly	Monthly	WAD
Eastern Red Cedar, Salt Cedar, Honey Mesquite, Russian Olive, Siberian Elm Monitoring and Control	As necessary	As necessary	As necessary	As necessary	WAD
Prairie Dog Control	--	Visual Barrier	--	--	WAD
Prairie Dog Town Mapping	--	Summer	Summer	Summer	WAD
Prairie Dog Population Estimation	--	Summer	Summer	Summer	WAD
Prairie Dog Subcontract Studies	Quarterly	Quarterly	Quarterly	Quarterly	WAD
Invertebrate Subcontract Studies	Spring, Summer, Fall	Spring, Summer, Fall	Spring, Summer, Fall	Spring, Summer, Fall	WAD
Archeological Site Monitoring	--	--	--	Per rainfall event	WAD

[1]**Quarters:** **Fall**=September - November; **Winter**=December - February; **Spring**=March - May; **Summer**=June - August

APPENDIX A
FIGURES

Figure 1. Playa Management Unit 1

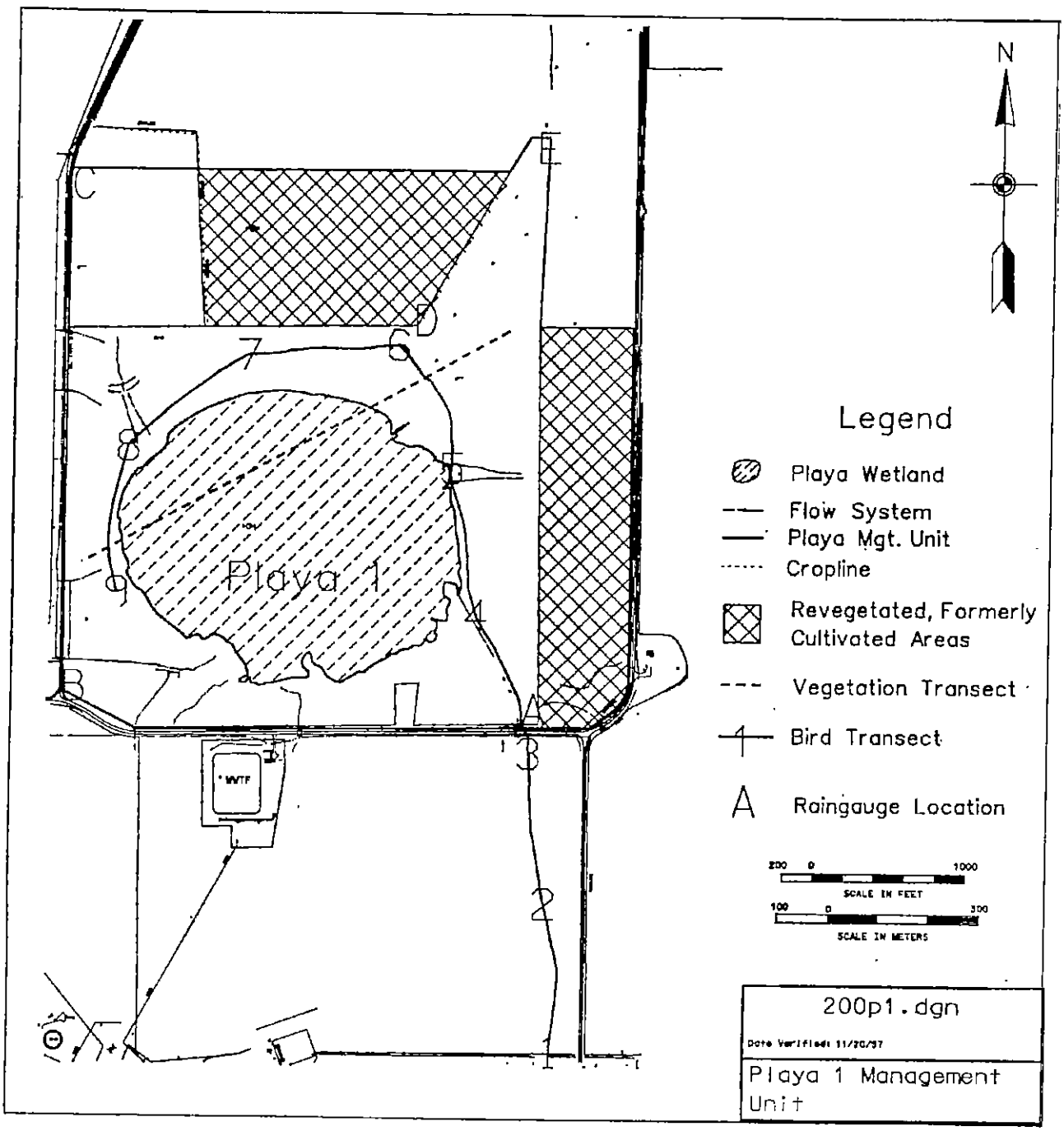


Figure 2. Playa Management Unit 2

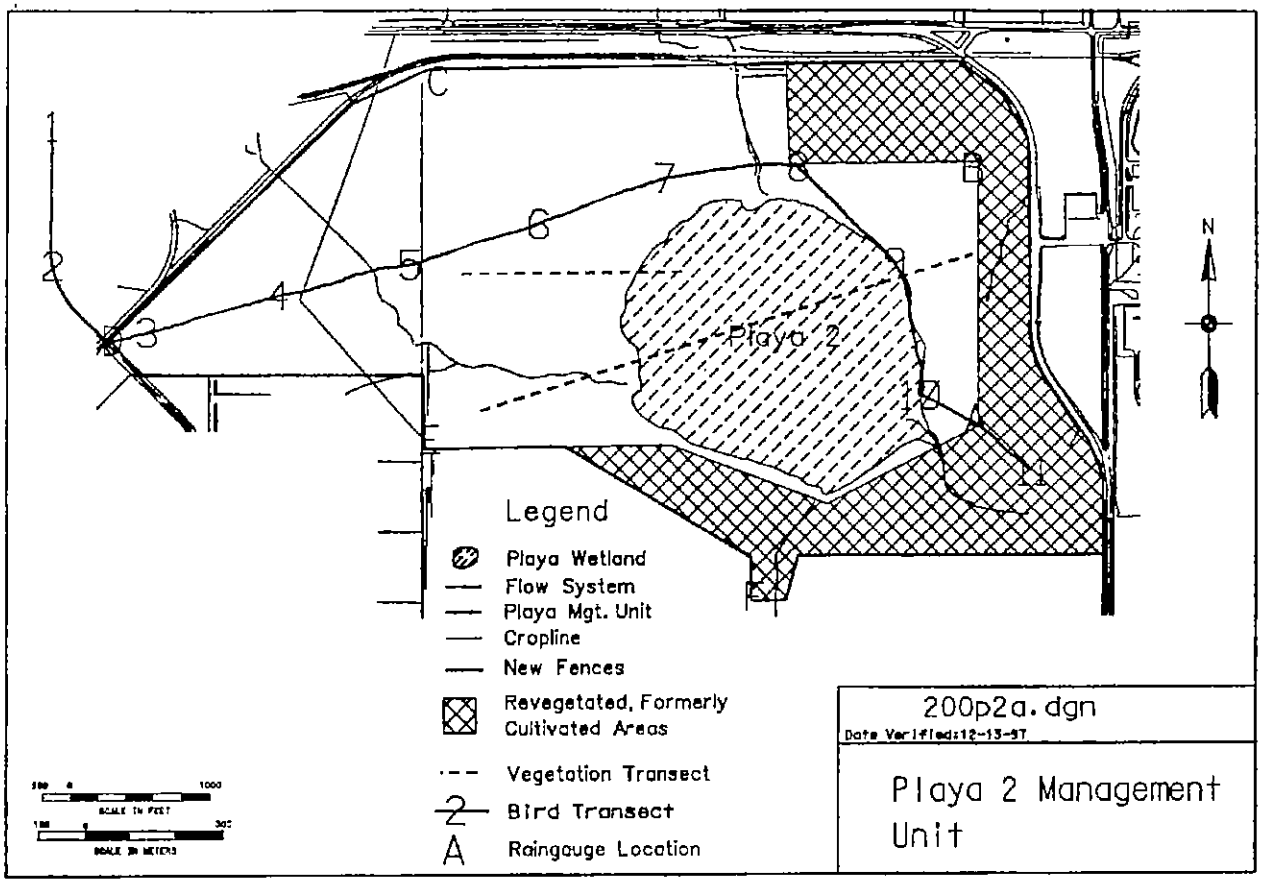


Figure 3. Playa Management Unit 3

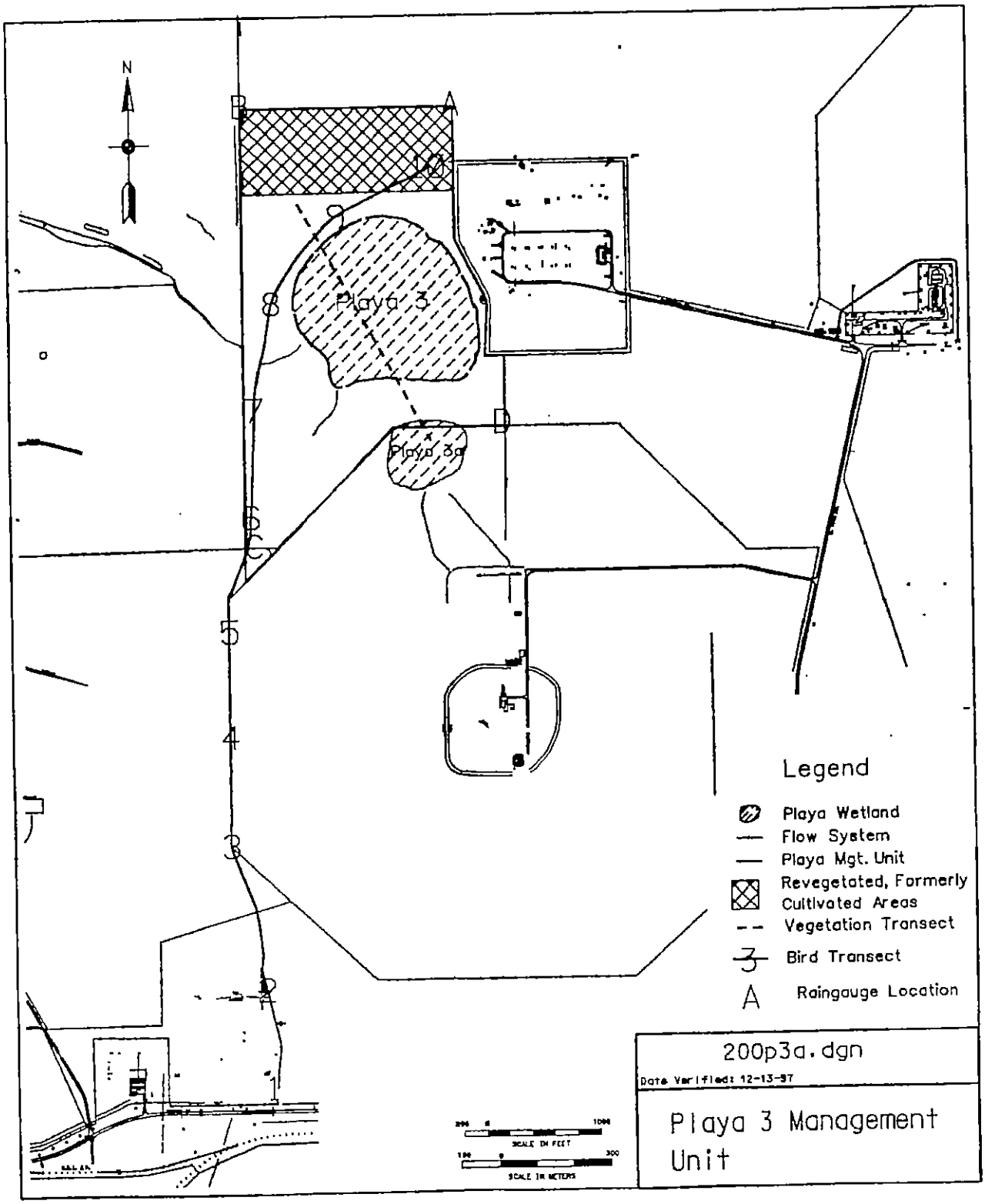


Figure 4. Pantex Lake

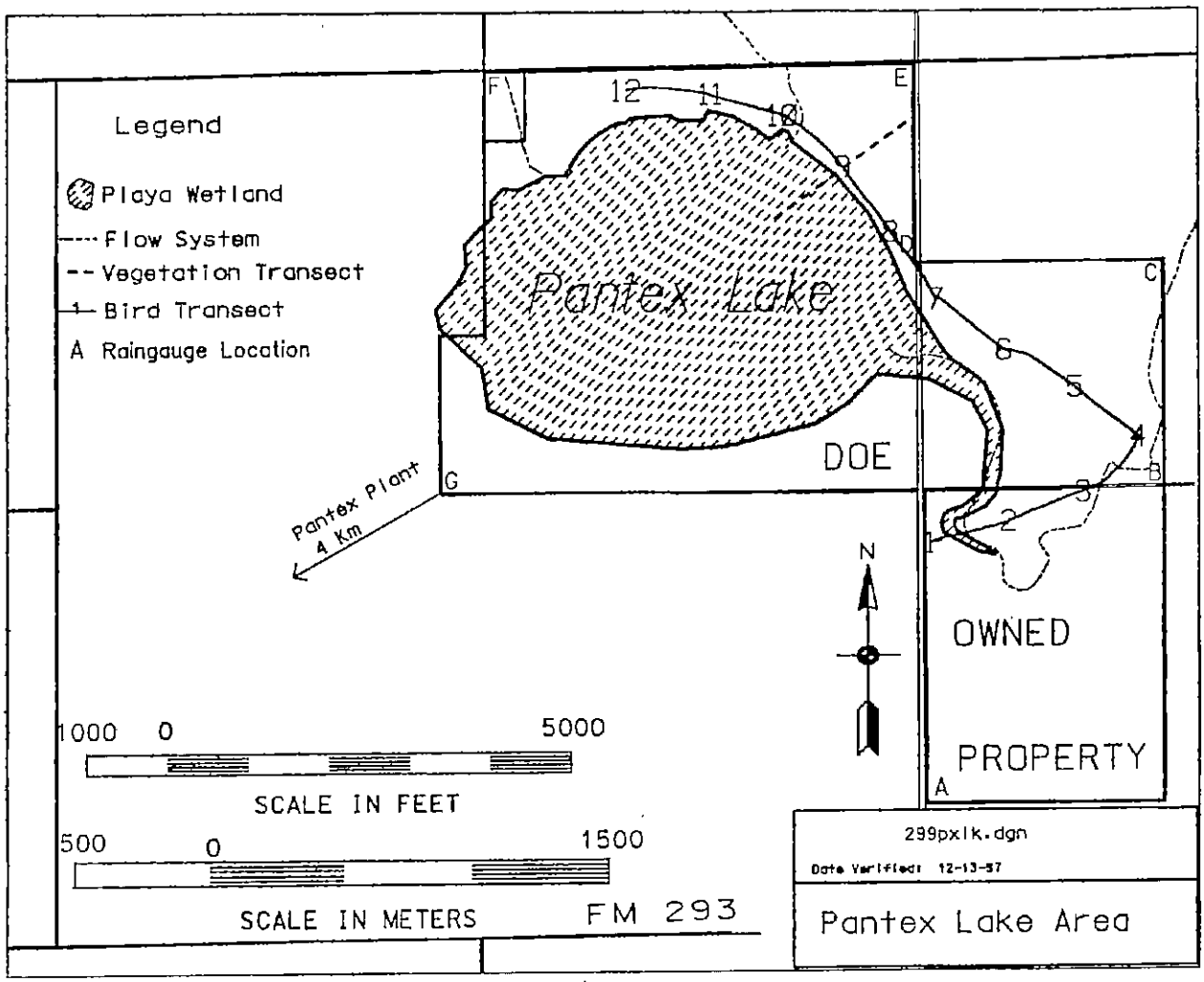


Table 1. Summary and Comparison of Bird Observations for 1999 and 2000.

Common Name	Scientific Name	Playa 1		Playa 2		Playa 3		Pantex Lake			
		99	00	99	00	99	00	99	00		
Pied-bill grebe	*Podilymbus podiceps*	0		X							
Eared grebe	*Podiceps nigricollis*	0									
Black-crowned night heron	*Nycticorax nycticorax*	X	X	X			0	X	X	0	
American bittern	*Botaurus lentiginosus*									0	
White-faced ibis	*Plegadis chihi*	X	X	X	X	0		X	0	0	
Cattle egret	*Bubulcus ibis*							X	0		
Great blue heron	*Ardea herodias*		0		0						
Little blue heron	*Egretta caerulea*	0									
Snowy egret	*Egretta thula*	X									
Sandhill crane	*Grus canadensis*				X			X			
Sora	*Porzana carolina*	0								0	
Virginia rail	*Rallus limicola*	0									
American coot	*Fulica americana*	X	X	X		X		X		0	0
Common moorhen	*Gallinula chloropus*	X									
Ring-billed gull	*Larus delawarensis*	X				X				0	
Franklin's gull	*Larus pipixcan*										0
Canada goose	*Branta canadensis*	0			X			X	0		
Ross' Goose	*Chen rossii*				X				0		
Snow goose	*Chen caerulescens*	0						0	0		
Wood duck	*Aix sponsa*	0	0								
American green-winged teal	*Anas crecca*	X	X				0	0		0	
Blue-winged teal	*Anas discors*	XN	X	X	X	XN		XN	0	0	0
Cinnamon teal	*Anas cyanoptera*	0	X	X		X			0	0	0
Mallard	*Anas platyrhynchos*	XN	XN	XN	X	XN	X	XN	X	0	0
Northern pintail	*Anas acuta*	X		X	0	0		X	0		
American wigeon	*Anas americana*	0		X		0		X			0
Northern shoveler	*Anas clypeata*	X		X		X		0		0	0

Common Name	Scientific Name	Playa 1		Playa 2		Playa 3		Pantex Lake		Other Areas	
Gadwall	*Anas strepera*	X	X							0	
Lesser scaup	*Aythya affinis*	X						X		0	0
Ring-necked duck	*Aythya collaris*	0								0	0
Redhead	*Aythya americana*	0		X		0				0	0
Canvasback	*Aythya valisineria*	0									0
Bufflehead	*Bucephala albeola*									0	
Common goldeneye	*Bucephala clangula*	0								0	
Ruddy duck	*Oxyura jamaicensis*	0		X		0					0
Wilson's phalarope	*Phalaropus tricolor*									0	
Common snipe	*Gallinago gallinago*	0	0						0		0
American avocet	*Recurvirostra americana*	X				X	0	X			
Killdeer	*Charadrius vociferus*	X	X	X	X	X	X	X	X	0N	0N
Long-billed dowitcher	*Limnodromus scolopaceus*							0			0
Solitary sandpiper	*Tringa solitaria*							0			
Spotted sandpiper	*Actitis macularia*							X		0	
Long-billed curlew	*Numenius americanus*										0
Greater yellowlegs	*Tringa melanoleuca*									0	
Upland sandpiper	*Bartramia longicauda*			0						0	
Willet	*Catoptrophorus semipalmatus*					0				0	
American kestrel	*Falco sparverius*	X	X	X	X	X	X	0	X	0	0N
Prairie falcon	*Falco mexicanus*			0		0		0	0	0	0
Peregrine falcon	*Falco peregrinus*						0		0		
Swainson's hawk	*Buteo swainsoni*		X	X	X	X	X	X	X	0	0N
Ferruginous hawk	*Buteo regalis*	0		X	X	X			0	0	
Red-tailed hawk	*Buteo jamaicensis*	0	X					0	X	0	0
Northern harrier	*Circus cyaneus*	X	X	X	X	0	X	X	X	0	0
Turkey vulture	*Cathartes aura*			X	X				X	0	
Golden eagle	*Aquila chrysaetos*			X	X						
Bald eagle	*Haliaeetus leucocephalus*			0		0			X	0	0
Osprey	*Pandion haliaetus*									0	

Common Name	Scientific Name	Playa 1		Playa 2		Playa 3		Pantex Lake		Other Areas	
Scaled quail	*Callipepla squamata*				0N					0	0N
Northern Bobwhite	*Colinus virginianus*						0			0N	0
Ring-necked pheasant	*Phasianus colchicus*	XN	X		X			XN	X	0	0
Rock dove (feral pigeon)	*Columba livia*	X	X	X	X	X	X			0N	0N
Mourning dove	*Zenaida macroura*	X	X	X	X	X	X	X	X	0N	0
Greater roadrunner	*Geococcyx californianus*										0
Burrowing owl	*Athene cunicularia hypugea*			XN	XN	XN	XN	0N	XN	0N	0N
Barn owl	*Tyto alba*		0		0						0N
Great horned owl	*Bubo virginianus*	XN									0N
Long-eared owl	*Asio otus*		0								
Common nighthawk	*Chordeiles minor*									0	
Black-chinned hummingbird	*Archilochus alexandri*										0
Common flicker	*Colaptes auratus collaris*	XN	X								
Western kingbird	*Tyrannus verticalis*	XN	XN	X	X	X	X		X	0N	0N
Cassin's kingbird	*Tyrannus vociferans*										0
Scissor-tailed flycatcher	*Tyrannus forficatus*									0	
Say's phoebe	*Sayornis saya*				X				X		0
Ash-throated flycatcher	*Myiarchus cinerascens*			0							
Eastern wood peewee	*Contopus virens*									0	
Olive-sided flycatcher	*Contopus borealis*	0	0							0	0
Empidonax flycatcher	*Empidonax spp.*		0								0
American pipit	*Anthus rubescens*						0		0		
Barn swallow	*Hirundo rustica*	X	X	X	X	X	X	X	X	0N	0N
Cliff swallow	*Hirundo pyrrhonota*	0		X	0		X	X	X	0N	0N
Bank swallow	*Riparia riparia*		X		X	X		X			
Tree swallow	*Tachycineta bicolor*		X								0
Northern rough-winged swallow	*Stelgidopteryx serripennis*	0	X				X	0			
Chihuahuan raven	*Corvus cryptoleucus*				X						0
Common raven	*Corvus corax*			X	X						
American crow	*Corvus brachyrhyncos*				X	X					

Common Name	Scientific Name	Playa 1		Playa 2		Playa 3		Pantex Lake		Other Areas	
Blue jay	*Cyanocitta cristata*	0	X							0	0
Scrub jay	*Aphelocoma coerulescens*		X								0
American robin	*Turdus migratorius*	0								0	0
Hermit thrush	*Catharus guttatus*		X								0
Mountain bluebird	*Sialia currucoides*								0		0
House wren	*Troglodytes aedon*										0
Bewick's wren	*Thryomanes bewickii*										0
Rock wren	*Salpinctes obsoletus*				0						0
Cedar waxwing	*Bombycilla cedrorum*									0	
Loggerhead shrike	*Lanius ludovicianus*	X		0		X	X		0	0	0
Northern mockingbird	*Mimus polyglottos*	0	X		0				0		0
Curve-billed thrasher	*Toxostoma curvirostre*										0
Blue-gray gnatcatcher	*Polioptila caerulea*		0								0
Ruby-crowned kinglet	*Regulus calendula*	0	0							0	0
European starling	*Sturnus vulgaris*	0	X	X						0N	0N
American goldfinch	*Carduelis tristis*										0
Horned lark	*Eremophila alpestris*	X	X	X	0	0	X	X	X	0	
Savannah sparrow	*Passerculus sandwichensis*		X		X		0		0		0
Lincoln's sparrow	*Melospiza lincolnii*									0	
Song sparrow	*Melospiza melodia*	X	0								0
Lark bunting	*Calamospiza melanocorys*				X	X	X	X		0	0
Vesper sparrow	*Pooecetes gramineus*	X	X	0	X		0			0	0
Cassin's sparrow	*Aimophila cassinii*			X	X	X	X		X		0
Rufous-crowned sparrow	*Aimophila ruficeps*									0	
White-throated sparrow	*Zonotrichia albicollis*										0
White-crowned sparrow	*Zonotrichia leucophrys*	0		0			X			0	0
Chipping sparrow	*Spizella passerina*		0							0	0
Brewer's sparrow	*Spizella breweri*			0							
Clay-colored sparrow	*Spizella pallida*		0								0
Dark-eyed junco	*Junco hyemalis montanus*									0	

Common Name	Scientific Name	Playa 1		Playa 2		Playa 3		Pantex Lake		Other Areas	
Dark-eyed junco, pink-sided	*Junco hyemalis mearnsi*										0
Dickcissel	*Spiza americana*	X	X	X	X	X	0		X	0	0
Spotted towhee	*Pipilo erythrophthalmus*										0
Lark sparrow	*Chondestes grammacus*	0	X	X		X	X		X	0	0
Grasshopper sparrow	*Ammodramus savannarum*	XN	X	XN	X	0	X	XN	X	XN	0
House finch	*Carpodacus mexicanus*	0	X		X					0	0
House sparrow	*Passer domesticus*	X	X	0					0	0N	0
Eastern meadowlark	*Sturnella magna*		X					0			
Western meadowlark	*Sturnella neglecta*	XN	X	XN	XN	XN	X	XN	XN	0N	0N
Red-winged blackbird	*Agelaius phoeniceus*	XN	X	XN	X	X	X	XN	X	0N	0
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*		X				X		X	0	0
Brewers's blackbird	*Euphagus cyanocephalus*	0							X		0
Great-tailed grackle	*Quiscalus mexicanus*	X		X						0N	
Common grackle	*Quiscalus quiscula*	0	X	0	0			X		0N	0
Brown-headed cowbird	*Molothrus ater*						0		X	0	
Common yellowthroat	*Geothlypis trichas*		X								
Black-throated green warbler	*Dendroica virens*										0
Orange-crowned warbler	*Vermivora celata*	0	0								0
Yellow warbler	*Dendroica petechia*	0	0							0	0
Yellow-rumped warbler	*Dendroica coronata auduboni*									0	0
Wilson's warbler	*Wilsonia pusilla*	0	0							0	0
MacGillivray's warbler	*Oporornis tolmiei*										0
Number seen at Playa		68	56	45	42	36	32	38	44	75	85
Number nesting at Playa		9	2	5	3	4	1	7	2	15	13
Percent nesting		13	4	11	7	11	3	18	5	20	15
Two year total seen at playa			84		61		48		59		112

X=Birds observed on transects
0=Birds not observed during transects, but observed during casual observations
N=Birds known to be nesting

CONTOUR TERRACE S

NRCS Design and Specifications Package

U. S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service

IX-ENG-51
Rev. 10/82

DIVERSION DATA SHEET

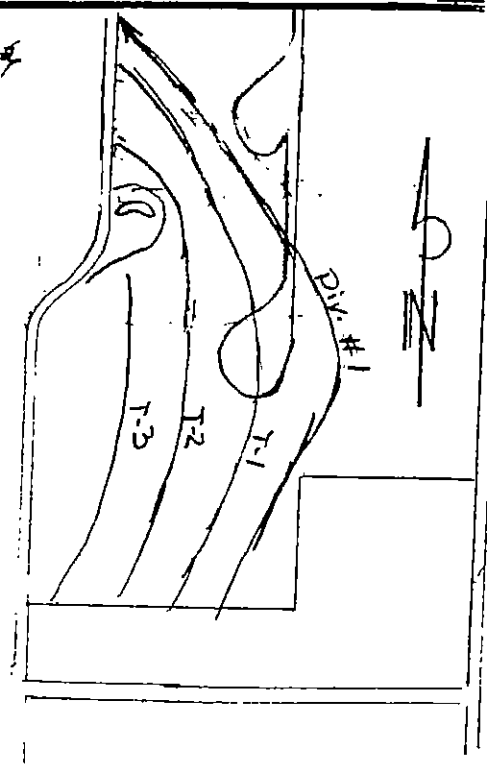
SWCD McClellan Creek SWCD FIELD OFFICE Panhandle

COOPERATOR Texas Tech University LOCATION Pantex Plant

IDENTIFICATION NO. _____ FIELD NO. _____ DIVERSION NO. 1

DESIGN AND LAYOUT

Station		3880		
Drainage Area:	Cultivated Ac.	67		
	Pasture Ac.			
	Woodland Ac.			
Q in cfs from Chart No. ~~EFM-Z25~~		92		
Vegetal Retardance		D		
Cross Slope of Land – Percent		1.00%		
Design Grade		0.15%		
Side Slope:	Channel	8:1		
	Back side of ridge	8:1		
Bottom Width, Ft.		20		
Designed Depth of Flow, Ft.		1.80		
Channel Cross Section, Sq. Ft.		67.23		
Depth of Flow Plus Freeboard, Ft.		2.3'		
℄ depth of cut(Ft.)(Channel Type) or H above nat. gr.(Ft.)(Ridge ")		1.0'		
Width of Crown, Ft.		4'		
Base Width (Ridge Type Diversions)		.		
Area of Exc.(Sq.Ft.)(Channel Type) ~~or A above Nat. Gr. (Ridge Type)~~		27.7		



Vicinity Sketch–Show North Arrow

1/ If runoff calculated by other method show calculations in space below.

Designed by Gregory D. Hinders Date 5/31/98

Approved by Gregory D. Hinders Date 5/31/98

Layout Data Party Ely Hinders Date 7/10/98

Grade by Section						Measured Length (Feet)	Remarks

Computations: Length = 3880 ft.

$3880\,ft \times 27.7\,ft^2 \times \frac{1\,yd^3}{27\,ft^3} = 3980.6\,yd^3$

Computations checked by Holly Byrd Date 7/15/98

Total Cubic Yards: _____

(over)

This is an Eng. Job Class II job. I have Job Class IV Authority.

U. S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service

TX-ENG-51
Rev. 10/82

DIVERSION DATA SHEET

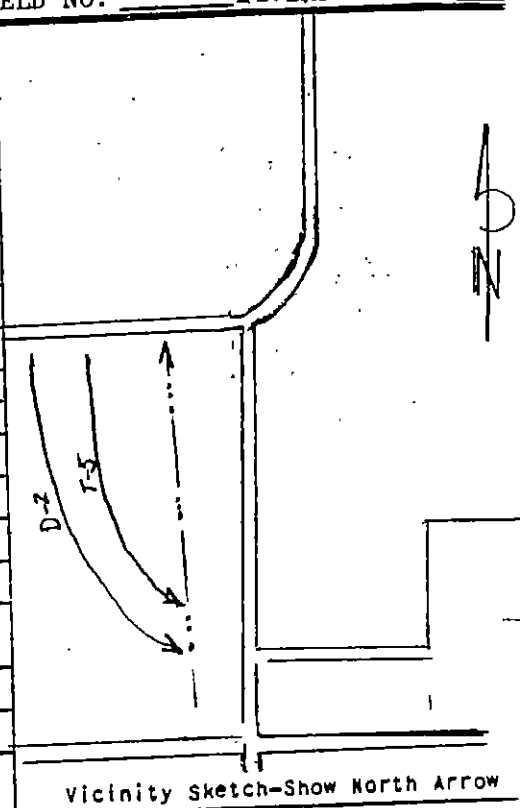
SWCD McClellan Creek FIELD OFFICE Panhandle

COOPERATOR Texas Tech University LOCATION Pantex Plant

IDENTIFICATION NO. _____ FIELD NO. _____ DIVERSION NO. 2

DESIGN AND LAYOUT

Station	1296		
Drainage Area: Cultivated Ac.	40		
Drainage Area: Pasture Ac.			
Drainage Area: Woodland Ac.			
Q in cfs from Chart No. ~~EFH-2 25yr~~	66		
Vegetal Retardance	D		
Cross Slope of Land - Percent	1.0%		
Design Grade	0.15		
Side Slope: Channel	8:1		
Side Slope: Back side of ridge	8:1		
Bottom Width, Ft.	20		
Designed Depth of Flow, Ft.	1.6		
Channel Cross Section, Sq. Ft.	52.83		
Depth of Flow Plus Freeboard, Ft.	2.1		
℄ depth of cut(Ft.)(Channel Type) or H above nat. gr.(Ft.)(Ridge ")	0.9'		
Width of Crown, Ft.	4'		
Base Width (Ridge Type Diversions)			
Area of Exc.(Sq.Ft.)(Channel Type) ~~or A above Nat. Gr. (Ridge Type)~~	24.2		



Vicinity Sketch-Show North Arrow

If runoff calculated by other method show calculations in space below.

Designed by Gregory D. Hinders Date 5/31/98

Approved by Gregory D. Hinders Date 5/31/98

Layout Data Party Elyn Hinders Date 7/10/98

Grade by Section						Measured Length (Feet)	Remarks

Computations: Volume:

Length = 1296

$1296 \times 24.2 ft^2 \times \frac{1 yd^3}{27 ft^3} = 1161.6 yd^3$

+243 yd^3 for fill (see attachment) 1161.6 + 243 1404.6 yd^3

Computations checked by Holly Byrd Date 7/15/98

Total Cubic Yards: _____

(over)

This is an Eng. Job Class II job. I have Job Class IV Authority

U. S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service

TERRACE DATA SHEET-Layout

TX-ENG-37
Rev. 10/82

SWCD McClellan Creek

FIELD OFFICE Panhandle

COOPERATOR Texas Tech University

LOCATION Pantex Plant

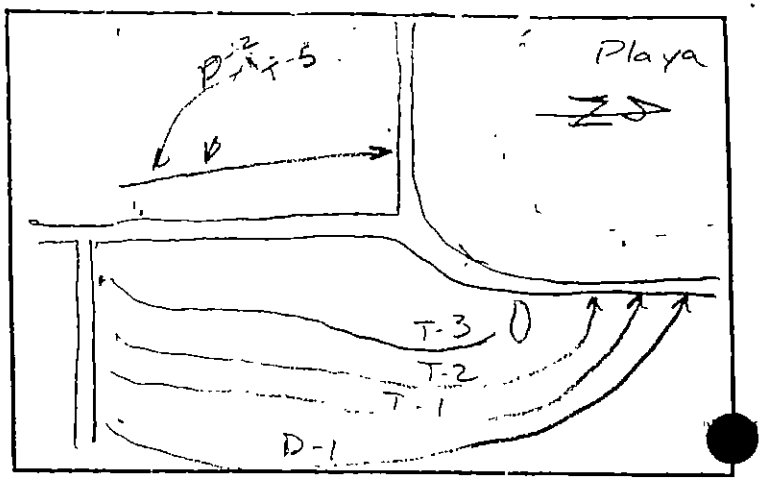
IDENTIFICATION NO. _____ SURVEY PARTY Ely / Hinders

FIELD NO. _____ _____

DESIGNED BY Gregory D. Hinders DATE 7/9/98

DESIGN APPROVED BY Gregory D. Hinders DATE 7/9/98

Checked: Harry Ryan 7/13/98



Sketch of Terraces-Show North Arrow

Ter. No.	Kind	Design Slope	Vert. Int. 1/	Hor. Int.	Ter. Spac.	Row Width	No. Rows	Grade by Section: Grade	D.A.	CH.	Q	Side Slope	Bottom Width	Length: Layout	Const.	Planned Dimensions: H	X-Area	Base W
1	G	1.4	3.34	240	240			.15	22			8:1	20	3532		1.4	32	22
2	G	1.1	3.16	290	290			.15	←			8:1	20	3113		1.4	32	22
3	G	1.4	3.34	240	240			.15	←			8:1	20	1948		1.4	32	22
5	G	2.0	3.7	185	185			.15	←			8:1	20	1012		1.4	21	20
	Graded																	

This is an Eng. Job Class IV job. I have Job Class IV Authority.

1/ Vert. Int. = $x^2 + x$ where x = 0.1 and x = 2.5

NATURAL RESOURCES CONSERVATION SERVICE

CONSTRUCTION SPECIFICATIONS
(Texas)

DIVERSION

1. SCOPE

Work shall consist of constructing the diversion including the channel and supporting ridge.

2. LOCATION

The location of the diversion shall be as shown on furnished drawings or as staked in the field.

3. UTILITIES

Utilities are defined to be overhead and underground power or communication lines, and pipelines. All utilities discovered to be in the work area are shown on the drawings or sketches. However, the absence of indicators on the drawings or sketches does not assure the nonexistence of utilities in the work area. The contractor is alerted to conduct his/her own search and discovery for utilities in order to lessen or avoid potential damages.

4 SITE PREPARATION

All old terraces, fence rows, all brush, and tall standing vegetation shall be removed from the area occupied by the diversion ridge and the area from which the earthen construction material will be taken. All old terraces, fence rows, and hedge rows shall be removed as specified in Item 8., Construction Details.

5 MATERIAL

Materials for earthfills shall be obtained from excavation in the channel or other designated areas, and shall be free of objectionable materials such as brush, roots, and rock particles that endanger the performance of the diversion.

6. PLACEMENT OF EARTHFILL

Diversion terraces shall be constructed to the dimensions specified on the drawings or as staked in the field. All fills shall be full-bodied, with cross section conforming to that specified at all stations. The top of the constructed ridge shall not be lower at any point than the design elevation plus the specified overbuild for settlement.

If an allowance for settlement in the ridge height is specified, it shall be made at the rate of 5 percent for motorgraders and similar equipment, 10 percent for dozers, disk plows, and similar equipment, and 20 percent for elevating graders, belt machines, and similar equipment.

Construction equipment shall be routed over the fill to provide compaction such that no bridging results. The top and side slopes of the ridge, channel, and other excavated areas shall be finished to a smoothness so the surface can be readily traveled upon by farm type equipment.

7. MEASUREMENT

Measurement will be made of the ridge earthfill for ridge type diversions, and the channel excavation for channel type diversions. The amount of earthfill, as appropriate, shall be the design yardage determined from the natural ground lines to the neat lines of the settled fill surface. The amount of excavation, as appropriate, shall be the design yardage computed from the natural ground line to the neat lines as specified. Volume of earthfill or excavation will be computed to the nearest cubic yard.

SOIL CONSERVATION SERVICE

CONSTRUCTION SPECIFICATIONS
(Texas)

TERRACES
Terrace Gradient

1. SCOPE

Work shall consist of constructing the terrace channels, ridges, and filling and leveling as required.

2. LOCATION

The location of the terrace shall be as shown on furnished drawings or as staked in the field.

3. PUBLIC AND PRIVATE UTILITIES

Utilities are defined to be overhead and underground power or communication lines, and pipelines. All utilities discovered to be in the work area are shown on the drawings or sketches. However, the absence of indicators on the drawings or sketches does not assure the nonexistence of utilities in the work area. The contractor is alerted to conduct his own search and discovery of utilities in order to lessen or avoid potential damages.

4. SITE PREPARATION

All old terraces, fence rows, brush, and tall standing vegetation shall be removed from the area occupied by the terrace ridge and the area from which the earthen construction material will be taken.

5. MATERIAL

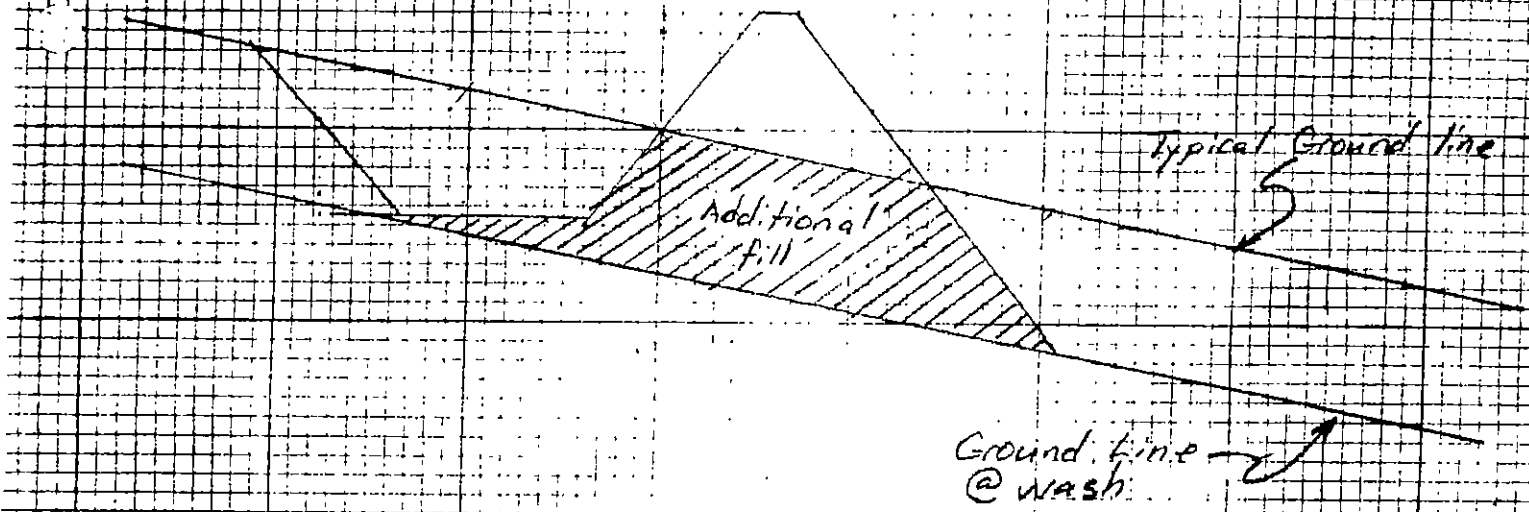
Materials for earthfills shall be obtained from excavation in the channel or other designated areas, and shall be free of objectionable materials as brush, roots, and rock particles that endanger the performance of the terrace.

6. PLACEMENT OF EARTHFILL

Terraces shall be constructed to the dimensions specified on the drawings, or as staked in the field. All fills shall be full-bodied with cross section conforming to that specified at all stations. The terrace channels, side slopes, ridges, cut areas, and fill areas shall be finished to a smoothness so the surface can be readily traveled upon by farm type equipment.

BY GDH DATE 7/15/98 SUBJECT Extra fill @ wash SHEET NO. OF

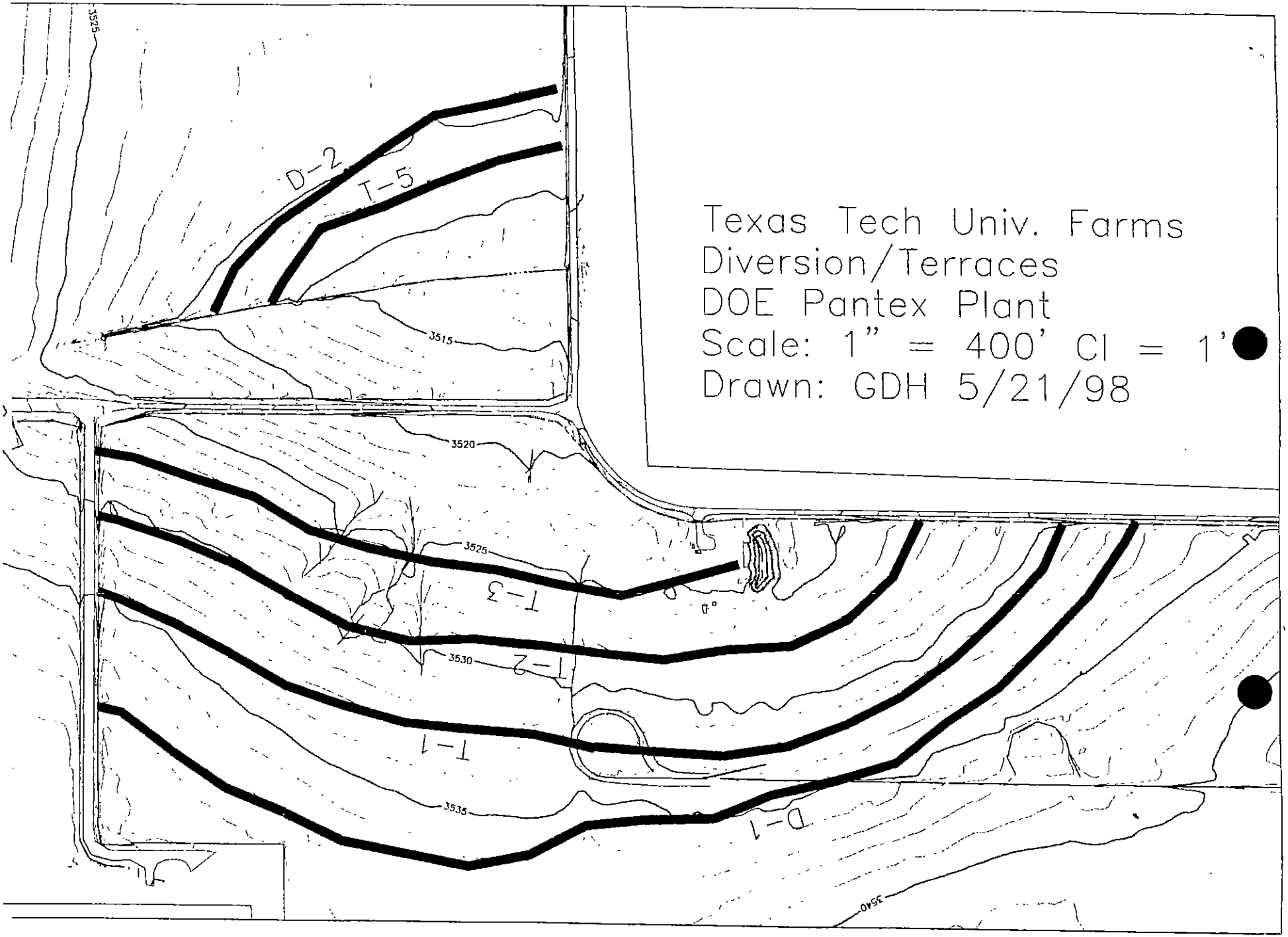
CHK'D BY DATE JOB NO.

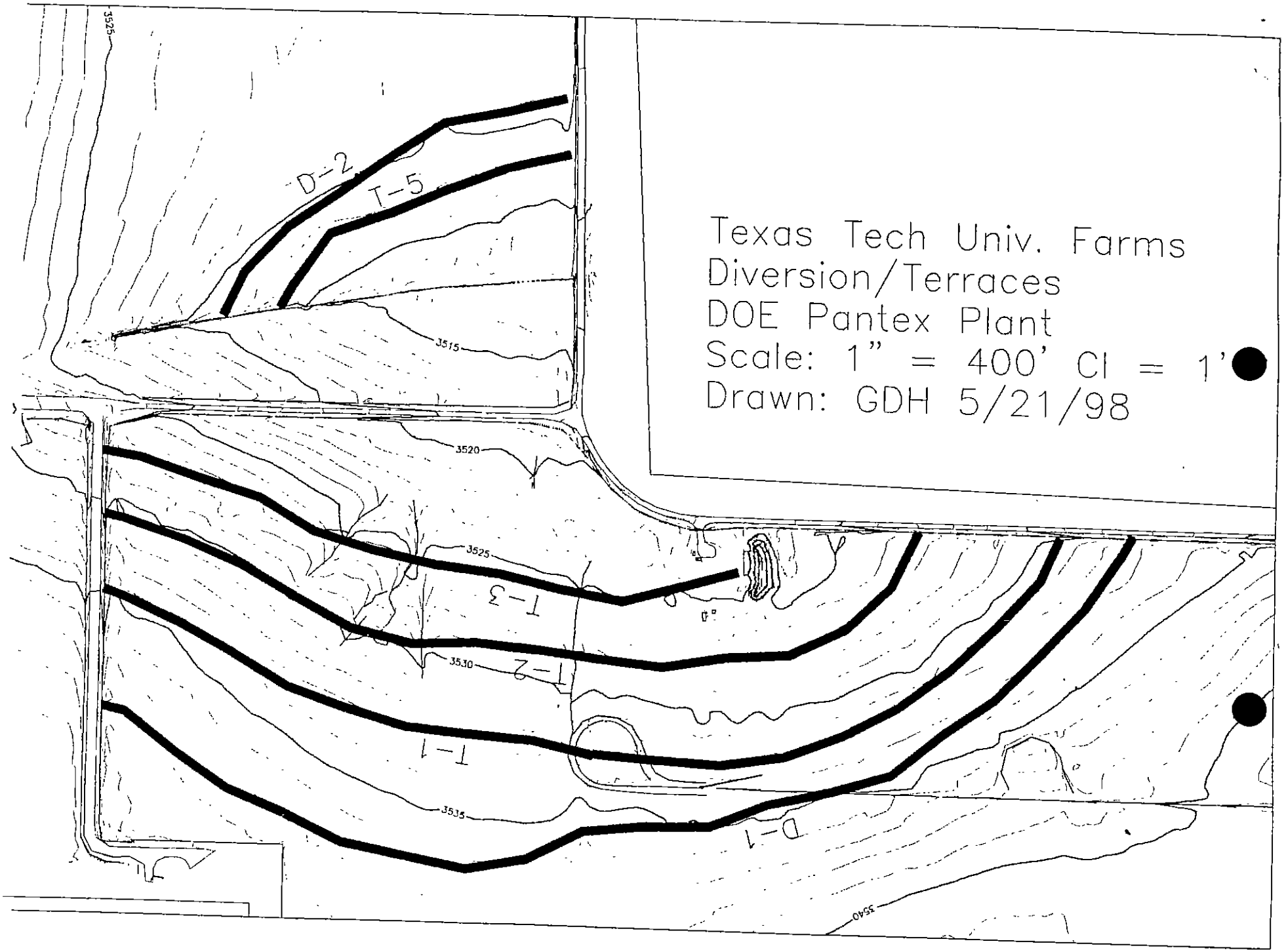


Addition fill area @ wash = 65.5 ft²

normal ground resumes 100' either side of wash

$$\frac{65.5}{2} \times 200 \times \frac{1 yd^3}{27 ft^3} = 243 yd^3$$


Texas Tech Univ. Farms
Diversion/Terraces
DOE Pantex Plant
Scale: 1" = 400' CI = 1'
Drawn: GDH 5/21/98
D-2
T-5
T-3
T-2
T-1
D-1
3515
3520
3525
3530
3535
3540


Texas Tech Univ. Farms
Diversion/Terraces
DOE Pantex Plant
Scale: 1" = 400' CI = 1'
Drawn: GDH 5/21/98
D-2
T-5
T-3
T-2
T-1
D-1
3515
3520
3525
3530
3535
3540

PAR. TERRACES

NRCS Design and Specification Package

Diversion / (Terrace Calculator) (Channel,) Ridge, Basin DIVCAL

Land Owner DOE - Pantex Plant Field Office Panhandle

By Ivy Harding 07-01-1999 Checked by _____ DATE _____

"D" Retardance

Inputs

Bottom width	=	16.00 ft.
Cross Slope	=	1.30000 %
Diversion Ht	=	1.50000 ft.
Crown Width	=	4.0000 ft.
Cut/Fill Ratio	=	1.00000
Freeboard	=	0.30000 ft.
Back Div. Z	=	8.0000 : 1
Front Div. Z	=	8.0000 : 1
Channel Side Z	=	20.0000 : 1
* Channel Slope	=	0.40000 %
Manning's N	=	0.05000

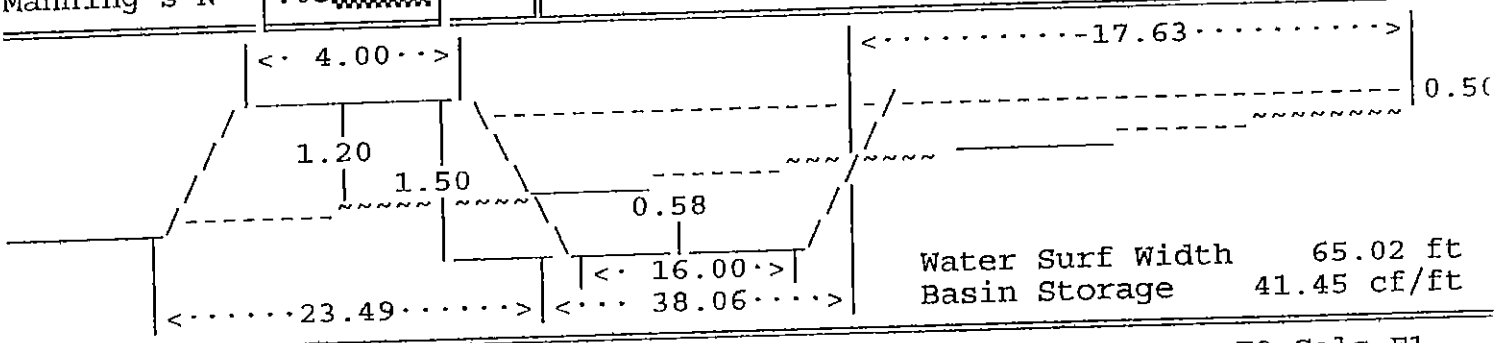
Maximum Depth of Flow	=	1.200 ft.
Depth of Cut at Cl of Channel	=	0.584 ft.
CL Height of diversion	=	1.202 ft.
Hydraulic Radius	=	0.889
Area of Cut	=	16.560 sqft.
Area of Fill	=	16.560 sqft.
Flow Area in Channel	=	39.36 sqft.
Flow Area out of Channel	=	0.00 sqft.
Total Flow Area	=	39.36 sqft.
Qf (1.486*A*R^(2/3))	=	54.07
Average Velocity	=	1.74 ft/sec
Capacity	=	68.4 cfs
Water Surface Width	=	65.02 feet
Basin Storage	=	41.45 cf/ft

* Terrace Grade

Diversion / Terrace Calculator (Channel) Ridge, Basin = DIVCALC =

Bottom Width	16	ft.
Cross Slope	1.3	%
Diversion Ht	1.5	ft.
Crown Width	4	ft.
Cut/Fill	1	: 1
Free Board	.3	ft.
Back Div. Z	8	: 1
Front Div. Z	8	: 1
Channel Side	20	: 1
Channel Slope	.4	: %
Manning's N	.05	

Channel Depth of Flow	=	1.200 ft.
Depth of Cut at Cl of Channel	=	0.584 ft.
Hydraulic Radius	=	0.889
Area of Cut	=	16.560 sqft.
Area of Fill	=	16.560 sqft.
Flow Area in Channel	=	39.36 sqft.
Flow Area out of Channel	=	0.00 sqft.
Total Flow Area	=	39.36 sqft.
Qf (1.486*A*R^(2/3))	=	54.07
Average Velocity	=	1.74 ft/sec
Capacity	=	68.4 cfs

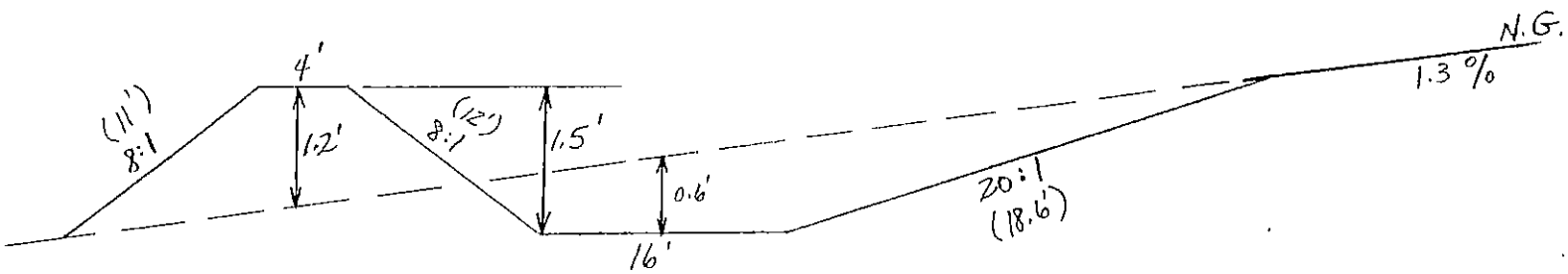


Water Surf Width 65.02 ft
Basin Storage 41.45 cf/ft

F1 Info F2 GRAPH F3 X-Y F4 F5 F6 F7-Printer F8- F9-Calc F1

1	-23.492	-0.305	2	-12.525	1.066
3	-10.525	1.066	4	-8.525	1.066
5	-6.125	0.766	6	0.000	0.000
7	3.475	-0.434	8	11.475	-0.434
9	19.475	-0.434	A	38.059	0.495
B	20.429	0.266	C	58.891	0.766
D	20.429	0.766	E	43.475	0.766
F	11.475	0.149	G	-10.525	-0.137

2 4 F D
3 5 7 E C
6 8 B
1 G 9 A



Front slope length from bottom of channel to crown of terrace = $\overset{(4)}{8.525} + \overset{(7)}{3.475} = 12'$

Bottom width of channel = $16'$

Back slope length from crown of terrace to N.G. = $\overset{(1)}{23.492} - \overset{(2)}{12.525} = 11'$

slope length from bottom of channel to N.G. upstream = $\overset{(A)}{38.059} - \overset{(9)}{19.475} = 18.6'$

SOIL CONSERVATION SERVICE

CONSTRUCTION SPECIFICATIONS
(Texas)

TERRACES
Terrace Gradient

1. SCOPE

Work shall consist of constructing the terrace channels, ridges, and filling and leveling as required.

2. LOCATION

The location of the terrace shall be as shown on furnished drawings or as staked in the field.

3. PUBLIC AND PRIVATE UTILITIES

Utilities are defined to be overhead and underground power or communication lines, and pipelines. All utilities discovered to be in the work area are shown on the drawings or sketches. However, the absence of indicators on the drawings or sketches does not assure the nonexistence of utilities in the work area. The contractor is alerted to conduct his own search and discovery of utilities in order to lessen or avoid potential damages.

4. SITE PREPARATION

All old terraces, fence rows, brush, and tall standing vegetation shall be removed from the area occupied by the terrace ridge and the area from which the earthen construction material will be taken.

5. MATERIAL

Materials for earthfills shall be obtained from excavation in the channel or other designated areas, and shall be free of objectionable materials as brush, roots, and rock particles that endanger the performance of the terrace.

6. PLACEMENT OF EARTHFILL

Terraces shall be constructed to the dimensions specified on the drawings, or as staked in the field. All fills shall be full-bodied with cross section conforming to that specified at all stations. The terrace channels, side slopes, ridges, cut areas, and fill areas shall be finished to a smoothness so the surface can be readily traveled upon by farm type equipment.

Attachment to S-600-B
Soil Conservation Service
Construction Specifications (Texas)

Terraces
Terrace Gradient

See also Section 3.5 and 3.5.1 in the SOW.

The diversion terrace (D1 on Map) already exists. There are 2 or 3 areas that have breached the terrace. These areas shall be filled in and the entire terrace built up to 2.1 feet. The diversion terrace, D1 shall be extended out into the grass land by the same amount of feet as terraces 1-5 (See Map).

Terraces 3, 7-10 shall have additional cut in the channel to obtain grade. This is due to level section and highs in the field along the terrace alignment.

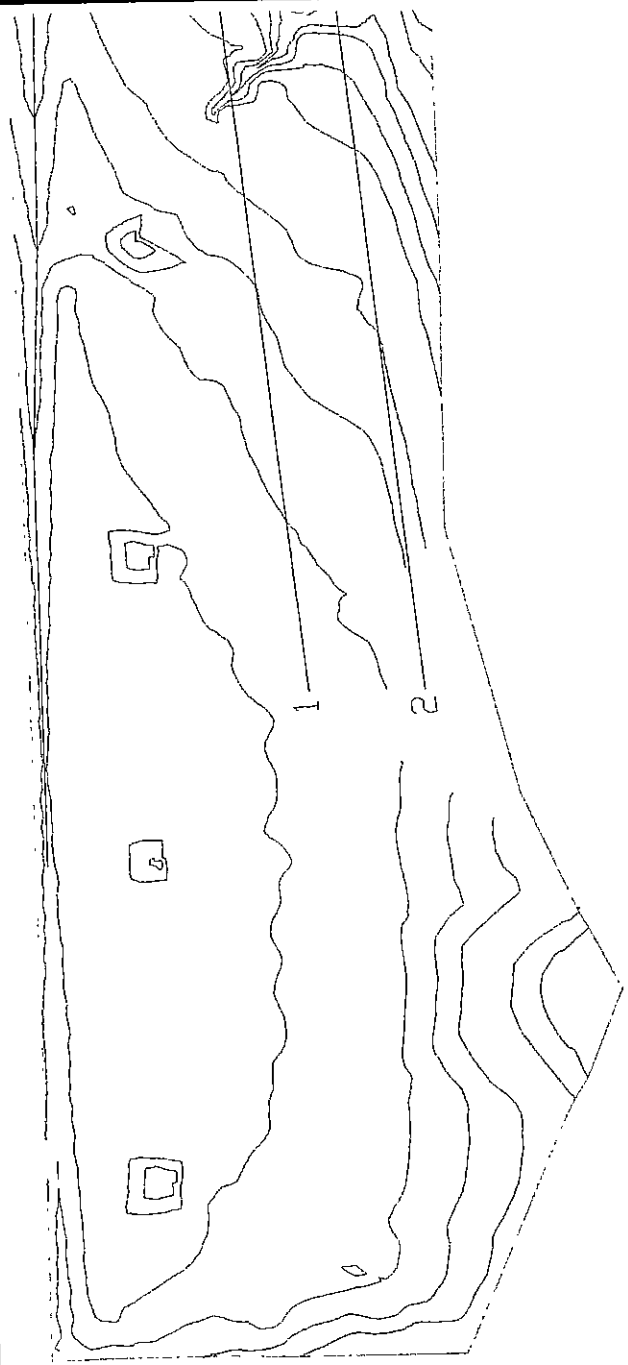
Terrace #3 shall have an additional channel cut of 0.2% in the first 800 feet.

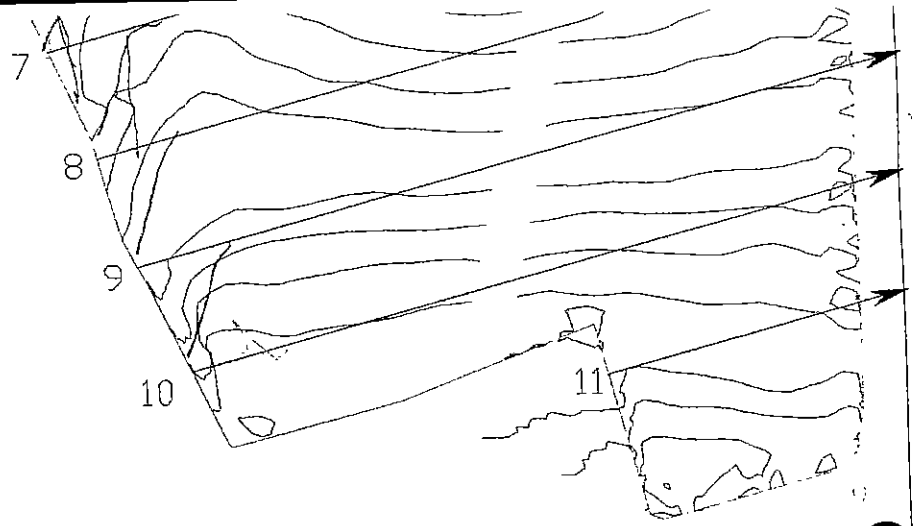
Terrace #7 shall have an additional channel cut of 0.2% in the first 300 feet.

Terrace #8 shall have an additional channel cut of 0.2% in the first 300 feet.

Terrace #9 shall have an additional channel cut of 0.2% in the first 500 feet.

Terrace #10 shall have an additional channel cut of 0.1% in the first 400 feet.





ESTIMATED TOTAL TERRACE YARDAGE = 13,004 Cu. Yd.
ESTIMATED TOTAL TERRACE LENGTH = 21,202'
DIVERSION YARDAGE = 2,344 Cu. Yd.
DIVERSION LENGTH = 1,580'
DI = DIVERSION TERRACE

7-22-99

GRADED PARALLEL TERRACE SYSTEM

DOE - PANTEX PLANT

PANHANDLE F.O. CARSON CO

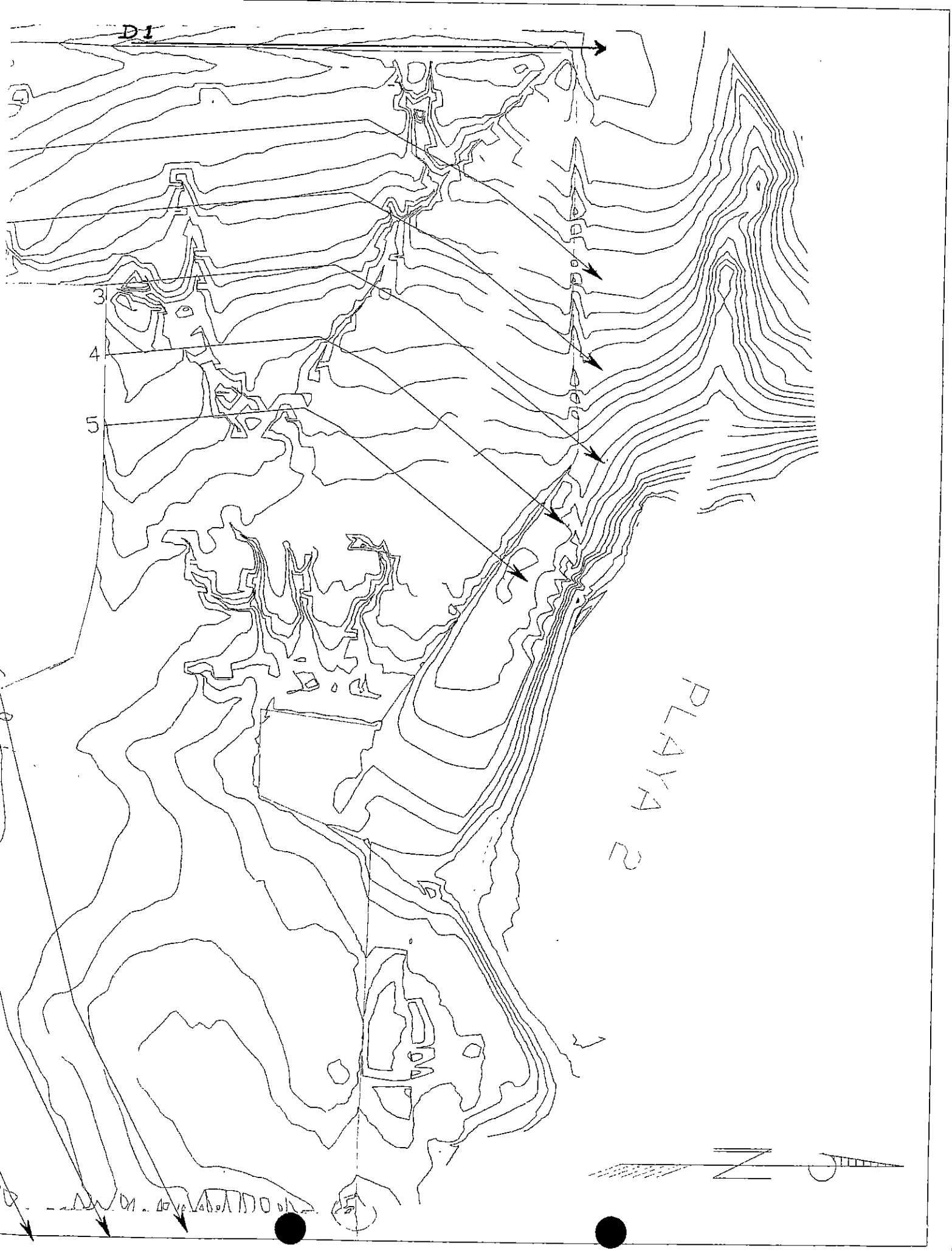
NATURAL RESOURCES CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

SURVEYED BY SCOTT ISCH
MASON & HANGER

DESIGNED BY TROY HEADINGS, PE
KELLY HOUSE, LET

DATE 6/16/99

SCALE 1" = 400'
CONTOUR INTERVAL 1
SURVEYED ACRES APPROX. 300 ACRES
DATE PLOTTED 7/1/99
FILE NAME PLAT2001.DAG


D1
3
4
5
PLAYA 2

DOE - PANTEX PLANT

GRADED PARALLEL TERRACE SYSTEM

ESTIMATED QUANTITIES

TERRACE NO.	AVG. GRADE Ft. / 100 Ft.	LENGTH Ft.	YARDAGE 1/ Cu. Yd.	COST / Ft. 2/	COST / Cu. Yd. 3/
1	0.43	3,652	2,239.9	1,606.88	1,791.91
2	0.38	3,682	2,258.3	1,620.08	1,806.63
3	0.44	1,826	1,119.9	803.44	895.96
4	0.47	1,701	1,043.3	748.44	834.62
5	0.45	1,547	948.8	680.68	759.06
6	0.23	1,860	1,140.8	818.40	912.64
7	0.22	1,770	1,085.6	778.80	868.48
8	0.24	1,665	1,021.2	732.60	816.96
9	0.23	1,537	942.7	676.28	754.15
10	0.21	1,425	874.0	627.00	699.20
11	0.37	537	329.4	236.28	263.49
TOTALS (1-11)		**21,202**	**13,003.9**	**9,328.88**	**10,403.11**
TOTALS (1, 3, 5, 7, 9, 11)		**10,869**	**6,666.3**	**4,782.36**	**5,333.06**

The existing field washes along the proposed terrace lines and between terrace intervals should be shaped and filled to blend in with the adjacent natural ground and finished to a smoothness so the surface can be readily travelled upon by farm equipment. It is estimated that 7,650 linear Ft. of field washes are present and that an average shaped width per wash would be 100 Ft. yielding 17.6 Ac. of shaped area. At an average cost of $500 / Ac. for medium shaping, the estimated cost for shaping and filling of field washes would be $8,800.

1/ Based on a 1.5 Ft. tall channel type terrace with 16 Ft. bottom width, 8:1 side slopes, 20:1 channnel slope, and 16.56 Sq. Ft. cut and fill area.

2/ Based on an average cost of $0.44 / Ft. for parallel terraces.

3/ Based on an average cost of $0.80 / Cu. Yd. for parallel terraces.

TSSWCB 004 (6/2/98)

WQMP Number 156-03-044

CERTIFICATION

I (We) concur in the conservation practices and implementation schedules indicated in this Water Quality Management Plan. I (We) understand that when these planned Conservation Practices are applied and maintained, the Resource Management System will meet the State's requirements for water quality. Failure to comply with this plan and implementation schedule will result in the loss of certification. I (We) agree to notify the local Soil and Water Conservation District in the event of deviation from the implementation schedule. Any substitution or changes to the above practices or implementation schedule must be in accordance with the Field Office Technical Guide and approved by the Soil and Water Conservation District.

Applicant (Producer) — Date: 11/21/02

The above Water Quality Management Plan meets the requirements of the Field Office Technical Guide for a Resource Management System.

Certified By: District Conservationist — Date: 12/16/02

The Water Quality Management Plan includes the entire operating unit and meets the Soil and Water Conservation District's program, plan and its priorities.

Approved by: Soil & Water Conservation District — Date: 12-19-02

The Water Quality Management Plan satisfies the State Board's criteria; complies with Section 26.121 (a) (2) of the Water Code which prohibits the discharge of other waste (agriculture nonpoint source pollution), unless the discharge complies with the person's Certified Water Quality Management Plan approved by the State Soil and Water Conservation Board as provided by Section 201.026 of the Agriculture Code.

Certified by: Texas State Soil & Water Conservation Board — Date: 1-30-03

TSSWCB 001 (11/24/98)

Request No. 044

Priority: _____

REQUEST FOR WATER QUALITY MANAGEMENT PLANNING ASSISTANCE

McClellan Creek SOIL AND WATER CONSERVATION DISTRICT # 156

County Carson, Texas HUA No. 1112030101-010

Name: United States Department of Energy, Office of Amarillo Site Operations

Address: P. O. Box 30030

City/State: Amarillo, Texas Zip Code: 79120 Phone #: 806-477-3125

Monty Schoenhals 806-477-5268

I hereby apply for assistance in developing a Water Quality Management Plan, as provided by Section 201.026 (c) of the Agricultural Code. It is my intention to implement and maintain this plan in order to meet the State's requirements for water quality as expressed in Section 26.121(a)(2)*, Texas Water Code.

(1) General description and location of all property within this operating unit.

Farm # 956

Total Acres: ~~4,792~~ 4809.7

(2) The land is controlled and operated by the applicant(s). (X) Yes ( ) No If no, explain.

Clarification: The Land is controlled and operated by DOE/OASO

(3) An Animal Feeding Operation is involved ( ) Yes (X) No If yes, is a permit required ( ) Yes ( ) No

(4) I understand that my plan could be randomly selected for an annual status review by personnel of the State Soil and Water Conservation Board.

Applicant's Signature — Date: 12/19/01

District Director — Date: 12-20-01

NOTE: If you are not a cooperator with the Soil and Water Conservation District, a District Cooperative Agreement must be completed and attached to this application.

*See back of this sheet for full text of quoted Sections.

Section 201.026(c). Agriculture Code

(c) In an area that the state board identifies as having or having the potential to develop agricultural or silvicultural nonpoint source water quality problems or an area within the "coastal zone" designated by the Coastal Coordination Council, the state board shall establish a water quality management plan certification program that provides, through local soil and water conservation districts, for the development, supervision, and monitoring of individual water quality management plans for agricultural and silvicultural lands. Each plan must be developed, maintained, and implemented under rules and criteria adopted by the state board and comply with state water quality standards established by the Texas Natural Resource Conservation Commission. The state board shall certify a plan that satisfies the state board's rules and criteria and complies with state water quality standards established by the Texas Natural Resource Conservation Commission. The Texas Natural Resource Conservation Commission has the sole and exclusive authority to set water quality standards for all water in the state.

Section 26.121(a)(2)

(a) Except as authorized by the commission, no person may:

(2) discharge other waste into or adjacent to any water in the state which in itself or in conjunction with any other discharge or activity causes, continues to cause, or will cause pollution of any of the water in the state, unless the discharge complies with a person's certified water quality management plan approved by the State Soil and Water Conservation Board as provided by Section 201.026, Agriculture Code;

McClellan Creek Soil and Water Conservation District Number 156
Box 26 - Panhandle, Texas 79068

This agreement is entered into by the McClellan Creek Soil & Water Conservation District referred to hereinafter as the "District" and

United States Department of Energy, Office of Amarillo Site Operations
referred to hereinafter as the "Farmer".

The District agrees to:

Assist in carrying out a conservation plan by furnishing to the farmer such (1) information, (2) technical assistance and supervision, and (3) other assistance it may have available at the time work is to be done.

The Farmer agrees to:

1. Use his land within its capabilities.
2. Treat his land in keeping with its needs.
3. Develop as rapidly as feasible a conservation plan for his entire farm.
4. Start applying one or more conservation practices in keeping with these objectives and the technical standards of the district.
5. Maintain all structures established in an effective condition, and to continue the use of all other conservation measures put into effect.
6. Use any material or equipment made available to him by the District for the purpose and in the manner provided for it.

It is further agreed that:

1. This agreement will become effective on the date of the last signature and may be terminated or modified by either party.
2. The provisions of this agreement are understood by the Farmer and the District and neither shall be liable for damage to the other's property resulting from carrying out this agreement.

Jimmy D Johnson — 12/19/01
(Owner) (Date)

N/A
(Operator) (Date)

Soil Conservation District No. 156

By: Shawn O'Neal — 12-20-01
(District Director) (Date)