

WATER PERMIT NO. 2474-2

Name of Applicant: Bob Pace

Address: 15991 226 St, New Underwood SD 57761

Phone: 605 754-6993

Amount of Water Claimed: 38.6 acre-feet

Total Acres: NA

Source of Water Supply: runoff

Water to be used for: fish & wildlife propagation

County: Pennington

Type of Waste Disposal System:

Location: 1 ½ miles northwest of New Underwood

PRIORITY Date Received: 12-7-01

Fee: \$150

Corrected Application Received: 12-12-01

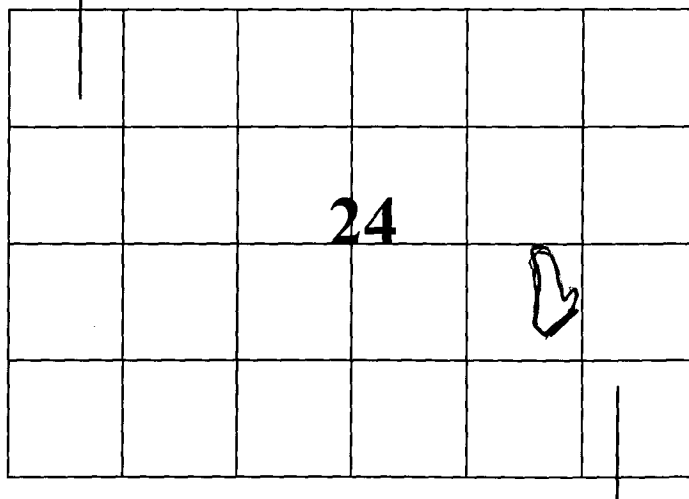
Period of Annual Use: January 1 – December 31

Remarks:

Diversion Point: NE ¼ SE ¼ Sec 24-T2N-R10E

Water Impounded: NE ¼ SE ¼

Sec 24-T2N-R10E



Depth of Well: NA

Well Driller: :

Remarks:

Type of Map: topo

Prepared by: Gerald Miller, NRCS

Reviewed and the Number Assigned on: 12-12-2001

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

SOUTH DAKOTA
WATER PERMIT NO. 2474-2

Date of first receipt of application December 7, 2001.

Date of return to applicant for corrections, amendments or changes December 7, 2001.

Date of receipt of corrected application December 12, 2001.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2474-2 to Bob Pace, 15991 226 St., New Underwood SD 57761 authorizing the construction of the dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 2474-2 authorizes impoundment of 38.6 acre-feet of water from runoff by constructing a dam located in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 24 with water impounded in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 24; all in T2N-R10E.
2. The water appropriated shall be used for the purpose of supplying water for fish and wildlife propagation and livestock use and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 2474-2 is February 11, 2002.
5. The date from which applicant may claim right is December 7, 2001.
6. One-fifth of the construction is to be completed on or before August 11, 2004.
7. All construction is to be completed on or before February 11, 2007.
8. Water is to be put to beneficial use on or before February 11, 2011.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. Water Permit No. 2474-2 authorizes a dam with a storage capacity of 38.6 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.
3. The existing well, located upstream of the dam which is at the approximate same elevation as the secondary spillway, shall be plugged in accordance with South Dakota Well Construction Standards.

WATER MANAGEMENT BOARD

By: Garland Erbele
Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

FEB 26 2002

date



FORM 2: Application for uses other than irrigation
(type or print)

Mail to: Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	No. <u>2474-2</u>	(office use only) Hydrologic Unit <u>10120111</u>
	Basin <u>Upper Cheyenne</u>	
	Newspaper <u>Rapid City Journal, Rapid City</u>	



Application For Permit To Appropriate Water Within The State Of South Dakota

Check use(s) of water:

☐ Municipal	☐ Suburban Housing	☐ Recreational	☐ Institutional
☐ Rural Water System	☐ Commercial	☒ Fish & Wildlife	☐ Geothermal Heat
☐ Domestic (over 18 gpm)	☐ Industrial	☒ Other <u>Livestock use</u>	

Type of Application: ☒ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation
(check one) ☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____
☐ Amendment/Correction to Permit No. _____

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.) _____

1. Name of Applicant BOB Pace Phone 605-754-6993
(check one) ☒ Owner ☐ Tenant/lessee
Mailing Address 15991 226 St. New Underwood State SD 57761
(Street, RR, or Box and City) (Zip Code)

2. Amount of water claimed _____ *CFS or _____ **GPM 38.6 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (**Acre Feet - storage capacity of dam/dugout or annual use if applicable)

3. Source of water supply RUNOFF & GROUND WATER (Base flow 2 cfs.)

4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) NE 1/4 SE 1/4 Sec 24-T2N-
R10E, Approximate Location 91 rds N and 18 rds W of the SE Corner
Sec 24-T2N-R10E Water Impounded: NE 1/4 SE 1/4 County PENNINGTON
Sec. 24-T2N-R10E

5. County or counties where water will be used PENNINGTON

6. Annual period during which water is to be used ANNUALLY Jan 1-Dec 31

7. Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed) A small dam will be constructed across a drainage located approximately 1/2 miles upstream and NW of New Underwood Dam and 1 1/2 miles NW of the city of New Underwood

STATE OF SOUTH DAKOTA)
County of Pennington SS

Attachments: Attach Form 2A if diversion is from a well or dugout, or if storage of water is proposed. Attach map and any other technical information. (see instructions)

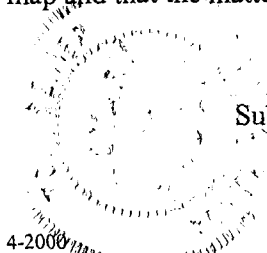
I, Robert Pace, the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary construction.

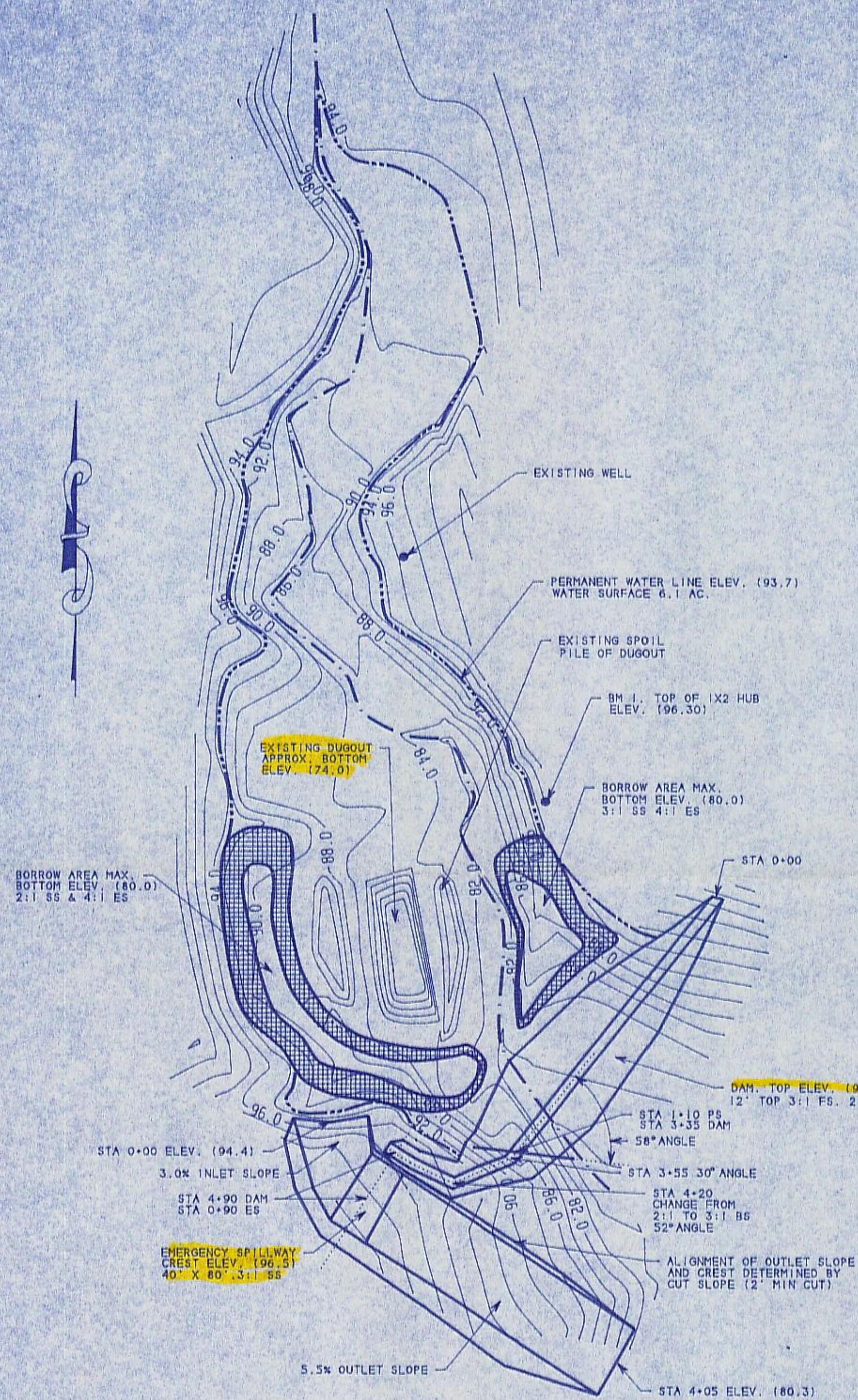
Applicant's signature Robert Pace

Subscribed and sworn to before me this 14th day of November 20 01

Toni Seiner
Notary Public signature

My Commission expires: 4-20-02





PLAN VIEW

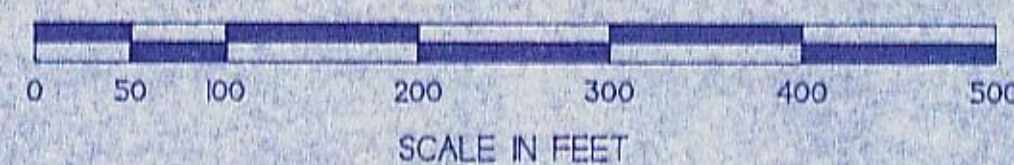


TABLE OF QUANTITIES

ITEM OR MATERIAL	UNIT	QUANTITIES BUILT
1. 18" PVC SDR 26 (60 PSI) PP (include elbow)	lf.	94
2. CANOPY INLET W/ ANTIVORTEX BAFFLE & GUARD POST SUPPORT (see Job Plan 5.5B, sheet 3 of 5)	ea.	1
3. 18" PVC 8" ELBOW (see Job Plan 3.8, sheet 4 of 5)	ea.	1
4. SAND ANTISEEP COLLAR (see Job Plan 3.8, sheet 4 of 5)	ea.	1
5. TIMBER PIPE SUPPORT (see Job Plan 4.0, sheet 5 of 5)	ea.	1
6. PIPE INSTALLATION		Lump Sum
7. EARTHFILL (Dam)	cy.	12500
8. EXCAVATION CORE TRENCH	cy.	1000
STRIPPING (Dam & Emergency Spillway)	cy.	1000
9. EXCAVATION BORROW AREA	cy.	9000
EMERGENCY SPILLWAY	cy.	5500
10. TOP DRESSING AND SPREADING TOP SOIL (E SPILLWAY)	sqyd.	4700
11. SEEDING (Dam & E Spillway)	ac.	5

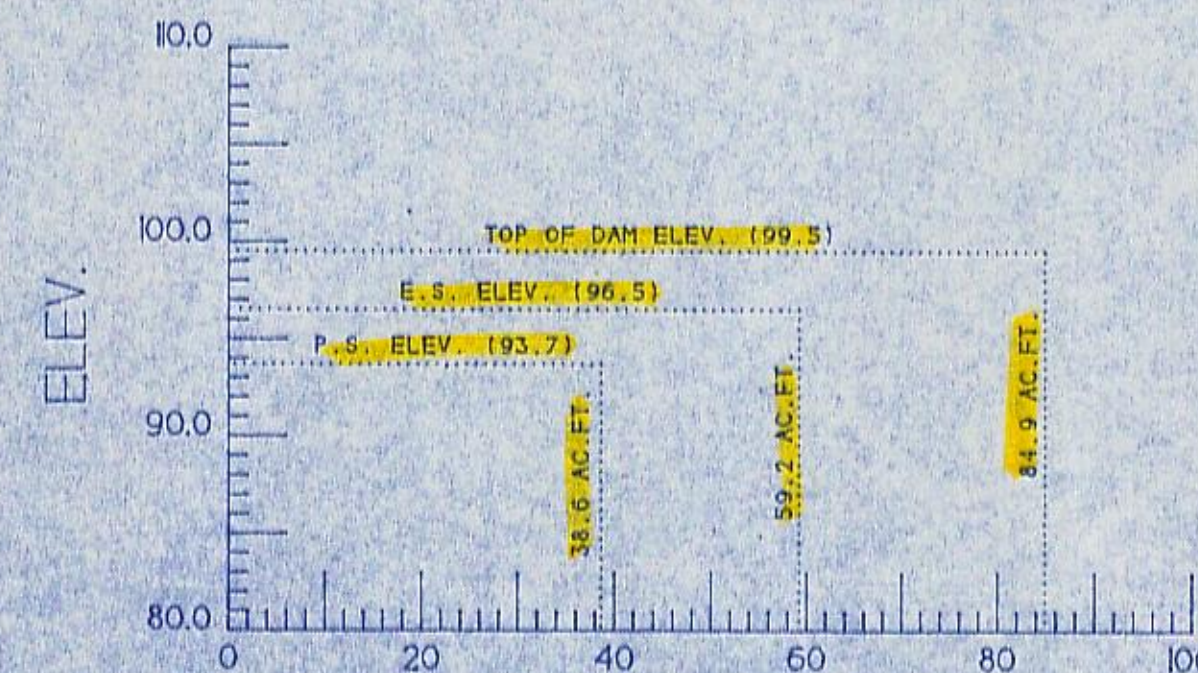
NOTE: Yardage amounts are estimates. Actual yardage will be based on calculations made from construction staking notes.

SOUTH DAKOTA CONSTRUCTION AND MATERIAL SPECIFICATIONS

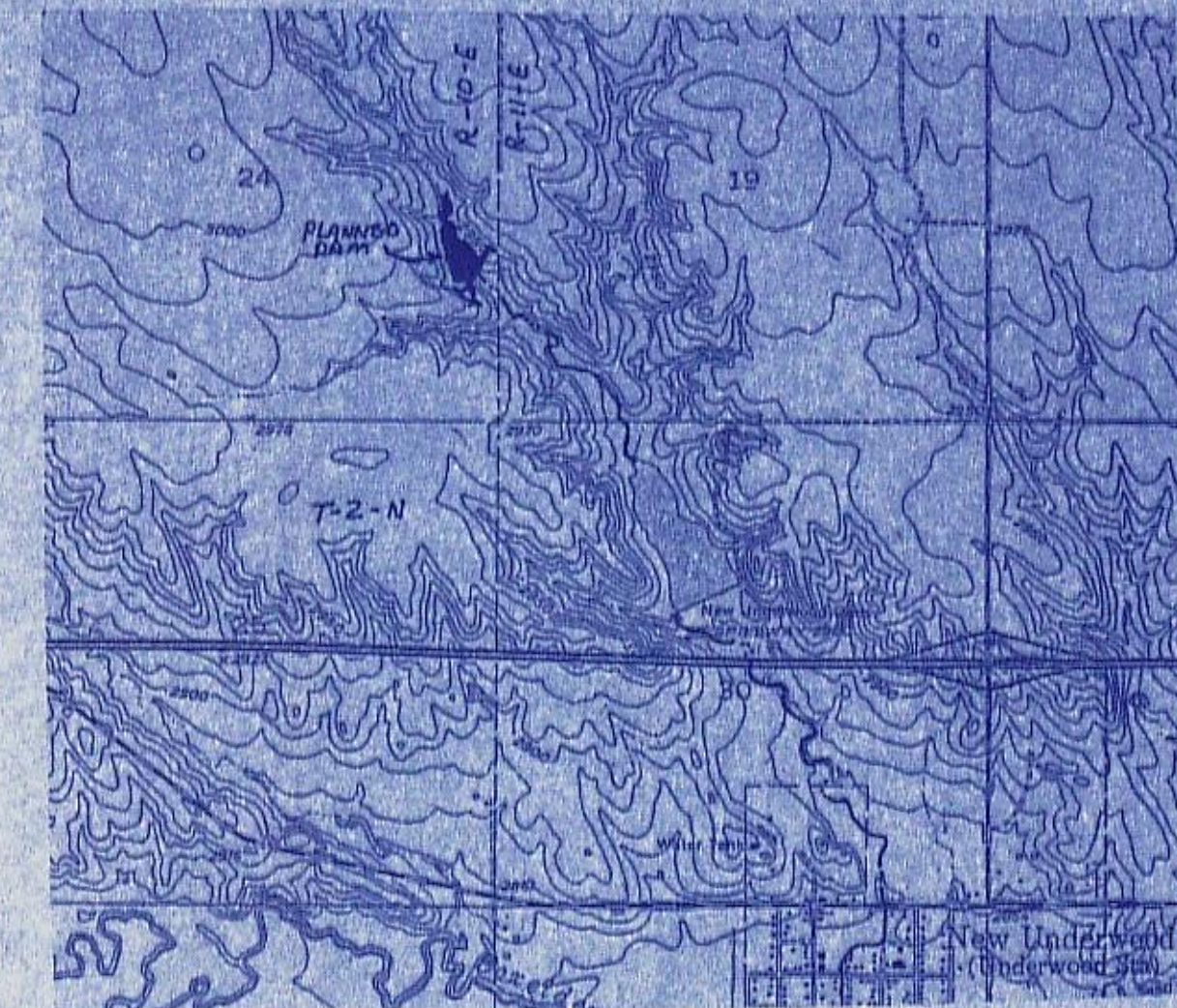
SD-4 STRIPPING
SD-5 EXCAVATION
SD-7S EARTHFILL -CLASS S- (Method Type Compaction)
SD-9 DRAINELL AND FILTER
SD-16 TIMBER FABRICATION AND INSTALLATION
SD-55 PLASTIC PIPE

ATTACHMENTS TO PLAN

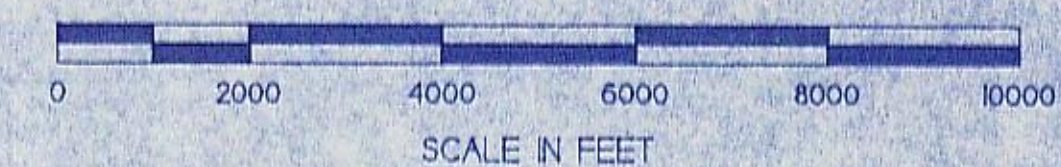
SAND ANTISEEP COLLAR (Job Plan 3.8)
TIMBER PIPE SUPPORT (Job Plan 4.0)
CANOPY INLET W/ ANTIVORTEX BAFFLE & GUARD POST SUPPORT (Job Plan 5.5B)
SOUTH DAKOTA CONSTRUCTION AND MATERIAL SPECIFICATIONS



STAGE-STORAGE CURVE



LOCATION MAP



STRUCTURE DATA

DRAINAGE AREA - 695 AC.

LENGTH OF FILL - 500 FT.
HEIGHT OF FILL - 22 FT. (Top of dam to Downstream toe)
EFFECTIVE HEIGHT - 18.5 FT.
(Elev. difference between E.S. and lowest point along CL of Dam)

NRCS DAM SAFETY HAZARD CLASS (a)
SD DAM SAFETY:
HAZARD POTENTIAL PER S.D. 74:02:08:05
CATEGORY 3, SMALL SIZE

STORAGE X EFFECTIVE HEIGHT - 1089
STORAGE: • TOP OF DAM 84.9 AC-FT.
• EMERGENCY SPILLWAY 59.2 AC-FT. (S.A. 7.9 AC.)
• PRINCIPAL SPILLWAY 38.6 AC-FT. (S.A. 6.1 AC.)

PRINCIPAL SPILLWAY DESIGN STORM - 2 YR + (2 cfs. BASE FLOW)
EMERGENCY SPILLWAY DESIGN STORM - 25 YR
EMERGENCY FREEBOARD STORM - 50 YR
Emergency Spillway would pass a 50 YR storm w/o overtopping Dam (1.3' freeboard).

BOB PACE DAM (FISH & WILDLIFE) PENNINGTON COUNTY S.DAK. PENNINGTON CD. NE1/4 SE1/4 SEC 24-T2N-R10E	
USDA U.S. Department of Agriculture Natural Resources Conservation Service	
DESIGNED... g. miller	APPROVED BY <i>Paula Miller</i>
DRAFTED... g. miller	TITLE <i>Bob Pace Dam</i>
DATE... 10/01	DWG NO. SHEET 1 OF 5 pacel.gcd

Supplemental Information

(Complete applicable portions only)

(type or print in ink)

1. Well Information - Proposed Construction

- a) Drill Hole Diameter _____ Depth _____
- b) Casing Type _____ Diameter _____ Thickness _____
- c) Screen Type _____ Diameter _____ Thickness _____
- d) Gravel Pack _____ Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material _____
- f) Depth to Water (ground surface to water level) _____
- g) Distance to nearest existing domestic well:

On applicants property _____ On property owned by others _____

2. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field) _____
- b) System Capacity (gallons) _____ Year Constructed _____
- c) Connected to the City of _____ Sanitary System _____

3. Dugout Information

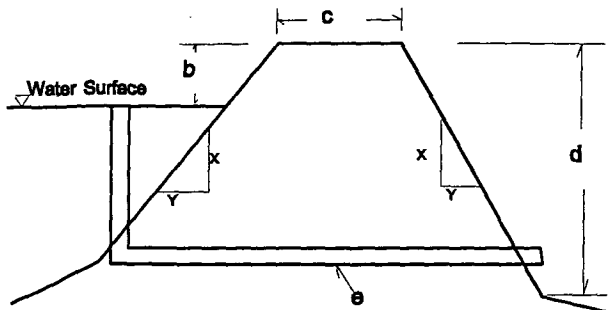
- a) Surface Dimensions _____ Depth _____
- b) Depth to water (ground surface to water level) _____

4. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to be shown on the map submitted with the application.

- a) If a private engineering firm or government agency was involved in the design of this dam, please give their name and address:

Gerald T Miller, CET, NRCS
1530 Samco Rd, Suite 4, Rapid City SD
57702-8007



- b) Freeboard 5.8 ft.
- c) Crest Width 12 ft.
 Crest Length 500 ft.
- d) Height 22 ft.
- e) Primary Outlet Capacity 34 cfs.
 If pipe, diameter 18" PVC
- f) Secondary Spillway Capacity 479 cfs.
 Spillway Width 80 ft.
- g) X & Y Slope _____
 Upstream 3:1
 Downstream 2:1
- h) Surface Area of Impoundment 6.1 Ac.
- i) Storage 38.6 Acre Feet
- j) Drainage Area Above Dam 695 Acres

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

№ 417009

Pierre, December 7, 2001

RECEIVED OF Robert or Ya Londa Pace, PO Box 191, New Underwood, SD 57761
the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct
and to put water to beneficial use _____

150 00

Fee for Application for Permit No. _____ to Appropriate Water, for Future
Use _____

Fee to retain Future Use Permit No. _____ after period of seven years.

Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water
License No. _____

Fee for Filing Transfer Form _____

Fee for Filing Extension Request _____

Fee for _____

(Any Other Work Provided by Law)

Total

150 00

By

Darland Erbe

Chief Engineer

gm

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

No 417017

Pierre, December 12, 20 01

RECEIVED OF Robert Pace, PO Box 191, New Underwood, SD 57761

the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct
and to put water to beneficial use _____

Fee for Application for Permit No. _____ to Appropriate Water, for Future
Use _____

Fee to retain Future Use Permit No. _____ after period of seven years.

Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water
License No. _____

Fee for Filing Transfer Form _____

Fee for Filing Extension Request _____

Fee for _____

(Any Other Work Provided by Law)

Total

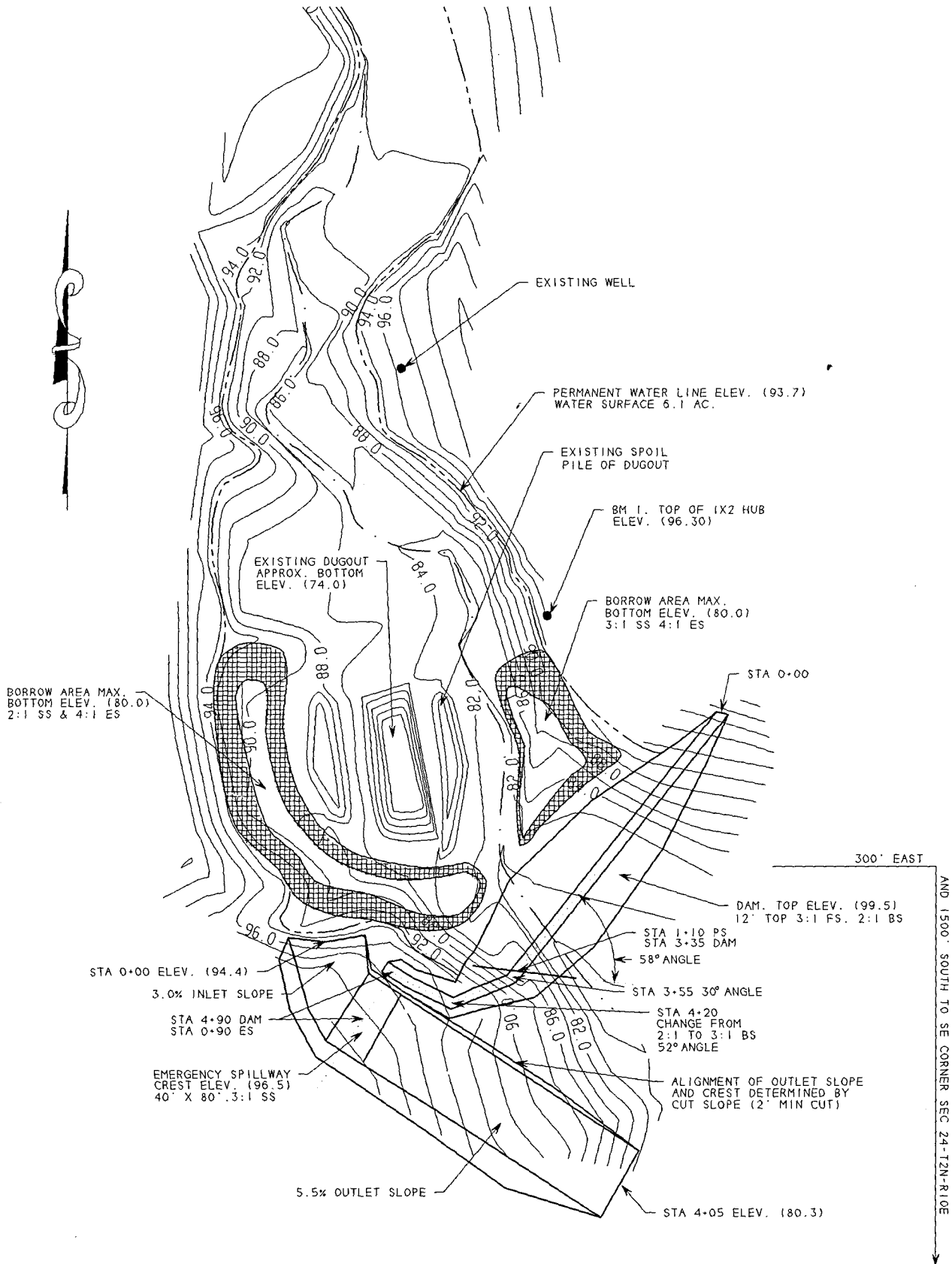
50 00

By

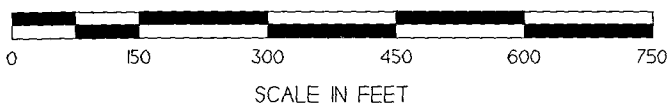
Darland Ebele

Chief Engineer

gmw



PLAN VIEW



Gerald Z Miller, CET
Natural Resources Engr. Service



United States
Department of
Agriculture

Natural Resources
Conservation
Service

1530 Samco Road
Suite 4
Rapid City, SD 57702-8007

October 23, 2001

Tim Schaal
DENR, Safety of Dams
Foss Building
523 East Capitol
Pierre, SD 57501-3182

Tim,

Attached for review and approval by your staff is a set of plans and specifications for a fish and wildlife pond for Bob Pace, NE1/4 SE1/4 S24 T2N R10E, Pennington County South Dakota. Dam is located 1/2 mile upstream and NW of New Underwood Dam and 1 1/2 miles NW of the city of New Underwood, dam is classified as "hazard class a" as per NRCS criteria. Documentation for arriving at the hazard class is included with the design documentation. Structure Data is as follows:

Drainage Area - 695ac.

Storage - principal spillway elev. 93.7 - 38.6 ac-ft. (S.A. 6.1 ac-ft.)

emergency spillway elev. 96.5 - 59.2 ac-ft. (S.A. 7.9 ac-ft.)

top of dam elev. 99.5 - 84.9 ac-ft.

Fill Height - 22.0 ft., Effective Height - 18.5 ft.

Water Depth - 19.7 ft.

Storage X Height - 1089

Principal Spillway Design Storm - 2 yr. (Base flow 2 cfs.)

Emergency Spillway Design Storm - 25 yr. (377 cfs.) (passes with 1.5 ft. depth in ES.)

Freeboard Hydrograph - 50 yr. (479 cfs.) (passes with 1.7 ft. depth in E.S.)

Structure Capacity @ elev. 99.2 - 1006 cfs.

Principal Spillway - 18" PVC Hood Inlet (34 cfs. capacity)

Gerald T. Miller
Civil Engineer Tech,
Natural Resources Conservation Service
1530 Samco Rd, suite 4
Rapid City, SD 57702-8007

cc. Gene Waterson, DC, NRCS, Rapid City SD

1*****

SITES XEQ 10/09/2001 WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM
 VER 96.1 (USER MANUAL - DATED MAY 1996)
 TIME 14:24:21

***** 80-80 LIST OF INPUT DATA *****

SITES 03/01/1996Pace24 Bob Pace Dam NE1/4 SE1/4 Sec 24-T2N-R10EH

*
 * 18" Hood Inlet Principal Spillway
 * Crest Elev. (93.7) 2 yr Design Storm (base flow 2 cfs.)
 * Emergency Spillway 80' Wide, 40' Crest
 * 25 yr Design Storm for capacity
 * 50 yr Design Storm for freeboard

STRUCTURE

75.0	0.05
80.0	0.70
82.0	1.52
84.0	3.33
86.0	8.41
88.0	13.43
92.0	29.13
94.0	40.3
98.0	70.48
100.0	89.75

*Routed PS Design Storm to
 Elev. 96.5
 Planned Emergency Spillway
 Elev. 96.5
 Planned Top of Dam
 Elev. 99.5*

ENDTABLE

WSDATA A1 AC 82 695 2.02
 BASEFLOW 1.84
 PDIRECT 2.0 3.6 4.1
 POOLDATA ELEV 93.7 93.7 78.0 77.5 HD
 PSDATA 1 18 0.009 79.8
 PSHOOD 80 20 80.0 79.0 0.6 1.0 B
 GRAPHICS I
 ASDATA 41 110 3 .055
 ASINSURF 41 0.035 0.04
 ASINLET 41 0.0 0.0 40 0.0 3
 110 2.1

ENDTABLE

ASEXSURF 41 0.035
 0.65 0
 3
 2 0
 0.2

ENDTABLE

ASEXIT 41 N 0 295
 BTMWIDTH FEET 80
 GO,DESIGN HLP TYPE2 24 TYPE2378 24 93.7
 ENDJOB

1SITES XEQ 10/09/2001 ----- COMMENT PAGE -----
 VER 96.1 Bob Pace Dam NE1/4 SE1/4 Sec 24-T2N-R10E WSID = Pace24

18" Hood Inlet Principal Spillway

Crest Elev. (93.7) 2 yr Design Storm (base flow 2 cfs.)

Emergency Spillway 80' Wide, 40' Crest

25 yr Design Storm for capacity

50 yr Design Storm for freeboard

***** MESSAGE - ALTERNATE STRUCTURE ID (S 1) BEING USED
SINCE USER DID NOT INPUT AN ID.

***** MESSAGE - ALTERNATE SUBWATERSHED ID (A) BEING USED SINCE
USER DID NOT INPUT AN ID.

***** MESSAGE - DRAINAGE AREA FROM WSDATA CONTROL BEING CONVERTED FROM
ACRES TO SQUARE MILES FOR COMPUTATION PURPOSES.

1SITES -----

XEQ 10/09/2001 Bob Pace Dam NE1/4 SE1/4 Sec 24-T2N-R10E WSID= Pace24
VER 96.1 SUBW= A
TIME 14:24:21 SITE = S 1 PASS= 1 PART= 1

***** BASIC DATA *****

CLIMATE AREA - NOT DEFINED DESIGN CLASS A1 = LT 3000.

STORM DISTRIBUTION-PSH 24 HOUR TYPE II RAINFALL DISTRIBUTION

STORM DISTRIBUTION AUX. -24 HOUR TYPE II RAINFALL DISTRIBUTION

PRECIP. - P-PS,1-DAY	P-PS,10-DAY	P-SD	P-FB
2.00	.00	3.60	4.10

WSDATA -	CN	DA-SM	TC/L	-/H	QRF
82.00	1.09	2.02	.00	.00	

SITEDATA- PERM POOL	CREST PS	FP SED	VALLEY FL	378?
93.70	93.70	.00	77.50	YES

BASEFLOW	INITIAL EL	EXTRA VOL	SITE TYPE
1.84	.00	.00	DESIGN

PSDATA - NO. COND	COND L	DIA/W	-/H
1.00	.00	18.00	.00

PS N	KE	WEIR L	TW EL
.009	.00	.00	79.80

2ND STG	ORF H	ORF L	START AUX.
.00	.00	.00	93.70

PSHOOD -	OUTLET	MITER	LENGTH	LENGTH
----------	--------	-------	--------	--------

ELEV.	ELEV.	INLET TO	MITER TO		
		MITER(FT)	OUTLET(FT)		
79.00	80.00	80.0	20.0		

ASCRESTS -	AUX.1	AUX.2	AUX.3	AUX.4	AUX.5
	.00	.00	.00	.00	

AUX.DATA -	REF.NO.	RETARD. C	TIE STATION	INLET LENGTH	
	41	.00	110		

AUX.DATA -	INLET N	SIDE SLOPE	EXIT N	EXIT SLOPE	ACTUAL AUX?
	.035	3.00	.055	NO	

BTM WIDTH -	BW1	BW2	BW3	BW4	BW5
ft	80.00	.00	.00	.00	

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES -----
 XEQ 10/09/2001 Bob Pace Dam NE1/4 SE1/4 Sec 24-T2N-R10E WSID= Pace24
 VER 96.1 SUBW= A
 TIME 14:24:21 SITE = S 1 PASS= 1 PART= 2

PERM POOL	93.70 FT	38.6 ACFT	.00 AC	.0 CFS
CREST PS	93.70 FT	38.6 ACFT	.00 AC	.0 CFS
SED ACCUM	93.70 FT	38.6 ACFT	.00 AC	.0 CFS
BASEFLOW	94.44 FT	43.6 ACFT	.00 AC	2.0 CFS
START ELEV	93.70 FT	38.6 ACFT	.00 AC	.0 CFS

NRCS-PSH D= 24.00 HR P= 2.00 IN Q= .65 IN DA= 1.09 SM
 TC= 2.02 HR CN= 82.00 VOL= 62.5 ACFT

2yr.
 PEAK = 137.6 CFS, AT 13.3 HRS.

ROUTED RESULT -	HYD TYPE	EMAX	VOL-MAX	AMAX	QMAX
	NRCS-PSH	96.47 FT	59.0 ACFT	.00 AC	34.0 CFS

PS STORAGE 20.3 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

DRAWDOWN (DDT) TEST 94.44 FT 43.6 ACFT 2.00 CFS
 CONTROL IS .000 DETENTION STORAGE

TIME = 3.99 DAYS, TO 2.0 CFS (LIMIT = 10.00 DAYS)

PLOT OF PRINCIPAL SPILLWAY HYDROGRAPH, 1 INCH= 20. CFS

				0.	20.	40.	60.	80.	100.	120.	140.
Time	Qin	Qout	Elev	Vol	Area	ExtVel	I	I	I	I	I
.00	2	0	93.7	38.6	.0	.1					
.30	2	0	93.7	38.7	.0	.1					

.60	2	0	93.7	38.7	.0	.
.91	2	0	93.7	38.8	.0	.
1.21	2	0	93.7	38.8	.0	.
1.51	2	0	93.7	38.9	.0	.
1.81	2	0	93.8	38.9	.0	.
2.11	2	0	93.8	39.0	.0	.
2.42	2	0	93.8	39.0	.0	.
2.72	2	0	93.8	39.1	.0	.
3.02	2	0	93.8	39.1	.0	.
3.32	2	0	93.8	39.2	.0	.
3.62	2	0	93.8	39.2	.0	.
3.93	2	0	93.8	39.2	.0	.
4.23	2	0	93.8	39.3	.0	.
4.53	2	0	93.8	39.3	.0	.
4.83	2	0	93.8	39.4	.0	.
5.13	2	0	93.8	39.4	.0	.
5.44	2	0	93.9	39.5	.0	.
5.74	2	0	93.9	39.5	.0	.
6.04	2	0	93.9	39.6	.0	.
6.34	2	0	93.9	39.6	.0	.
6.64	2	0	93.9	39.6	.0	.
6.95	2	0	93.9	39.7	.0	.
7.25	2	0	93.9	39.7	.0	.
7.55	2	0	93.9	39.8	.0	.
7.85	2	0	93.9	39.8	.0	.
8.15	2	0	93.9	39.8	.0	.
8.46	2	0	93.9	39.9	.0	.
8.76	2	0	93.9	39.9	.0	.
9.06	2	0	93.9	40.0	.0	.
9.36	2	0	93.9	40.0	.0	.
9.66	2	0	94.0	40.0	.0	.
9.97	2	0	94.0	40.1	.0	.
10.27	2	0	94.0	40.1	.0	.
10.57	2	0	94.0	40.2	.0	.
10.87	2	0	94.0	40.2	.0	.
11.17	2	0	94.0	40.2	.0	.
11.48	2	0	94.0	40.3	.0	.
11.78	4	1	94.0	40.4	.0	.
12.08	18	1	94.0	40.6	.0	.
12.38	51	1	94.2	41.5	.0	.
12.69	98	2	94.4	43.3	.0	P
12.99	130	4	94.8	46.1	.0	P
13.29	138	6	95.2	49.3	.0	P
13.59	127	23	95.6	52.2	.0	P
13.89	105	33	95.9	54.4	.0	P
14.20	85	34	96.1	56.0	.0	P
14.50	71	34	96.2	57.1	.0	P
14.80	59	34	96.3	57.8	.0	P
15.10	51	34	96.4	58.4	.0	P
15.40	44	34	96.4	58.7	.0	P
15.71	39	34	96.5	58.9	.0	P
16.01	35	34	96.5	59.0	.0	XI
16.31	32	34	96.5	59.0	.0	IP
16.61	29	34	96.5	58.9	.0	IP
16.91	27	34	96.4	58.7	.0	IP
17.22	25	34	96.4	58.5	.0	IP

17.52	24	34	96.4	58.3	.0	.	I	P
17.82	22	34	96.4	58.0	.0	.	I	P
18.12	21	34	96.3	57.7	.0	.	I	P
18.42	21	34	96.3	57.4	.0	.	I	P
18.73	20	34	96.2	57.1	.0	.	I	P
19.03	19	34	96.2	56.7	.0	.	I	P
19.33	18	34	96.1	56.3	.0	.	I	P
19.63	18	34	96.1	56.0	.0	.	I	P
19.93	17	34	96.0	55.6	.0	.	I	P
20.24	16	33	96.0	55.1	.0	.	I	P
20.54	16	33	95.9	54.7	.0	.	I	P
20.84	15	33	95.9	54.3	.0	.	I	P
21.14	15	33	95.8	53.8	.0	.	I	P
21.44	14	33	95.7	53.3	.0	.	I	P
21.75	14	29	95.7	52.9	.0	.	I	P
22.05	14	26	95.6	52.6	.0	.	I	P
22.35	14	23	95.6	52.3	.0	.	I	P
22.65	13	21	95.6	52.1	.0	.	I	P
22.95	13	19	95.5	51.9	.0	.	I	P
23.26	13	18	95.5	51.8	.0	.	I	P
23.56	13	17	95.5	51.7	.0	.	I	P
23.86	13	16	95.5	51.6	.0	.	I	P
24.16	13	15	95.5	51.5	.0	.	I	P
24.46	12	15	95.5	51.4	.0	.	I	P
24.77	11	14	95.5	51.4	.0	.	I	P
25.07	9	13	95.5	51.3	.0	.	I	P
25.37	8	12	95.4	51.2	.0	.	I	P
25.67	6	11	95.4	51.1	.0	.	I	P
25.97	5	10	95.4	50.9	.0	.	I	P
26.28	4	9	95.4	50.8	.0	.	I	P
26.58	3	7	95.4	50.7	.0	.	I	P
26.88	3	7	95.4	50.6	.0	.	I	P
27.18	3	7	95.3	50.5	.0	.	I	P
27.48	2	7	95.3	50.4	.0	.	I	P
27.79	2	6	95.3	50.3	.0	.	I	P
28.09	2	6	95.3	50.2	.0	.	I	P
28.39	2	6	95.3	50.1	.0	.	I	P
28.69	2	6	95.3	50.0	.0	.	I	P
28.99	2	6	95.3	49.9	.0	.	I	P
29.30	2	6	95.3	49.8	.0	.	I	P
29.60	2	6	95.2	49.7	.0	.	I	P
29.90	2	6	95.2	49.6	.0	.	I	P
30.20	2	6	95.2	49.5	.0	.	I	P
30.50	2	6	95.2	49.4	.0	.	I	P
30.81	2	6	95.2	49.3	.0	.	I	P
31.11	2	6	95.2	49.2	.0	.	I	P
31.41	2	6	95.2	49.1	.0	.	I	P
31.71	2	6	95.2	49.0	.0	.	I	P
32.01	2	6	95.1	48.9	.0	.	I	P
32.32	2	5	95.1	48.8	.0	.	I	P
32.62	2	5	95.1	48.7	.0	.	I	P
32.92	2	5	95.1	48.6	.0	.	I	P
33.22	2	5	95.1	48.6	.0	.	I	P
33.52	2	5	95.1	48.5	.0	.	I	P
33.83	2	5	95.1	48.4	.0	.	I	P
34.13	2	5	95.1	48.3	.0	.	I	P

34.43	2	5	95.1	48.2	.0	.IP
34.73	2	5	95.0	48.2	.0	.IP
35.04	2	5	95.0	48.1	.0	.IP
35.34	2	5	95.0	48.0	.0	.IP
35.64	2	5	95.0	47.9	.0	.IP
35.94	2	5	95.0	47.9	.0	.IP
36.24	2	5	95.0	47.8	.0	.IP
36.55	2	5	95.0	47.7	.0	.IP
36.85	2	5	95.0	47.7	.0	.IP
37.15	2	5	95.0	47.6	.0	.IP
37.45	2	5	95.0	47.5	.0	.IP
37.75	2	5	94.9	47.5	.0	.IP
38.06	2	5	94.9	47.4	.0	.IP
38.36	2	5	94.9	47.3	.0	.IP
38.66	2	4	94.9	47.3	.0	.IP
38.96	2	4	94.9	47.2	.0	.IP
39.26	2	4	94.9	47.2	.0	.IP
39.57	2	4	94.9	47.1	.0	.IP
39.87	2	4	94.9	47.0	.0	.IP
40.17	2	4	94.9	47.0	.0	.IP
40.47	2	4	94.9	46.9	.0	.IP
40.77	2	4	94.9	46.9	.0	.IP
41.08	2	4	94.9	46.8	.0	.IP
41.38	2	4	94.9	46.8	.0	.IP
41.68	2	4	94.8	46.7	.0	.IP
41.98	2	4	94.8	46.7	.0	.IP
42.28	2	4	94.8	46.6	.0	.IP
42.59	2	4	94.8	46.6	.0	.IP
42.89	2	4	94.8	46.5	.0	.IP
43.19	2	4	94.8	46.5	.0	.IP
43.49	2	4	94.8	46.4	.0	.IP
43.79	2	4	94.8	46.4	.0	.IP
44.10	2	4	94.8	46.3	.0	.IP
44.40	2	4	94.8	46.3	.0	.IP
44.70	2	4	94.8	46.2	.0	.IP
45.00	2	4	94.8	46.2	.0	.IP
45.30	2	4	94.8	46.1	.0	.IP
45.61	2	4	94.8	46.1	.0	.IP
45.91	2	4	94.8	46.1	.0	.IP
46.21	2	4	94.8	46.0	.0	.IP
46.51	2	4	94.8	46.0	.0	.IP
46.81	2	4	94.7	45.9	.0	.IP
47.12	2	4	94.7	45.9	.0	.IP
47.42	2	4	94.7	45.9	.0	.IP
47.72	2	3	94.7	45.8	.0	.IP
48.02	2	3	94.7	45.8	.0	.IP
48.32	2	3	94.7	45.7	.0	.IP
48.63	2	3	94.7	45.7	.0	.IP
48.93	2	3	94.7	45.7	.0	.IP
49.23	2	3	94.7	45.6	.0	.IP
49.53	2	3	94.7	45.6	.0	.IP
49.83	2	3	94.7	45.6	.0	.IP
50.14	2	3	94.7	45.5	.0	.IP
50.44	2	3	94.7	45.5	.0	.IP
50.74	2	3	94.7	45.5	.0	.IP
51.04	2	3	94.7	45.4	.0	.IP

51.34	2	3	94.7	45.4	.0	.IP
51.65	2	3	94.7	45.4	.0	.IP
51.95	2	3	94.7	45.4	.0	.IP
52.25	2	3	94.7	45.3	.0	.IP
52.55	2	3	94.7	45.3	.0	.IP
52.85	2	3	94.7	45.3	.0	.IP
53.16	2	3	94.7	45.2	.0	.IP
53.46	2	3	94.7	45.2	.0	.IP
53.76	2	3	94.6	45.2	.0	.IP
54.06	2	3	94.6	45.2	.0	.IP
54.36	2	3	94.6	45.1	.0	.IP
54.67	2	3	94.6	45.1	.0	.IP
54.97	2	3	94.6	45.1	.0	.P
55.27	2	3	94.6	45.1	.0	.P
55.57	2	3	94.6	45.0	.0	.P
55.87	2	3	94.6	45.0	.0	.P
56.18	2	3	94.6	45.0	.0	.P
56.48	2	3	94.6	45.0	.0	.P
56.78	2	3	94.6	44.9	.0	.P
57.08	2	3	94.6	44.9	.0	.P
57.38	2	3	94.6	44.9	.0	.P
57.69	2	3	94.6	44.9	.0	.P
57.99	2	3	94.6	44.9	.0	.P
58.29	2	3	94.6	44.8	.0	.P
58.59	2	3	94.6	44.8	.0	.P
58.89	2	3	94.6	44.8	.0	.P
59.20	2	3	94.6	44.8	.0	.P
59.50	2	3	94.6	44.8	.0	.P
59.80	2	3	94.6	44.7	.0	.P
60.10	2	3	94.6	44.7	.0	.P
60.41	2	3	94.6	44.7	.0	.P
60.71	2	3	94.6	44.7	.0	.P
61.01	2	3	94.6	44.7	.0	.P
61.31	2	3	94.6	44.6	.0	.P
61.61	2	3	94.6	44.6	.0	.P
61.92	2	3	94.6	44.6	.0	.P
62.22	2	3	94.6	44.6	.0	.P
62.52	2	3	94.6	44.6	.0	.P
62.82	2	3	94.6	44.6	.0	.P
63.12	2	3	94.6	44.5	.0	.P
63.43	2	3	94.6	44.5	.0	.P
63.73	2	3	94.6	44.5	.0	.P
64.03	2	3	94.6	44.5	.0	.P
64.33	2	3	94.6	44.5	.0	.P
64.63	2	3	94.6	44.5	.0	.P
64.94	2	3	94.6	44.5	.0	.P
65.24	2	3	94.5	44.4	.0	.P
65.54	2	3	94.5	44.4	.0	.P
65.84	2	3	94.5	44.4	.0	.P
66.14	2	3	94.5	44.4	.0	.P
66.45	2	3	94.5	44.4	.0	.P
66.75	2	3	94.5	44.4	.0	.P
67.05	2	3	94.5	44.4	.0	.P
67.35	2	2	94.5	44.4	.0	.P
67.65	2	2	94.5	44.3	.0	.P
67.96	2	2	94.5	44.3	.0	.P

68.26	2	2	94.5	44.3	.0	.P
68.56	2	2	94.5	44.3	.0	.P
68.86	2	2	94.5	44.3	.0	.P
69.16	2	2	94.5	44.3	.0	.P
69.47	2	2	94.5	44.3	.0	.P
69.77	2	2	94.5	44.3	.0	.P
70.07	2	2	94.5	44.3	.0	.P
70.37	2	2	94.5	44.2	.0	.P
70.67	2	2	94.5	44.2	.0	.P
70.98	2	2	94.5	44.2	.0	.P
71.28	2	2	94.5	44.2	.0	.P
71.58	2	2	94.5	44.2	.0	.P
71.88	2	2	94.5	44.2	.0	.P
72.18	2	2	94.5	44.2	.0	.P

Time Qin Qout Elev Vol Area ExtVel | | | | | | | |

0. 20. 40. 60. 80. 100. 120. 140.

END NRCS-PSH PLOT

RATING TABLE DEVELOPED, SITE = S 1:
 BY PROGRAM FOR PS AND AUX. SPILLWAYS
 AUX. RATING USED WSPVRT METHOD.

RATING TABLE NUMBER 1

	ELEV. FEET	Q-TOTAL CFS	Q-PS CFS	Q-AUX. CFS	VOLUME AC-FT	AREA ACRE
1	93.70	.00	.00	.00	38.62	.00
2	94.25	1.04	1.04	.00	42.22	.00
3	94.81	3.89	3.89	.00	46.41	.00
4	95.36	6.65	6.65	.00	50.60	.00
5	95.48	15.39	15.39	.00	51.50	.00
6	95.60	24.16	24.16	.00	52.40	.00
7	95.72	33.20	33.20	.00	53.30	.00
FULL CONDUIT FLOW, ELEV = 95.72 FT						
8	96.05	33.54	33.54	.00	55.78	.00
9	96.38	33.88	33.88	.00	58.27	.00
10	96.71	34.21	34.21	.00	60.75	.00
11	97.04	34.54	34.54	.00	63.23	.00
12	97.37	34.87	34.87	.00	65.71	.00
13	97.70	35.20	35.20	.00	68.19	.00

1SITES -----

XEQ 10/09/2001 Bob Pace Dam NE1/4 SE1/4 Sec 24-T2N-R10E WSID= Pace24
 VER 96.1 SUBW= A
 TIME 14:24:21 SITE = S 1 PASS= 1 PART= 3

AUX. CREST 96.47 FT 59.0 ACFT .00 AC 34.0 CFS

PS STORAGE 20.3 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

START ELEV 94.45 FT 43.7 ACFT .00 AC 2.0 CFS

EFFECTIVE HEIGHT(H)= 18.5 FEET, PRODUCT= 1089. (H * STORAGE AT CREST AUX.).

INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.

NRCS-SDH D= 24.00 HR P= 3.60 IN Q= 1.87 IN DA= 1.09 SM
TC= 2.02 HR CN= 82.00 VOL= 133.0 ACFT

25yr
PEAK = 421.1 CFS, AT 13.3 HRS.

NRCS-FBH D= 24.00 HR P= 4.10 IN Q= 2.29 IN DA= 1.09 SM
TC= 2.02 HR CN= 82.00 VOL= 157.5 ACFT

50yr
PEAK = 518.2 CFS, AT 13.3 HRS.

RATING TABLE DEVELOPED, SITE = S 1:
BY PROGRAM FOR PS AND AUX. SPILLWAYS
AUX. RATING USED WSPVRT METHOD.

RATING TABLE NUMBER 2

	ELEV. FEET	Q-TOTAL CFS	Q-PS CFS	Q-AUX. CFS	VOLUME AC-FT	AREA ACRE
1	93.70	.00	.00	.00	38.62	.00
2	94.25	1.04	1.04	.00	42.22	.00
3	94.81	3.89	3.89	.00	46.41	.00
4	95.36	6.65	6.65	.00	50.60	.00
5	95.48	15.39	15.39	.00	51.50	.00
6	95.60	24.16	24.16	.00	52.40	.00
7	95.72	33.20	33.20	.00	53.30	.00
FULL CONDUIT FLOW, ELEV = 95.72 FT						
8	95.85	33.33	33.33	.00	54.25	.00
9	95.97	33.46	33.46	.00	55.19	.00
10	96.10	33.59	33.59	.00	56.14	.00
11	96.22	33.72	33.72	.00	57.08	.00
12	96.35	33.84	33.84	.00	58.02	.00
13	96.47	33.97	33.97	.00	58.97	.00
14	96.65	43.23	34.15	9.08	60.30	.00
15	96.83	55.40	34.33	21.07	61.63	.00
16	97.14	112.07	34.65	77.43	64.02	.00
17	97.53	213.39	35.03	178.36	66.95	.00
18	98.24	489.06	35.72	453.34	72.77	.00
19	99.12	943.71	36.57	907.15	81.26	.00
20	100.00	1517.48	37.39	1480.09	89.75	.00

SUMMARY OF AUXILIARY SPILLWAY SURFACE CONDITIONS USED IN COMPUTATIONS BY REACH

REACH	FROM STA (ft)	TO STA (ft)	SLOPE (%)	RETARDANCE CURVE INDEX@	VEGETAL COVER FACTOR	MAINT. CODE	ROOTING DEPTH (ft)	REACH LOCATION
1	-110.	-40.	-3.0	.035	**	**	**	INLET
2	-40.	0.	.0	.035	**	**	**	CREST
3	0.	295.	5.5	.035	.65	3	2.0	EXIT !

@ The program interprets retardance curve index entries of less than 1 as Manning's n values.

* Upper case indicates a reach of constructed spillway channel.

** The program does not use vegetal cover factor, maintenance code, and rooting depth for inlet and crest reaches in computations.

! Reach 3 used in computing exit channel velocities.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.-HP FT	VOL-AUX. ACFT
NRCS-SDH	80.0	97.99	70.4	.0	1.51	11.4

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGE = 35.4 341.3 376.7

	CRITICAL DEPTH	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
AUXILIARY SPILLWAY ---	.82	5.06	.019	.026

AUXILIARY SPILLWAY DURATION FLOW = 10.0 HOURS

***** MESSAGE - NHCP378 CRITERIA USED BUT AUXILIARY SPILLWAY RATING NOT BASED ON ASFILE RATINGS.

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 7.0 FT/SEC
EXIT SLOPE = .055 FT/FT
FLOW DEPTH = .6 FT

EFFECTIVE STRESS FOR STABILITY ANALYSIS OF AUX. EXIT CHANNEL
(Refer to Ag. Handbook 667, Chapt. 3, for allowable stresses.)
Aux. Discharge = 341. cfs; Bottom Width = 80. ft

REACH	FROM	TO	SLOPE	MANNING'S n	VELOCITY ft/s	STRESS lb/ft^2
3	0.	295.	5.50	.035	6.97	1.971

Time	Qin	Qout	Elev	Vol	Area	ExtVel	1 IN = 100. CFS										EXIT SLOPE = .055
							0.	100.	200.	300.	400.	500.	600.	700.			
.00	2	2	94.4	43.7	.0	.00											
.30	2	2	94.4	43.7	.0	.00											
.60	2	2	94.4	43.7	.0	.00											
.91	2	2	94.4	43.7	.0	.00											
1.21	2	2	94.4	43.7	.0	.00											
1.51	2	2	94.4	43.7	.0	.00											
1.81	2	2	94.4	43.7	.0	.00											
2.11	2	2	94.4	43.7	.0	.00											
2.42	2	2	94.4	43.7	.0	.00											
2.72	2	2	94.4	43.7	.0	.00											
3.02	2	2	94.4	43.7	.0	.00											
3.32	2	2	94.4	43.7	.0	.00											

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20.54	34	42	96.6	60.1	.0	1.54	. IA
20.84	33	40	96.6	59.9	.0	1.43	. IA
21.14	32	39	96.6	59.7	.0	1.31	. IA
21.44	31	38	96.5	59.5	.0	1.16	. IA
21.75	30	37	96.5	59.3	.0	1.00*	. IA
22.05	29	35	96.5	59.2	.0	.79*	. IA
22.35	29	34	96.5	59.0	.0	.00	. A
22.65	28	34	96.5	58.9	.0	.00	. P
Time	Qin	Qout	Elev	Vol	Area	ExtVel	
					0.	100.	200.
							300.
							400.
							500.
							600.
							700.

END NRCS-SDH PLOT

DRAWDOWN USING FREEBOARD STORM FOLLOWS, STARTING AT ELEVATION 96.47 FT.

DRAWDOWN (DDT) TEST 94.44 FT 43.6 ACFT 2.00 CFS
CONTROL IS .000 DETENTION STORAGE

TIME = 3.79 DAYS, TO 2.0 CFS (LIMIT = 10.00 DAYS)

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.-HP FT	VOL-AUX. ACFT
NRCS-FBH	80.0	98.21	72.6	.0	1.74	13.6

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGE = 35.7 443.2 478.9

CRITICAL CRITICAL CRITICAL 25% OF Q
DEPTH VELOCITY SLOPE-Sc Sc
AUXILIARY FT FT/SEC FT/FT FT/FT
SPILLWAY --- .97 5.50 .018 .025

AUXILIARY SPILLWAY DURATION FLOW = 12.1 HOURS
ATTACK, OE/B = 1.0 ACFT/FT

***** MESSAGE - NHCP378 CRITERIA USED BUT AUXILIARY SPILLWAY RATING NOT
BASED ON ASFILE RATINGS.

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 7.7 FT/SEC
EXIT SLOPE = .055 FT/FT
FLOW DEPTH = .7 FT

>>>>> NHCP378 RUN - MINIMUM DEPTH, CREST AUX. TO TOP OF DAM IS 2.00 FT.
NEW TOP OF DAM ELEVATION = 98.47.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.-HP FT	VOL-AUX. ACFT
MINIMUM AUX.	80.0	98.47	75.1	.0	2.00	16.1

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGES = 35.9 575.5 611.4

CRITICAL CRITICAL CRITICAL 25% OF Q
DEPTH VELOCITY SLOPE-Sc Sc
AUXILIARY FT FT/SEC FT/FT FT/FT

SPILLWAY --- 1.15 5.97 .017 .023

>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED
FOR THIS PASS. NEW TOP OF DAM ELEVATION = 99.21.

ROUTED RESULTS	BTM	WIDTH	MAX ELEV	VOL-MAX	AREA-MAX	AUX.HP	VOL-AUX.
	FT	FT	ACFT	AC	FT	ACFT	
MINIMUM AUX.	80.0	99.21	82.2	.0	2.74	23.2	

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGES = 36.7 969.8 1006.4

	CRITICAL DEPTH	CRITICAL VELOCITY	CRITICAL SLOPE-Sc	25% OF Q Sc
AUXILIARY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY ---	1.62	7.03	.016	.021

PLOT NRCS-FBH				1 IN = 100. CFS				EXIT SLOPE = .055			
				0.	100.	200.	300.	400.	500.	600.	700.
Time	Qin	Qout	Elev	Vol	Area	ExtVel					
.00	2	2	94.4	43.7	.0	.00					
.30	2	2	94.4	43.7	.0	.00					
.60	2	2	94.4	43.7	.0	.00					
.91	2	2	94.4	43.7	.0	.00					
1.21	2	2	94.4	43.7	.0	.00					
1.51	2	2	94.4	43.7	.0	.00					
1.81	2	2	94.4	43.7	.0	.00					
2.11	2	2	94.4	43.7	.0	.00					
2.42	2	2	94.4	43.7	.0	.00					
2.72	2	2	94.4	43.7	.0	.00					
3.02	2	2	94.4	43.7	.0	.00					
3.32	2	2	94.4	43.7	.0	.00					
3.62	2	2	94.4	43.7	.0	.00					
3.93	2	2	94.4	43.7	.0	.00					
4.23	2	2	94.4	43.7	.0	.00					
4.53	2	2	94.4	43.7	.0	.00					
4.83	2	2	94.4	43.7	.0	.00					
5.13	2	2	94.4	43.7	.0	.00					
5.44	2	2	94.4	43.7	.0	.00					
5.74	2	2	94.4	43.7	.0	.00					
6.04	2	2	94.4	43.7	.0	.00					
6.34	2	2	94.4	43.7	.0	.00					
6.64	2	2	94.4	43.7	.0	.00					
6.95	2	2	94.4	43.7	.0	.00					
7.25	2	2	94.4	43.7	.0	.00					
7.55	2	2	94.4	43.7	.0	.00					
7.85	2	2	94.4	43.7	.0	.00					
8.15	2	2	94.4	43.7	.0	.00					
8.46	2	2	94.4	43.7	.0	.00					
8.76	3	2	94.4	43.7	.0	.00					
9.06	4	2	94.5	43.7	.0	.00					
9.36	5	2	94.5	43.8	.0	.00	.1				
9.66	7	2	94.5	43.9	.0	.00	.1				
9.97	10	2	94.5	44.1	.0	.00	.1				
10.27	12	2	94.5	44.3	.0	.00	.1				

10.57	15	3	94.6	44.5	.0	.00	.I												
10.87	20	3	94.6	44.9	.0	.00	.I												
11.17	25	3	94.7	45.4	.0	.00	.I												
11.48	34	4	94.8	46.1	.0	.00	.I												
11.78	51	4	94.9	47.0	.0	.00	.I												
12.08	114	6	95.1	48.9	.0	.00	.P	I											
12.38	246	30	95.7	53.0	.0	.00	.P		I										
12.69	415	44	96.7	60.3	.0	1.68	.A			I									
12.99	513	266	97.7	68.1	.0	5.98	.				A							I	
13.29	518	452	98.2	72.0	.0	7.53	.											A	X
13.59	458	479	98.2	72.6	.0	7.72	.											I	X
13.89	364	428	98.1	71.5	.0	7.37	.											A	
14.20	286	351	97.9	69.9	.0	6.77	.				I	A							
14.50	231	282	97.7	68.4	.0	6.15	.				I	A							
14.80	188	228	97.6	67.3	.0	5.58	.				I	A							
15.10	156	192	97.4	66.3	.0	5.14	.				I	A							
15.40	133	163	97.3	65.5	.0	4.75	.				I	A							
15.71	114	139	97.2	64.8	.0	4.38	.				I	A							
16.01	101	120	97.2	64.3	.0	4.05	.				I	A							
16.31	90	107	97.1	63.8	.0	3.79	.				I	A							
16.61	81	97	97.1	63.4	.0	3.58	.				I	A							
16.91	74	88	97.0	63.0	.0	3.37	.				I	A							
17.22	68	81	97.0	62.7	.0	3.17	.				I	A							
17.52	64	74	96.9	62.4	.0	2.98	.				I	A							
17.82	60	68	96.9	62.2	.0	2.81	.				I	A							
18.12	56	64	96.9	62.0	.0	2.64	.				A								
18.42	53	60	96.9	61.8	.0	2.49	.				I	A							
18.73	51	56	96.8	61.7	.0	2.36	.				I	A							
19.03	49	55	96.8	61.5	.0	2.29	.				A								
19.33	47	53	96.8	61.4	.0	2.23	.				A								
19.63	45	52	96.8	61.2	.0	2.16	.				A								
19.93	44	50	96.8	61.1	.0	2.09	.				I	A							
20.24	42	49	96.7	60.9	.0	2.00	.				I	A							
20.54	40	47	96.7	60.7	.0	1.91	.				I	A							
20.84	38	46	96.7	60.5	.0	1.81	.				I	A							
21.14	37	44	96.7	60.4	.0	1.71	.				A								
21.44	36	43	96.6	60.2	.0	1.61	.				A								
21.75	35	41	96.6	60.0	.0	1.52	.				I	A							
22.05	34	40	96.6	59.9	.0	1.42	.				I	A							
22.35	33	39	96.6	59.7	.0	1.32	.				I	A							
22.65	33	38	96.6	59.6	.0	1.22	.				I	A							
22.95	32	37	96.5	59.5	.0	1.11	.				I	A							
23.26	32	37	96.5	59.3	.0	.99*	.				I	A							
23.56	32	36	96.5	59.2	.0	.86*	.				I	A							
23.86	31	35	96.5	59.1	.0	.71*	.				I	A							
24.16	31	34	96.5	59.0	.0	.00	.				A								
24.46	29	34	96.5	58.9	.0	.00	.	P											
Time	Qin	Qout	Elev	Vol	Area	ExtVel	I	I	I	I	I	I	I	I	I	I	I	I	I
					0.	100.	200.	300.	400.	500.	600.	700.							

END NRCS-FBH PLOT

1SITES....JOB NO. 1 COMPLETE.

Pace24 Bob Pace Dam NE1/4 SE1/4 Sec 24-T2N-R10E

0 SUBWATERSHED(S) ANALYZED.

1 STRUCTURE(S) ANALYZED.

3 HYDROGRAPHS ROUTED AT LOWEST SITE.

0 TRIALS TO OBTAIN BOTTOM WIDTH FOR SPECIFIED STRESS OR VELOCITY.

SITES.....COMPUTATIONS COMPLETE

1 SUMMARY TABLE 1 SITES VERSION 96.1
DATED 03/01/1996

WATERSHED ID	RUN DATE	RUN TIME
Pace24	10/09/2001	14:24:21

>>> SITE SUBWS SUBWS DA CURVE TC TOTAL DA TYPE STRUC <<<									
ID	ID	(SQ MI)	NO.	(HRS)	(SQ MI)	DESIGN	CLASS		
S	1	A	1.09	82.	2.02	1.09	378CR	A1	

PASS	DIA./	AUX.CREST	BTM.	MAX.	MAX.	EMB.	INTEGR.*	EXIT*	TYPE
NO.	WIDTH	ELEV	WIDTH	HP	ELEV	VOL.	DIST.	VEL.	HYD
(IN/FT)	(FT)	(FT)	(FT)	(FT)	(CY)	(FT)	(FT/SEC)		
1	18.0	96.5	80.0	2.7	99.2	0.	0.	7.7	MIN. AUX.

* INTEGRITY DIST. AND EXIT VEL. ARE BASED ON THE ROUTED HYDROGRAPH
AND WILL NOT RELATE TO THE MAX. ELEV. (TOP OF DAM),
WHICH IS SET BY MINIMUM DESIGN CRITERIA.

SITES.....SUMMARY TABLE 1 COMPLETED.

NRCS SITES VERSION 96.1 ,03/01/1996
Pace24 FILES

INPUT
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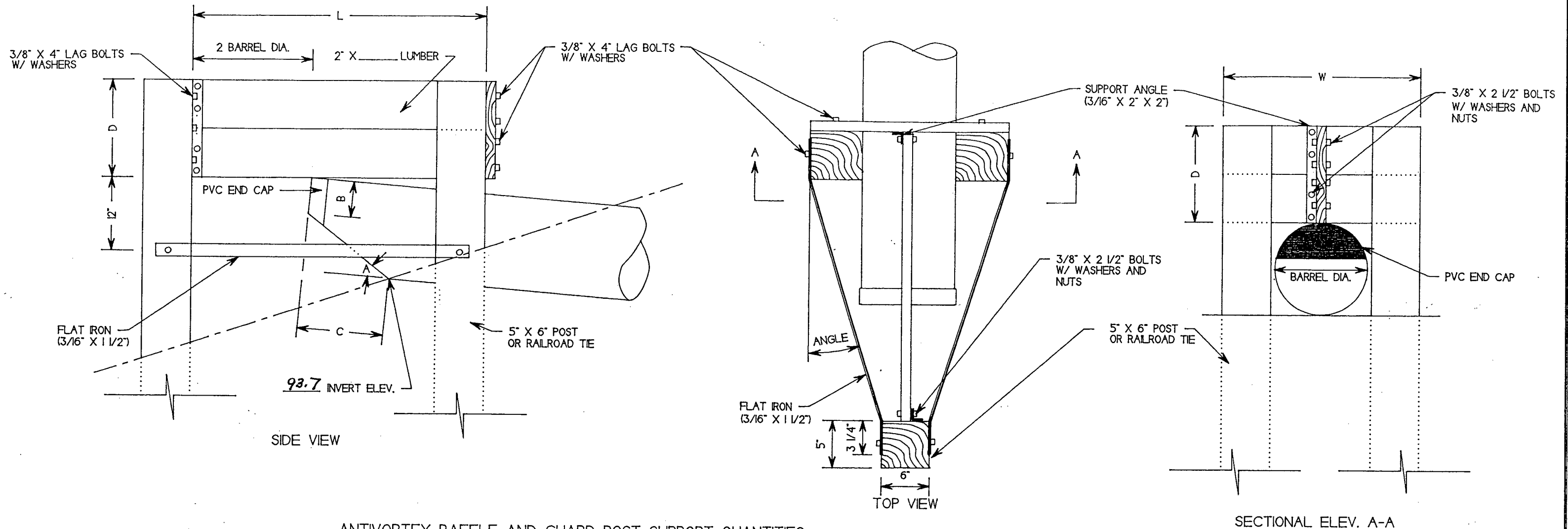
OUTPUT - DATED 10/09/2001 14:24:21
C:\Engineer\sites32\Pace24\Pace18HI,80.OUT

GRAPHICS FILES GENERATED

OPTION "L" DATED 10/09/2001 14:24:21
C:\Engineer\sites32\Pace24\Pace18HI,80.DRG

OPTION "P" DATED 10/09/2001 14:24:21
C:\Engineer\sites32\Pace24\Pace18HI,80.DHY

OPTION "E" DATED 10/09/2001 14:24:21
C:\Engineer\sites32\Pace24\Pace18HI,80.DEM



ANTIVORTEX BAFFLE AND GUARD POST SUPPORT QUANTITIES

BARREL DIA.	D	L LENGTH FT.-IN.	NO. REQ'D	FLAT IRON LENGTH FT.-IN.	NO. REQ'D	3/8" X 4" LAG BOLTS & WASHERS NO. REQ'D	SUPPORT ANGLE LENGTH FT.-IN.	NO. REQ'D	POSTS LENGTH FT.-IN.	NO. REQ'D	W LENGTH FT.-IN.	NO. REQ'D	3/8" X 2 1/2" BOLTS, NUTS & WASHERS EA.	ANGLE
15"	1'-2 3/4"	(2" X 10") X 4'-4 1/2" (2" X 6") X 4'-4 1/2"	1 1	4'-7"	2	16	1'-2 3/4"	2	6'-0"	3	(2" X 10") X 2'-3" (2" X 6") X 2'-3"	1 1	12 (24 WASHERS)	13°
18"	1'-6 1/2"	(2" X 10") X 5'-3"	2	5'-5"	2	16	1'-6 1/2"	2	8'-0"	3	(2" X 10") X 2'-6"	2	12 (24 WASHERS)	12°
24"	1'-10 1/2"	(2" X 12") X 7'-0"	2	7'-3"	2	16	1'-10 1/2"	2	8'-0"	3	(2" X 12") X 3'-0"	2	12 (24 WASHERS)	11°

NOTE: ALL LUMBER AND POSTS WILL BE PRESSURE TREATED

CONAPY INLET DIMENSIONS

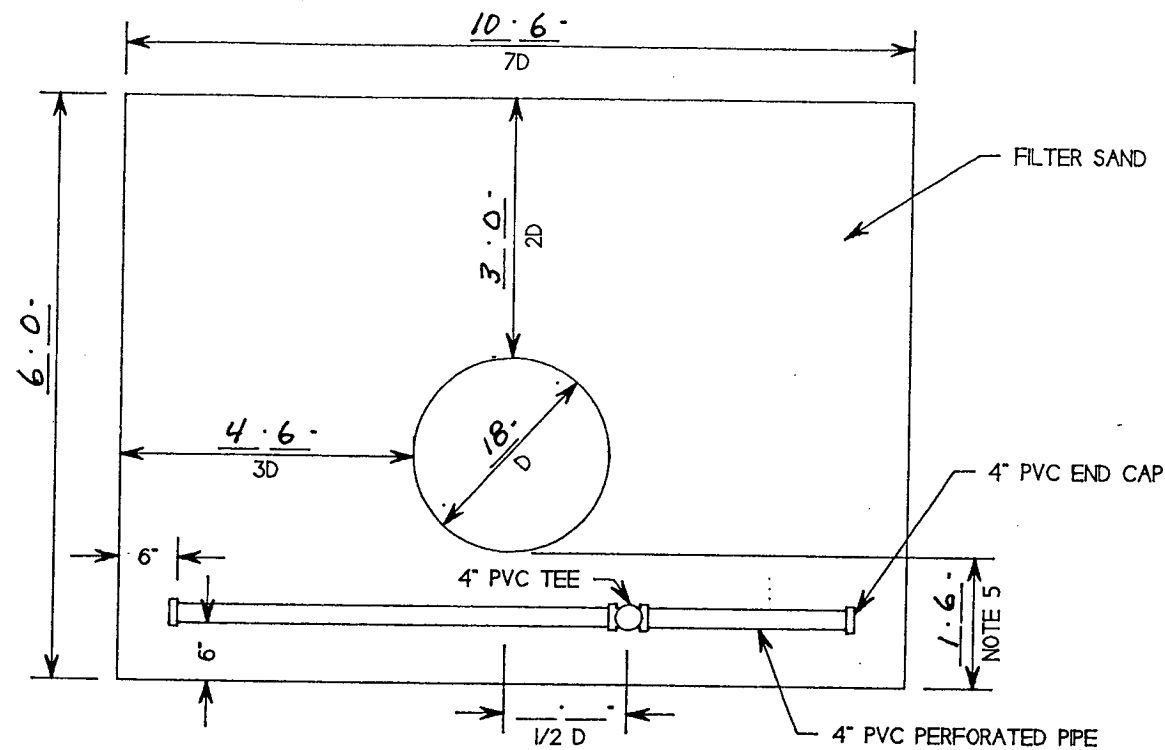
PIPE DIA. IN.	PIPE GRADE %	A DEG	B IN.	C IN.	H FT.	PIPE DIA. IN.	PIPE GRADE %	A DEG	B IN.	C IN.	H FT.	PIPE DIA. IN.	PIPE GRADE %	A DEG	B IN.	C IN.	H FT.
15	0-5	56	2 7/8	8 1/8	1.8	18	0-5	56	3 3/8	9 3/4	2.1	24	0-5	56	4 1/2	13	2.8
	5-15	45	3	12	1.9		5-15	45	3 5/8	14 3/8	2.3		5-15	45	4 3/4	19 1/4	3.0
	15-25	33	4	16 1/2	2.0		15-25	33	4 7/8	19 3/4	2.4		15-25	33	6 1/2	26 3/8	3.2
							25-32	27	6 1/4	23 3/8	2.6						

PVC CANOPY INLET
W/ ANTIVORTEX BAFFLE
AND GUARD POST SUPPORT
FOR 15" thru 24" PIPE

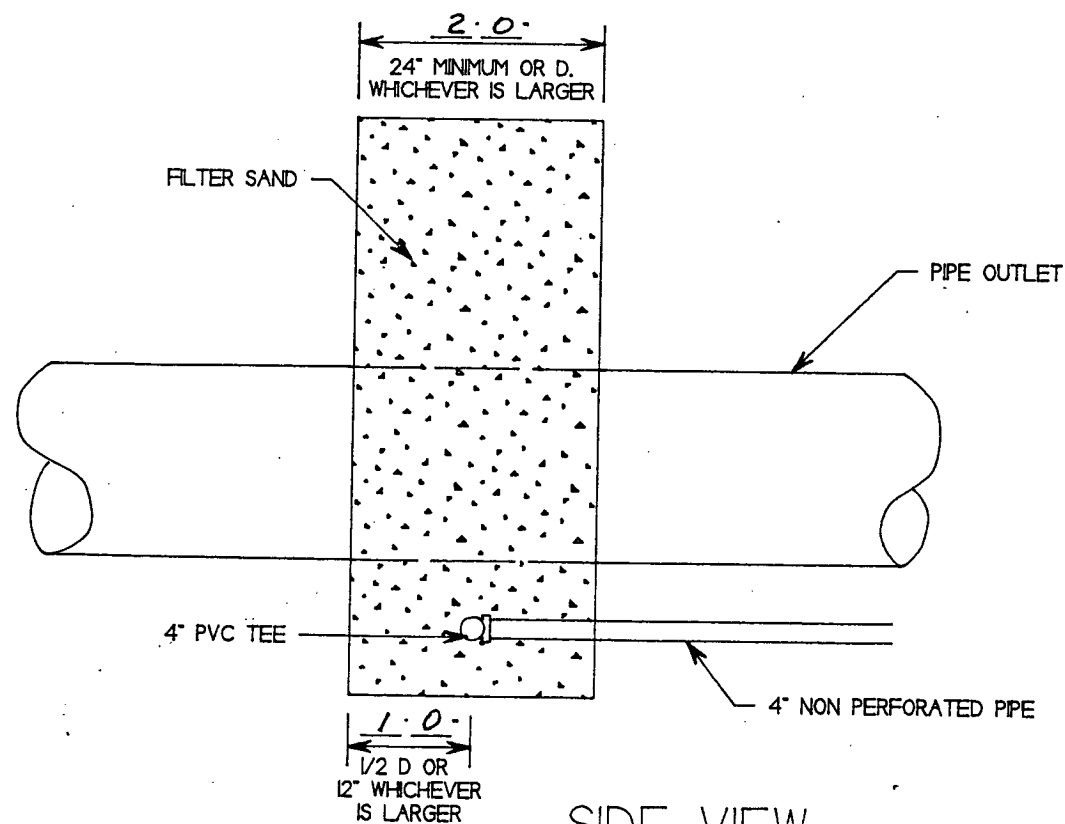
BOB PACE
DAM (FISH & WILDLIFE)
PENNINGTON CO. SD - PENNINGTON CD.
NE 1/4 SE 1/4 SEC 28-T2N-R1E

USDA U.S. Department of Agriculture
Natural Resources Conservation Service

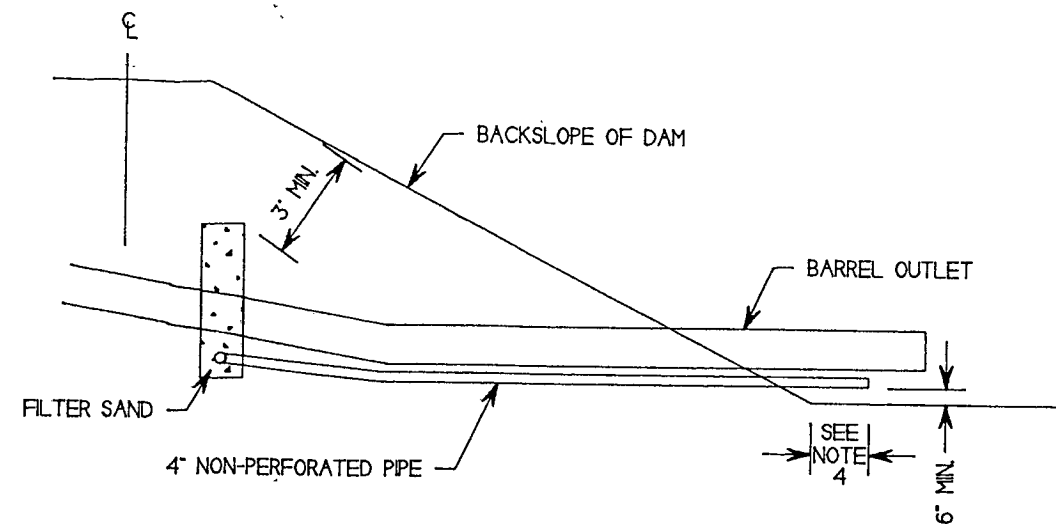
DESIGNED: g miller APPROVED BY: _____
DRAFTED: _____ TITLE: _____
DATE: 10/01 SHEET 3 OF 5 DWG NO. CAN-PVCL



UPSTREAM VIEW



SIDE VIEW



OUTLET DETAIL

FILTER GRADATION

SIEVE SIZE	PERCENT PASSING
3/8"	100
4	85-100
8	80-100
16	50-85
30	25-60
50	10-30
100	2-10

- NOTE: 1. THE 4" DIA. PIPE SHALL BE SDR 35 PVC OR STRONGER
2. PROVIDE AN ANIMAL GUARD ON DRAIN OUTLET PIPE. DRILL 2-2 1/2" HOLES ON Q 6" FROM END OF PIPE AND PLACE A 3/8" DIA. 5 1/2" LONG GALVANIZED STEEL BOLT THRU THEM AND SECURE WITH A NUT (PLACE BOLT HORIZONTAL).
3. FILTER SAND WILL BE CLEAN PEA AGGREGATE OR CONCRETE SAND.
4. 4" PIPE WILL BE SECURED TO PIPE SUPPORT AND EXTEND A MIN. OF 2' BEYOND SUPPORT.
5. DISTANCE EQUALS 18" MINIMUM IF BARREL AND 4" PIPE ARE LOCATED IN ORIGINAL FOUNDATION MATERIAL AND 2D MINIMUM IF LOCATED IN FILL MATERIAL FOR DAM.

LIST OF MATERIALS			
ITEM NO.	ITEM	UNIT	QUANTITY
1	4" PVC PERFORATED PIPE	lf.	9.5'
2	4" PVC NON-PERFORATED PIPE	lf.	33'
3	4" PVC END CAP	ea.	2
4	4" PVC TEE	ea.	1
5	SAND	cy.	4.7
6	ANIMAL GUARD (see note 2)	ea.	1

SAND ANTISEEP COLLAR

BOB PACE DAM (FISH & WILDLIFE) PENNINGTON COUNTY, SD NE 1/4 SE 1/4 SEC 24-T2N-R1E	
USDA U.S. Department of Agriculture Natural Resources Conservation Service	
DESIGNED: g. miller	APPROVED BY: _____
DRAFTED: _____	TITLE: _____
DATE: 10/01	SHEET 4 OF 5

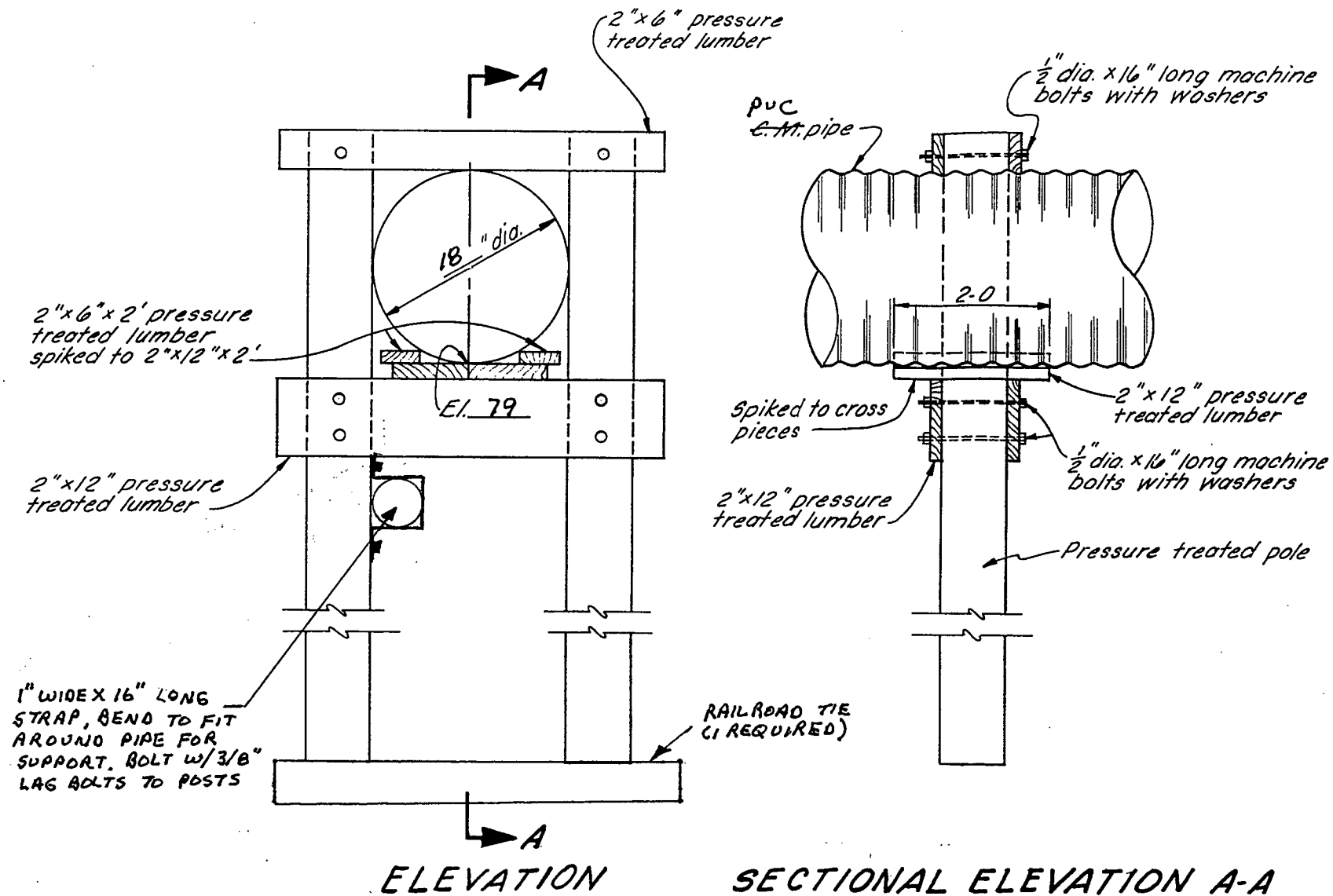


TABLE OF QUANTITIES

ITEM	LENGTH FOR 18" DIA. PVC C.M. PIPE	UNIT	QUANTITY
PRESSURE TREATED POLE 8" DIA.	12'-0" 8'-0"	EACH	2
2" X 12" PRESSURE TREATED LUMBER	4'-0"	EACH	2
2" X 6" PRESSURE TREATED LUMBER	4'-0"	EACH	2
2" X 12" PRESSURE TREATED LUMBER	2'-0"	EACH	2
2" X 6" PRESSURE TREATED LUMBER	2'-0"	EACH	2
1/2" DIA. MACHINE BOLTS WITH NUTS	1'-4"	EACH	6
1/2" DIA. WASHERS		EACH	12

NOTES:

1. HAND OR MACHINE TAMP BACKFILL THOROUGHLY AROUND FOOTINGS AND COLUMNS.

TIMBER PIPE SUPPORT

OPERATOR: <u>BOB PACE</u>	
CONSERVATION DISTRICT: <u>PENNINGTON CO.</u>	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed: <u>g. miller</u> Date: <u>10/1/66</u>	Approved by: _____
Drawn: _____	Title: _____
Traced: _____	Title: _____
Checked: _____	Drawing No. _____
	Sheet <u>5</u> of <u>5</u>

REFERENCE: GUIDE PLAN NO. 4.0

JOB PLAN NO. 4.0

5, N-29,073.4a

Water Permit Application No 247d-2

Bob Pace

Top of Dam Elev. - 99.5
 2nd Spway Elev. - 96.5
 P. Spway Elev. - 93.7
 Dis Toe Elev. - 79.5

Cat. 3 Low Hazard Dam

Ht. = 20 ft

Normal Storage Capacity = 38.6 Ac-Ft
 Int. Storage Capacity = 59.2 Ac-Ft
 Max. Storage Capacity = 84.9 Ac-Ft

Int. Capacity x Eff. Ht. = $59.2 \times 18.5 = 1095 < 3000 \therefore 25 \text{ yr}$
Minimum Spillway Design

From USGS WRI 80-80 "Tech. for Est. Flood Peaks ... in SD"

DA = 695 Ac = 1.09 mi²
 Slope = 70 ft/mi
 SI = 1.76

$$Q_{25} = 83.4 A^{.64} S^{.72}$$

$$= 83.4 (1.09)^{.64} (70)^{.72} (1.76)$$

$$= 83.4 (1.05) (6.48) (0.6656)$$

$$= \underline{378 \text{ cfs}}$$

$$Q_{100} = 132 A^{.65} S^{.67}$$

$$= 132 (1.09)^{.65} (70)^{.67} (1.76)$$

$$= 132 (1.0576) (7.059) (0.6847)$$

$$= \underline{675 \text{ cfs}}$$

Spillway Flow

$$Q = CLH^{3/2}$$

$$C = 2.6 \quad L = 80 \quad H = 3$$

$$= (2.6)(80)(3)^{1.5}$$

$$= \underline{1080 \text{ cfs}}$$

NRCS Annual Yield

$$DA = 695 \text{ (Pace Dam)} \quad CN = 82 \quad ISU = 1/2$$

$$= 1882 \text{ (New Underwood)}$$

Section 74:02:08:09

1. Topo Map - OK
2. Dam Axis Profile - OK
3. Dam Max X-Sec - OK
4. Area Capacity - OK
5. Outlet Details - OK
6. Spillway Rating - OK
7. Spillway Details - OK
8. Specs S&B NRCS - OK
9. EPP N/A Cat. 3 - OK

80% chance = 0.25

$$0.25 \times 695^{1/2} = 14.5 \text{ Ac-Ft}$$

$$\text{(New U.) } 0.25 \times 1882^{1/2} = 39.2 \text{ Ac-Ft}$$

50% chance = 0.58

$$0.58 \times 695^{1/2} = 46.3 \text{ Ac-Ft}$$

$$\text{(New U.) } 0.58 \times 1882^{1/2} = 115.5 \text{ Ac-Ft}$$

10% chance = 2.30

$$2.30 \times 695^{1/2} = 133 \text{ Ac-Ft}$$

$$\text{(New U.) } 2.30 \times 1882^{1/2} = 361 \text{ Ac-Ft}$$



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

December 7, 2001

Robert Pace
PO Box 191
New Underwood SD 57761

Dear Mr. Pace

Thank you for submitting the *Application for a Permit to Appropriate Water* for 38.6 acre-feet storage dam in Pennington County.

We have received the \$150 application filing fee. In addition to the application filing fee, the Water Rights Program collects the \$50 licensing fee at the time of filing. Please submit \$50 for the licensing of the water permit.

If you have any questions, please contact me.

Sincerely,

Karen Schlaak

Karen Schlaak
Water Rights Program
605 773-3352





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

January 11, 2002

Bob Pace
15991 226 St.
New Underwood, SD 57761

Dear Mr. Pace:

We have reviewed the plans and specifications for your dam project located in the SE 1/4 of Section 24-T2N-R10E, in Pennington County. The plans and specifications as submitted are approved. Approval of the plans and specifications does not authorize construction of the dam. The construction of the dam may not begin until Water Permit No. 2474-2 is approved.

Our review was to determine compliance with the requirements of the Water Management Board Safety of Dams Rules, Chapter 74:02:08. Approval of these plans and specifications does not release you, as owner of the dam, from the responsibility for operating and maintaining the dam in good repair to ensure the safety of the dam.

The Pace Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 20 feet and a normal storage capacity of 38.6 acre-feet and a maximum storage capacity of 84.9 acre-feet.

If you have any questions, please feel free to contact us.

Sincerely,

Gale N. Selken, P.E.
Natural Resources Engineer Director
for Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

c: Gerald Miller, NRCS, Rapid City

REPORT ON
WATER PERMIT APPLICATION NO. 2474-2
Bob Pace
January 4, 2002

Water Permit Application No. 2474-2 has been filed by Bob Pace to impound 38.6 acre-feet of water by constructing a dam located in the NE 1/4 SE 1/4 of Section 24-T2N-R10E, in Pennington County. The application also requests impoundment of sufficient water to maintain water at the outlet elevation. The water will be used for fish and wildlife production and livestock use.

Discussion:

The dam will be classified as a small size, Category 3, Low Hazard dam. The Natural Resources Conservation Service (NRCS) has designed the dam. The plans and specifications have been reviewed and will be approved.

The Pace Dam will be 20 feet high with a normal storage capacity of 38.6 acre-feet with a reservoir level at the primary spillway elevation, and a maximum storage capacity of 84.9 acre-feet with a reservoir level at the top of dam elevation. A dam of this size and hazard classification is required to have a minimum spillway design capable of passing a 25-year frequency event.

The dam has a drainage area of 695 acres or 1.09 square miles. A 25-year frequency event for this drainage area produces a peak runoff of approximately 378 cfs. A 100-year frequency event produces a peak of approximately 675 cfs. The dam was designed to have an 18 inch diameter PVC pipe with 5.8 feet of available freeboard as the primary spillway, and a 80 foot wide earthcut spillway with 3.0 feet of available freeboard as the secondary spillway. The 80 foot wide earthcut spillway has a capacity of approximately 1080 cfs.

The annual yield for this drainage area with an 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 14.5 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 33.6 acre-feet and the annual yield with a 10 percent chance, or 1 out of 10 years, is expected to be 133 acre-feet.

The Pace Dam will be located in the NE 1/4 SE 1/4 of Section 24-T2N-R10E on an unnamed tributary to Boxelder Creek about one and one-half miles upstream of its confluence with Boxelder Creek. The Department of Game, Fish & Parks holds Vested Right Claim No. 593-2 for approximately 75 acre-feet in New Underwood Dam, which is located about one-half mile downstream of the proposed dam. The Phase I Inspection Report on New Underwood Dam, dated May 15, 1978, lists the storage capacity of New Underwood Dam at 59 acre-feet. New Underwood Dam has a drainage area of 1882 acres or 2.94 square miles, which includes the 695 acres or 1.09 square miles drainage for the Pace Dam.

The annual yield for the New Underwood Dam drainage area (including the Pace Dam drainage area) with an 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 39.2 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to

be 94 acre-feet and the annual yield with a 10 percent chance, or 1 out of 10 years, is expected to be 361 acre-feet.

The annual yield for the New Underwood Dam drainage area (excluding the Pace Dam drainage area) with an 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 24.7 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 60.5 acre-feet and the annual yield with a 10 percent chance, or 1 out of 10 years, is expected to be 228 acre-feet.

New Underwood Dam has a surface area of 14 acres. Assuming an annual evaporation of 40 inches, that would equal a loss due to evaporation of 28 acre-feet ($14 \times 40/12 \times 0.6=28$). The proposed Pace Dam will have a surface area of 6 acres. Assuming an annual evaporation of 40 inches, that would equal a loss due to evaporation of 12 acre-feet ($6 \times 40/12 \times 0.6=12$). In both of these cases, the 80 percent chance of occurrence should offset the losses due to evaporation. Approval of Water Permit Application No. 2474-2, should not have an adverse effect on New Underwood Dam.

There is an existing dugout at the location of the proposed dam. According to the applicant and the NRCS, this is a spring fed dugout and there is usually some base flow in the creek bottom. The applicant also has a well upstream of the proposed dam and at approximately the same elevation as the secondary spillway. The well is used for household purposes and has the potential for being flooded. The existing well should be plugged and a new well drilled at a higher elevation.

Conclusions:

1. Water Permit Application No. 2474-2 should be approved since unappropriated water is available and approval should not have an adverse effect on existing Water Permits/Rights.
2. If approved, the low flow bypass requirement for downstream domestic use and existing prior Water Permits/Rights should be a qualification on Water Permit Application No. 2474-2.
3. If approved, the existing well will need to be plugged and a new well drilled at a higher elevation.



Timothy G. Schaal, P.E.

Natural Resources Engineer Specialist

Approved by:



Gale N. Selken, P.E.

Natural Resources Engineer Director



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2474-2, Bob Pace**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 2474-2, Bob Pace, 15991 226th Street, New Underwood SD 57761.

The Chief Engineer is recommending APPROVAL of Application No. 2474-2 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. Water Permit No. 2474-2 authorizes a dam with a storage capacity of 38.6 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.
3. The existing well, located upstream of the dam which is at the approximate same elevation as the secondary spillway, shall be plugged in accordance with South Dakota Well Construction Standards.

See report on application for additional information.

Garland Erbele, Chief Engineer
January 11, 2002



PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
) SS
 County of Pennington)

I, Patricia K. Van Patten

certify that the attached printed Notice was taken

from the Rapid City Journal

printed and published in Rapid City

County of Pennington and

state of South Dakota. The notice was published

in the newspaper on the following two dates:

January 23, 2002

January 30, 2002

Cost of Printing Eighty-six dollars

and thirty-two cents (\$86.32)

Patricia K. Van Patten
 (Signature)

Legal Advertising Rep
 (Title)

1/31/02
 (Date Signed)

Jan. 23, 30 L1065915

NOTICE OF APPLICATION NO. 2474-2 TO APPROPRIATE WATER

Notice is given that Bob Pace, 15991 226 St., New Underwood, SD 57761, has filed the following application for a water permit to impound 38.6 acre-feet of water from runoff by constructing a dam located in the NE1/4SE1/4 Section 24 with water impounded in the NE1/4SE1/4 Section 24; all in T2N-R10E. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation and livestock use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2474-2 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider the application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or the recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E. Capitol, Pierre, SD 57501 (605-773-3352)," and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by February 11, 2002.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application.

Steven M. Pirner, Secretary
 Department of Environment
 and Natural Resources



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

January 14, 2002

Rapid City Journal
PO Box 450
Rapid City, SD 57709-0450

ATTENTION: Legal Public Notice

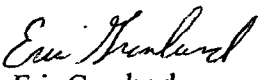
Enclosed is a Notice of Hearing on Application No. 2474-2 to Appropriate Water to be published twice. Please publish the first notice on January 23, 2002 with the second publication 7 days later.

The applicant must verify to you that the notice is to be published, before you make the first publication **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is Bob Pace, 15991 226 St., New Underwood, SD 57761 (Ph # 605-754-6993).

Please send the Water Rights Program the first publication immediately. The publication is checked for accuracy so any corrections can be made in the second publication. You may use the form below or fax a copy of the first publication. Any fax should be sent to the attention of Karen Schlaak at (605) 773-4068. Publication errors can invalidate the public notice.

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,


Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

No. 2474-2

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of January 14, 2002 enclosing Notice of Hearing to Appropriate Water by Application No. 2474-2 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

**NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPER RIGHT AWAY.**

January 14, 2002

Bob Pace
15991 226 St.
New Underwood, SD 57761

Dear Mr. Pace:

Water Permit Application No. 2474-2 for fish & wildlife propagation use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of hearing has been sent to the Publisher of the Rapid City Journal printed at Rapid City, SD (Ph # 605-394-8300). You will need to contact the newspaper and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and a report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspaper to authorize publication of your Notice of Hearing and to arrange for payment. Early contact with the paper can eliminate delays. Upon receiving authorization, the publisher has been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. The newspaper has also been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

Eric Gronlund
Natural Resources Engineer
(605) 773-3352

enclosures

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.

Instruction to Newspaper - Publish first Notice on January 23, 2002 with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 2474-2 to Appropriate Water

Notice is given that Bob Pace, 15991 226 St, New Underwood SD 57761 has filed an application for a water permit to impound 38.6 acre-feet of water from runoff by constructing a dam located in the NE ¼ SE ¼ Section 24 with water impounded in the NE ¼ SE ¼ Section 24; all in T2N-R10E This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation and livestock use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2474-2 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider the application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by February 11, 2002.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
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PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

FEB 26 2002

Bob Pace
15991 226 St.
New Underwood, SD 57761

Dear Mr. Pace:

Enclosed is Water Permit No. 2474-2 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the acquisition of a water right.

An informational sheet *Common Water Right Questions?* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Sincerely,

Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

Water Rights Division -DENR
Conversation or File Documentation

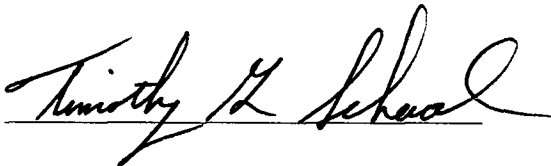
NAME OF PERSON OR FILE: Bob Pace

ADDRESS: 15991 226 St. New Underwood, SD 57761 COUNTY: Pennington

DATE: October 16, 2003 TELEPHONE: XXXXXXX

RE: Qualification to plug well

I talked to Bob Pace today about the qualification on Water Permit No. 2427-2 to plug their existing well and drill a new one. The well is at approximately the same elevation as the secondary spillway of their new dam. Mr. Pace indicated that the well is used for their household purposes, but not drinking water. I think that at the time this qualification was placed on the Permit, we were under the impression that the well was used for drinking water purposes. Mr. Pace indicated that he would relocate the well if the location becomes a problem; however, at this time they would prefer to keep the existing well. I told him we would have to schedule the removal of this qualification before the Water Management Board.

A handwritten signature in cursive script, reading "Timothy G. Schaal", written over a horizontal line.

Timothy G. Schaal, P.E.
Natural Resources Engineer Specialist
Water Rights Program



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

October 20, 2003

NOTICE

TO: Bob Pace
15991 226 Street
New Underwood SD 57761

FROM: Garland Erbele, Chief Engineer
Water Rights Program *Garland Erbele*

SUBJECT: Amendment to Condition on Water Permit No. 2474-2

On September 16, 2003, Tim Schaal of the Water Rights Program staff conducted a licensing investigation of Water Permit No. 2474-2. This permit is for a dam constructed in Section 24, T2N, R10E in Pennington County. The permit includes the following condition:

The existing well, located upstream of the dam which is at the approximate same elevation as the secondary spillway, shall be plugged in accordance with South Dakota Well Construction Standards.

The basis for this condition is that the well is at the approximate same elevation as the secondary spillway and is subject to inundation during high water levels.

During your conversation with Mr. Schaal, you expressed a desire to continue using the well for household purposes, but not drinking water. Prior to licensing of the water permit, this condition must either be complied with or the permit amended to change this condition. Based on your desire to continue using the well, the permit will be brought before the Water Management Board for their consideration to amend the permit to remove the condition involving plugging the well.

The Water Management Board will consider amending Water Permit No. 2474-2 at 8:30 AM on December 3, 2003 in the Conference Room of the Floyd Matthew Training Center, Joe Foss Building, 523 E. Capitol Avenue, Pierre SD. The Board is authorized to 1) remove the condition requiring plugging of the well, 2) amend the condition, 3) defer action, or 4) continue to require plugging of the well based on the evidence presented at the public hearing. You may present testimony at this December 3rd hearing in support of amending the permit.

If you have any questions, contact Tim Schaal or Eric Gronlund at (605) 773-3352.

c: Diane Best, Assistant Attorney General

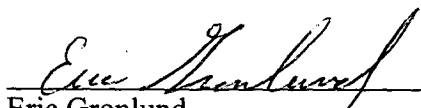
CERTIFICATION

I hereby certify that on October 20, 2003, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated October 20, 2003, regarding scheduling consideration of an amendment to the condition to Water Permit No. 2474-2, addressed as stated below.

Bob Pace
15991 226 Street
New Underwood SD 57761

A copy of the Notice was sent Inter-office to:

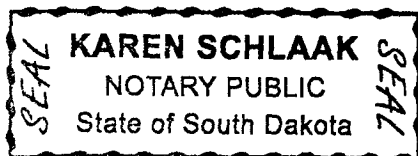
Diane Best, Assistant Attorney General


Eric Gronlund
Natural Resource Engineer
Water Rights Program

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 21st day of October, 2003.


Karen Schlaak
Notary Public
My Commission expires April 1, 2007



Water Rights Division -DENR
Conversation or File Documentation

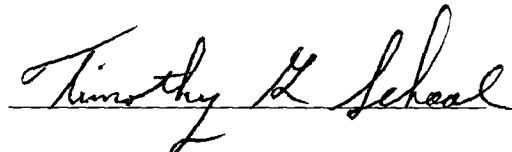
NAME OF PERSON OR FILE: Bob Pace

ADDRESS: 15991 226 St. New Underwood, SD 57761 COUNTY: Pennington

DATE: October 9, 2003 TELEPHONE: XXXXXXX

RE: Height of dam correction

The height of the Bob Pace dam on my P&S review sheet and application report should be 22 feet high, instead of 20 feet as indicated.

A handwritten signature in cursive script, reading "Timothy G. Schaal", is written over a horizontal line.

Timothy G. Schaal, P.E.
Natural Resources Engineer Specialist
Water Rights Program

Permit No. 2474-2
Upper Cheyenne River - Water District

Report Of Examination Of Works And/Or Application of Water To Beneficial Use

TO: Chief Engineer, Water Rights Program, DENR, Foss Bldg., Pierre, SD 57501

I have this day, September 16, 2003, made a thorough examination of the water use system constructed by Bob Pace of 15991 226 St. New Underwood, SD 57761 holder of Permit No. 2474-2, bearing the priority of December 7, 2001 authorizing the storage of 38.6 acre-feet of the waters of runoff for fish & wildlife propagation and livestock use purposes, in Pennington County.

I have to report on the conditions of the same as follows:

A. Works used to divert the water:

A 22 ft. high earth dam with 38.6 ac-ft storage capacity

B. Works used to transport water to place of use:

N/A

C. Works used to apply water to beneficial use:

A 22 ft. high earth dam with 38.6 ac-ft storage capacity

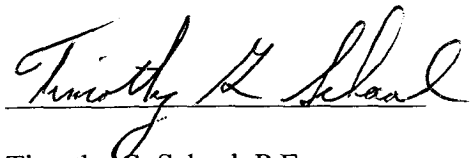
The system is in the following condition good. The point of diversion is located 300 feet west & 1500 feet north of the SE corner of Sec. 24-T2N-R10E (NE ¼ SE ¼). The works are capable of storing 38.6 acre-feet of water which is to be used for fish & wildlife propagation and livestock use. Water has been put to beneficial use to the maximum extent as follows:

A 22 ft. high earth dam with 38.6 ac-ft storage capacity

and the license should be issued for 38.6 acre-feet of storage.

Applicable permit qualifications have been complied with: Yes X

Exceptions to compliance are: none Date Report Completed: October 9, 2002



Timothy G. Schaal, P.E.
Natural Resources Engineer Specialist
DENR, Water Rights Program

REPORT ON INSPECTION OF PERMIT NO. 2474-2

Other permit(s) associated with the project: XXXX

DATE OF INSPECTION: September 16, 2003

NAME & ADDRESS OF INSPECTION CONTACT/ Mrs. Bob Pace

RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE: wife

NAME & ADDRESS OF PERMIT HOLDER: Bob Pace, 15991 226 St. New Underwood, SD 57761

DIVERSION POINT LEGAL LOCATION: 300 feet west & 1500 feet north of the SE corner of Sec. 24-T2N-R10E (NE ¼ SE ¼).

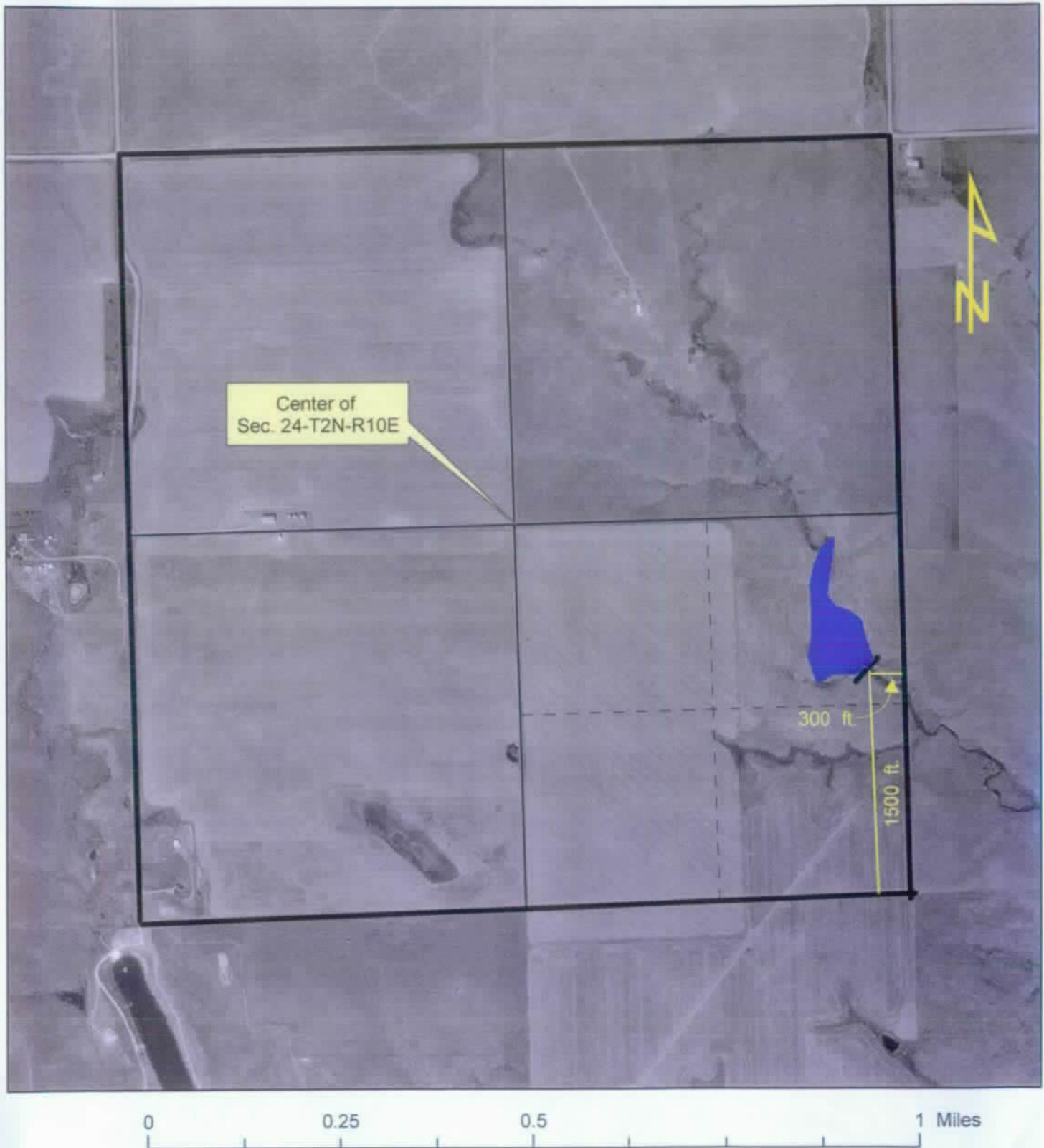
DAM INFORMATION:

- 1) Height to crest 22 feet
- 2) Height to primary spillway 16 feet
- 3) Height to secondary spillway 19 feet
- 4) Crest width 12 feet
- 5) Crest length 500 feet
- 6) Spillway length XXX feet
- 7) Spillway width 80 feet
- 8) Approx. storage (Normal) 38.6 acre-feet
- 9) Approx. storage (Maximum) 85 acre-feet
- 10) Date constructed: 2002

PERMIT QUALIFICATIONS AND REGULATIONS:

- 1) Soil and water permit lands agree with lands being irrigated and lands listed on permit N/A
- 2) Special qualifications to permit being abided by yes
- 3) All structures, wells and lands on map yes
- 4) Irrigation Questionnaires checked to determine if permit owner started irrigation by the end of construction period N/A

Water Permit Application No. 2474-2



STATE OF SOUTH DAKOTA

WATER LICENSE NO. 2474-2

(1) Bob Pace, 15991 226 St, New Underwood SD 57761 made Application No. 2474-2, December 7, 2001 for a water permit to impound 38.6 acre feet of water from runoff, Pennington County, South Dakota for fish and wildlife propagation and livestock watering purposes. Permit No. 2474-2, with a priority date of December 7, 2001 was approved February 11, 2002 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before February 11, 2007 and for the application to beneficial use of water on or before February 11, 2011.

On December 3, 2003, the Water Management Board amended Permit No. 2474-2 by removing the qualification involving plugging the existing well.

(2) The water supply system has been completed and water applied to beneficial use in accordance with South Dakota State Law. Pursuant to South Dakota Codified Law 46-5-30.1, the holder and/or owner of Water Right No. 2474-2 is issued a license, bearing a priority date of December 7, 2001, to impound 38.6 acre feet of water.

The location of the storage dam (spillway) is 300 feet west and 1,500 feet north of the southeast corner of Section 24-T2N-R10E (NE ¼ SE ¼).

(3) This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Permit No. 2474-2, including the following now applicable qualifications:

- Water Permit No. 2474-2 authorizes a dam with a storage capacity of 38.6 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
- Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.



Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

DEC 10 2003

date





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

DEC 10 2003

2474-2

Bob Pace
15991 226 St
New Underwood SD 57761

Dear Mr. Pace:

Enclosed is Water License No. 2474-2. This is the final water right document completing your process of obtaining a Water Right. On December 3, 2003, the Water Management Board amended Permit No. 2474-2 by removing the qualification involving plugging the existing well.

The Board in approving the amendment expressed concern for potential contamination to the well and urged caution that the well not be used for drinking water purposes.

As long as you use the water beneficially, as stated in the Water License, State Water Laws provide that you have a continuing right to use the water.

Sincerely,

Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures