

**WATER PERMIT NO. 2428-2**

Name of Applicant: Lyndell Petersen

Address: 14895 Lower Spring Creek Rd, Hermosa SD 57744

Phone: 605 342-5595

Amount of Water Claimed: 28.4 acre-feet

Total Acres: NA

Source of Water Supply: dry draw

Water to be used for: fish & wildlife propagation & livestock

County: Pennington

Type of Waste Disposal System: NA

Location: 10 miles northwest of Hermosa

PRIORITY Date Received: 10-4-1999

Fee: \$150

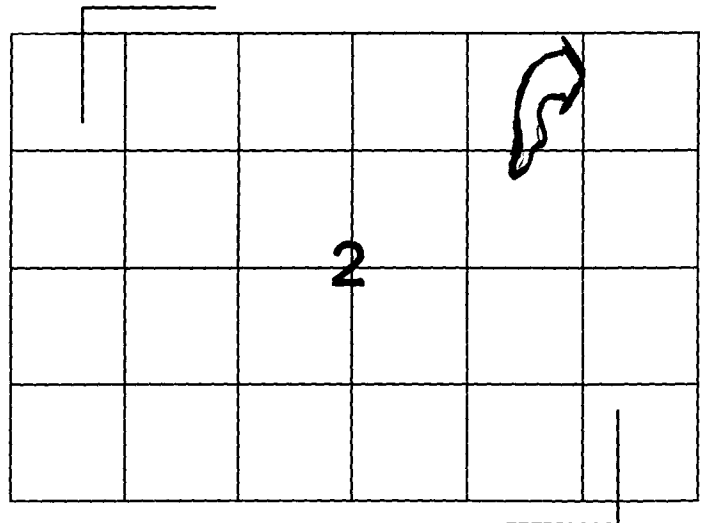
Corrected Application Received: 10-7-1999

Period of Annual Use: January 1 – December 31

Remarks:

Diversion Point: NE ¼ NE ¼ Sec 2-T2S-R8E

Water Impounded: E ½ NE ¼ Sec 2-T2S-R8E



Depth of Well: NA

Well Driller:

Remarks:

Type of Map: topographic

Prepared by: Gerald T Miller, NRCS

Reviewed and the Number Assigned on: 10-7-1999

By: **Karen Schlaak**

Notice of Hearing - date to intervene: \_\_\_\_\_

Mail to:  
Water Rights Program  
Joe Foss Building  
523 E. Capitol  
Pierre, SD 57501-3181  
(605) 773-3352

(office use only)

No. 2428-2 Hydrologic Unit 10/20/10

Basin Upper Cheyenne

Newspaper Rapid City Journal, Rapid City, SD



## For Permit To

**Check use(s) of water:**

|                                                 |                                           |                                                     |                                          |
|-------------------------------------------------|-------------------------------------------|-----------------------------------------------------|------------------------------------------|
| <input type="checkbox"/> Municipal              | <input type="checkbox"/> Suburban Housing | <input type="checkbox"/> Recreational               | <input type="checkbox"/> Institutional   |
| <input type="checkbox"/> Rural Water System     | <input type="checkbox"/> Commercial       | <input checked="" type="checkbox"/> Fish & Wildlife | <input type="checkbox"/> Geothermal Heat |
| <input type="checkbox"/> Domestic (over 18 gpm) | <input type="checkbox"/> Industrial       | <input type="checkbox"/> Other                      |                                          |

**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 Lyndell Petersen Phone 605-342-5595  
(check one) ☒ Owner ☐ Tenant/lessee

Mailing Address 14895 Lower Spring Creek RD., Hermosa State South Dakota  
(Street, RR. or Box) 57744 (Zip Code)

2. Amount of water claimed \_\_\_\_\_ \*CFS or \_\_\_\_\_ \*\*GPM 28.4 \*\*\*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 Dry Draw Drainage

4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) NE1/4 NE1/4 Sec 2 - T2S - RBE Water Impounded: E1/2 NE1/4  
Sec. 2-T2S-RBE County Pennington

5. County or counties where water will be used Pennington

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

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)

Dam constructed across a dry draw tributary to Spring creek, located in Pennington Co., SD

STATE OF SOUTH DAKOTA) SS  
County of Pennings)

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, Lyndell Petersen, 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.

SHAWNDA M. ADAMS  
NOTARY PUBLIC  
SOUTH DAKOTA

Signed Samuel A. Petersen

sworn to before me this 29 day of September 19 99

SHAWNDA M. ADAMS, Notary Public  
Pennington County, South Dakota  
My Commission Expires September 9, 2004

Maundie Adams

BM 2 ELEV. (92.59)  
TOP OF SPIKE IN  
FENCE POST EAST  
SIDE OF GATE

## TABLE OF QUANTITIES

| ITEM OR MATERIAL                                                 | UNIT     | QUANTITIES AS BUILT |
|------------------------------------------------------------------|----------|---------------------|
| 1. 48" CMP 12 ga. W/2-2/3 XI/2 in. CORRUGATIONS (includes elbow) | lf.      | 87                  |
| 2. 96" X 6" CMP RISER 10 ga. W/ 4 ft. stub of 48" CMP HOOD INLET | ea.      | 1                   |
| 3. 48" CMP 12 ga. CMP 5° ELBOW                                   | ea.      | 1                   |
| 4. 48" X 24" W/T CONNECTING BANDS (see Job Plan 3.0)             | ea.      | 4                   |
| 5. TRASH RACK AND BAFFLE (see sheet 4 of 6)                      | ea.      | 1                   |
| 6. SAND ANTISEEP DRAIN (see Job Plan 3.8-P)                      | cy.      | 20                  |
| 4" SCH 40 SOLID PIPE                                             | lf.      | 25                  |
| 4" SCH 40 PERFORATED PVC PIPE W/ END CAP                         | lf.      | 25                  |
| 7. TIMBER PIPE SUPPORT (see Job Plan 4.0)                        | ea.      | 1                   |
| 8. CONCRETE FOR RISER BASE                                       | cy.      | 3.7                 |
| 9. ROCK LAYER AROUND RISER (6"-12" size, 18" layer)              | tons     | 27                  |
| 10. ROCK CROSSING IN EMERGENCY SPILLWAY (4"-6" size, 9" layer)   | tons     | 115                 |
| 11. GEOTEXTILE FABRIC (8 oz.)                                    | sq.ft.   | 3000                |
| 12. PIPE INSTALLATION                                            | Lump Sum |                     |
| 13. EARTHFILL (Dam) including berm                               | cy.      | 9800                |
| 14. EXCAVATION                                                   | cy.      | 560                 |
| CORE TRENCH STRIPPING                                            | cy.      | 850                 |

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

## ATTACHMENTS TO PLAN

WATERTIGHT CONNECTING BANDS (Job Plan 3.0)  
SAND ANTISEEP DRAIN (Job Plan 3.8-P)  
TIMBER PIPE SUPPORT (Job Plan 4.0)  
SOUTH DAKOTA CONSTRUCTION AND MATERIAL SPECIFICATIONS

## SOUTH DAKOTA CONSTRUCTION AND MATERIAL SPECIFICATIONS

SD-4 STRIPPING  
SD-5 EXCAVATION  
SD-7A EARTHFILL -CLASS A- (Controlled Compaction)  
SD-9 DRAINFILL AND FILTER  
SD-12B CONCRETE FOR MINOR STRUCTURES  
SD-13 STEEL REINFORCEMENT  
SD-15 CORRUGATED METAL PIPE CONDUITS  
SD-16 TIMBER FABRICATION AND INSTALLATION  
SD-50 ZINC-COATED IRON OR STEEL CORRUGATED PIPE  
SD-55 PLASTIC PIPE

## STRUCTURE DATA

DRAINAGE AREA - 2988 AC.

LENGTH OF FILL - 1060 FT.  
HEIGHT OF FILL - 17.8 FT. (Top of dam to Downstream toe)  
EFFECTIVE HEIGHT - 14.8 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

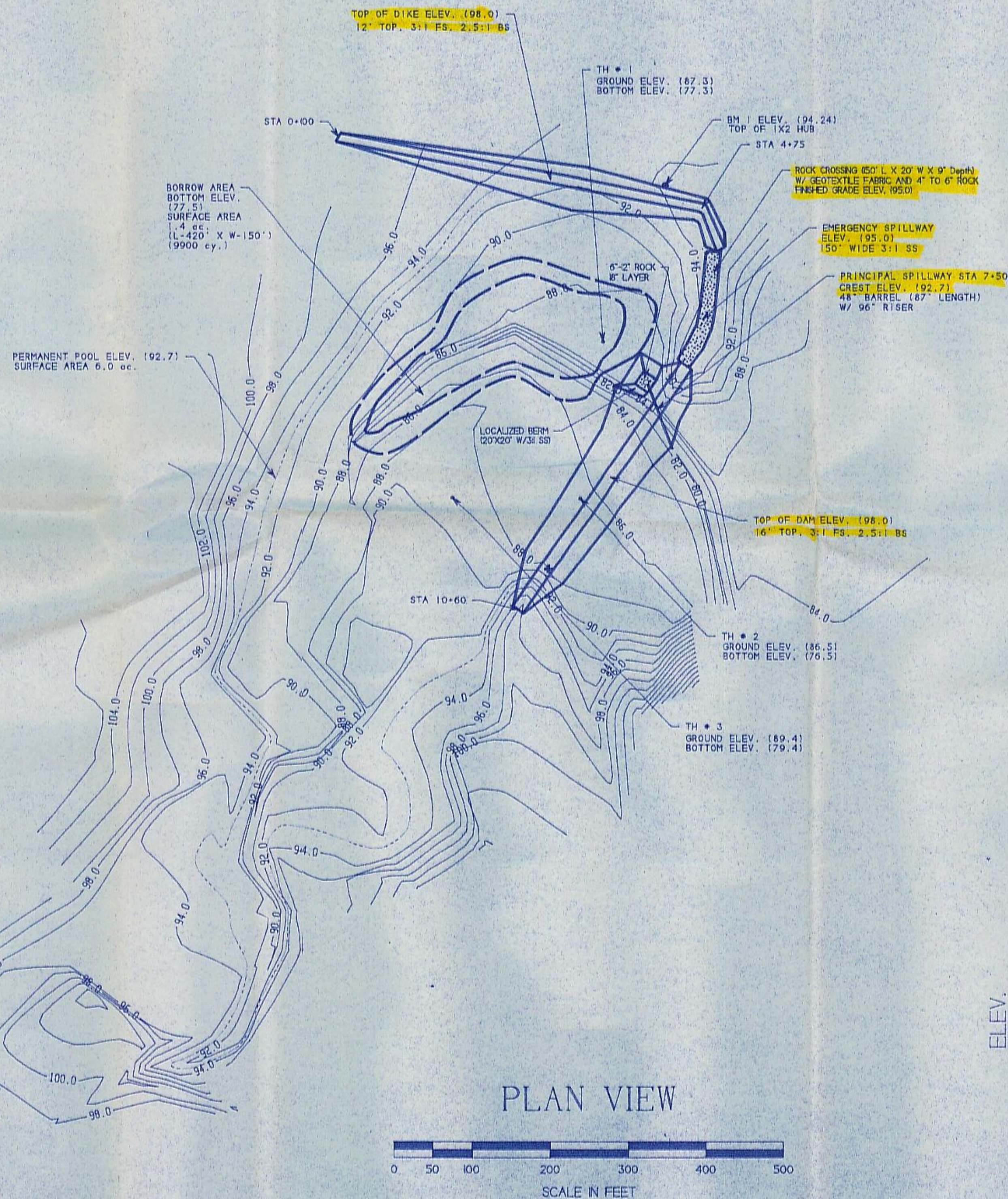
STORAGE X EFFECTIVE HEIGHT - 726.68  
STORAGE: • TOP OF DAM 84.2 AC-FT.  
• EMERGENCY SPILLWAY 491 AC-FT.  
• PRINCIPAL SPILLWAY 28.4 AC-FT.

PRINCIPAL SPILLWAY DESIGN STORM - 10 YR  
(Emergency Spillway flow would occur during design storm for approximately 8.7 hrs. @ a depth of 102")  
EMERGENCY SPILLWAY DESIGN STORM - 25 YR  
EMERGENCY FREEBOARD STORM - 50 YR

LYNDELL PETERSEN  
FISH & WILDLIFE POND  
PENNINGTON COUNTY S.D.A.K. - PENNINGTON CD  
NE1/4 NE1/4 SEC 2-T2S-R8E

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

DESIGNED BY g. muer  
DRAFTED BY g. muer  
DATE 8/99  
APPROVED BY  
TITLE  
DWG. NO.  
SHEET 1 OF 7  
DESIGNED BY g. muer  
DRAFTED BY g. muer  
DATE 8/99  
APPROVED BY  
TITLE  
DWG. NO.  
SHEET 1 OF 7



**SOUTH DAKOTA  
WATER PERMIT NO. 2428-2**

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Date of first receipt of application October 4, 1999.

Date of return to applicant for corrections, amendments or changes October 4, 1999.

Date of receipt of corrected application October 7, 1999.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2428-2 to Lyndell Petersen, 14895 Lower Spring Creek Road, Hermosa SD 57744 authorizing the construction of the a dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 2428-2 authorizes impoundment of 28.4 acre-feet of water from runoff in a dry draw dam located in the NE ¼ NE ¼ Section 2 with water impounded in the E ½ NE ¼ Section 2; all in T2S-R8E.  
This permit authorizes impoundment of sufficient water to maintain water to the outlet elevation.
2. The water appropriated shall be used for the purpose of supplying water for fish and wildlife propagation and livestock water 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. 2428-2 is November 29, 1999.
5. The date from which applicant may claim right is October 4, 1999.
6. One-fifth of the construction is to be completed on or before May 29, 2001.
7. All construction is to be completed on or before November 29, 2004.
8. Water is to be put to beneficial use on or before November 29, 2008.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

**QUALIFICATIONS**

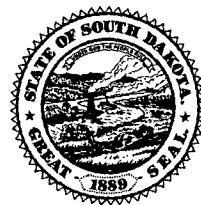
1. Water Permit No. 2428-2 authorizes a dam with storage capacity of 28.4 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

**WATER MANAGEMENT BOARD**

By: John Hatch  
John Hatch, Chief Engineer  
Water Rights Program  
Department of Environment and Natural Resources

DEC 10 1999

date



## Supplemental Information

(type or print in ink)

Notary Public



## 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

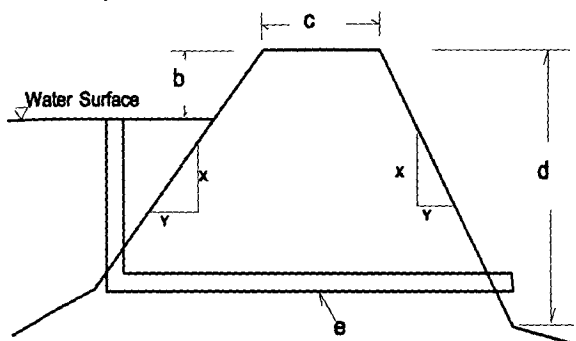
- a) Surface Dimensions \_\_\_\_\_ Depth \_\_\_\_\_
- b) Depth to water (ground surface to water level) \_\_\_\_\_

## 4. Water Storage Dams

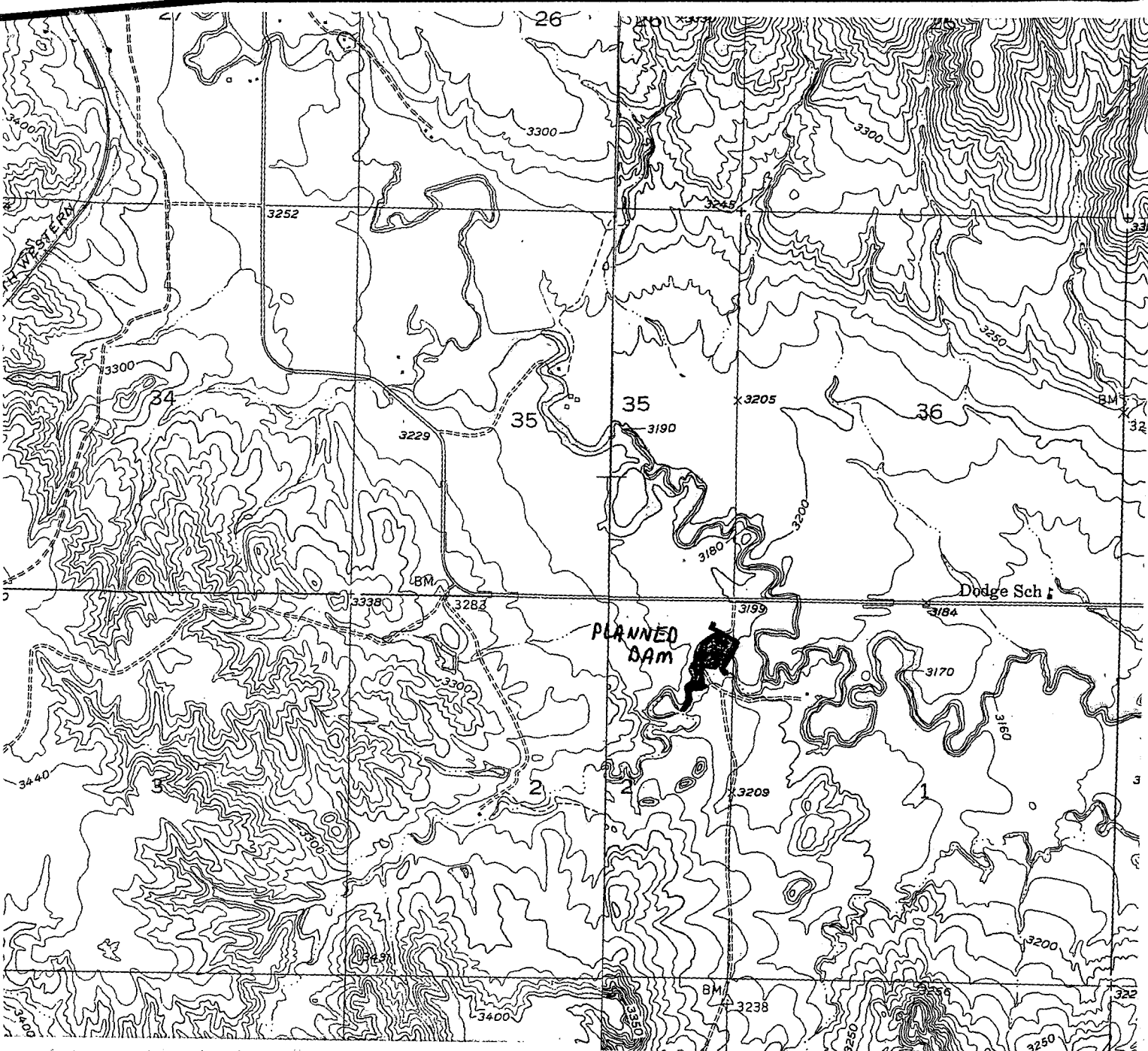
If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to be shown on the map submitted with the application.

- 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 Samed Rd, Suite 4  
Rapid City, SD 57702-8007



- b) Freeboard 5.3 ft.
- c) Crest Width 16 ft.  
 Crest Length 385 LF.
- d) Height 17.8 ft.
- e) Primary Outlet Capacity 184.5 cfs.  
 If pipe, diameter 48" Barrel, 96" Riser
- f) Secondary Spillway Capacity 2468 cfs  
 Spillway Width 150'
- g) X & Y Slope  
 Upstream 3:1  
 Downstream 2.5:1
- h) Surface Area of Impoundment 6.0 ac.
- i) Storage 28.4 Acre Feet
- j) Drainage Area Above Dam 2988 Acres



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

SCS - CPA - 16  
2 - 81

### CONSERVATION PLAN MAP

Owner Lyndell Petersen Operator Same  
 County Pennington State SD Date 9/23/99  
 Approximate acres \_\_\_\_\_ Approximate scale 1" = 2000  
 Cooperating with \_\_\_\_\_ Conservation District \_\_\_\_\_  
 Plan identification \_\_\_\_\_ Photo number \_\_\_\_\_  
 Assisted by Gerald T Miller, NRCS, Rapid City SD USDA Soil Conservation Service



# RECEIPT

## Water Rights Program

South Dakota Department of Environment and Natural Resources

№ 416209

Pierre, \_\_\_\_\_ October 4, 19 99

RECEIVED OF Lyndell H., Jill W., or Dell S. Petersen, 14895 Lower Spring Creek Rd., Hermosa, SD  
the following amount in fees for services rendered as provided for by law: 57744

Fee for Application for Permit No. 2428-2 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

Chief Engineer

John Hatch

# RECEIPT

## Water Rights Program

South Dakota Department of Environment and Natural Resources

№ 416212

Pierre, \_\_\_\_\_ October 7, 19 989

RECEIVED OF Lyndell Petersen, 14895 Lower Spring Creek Rd., Hermosa, SD 57744  
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. 2428-2

50 00

Fee for Filing Transfer Form \_\_\_\_\_

Fee for Filing Extension Request \_\_\_\_\_

Fee for \_\_\_\_\_

(Any Other Work Provided by Law)

Total

50 00

By

Chief Engineer

*John Hatcher*

# Water Permit Application No. 2428-2

Lyndell Petersen

Top of Dam Elev. - 98  
 2nd Spway Elev. - 95  
 P. Spway Elev. - 92.7  
 DIS Top Elev. - 80.2

Cat. 3 - Low Hazard Dam

Ht. = 17.8 ft.

Normal Storage Capacity - 28.4 A.-Ft  
 Int. Storage Capacity - 49.1  
 Max. Storage Capacity - 84.2

Int. Capacity x Eff. Ht. =  $49.1 \times 14.8 = 726.68 < 3000$  ∴ 25 year  
Minimum Spillway Design

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

DA = 2988 A. = 4.67 mi.<sup>2</sup>

Slope = 100 ft/mi

SI = 1.76

$$Q_{25} = 83.4 A^{.65} S^{.46} S_i^{-.72}$$

$$= 83.4 (4.67)^{.65} (100)^{.46} (1.76)^{-.72}$$

$$= 83.4 (2.5211) (7.5858) (0.6656)$$

$$= \underline{1062 \text{ cfs}}$$

$$Q_{100} = 132 A^{.65} S^{.46} S_i^{-.67}$$

$$= 132 (4.67)^{.65} (100)^{.46} (1.76)^{-.67}$$

$$= 132 (2.7231) (8.3176) (0.6847)$$

$$= \underline{2047 \text{ cfs}}$$

## Spillway Flow

$$Q_{2nd} = C L H^{3/2}$$

$$= (2.6)(150)(3)^{1.5}$$

$$= \underline{2026 \text{ cfs}} + 185 \text{ (Primary)} = \underline{2211 \text{ cfs total}}$$

Section 74:02:08:09

NRCS Annual Field

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

DA = 2988 A. CN = 76 ISO = 1.5

80% chance = 0.10

$$0.10 \times 2988^{1/2} = \underline{25 \text{ A.-Ft}}$$

50% chance = 0.28

$$0.28 \times 2988^{1/2} = \underline{70 \text{ A.-Ft}}$$

10% chance = 1.5

$$1.5 \times 2988^{1/2} = \underline{375 \text{ A.-Ft}}$$

DATE 9/27/99

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

- |                                                  |                                              |
|--------------------------------------------------|----------------------------------------------|
| <input type="checkbox"/> Action                  | <input type="checkbox"/> Note and Return     |
| <input type="checkbox"/> Approval                | <input type="checkbox"/> Per Phone Call      |
| <input checked="" type="checkbox"/> As Requested | <input type="checkbox"/> Recommendation      |
| <input type="checkbox"/> For Comment             | <input type="checkbox"/> Reply for Signature |
| <input type="checkbox"/> For Information         | <input type="checkbox"/> Returned            |
| <input type="checkbox"/> Initials                | <input type="checkbox"/> See Me              |
| <input type="checkbox"/> Note and File           | <input type="checkbox"/> Your Signature      |

REMARKS Lyndell Petersen Dam  
Site Analysis computer  
program.



FROM Herald R. Miller  
NRCS Rapid City SD

*Final Design Run*

\*\*\*\*\*  
WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM  
(USER MANUAL - DATED MAY 1996)

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

TYPICAL DESIGN RUN - 378 ES CREST ONLY

0.02  
0.27  
4.19  
8.09  
14.19  
23.49  
37.39  
84.19  
157.4  
260.8

2988      2.87      25 YR. E.S.  
            3.8      4.4      50 YR. FREE BOARD  
92.7      92.7      80.2  
48      0.025      84.0  
25.13      96" RISER  
.035      3      .04      5  
1.0      3.0

*Hood will prime  
PIPE @ MAX of 1.8  
d = 7.2 ft.  
(5.3')  
6' RISER + 2.3'  
to E.S. = 7.6'  
∴ Adequate*

PROVIDES THE DESIGN ELEVATION OF THE  
DAY CREST ONLY, INCLUDING THE PSH

DAY STORM IS A TYPE I, 10 YR 24 HR  
RECOMMENDED BY NEH 4 CHAPTER 16

DAY STORM IS 25 YR. 24 HR TYPE II STORM

24      TYPE1378      24

\*\*\*\*\* MESSAGE - ALTERNATE STRUCTURE ID. (S 1) 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 09/15/99 ----- COMMENT PAGE -----  
VER 96.1      TYPICAL DESIGN RUN - 378 ES CREST ONLY      WSID = peteq

PRINCIPAL SPILLWAY STORM IS A TYPE I, 10 YR 24 HR  
PROPORTIONS RECOMMENDED BY NEH 4 CHAPTER 16

```

1SITES -----
XEQ 09/15/99          TYPICAL DESIGN RUN - 378 ES CREST ONLY          WSID= peteq
VER 96.1                                           SUBW= 01
TIME 13:36:52          SITE = S      1          PASS=      1          PAGE=      1

```

STORM DISTRIBUTION AUX. -24 HOUR TYPE II RAINFALL DISTRIBUTION

|                      |             |        |           |      |
|----------------------|-------------|--------|-----------|------|
| PRECIP. - P-PS,1-DAY | P-PS,10-DAY | P-SD   | P-FB      |      |
| 2.47                 | .00         | 3.80   | 4.40      |      |
| WSDATA - CN          | DA-SM       | TC/L   | -/H       | QRF  |
| 76.00                | 4.67        | 2.87   | .00       | .00  |
| SITEDATA- PERM POOL  | CREST PS    | FP SED | VALLEY FL | 378? |
| 92.70                | 92.70       | 92.70  | .00       | YES  |

|            |          |            |           |            |       |
|------------|----------|------------|-----------|------------|-------|
|            | BASEFLOW | INITIAL EL | EXTRA VOL | SITE TYPE  |       |
|            | .00      | .00        | .00       | DESIGN     |       |
| PSDATA -   | NO. COND | COND L     | DIA/W     | -/H        |       |
|            | 1.00     | 70.00      | 48.00     | .00        |       |
|            | PS N     | KE         | WEIR L    | TW EL      |       |
|            | .025     | 1.00       | 25.13     | 84.00      |       |
|            | 2ND STG  | ORF H      | ORF L     | START AUX. |       |
|            | .00      | .00        | .00       | .00        |       |
| ASCRESTS - | AUX.1    | AUX.2      | AUX.3     | AUX.4      | AUX.5 |
|            | .00      | .00        | .00       | .00        | .00   |

[illegible]

|                    |            |        |            |
|--------------------|------------|--------|------------|
| 1                  | .00        | .00    | 30         |
| AUX.DATA - INLET N | SIDE SLOPE | EXIT N | EXIT SLOPE |
| .035               | 3.00       | .040   | .050       |
| ACTUAL AUX?        |            |        | NO         |
| BTM WIDTH - BW1    | BW2        | BW3    | BW4        |
| ft 150.00          | .00        | .00    | .00        |
|                    |            |        | BW5        |
|                    |            |        | .00        |

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES -----  
 XEQ 09/15/99 TYPICAL DESIGN RUN - 378 ES CREST ONLY WSID= peteq  
 VER 96.1 SUBW= 01  
 TIME 13:36:52 SITE = S 1 PASS= 1 PAGE= 2

|            |             |            |                 |             |
|------------|-------------|------------|-----------------|-------------|
| PERM POOL  | 92.70 FT    | 28.4 ACFT  | .00 AC          | .0 CFS      |
| CREST PS   | 92.70 FT    | 28.4 ACFT  | .00 AC          | .0 CFS      |
| SED ACCUM  | 92.70 FT    | 28.4 ACFT  | .00 AC          | .0 CFS      |
| START ELEV | 92.70 FT    | 28.4 ACFT  | .00 AC          | .0 CFS      |
| NRCS-PSH   | D= 24.00 HR | P= 2.47 IN | Q= .68 IN       | DA= 4.67 SM |
|            | TC= 2.87 HR | CN= 76.00  | VOL= 169.0 ACFT |             |

PEAK = 257.8 CFS, AT 12.1 HRS.

*P.S. will pass 2 yr. 24 hrs. storm*

|                          |          |           |        |           |
|--------------------------|----------|-----------|--------|-----------|
| ROUTED RESULT - HYD TYPE | EMAX     | VOL-MAX   | AMAX   | QMAX      |
| NRCS-PSH                 | 95.00 FT | 49.1 ACFT | .00 AC | 184.5 CFS |

PS STORAGE 20.7 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS

DRAWDOWN (DDT) TEST 92.70 FT 28.4 ACFT .00 CFS  
 CONTROL IS .000 DETENTION STORAGE

TIME = 1.01 DAYS, TO .0 CFS (LIMIT = 10.00 DAYS)

PLOT OF PRINCIPAL SPILLWAY HYDROGRAPH, 1 INCH= 50. CFS  
 0. 50. 100.

| 150. | 200. | 250. | 300. | 350. |      |        |   |
|------|------|------|------|------|------|--------|---|
| Time | Qin  | Qout | Elev | Vol  | Area | ExtVel | I |
| I    | I    | I    | I    | I    | I    | I      | I |
| .00  | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| .33  | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| .65  | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| .98  | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| 1.31 | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| 1.64 | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| 1.96 | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| 2.29 | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| 2.62 | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| 2.95 | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |
| 3.27 | 0    | 0    | 92.7 | 28.4 | .0   | .      | . |

*P.S. "Q" equal to "Tech Guide Q" using E.S. factor of 0.35 ± 10 yr 24 hr. design storm.*

|     |       |     |     |      |      |    |     |   |   |
|-----|-------|-----|-----|------|------|----|-----|---|---|
|     | 3.60  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 3.93  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 4.26  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 4.58  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 4.91  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 5.24  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 5.57  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 5.89  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 6.22  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 6.55  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 6.88  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 7.20  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 7.53  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 7.86  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 8.19  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 8.51  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 8.84  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 9.17  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 9.50  | 0   | 0   | 92.7 | 28.4 | .0 | .   |   |   |
|     | 9.82  | 3   | 0   | 92.7 | 28.4 | .0 | .I  |   |   |
|     | 10.15 | 17  | 2   | 92.7 | 28.6 | .0 | . I |   |   |
|     | 10.48 | 50  | 8   | 92.9 | 29.4 | .0 | . P | I |   |
|     | 10.81 | 106 | 21  | 93.1 | 31.1 | .0 | . P |   | I |
|     | 11.13 | 169 | 55  | 93.5 | 33.8 | .0 | .   | P |   |
| I   | 11.46 | 218 | 106 | 93.9 | 36.9 | .0 | .   |   | P |
| I   | 11.79 | 247 | 145 | 94.2 | 39.8 | .0 | .   |   | P |
| I   | 12.12 | 258 | 176 | 94.4 | 42.3 | .0 | .   |   |   |
| P   | 12.44 | 254 | X   | 94.6 | 44.4 | .0 | .   |   |   |
| P   | 12.77 | 238 | I   | 94.7 | 46.1 | .0 | .   |   |   |
| P   | 13.10 | 223 | I   | 94.9 | 47.4 | .0 | .   |   |   |
| P   | 13.43 | 210 | I   | 94.9 | 48.3 | .0 | .   |   |   |
| P   | 13.75 | 198 | I   | 95.0 | 48.8 | .0 | .   |   |   |
| P   | 14.08 | 187 | I   | 95.0 | 49.1 | .0 | .   |   |   |
| X   | 14.41 | 177 |     | 95.0 | 49.0 | .0 | .   |   |   |
| I P | 14.74 | 167 |     | 95.0 | 48.7 | .0 | .   |   |   |
| I P | 15.06 | 158 |     | 94.9 | 48.1 | .0 | .   |   |   |
| I P | 15.39 | 150 |     | 94.8 | 47.3 | .0 | .   |   | I |
| P   | 15.72 | 142 |     | 94.8 | 46.3 | .0 | .   |   | I |
| P   | 16.05 | 136 |     | 94.7 | 45.1 | .0 | .   |   | I |
| P   | 16.37 | 132 |     | 94.6 | 43.8 | .0 | .   |   | I |

*Full Pipe Flow*

|   |       |     |     |      |      |    |   |  |     |
|---|-------|-----|-----|------|------|----|---|--|-----|
|   | 16.70 | 128 | 178 | 94.4 | 42.5 | .0 | . |  | I   |
| P |       |     |     |      |      |    |   |  |     |
|   | 17.03 | 124 | 163 | 94.3 | 41.3 | .0 | . |  | I   |
| P |       |     |     |      |      |    |   |  |     |
|   | 17.36 | 121 | 152 | 94.3 | 40.3 | .0 | . |  | I P |
|   | 17.68 | 119 | 143 | 94.2 | 39.6 | .0 | . |  | I P |
|   | 18.01 | 117 | 136 | 94.1 | 39.0 | .0 | . |  | I P |
|   | 18.34 | 114 | 130 | 94.1 | 38.6 | .0 | . |  | I P |
|   | 18.67 | 112 | 125 | 94.1 | 38.2 | .0 | . |  | I P |
|   | 18.99 | 110 | 121 | 94.0 | 37.9 | .0 | . |  | I P |
|   | 19.32 | 108 | 118 | 94.0 | 37.6 | .0 | . |  | I P |
|   | 19.65 | 106 | 114 | 94.0 | 37.3 | .0 | . |  | I P |
|   | 19.98 | 104 | 111 | 94.0 | 37.2 | .0 | . |  | IP  |
|   | 20.30 | 102 | 108 | 93.9 | 37.0 | .0 | . |  | I P |
|   | 20.63 | 100 | 105 | 93.9 | 36.8 | .0 | . |  | IP  |
|   | 20.96 | 98  | 103 | 93.9 | 36.7 | .0 | . |  | IP  |
|   | 21.29 | 96  | 101 | 93.9 | 36.6 | .0 | . |  | IP  |
|   | 21.61 | 94  | 98  | 93.9 | 36.4 | .0 | . |  | IP  |
|   | 21.94 | 91  | 96  | 93.8 | 36.3 | .0 | . |  | IP  |
|   | 22.27 | 89  | 94  | 93.8 | 36.2 | .0 | . |  | IP  |
|   | 22.60 | 87  | 92  | 93.8 | 36.1 | .0 | . |  | IP  |
|   | 22.92 | 84  | 89  | 93.8 | 35.9 | .0 | . |  | IP  |
|   | 23.25 | 82  | 87  | 93.8 | 35.8 | .0 | . |  | IP  |
|   | 23.58 | 79  | 85  | 93.7 | 35.6 | .0 | . |  | IP  |
|   | 23.91 | 77  | 82  | 93.7 | 35.5 | .0 | . |  | IP  |
|   | 24.23 | 74  | 80  | 93.7 | 35.4 | .0 | . |  | IP  |
|   | 24.56 | 70  | 77  | 93.7 | 35.2 | .0 | . |  | IP  |
|   | 24.89 | 65  | 73  | 93.7 | 35.0 | .0 | . |  | I P |
|   | 25.22 | 57  | 69  | 93.6 | 34.7 | .0 | . |  | I P |
|   | 25.54 | 48  | 63  | 93.6 | 34.4 | .0 | . |  | I P |
|   | 25.87 | 38  | 56  | 93.5 | 33.9 | .0 | . |  | I P |
|   | 26.20 | 29  | 49  | 93.4 | 33.4 | .0 | . |  | I P |
|   | 26.53 | 21  | 42  | 93.3 | 32.8 | .0 | . |  | I P |
|   | 26.85 | 16  | 35  | 93.3 | 32.3 | .0 | . |  | I P |
|   | 27.18 | 12  | 28  | 93.2 | 31.8 | .0 | . |  | I P |
|   | 27.51 | 9   | 23  | 93.1 | 31.4 | .0 | . |  | I P |
|   | 27.84 | 6   | 20  | 93.1 | 31.0 | .0 | . |  | I P |
|   | 28.16 | 5   | 17  | 93.0 | 30.7 | .0 | . |  | I P |
|   | 28.49 | 3   | 15  | 93.0 | 30.3 | .0 | . |  | I P |
|   | 28.82 | 2   | 13  | 92.9 | 30.1 | .0 | . |  | P   |
|   | 29.15 | 2   | 11  | 92.9 | 29.8 | .0 | . |  | P   |
|   | 29.47 | 1   | 9   | 92.9 | 29.6 | .0 | . |  | P   |
|   | 29.80 | 1   | 8   | 92.8 | 29.4 | .0 | . |  | P   |
|   | 30.13 | 1   | 6   | 92.8 | 29.2 | .0 | . |  | P   |
|   | 30.46 | 0   | 5   | 92.8 | 29.1 | .0 | . |  | P   |
|   | 30.78 | 0   | 4   | 92.8 | 28.9 | .0 | . |  | P   |
|   | 31.11 | 0   | 4   | 92.8 | 28.8 | .0 | . |  | P   |
|   | 31.44 | 0   | 3   | 92.8 | 28.8 | .0 | . |  | P   |
|   | 31.77 | 0   | 2   | 92.7 | 28.7 | .0 | . |  |     |
|   | 32.09 | 0   | 2   | 92.7 | 28.6 | .0 | . |  |     |
|   | 32.42 | 0   | 2   | 92.7 | 28.6 | .0 | . |  |     |
|   | 32.75 | 0   | 1   | 92.7 | 28.5 | .0 | . |  |     |
|   | 33.08 | 0   | 1   | 92.7 | 28.5 | .0 | . |  |     |
|   | 33.40 | 0   | 1   | 92.7 | 28.5 | .0 | . |  |     |
|   | 33.73 | 0   | 1   | 92.7 | 28.5 | .0 | . |  |     |
|   | 34.06 | 0   | 1   | 92.7 | 28.4 | .0 | . |  |     |
|   | 34.39 | 0   | 1   | 92.7 | 28.4 | .0 | . |  |     |

|       |   |   |      |      |    |   |
|-------|---|---|------|------|----|---|
| 34.71 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 35.04 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 35.37 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 35.70 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 36.02 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 36.35 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 36.68 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 37.01 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 37.33 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 37.66 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 37.99 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 38.32 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 38.64 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 38.97 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 39.30 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 39.63 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 39.95 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 40.28 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 40.61 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 40.94 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 41.26 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 41.59 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 41.92 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 42.25 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 42.57 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 42.90 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 43.23 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 43.56 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 43.88 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 44.21 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 44.54 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 44.87 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 45.19 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 45.52 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 45.85 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 46.18 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 46.50 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 46.83 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 47.16 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 47.49 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 47.81 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 48.14 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 48.47 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 48.80 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 49.12 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 49.45 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 49.78 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 50.11 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 50.43 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 50.76 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 51.09 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 51.42 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 51.74 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 52.07 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 52.40 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 52.73 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 53.05 | 0 | 0 | 92.7 | 28.4 | .0 | . |

|       |   |   |      |      |    |   |
|-------|---|---|------|------|----|---|
| 53.38 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 53.71 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 54.04 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 54.36 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 54.69 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 55.02 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 55.35 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 55.67 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 56.00 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 56.33 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 56.66 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 56.98 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 57.31 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 57.64 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 57.97 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 58.29 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 58.62 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 58.95 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 59.28 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 59.60 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 59.93 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 60.26 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 60.59 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 60.91 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 61.24 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 61.57 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 61.90 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 62.22 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 62.55 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 62.88 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 63.21 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 63.53 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 63.86 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 64.19 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 64.52 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 64.84 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 65.17 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 65.50 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 65.83 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 66.15 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 66.48 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 66.81 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 67.14 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 67.46 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 67.79 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 68.12 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 68.45 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 68.77 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 69.10 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 69.43 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 69.76 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 70.08 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 70.41 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 70.74 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 71.07 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 71.39 | 0 | 0 | 92.7 | 28.4 | .0 | . |
| 71.72 | 0 | 0 | 92.7 | 28.4 | .0 | . |

| Time  | Qin | Qout | Elev | Vol  | Area | ExtVel | I | I | I |
|-------|-----|------|------|------|------|--------|---|---|---|
| 72.05 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 72.38 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 72.70 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 73.03 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 73.36 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 73.69 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 74.01 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 74.34 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 74.67 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 75.00 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 75.32 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 75.65 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 75.98 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 76.31 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 76.63 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 76.96 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 77.29 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 77.62 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 77.94 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |
| 78.27 | 0   | 0    | 92.7 | 28.4 | .0   | .      |   |   |   |

150. 200. 250. 300. 350. 0. 50. 100.

END NRCS-PSH PLOT

\*\*\*\*\* MESSAGE - PSFULL CONTROL ENTERED BUT NOT USED IN THE NEXT RATING:  
 BECAUSE EITHER THE PS OR AUX. SPILLWAY RATINGS ARE GIVEN,  
 OR THE AUX. CREST ELEVATION 95.00 IS HIGHER THAN THE  
 FULL PIPE FLOW ELEVATION 94.45.

1SITES -----

XEQ 09/15/99 TYPICAL DESIGN RUN - 378 ES CREST ONLY WSID= peteq  
 VER 96.1 SUBW= 01  
 TIME 13:36:52 SITE = S 1 PASS= 1 PAGE= 3

AUX. CREST 95.00 FT 49.1 ACFT .00 AC 184.5 CFS

PS STORAGE 20.7 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

START ELEV 92.70 FT 28.4 ACFT .00 AC .0 CFS

EFFECTIVE HEIGHT(H)= 14.8 FEET, PRODUCT= 726. (H \* STORAGE AT CREST AUX.).

INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.

NRCS-SDH D= 24.00 HR P= 3.80 IN Q= 1.59 IN DA= 4.67 SM  
 TC= 2.87 HR CN= 76.00 VOL= 395.1 ACFT

PEAK = 1160.4 CFS, AT 13.8 HRS. *25 yr. Peak.*

NRCS-FBH D= 24.00 HR P= 4.40 IN Q= 2.05 IN DA= 4.67 SM  
 TC= 2.87 HR CN= 76.00 VOL= 510.5 ACFT

PEAK = 1524.5 CFS, AT 13.8 HRS.

50 yr. Free Board  
Hydrograph

| ROUTED RESULTS | BTM WIDTH<br>FT | MAX ELEV<br>FT | VOL-MAX<br>ACFT | AREA-MAX<br>AC | AUX.-HP<br>FT | VOL-AUX.<br>ACFT |
|----------------|-----------------|----------------|-----------------|----------------|---------------|------------------|
| NRCS-SDH       | 150.0           | 96.75          | 69.5            | .0             | 1.75          | 20.5             |

| PEAK - CFS<br>DISCHARGE = | Q-PS | Q-AUX. | Q-TOT. |
|---------------------------|------|--------|--------|
|                           | 199. | 940.   | 1139.  |

HP @ 25 yr.

| AUXILIARY<br>SPILLWAY --- | CRITICAL<br>DEPTH<br>FT | CRITICAL<br>VELOCITY<br>FT/SEC | CRITICAL<br>SLOPE-Sc<br>FT/FT | 25% OF Q<br>Sc<br>FT/FT |
|---------------------------|-------------------------|--------------------------------|-------------------------------|-------------------------|
|                           | 1.06                    | 5.78                           | .023                          | .031                    |

AUXILIARY SPILLWAY DURATION FLOW = 7.2 HOURS

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

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 7.3 FT/SEC  
EXIT SLOPE = .050 FT/FT  
FLOW DEPTH = .8 FT

PLOT NRCS-SDH  
EXIT SLOPE = .050

1 IN = 200. CFS

| Time | Qin | Qout | Elev | Vol  | Area | ExtVel | I | I | I |
|------|-----|------|------|------|------|--------|---|---|---|
| .00  | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| .33  | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| .65  | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| .98  | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 1.31 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 1.64 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 1.96 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 2.29 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 2.62 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 2.95 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 3.27 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 3.60 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 3.93 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 4.26 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 4.58 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 4.91 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 5.24 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 5.57 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 5.89 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 6.22 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 6.55 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 6.88 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 7.20 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 7.53 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 7.86 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 8.19 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |
| 8.51 | 0   | 0    | 92.7 | 28.4 | .0   | .00    | . |   |   |



|          |       |       |      |    |      |      |
|----------|-------|-------|------|----|------|------|
| RESULTS  | FT    | FT    | ACFT | AC | FT   | ACFT |
| NRCS-FBH | 150.0 | 97.15 | 74.3 | .0 | 2.16 | 25.2 |

|             |      |        |        |
|-------------|------|--------|--------|
| PEAK - CFS  | Q-PS | Q-AUX. | Q-TOT. |
| DISCHARGE = | 202. | 1290.  | 1492.  |

*H.P. @ 50%.*

|              |          |          |          |          |
|--------------|----------|----------|----------|----------|
|              | CRITICAL | CRITICAL | CRITICAL | 25% OF Q |
|              | DEPTH    | VELOCITY | SLOPE-Sc | Sc       |
| AUXILIARY    | FT       | FT/SEC   | FT/FT    | FT/FT    |
| SPILLWAY --- | 1.31     | 6.41     | .022     | .029     |

|                                    |             |
|------------------------------------|-------------|
| AUXILIARY SPILLWAY DURATION FLOW = | 8.8 HOURS   |
| ATTACK, OE/B =                     | 1.9 ACFT/FT |

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

|                                                |            |
|------------------------------------------------|------------|
| EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= | 8.3 FT/SEC |
| EXIT SLOPE =                                   | .050 FT/FT |
| FLOW DEPTH =                                   | 1.0 FT     |

>>>>> NHCP378 RUN - MINIMUM DEPTH, CREST AUX. TO TOP OF DAM IS 3.00 FT.  
NEW TOP OF DAM ELEVATION = 98.00.

|              |           |          |         |          |        |          |
|--------------|-----------|----------|---------|----------|--------|----------|
| ROUTED       | BTM WIDTH | MAX ELEV | VOL-MAX | AREA-MAX | AUX.HP | VOL-AUX. |
| RESULTS      | FT        | FT       | ACFT    | AC       | FT     | ACFT     |
| MINIMUM AUX. | 150.0     | 98.00    | 85.6    | .0       | 3.00   | 36.6     |

|              |       |        |        |
|--------------|-------|--------|--------|
| PEAK - CFS   | Q-PS  | Q-AUX. | Q-TOT. |
| DISCHARGES = | 209.0 | 2259.1 | 2468.1 |

|              |          |          |          |          |
|--------------|----------|----------|----------|----------|
|              | CRITICAL | CRITICAL | CRITICAL | 25% OF Q |
|              | DEPTH    | VELOCITY | SLOPE-Sc | Sc       |
| AUXILIARY    | FT       | FT/SEC   | FT/FT    | FT/FT    |
| SPILLWAY --- | 1.89     | 7.67     | .019     | .026     |

>>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED FOR THIS PASS. NEW TOP OF DAM ELEVATION = 98.15.

|              |           |          |         |          |        |          |
|--------------|-----------|----------|---------|----------|--------|----------|
| ROUTED       | BTM WIDTH | MAX ELEV | VOL-MAX | AREA-MAX | AUX.HP | VOL-AUX. |
| RESULTS      | FT        | FT       | ACFT    | AC       | FT     | ACFT     |
| MINIMUM AUX. | 150.0     | 98.15    | 87.7    | .0       | 3.20   | 38.7     |

|              |       |        |        |
|--------------|-------|--------|--------|
| PEAK - CFS   | Q-PS  | Q-AUX. | Q-TOT. |
| DISCHARGES = | 209.8 | 2438.6 | 2648.4 |

|              |          |          |          |          |
|--------------|----------|----------|----------|----------|
|              | CRITICAL | CRITICAL | CRITICAL | 25% OF Q |
|              | DEPTH    | VELOCITY | SLOPE-Sc | Sc       |
| AUXILIARY    | FT       | FT/SEC   | FT/FT    | FT/FT    |
| SPILLWAY --- | 1.99     | 7.86     | .019     | .025     |

|               |        |          |
|---------------|--------|----------|
| PLOT NRCS-FBH | 1 IN = | 500. CFS |
| EXIT SLOPE =  | .050   |          |

| 1500. | 2000. | 2500. | 3000. | 3500. | 0.   | 500.   | 1000. |
|-------|-------|-------|-------|-------|------|--------|-------|
| Time  | Qin   | Qout  | Elev  | Vol   | Area | ExtVel | I     |
| I     | I     |       | I     | I     | I    |        |       |
| .00   | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| .33   | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| .65   | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| .98   | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 1.31  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 1.64  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 1.96  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 2.29  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 2.62  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 2.95  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 3.27  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 3.60  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 3.93  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 4.26  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 4.58  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 4.91  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 5.24  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 5.57  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 5.89  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 6.22  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 6.55  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 6.88  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 7.20  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 7.53  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 7.86  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 8.19  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 8.51  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 8.84  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 9.17  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 9.50  | 0     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 9.82  | 1     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 10.15 | 3     | 0     | 92.7  | 28.4  | .0   | .00    | .     |
| 10.48 | 6     | 1     | 92.7  | 28.5  | .0   | .00    | .     |
| 10.81 | 12    | 3     | 92.8  | 28.7  | .0   | .00    | .     |
| 11.13 | 22    | 5     | 92.8  | 29.1  | .0   | .00    | .     |
| 11.46 | 38    | 10    | 92.9  | 29.7  | .0   | .00    | .I    |
| 11.79 | 72    | 18    | 93.0  | 30.8  | .0   | .00    | .I    |
| 12.12 | 194   | 50    | 93.4  | 33.5  | .0   | .00    | .P I  |
| 12.44 | 439   | 141   | 94.2  | 39.4  | .0   | .00    | . P I |
| 12.77 | 816   | 230   | 95.2  | 51.4  | .0   | 2.18   | . A I |
| 13.10 | 1208  | 802   | 96.3  | 64.8  | .0   | 6.17   | . A I |
| 13.43 | 1452  | 1322  | 97.0  | 72.1  | .0   | 7.86   | . A I |
| 13.75 | 1525  | 1491  | 97.2  | 74.3  | .0   | 8.29   | . A I |
| 14.08 | 1459  | 1492  | 97.2  | 74.3  | .0   | 8.30   | . IX  |
| 14.41 | 1306  | 1379  | 97.0  | 72.9  | .0   | 8.01   | . I A |
| 14.74 | 1090  | 1200  | 96.8  | 70.4  | .0   | 7.51   | . I A |
| 15.06 | 910   | 1003  | 96.6  | 67.6  | .0   | 6.90   | . I A |
| 15.39 | 771   | 843   | 96.4  | 65.4  | .0   | 6.33   | . I A |
| 15.72 | 663   | 719   | 96.2  | 63.7  | .0   | 5.83   | . IA  |
| 16.05 | 572   | 619   | 96.1  | 62.3  | .0   | 5.36   | . IA  |
| 16.37 | 500   | 551   | 96.0  | 61.0  | .0   | 5.01   | . IA  |
| 16.70 | 441   | 491   | 95.9  | 59.6  | .0   | 4.66   | . IA  |
| 17.03 | 392   | 435   | 95.8  | 58.3  | .0   | 4.31   | . IA  |



1 48.0 95.0 150.0 3.2 98.2 0. 0. 8.3 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 ,03/01/96  
peteq FILES

INPUT = d:peteq  
OUTPUT = d:peteq.OUT

DATED 09/15/99 13:36:52



United States  
Department of  
Agriculture

Natural Resources  
Conservation  
Service

Federal Building, Room 239  
515 9th Street  
Rapid City, SD 57701-2663

September 23, 1999

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 Lyndell Petersen, NE1/4 NE1/4 S2 T2S R8E, Pennington County South Dakota. The 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 - 2988 ac.

Storage - principal spillway elev. 92.7 - 28.4 ac-ft.

emergency spillway elev. 95.0 - 49.1 ac-ft.

top of dam elev. 98.0 - 84.2 ac-ft.

Fill Height - 17.8 ft., Effective Height - 14.8 ft.

Water Depth - 15.2 ft.

Storage X Height - 726.68

Principal Spillway Storm - 10 yr.

(Emergency Spillway flow would occur during design storm for  
approximatly 8.7 hrs. @ a depth of 1.02')

Emergency Spillway Design Storm - 25 yr. (passes with 1.75 ft. depth in ES.)

Freeboard Hydrograph - 50 yr. (passes with 2.16 ft. depth in E.S.)

Maximum Structure Capacity (without overtopping) - 2468 cfs

Principal Spillway - 48" CMP w/ 96" CMP riser (184.5 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



**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE, SOUTH DAKOTA 57501-3181  
[www.state.sd.us/denr](http://www.state.sd.us/denr)

October 4, 1999

Lyndell Peterson  
14895 Lower Spring Creek Rd  
Hermosa SD 57744

Dear Mr. Peterson:

Thank you for submitting the *Application for a Permit to Appropriate Water* for a dam located in Pennington County.

We are in receipt of the \$150 application filing fee. In addition to the application filing fee, the Water Rights Program now 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  
Water Rights Program  
605 773-3352



**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE, SOUTH DAKOTA 57501-3181  
[www.state.sd.us/denr](http://www.state.sd.us/denr)

November 2, 1999

Lyndell Petersen  
14895 Lower Spring Creek Rd.  
Hermosa, SD 57744

Dear Mr. Petersen:

We have reviewed the plans and specifications for your dam located in the NE  $\frac{1}{4}$  NE  $\frac{1}{4}$  of Section 2-T2S-R8E, in Pennington County. The plans and specifications as submitted are approved. Approval of the plans and specifications does not authorize construction of the project. Construction of the project may not begin until Water Permit Application No. 2428-2 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 Petersen Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 17.8 feet and a normal storage capacity of 28.4 acre-feet and a maximum storage capacity of 84.2 acre-feet.

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

Sincerely,

Gale N. Selken, P.E.  
Natural Resources Engineer IV  
for John Hatch, Chief Engineer  
Water Rights Program  
(605) 773-3352

c: Gerald Miller, NRCS, Rapid City

REPORT ON  
WATER PERMIT APPLICATION NO. 2428-2  
Lyndell Petersen  
October 25, 1999

Water Permit Application No. 2428-2 has been filed by Lyndell Petersen to impound 28.4 acre-feet of water from runoff by constructing a dam located in the NE $\frac{1}{4}$  NE  $\frac{1}{4}$  of Section 2-T2S-R8E, in Pennington County. The application also requests impoundment of sufficient water to maintain the reservoir at the outlet elevation. The water will be used for fish and wildlife propagation and livestock watering.

Discussion:

The Petersen Dam will be classified as a Category 3, Low Hazard dam. The dam has been designed by the Natural Resources Conservation Service. The plans and specifications have been reviewed and will be approved; however, construction of the dam can not begin until Water Permit Application No. 2428-2 is approved.

The dam will be 17.8 feet high with a normal storage capacity of 28.4 acre-feet with a reservoir level at the spillway elevation, and a maximum storage capacity of 84.2 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.

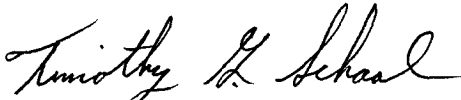
The dam is designed to have a 96 inch CMP riser with a 48 inch CMP barrel with 5.3 feet of available freeboard as the primary spillway, and a 150 foot wide earthcut spillway with 3 feet of available freeboard as the secondary spillway. The dam will have a drainage area of 2988 acres (4.67 square miles). A 25-year frequency event will produce a peak of approximately 1062 cfs and a 100-year frequency event will produce a peak of approximately 2047 cfs. The 150 foot wide earthcut secondary spillway will have a capacity of approximately 2026 cfs. The primary spillway will have a capacity of approximately 185 cfs, for a total spillway capacity of 2211 cfs.

The annual yield for this drainage area with a 10 percent chance of occurrence, or 1 out of 10 years, is expected to be 375 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 70 acre-feet and the annual yield with a 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 25 acre-feet.

The Petersen Dam will be located in the NE  $\frac{1}{4}$  of Section 2-T2S-R8E on an unnamed tributary to the Spring Creek, about one-quarter of a mile upstream of the confluence of the unnamed tributary and Spring Creek. There are no existing Water Permits/Rights located on the unnamed tributary between the proposed dam and Spring Creek.

Conclusions:

1. Water Permit Application No. 2428-2 should be approved since unappropriated water is available and approval should not have any adverse effect on existing Water Permits/Rights.
2. If approved, the low flow bypass requirement for downstream domestic use should be a qualification on Water Permit Application No. 2428-2.



Timothy G. Schaal, P.E.

Natural Resources Engineer III

Approved by:



Gale N. Selken, P.E.

Natural Resources Engineer IV

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT  
APPLICATION NO. 2428-2, Lyndell Peterson**

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. 2428-2, Lyndell Peterson, 14895 Lower Spring Creek Road, Hermosa SD 57744.

The Chief Engineer is recommending APPROVAL of Application No. 2428-2 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. 2428-2 authorizes a dam with storage capacity of 28.4 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.

See report on application for additional information.

  
for JOHN HATCH, Chief Engineer  
November 1, 1999



**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE, SOUTH DAKOTA 57501-3181  
[www.state.sd.us/denr](http://www.state.sd.us/denr)

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

November 2, 1999

Lyndell Petersen  
14895 Lower Spring Creek Rd.  
Hermosa, SD 57744

Dear Ms. Petersen:

Water Permit Application No. 2428-2 for fish and wildlife propagation and livestock 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). 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. 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 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.



DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE, SOUTH DAKOTA 57501-3181  
www.state.sd.us/denr

November 2, 1999

Rapid City Journal  
P.O. Box 450  
Rapid City, SD 57709-0450

ATTENTION: Legal Public Notice

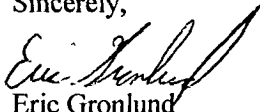
Enclosed is a Notice of Hearing on Application No. 2428-2 to Appropriate Water to be published twice. Please publish the first notice on November 10, 1999, with the second publication 7 days later.

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 Lyndell Petersen, 14895 Lower Spring Creek Rd., Hermosa, SD 57744 (Ph # (605) 342-5595).

**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

-----CU T HERE-----

No. 2428-2

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

Date \_\_\_\_\_

We are in receipt of your letter of November 2, 1999, enclosing Notice of Hearing to Appropriate Water by Application No. 2428-2 which was first published in our issue of \_\_\_\_\_. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

\_\_\_\_\_  
Name

\_\_\_\_\_  
Newspaper

Instruction to Newspaper - Publish first Notice on November 10, 1999, with the second publication 7 days later. The applicant is responsible for payment.

---

NOTICE OF APPLICATION NO. 2428-2 to Appropriate Water

Notice is given that Lyndell Petersen, 14895 Lower Spring Creek Rd, Hermosa SD 57744 has filed an application for a water permit to impound 28.4 acre-feet of water from runoff in a dry draw by constructing a dam located in the NE  $\frac{1}{4}$  NE  $\frac{1}{4}$  Section 2 with water impounded in the E  $\frac{1}{2}$  NE  $\frac{1}{4}$  Section 2; all in T2S-R8E. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water will be used for fish and wildlife propagation and livestock water.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2428-2 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 November 29, 1999.

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. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.

# **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:

November 10, 1999

November 17, 1999

Cost of Printing Seventy-five

dollars and no cents (\$75.00)

Patricia K. Van Patten  
 (Signature)

Legal Advertising Representative  
 (Title)

11/17/99  
 (Date Signed)



Nov. 10, 17 L532712  
**NOTICE OF APPLICATION**  
**NO. 2428-2**

## **TO APPROPRIATE WATER**

Notice is given that Lyndell Petersen, 14895 Lower Spring Creek Rd., Hermosa, SD 57744, has filed an application for a water permit to impound 28.4 acre-feet of water from runoff in a dry draw by constructing a dam located in the NE 1/4 NE 1/4 Section 2 with water impounded in the E 1/4 NE 1/4 Section 2; all in T2S-R8E. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water will be used for fish and wildlife propagation and livestock water.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2428-2 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 November 29, 1999.

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.

Nettie H. Myers, Secretary  
 Department of Environment  
 and Natural Resources



**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE, SOUTH DAKOTA 57501-3181  
[www.state.sd.us/denr](http://www.state.sd.us/denr)

DEC 10 1999

Lyndell Petersen  
14895 Lower Spring Creek Rd.  
Hermosa, SD 57744

Dear Mr. Petersen:

Enclosed is Water Permit No. 2428-2 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.

Very truly yours,

JOHN HATCH, Chief Engineer  
Water Rights Program  
(605) 773-3352

enclosures

## Report of Examination of Works and/or Application of Water to Beneficial Use For Permit No. 2428-2

I have this day, April 19, 2016, made a thorough examination of the water use system constructed by Lyndell Petersen, 14895 Lower Spring Creek Rd, Hermosa, So. Dak. of Permit No. 2428-2, bearing the priority of 10/4/99 authorizing the diversion and storage of 28.4 acre-feet waters of a dry draw tributary of Spring Creek for fish, wildlife and domestic purposes, in Pennington County.

Inspection contact & relationship to permit holder, if applicable:

**Lyndell Petersen, owner**  
**605-342-5595**

### **A. Dam Information:**

- 1) Height to crest 17.8 feet from downstream toe
- 2) Height to primary spillway 12.5 feet from downstream toe
- 3) Height to secondary spillway 14.8 feet from downstream toe
- 4) Crest width 16 feet
- 5) Crest length 385 feet
- 6) Primary Spillway diameter 48 inches
- 7) Secondary Spillway width 150 feet
- 8) Approx. storage to primary spillway 28.4 ac-ft
- 9) Approx. storage to crest 84.2 ac-ft

Date constructed: March 2000

### **B. Works used to put water to beneficial use:**

This is an earth fill embankment utilizing a corrugated metal pipe principal spillway and a vegetated earth emergency spillway. The water impounded in the reservoir is put to beneficial use in-place.

### **C. Compliance with Permit Requirements:**

- 1) Permit qualifications being abided by: Yes

Low flows as needed for downstream domestic use including livestock and prior water rights must be by-passed. A permanent by-pass structure was not installed. Any by-pass of flows if needed will use temporary means.

Irrigation Questionnaires checked to determine if permit owner started irrigation by the end of construction period. N/A

List any extended period of nonuse: **none**

- 2) Exceptions to compliance are: none

**E. Condition and Location:**

1. The system is in **good** condition with the point of diversion located as follows: **NE ¼ NE ¼ S2 T2S R8E** (south 688 feet and west 95 feet from the NE corner, Section 2 T2S R8E, N43.910129 W103.11929 ).

The works are capable of diverting to the place of use and storing **28.4** acre-feet of water which is to be used for **fish, wildlife and domestic use**. Water has been put to beneficial use to the maximum extent and the license should be issued for **28.4 acre-feet** storage.

2. All structures, wells and lands on map **Yes**

If no, describe: **xx**

**F. Comments or other permit(s) associated with the project:**

The dam has filled four or five times since constructed. The pool area seeps and does not hold water for any extended period.




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Steven Quissell  
Water Rights Inspector  
DENR, Water Rights Program

Date report completed: **4/19/2016**



Dam crest on left, pool on right

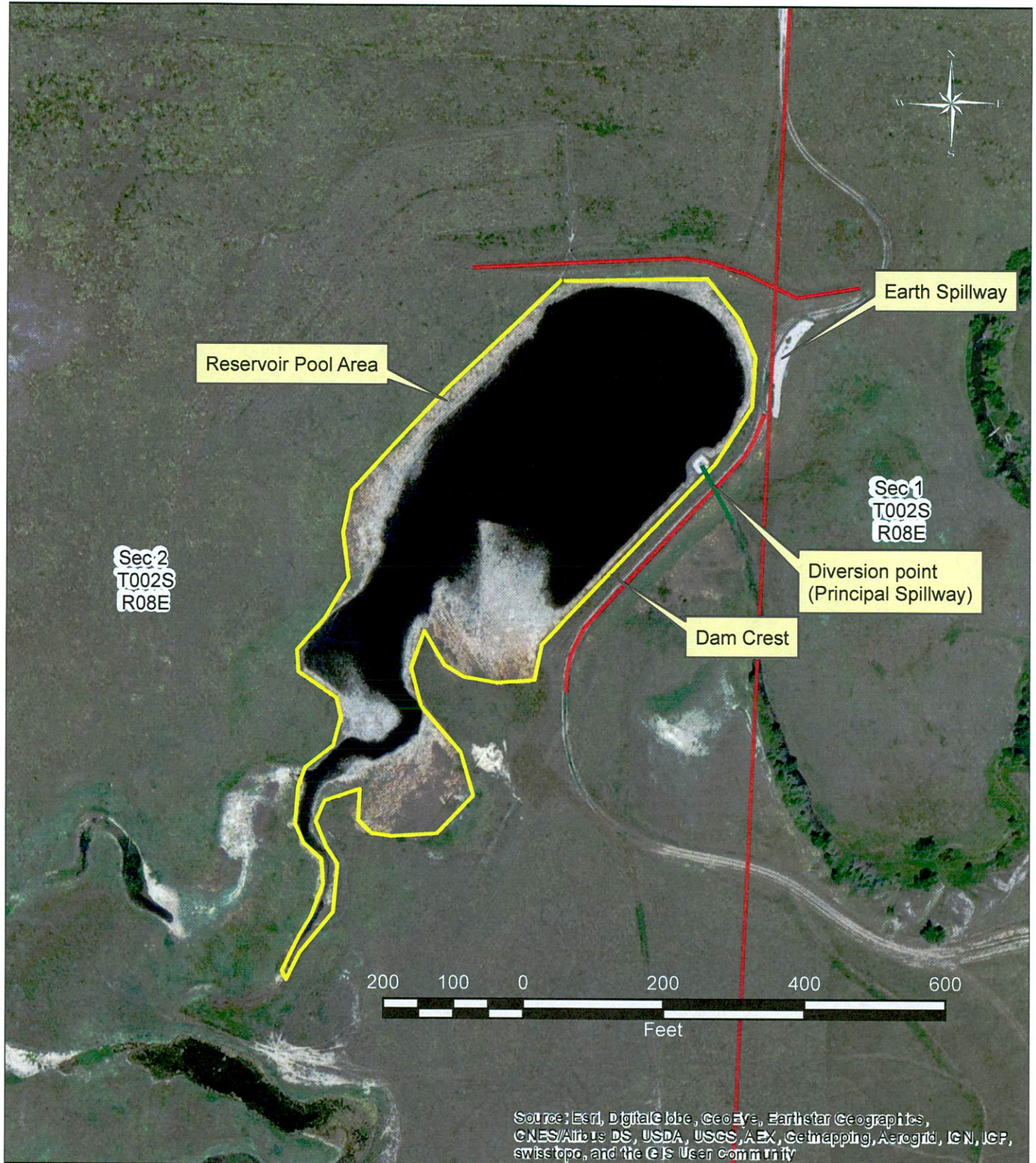


Principal Spillway inlet



Principal Spillway outlet

Water Right # 2428-2  
Lyndell Petersen  
4/19/2016

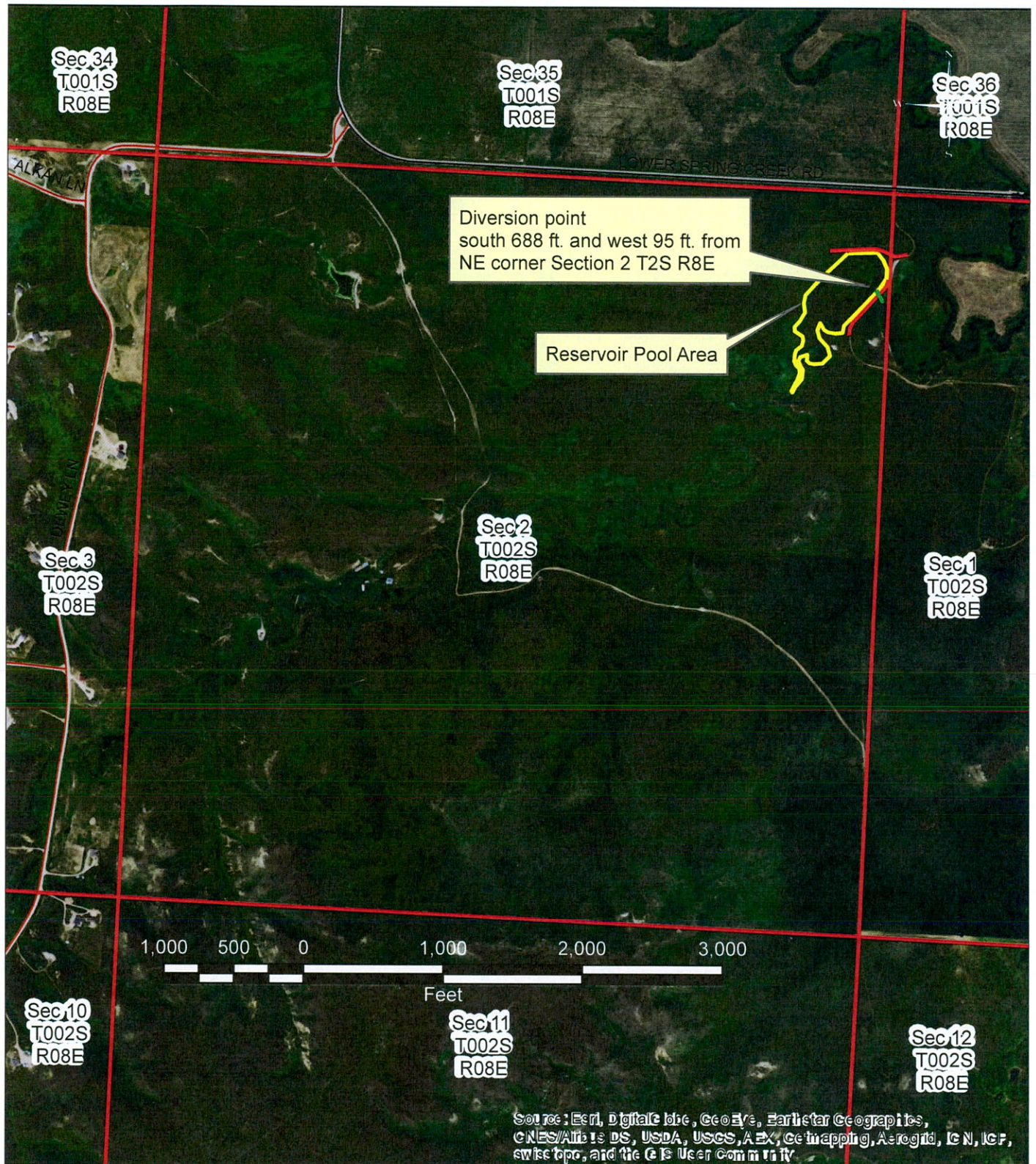


*Steven Quissell*

Steven Quissell  
Water Rights Inspector  
DENR Water Rights Program



Water Right # 2428-2  
Lyndell Petersen  
4/19/2016



*Steven Quissell*

Steven Quissell  
Water Rights Inspector  
DENR Water Rights Program





DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE, SOUTH DAKOTA 57501-3182

[denr.sd.gov](http://denr.sd.gov)

MAY 03 2016

2428-2

Lyndell Peterson  
14895 Lower Spring Creek Rd  
Hermosa SD 57744

Dear Mr. Peterson:

Enclosed is Water License No. 2428-2. This is the final water right document completing your process of obtaining a Water Right. Also, included with your license is a map prepared by the staff engineer who conducted the investigation.

As long as you use the water beneficially, as stated in the Water License, the State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Sincerely,

  
Jeanne Goodman, Chief Engineer  
Water Rights Program  
(605) 773-3352

enclosures

# STATE OF SOUTH DAKOTA

## WATER LICENSE NO. 2428-2

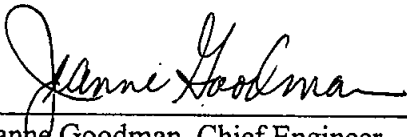
(1) Lyndell Peterson, 14895 Lower Spring Creek Rd, Hermosa SD 57744 made Application No. 2428-2, October 4, 1999 for a water permit to impound 28.4 acre feet of water from runoff, Pennington County, South Dakota for fish and wildlife propagation and livestock watering purposes. Permit No. 2428-2, with a priority date of October 4, 1999 was approved November 29, 1999 and issued to the applicant for impoundment of water with construction of the described water supply system to be completed on or before November 29, 2004 and for the application to beneficial use of water on or before November 29, 2008.

(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. 2428-2 is issued a license, bearing a priority date of October 4, 1999, to impound 28.4 acre feet of water from runoff for fish and wildlife propagation and livestock watering purposes.

The location of the storage dam (spillway) is 688 feet south and 95 feet west from the NE corner of Section 2-T2S-R8E (NE 1/4 NE 1/4) with water impounded in the same area.

(3) This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Permit No. 2428-2, including the following qualifications:

- Water Permit No. 2428-2 authorizes a dam with storage capacity of 28.4 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.



Jeanne Goodman, Chief Engineer  
Water Rights Program  
Department of Environment and Natural Resources

**MAY 03 2016**  
date

