

Considered: _____

WATER PERMIT NO. 2140-2

Phone: 859-2071

Name of Applicant: Marie Hansen

Post Office Address: Box 435, Philip, SD 57567

Amount of Water Claimed: 31.2 ac-ft (dam) Total Acres: N/A

Source of Water Supply: surface runoff

Water to be used for: livestock watering County: Haakon

About 19 miles North and 10 miles East of Philip

PROOF OF PUBLICATION: Received _____ Not Received _____

APPLICATION: Approved _____ Subject to _____

F.F. & C/.L. Adopted _____ Not Approved _____ Deferred _____

PRIORITY Date Received: July 25, 1990 Fee: \$150 Remarks _____

Corrected Application Received 8/16/90 Period of Annual Use Jan 1 - Dec 31

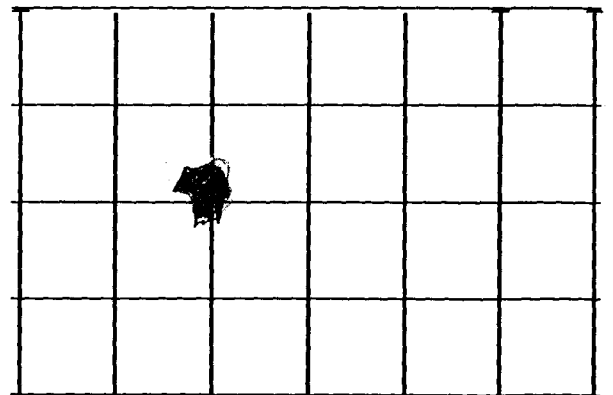
WATER QUALITY APPROVAL RECEIVED _____ APPROVED/CONDITIONAL (Circle one)

WI-1 Description same as Application YES _____ NO _____ REMARKS _____

Diversion Point: SE1/4 NW1/4, SW1/4 NE1/4, NE1/4

SW1/4, NW1/4 SE1/4 Section 9 T4N-R22E

Land to be Irrigated: _____



Well Log: Driller: _____ Licensed YES _____ NO _____

Depth of Well: _____ REMARKS _____

Type of Map: P & S PREPARED BY: Tim Hendricks Reviewed and the Number

Assigned on 8/16/90 By Eric Gronlund

No. _____ Hydrologic Unit _____
 Map No. _____ Basin _____
 Newspaper _____

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

Check use of water: Industrial ☐ Commercial ☐ Municipal ☐ Other Common Distribution System ☐
 Rural Water System ☐ Suburban Housing ☐ Geothermal Heat ☐ Institutional ☐ Recreational ☐
 Domestic ☐ (above 18gpm) Other ☒ CATTLE water supply

Type of Application: Check one or more of the following

New ☒ Vested Right ☐ Future Use ☐ Change Use ☐☐ Amend Permit No. _____ with old priority date retainedChange diversion point(s) ☐ Add diversion point(s) ☐ Other ☐☐ Application to: Change diversion point(s) ☐ Add diversion point(s) ☐ on Permit No. _____☐ Construction to use water reserved by Future Use Permit No. _____1. Name of Applicant Marie Hansen Phone No. 859-2070Post Office Address Box 435 Philip State SD Zip Code 57567-0435
(Street, RR or Box) (City)2. Amount of water claimed (c.f.s.) 31.2 acre-feet

3. Source of water supply _____

4. Location of point of diversion SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec 9-T4N-R22E2250' East by 2200' South from NW cornerCounty Haakon5. Counties where water will be used Haakon6. Annual period during which water is to be used January 1 - December 31

7. Give a brief description of proposed 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)

This will be a new dam to water livestock- old dams
on the same creeks are silted in - No depth for holding
water.

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map (see instruction)

STATE OF SOUTH DAKOTA)

County of Haakon ss.

I, Marie Hansen 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.

Signed Marie HansenSubscribed and sworn to before me this 24 day of July 1990

Karl Dietrich 2-8-91
 Notary Public

Supplemental Information

(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 Thickness _____ 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. Dugout Information Estimates

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

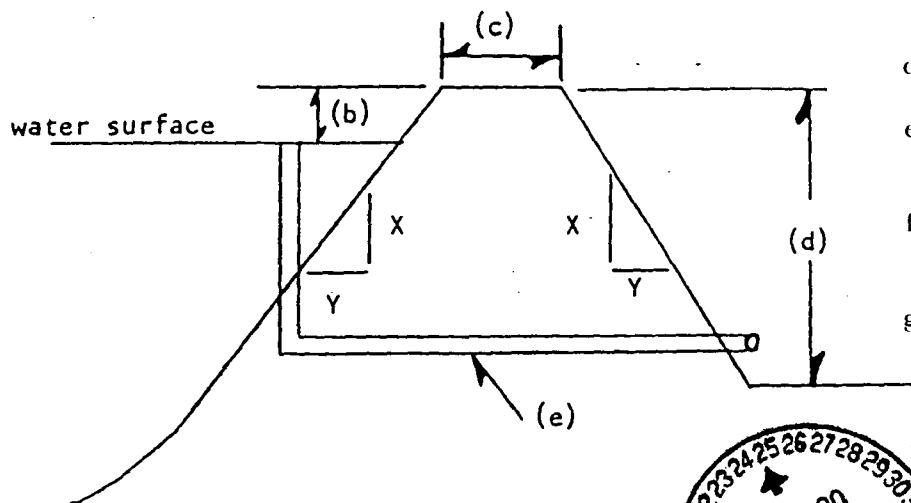
3. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below. The locations of each dam should 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

Tim Hendricks
Soil Conservation Service
Box 130, Philip, SD 57567

- b) Freeboard 1.0
- c) Crest Width 12
Crest Length 400
- d) Height 17.8
- e) Primary Outlet Capacity _____
If Pipe, diameter n/a
- f) Secondary Spillway Capacity _____
Spillway width _____
- g) X & Y Slope 3:1
Upstream _____
Downstream 2:1



Surface Area of Impoundment 7.0
(at spillway crest) 42.0 acre feet
Storage 70.0 a-f
Max storage to top of dam 585 acres
Drainage area above dam 585 acres

Marie Hansen
Signature of Applicant



(Thursday)

Mail to: Water Rights Div.

No. 2140-2 Hydrologic Unit 10120112
 Map No. _____ Basin Lower Cheyenne
 Newspaper The Pioneer Review, Box 788, Philip, SD
 57567

523 E. Capitol
 Pierre, SD 57501
 (605) 773-3352

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

Check use of water: Industrial ☐ Commercial ☐ Municipal ☐ Other Common Distribution System ☐
 Rural Water System ☐ Suburban Housing ☐ Geothermal Heat ☐ Institutional ☐ Recreational ☐
 Domestic ☐ (above 18gpm) Other ☒ livestock water supply

Type of Application: Check one or more of the following

New ☒ Vested Right ☐ Future Use ☐ Change Use ☐

☐ Amend Permit No. _____ with old priority date retained

Change diversion point(s) ☐ Add diversion point(s) ☐ Other ☐ _____

☐ Application to: Change diversion point(s) ☐ Add diversion point(s) ☐ on Permit No. _____

☐ Construction to use water reserved by Future Use Permit No. _____

1. Name of Applicant Marie Hansen Phone No. 859-2073
 Post Office Address Box 435 - Philip State SD Zip Code 57567
(Street, RR or Box) (City)

2. Amount of water claimed (c.f.s.) 31.2 ac ft

3. Source of water supply Drainage

4. Location of point of diversion SE $\frac{1}{4}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 9 T4N R22E

County Haakon

5. Counties where water will be used Haakon

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

7. Give a brief description of proposed 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)

Barthen dam for livestock watering

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map (see instruction)

STATE OF SOUTH DAKOTA)
 County of Haakon)^{ss}

I, Marie Hansen 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.

Signed Marie Hansen

Subscribed and sworn to before me this 8 day of August 1990

Notary Public

Supplemental Information

(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 Thickness _____ 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. Dugout Information Estimates

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

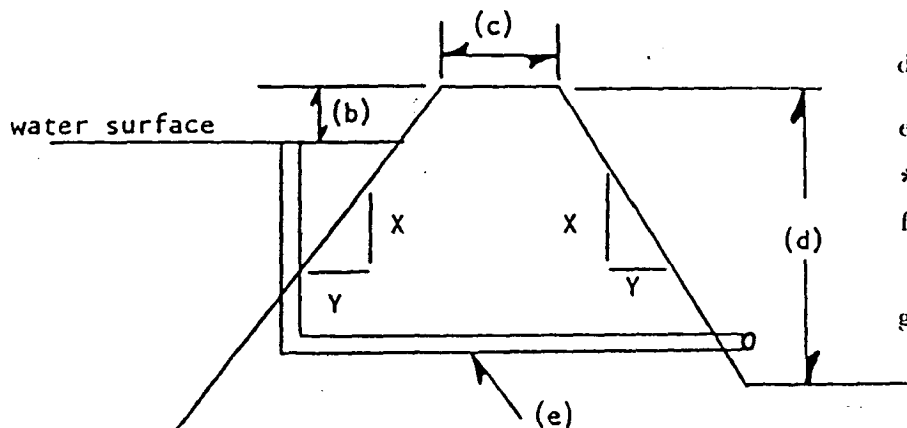
3. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below. The locations of each dam should 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

Tim Hendricks - USDA Soil Conservation

Service PO Box 130 Philip SD 57567



- b) Freeboard 1.0'
- c) Crest Width 12.0'
- Crest Length 400'
- d) Height 17.8'
- e) Primary Outlet Capacity 83.5 cfs*
- If Pipe, diameter _____
- *storm routed using Dams2 program
- f) Secondary Spillway Capacity _____
- Spillway width _____
- g) X & Y Slope
- Upstream 3:1
- Downstream 2:1

Surface Area of Impoundment 7.0 ac

Storage 31.2 ac-ft acre feet

Drainage area above dam 585 ac

Marie Hansen

Signature of Applicant

**SOUTH DAKOTA
WATER PERMIT No. 2140-2**

Date of first receipt of application July 25, 1990.

Date of return to applicant for corrections, amendments or changes
July 30, 1990.

Date of receipt of corrected application August 16, 1990.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2140-2 to Marie Hansen, Box 435, Philip, SD 57567 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 2140-2 authorizes impoundment of 31.2 acre feet of water by construction of a dam. The damsite is to located in the SE1/4 NW1/4, SW1/4 NE1/4, NE1/4 SW1/4, NW1/4 SE1/4 of Section 9, T4N, R22E.
2. The water appropriated shall be used for the purpose of livestock watering and may not exceed the amount of water needed for beneficial use for domestic purposes.
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. 2140-2 is February 1, 1991.
5. The date from which applicant may claim right is July 25, 1990.
6. One-fifth of the construction is to be completed on or before
August 1, 1993.
7. All construction is to be completed on or before February 1, 1996.
8. Water is to be put to beneficial use on or before February 1, 2000.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

WATER MANAGEMENT BOARD

By: _____

John Hatch
Chief Engineer, Water Rights Division
Department of Water and Natural Resources

MAR 27 1991

(date)

RECEIPT

Division of Water Rights

South Dakota Department of Water and Natural Resources

412840

Pierre, August 10, 1990

RECEIVED OF Marie Hansen, Box 435, Philip, SD 57567

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

Fee for Application for Permit No. <u>2140-2</u> to Appropriate Water, to construct works 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 Certified Copy of _____		
Fee for Print Copy of Map _____		
Fee for Certifying _____		
Fee for _____		
(Any Other Work Provided by Law)	Total	150 00

By John Walch
Chief Engineer



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

July 16, 1990

Marie Hansen
Box 435
Philip, SD 57567-0435

Dear Ms. Hansen:

This letter is in regards to the location notice you submitted to this office. The location notice stated the amount of water to be claimed annually is 31.2 acre feet. If the proposed structure at the spillway crest or overflow elevation (42.0 acre feet on your location notice) exceeds 25 acre feet then a water permit from the Water Management Board is required. In your case, a water permit will be required. I am returning your location notice and fee.

I have also taken the liberty of transposing the information from the location notice to a water permit application. An instruction sheet is also attached which assist you in filling out the application. Please read this material carefully as failure to file a completed application will cause delays.

If you have any questions, do not hesitate to give me a call.

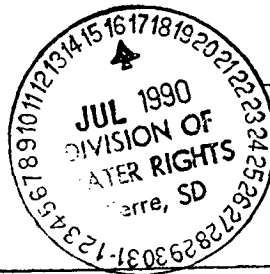
Sincerely,

Eric Gronlund
Water Rights Division
605 773-3352

enc.

LOCATION NOTICE FOR DAM/DUGOUT

Mail to: Water Rights Div.
DWR, Foss Bldg.
Pierre, SD 57501
(605) 773-3352



Haakon

County

Location Notice No. _____

I, ~~MARIE~~ MARIE Hansen

Name

, of

435-191 E. Cherry
PO Box 91, ~~150 Spruce St.~~ Philip, SD 57567-0091

Address & Zip Code

Haakon
County

operator

OWNER

, of the following described land, do hereby
(owner or operator)

notify the Water Management Board of the State of South Dakota and all others concerned that I am exercising my right under SDCL 46-4, for construction of a dam for the purpose of impounding runoff waters for livestock watering purposes.
(type of use)

The following data is presented in compliance with SDCL 46-4-3 and 46-4-4.

(1) Date of:

(a) This notice 7/90

(b) Proposed construction 7/90

(2) Legal description of the land upon which the dam/dugout is located:

SENW 1/4 Sec. 9 T4N R22E

(describe to the nearest 40 acre sub-division)

(3) Location of the dam/dugout from a section corner:

2250' East by 2200' South from NW corner

(describe distance N.S.E.W. from the corner)

(4) County Haakon

(5) The owner of the land Marie Hansen

(6) Acre feet of water claimed annually 31.2

Notes: If the storage of the proposed structure at the spillway crest or overflow elevation exceeds twenty five (25) acre feet, a water permit from the Water Management Board is required.

A location notice is only required on a dugout, if the dugout captures surface runoff waters.

(7) Complete the following information for the proposed dam/dugout:

• Items to be completed for a dugout

*a) Dam/Dugout designed by Tim Hendricks
Soil Conservation Service
PO Box 130, Philip, SD 57567
(name and address)

b) Freeboard 1.0

c) Crest Width 12

Crest Length 400

d) Height 17.8

• Depth, if Dugout _____

e) Outlet Dimensions:

Pipe diameter N/A

Spillway width _____

f) X & Y Slope:

Upstream 3:1

Downstream 2:1

*g) Water surface area 7.0

*h) Storage at spillway crest or overflow elevation

(acre feet) 42.0

i) Maximum storage to top of dam

(acre feet) 70.0

*j) Drainage area above dam/dugout

585

Enclosed herewith is ten dollars (\$10.00). The Water Management Board is requested to file this Location Notice in their official records. A copy of this Location Notice has been filed (do not record) with the Register of Deeds of Haskell County in accordance with SDCL 46-4-3.

Marie Hansen
owner

STATE OF SOUTH DAKOTA)
COUNTY OF HASKELL) ss

I, Marie Hansen the applicant, certify that I have read this Location Notice and that the matters stated in this notice are true and that I intend, and am able to start construction within sixty days after the filing of this notice.

Signed Marie Hansen

Subscribed and sworn to before me this 9 day of July, 1990.

(seal)

Ken Rutter 2-28-91
notary public

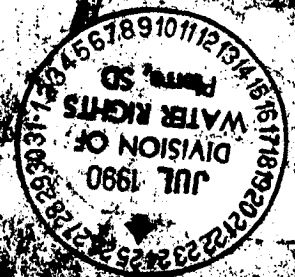
Ypina & Runner
Soil Conservation Service

1173

See Map
L14

72857

L15
4-22



4-22

L15

L14

See



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

July 30, 1990

Marie Hansen
Box 435
Philip, SD 57567-0435

Dear Mrs. Hansen:

This letter is in regards to your water permit application submitted to this office on July 25, 1990. The application needs the following items addressed before processing.

1. The application filing fee is \$150, instead of the \$50 that was submitted with your application. Enclosed is your previously submitted \$50 check.
2. The application must be notarized by a notary public. The seal of Mr. Dietrich shows that he is the county auditor and not a notary.
3. There appears to be some discrepancy in the amount of water claimed. On your application it states 31.2 acre feet, however, Form 2A states that the dams storage is 42 acre feet at the spillway elevation and 70 acre feet to the top of the dam. This information was all transposed from location notice you originally submitted. Please clarify the amount of water to be claimed.
4. The dam location as shown on the map lies in the S1/2 NW1/4 of Section 9. Also, from looking at the drainage way it appears the dam's impounded area is located on the opposite side of the dam of where it should be. Please let me know if you concur with the legal description.
5. Finally a dam of this size must conform to dam safety regulations. This will entail a risk assessment and plans and specification to be submitted. From looking at Form 2A, it appears that SCS has been assisting you in this project. Generally if SCS is involved, plans and specifications have been drawn up on your project. The SCS may also be able to assist you in preparing a risk assessment.

Please address the above mentioned items and return the application to this office. Under receiving a completed application, I will begin processing your water permit application.

Please feel free to contact me if you have any questions.

Sincerely,

Eric Gronlund
Water Rights Division
605 773-3352
enc.



August 8, 1990

Eric Gronlund
Water Rights Division
523 East Capitol
Pierre, South Dakota 57501-3181

Dear Mr. Gronlund:

This letter is in response to the letter sent to Marie Hanson on July 30, 1990 concerning the risk assessment below the proposed dam site. Upon tracking the downstream flow it was determined that at the approximate distances the following items were encountered:

1. 3,000 feet - Old dam on the Hansen farm (will be removed at a later date).
2. 12,500 feet - An old section line road.
3. 17,000 feet - County bridge on South Creek

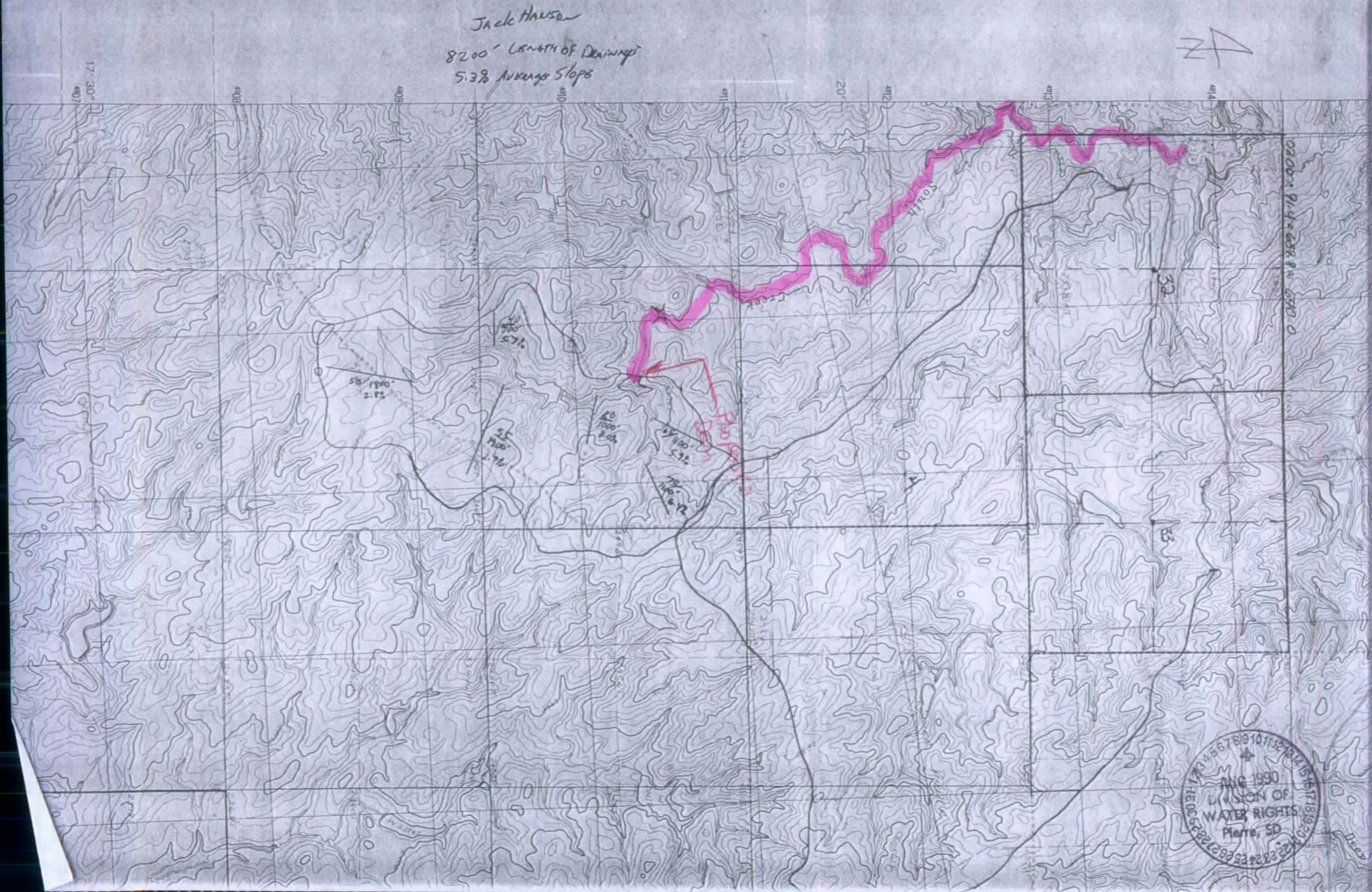
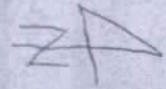
No tracking was done beyond this point as in the event the dam was to break the flood waters should have dissipated by the last point downstream which lies 3.22 miles from the proposed dam. I have enclosed a copy of the Mule Creek Quad for your review.

Sincerely,

Tim Hendricks
USDA Soil Conservation Service
605 859-2209
enc.

Appl. No. 2140-2

Jack Hanson
8200' LENGTH OF Drainage
5.3% Average Slope





Appl No 2140-2

T40-R226 Section #9

Conversation or File Documentation

NAME OF PERSON OR FILE: Marie Hansen Applic.

ADDRESS: _____ COUNTY _____

DATE: 8/15/90 TELEPHONE _____

RE: _____

COMMENTS:

Talked w/ Tim Hendrick SCS agent from Haakon County. He's now sending the SCS plans for the proposed dam. Also he confirmed that the dam will impound water in SE¹/₄ NW⁴, SW¹/₄ NE⁴, NE¹/₄ SW⁴, NW¹/₄ SE⁴ of Section 9 T4N-R27E

File in Permit or other file as necessary. Use to document conversations and what the other party was told; why action or decision was made.

August 23, 1990 1/3

Review of Water Permit Application No. 2140-2

David Brown

Safety of Dams Criteria 74:02:08

review of submitted application towards compliance of Safety of Dams Rules

74:02:08:05.01

Preliminary Risk Assessment

- Done by and Engineer? is Tim Hendrick an Engineer?
- probably a Category 3 Dam due to small height & storage, & locality

74:02:08:07

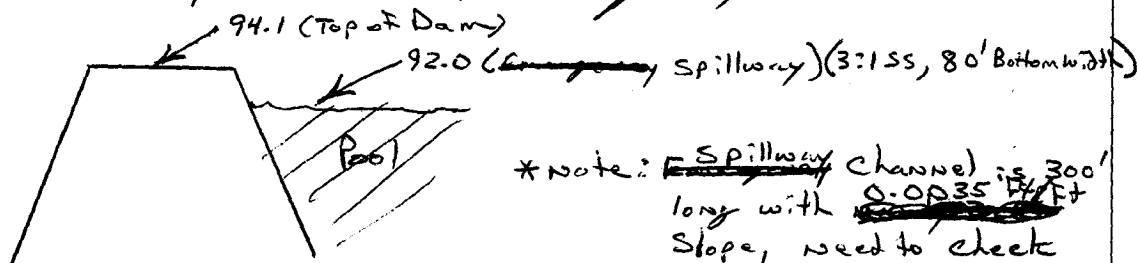
Minimum Spillway Design Flood

Small Dam (31.2 acre-Feet Minimum pool, 70.0 AC-Feet Max pool)

Category 3

Single Spillway - does ~~not~~ qualify for 74:02:08:07.01 spillway exception

Minimum Spillway Design = ²⁵ year Frequency



* note: ~~Spillway~~ channel is 300' long with ~~0.0035 ft/ft~~ Slope, need to check Q through spillway with HEC2

Max Head through spillway = 2.0'

- Zero Freeboard

* $Q_{HEC2 \text{ max}} = 525 \text{ cfs}$ (critical Depth)

$Q_{\text{Anadarko Analysis straight through relationship}} = 607 \text{ cfs}$ (critical Depth was not assumed at exit)

- Assume critical Depth at exit, Manning's $n = 0.03$ (Hudson County, sparse grass cover)

Check Design Flood with DOT Method

$Q_{50 \text{ DOT Flood}} = 454 \text{ cfs}$

$Q_{25 \text{ DOT Flood}} = 338 \text{ cfs}$

$Q_{50 \text{ submitted by SCS}} = 668 \text{ cfs}$

$Q_{25 \text{ submitted by SCS}} = 544 \text{ cfs}$

Spillway meets minimum design criteria

David Brown

Input Data For HEC2 Backwater analysisStarting
at downstream exit location

1001

Station :	0	6.0	86.0	92.0	} Located at 0.00
Elevation :	92.3	90.3	90.3	92.3	

Station :	0	6.0	86.0	92.0	} Located at 0.214
Elevation :	92.4	90.4	90.4	92.4	

Station :	0	6.0	86.0	92.0	} Located at 0.428
Elevation :	92.5	90.5	90.5	92.5	

Station :	0	6.0	86.0	92.0	} Located at 0.642
Elevation :	92.6	90.6	90.6	92.6	

Station :	0	6.0	86.0	92.0	} Located at 0.856
Elevation :	92.7	90.7	90.7	92.7	

Station :	0	6.0	86.0	92.0	} Located at 1.070
Elevation :	92.8	90.8	90.8	92.8	

Station :	0	6.0	86.0	92.0	} Located at 1.50
Elevation :	94.0	92.0	92.0	94.0	

Station :	0	6.0	86.0	92.0	} Located at 2.00
Elevation :	94.0	92.0	92.0	94.0	

Station :	0	6.6	86.6	93.2	} Located at 2.50
Elevation :	94.0	91.8	91.8	94.0	

Station :	0	7.5	87.5	95.0	} Located at 3.00 (Entrance of spillway, at upstream side of dam)
Elevation :	94.0	91.5	91.5	94.0	

Assume: Mannings $N = 0.03$ (short grass cover)

Critical Depth at exit location

Loss coefficients of 0.1 and 0.3

(expect
minimal losses due
to contraction of
spillway)Spillway Rating Curve From HEC2 runs

Head	Discharge	Elev	$N = 0.03$
0	0	92.0	
0.83	100 ✓	92.83	
1.20	200 ✓	93.20	
1.48	300 ✓	93.48	
1.73	400 ✓	93.73	
2.0	525	94.0	

2140-2 Water Permit Application

August 30, 1983 3/3

74:02:08:09 Plans and Specs

David
Brown

- 1) Topo map? ok
- 2) Profile? ok
- 3) Max-x-section? ok
- 4) Area - Capacity Data? ok
- 5) Detailed drawings? ok
- 6) Discharge capacity data? no, but generated in house
- 7) Detailed plans? ok
- 8) NA
- 9) NA

All Safety of Dams criteria have been met if Tim Hendricks
is a PE or works under a PE.

8/23/90

Dwight Brown

DWR,
Water Rights Division
Pierre, SD 57501

Proposed Dam

Proposed Dam

Drainage

Area = 0.72 mi²

Stream L = 1.45 miles
Total L = 1.23 miles

1.08 = 0.15 miles

Slope

Slope = $\frac{\Delta \text{Elevation}}{\Delta \text{Distance}} = \frac{(2510 - 2437')}{(1.23 \text{ mi} - 0.15 \text{ mi})}$

$\frac{73 \text{ ft}}{1.08 \text{ mi}} = 1.76 \text{ inches}$

Water Resources Investigation 88-80
Fig. 13, USFS, P-1 Technique

$\frac{73 \text{ ft}}{1.08 \text{ mi}} = 68 \text{ ft/mi}$

run.
Hello, this program estimates peak discharges and runoff volumes for 2, 5, 10, 25, 50, and 100 year floods based upon equations specified in USGS publication: Techniques for Estimating Flood Peaks Volumes, and Hydrographs on Small Streams, September 1980, Water Resources Investigations 80-80. Input data needed to run this program are: drainage basin size (sq. mi.), soil infiltration index (see Figure 13 in publication), and main channel slope in feet per mile.

8/29/90
Dain Brown
DWR, Water Rights
Division
Pierre, SD

WHAT IS THE DRAINAGE BASIN NAME?

? MARIE HANSON 214-0-2

ENTER THE DRAINAGE BASIN AREA (SQ. MI.)

? 0.92

ENTER THE SOIL INFILTRATION INDEX FROM FIGURE 13

? 1.76

DO YOU WISH TO DETERMINE THE PEAK DISCHARGE? (Y/N)

? Y

ENTER SLOPE ALONG MAIN CHANNEL (FT/MILE)

? 68

THE ESTIMATED PEAK DISCHARGE FOR 2, 5, 10, 25, 50, AND 100 YEAR FLOODS FOR MARIE HANSON 2140-2 DRAINAGE ARE:

Q2 = 67.68045 CFS

Q5 = 138.6571 CFS

Q10 = 215.0135 CFS

Q25 = 338.0442 CFS

Q50 = 454.6921 CFS

Q100 = 596.3436 CFS

THE ESTIMATED RUNOFF VOLUME FOR 2, 5, 10, 25, 50, AND 100 YEARS FLOODS FOR MARIE HANSON 2140-2 DRAINAGE ARE:

V2 = 45.42814 ACRE-FEET

V5 = 80.41995 ACRE-FEET

V10 = 109.5875 ACRE-FEET

V25 = 154.0922 ACRE-FEET

V50 = 192.9616 ACRE-FEET

V100 = 237.9129 ACRE-FEET

THE ACCURACY OF THE ESTIMATED PEAK DISCHARGES AND RUNOFF VOLUMES ARE SUBJECT TO THE LIMITATIONS AS SPECIFIED IN THE ABOVE USGS PUBLICATION

Peak-discharge relation	Standard error of estimate (%)	Runoff volume relation	Standard error of estimate (%)
Average	Range	Average	Range
Q2	106 (+152, -60)	V2	96 (+136, -58)
Q10	90 (+124, -55)	V10	92 (+128, -56)
Q25	90 (+125, -56)	V25	90 (+125, -56)
Q50	93 (+130, -56)	V50	89 (+123, -55)
Q100	98 (+139, -58)	V100	89 (+123, -55)

DO YOU WISH TO GENERATE A SYNTHETIC HYDROGRAPH FOR MARIE HANSON 2140-2 DRAINAGE BASIN? (Y/N).

? Y

ENTER THE NUMERICAL FLOODING FREQUENCY, i.e. for a 25 year
flood enter the value 25.0
? 2

THE 2 YEAR SYNTHETIC HYDROGRAPH FOR THE MARIE HANSON 2140-2
DRAINAGE IS AS FOLLOWS:

TIME (MINUTES)	DISCHARGE (CFS)
0	0
90.4328	6.316842
150.7214	14.6641
211.0099	28.20019
301.4427	55.27237
331.587	64.29643
361.7312	67.68045
391.8755	66.55245
422.0198	62.04042
542.5968	42.86429
693.3182	25.94418
904.3281	13.53609
1205.771	5.865639
1507.213	2.256015
1808.656	.5640038
2110.099	0

DO YOU WISH TO GENERATE ANOTHER SYNTHETIC HYDROGRAPH? (Y/N)
? Y

ENTER THE NUMERICAL FLOODING FREQUENCY, i.e. for a 25 year
flood enter the value 25.0
? 5

THE 5 YEAR SYNTHETIC HYDROGRAPH FOR THE MARIE HANSON 2140-2
DRAINAGE IS AS FOLLOWS:

TIME (MINUTES)	DISCHARGE (CFS)
0	0
78.14229	12.94133
130.2372	30.04236
182.332	57.77378
260.4743	113.2366
286.5217	131.7242
312.5692	138.6571
338.6166	136.3461
364.664	127.1023
468.8538	87.81614
599.0909	53.15187
781.423	27.73141
1041.897	12.01695
1302.372	4.621902
1562.846	1.155476
1823.32	0

DO YOU WISH TO GENERATE ANOTHER SYNTHETIC HYDROGRAPH? (Y/N)
? Y

ENTER THE NUMERICAL FLOODING FREQUENCY, i.e. for a 25 year
flood enter the value 25.0

10
THE 10 YEAR SYNTHETIC HYDROGRAPH FOR THE MARIE HANSON 2140-2
DRAINAGE IS AS FOLLOWS:

TIME (MINUTES)	DISCHARGE (CFS)
0	0
68.6688	20.06793
114.448	46.58626
160.2272	89.58896
228.896	175.5944
251.7856	204.2628
274.6752	215.0135
297.5648	211.4299
320.4544	197.0957
412.0128	136.1752
526.4608	82.42185
686.688	43.0027
915.5841	18.6345
1144.48	7.167117
1373.376	1.791779
1602.272	0

DO YOU WISH TO GENERATE ANOTHER SYNTHETIC HYDROGRAPH? (Y/N)

Y

ENTER THE NUMERICAL FLOODING FREQUENCY, i.e. for a 25 year

Flood enter the value 25.0

25

THE 25 YEAR SYNTHETIC HYDROGRAPH FOR THE MARIE HANSON 2140-2
DRAINAGE IS AS FOLLOWS:

TIME (MINUTES)	DISCHARGE (CFS)
0	0
61.4146	31.55079
102.3577	73.24291
143.3007	140.8518
204.7153	276.0694
225.1869	321.142
245.6584	338.0442
266.1299	332.4101
286.6015	309.8739
368.4876	214.0947
470.8452	129.5836
614.146	67.60885
818.8612	29.29716
1023.577	11.26814
1228.292	2.817035
1433.007	0

DO YOU WISH TO GENERATE ANOTHER SYNTHETIC HYDROGRAPH? (Y/N)

Y

ENTER THE NUMERICAL FLOODING FREQUENCY, i.e. for a 25 year

Flood enter the value 25.0

50

THE 50 YEAR SYNTHETIC HYDROGRAPH FOR THE MARIE HANSON 2140-2 DRAINAGE IS AS FOLLOWS:

TIME (MINUTES)	<u>Hrs</u>	DISCHARGE (CFS)
0		0
57.17652	— 0.95	42.43793
95.29419	— 1.59	98.51662
133.4119	— 2.22	189.455
190.5884	— 3.18	371.3319
209.6472	— 3.49	431.9575
228.7061	— 3.81	454.6921
247.7649	— 4.13	447.1139
266.8237	— 4.45	416.8011
343.0591	— 5.72	287.9717
438.3533	— 7.31	174.2986
571.7651	— 9.53	90.93841
762.3535	— 12.70	39.40665
952.9419	— 15.88	15.1564
1143.53	— 19.06	3.789101
1334.119	— 22.24	0

DO YOU WISH TO GENERATE ANOTHER SYNTHETIC HYDROGRAPH? (Y/N)

Y
ENTER THE NUMERICAL FLOODING FREQUENCY, i.e. for a 25 year
Flood enter the value 25.0
100

THE 100 YEAR SYNTHETIC HYDROGRAPH FOR THE MARIE HANSON 2140-2 DRAINAGE IS AS FOLLOWS:

TIME (MINUTES)	DISCHARGE (CFS)
0	0
53.7509	55.65874
89.58484	129.2078
125.4188	248.4765
179.1697	487.014
197.0866	566.5265
215.0036	596.3436
232.9206	586.4046
250.8376	546.6483
322.5054	377.6843
412.0903	228.5984
537.5091	119.2687
716.6787	51.68312
895.8484	19.87812
1075.018	4.96953
1254.188	0

DO YOU WISH TO GENERATE ANOTHER SYNTHETIC HYDROGRAPH? (Y/N)

LOAD"
RUN

THIS PROGRAM CALCULATES THE DISCHARGE FROM A TRAPAZODIAL
SPILLWAY WHEN THE SLOPE, FLOW DEPTH, SIDE SLOPES, AND
THE BOTTOM WIDTH ARE KNOWN.

WHAT IS THE DAM NAME?

? MARIE HANSON 2140-2

WHAT IS THE SIDE SLOPE X:Y WITH Y=1?

? 3

WHAT IS THE BOTTOM WIDTH OF THE SPILLWAY?

? 80

WHAT IS THE SLOPE OF THE SPILLWAY CHANNEL?

? .0035

WHAT IS THE MANNINGS N?

? .03

WHAT IS THE DEPTH OF FLOW?

? 0.5

DO YOU WISH THIS ROUTED TO THE PRINTER?

? Y

manning's n= .03

velocity= 1.82224

flow= 74.25629 cfs

MARIE HANSON 2140-2

FLOW DEPTH= .5 FT

AREA= 40.75 FT^2

WETTED PERIMETER= 83.16228

HYDRAULIC RADIUS= .4900058

MANNINGS N= .03

VELOCITY= 1.82224 FT/SEC

FLOW= 74.25629 CFS

DO YOU WANT A BACKWATER ANALYSIS COMPUTED?

? Y

BACKWATER ANALYSIS INDICATES AN ENTRANCE WATER

DEPTH OF .5515615 FEET

DO YOU WISH ANOTHER CALULATION VARYING ONLY FLOW DEPTH?

? Y

WHAT IS THE DEPTH OF FLOW?

? 1.0

DO YOU WISH THIS ROUTED TO THE PRINTER?

? Y

manning's n= .03

velocity= 2.854777

flow= 236.9465 cfs

MARIE HANSON 2140-2

FLOW DEPTH= 1 FT

AREA= 83 FT^2

WETTED PERIMETER= 86.32456

HYDRAULIC RADIUS= .9614877

MANNINGS N= .03

VELOCITY= 2.854777 FT/SEC

FLOW= 236.9465 CFS

DO YOU WANT A BACKWATER ANALYSIS COMPUTED?

? Y

BACKWATER ANALYSIS INDICATES AN ENTRANCE WATER

DEPTH OF 1.126549 FEET

DO YOU WISH ANOTHER CALULATION VARYING ONLY FLOW DEPTH?

? Y

WHAT IS THE DEPTH OF FLOW?

? 1.5

DO YOU WISH THIS ROUTED TO THE PRINTER?

? Y

manning's n= .03

velocity= 3.695076

flow= 459.2509 cfs

8/29/90
David
Brown
DWR, R.
Water Rights
Division
Pierre, SD

FLOW= 468.3509 CFS
MARIE HANSON 2140-2
FLOW DEPTH= 1.5 FT
AREA= 126.75 FT²
WETTED PERIMETER= 89.48683
HYDRAULIC RADIUS= 1.41641
MANNINGS N= .03
VELOCITY= 3.695076 FT/SEC
FLOW= 468.3509 CFS
DO YOU WANT A BACKWATER ANALYSIS COMPUTED?
? Y
BACKWATER ANALYSIS INDICATES AN ENTRANCE WATER
DEPTH OF 1.712012 FEET

DO YOU WISH ANOTHER CALULATION VARYING ONLY FLOW DEPTH?
? Y
WHAT IS THE DEPTH OF FLOW?
? 2.0
DO YOU WISH THIS ROUTED TO THE PRINTER?
? Y

manning's n= .03
velocity= 4.424633
flow= 761.0369 cfs
MARIE HANSON 2140-2
FLOW DEPTH= 2 FT
AREA= 172 FT²
WETTED PERIMETER= 92.64911
HYDRAULIC RADIUS= 1.856467
MANNINGS N= .03
VELOCITY= 4.424633 FT/SEC
FLOW= 761.0369 CFS
DO YOU WANT A BACKWATER ANALYSIS COMPUTED?
? Y
BACKWATER ANALYSIS INDICATES AN ENTRANCE WATER
DEPTH OF 2.303997 FEET

DO YOU WISH ANOTHER CALULATION VARYING ONLY FLOW DEPTH?
? Y
WHAT IS THE DEPTH OF FLOW?
? 1.75
DO YOU WISH THIS ROUTED TO THE PRINTER?
? Y

manning's n= .03
velocity= 4.070989
flow= 607.3406 cfs
MARIE HANSON 2140-2
FLOW DEPTH= 1.75 FT
AREA= 149.1875 FT²
WETTED PERIMETER= 91.06797
HYDRAULIC RADIUS= 1.6382
MANNINGS N= .03
VELOCITY= 4.070989 FT/SEC
FLOW= 607.3406 CFS
DO YOU WANT A BACKWATER ANALYSIS COMPUTED?
? Y
BACKWATER ANALYSIS INDICATES AN ENTRANCE WATER
DEPTH OF 2.007344 FEET

DO YOU WISH ANOTHER CALULATION VARYING ONLY FLOW DEPTH?
? N

OK

? 1

LINE :	1	COLUMN 2
1 :	0	0
2 :	.95	42.4
3 :	1.59	98.5
4 :	2.22	189.5
5 :	3.18	371.33
6 :	3.49	431.9
7 :	3.81	454.7
8 :	4.13	447.1
9 :	4.45	416.8
10 :	5.72	287.9
11 :	7.31	174.3
12 :	9.53	90.9

ENTER C TO CONTINUE

? C

LINE :	1	COLUMN 2
--------	---	----------

PRESS M TO RETURN TO MENU

? M

DO YOU WANT TO:

1. SEE HYDROGRAPH DATA
2. SEE ELEV - DISC - STO. DATA
3. MAKE CORRECTIONS TO DATA
4. EXECUTE FLOOD ROUTING
5. SAVE THE DATA
6. EXIT PROGRAM

? 2

LINE:	1	COLUMN 2	3
1 :	91.99	0	43.99
2 :	92	0	44
3 :	92.83	100	55.3
4 :	93.2	200	60.3
5 :	93.48001	300	64.1
6 :	93.73001	400	67.5
7 :	94	525	71.2

PRESS M TO RETURN TO MENU

? M

DO YOU WANT TO:

1. SEE HYDROGRAPH DATA
2. SEE ELEV - DISC - STO. DATA
3. MAKE CORRECTIONS TO DATA
4. EXECUTE FLOOD ROUTING
5. SAVE THE DATA
6. EXIT PROGRAM

? 4

DO YOU WANT TO PRINT FLOOD ROUTING RESULTS? (Y/N) (RETURN)

? Y

RESERVOIR FLOOD ROUTING PROGRAM

MARIE HANSON

DAVID BROWN DWR 8/30/90

ELEV	DISC	STO	ELEV	DISC	STO	ELEV	DISC	STO
91.99	0	43.99	93.48001					
92	0	44	300	64.1	-1	0	0	0
92.83	100	55.3	400	67.5	0	0	0	0
			525	71.2	0	0	0	0
T = .95	I = 42.4		O = 10.97	E = 92.08999				
TIME	INFLOW		OUTFLOW	POOL ELEV				
.95	42.4		10.97	92.08999				
T = 1.59	I = 98.5		O = 33.62	E = 92.28				
1.59	98.5		33.62	92.28				
T = 2.22	I = 189.5		O = 75.08	E = 92.62				
2.22	189.5		75.08	92.62				
T = 3.18	I = 371.33		O = 245.46	E = 93.33				

3.18	371.33	245.46	93.33	
T = 3.49	I = 431.9	O = 326.53	E = 93.55	
3.49	431.9	326.53	93.55	
T = 3.81	I = 454.7	O = 392.54	E = 93.71	
3.81	454.7	392.54	93.71	
T = 4.13	I = 447.1	O = 427.95	E = 93.79	
4.13	447.1	427.95	93.79	
T = 4.45	I = 416.8	O = 430.73	E = 93.8	
4.45	416.8	430.73	93.8	
T = 5.72	I = 287.9	O = 334.13	E = 93.57	
5.72	287.9	334.13	93.57	
T = 7.31	I = 174.3	O = 202.59	E = 93.21	
7.31	174.3	202.59	93.21	
T = 9.53	I = 90.9	O = 111.94	E = 92.87	
9.53	90.9	111.94	92.87	

ROUTING COMPLETED
ROUTING COMPLETED
ENTER M TO RETURN TO MENU

C:\SPECIAL\HECII\PR LIST 2140-2.S
C:\SPECIAL\HECII\TYPE A:2140-2.SPL
T1 SUBCRITICAL FLOW, MARIE HANSON STOCK DAM
T2 EARTHEN EMERGENCY SPILLWAY, TRAPEZOIDAL, 8/30/90
T3 80 FEET WIDE, 3:1 SS, MANNINGS N=0.03, 525 CFS

J1	0	0	0	0	-1	0	0	525	90.5
J2	-1	0	-1						
NC	0.030	0.030	0.030	.1	.3				
X1	0.00	4	0	92.0					
GR	93.3	0	91.3	6.0	91.3	86.0	93.3	92.0	
X1	0.21				21.4	21.4	21.4		+0.1
X1	0.42				21.4	21.4	21.4		+0.1
X1	0.64				21.4	21.4	21.4		+0.1
X1	0.85				21.4	21.4	21.4		+0.1
X1	1.07				21.4	21.4	21.4		+0.1
X1	1.50				43.0	43.0	43.0		+0.2
X1	2.00				50.0	50.0	50.0		+0.0
X1	2.25	4	0	92.3	25.0	25.0	25.0		
GR	94.0	0	91.9	6.3	91.9	86.3	94.0	92.3	
X1	2.50	4	0	93.2	25.0	25.0	25.0		
GR	94.0	0	91.8	6.6	91.8	86.6	94.0	93.2	
X1	3.00	4	0	95.0	50.0	50.0	50.0		
GR	94.0	0	91.5	7.5	91.5	87.5	94.0	95.0	

EJ

ER

C:\SPECIAL\HECII\TYPE A:2140-2.SPL
C:\SPECIAL\HECII\TYPE 21
C:\SPECIAL\HECII\TYPE A:2140-2.OUT

Data error reading drive A
Abort, Retry, Ignore, Fail? A

C:\SPECIAL\HECII\TYPE A:2140-2.OUT

Data error reading drive A
Abort, Retry, Ignore, Fail? A

C:\SPECIAL\HECII\TYPE A:2140-2.OUT

* WATER SURFACE PROFILES *
* VERSION OF SEPTEMBER 1988 *
* ERROR: 01,02,03 *
* UPDATED: SEPTEMBER 1989 *
* RUN DATE 8/30/90 TIME 11: 2: 3 *

* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616-4687 *
* (916) 756-1104 *

X	X	XXXXXXX	XXXXX		XXXXX
X	X	X	X	X	X
X	X	X	X		X
XXXXXXX	XXXX	X		XXXXX	XXXXX
X	X	X	X		X
X	X	X	X	X	X
X	X	XXXXXXX	XXXXX		XXXXXXX

END OF BANNER

1 8/30/90 11: 2: 3

PAGE 1

THIS RUN EXECUTED 8/30/90 11: 2: 3

HEC2 RELEASE DATED SEP 88 UPDATED SEPT 1989

ERROR CORR - 01,02,03
MODIFICATION -

T1 SUBCRITICAL FLOW, MARIE HANSON STOCK DAM
T2 EARTHEN EMERGENCY SPILLWAY, TRAPEZOIDAL, 8/30/90
T3 80 FEET WIDE, 3:1 SS, MANNINGS N=0.03, 525 CFS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	0	0	0	-1	0	0	525	90.5	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1	0	-1							
NC	0.030	0.030	0.030	.1	.3					
X1	0.00	4	0	92.0						
GR	93.3	0	91.3	6.0	91.3	86.0	93.3	92.0		
X1	0.21				21.4	21.4	21.4			+0.1
X1	0.42				21.4	21.4	21.4			+0.1
X1	0.64				21.4	21.4	21.4			+0.1
X1	0.85				21.4	21.4	21.4			+0.1
X1	1.07				21.4	21.4	21.4			+0.1
X1	1.50				43.0	43.0	43.0			+0.2
X1	2.00				50.0	50.0	50.0			+0.0
X1	2.25	4	0	92.3	25.0	25.0	25.0			
GR	94.0	0	91.9	6.3	91.9	86.3	94.0	92.3		
X1	2.50	4	0	93.2	25.0	25.0	25.0			
GR	94.0	0	91.8	6.6	91.8	86.6	94.0	93.2		
X1	3.00	4	0	95.0	50.0	50.0	50.0			
GR	94.0	0	91.5	7.5	91.5	87.5	94.0	95.0		

1 8/30/90 11: 2: 3

PAGE 2

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CONAR	TOPWID	ENDST

*PROF 1

0

CCHV= .100 CEHV= .300

*SECNO .000

3720 CRITICAL DEPTH ASSUMED

.000	1.09	92.39	92.39	90.50	92.91	.52	.00	.00	93.30
525.	0.	525.	0.	0.	90.	0.	0.	0.	93.30
.00	.00	5.81	.00	.000	.030	.000	.000	91.30	2.74
.013031	0.	0.	0.	0	14	0	.00	86.52	89.26

0

*SECNO .210

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.54

.210	1.40	92.80	.00	.00	93.10	.31	.17	.02	93.40
525.	0.	525.	0.	0.	118.	0.	0.	0.	93.40
.00	.00	4.44	.00	.000	.030	.000	.000	91.40	1.79
.005496	21.	21.	21.	2	0	0	.00	88.42	90.21

0

*SECNO .420

.420	1.42	92.92	.00	.00	93.22	.30	.11	.00	93.50
525.	0.	525.	0.	0.	120.	0.	0.	0.	93.50
.00	.00	4.38	.00	.000	.030	.000	.000	91.50	1.73
.005238	21.	21.	21.	2	0	0	.00	88.54	90.27

0

*SECNO .640

.640	1.44	93.04	.00	.00	93.33	.29	.11	.00	93.60
525.	0.	525.	0.	0.	121.	0.	0.	0.	93.60
.00	.00	4.33	.00	.000	.030	.000	.000	91.60	1.69
.005073	21.	21.	21.	0	0	0	.00	88.62	90.31

0

*SECNO .850

.850	1.45	93.15	.00	.00	93.44	.29	.11	.00	93.70
525.	0.	525.	0.	0.	122.	0.	0.	0.	93.70
.01	.00	4.29	.00	.000	.030	.000	.000	91.70	1.65
.004931	21.	21.	21.	0	0	0	.00	88.70	90.35

0

1

SECNO Q TIME SLOPE	DEPTH GLOB VLOB XLOBL	CWSEL GCH VCH XLCH	CRWS GROB VROB XLOBR	WSELK ALOB XNL ITRIAL	EG ACH XNCH IDC	HV AROB XNR ICONT	HL VOL WTN CDRAR	GLOSS TWA ELMIN TOPWID	BANK ELEV LEFT/RIGHT SSTA ENDST
*SECNO 1.070									
1.070	1.46	93.26	.00	.00	93.54	.28	.10	.00	93.80
525.	0.	525.	0.	0.	123.	0.	0.	0.	93.80
.01	.00	4.26	.00	.000	.030	.000	.000	91.80	1.62
.004824	21.	21.	21.	0	0	0	.00	88.75	90.38
0									
*SECNO 1.500									
1.500	1.47	93.47	.00	.00	93.75	.28	.20	.00	94.00
525.	0.	525.	0.	0.	124.	0.	0.	0.	94.00
.01	.00	4.23	.00	.000	.030	.000	.000	92.00	1.59
.004701	43.	43.	43.	0	0	0	.00	88.82	90.41
0									
*SECNO 2.000									
2.000	1.74	93.74	.00	.00	93.93	.20	.17	.01	94.00
525.	0.	525.	0.	0.	148.	0.	1.	0.	94.00
.01	.00	3.55	.00	.000	.030	.000	.000	92.00	.79
.002690	50.	50.	50.	2	0	0	.00	90.41	91.21
0									
*SECNO 2.250									
2.250	1.93	93.83	.00	.00	93.99	.16	.06	.00	94.00
525.	0.	525.	0.	0.	165.	0.	1.	0.	94.00
.02	.00	3.18	.00	.000	.030	.000	.000	91.90	.52
.001889	25.	25.	25.	0	0	0	.00	91.29	91.81
0									
*SECNO 2.500									
2.500	2.10	93.90	.00	.00	94.03	.13	.04	.00	94.00
525.	0.	525.	0.	0.	181.	0.	1.	1.	94.00
.02	.00	2.90	.00	.000	.030	.000	.000	91.80	.31
.001418	25.	25.	25.	1	0	0	.00	92.58	92.89
0									
*SECNO 3.000									
3.000	2.50	94.00	.00	.00	94.09	.09	.05	.00	94.00
525.	0.	525.	0.	0.	218.	0.	1.	1.	94.00
.02	.00	2.41	.00	.000	.030	.000	.000	91.50	.02
.000789	50.	50.	50.	1	0	0	.00	94.96	94.98

8/30/90 11: 2: 3

PAGE 4

THIS RUN EXECUTED 8/30/90 11: 2: 8

 HEC2 RELEASE DATED SEP 88 UPDATED SEPT 1989

ERROR CORR - 01,02,03
 MODIFICATION -

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

80 FEET WIDE, 3:1 SS, M

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRWS	EG	10*KS	VCH	AREA	.01K
*	.000	.00	.00	.00	91.30	525.00	92.39	92.39	92.91	130.31	5.81	90.41	45.99
*	.210	21.40	.00	.00	91.40	525.00	92.80	.00	93.10	54.96	4.44	118.21	70.82
	.420	21.40	.00	.00	91.50	525.00	92.92	.00	93.22	52.38	4.38	120.00	72.54
	.640	21.40	.00	.00	91.60	525.00	93.04	.00	93.33	50.73	4.33	121.20	73.71
	.850	21.40	.00	.00	91.70	525.00	93.15	.00	93.44	49.31	4.29	122.28	74.77
	1.070	21.40	.00	.00	91.80	525.00	93.26	.00	93.54	48.24	4.26	123.12	75.59
	1.500	43.00	.00	.00	92.00	525.00	93.47	.00	93.75	47.01	4.23	124.12	76.57
	2.000	50.00	.00	.00	92.00	525.00	93.74	.00	93.93	26.90	3.55	147.84	101.22
	2.250	25.00	.00	.00	91.90	525.00	93.83	.00	93.99	18.89	3.18	165.07	120.80

2.500	25.00	.00	.00	91.80	525.00	93.90	.00	94.03	14.18	2.90	180.93	139.40
3.000	50.00	.00	.00	91.50	525.00	94.00	.00	94.09	7.89	2.41	218.06	186.95

8/30/90 11: 2: 3

PAGE 5

80 FEET WIDE, 3:1 SS, M

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.000	525.00	92.39	.00	.00	1.89	86.52	.00
*	.210	525.00	92.80	.00	.41	.00	88.42	21.40
	.420	525.00	92.92	.00	.12	.00	88.54	21.40
	.640	525.00	93.04	.00	.12	.00	88.62	21.40
	.850	525.00	93.15	.00	.11	.00	88.70	21.40
	1.070	525.00	93.26	.00	.11	.00	88.75	21.40
	1.500	525.00	93.47	.00	.21	.00	88.82	43.00
	2.000	525.00	93.74	.00	.26	.00	90.41	50.00
	2.250	525.00	93.83	.00	.10	.00	91.29	25.00
	2.500	525.00	93.90	.00	.07	.00	92.58	25.00
	3.000	525.00	94.00	.00	.10	.00	94.96	50.00

8/30/90 11: 2: 3

PAGE 6

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= .000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= .210 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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*-----*
|           S U M P O           |
|                               |
| Interactive Summary Printout  |
| for MS-DOS/PC-DOS micro computers |
| Sept 1988 version (6/89 update) |
|                               |
*-----*

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NOTE - Asterisk (*) at left of profile number indicates message in summary of errors list

80 FEET WIDE, 3:1 SS, M

Summary Printout

	SECNO	Q	DEPTH	CWSEL	VCH	TOPWID	AREA	ELMIN
*	.00	525.00	1.09	92.39	5.81	86.52	90.41	91.30
*	.21	525.00	1.40	92.80	4.44	88.42	118.21	91.40
	.42	525.00	1.42	92.92	4.38	88.54	120.00	91.50
	.64	525.00	1.44	93.04	4.33	88.62	121.20	91.60
	.85	525.00	1.45	93.15	4.29	88.70	122.28	91.70
	1.07	525.00	1.46	93.26	4.26	88.75	123.12	91.80
	1.50	525.00	1.47	93.47	4.23	88.82	124.12	92.00
	2.00	525.00	1.74	93.74	3.55	90.41	147.84	92.00
	2.25	525.00	1.93	93.83	3.18	91.29	165.07	91.90
	2.50	525.00	2.10	93.90	2.90	92.58	180.93	91.80
	3.00	525.00	2.50	94.00	2.41	94.96	218.06	91.50

Summary of Errors and Special Notes

CAUTION SECNO= .000 PROFILE= 1 Critical depth assumed

WARNING SECNO= .210 PROFILE= 1 KRATIO outside acceptable range

Report On
Water Permit Application No. 2140-2
Marie Hansen
August 31, 1990

Water Permit Application No. 2140-2 proposes to impound 31.2 acre feet of water by constructing a dam on a dry draw. The dam site is to be located in the SE1/4 NE1/4, SW1/4 NE1/4, NE1/4 SW1/4 and the NW1/4 SE1/4 of Section 9, T4N, R22E. Water is to be used for livestock watering purposes.

Review of Safety of Dams Criteria

All required design criteria, for the proposed dam, have been met pursuant to Safety of Dams Rules 74:02:08. The proposed dam has a spillway capacity of approximately 525 cubic feet per second (cfs) (Division 1990) while the spillway design flood (25 year frequency) is approximately 338 - 544 cfs. All plans and specifications for the project have been submitted and approved by the Division pursuant to Safety of Dams Rules 74:02:08:09.

Existing Water Rights

Two Water Rights are on file with the Division for the drainage downstream of this permit. Water Right No. 1806-2 is located approximately six miles downstream of this application. Water Right No. 1806-2 is held by Cow Creek Ranch and authorizes 15.67 cfs of water (Cheyenne River Water and watershed runoff water) to be used to irrigate 1097 acres. Water Right No. 539-2 is located approximately twelve miles downstream of this application. Water Right No. 539-2 is held by Daniel Bierwagon and authorizes 1.23 cfs of water (Snake Creek watershed runoff) to be used to irrigate 86.3 acres.

Due to the relatively small storage capacity (31.2 acre feet) of the proposed dam, and the small drainage basin involved (585 acres), no adverse impairment of existing water rights held by downstream water right holders is expected upon issuance of this permit.

Conclusions

1. Unappropriated water is available for this application from a dry draw.
2. No impairment of existing water rights is expected due to the issuance of this permit.
3. Safety of Dams Rules 74:02:08 criteria have been met for the proposed dam.



DAVID S BROWN
Natural Resources Engineer II
Water Rights Division

reviewed and approved by:



GALE N SELKEN
Natural Resources Engineer IV
Water Rights Division

Bibliography

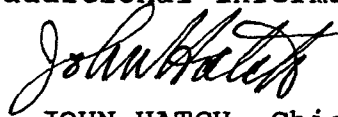
Division Files and Records, 1990, Department of Water and Natural Resources, Joe Foss Building, Pierre SD 57501

RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2140-2, Marie Hansen

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning Water Permit Application No. 2140-2, Marie Hansen, Box 435, Philip SD.

The Chief Engineer is recommending APPROVAL of Application No. 2140-2 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) in the public interest.

See report on application for additional information.

A handwritten signature in cursive script, appearing to read "John Hatch".

JOHN HATCH, Chief Engineer
September 12, 1990



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

October 22, 1990

The Pioneer Review
Box 788
Philip SD 57567-0788

ATTN: Legal Publications:

Enclosed is a Notice of Hearing on Application No. 2140-2 to be published twice. Please publish the first notice on or before November 1, 1990 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 Marie Hansen, Box 435, Philip SD 57567.

A copy of BOTH publications must be SENT to the WATER RIGHTS DIVISION. IMMEDIATELY return the FIRST publication with the FIRST Transmittal form on the bottom of this page. The first copy is needed to check the publication for errors so any corrections can be made in the second publication. Publication errors can invalidate the public notice and cause the applicant costly delays.

Please be sure the SECOND publication is returned IMMEDIATELY with the enclosed Proof of Publication form. DO NOT WAIT until the end of the month or the billing cycle. The permit application cannot be considered by the Water Management Board until proof of publication has been received.

Sincerely,

Eric Gronlund
Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

CUT HERE

FIRST TRANSMITTAL NOTICE

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

No. _____

Date _____

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

Name _____

Newspaper _____



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

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

October 22, 1990

Marie Hansen
Box 435
Philip SD 57567

Dear Ms. Hansen:

Water Permit Application No. 2140-2 for livestock watering 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 Pioneer Review printed at Philip SD. For your information, a copy of the notice is enclosed. Copies of the report and the Chief Engineer's recommendation are also 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 Intent to Appropriate Water 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. We must receive Proof of Publication before the application can be considered by the Water Management Board.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

Instruction to Newspaper - Publish first Notice on or before November 1, 1990 with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF HEARING on Application No. 2140-2 to Appropriate Water

Notice is given that Marie Hansen, Box 435, Philip SD 57567-0435 has filed an application for a water permit to impound 31.2 acre feet of water by constructing a dam. The damsite is to be located in the SE1/4 NW1/4, SW1/4 NE1/4, NE1/4 SW1/4, NW1/4 SE1/4 of Section 9 T4N-R22E. Water is to be used for livestock watering purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2140-2 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.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposing the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, 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 26, 1990. 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.

The Chief Engineer will act on this application in accordance with the above recommendation and no hearing will be held if the applicant does not contest the Chief Engineer's recommendation and no petition is filed opposing the application. If the applicant contests the recommendation or an interested person opposes the application, then the application will be considered by the Water Management Board. Petitions filed in support of the application will not require the Board to hear the application. The Board may conduct a hearing no sooner than 10:00 am, on December 5, 1990 at the Hilton Inn, Deerfield Room, 445 Mt. Rushmore Road, Rapid City SD and the hearing may be rescheduled for a later date. If the hearing is rescheduled, notice will be given of the time and place. The above hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by November 26, 1990.

The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing. This hearing is an adversary proceeding. Any person filing a petition opposing the application and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law. Contact the Water Rights Division to request copies of information pertaining to this application or to assure access to the hearing by the handicapped.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
 County Haakon) ss.

I, Andrea Cook

certify that the attached printed Notice was taken
 from the Pioneer Review

A newspaper which during the whole time of publication of
 said notice herein after stated, has been and is printed and
 published in the _____

City _____ of Philip

County of Haakon and State of South Dakota;
 that the said notice was published in said newspaper on the
 following two dates:

November 1, 1990

November 8, 1990

Andrea Cook

(Signature)

Editor

(Title)

11-30-90

(Date Signed)

Cost of Printing: \$45.45



proceeding. Any person filing a petition opposing the application and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law. Contact the Water Rights Division to request copies of information pertaining to this application or to assure access to the hearing by the handicapped.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

(Publish November 1 & 8, 1990)

Notice of Hearing

on Application No. 2140-2 to
 Appropriate Water

Notice is given that Marie Hansen, Box 435, Philip, SD 57567-0435 has filed an application for a water permit to impound 31.2 acre feet of water by constructing a dam. The damsite is to be located in the SE1/4NW1/4, SW1/4NE1/4, NE1/4SW1/4NW1/4SE1/4 of Section 9 T4N-R22E. Water is to be used for livestock watering purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2140-2 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.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposing the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, 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 26, 1990. 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.

The Chief Engineer will act on this application in accordance with the above recommendation and no hearing will be held if the applicant does not contest the Chief Engineer's recommendation and no petition is filed opposing the application. If the applicant contests the recommendation or an interested person opposes the application, then the application will be considered by the Water Management Board. Petitions filed in support of the application will not require the Board to hear the application. The Board may conduct a hearing no sooner than 10:00 a.m., on December 5, 1990, at the Hilton Inn, Deerfield Room, 445 Mt. Rushmore Road, Rapid City, SD, and the hearing may be rescheduled for a later date. If the hearing is rescheduled, notice will be given of the time and place. The above hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by November 26, 1990.

The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve; 2) approve with qualifications; 3) defer; and 4) deny this application based on the facts presented at the public hearing. This hearing is an adversary



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

November 7, 1990

Marie Hansen
Box 435
Philip SD 57567

Dear Ms. Hansen:

I am writing to advise you that the legal notice of hearing on your water permit application published in the Pioneer Review is not correct. I called the newspaper on November 7 to have the error in the legal description corrected on the second publication; however, the paper was being run at the time, making it impossible to make the change.

As a result of the error, the legal notice will need to be readvertised. The readvertisement is needed to ensure that the Water Permit is free from legal problems due to inaccurate and incomplete public notice. The information needed to readvertise the notice will be sent to you and the newspaper in the near future.

Please contact me, if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Karen Schlaak".

Karen Schlaak
Natural Resources Analyst
605 773-3352

cc: The Pioneer Review



DEPARTMENT OF WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

December 21, 1991

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

Marie Hansen
Box 435
Philip SD 57567

Dear Ms. Hansen:

I am writing to advise you that the legal notice of hearing published in the The Pioneer Review for Water Permit Application No. 2140-2 was not published correct due to an error made by this office. As a result, the legal notice will need to be readvertised. The readvertisement is needed to ensure that the Water Permit is free from legal problems due to inaccurate and incomplete public notice. The information needed to readvertise the notice is being sent to the Publisher of the Pioneer Review printed at Philip SD.

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 WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

December 21, 1990

The Pioneer Review
Box 788
Philip SD 57567-0788

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 2140-2 to be published twice. Please publish the first notice on or before January 3, 1991 with the second publication 7 days later.

Please BILL the Water Rights Division for the cost of publication.

A copy of BOTH publications must be SENT to the WATER RIGHTS DIVISION. IMMEDIATELY return the FIRST publication with the FIRST Transmittal form on the bottom of this page. The first copy is needed to check the publication for errors so any corrections can be made in the second publication. Publication errors can invalidate the public notice and cause the applicant costly delays.

Please be sure the SECOND publication is returned IMMEDIATELY with the enclosed Proof of Publication form. DO NOT WAIT until the end of the month or the billing cycle. No action may be taken on the permit application until proof of publication has been received.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

FIRST TRANSMITTAL NOTICE

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

No. _____

Date _____

We are in receipt of your letter of _____ enclosing Notice of Hearing to Appropriate Water by Application No. _____ 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 or before January 3, 1991 with the second publication 7 days later.

NOTICE OF HEARING on Application No. 2140-2 to Appropriate Water

Notice is given that Marie Hansen has filed an application for a water permit to impound 31.2 acre feet of water by constructing a dam. The damsite is to be located in the SE 1/4 NW 1/4, SW 1/4 NE 1/4, NE 1/4 SW 1/4, NW 1/4 SE 1/4 of Section 9-T4N-R22E. Water is to be used for livestock watering purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends ^{Approval} of Application No. 2140-2 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. Unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation, the Water Management Board will NOT CONDUCT a HEARING to consider this application and the chief engineer will issue the permit as recommended. Petitions filed in support of the application will NOT require the Board to hear the application.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, 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 January 21, 1991. 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.

For purposes of publishing 1) the notice of hearing on Application No. 2140-2 and 2) the chief engineer's recommendation, a special Board meeting is scheduled for February 1, 1991, at 9:00 am in Room 413, Joe Foss Building, 523 E Capitol, Pierre SD. If this application is opposed or the recommendation is contested, the February 1, 1991 hearing date may be rescheduled for another Board meeting. If the hearing is rescheduled, notice of the time and place will be given by First Class Mail to the applicant and persons filing petitions. Anyone not filing a petition, but interested in attending the hearing, may contact the Division of Water Rights to confirm a hearing date and location. The February 1, 1991 hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by January 21, 1991.

If a hearing is held, the Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing. Any hearing will be an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law. Contact the Water Rights Division to request copies of information pertaining to this application or to assure access to the hearing by the handicapped.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
 County Haakon) ss.

I, Belle Ravellette

certify that the attached printed Notice
 from the The Pioneer Review

A newspaper which during the whole time
 said notice herein after stated, has been and
 published in the _____

City of Philip

County of Haakon and State of _____
 that the said notice was published in said newspaper
 following two dates:

January 3, 1991

January 10, 1991

Belle Ravellette
 (Signature)

Secretary
 (Title)

January 17, 1991
 (Date Signed)

Cost of Printing: \$51.99

If a hearing is held, the Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing. Any hearing will be an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and the State Supreme Court as provided by law. Contact the Water Rights Division to request copies of information pertaining to this application or to assure access to the hearing by the handicapped.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

(Publish January 3 & 10, 1991)

Notice of Hearing

on Application No. 2140-2
 to Appropriate Water

Notice is given that Marie Hansen has filed an application for a water permit to impound 31.2 acre feet of water by constructing a dam. The damsite is to be located in the SE1/4NW1/4, SW1/4NE1/4, NE1/4SW1/4, NW1/4SE1/4 of Section 9-T4N-R22E. Water is to be used for livestock watering purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends approval of Application No. 2140-2 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. Unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation, the Water Management Board will NOT CONDUCT a HEARING to consider this application and the Chief Engineer will issue the permit as recommended. Petitions filed in support of the application will NOT require the Board to hear the application.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, 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 January 21, 1991. 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.

For purposes of publishing 1) the notice of hearing on Application No. 2140-2 and 2) the Chief Engineer's recommendation, a special Board meeting is scheduled for February 1, 1991, at 9:00 a.m. in Room 413, Joe Foss Building, 523 E. Capitol, Pierre, SD. If this application is opposed or the recommendation is contested, the February 1, 1991, hearing date may be rescheduled for another board meeting. If the hearing is rescheduled, notice of the time and place will be given by First Class Mail to the applicant and persons filing petitions. Anyone not filing a petition, but interested in attending the hearing, may contact the Division of Water Rights to confirm a hearing date and location. The February 1, 1991, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by January 21, 1991.



South Dakota

GREAT FACES. GREAT PLACES.

DEPARTMENT OF WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

MAR 27 1991

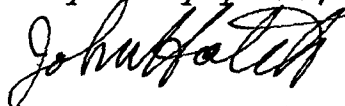
Marie Hansen
Box 435
Philip, SD 57567

Dear Ms. Hansen:

Enclosed is Water Permit No. 2140-2 authorizing construction of your water diversion system and put the water to beneficial use, not exceeding the limits as specified in the Water Permit.

Also enclosed is Form 10, Notice of Completion of Works and Application of Water to Beneficial Use, which you are to complete and submit to the Chief Engineer when you have completed the system and/or have put the water to beneficial use. An inspection can then be scheduled so that the Water License may be issued, thus completing your acquisition of a Water Right.

Very truly yours,



JOHN HATCH, Chief Engineer
Water Rights Division
605 773-3352

enclosures

PLEASE NOTE: Certain changes can be made in your permit within the five year construction period, usually without affecting the priority date provided an application to amend your permit is made within the five year period - i.e. changes in location or number of diversion points (wells) or location of land to be irrigated. Well locations for wells into the same aquifer can be moved up to 660 feet without application.

Applications to amend a permit after the five year construction period will be assigned a new priority date. Applications to change water sources, to add lands or increase original diversion rates, if approved will usually receive the date of the new application as a priority date regardless of the five year construction period.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

February 25, 2004

2140-2

Marie Hansen
319 E Cherry
Philip SD 57567

Dear Ms. Hansen:

On October 29, 2003, the investigation of your water use system, including the extent of application of water to beneficial use, as developed under Water Permit No. 2140-2, was completed by Eric Gronlund, a staff engineer with our program. Your final water right document, the water license, can now be issued.

State law requires that we charge a \$50.00 fee for the investigation and issuance of the water license. Upon receipt of the \$50.00 fee from you, we will complete processing your water license. The check or money order for the fee should be made payable to the "Water Rights Program".

Your licensed water right will be similar to a property right that can not be lost as long as the water use continues and you abide by the permit requirements.

If you have any questions regarding the water permit, investigation of your water use system or payment of the fee, please contact me.

Sincerely,

Genny McMath
Environmental Scientist
Water Rights Program
(605) 773-3352

RECEIPT

WATER RIGHTS PROGRAM
South Dakota Department of Environment and Natural Resources

Date March 8, 20 04

RECEIVED OF Marie Hansen, 319 E Cherry, Philip SD 57567

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. <u>2140-2</u>	50 00
Fee for Filing Transfer Form _____	
Fee for _____	
Fee for Issuing New Well Driller's License No. _____ for C.Y. _____	
Fee for Renewal of Well Driller's License No. _____ for C.Y. _____	
Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____	
Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____	
(Any Other Work Provided by Law)	
TOTAL	50.00

No.

001216

By Douglas Webb

Chief Engineer

gm

Permit No. 2140-2
Lower Cheyenne - 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, **October 29, 2003**, made a thorough examination of the water use system constructed by **Marie Hansen** of **319 East Cherry, Philip SD 57567** holder of Permit No. **2140-2**, bearing the priority of **July 25, 1990** authorizing the storage of **31.2** acre-feet of the waters of **unnamed drainage** for **livestock** purposes, in **Haakon** County.

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

A. Works used to divert the water:

Water is impounded in place by a dam as shown on map

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

Dam impounds water for livestock watering (also serves wildlife benefits)

C. Works used to apply water to beneficial use:

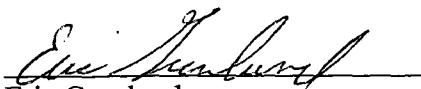
Earthen dam with a spillway

The system is in the following condition **good**. The point of diversion is located **dam is located in the SE ¼ NW ¼ Section 9, T4N, R22E (lat/lon 44.321778, -101.479321)**. The works are capable of storing **31.2** acre-feet of water which is to be used for **livestock watering**. Water has been put to beneficial use to the maximum extent **impounding water in portions of the SE ¼ NW ¼ and NE ¼ SW ¼ Section 9, T4N, R22E.**

and the license should be issued for **31.2** acre-feet of storage.

Applicable permit qualifications have been complied with: **Yes**

Exceptions to compliance are: **none** Date Report Completed: **February 9, 2004**



Eric Gronlund

Natural Resources Engineer

DENR, Water Rights Program

FIELD INVESTIGATION REPORT FOR PERMIT NO. 2140-2

DATE OF INVESTIGATION:	October 29, 2003
NAME & ADDRESS OF INVESTIGATION CONTACT/ RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE	Jack Hansen
NAME & ADDRESS OF PERMIT HOLDER	Marie Hansen 319 E. Cherry Street Philip SD 57567
DIVERSION POINT LEGAL LOCATION	SE ¼ NW ¼ Section 9, T4N, R22E

Other permit(s) associated with the project: NONE

DAM INFORMATION:

- | | |
|--|---|
| 1) Height to crest <u>approx. 25</u> feet | 6) Spillway length <u>approx. 200</u> feet |
| 2) Height to primary spillway <u>approx. 20</u> feet | 7) Spillway width <u>approx. 75</u> feet |
| 3) Height to secondary spillway <u>N/A</u> ft | 8) Approx. storage <u>31,2</u> ac-ft |
| 4) Crest width <u>approx. 12</u> feet | 9) Approx. storage to crest <u>78</u> ac-ft |
| 5) Crest length <u>approx. 350</u> feet | 10) Date constructed: <u>1990</u> |

Water Level in the dam was low at the time of field investigation.

Estimated surface area from ortho photo (full) is 3.8 acres (3.9 acres X 20 feet X 0.4 = 31.2 ac-ft)

PERMIT QUALIFICATIONS:

- 1) Special qualifications to permit being abided by YES
- 2) All structures, wells and lands on map YES
- 3) Irrigation Questionnaires checked to determine if permit owner started irrigation by the end of construction period not applica ble

All correspondence is to go to Marie Hansen

Water Permit No. 2140-2, Marie Hansen

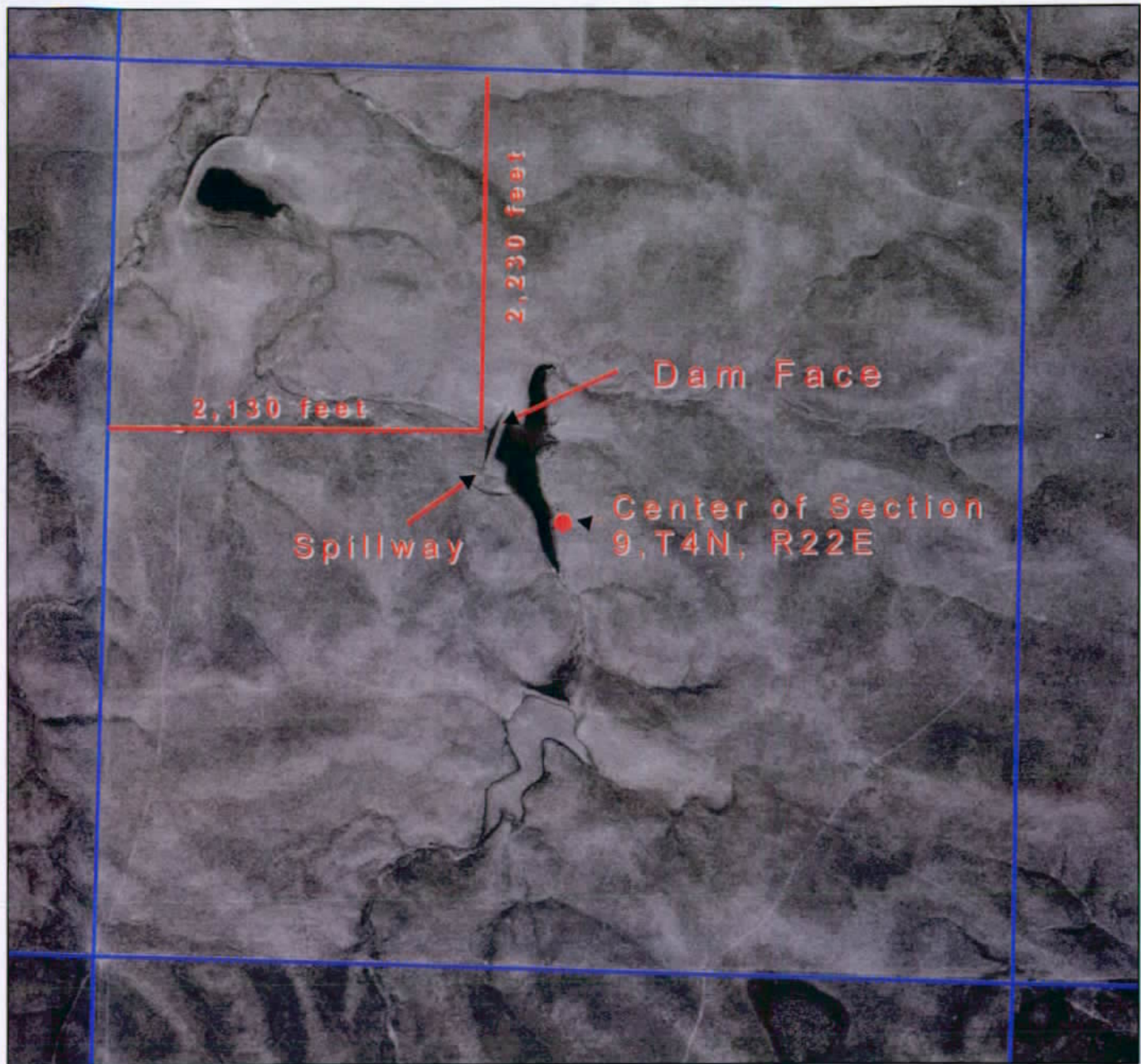


Picture of dam looking north



Picture of dam face (looking north)

Water Permit No. 2140-2, Marie Hansen



2,000 1,000 0 2,000 Feet



Dam located in the SE 1/4 NW 1/4 Section 9, T4N, R22E.
Water also impounded in the NE 1/4 SW 1/4
(Lat/Lon 44.321778 -101.479321)

Eric Gronlund
Eric Gronlund
Water Rights Program, DENR
October 29, 2003

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 2140-2

(1) Marie Hansen, 319 East Cherry, Philip SD 57567 made Application No. 2140-2, July 25, 1990 for a water permit to impound 31.2 acre feet of water from an unnamed drainage, Haakon County, South Dakota for livestock watering purposes. Permit No. 2140-2, with a priority date of July 25, 1990 was approved February 1, 1991 and issued to the applicants for diversion of water with construction of the described water supply system to be completed on or before February 1, 1996 and for the application to beneficial use of water on or before February 1, 2000.

(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. 2140-2 is issued a license, bearing a priority date of July 25, 1990, to impound 31.2 acre feet of water for domestic.

The location of the storage dam (spillway) is SE ¼ NW ¼ Section 9-T4N-R22E.

(3) This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Permit No. 2140-2.



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

MAY 10 2004

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

MAY 10 2004

2140-2

Marie Hansen
319 East Cherry
Philip SD 57567

Dear Ms. Hansen:

Enclosed is Water License No. 2140-2. This is the final water right document completing your process of obtaining a Water Right. Enclosed is Receipt No. 001216 in the amount of \$50.00 which you paid for the investigation and issuance of the Water License.

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

STRUCTURE DATA

RAINAGE AREA	ANNUAL YIELD	PEAK RUNOFF	EMERG. SPLWY. CAPACITY	WATER DEPTH	SURFACE AREA	SEDIMENT STORAGE	TOTAL STORAGE
ACRES	AC. FT.	25-YR.	C.F.S.	FEET	ACRES	AC. FT.	AC. FT.
385	31.2	544 cfs	33.5*	15.7	17.0	8,19	44.8

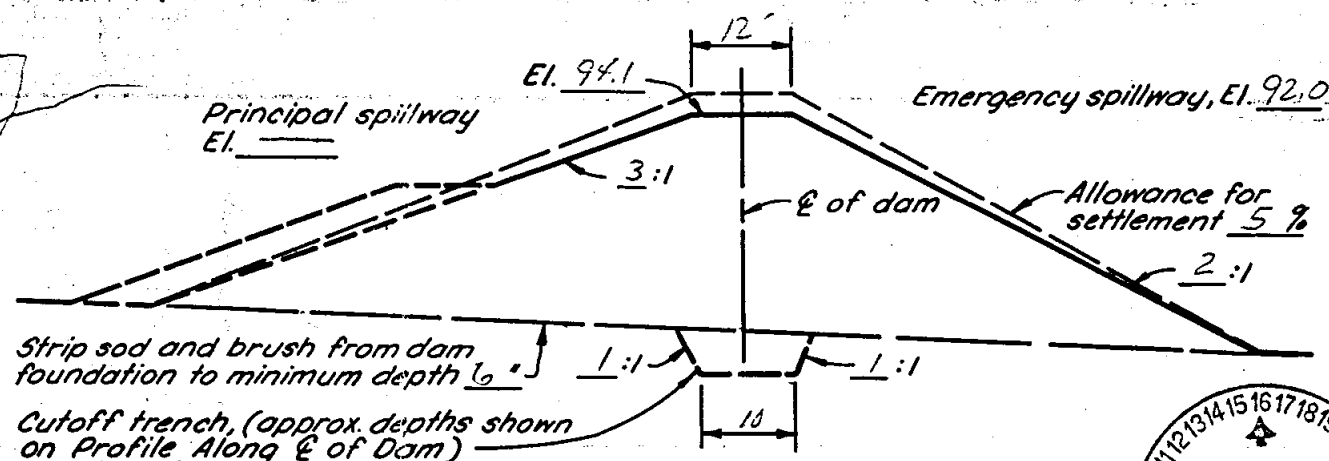
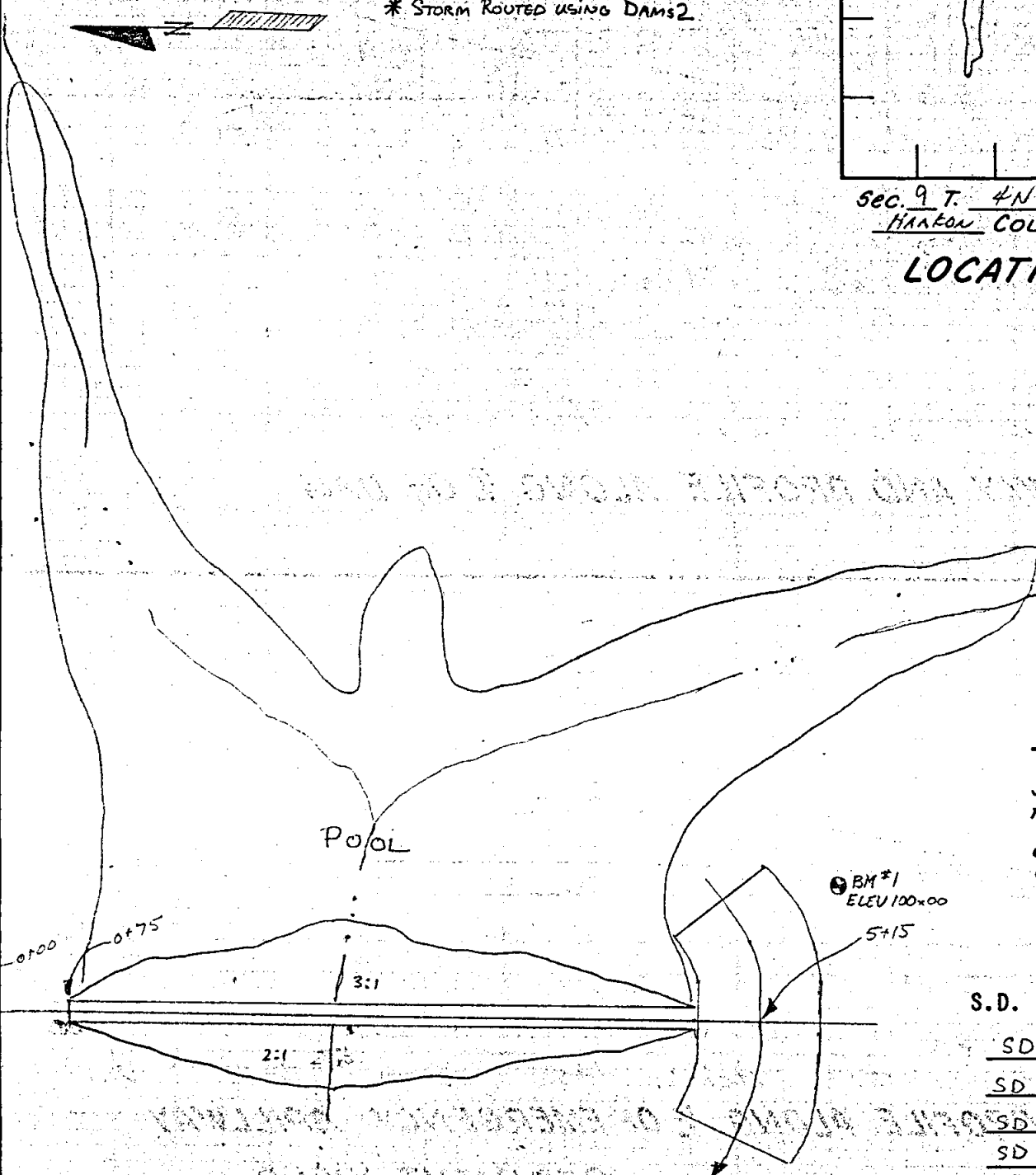
* STORM ROUTED USING DAMS2



Sec. 9 T. 4N R. 22E
Hakon County

LOCATION

TABLE OF QUANTITIES

[illegible]

TYPICAL CROSS SECTION OF DAM

S.D. CONSTRUCTION AND MATERIAL SPECIFICATIONS:

SD 2 CLEARING & GRUBBING
SD 4 STRIPPING
SD 5 EXCAVATION
SD 7S EARTH FILL CLASS 5
SD-O&M - 378-1

EARTH DAM

OPERATOR: JACK HANSEN
CONSERVATION DISTRICT: HAakon Co.
April 11 1940-2
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SKETCH PLAN OF DAM AND RESERVOIR AREA

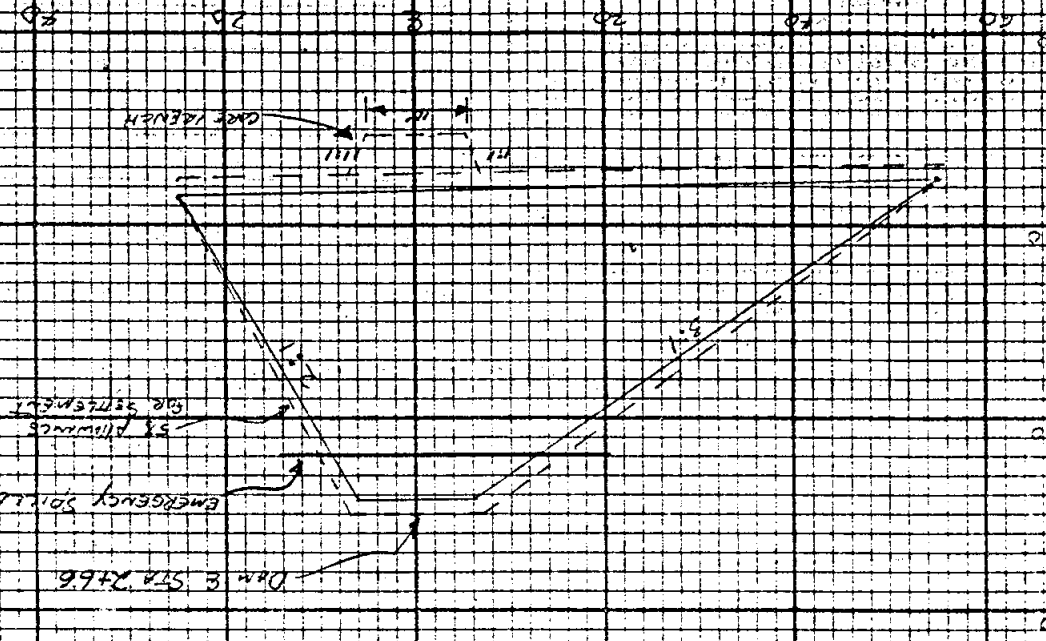
Approximate scale $1'' = 100'$

REFERENCE: GUIDE PLAN NO. 1.0

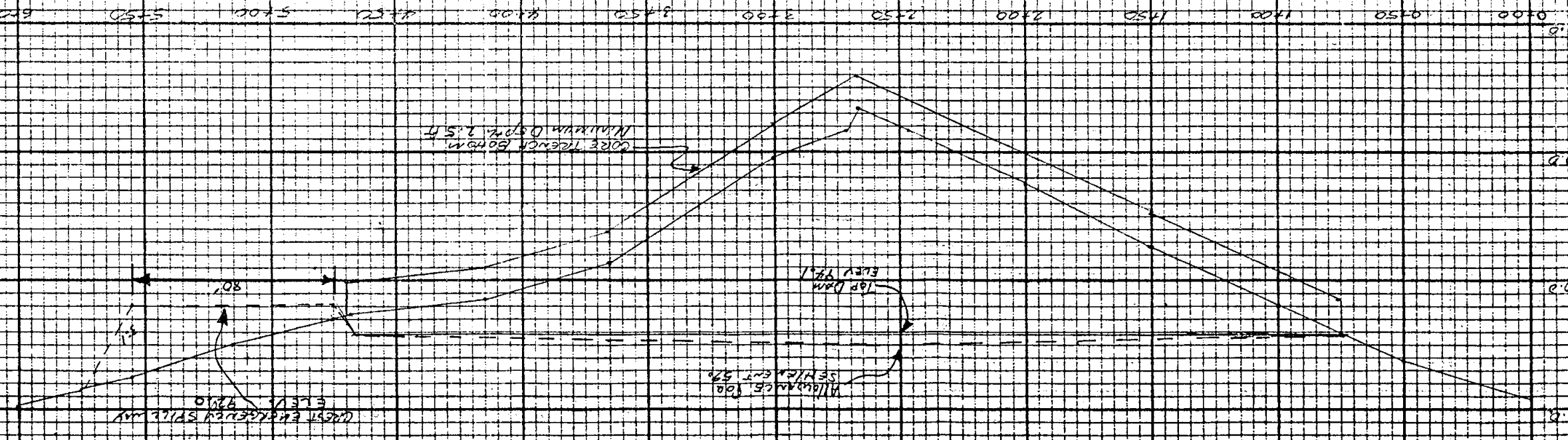
JOB PLAN NO. 1.0



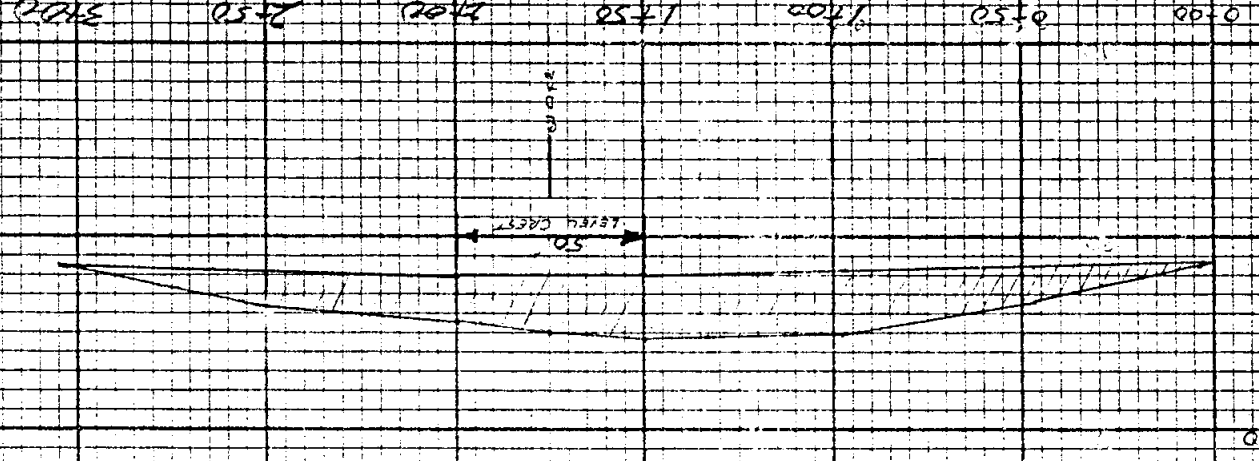
MAXIMUM CROSS SECTION OF DAM



CROSS SECTION AT CREST OF EMERGENCY SPILLWAY AND PROFILE ALONG E OF DAM

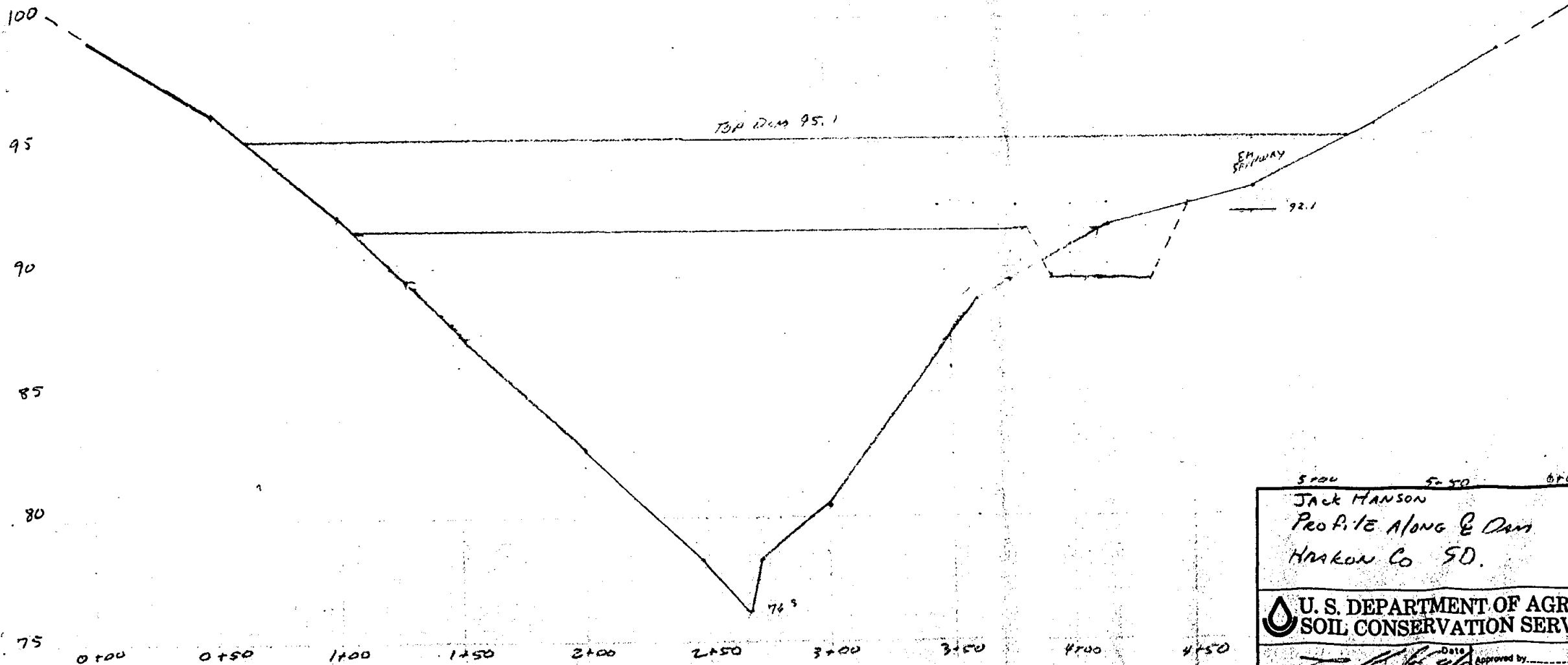


PROFILE ALONG E OF EMERGENCY SPILLWAY



SEDIMENT YIELD

ERODIBILITY	ACRES	A.F./AC./YR.	GROSS RATE	DRAINAGE AREA	DELIVERY RATE	DESIGN PERIOD	REQ'D. SEDIMENT VOLUME
585	0.004	585	14%	25	8.19		



5+00		5+50		6+00	
JACK HANSON PROFILE ALONG E DAM HRAKON CO SD.				SCALE: VERT-1"=5' HORIZ-1"=50'	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE					
Designed	Date		Approved by		
Drawn	Title		Title		
Traced	Sheet		Drawing No.		
Checked	No		BY		



100

95

90

85

80

75

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00

DAM

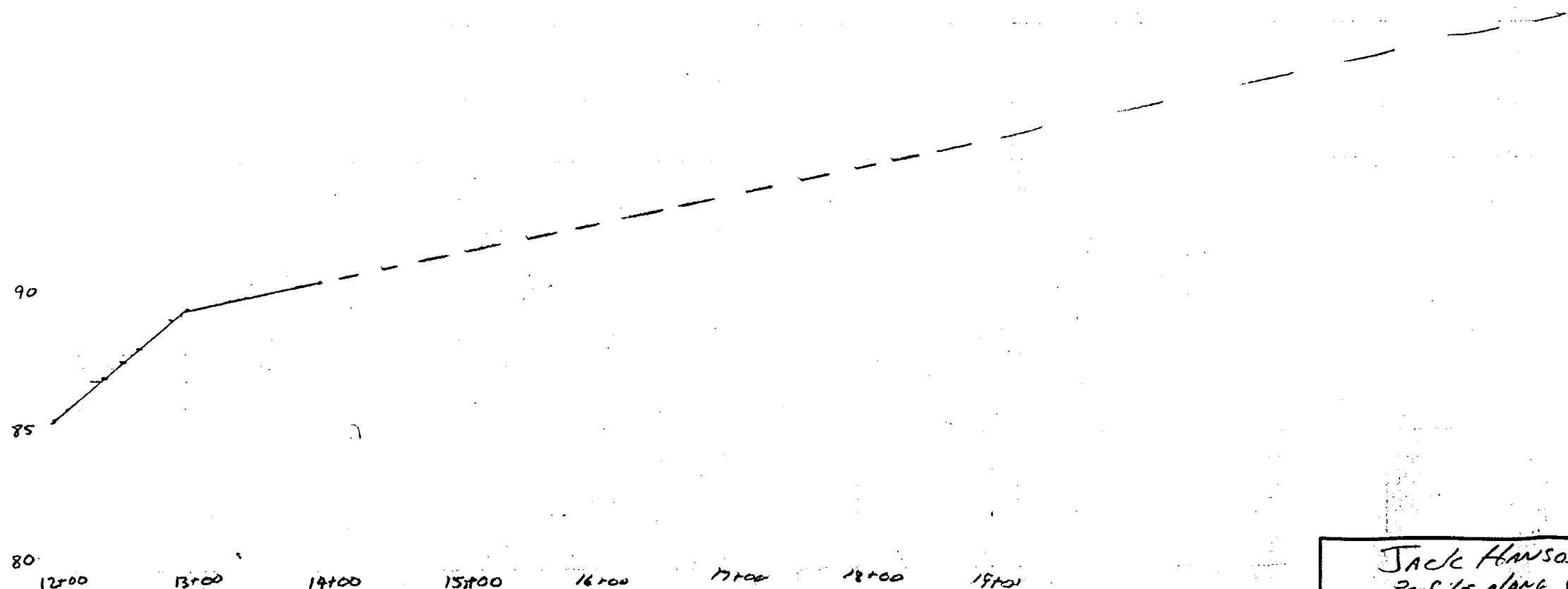
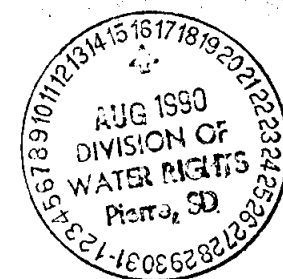
10+00 11+00 12+00 13

JACK HANSON
 Profile along E Channel
 Hanson County

SCALE:
 VERT = 1" = 5'
 HORIZ = 1" = 100'

U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed	<i>[Signature]</i>	Date	8/1/90	Approved by	
Drawn	<i>[Signature]</i>	Title			
Traced		Sheet		Drawing No.	
Checked		No			
		of			



JACK HANSON
Profile along E of Channel
Hanson County

SCALES:
VERT - 1" = 5'
HORIZ - 1" = 100'

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed <u>L. Hanson</u> Date <u>4/90</u> Drawn <u>L. Hanson</u> Date <u>4/90</u> Traced _____ Checked _____	Approved by _____ Title _____ _____ _____ Drawing No. _____

Client : Jack Hanson

By: TJH

Date: 04-13-90

County : Haakon-E

State: SD

Checked: _____

Date: _____

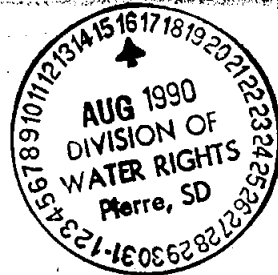
Practice: Livestock Watering Dam

Drainage Area : 585 Acres
Curve Number : 80
Watershed Length : 8200 Feet
Watershed Slope : 5.3 Percent
Time of Concentration: 1.24 Hours
Rainfall Type : II

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr Rainfall (in)	1.6	2.08	2.85	3.4	3.9	4.4	5
Ia/P Ratio	0.31	0.24	0.18	0.15	0.13	0.11	0.10
Runoff (in)	0.34	0.61	1.14	1.56	1.96	2.38	2.89
Unit Peak Discharge (cfs/acre/in)	0.387	0.424	0.453	0.466	0.474	0.481	0.487
Peak Discharge (cfs)	76	152	302	424	544	668	824



STATE SOUTH DAKOTA PROJECT JACK HANSON
 BY TSH DATE 4/90 CHECKED BY _____ DATE _____
 SUBJECT SURFACE AREA & STORAGE CALCULATIONS



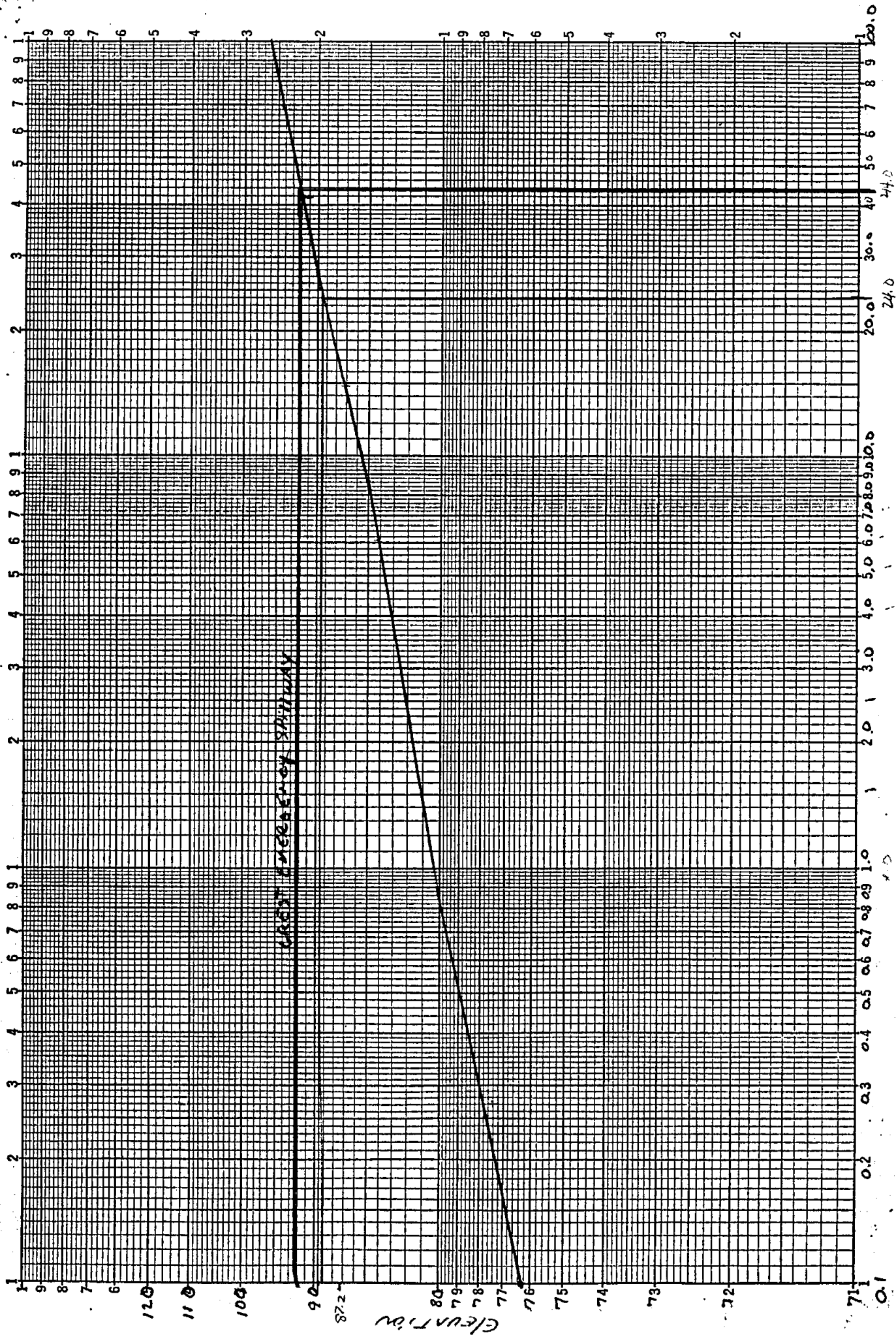
$$\text{SURFACE AREA} = \frac{\text{WIDTH} \times \text{LENGTH} \times \text{FACTOR}}{43560} \text{ IN ACRES}$$

$$\text{STORAGE} = \text{SURFACE AREA} \times \text{DEPTH} \times \text{FACTOR} \text{ IN AC-FT}$$

$$\text{SURFACE AREA FACTOR} = 0.6$$

$$\text{STORAGE FACTOR} = 0.4$$

ELEVATION	LENGTH	WIDTH	DEPTH	SURFACE AREA	STORAGE
76.3	0	0	0	0	0
80.0	680	63	3.7	0.59	0.87
85.0	1130	160	8.7	2.49	8.67
87.2	1240	190	10.9	3.25	14.2
87.3	1243	196	11.0	3.36	14.8
87.4	1245	198	11.1	3.40	15.1
87.5	1248	200	11.2	3.44	15.4
87.8	1252	200	11.5	3.45	15.9
88.3	1265	215	12.0	3.75	18.0
89.3	1290	240	13.0	4.26	22.18
89.5	1297	247	13.2	4.41	23.3
90.0	1340	270	13.7	4.98	27.29
90.5	1385	290	14.2	5.53	31.42
92.0	1530	330	15.8	6.95	44.0
95.0	1830	450	18.7	11.37	84.82
100.0	2320	612	23.7	19.56	185.40



JACK HANSON

STORAGE AC-FT