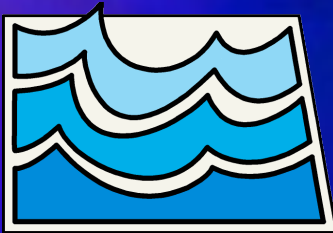


Telemetry Pilot Study

&

N. Dak. Water Use Program



Michael Hove
North Dakota Office of the State Engineer

Main Topics

- **Water Use Program**
- **Water Permit / Water Use Database**
- **Telemetry History – Why & How**
- **Telemetry Pilot Study – What is being done?**

State Engineer Water Use Program

- **1970s to Present**
- **Self-Monitoring & Reporting “Honor System”**
- **Annual Water Use Form**
- **Over 2,200 Irrigation Permit AUFs : ~ 93% R.R.**
- **Over 850 Mun/Ind Permit AUFs : ~ 97% R.R**
- **Water Permit Data Base**
- **S.E. Flow Rates : Ultrasonic Flow Meter**

Panametrics Ultrasonic Flow Meter



Water Permit / Water Use Database

Hide Advanced

2238 Selected Records

Stored Selections

Quick Search

Permit No.

Go

Use Type

Status

County

Basin

Aquifer

Export Data

Report Editor

Preferences

New Window

All A-C D-F G-I J-L M-O P-R S-U V-X Y-Z N/A			
Permit Number	Name	Address1	Address2
02584	CASE, DALE	6907 141ST AVE SE	
02585	GARNAS, DANIEL M.	14775 S.W. 6TH ST	
02586	LAUINGER, GEORGE JR.	PO BOX 623	
02587	JOHNSON, SHERWOOD	JOHNSON FARM ENT. INC	1710 141ST AVE SE
02588	WILCOX, LARRY	13973 26 R ST SE	
02589	STREIFEL, KENNETH	4370 38TH AVE NE	
02590	DAWSON FARMS	3343 39TH AVE SE	
02591	ALAMO FARMS	% DOUGLAS A. SCHMIT	1203 N 7TH ST
02592	BUXA, STANLEY AND RODNEY	601 RIVERVIEW DRIVE	
02593	SUNDHAGEN, HAROLD	10497 70TH ST NW	
02594	SHOCKMAN, ORVILLE	% PETER SHOCKMAN	6847 CTY ROAD 62
02595	OLSON, PAUL	RR 1 BOX 81	
02596	JABS, CURTIS	2905 BAY SHORE BEND SE	



Add



All



Subset



Toggle



Prev



Query



Twp



Sort



Save



Load

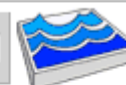


Done

Water Permit Information

Permit Information

Permit Index 2380



First



Previous



Next



Last



Cancel



Save



Delete

Permit Info

Conditions

Application Info

History

Documents & Forms

Permit Number 02590 Const Perm No Priority Date 10/27/1976

Permit Holder

Name DAWSON FARMS Phone Number (701) 327-4566
 Address1 3343 39TH AVE SE Other Phone (701) 327-4497
 Address2
 City TAPPEN State ND Zip 58487 Clear Address

Mail To

Name Phone
 Address 1
 Address 2
 City State Zip Clear Address

Reservation None Checked Out 00/00/00
 Use Type Irrigation File Location Files
 Status Perfected Function
 Remarks Date Issued 02/23/1977
 Date Cancelled 00/00/00
 Date Perfected 00/00/00

Point of Diversion Info

POD	Beneficial Use	Req AcFt	Req Acre	Req Rate	App AcFt	App Acre	App Rate
13807202C	07/01/1982	145.4	96.9	581.6	0.0	0.0	0.0
13807202D	07/01/1982	145.4	97.0	581.6	218.1	145.4	872.4
13807203A	07/01/1982	145.4	96.9	581.6	218.1	145.4	872.4

Requested/Approved 436.2 290.8 1,744.8 436.2 290.8 1,744.8

Held in Abeyance 0.0 0.0 0.0

Req. Storage 0.0 Abey. Storage 0.0 App. Storage 0.0

Water Permit Information

Point of Diversion

Permit Index 2380
 POD Index 4142
 Permit No. 02590



First



Previous



Next



Last



Cancel



Save



Delete

POD 13807202D

Beneficial Use 07/01/1982

POD Status Active

County Kidder

Basin Apple Creek

Subreach 007

Aquifer Kidder County

SubAquifer

Source Ground Water

Source Name

Irrigation Type Sprinkler

Req. AcFt 145.4 App. AcFt 218.1

Req. Acre 97.0 App. Acre 145.4

Req. Rate 581.6 App. Rate 872.4

Req. Storage 0.0 App. Storage 0.0

Well Locations

Location	Date	Rate	Comments
13807202D	8/11/00	894	End Gun On
13807202D	8/30/88	803	Measured at Piv



Irrigation Tracts

Legal	Acres
13807202D	0.0

Reported Water Use

Year	Nature Of Data	NonConsump.	Rep. AcFt	Rep. Acres	Rep. Rate
2005		0.0	147.3	130.0	800.0
2004		0.0	132.6	133.0	800.0
2003		0.0	13.9	130.0	800.0
2002		0.0	110.9	130.0	800.0
2001		0.0	42.6	130.0	894.0
2000		0.0	59.4	130.0	894.0
1999		0.0	75.3	130.0	800.0
1998		0.0	86.2	135.0	800.0
1997		0.0	127.3	133.0	800.0
1996		0.0	110.6	133.0	800.0

Water Use

Permit No. 02590

Permit Index 2380

POD 13807202D

POD Index 4142

Year 2005

Nature of Data

Consumptive Use 147.3

NonConsumptive Use 0.0

Reported Acres 130.0

Crop Type (Primary) Corn

Reported Rate 800.0

Crop Type (Secondary)

Reported Inches

End Meter 18526

Begin Meter 17526

Meter Units Hours

KWHrs 0

KWH Demand 0

Pump HP 0

Comments

State Water Commission

- Home
- About the SWC
- Atmospheric Resources
- Devils Lake Flooding
- Floodplain Management
- Map and Data Resources
 - Construction Permits
 - Drains
 - Government Surveys
 - Ground / Surface Water
 - MapServices
 - Precipitation
 - Private Contractor Logs
 - Published Maps
 - Retention Structures
 - Tools
 - Water Permits



Search Form

Query Water Permits

Permit Number

Name [Last Name, First Name]

County

Aquifer

Basin

Use Type

Source

Township [TTTTT]

☒ Retrieve Only Active Permits.

Combine the criteria using:

☐ Or ☒ And

Disclaimer

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71 Records were found matching Search Criteria

Permit	Name	Use Type	Status
1769	PETRO-HUNT, L.L.C.	Industrial	Perfected
2344	TRUE OIL LLC	Industrial	Perfected
3419	JOHN P. HEGGEN TRUST	Industrial	Perfected
3474	ANR PRODUCTION COMPANY	Industrial	Perfected
3524	PETRO-HUNT, L.L.C.	Industrial	Perfected
3562	ENCORE OPERATING, LLC	Industrial	Perfected
3587	AMERADA HESS CORPORATION	Industrial	Perfected
3601	AMERADA HESS CORPORATION	Industrial	Perfected
3610	ENCORE OPERATING, LLC	Industrial	Perfected
3621	WESCO OPERATING, INC.	Industrial	Perfected
3660	AMERADA HESS CORPORATION	Industrial	Perfected
3672	PETRO-HUNT, L.L.C.	Industrial	Perfected
3689	SIGNALNESS, LARRY J.	Industrial	Perfected
3700	ENCORE OPERATING, LLC	Industrial	Perfected
3704	MISSOURI RIVER ROYALTY CORP.	Industrial	Perfected
3730	RIGEL, INC.	Industrial	Perfected
3746	ENCORE OPERATING, LLC	Industrial	Perfected
3792	LANDTECH ENTERPRISES LTD. CO.	Industrial	Perfected
3813	SYTH, KIMBERLY	Industrial	Perfected
3817A	RANCH OIL	Industrial	Conditionally Approved

Water Use Report Generator

Year Range Start - End

1998

- 2011

Minimum starting year is 1977.

Group By: ☒ No Grouping

☐ Use Type

☐ Permit Status

☐ Source (Surface/Ground)

☐ Aquifer

☐ Basin

SubGroup: ☒ No Grouping

☐ Use Type

☐ Permit Status

☐ Source (Surface/Ground)

☐ Aquifer

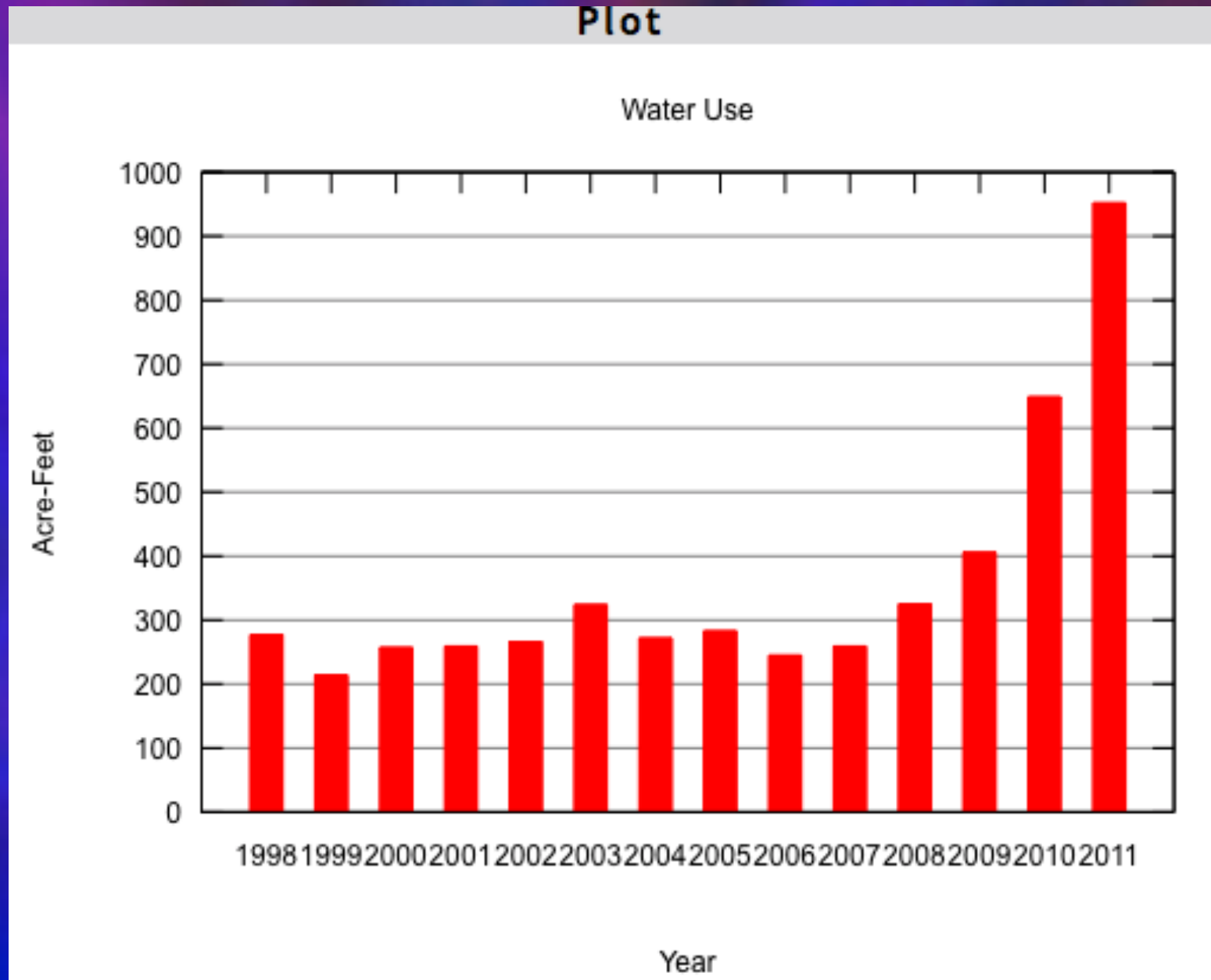
☐ Basin

Generate Report

* Historic reported figures may not accurately reflect total reported information if you did not deselect the Retrieve Only Active Permits option when the permit query was submitted!

[\[Return to Permit Selection\]](#)

3 Fold Increase in Industrial Water Use



Water Use Report

Year	Acre Feet	Acres
2011	952.6	0.0
2010	649.3	0.0
2009	406.3	0.0
2008	325.7	0.0
2007	259.7	0.0
2006	245.9	0.0
2005	283.0	0.0
2004	272.7	0.0
2003	324.7	0.0
2002	266.6	0.0
2001	259.3	0.0
2000	257.7	0.0
1999	214.5	0.0
1998	277.6	0.0

Water Use Report Generator

Year Range Start - End

1998

-

2011

Minimum starting year is 1977.

Group By: ☐ No Grouping

☐ Use Type

☐ Permit Status

☒ Source (Surface/Ground)

☐ Aquifer

☐ Basin

SubGroup: ☒ No Grouping

☐ Use Type

☐ Permit Status

☐ Source (Surface/Ground)

☐ Aquifer

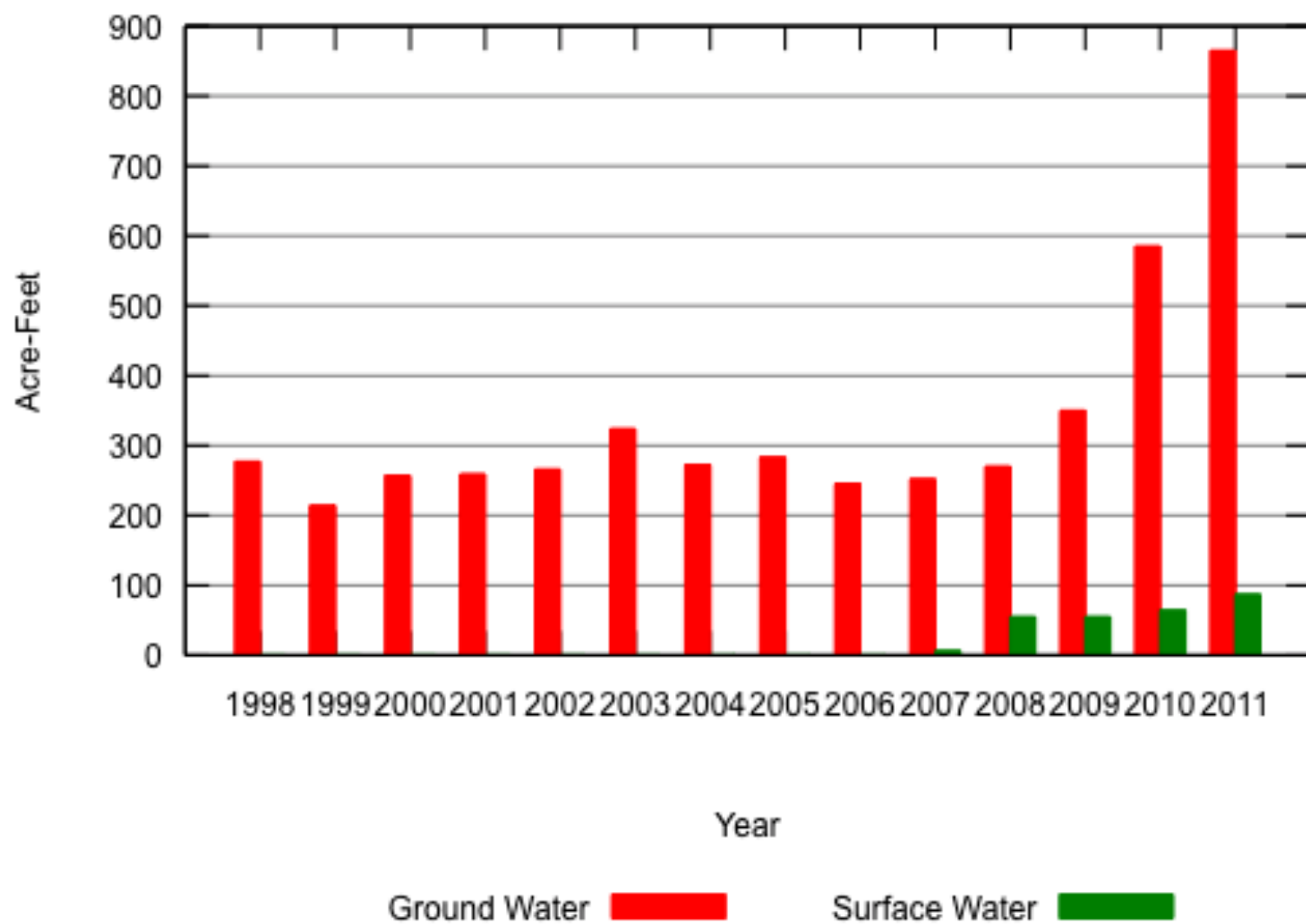
☐ Basin

* Historic reported figures may not accurately reflect total reported information if you did not deselect the Retrieve Only Active Permits option when the permit query was submitted!

[\[Return to Permit Selection\]](#)

Plot

Water Use



State Water Commission

- Home
- About the SWC
- Atmospheric Resources
- Devils Lake Flooding
- Floodplain Management
- Map and Data Resources
 - Construction Permits
 - Drains
 - Government Surveys
 - Ground / Surface Water
 - MapServices
 - Precipitation
 - Private Contractor Logs
 - Published Maps
 - Retention Structures
 - Tools
 - Water Permits



Search Form

Query Water Permits

Permit Number

Name [Last Name, First Name]

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Aquifer

Basin

Use Type

Source

Township [TTTTRRR]☒ Retrieve Only Active Permits.

Combine the criteria using:

☐ Or ☒ And

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22 Records were found matching Search Criteria

Permit	Name	Use Type	Status
1489	ZAVALNEY, TED	Industrial	Perfected
5237	WHITING PETROLEUM CORPORATION	Industrial	Conditionally Approved
5238	WHITING PETROLEUM CORPORATION	Industrial	Conditionally Approved
5509A	PARSHALL, CITY OF	Industrial	Conditionally Approved
5761	ORTLOFF, TERENCE	Industrial	Conditionally Approved
5761A	ORTLOFF, TERENCE	Industrial	Conditionally Approved
5949	NEW TOWN, CITY OF	Industrial	Conditionally Approved
5958A	PARSHALL, CITY OF	Industrial	Conditionally Approved
5960	WURTZ, JERRY AND RICHARD	Industrial	Conditionally Approved
5968	EDWARDS, JAMES WILLIS	Industrial	Conditionally Approved
5975	WURTZ, JERRY & RICHARD AND AMES, MIKE	Industrial	Conditionally Approved
5988	DENNIS, JAMES E.	Industrial	Held In Abeyance
6023	STANLEY, CITY OF	Industrial	Conditionally Approved
6024	RISMON, CLARK O. AND JANE V.	Industrial	Held In Abeyance
6031	JOHNSON, HARVEY	Industrial	Conditionally Approved
6033	BARSTAD, RODNEY W.	Industrial	Conditionally Approved
6038	LINDBERG, DWYGHY	Industrial	Held In Abeyance
6049	JENSEN, EARL R.	Industrial	Conditionally Approved
6061	SJOL, JACK	Industrial	Conditionally Approved
6065	PENNINGTON, DONALD, STEVEN & JACK	Industrial	Conditionally Approved

Water Use Report Generator

Year Range Start - End

1998

- 2011

Minimum starting year is 1977.

Group By: ☒ No Grouping

☐ Use Type

☐ Permit Status

☐ Source (Surface/Ground)

☐ Aquifer

☐ Basin

SubGroup: ☒ No Grouping

☐ Use Type

☐ Permit Status

☐ Source (Surface/Ground)

☐ Aquifer

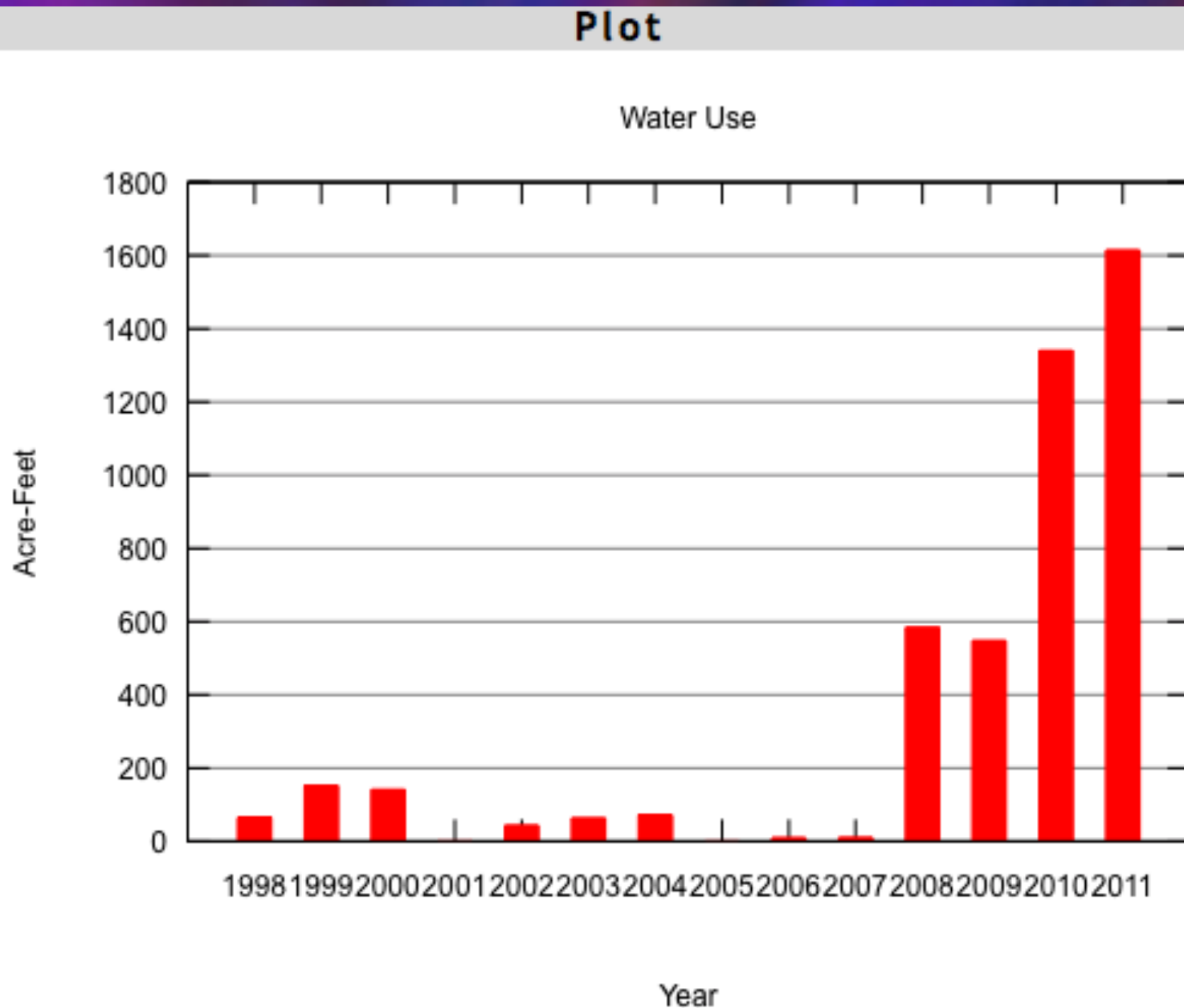
☐ Basin

Generate Report

• Historic reported figures may not accurately reflect total reported information if you did not deselect the Retrieve Only Active Permits option when the permit query was submitted!

[\[Return to Permit Selection\]](#)

10 Fold Increase in Industrial Water Use



Water Use Report

Year	Acre Feet	Acres
2011	1,614.2	0.0
2010	1,340.1	0.0
2009	548.5	0.0
2008	584.6	0.0
2007	10.9	0.0
2006	9.3	0.0
2005	0.1	0.0
2004	72.2	0.0
2003	63.4	0.0
2002	43.9	0.0
2001	0.1	0.0
2000	141.6	0.0
1999	152.7	0.0
1998	65.7	0.0

Water Use Report Generator

Year Range Start - End

1998

-

2011

Minimum starting year is 1977.

Group By: ☐ No Grouping

☐ Use Type

☐ Permit Status

☒ Source (Surface/Ground)

☐ Aquifer

☐ Basin

SubGroup: ☒ No Grouping

☐ Use Type

☐ Permit Status

☐ Source (Surface/Ground)

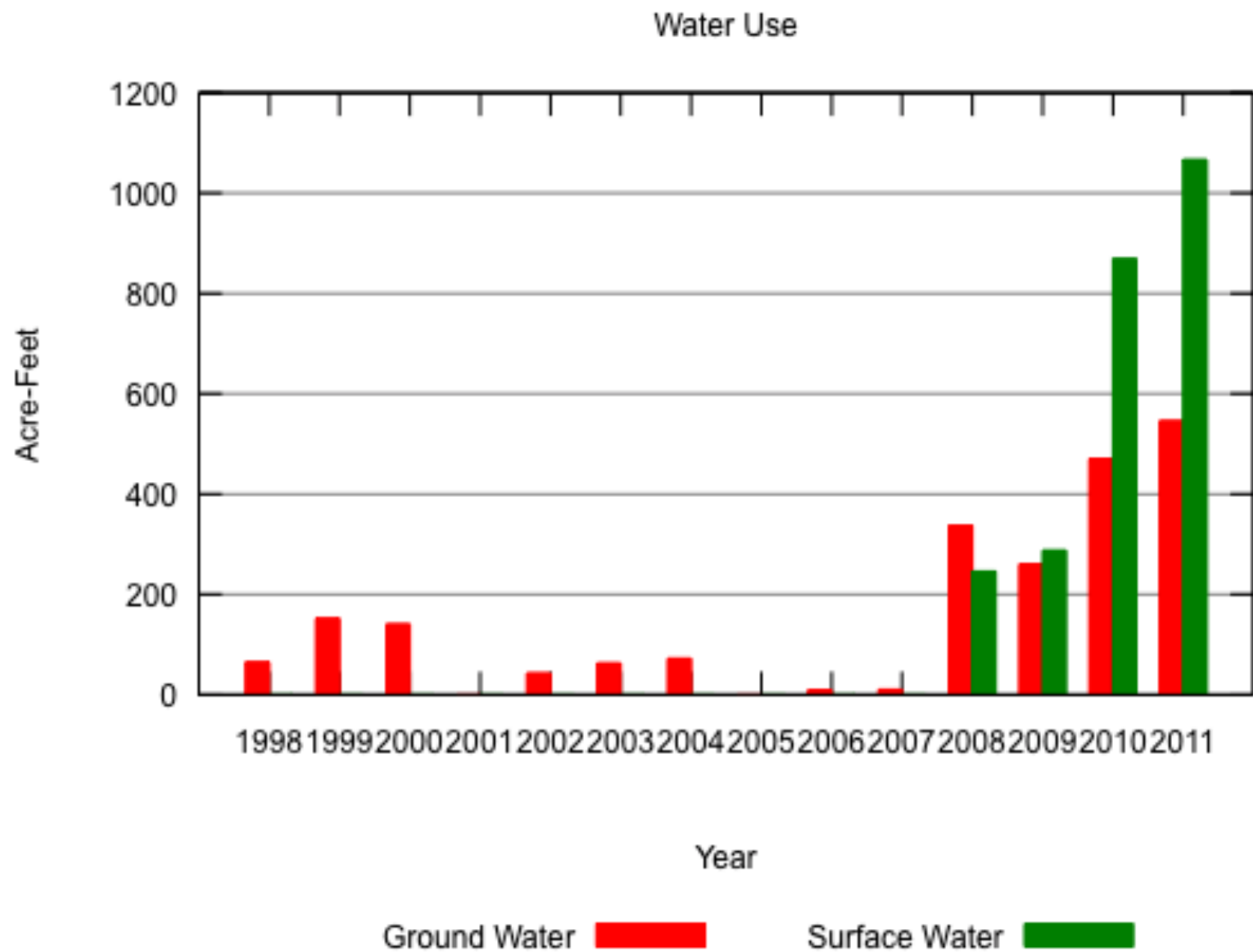
☐ Aquifer

☐ Basin

* Historic reported figures may not accurately reflect total reported information if you did not deselect the Retrieve Only Active Permits option when the permit query was submitted!

[\[Return to Permit Selection\]](#)

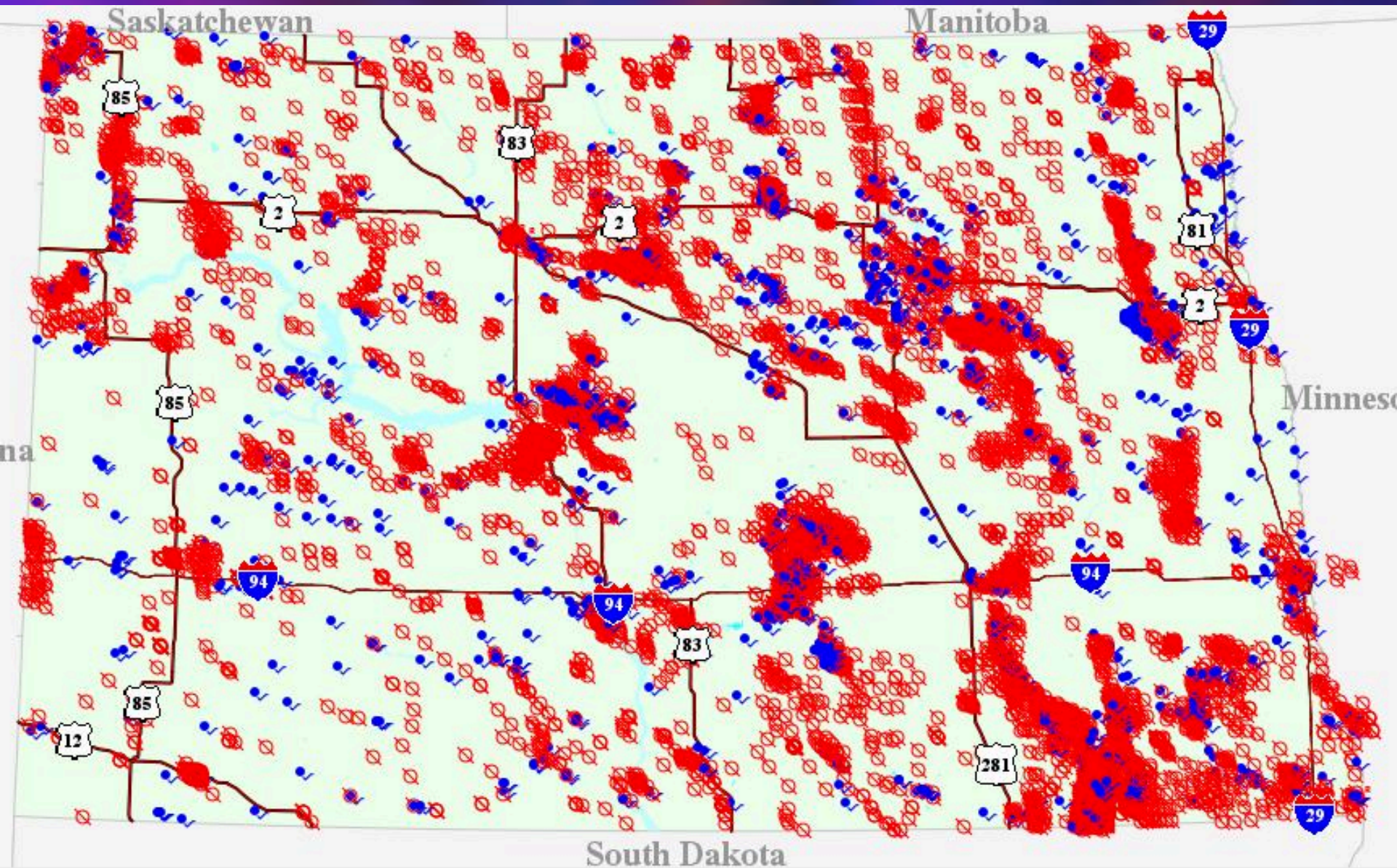
Plot



Annual Hydrologic Monitoring

- **Well Drilling Program – State Rig : ~ 100 sites**
- **Water level monitoring : ~4,000 wells**
- **Obs. Well Sampling : ~ 1,500 samples**
- **Surface Water gauges : ~ 150 gauges**
- **Surface Water Sampling : ~ 200 samples**
- **Water Use Program : ~ 3,000 AUFs**

Monitoring Wells & Surface Water Sites



Telemetry History : Why?

- **Rapid Development of Water Depots**
- **Rapid Development of Oil Industry**
- **2011 Legislative concern regarding :
Accuracy of information from the “Self
Reporting : Honor System”**

Telemetry History : How ?

- **April 28, 2011 – Bill 2020 Passes House & Senate :
“Remote Terminal Water Metering Devices”**

Telemetry History : How ?

- **April 28, 2011 – Bill 2020 Passes House & Senate :
“Remote Terminal Water Metering Devices”**
- **May 18, 2011 – Governor veto of telemetry section,
noting S.E. is in best position to develop metering
specifications.**

Telemetry History : How ?

- **April 28, 2011 – Bill 2020 Passes House & Senate :
“Remote Terminal Water Metering Devices”**
- **May 18, 2011 – Governor veto of telemetry section,
noting S.E. is in best position to develop metering
specifications.**
- **State Engineer provided assurances :**
 - 1. Increase frequency of meter readings by staff**
 - 2. Develop monthly meter report by permit holder**
 - 3. Implement a Telemetry Pilot Study**

Water Depot Database

Water Depot : Bratcher-Ames (Timber Creek) Depot

Depot Index : 50



History | Documents

Name : Bratcher-Ames (Timber Creek) Depot

Location : 15110109CAAC

Long, Lat : -103.61767, 47.91209

X-Coord, Y-Coord : 1,204,009, 834,124

Contact : Lyle Bratcher

Address 1 : 2041 Highway 68

Username :

Address 2 :

Password :

City, State, Zip : Alexander

ND

58831-0000

Phone : (701) 828-3521

Cell Phone : (701) 572-3933

E-Mail :

County : McKenzie

Status : Developed

Meter Station



Location Name	Location	Model	Serial No	Meter Units
West (#1)	15110109CAAC	MF-106	GP11-1920	Barrels
West (East)-(#2)	15110109CAAC	MF-106	GP11-3921	Barrels
East (#3) Middle	15110109CAAC	McCrometer	GP11-5770-6	Barrels
East (#4)	15110109CAAC	McCrometer	GP11-5763-6	Barrels

Meter Station :

Depot Name : Bratcher-Ames (Timber Creek) Depot

Meter Station ID : 29

Depot Info History Documents

Location Name : West (#1)

Location : 15110109CAAC

Long, Lat : -103.61767, 47.91209

X-Coord, Y-Coord : 1,204,009, 834,124

Meter Name : McCrometer

Meter Model : MF-106

Meter Serial No : GP11-1920

Meter Units : Barrels

Meter Precision :

County : McKenzie

Future web-log-in
for the
Permit Holder

Meter Reading



Date	Time	Reading	Observer Type	Comment
West (#1) 5/15/12	12:25:00	752,738.0	State Personnel	This is the west mete
West (East)- 5/8/12	13:14:00	704,857.0	State Personnel	Barrels
East (#3) M 4/30/12	00:00:00	653,367.0	Permit Holder	Barrels
East (#4) 4/10/12	19:05:00	589,120.0	State Personnel	Barrels
4/1/12	00:00:00	560,251.0	Permit Holder	
3/6/12	13:59:00	396,805.0	State Personnel	
3/1/12	11:00:00	351,465.0	Permit Holder	
1/1/12	15:30:00	839,537.0	Permit Holder	
11/1/11	00:00:00	361,643.0	State Personnel	

Water Depot Map

Trenton
Depot

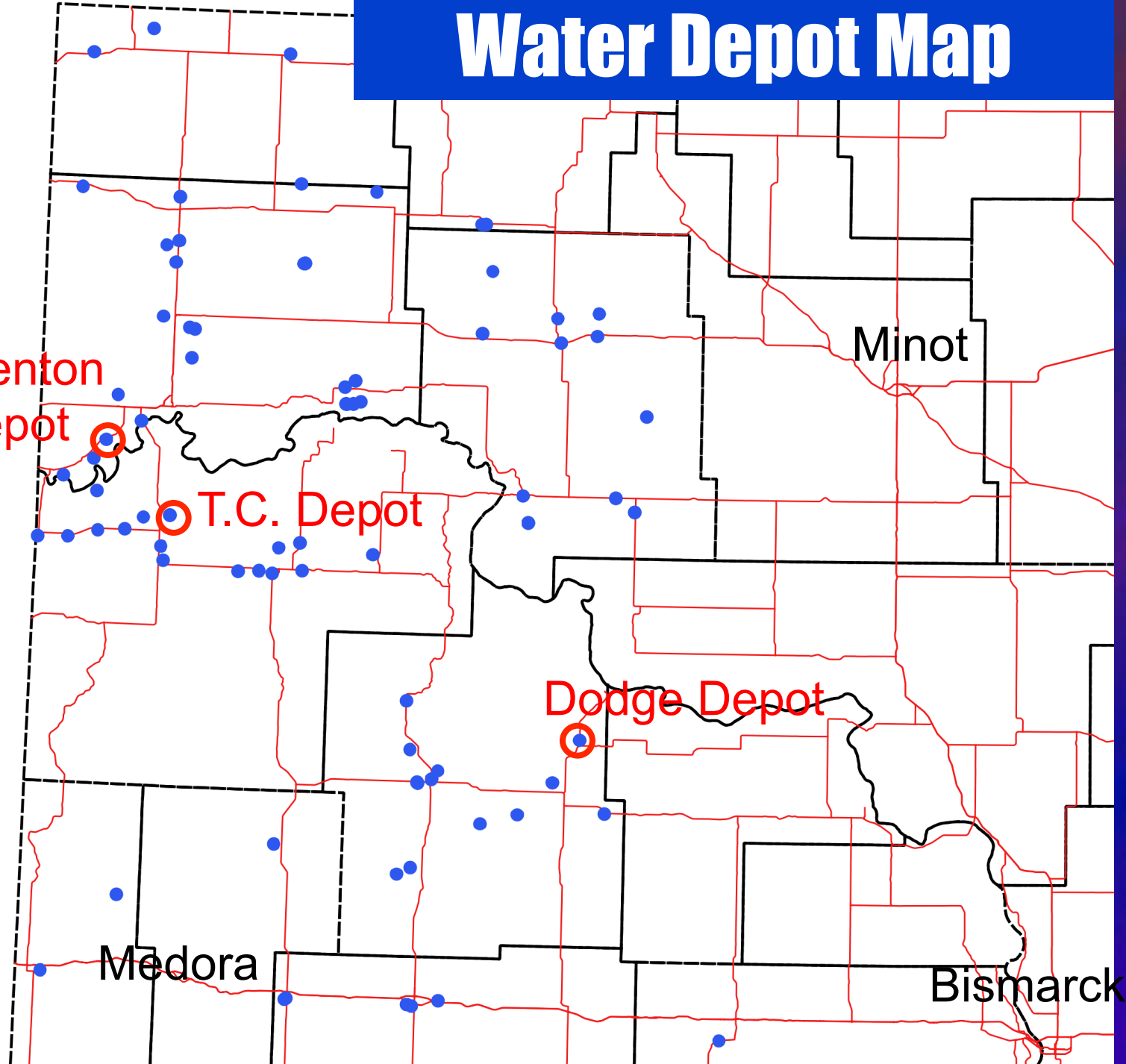
T.C. Depot

Dodge Depot

Minot

Medora

Bismarck



Telemetry Pilot Study : What is being done?

- **1st Phase – Research & Review**
- **2nd Phase – Data Transfer Testing**
- **3rd Phase – Installation at sites (collection & transfer)**
 - A. Dodge Depot**
 - B. Timber Creek (T. C.) Depot**
 - C. Trenton Depot**

1st Phase – Research & Review

- **Tabulated meter brands at 73 depot fills : (18)**

McCrometer 53%

Neptune 12%

Sensus 9%

15 other meter types 26%

- **McCrometer pilot : Central Colorado Con. Water District**

Ken Quandt : Regional Representative

Randy Ray : Telemetry project started in June of 2009

1st Phase – Research & Review

- Existing telemetry at N.D. water depots : Basic Energy SWWA , Lalim Depot, & Cities of Parshall, Killdeer, New Town
2 to 4 months for successful completion of installation.

Parshall Depot : Feb. 2012 transition to SCADA ~ \$115 K



1st Phase – Research & Review

- **Other telemetry vendors : \$5,000 to \$115,000 & Up.**
 - 1. On-Set Computer HOB0 Data Logger : Dodge depot**
 - 2. Design Solutions & Integration : Basic Energy**
 - 3. Informational Data Technologies : SWWA (5 sites)**
 - 4. Red Lion : Lalim Depot**
 - 5. Watch Technologies : Oregon**
 - 6. MicroComm SCADA (supervisory control & data acq.)**

1st Phase – Research & Review

- **Telemetry communication :**

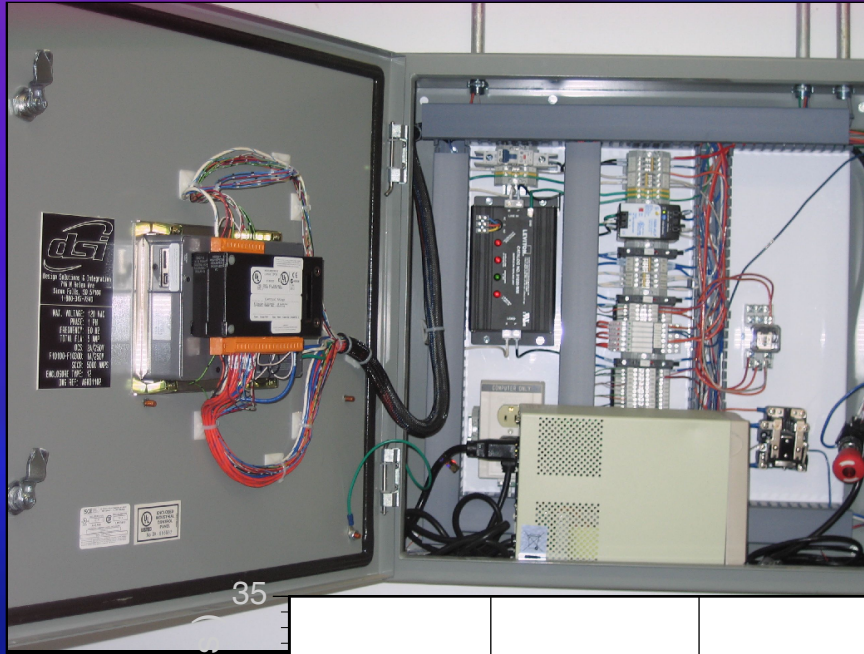
- 1. Satellite : McCrometer & idt**

- 2. Cell Phone : HOB0 logger**

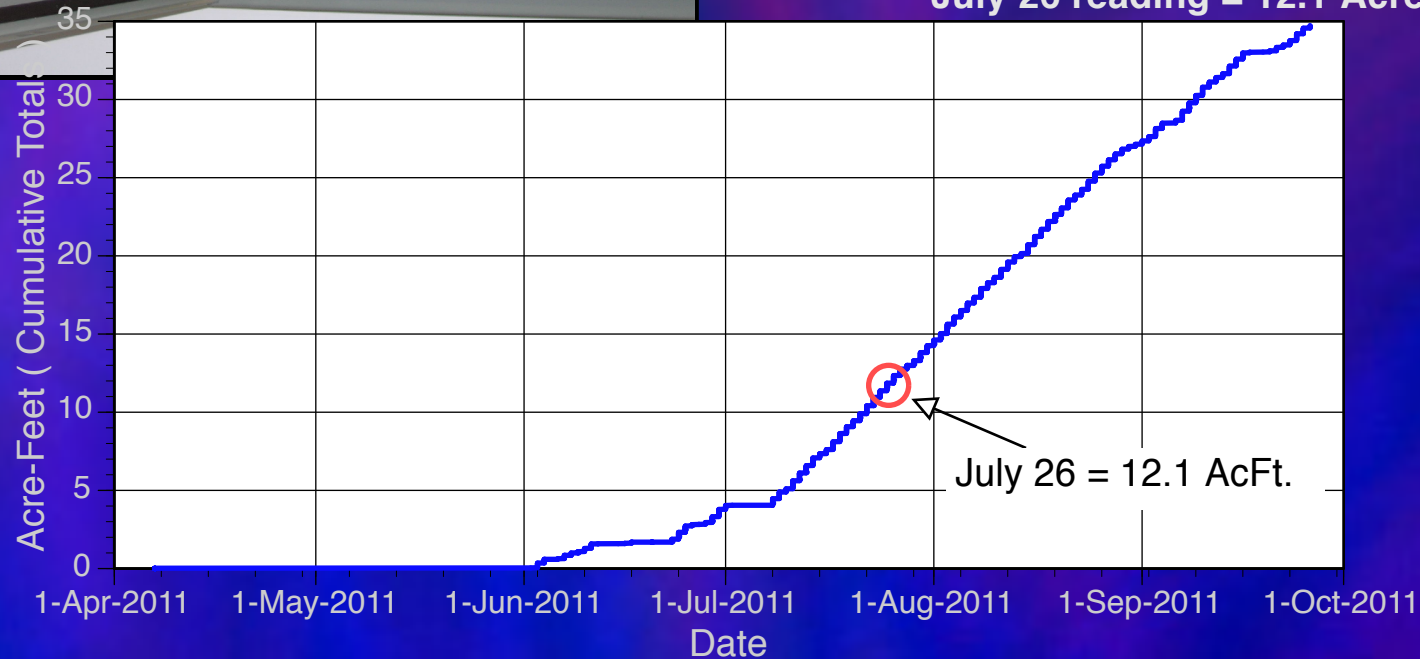
- 3. Radio : State Radio Towers : ~ \$500K upgrade**

- 4. Hard-wired internet (TCP / IP) : DSI**

2nd Phase – Data Transfer from Basic E.

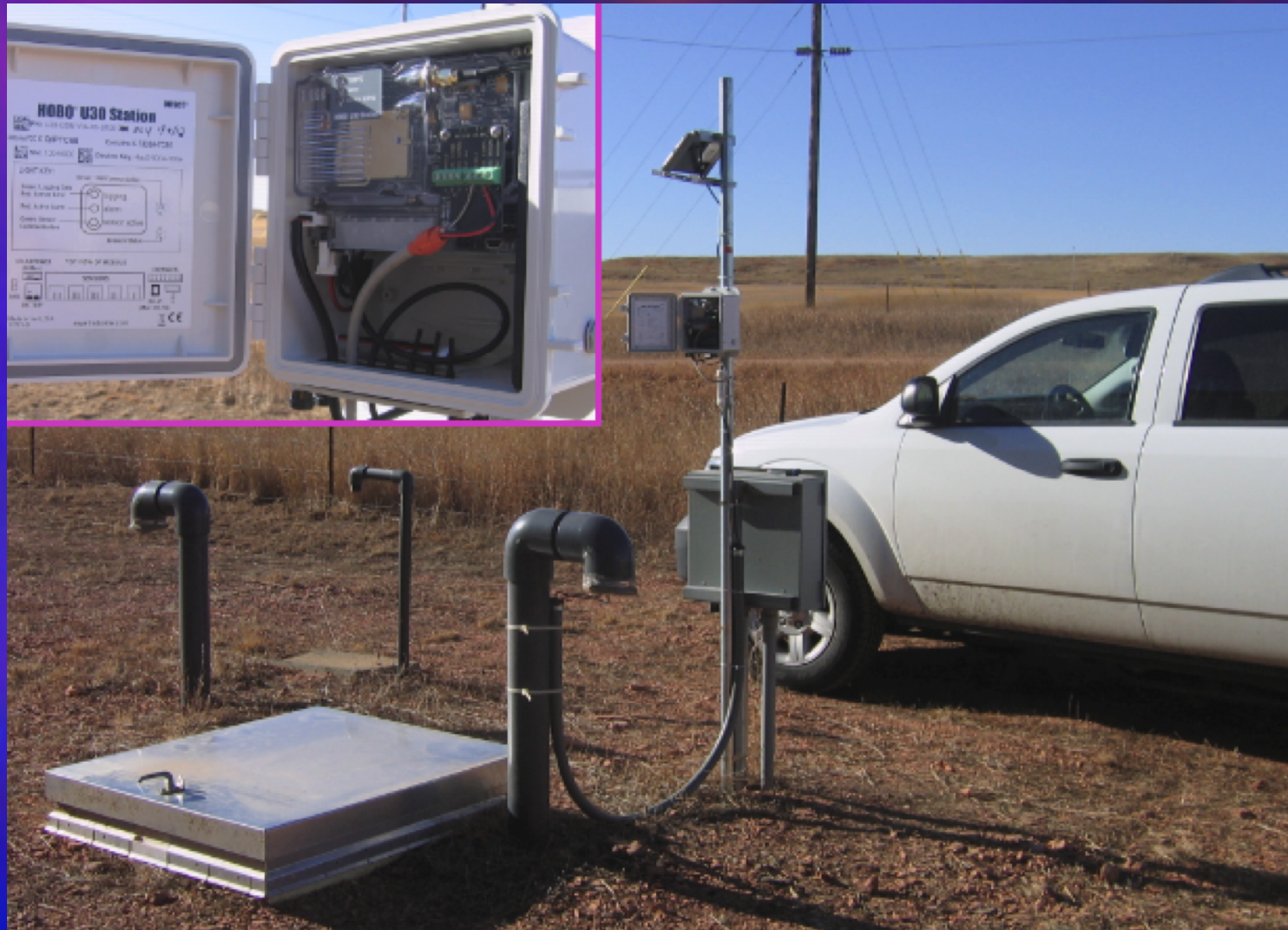


Flow Meter at Basic Energy Site
July 26 reading = 12.1 Acre-Feet.



3rd Phase – HOB0 Installation at Dodge

Dodge Depot : Jan. 2012 Initial set-up ~ \$1,600+\$750+\$143







3rd Phase – HOB0 Installation at Dodge




3rd Phase – HOB0 Installation at Dodge

Latest Conditions

 **Relay State:** Deactivated (Open)  

 **Gallons (Start ~ 57,036,000):** 135 Gallons

 **Tricon (Dodge GPM):** 1.6 GPM

Battery: 4.39 V

Latest Connections

Next connection expected in 34 minutes

Today at 12:44 MDT

Today at 11:35 MDT

Today at 10:36 MDT

Today at 09:26 MDT

Today at 08:28 MDT

Latest Data

-  Dodge Depot_18.csv
-  Dodge Depot_18.dtf
-  Dodge Depot_17.csv
-  Dodge Depot_17.dtf
-  Dodge Depot_16.csv

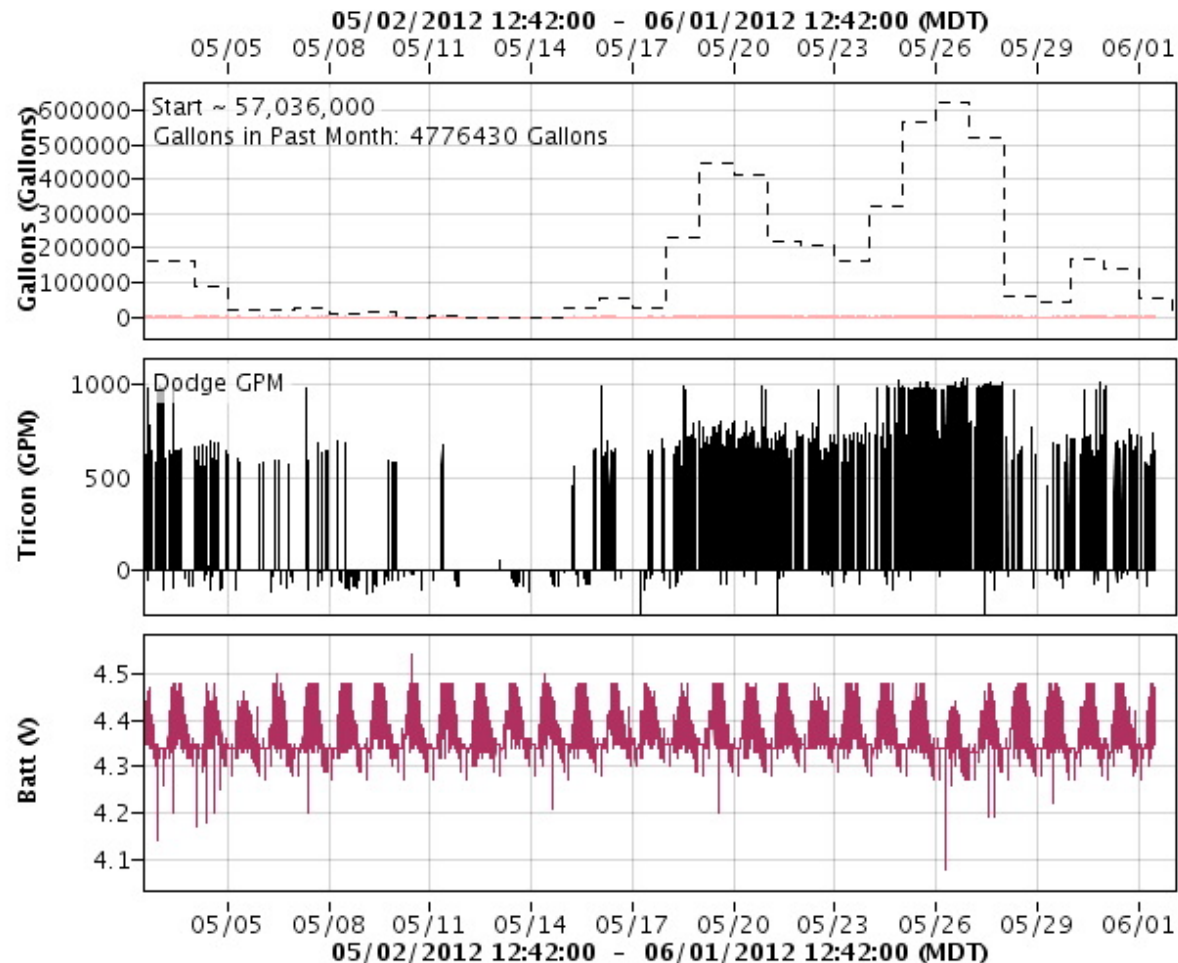
Device Information

Status: Logging every 01 min



SWC_HOB01

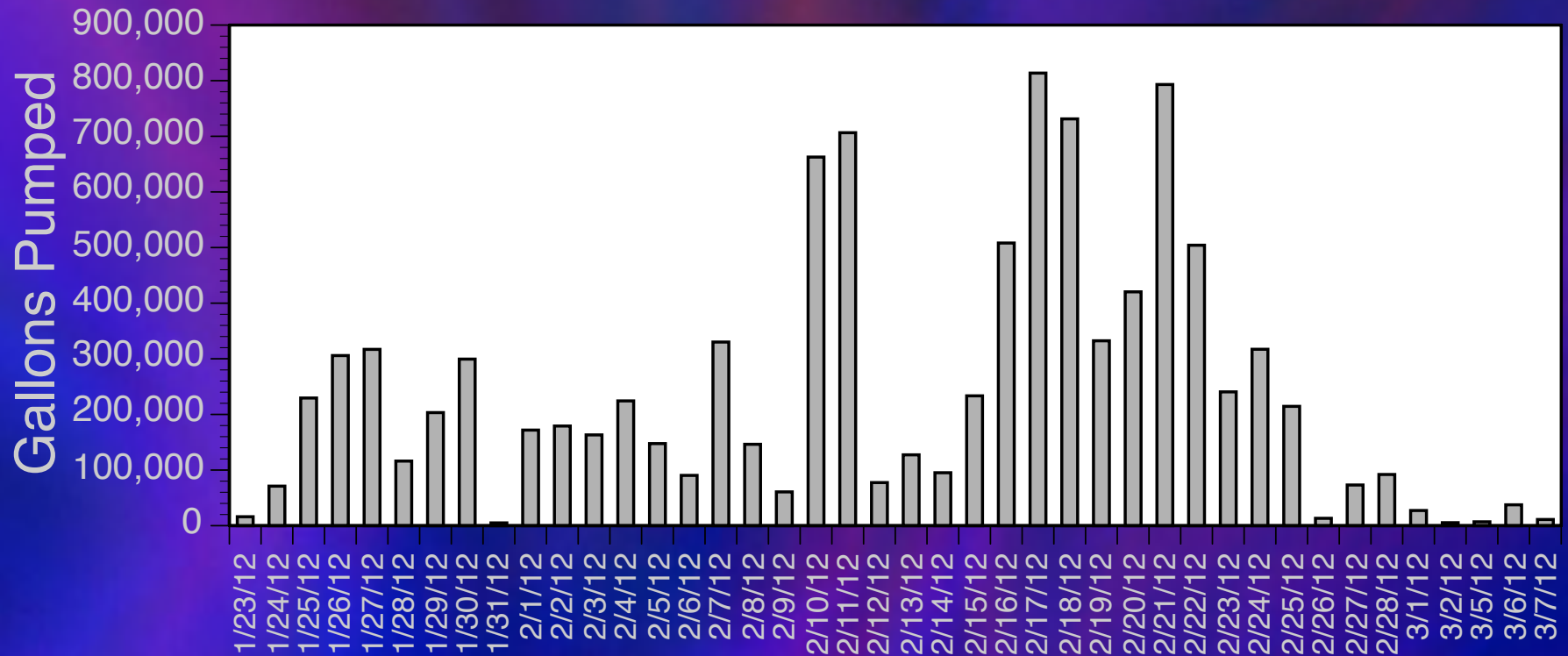
Past Day **Past Week** **Past Month**



3rd Phase – HOB0 Installation at Dodge

Date	Total Gallons	Avg. GPM	Max GPM	Date	Total Gallons	Avg. GPM	Max GPM
23-Jan	16,062	537	658	8-Feb	146,268	619	755
24-Jan	71,040	625	1,072	9-Feb	60,705	639	1,047
25-Jan	229,485	781	1,095	10-Feb	662,640	708	1,069
26-Jan	305,795	679	1,080	11-Feb	706,468	779	1,069
27-Jan	316,927	726	1,113	12-Feb	77,447	587	697
28-Jan	116,106	647	1,077	13-Feb	127,318	599	1,050
29-Jan	203,255	691	1,091	14-Feb	95,169	639	1,069
30-Jan	299,434	713	1,113	15-Feb	233,393	627	1,053
31-Jan	4,981	577	653	16-Feb	508,121	689	1,066
1-Feb	171,822	704	1,083	17-Feb	813,628	749	1,158
2-Feb	179,127	641	1,092	18-Feb	731,281	724	1,070
3-Feb	163,156	644	1,073	19-Feb	332,346	628	1,058
4-Feb	224,276	632	1,081	20-Feb	420,364	672	1,066
5-Feb	147,567	615	838	21-Feb	793,070	759	1,073
6-Feb	90,336	536	761	22-Feb	504,169	678	1,080
7-Feb	330,106	722	1,086	23-Feb	240,519	660	961

3rd Phase – HOB0 Installation at Dodge

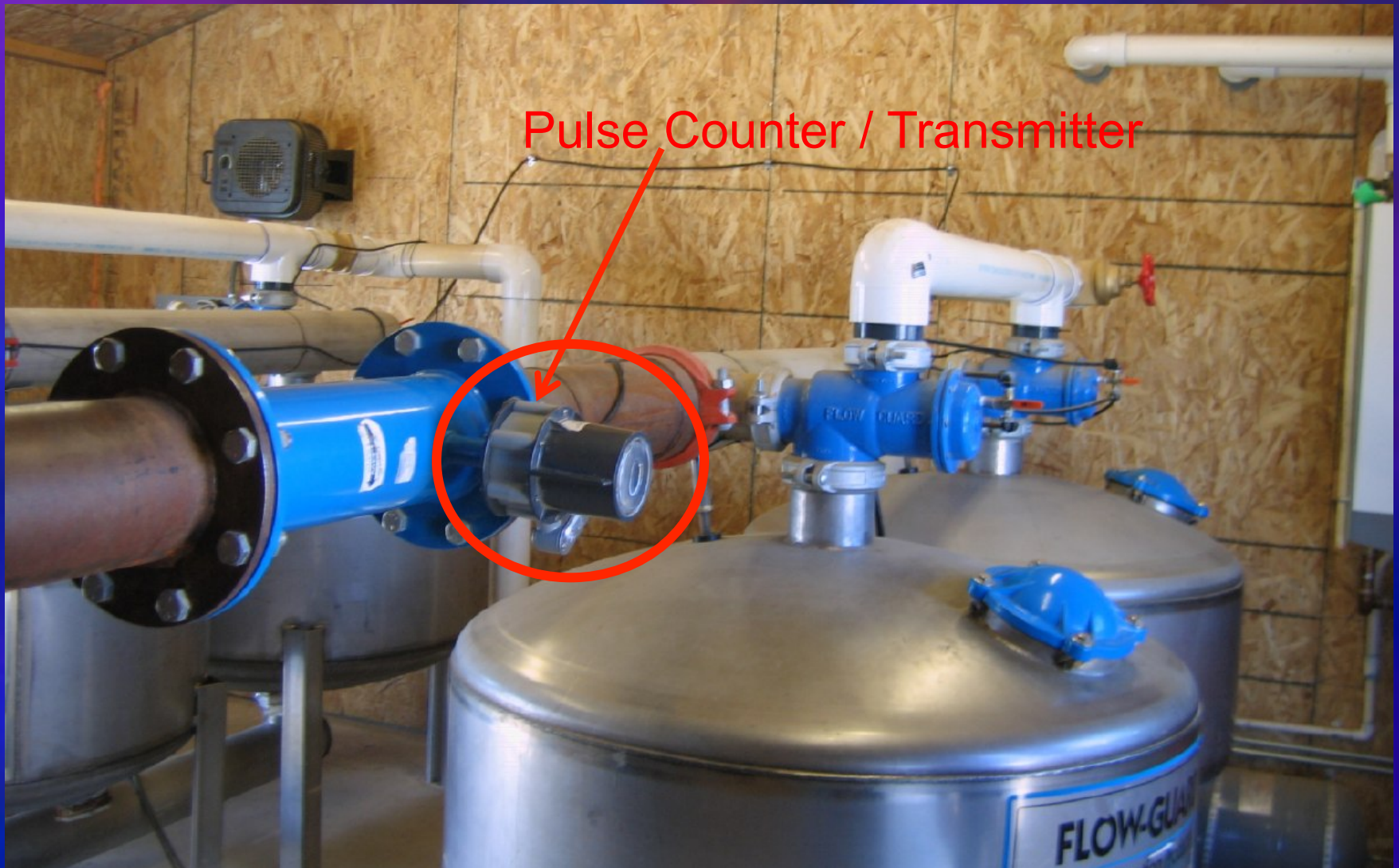


3rd Phase – McCrometer Installation

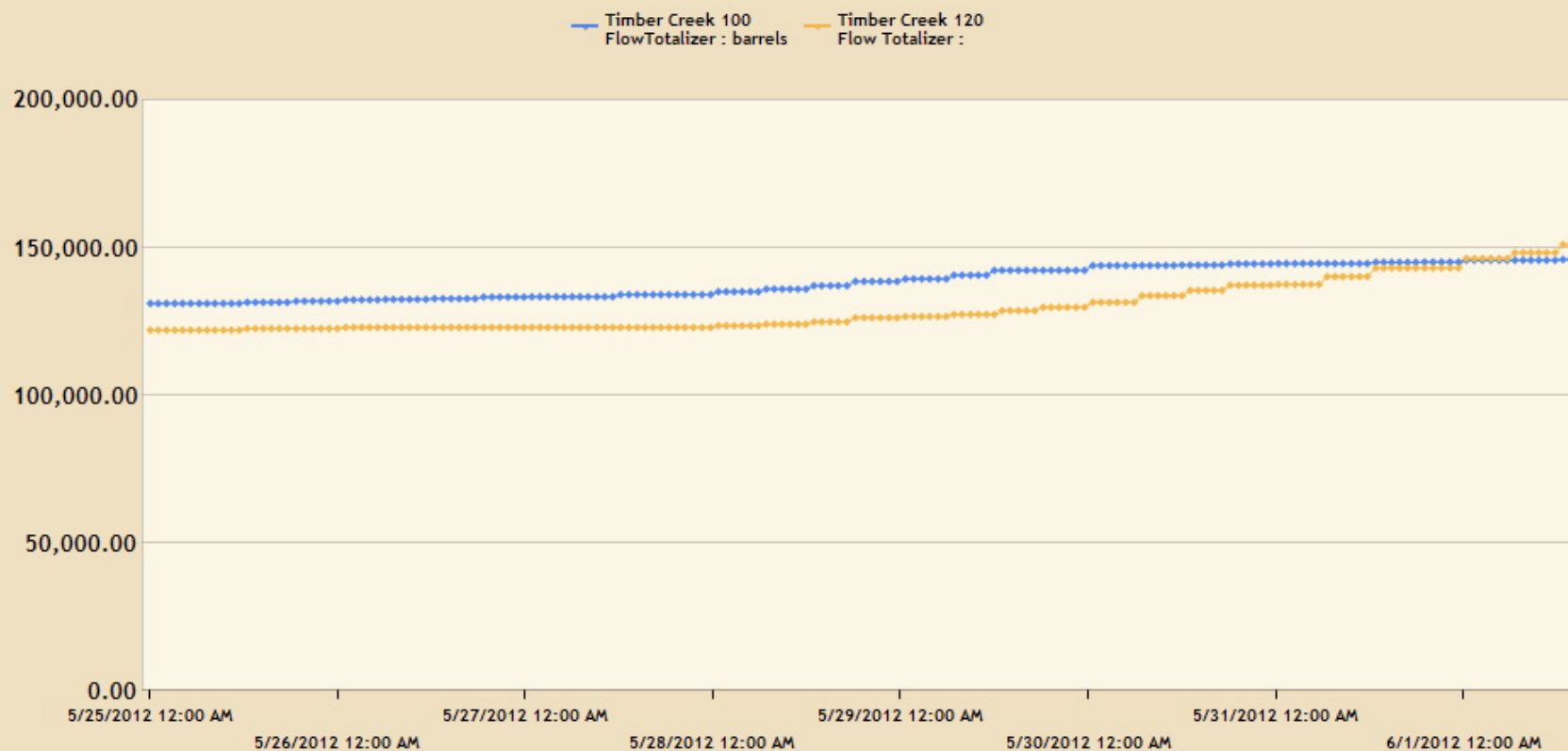
T.C. Depot : April 2012 Initial set-up ~ \$1,800+\$300+\$300



3rd Phase – McCrometer Installation



This is the new graphing page, if you wish to use the old one, it is here: [Old Graph Page](#)



Add Sensor to Graph

Timber Creek 120

Flow Totalizer

Add Sensor

From: 05-25-2012 00 00 00

To: 06-01-2012 14 13 02

Select Group to Graph

Add These Sensors to new Graphing Group

Delete

Redraw Graph

Clear Graph

Export to Excel

(GMT-06:00) Central Time (US & Canada)

[Help](#)

Telemetry Challenges

- **Network accessibility & Data up-links**
- **Equipment availability**
- **Learning curve**
- **Systems integration**
- **No New Funds : Existing Budget & Personnel**
- **Thank you to:**

Chris, Dan, Alan, Kelvin, Neil, Albert & Jon

Telemetry

- Quick ?
- Simple ?
- Easy ?

Not Really

Questions ?