



Gary Hanson, Chair  
Steve Kolbeck, Vice Chair  
Dustin Johnson, Commissioner

## SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

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October 10, 2008

Ms. Patricia Van Gerpen, Executive Director  
South Dakota Public Utilities Commission  
500 E. Capitol Avenue  
Pierre, SD 57501

RE: PS08-001

Dear Ms. Van Gerpen:

Per the request of the Commissioner's at the September 23, 2008 commission meeting, Staff is filing the following additional information for consideration in docket PS08-001:

- Updated and refined cost estimates of a controlled gas release to retrieve the second pig.
- An analysis of the utility of using alarms as a forewarning device for the arrival of the second pig
- Filter sizing and cost data for improving the removal of the debris that may be ahead of the second pig

Information sources are noted on each of the three attachments.

Although time is of the essence in this docket, due process and scheduling conflicts prevent this docket from being scheduled at the October 21, 2008 Commission Meeting. Options for the Commission to consider include waiting until the regularly scheduled meeting of November 12, 2008 or scheduling an Ad Hoc meeting the week of November 3-7, 2008.

Sincerely,

Nathan D. Solem  
Pipeline Safety Program Manager, SDPUC

attachments

**PS08-001: Controlled Gas Release Calculations for Pigging**

10/10/2008

**Data:**

Pig Manufacturer: Pigs Unlimited  
 Pig Model: VP-2BA Batching Pig 6 Inch Diameter  
 Recommended Pig Velocity: 3-5 feet per second  
 Traverse Length: 29 miles  
 Mina Discharge Pressure: 902 PSIA  
 Pierre Inlet Pressure: 881 PSIA  
 Contract Delivery Pressure: 315 PSIA  
 Maximum differential pressure: 587  
 Gas Cost Oct 2008: 5.549 per dekatherm  
 0.001033 Dekatherms per SCF  
 Gas Cost Oct 2008: 0.0057 per SCF  
 Maximum flow capacity: approximately 10,273 SCFM

**Source:**

Gordon Woods, SDIP  
 Gordon Woods, SDIP  
[www.pigsunlimited.com](http://www.pigsunlimited.com)  
 Gordon Woods estimate of pig location at 9-23-08 Commission Meeting  
 Gordon Woods, SDIP  
 Gordon Woods, SDIP  
 Gordon Woods, SDIP  
 Calculation by Nathan Solem, SDPUC Staff  
 Dave Jacobson, SDPUC Staff  
 Standard conversion factor  
 Calculation by Nathan Solem, SDPUC Staff  
 SDIP/MDU Contract

(psig) Diff. Press	(ft/sec) Velocity	(MPH) Velocity	Pig Traverse Time (Hr)	SCFM	Total SCF	\$/SCF	Total Cost
200	3	2	14.2	517	439,795	\$ 0.0057	\$ 2,507
200	4	3	10.6	689	439,582	\$ 0.0057	\$ 2,506
200	5	3	8.5	861	439,454	\$ 0.0057	\$ 2,505
300	3	2	14.2	757	643,955	\$ 0.0057	\$ 3,671
300	4	3	10.6	1,009	643,742	\$ 0.0057	\$ 3,669
300	5	3	8.5	1,262	644,125	\$ 0.0057	\$ 3,672
400	3	2	14.2	998	848,965	\$ 0.0057	\$ 4,839
400	4	3	10.6	1,330	848,540	\$ 0.0057	\$ 4,837
400	5	3	8.5	1,663	848,795	\$ 0.0057	\$ 4,838
500	3	2	14.2	1,238	1,053,125	\$ 0.0057	\$ 6,003
500	4	3	10.6	1,651	1,053,338	\$ 0.0057	\$ 6,004
500	5	3	8.5	2,064	1,053,466	\$ 0.0057	\$ 6,005
200	3	2	14.2	517	439,795	\$ 0.0086	\$ 3,760
200	4	3	10.6	689	439,582	\$ 0.0086	\$ 3,758
200	5	3	8.5	861	439,454	\$ 0.0086	\$ 3,757
300	3	2	14.2	757	643,955	\$ 0.0086	\$ 5,506
300	4	3	10.6	1,009	643,742	\$ 0.0086	\$ 5,504
300	5	3	8.5	1,262	644,125	\$ 0.0086	\$ 5,507
400	3	2	14.2	998	848,965	\$ 0.0086	\$ 7,259
400	4	3	10.6	1,330	848,540	\$ 0.0086	\$ 7,255
400	5	3	8.5	1,663	848,795	\$ 0.0086	\$ 7,257
500	3	2	14.2	1,238	1,053,125	\$ 0.0086	\$ 9,004
500	4	3	10.6	1,651	1,053,338	\$ 0.0086	\$ 9,006
500	5	3	8.5	2,064	1,053,466	\$ 0.0086	\$ 9,007

MEMO: SCFM = standard cubic feet per minute. Calculated using formula at [www.pigsunlimited.com](http://www.pigsunlimited.com)  
 Total SCF - total standard cubic feet  
 Assumes pig is not completely blocked by debris or caught in an elbow.  
 \$0.00855 per SCF represents a 50 % increase in gas cost over Oct 2008 data.

**PS08-001: Analysis of Use of Alarms as Forewarning Device to Prevent Reoccurrence**  
10/10/2008

**SDIP Differential Pressure Alarm on Filter**  
Set to 10 psi  
Calls SDIP personnel or if desired can add MDU  
Source: Gordon Woods, SDIP

**Forewarning Time Calculation**  
Piping Distance from SDIP filter to MDU regulator = approximately 300 feet

Velocity (ft/sec)	Forewarning Time At MDU Regulator (Sec)
3	100.0
4	75.0
5	60.0

MDU Distribution System Pressure Alarm is downstream of first stage regulator with no forewarning provided.  
Source: Scott Besmer, MDU

**PS08-001: Larger Filters to Improve Debris Handling**

10/10/2008

**SDIP Filter Data**

Manufacturer: Peco  
 Pressure: ANSI 600  
 Inlet/Outlet: 6"  
 Filter Pore Size: 1 micron  
 Filter Media Square Footage: 34.1  
 Average debris loading: 20 lbs  
 Debris Loading lbs per sq ft: .586  
 Source: Gordon Woods, SDIP

**MDU Filter Data**

Manufacturer: Peco  
 Pressure: 1480 psig at 100 degrees F  
 Model: 30-F-5519-8-1480-4  
 Filter Pore Size: 1 micron  
 Filter Media Square Footage: 19.63  
 Source: Mike Schoepp, MDU

Assumption: Sizing a new filter or filters to handle the debris load in front of the first pig may stop filter collapse and blow by of debris.

Item	Load in Lbs	Lb/sq ft	Media Sq Ft	Filter Option	** Filter Capital Cost	*** Installation Capital Cost	Total Capital Cost	** Delivery (Wks)
SDIP Incident Debris Load	17	0.586	29.0					
Estimated MDU Load from Incident*	20	0.586	34.1					
Total Retained	37	0.586	63.1	A	\$ 17,727	\$ 56,862	\$ 74,589	12
Assumed Debris Blow By as % of Retained Load								
50%	18.5	0.586	31.6					
160%	59.2	0.586	101.0					
225%	83.25	0.586	142.1					
500%	185	0.586	315.7					
Total Assumed Debris Load								
50%	55.5	0.586	94.7	B	\$ 25,137	\$ 57,584	\$ 82,721	12
160%	96.2	0.586	164.2					
225%	120.25	0.586	205.2	C	\$ 50,274	\$ 73,410	\$ 123,684	12
500%	222	0.586	378.8					

MEMO Cannot accurately size filter as reasonable estimates for debris blow by from first pig and debris loading ahead of second pig are difficult to make.

\* Estimate from Pat Darras, MDU

\*\* Filters costs and delivery times from Nelson Technologies, Eden Prairie, MN

\*\*\* Installation costs from Gordon Woods, SDIP

Filter Option	Sq Ft	Inlet Size	Pressure Rating	# Elements	Cost	Delivery (Wks)
A - 1 filter vessel	68.2	10"	ANSI 600	2	\$ 17,727	12
B - 1 filter vessel	102.42	12"	ANSI 600	3	\$ 25,137	12
C - 2 filter vessels	204.84	12"	ANSI 600	6	\$ 50,274	12

Filter Option	Installation Materials Cost	Installation Labor Cost	Total Installation
A - 1 filter vessel	\$ 16,862	\$ 40,000	\$ 56,862
B - 1 filter vessel	\$ 17,584	\$ 40,000	\$ 57,584
C - 2 filter vessels	\$ 33,410	\$ 40,000	\$ 73,410