BMP GUIDANCE FOR WASTEWATER TREATMENT, AND SEDIMENT AND EROSION CONTROL FOR WATER WELL DRILLING IN IOWA

INTRODUCTION

The discharge of wastewater from a water well drilling site can cause significant water turbidity or, in some cases, pollution if it is not properly monitored and controlled. This guidance document is intended to describe some of the common best management practices ("BMPs") that can be used when complying with Iowa DNR NPDES General Permit #6 anytime the wastewater is reaching a Water of the United States.

CONSIDERATIONS

Water well drilling can generate from 25 to 4000 gallons per minute of wastewater from both the drilling and pumping operations. This wastewater may contain sediments, mud and foam that can impact a stream or river. Anytime that well construction or well services related wastewater reaches a Water of the United States, the conditions of General Permit #6 will be in place for the permittee and co-permittees. Pleaser review General Permit #6 for further information on the conditions placed on the permittee and co-permittees when the permit is in force.

Although there are several different methods that can be used to treat wastewater, they all fall into one of three categories: 1) slowing, detaining or adding flocculants to the water to allow particles to drop out of the waste stream, 2) filtering the wastewater to collect the solids, and/or 3) preventing the wastewater from going to a water body. The determination of a single method or combination of methods that will be successful on a given site will depend on several factors:

1. Volume and Quality of Wastewater Discharge

A realistic assessment must be made of the expected volumes and duration of the wastewater discharge along with the quality of the wastewater generated in each phase of well construction or well services. The appropriate method of addressing a 100 GPM flow is substantially different than that for a 1000 GPM flow. Care should be taken that no more water than is necessary is wasted during the drilling process, thus limiting the amount of water to be addressed by the BMPs. If conditions change during the drilling process, you must be ready to make the necessary changes to the BMPs to prevent the discharge of impacted water into a river or stream.

2. Site Conditions

A thorough review of the conditions existing at the site is of critical importance. While not mandatory, preferred drilling sites include those that are flat, with undisturbed grassy areas, and that are away from steep slopes and loosely compacted soils. Care should be taken to site the well in a location that optimizes your ability to install and properly maintain the appropriate BMPs.

Weather conditions are an additional factor that must be considered. Snowfall, frozen soils, saturated soils, high temperatures and/or drought conditions will all have an impact on the effectiveness of the BMPs being used.

3. Best Management Practices

BMPs are those methods, practices or structures that are used by the well driller to avoid wastewater discharge or to treat the drilling wastewater during and after the drilling process. It is the driller's responsibility to make sure that the BMPs are put in place and maintained during the entire well drilling process.

BMPs for well drilling can be broadly categorized into six groups:

a. Natural grassways or buffer strips – to naturally filter out, settle and slow down water velocity during discharge;

b. Silt fences and berms – to redirect run-off to more favorable areas and to slow down or sift out solids;

c. Retention basins and settling pits – to settle out vast amounts of solids and colloidals from drilling fluids;

d. Filter bags, filter socks or other mechanical means (including flocculants) – used in conjunction with any or all of the above BMPs;

e. Land application of drilling fluids – used to irrigate land areas near the well site.

f. Discharge of water to a sanitary sewer system when allowed by the treatment works.

It is up to the driller to determine the appropriate BMPs, or combination of BMPs, that will adequately address the realistically estimated amount of wastewater in light of the existing site conditions. Because every well and every site will be unique, it is not possible to create a single set of BMPs that would suffice at all sites. However, the following pages include some of the common BMPs methods and approximate application criteria. "Best Management Practices Guide for Water Well Drilling" is a guide that looks are the common BMPs that may be considered for every site. The appropriate BMP, or mix of BMPs, will depend on the variables affecting that site.

This information was developed by the Iowa Water Well Association to help Iowa's drilling industry meet the challenges of controlling well construction and well services discharge wastewater. Due to the improvements of BMPs as General Permit #6 matures, we recommend that you check the Iowa DRN web site on a periodic basis to check for updated information. You can also subscribe to the Iowa Well Water Discharge listserv by clicking this link: IAWellDischarage@lists.ia.gov.

GENERAL PERMIT #6 PROCEDURAL REQUIREMENTS

Please view the procedural requirements of well construction and well services related wastewater discharge as found in Iowa NPDES General Permit #6 and available on the following website: http://www.iowadnr.gov/water/wells/index.html.

BEST MANAGEMENT PRACTICES GUIDE FOR WATER WELL DRILLING

I. OPEN AREA BMP

Grass Ways/Pastures

Slope	*Required sq/ft*	*Air Drilling*	*Development*	*Test Pump/Flushing*
<5%	100	10 GPM	25 GPM	50 GPM
5%-15%	350	10 GPM	25 GPM	50 GPM
15%-20%	500	10 GPM	25 GPM	50 GPM
>20%	This device should not be used on slopes of greater than 20%			

Grass Ways/Pastures with additional BMP

Slope	*Required sq/ft*	*Air Drilling*	*Development*	*Test Pump/Flushing*
<5%	100	20 GPM	40 GPM	100 GPM
5%-15%	350	20 GPM	40 GPM	100 GPM
15%-20%	500	20 GPM	40 GPM	100 GPM
>20%	This device should not be used on slopes of greater than 20%			

Manufactured Mats

Slope	*Required sq/ft*	*Air Drilling*	*Development*	*Test Pump/Flushing*
<5%	100	40 GPM	80 GPM	200 GPM
5%-15%	350	40 GPM	80 GPM	200 GPM
>15%	This device should not be used on slopes of greater than 15%			

Manufactured Mats with additional BMP

Slope	*Required sq/ft*	*Air Drilling*	*Development*	*Test Pump/Flushing*
<5%	100	80 GPM	200 GPM	200 GPM
5%-15%	350	80 GPM	200 GPM	200 GPM
>15%	This device should not be used on slopes of greater than 15%			

Open Area BMP Instructions:

1. Determine reason for BMP (Air Drilling/Development/Test Pumping/Flushing)
2. Determine slope of ground
3. Determine actual maximum encountered
4. Divide actual flow by capacity required for site conditions
5. Multiply answer of 4 by required square footage
6. This is the amount of BMP that needs to be in place

II. SILT FENCE BMP

Silt fence, when installed in accordance with manufacturer's recommendations, will retain and treat 1.5 GPM per lineal foot of fence. Care must be taken to monitor the integrity of the fence at all times. Silt fence is particularly effective when used in conjunction with other BMPs.

Silt Fence BMP Instructions:

1. Determine maximum flow rate
2. Divide flow rate by 1.5'
3. Install in compliance with manufacturer's specifications
4. Remove sediment as necessary to maintain effectiveness

III. WATER DETENTION BMP

Containment Basin/ Retention/ Check Dam/ Frack Tank

	Air Drilling	*Development*	*Test Pump/Flush*
Retention alone	10 min	5 min	3 min
Retention with pre-treatment	6 min	3 min	2 min
Retention with pre & post Treatment	4 min	2 min	2 min

Addition of baffle in retention area will deduct 1.5 minutes from retention time.***

Addition of surface skimmer submerged no more than 1.5" per ft of pit depth at exit end of retention area will deduct 1 minute from retention time.***

***In no case is less than 1.5 minutes considered adequate retention time.

Water Detention BMP Instructions:

1. Determine reason for BMP
2. Determine maximum flow
3. Multiply flow (GPM) by required minutes

IV. MECHANICAL TYPES OF BMPs

A. FILTER SOCKS

Air Drilling

Diameter	*Capacity alone*	*Capacity with PAM*
9"	8 GPM/lf	12 GPM/lf
12"	10 GPM/lf	14 GPM/lf
18"	12 GPM/lf	16 GPM/lf
24"	16 GPM/lf	20 GPM/lf

Development/ Test Pumping/ Flushing

Diameter	*Capacity alone*	*Capacity with PAM*
9”	12 GPM/lf	14 GPM/lf
12”	14 GPM/lf	16 GPM/lf
18”	16 GPM/lf	20 GPM/lf
24”	20 GPM/lf	24 GPM/lf

Filter sock capacities can be upgraded by 50 % when used in conjunction with another BMP.

Filter Socks Instructions:

1. Determine reason for BMP
2. Determine maximum flow
3. Divide maximum flow by capacity of filter sock as per manufacturer’s recommendations

B. SILT SACK

(with 30 lb/sq ft straw or 3” crushed stone base)

Percent of manufactures MAXIMUM flow rate

	Air Drilling	*Development*	*Test Pump/Flushing*
Alone	50%	60%	75%
With pre-treatment	60%	70%	75%
With pre & post treatment	75%	75%	75%

If silt sack is placed directly on ground, with no base, cut percentages in half.

Silt Sack BMP Instructions:

1. Determine reason for BMP
2. Determine maximum actual flow
3. Divide flow by percentage in chart
4. Size bag by answer of 3 using manufactures maximum flow rate

C. PAM *(Polymer Flocculants)*

Use of Polymer Flocculants

Polymer Flocculants may be added to the waste stream to remove solids. Effectiveness of this BMP is dependent on use and specifications set out in the manufacturer's recommendations. PAM must be used in conjunction with other appropriate BMPs.

V. LAND APPLICATION BMP

Containment on Landowners Parcel *(Requires permission from land owner(s))*

Discharge all wastewater in a manner that will cause it to remain contained on the landowner's parcel. If this method is used, no additional BMPs are required.

VI. SANITARY SEWER BMP

DISCHARGE TO SANITARY SEWER *(Requires permission from sewer authority)*

Discharge of wastewater to a sanitary sewer after receiving permission from the treatment works. If this method is used, no additional BMPs are required.