

STORM WATER MANAGEMENT PLAN (SWMP)

UPDATED MARCH 2007

YELLOW CREEK FIELD RIO BLANCO COUNTY, COLORADO

Prepared For:

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1.0 INTRODUCTION

The Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD), the Administrator, requires oil and gas operators to obtain a Colorado Discharge Permit System (CDPS) permit for storm water discharges associated with construction activities that disturb more than one acre. An operator who intends to seek coverage under this permit must prepare a Storm Water Management Plan (SWMP) for the construction activity. The primary objective of the SWMP is to identify Best Management Practices (BMPs) that when implemented, will meet the terms and conditions of the general permit by preventing or reducing the pollution of the waters of the State of Colorado.

BOPCO, LP (BOPCO), the Permittee, seeks coverage under the CDPS large construction permit COR-030000 (**Appendix A**), and has prepared this SWMP for new construction activities in accordance with the requirements of the permit. The SWMP was prepared in accordance with good engineering, hydrologic, and pollution control practices. The SWMP is intended to be a dynamic document that will be updated on an as needed basis to address changes in the planned development, additional disturbances, or BMPs.

2.0 SITE DESCRIPTION

2.1 Project Description

The area of construction activities that this SWMP covers are the Yellow Creek Field (Project Area). A topographical map of the Project Area is included as **Figure 1**. The construction activity (area of disturbance) is approximately 190 acres in Rio Blanco County, Colorado. The total (disturbed and undisturbed area) Project Area is approximately 15,000 acres. This project is being undertaken to explore and develop natural gas resources. The well pads, pipelines and access roads will be located on fee, state, and federal lands.

2.2.1 Construction of Access Roads and Well Pads

Access road and well pad construction will comply with the standards outlined in the BLM's *The Gold Book, Fourth Edition-2006 (Appendix F)*. Construction activities associated with building access roads and well pads consists of but may not be limited to clearing and grubbing, grading, surfacing and reclamation. In general, the construction of access roads and well pads takes approximately 45 to 60 days. Production and reclamation activities will begin immediately following the construction phase, which includes drilling and well completion. All areas not being used will be reclaimed pursuant to the Federal, State and/or Local regulations.

2.2.2 Soil Characteristics

According to the National Cooperative Soil Survey (NCSS) Web Soil Survey (accessed March 22, 2007), there are 11 soil map units within the Project Area. Water features, physical, chemical, and engineering soil properties for the above soils are included in **Table I**.

Based on the table provided in the *State of Colorado General Permit Application and Stormwater Management SWMP Guidance for Stormwater Discharges Associated with Construction Activity*, the runoff coefficient prior to construction activities for unimproved areas is 0.10 to 0.30. The characteristics of the Project Area most resemble the characteristics of the “Railroad yard areas” as shown below. Once construction activities are complete, the runoff coefficient for railroad yards will be 0.20 to 0.40.

Typical Runoff Coefficient “C” Values (ASCE 1960)

| Description of Area | “C” Value | Description of Area | “C” Value |
|-----------------------------------|-------------|---|-------------|
| Business - Downtown areas | 0.70 – 0.95 | Parks, cemeteries | 0.10 – 0.25 |
| Business - Neighborhood areas | 0.50 – 0.70 | Playgrounds | 0.20 – 0.35 |
| Residential - Single-family areas | 0.30 – 0.50 | Railroad yard areas | 0.20 – 0.40 |
| Residential - Multinuis, detached | 0.40 – 0.60 | Unimproved areas | 0.10 – 0.30 |
| Residential - Multinuis, attached | 0.60 – 0.75 | Lawns - coarse textured soil (greater than 85% sand): | |
| Industrial - Light areas | 0.50 – 0.80 | Slope: Flat, 2% | 0.05 – 0.10 |
| Industrial - Heavy areas | 0.60 – 0.90 | Average, 2-7% | 0.10 – 0.15 |
| Streets - Asphalt | 0.70 – 0.95 | Steep, 7% | 0.15 – 0.20 |
| Streets - Concrete | 0.80 – 0.95 | Lawns - fine textured soil (greater than 40% clay): | |
| Streets - Brick | 0.70 – 0.85 | Slope: Flat, 2% | 0.13 – 0.17 |
| Drives and walks | 0.75 – 0.85 | Average, 2-7% | 0.18 – 0.22 |
| Roofs | 0.75 – 0.95 | Steep, 7% | 0.25 – 0.35 |

Source: State of Colorado General Permit Application and Stormwater Management SWMP Guidance for Stormwater Discharges Associated with Construction Activity.

2.2.3 Existing Vegetation

The major plant communities within the Project Area are Big Sagebrush, Foothills/Mountain Grassland, Juniper Woodland and Pinyon-Juniper. A photograph of each location will be taken prior to beginning construction activities documenting existing vegetative cover.

2.2.4 Name of Receiving Water

The Project Area is located in the Piceance-Yellow watershed (USGS Hydrologic Unit Code 14050006), which is part of the White-Yampa River Basin. From the Project Area, storm water runoff would flow northeast from the western portion of the Project Area and to the northwest from the eastern portion of the Project Area, to Yellow Creek and ultimately the White River. The White River is located approximately 4 miles north of the Project Area. Within the Project Area, there are also a few intermittent/ephemeral drainages. Surface water hydrology is shown on Figure 2.

3.0 BMPs FOR STORMWATER POLLUTION PREVENTION

3.1 Structural and Non-Structural Sediment and Erosion Controls

A variety of techniques should be employed to reduce soil erosion and sediment loss. The selection of erosion and sediment control BMPs is contingent upon site specific conditions (e.g. topography and drainage pattern). Site-specific BMP location maps are included in Appendix D.

An extensive list of BMPs has been developed by the California Stormwater Quality Association, as part of the California Stormwater BMP Handbook, which is available online at www.cabmphandbooks.com. Best management practices obtained from the handbook, including descriptions, suitable applications, potential alternatives, design, installation, limitations, costs and maintenance, are included as **Appendix C**.

Site-specific BMP installation checklists are included in **Appendix D**. A list of common BMPs is provided below.

| TYPE OF BMP |
|--|
| Fiber Rolls (Erosion Control Logs/Wattles) |
| Earth Dikes and Drainage Swales (Diversion Dike) |
| Silt Fence |
| Velocity Dissipation Devices (Rock Apron) |
| Check Dams |
| Preservation of Existing Vegetation |
| Straw Mulch |
| Hydroseeding |
| Geotextiles and Mats |
| Rip Rap |
| Surface Roughening |

3.1.1 Best Management Practices for Access Roads

All roads would be constructed using native materials. Drainage controls such as drainage dips, ditch turnouts, ditches, or culverts would be required. Aggregate may be used for steep grades, highly erosive soils, clay soils, and to provide all weather access. Upon completion, road ditches would be revegetated.

3.1.2 Best Management Practices for Well Pads

All well pads should be graded with a gradual slope toward the reserve pit. By grading toward the reserve pits, runoff carrying sediment from the newly constructed well pad would flow toward the containment structure.

Slope stabilization techniques would be used on the cut and fill slopes. Slope stabilizers include erosion control matting, hydro-seed, mulching, riprap, terracing, or surface roughening. Erosion control logs or a similar structural control will be placed at the proper interval on the cut and fill slopes. An earth dike or a similar structural control would be placed between the well pad and the fill slope.

All stock piles would be sufficiently compacted with heavy equipment to prevent erosion and structural controls would be placed around the stockpiles. Stockpiles that would remain unused for more than a 90 day period would also be revegetated.

A diversion ditch with check dams will be placed upstream of the site to prevent runoff from entering onto the well pad. Excess debris would be periodically removed from discharge diversion and conveyance systems. This activity should be conducted in accordance with the maintenance schedule. Routine maintenance schedules would correspond with the inspection schedule discussed in **Section 6.1**.

3.2 Materials Handling and Spill Prevention

A Spill Prevention Control and Countermeasures (SPCC) plan would be completed for drilling and production activities when required under SPCC regulations. A copy of the SPCC plan will be available upon request.

Materials and petroleum products to be used during construction activities will be limited to fuel and lubricants for construction equipment and vehicles; small quantities of paints and solvents; water or gel based fracture fluids (surfactant, friction reducer, acid, potassium chloride) used during completion; produced water; and crude oil condensate.

All waste from materials imported to the construction site would be removed for disposal/recycling to an appropriate licensed disposal/recycling facility, including sanitary sewage facilities (typically portable). No wastes or other material would be buried or discharged to waters of the state.

Refueling and lubrication of vehicles would be conducted as far as possible from the existing drainage. Any spill would be promptly cleaned up and contaminated materials hauled off-site to an appropriate licensed disposal/recycling facility. Any spills that discharge into waters of the state would be reported immediately to the CDPHE.

Additional BMPs for Materials Handling and Control are contained in **Appendix C**. The following BMPs are included:

| Materials Handling and Control | |
|--------------------------------|--|
| Spill Prevention and Control | |
| Vehicle and Equipment Fueling | |
| Stockpile Management | |
| Material Delivery and Storage | |
| Solid Waste Management | |
| Hazardous Waste Management | |
| Contaminated Soil Management | |

3.3 Permanent Best Management Practices

For producing wells and gravel roads certain areas must remain unvegetated. These areas include the travel way of an access road and the working areas or established fire walls surrounding the tank batteries. Permanent BMPs are required to prevent ongoing erosion problems over the life of the project because portions of the disturbed area are left unvegetated.

Many of the structural controls that are built prior to the construction would be maintained as permanent erosion control structures during production. They include diversion dikes, earth berms, rock berms, and check dams.

4.0 Reclamation

Reclamation will begin once the well has been completed. The topsoil that was removed prior to the construction of all disturbed areas will be spread over the area. Backfilling and regrading are planned as soon as all pits have been evaporated and closed. Waste and spoil materials within the reserve pit will be buried once the water evaporates. Following reclamation, BMPs would be reinstalled until final stabilization occurs.

Revegetation will be accomplished by planting the seed mixture approved by the appropriate Federal, State and/or Local agency. Seed will be planted using a drill, and in areas not suitable for drilling, the seed will be broadcast and the area shall be raked, or chained to cover the seed. Once reclamation is complete a final photograph will be taken to document the 70 percent revegetation.

5.0 MAINTENANCE

The access road and well site will be routinely inspected to ensure that the BMPs are properly maintained. Any observed problems such as erosion, improperly installed BMPs, BMPs requiring maintenance, etc, will be documented and attended to as soon as possible, **but in no case more than 7 calendar days after the inspection.**

6.0 INSPECTIONS

Inspection of the construction areas will be performed by the field supervisor and field personnel. An inspection report will be immediately prepared and signed by the individual conducting the inspection. If the report describes deficiencies in erosion or other pollution control structures or procedures, such deficiencies will be corrected as soon as practical.

Copies of the inspection form and an example can be found in **Appendix E.**

6.1 Inspection Schedule

6.1.1 Active Construction

During construction, drilling and completion operations, the disturbed areas, structural control measures and locations where vehicles enter the site will be inspected at least **once every 14 calendar days** and after any precipitation or snowmelt event that causes surface erosion.

6.1.2 Completed Construction

After completion of the construction, but prior to returning the disturbed areas to approximate preconstruction conditions, the disturbed areas will be inspected at least **once a month.**

6.1.3 Winter Conditions

Inspections will not be required at sites where snow cover exists over the entire site for an extended period, and melting conditions do not exist. This exemption is **only** applicable during the period where melting conditions do not exist. Regular inspections, as described in **Sections 6.1.1 and 6.1.2**, are required at all other times.

6.2 Retention of Reports

Copies of the inspection reports shall be retained with the SWMP at the field office during construction, drilling and completion operations and for a minimum of 3 years following completion activities. All reports will be provided to the Administrator upon request.

6.3 Collection and Submission of Self Monitoring Information

Upon written notification from the Administrator, BOPCO will collect and report storm water effluent or ambient water quality data of the type and at the frequency specified by the Administrator.

7.0 TERMINATION

7.1 Inactivation Notice

On a site-specific basis the Permittee no longer requires coverage under this permit if all soil disturbing activities are complete and one of the following:

1. All disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with a density of at least 70 percent of pre-disturbance levels or equivalent permanent, physical erosion reduction methods have been employed.
2. Areas needed for operation of the facility are developed as stabilized unpaved surfaces.
3. Areas are returned to crop land in accordance with Colorado oil and Gas Conservation Commission (COGCC) rules and returned to control of the farmer.

At that time, the permittee will submit to the Administrator the Inactivation Notice included as **Appendix B** of this SWMP.

8.0 SWMP RETENTION

During construction and seasonal shut downs, this SWMP will be retained at BOPCO's field office. A copy of this SWMP will be made available to the Administrator upon request.

9.0 Obligation/Responsible Persons

Buys and Associates, Inc. has prepared this SWMP for BOPCO; however, BOPCO employees and/or contractors are responsible for the implementation and execution this SWMP. The authorized representative(s) for this SWMP is listed below:

Trent Green
Project Superintendent
BOPCO, LP
9949 Oswego Street, Suite 200
Parker, Colorado 80134

10.0 CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Trent M. Green Project Superintendent 4/5/07
SIGNATURE TITLE DATE

Trent Green
Project Superintendent