

FORM

27

Rev 6/99



01761015

## State of Colorado

## Oil and Gas Conservation Commission



1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109

## SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

## CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☒ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☐ Site/Facility Closure ☐ Other (describe): \_\_\_\_\_

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OGCC Employee

☐ Spill ☐ Complaint☐ Inspection ☒ NOAV

Tracking No:

OGCC Operator Number: 53970

Name of Operator: Markus Production, Inc.

Address: 621 17th Street, Suite 1001

City: Denver State: CO Zip: 80293

Contact Name and Telephone:

Mark E. Brown

No: 303-295-6910 Ext. 24

Fax: 303-295-6980

API Number: 05-121-09826

County: Weld

Facility Name: Jolly 41X-6 Produced Water Pit

Facility Number: 237325

Well Name: Jolly 41X-6

Well Number: NA

Location: (QtrQtr, Sec, Twp, Rng, Meridian): NENE, 6, 3S, 55W, 6th Latitude: 39.825597 Longitude: -103.5762

## TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): Produced Water

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☐ Y ☒ N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Pasture, Non-Cropland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Sandy Clay

Potential receptors (water wells within 1/4 mi, surface waters, etc.): Plum Bush Creek (100 ft south, and 200 ft east),

Two stock watering wells within 1/4 mi (Permits 155226 and 155227).

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):



Soils



Vegetation



Groundwater



Surface Water

Extent of Impact:

Not Yet Determined

How Determined:

Berm leaking, See NOAV 200123526

## REMEDIALATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

Discontinued pit use. Scheduled site assessment activities to determine the extent and magnitude of subsurface impacts.

Describe how source is to be removed:

Source remediation and/or removal activities will be provided once the extent and magnitude of subsurface impacts are identified.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

NA



REMEDIATION WORKPLAN (Cont.)

Tracking Number: 01761015  
Name of Operator: Markus Production, Inc  
OGCC Operator No: 53970  
Received Date: 1/7/08  
Well Name & No: Jolly 41X-6 05-121-09820  
Facility Name & No: Produced Water Pit

OGCC Employee:

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

NA

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

NA

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Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☒ Y ☐ N If yes, describe:

To determine if soil and groundwater have been impacted, five soil borings will be advanced using a direct push method. Proposed soil boring locations are illustrated on the attached Figure 1. Four borings will be advanced along the pit berm where the leak was observed. One soil boring will be advanced west of the pit to document background conditions. During drilling, soil samples will be field screened for total volatile organic vapors with a photo-ionization detector. Soil samples will be sent to an analytical laboratory for analysis of gasoline range organics (GRO) by EPA Modified Method 8015. Soil samples will also be analyzed for pH, and electrical conductivity. While it is assumed that groundwater will not be encountered during drilling activities, if groundwater is encountered, 1-inch diameter polyvinyl chloride wells will be completed in the open soil borings as temporary monitoring wells. If temporary wells are installed, they will be developed and sampled. Groundwater samples will be analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8260.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

NA

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: January 2008 Date Site Investigation Completed: TBD Date Remediation Plan Submitted: TBD  
Remediation Start Date: TBD Anticipated Completion Date: TBD Actual Completion Date: TBD

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

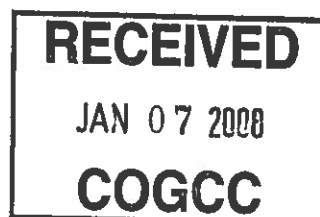
Print Name: Mark E. Brown Signed: \_\_\_\_\_

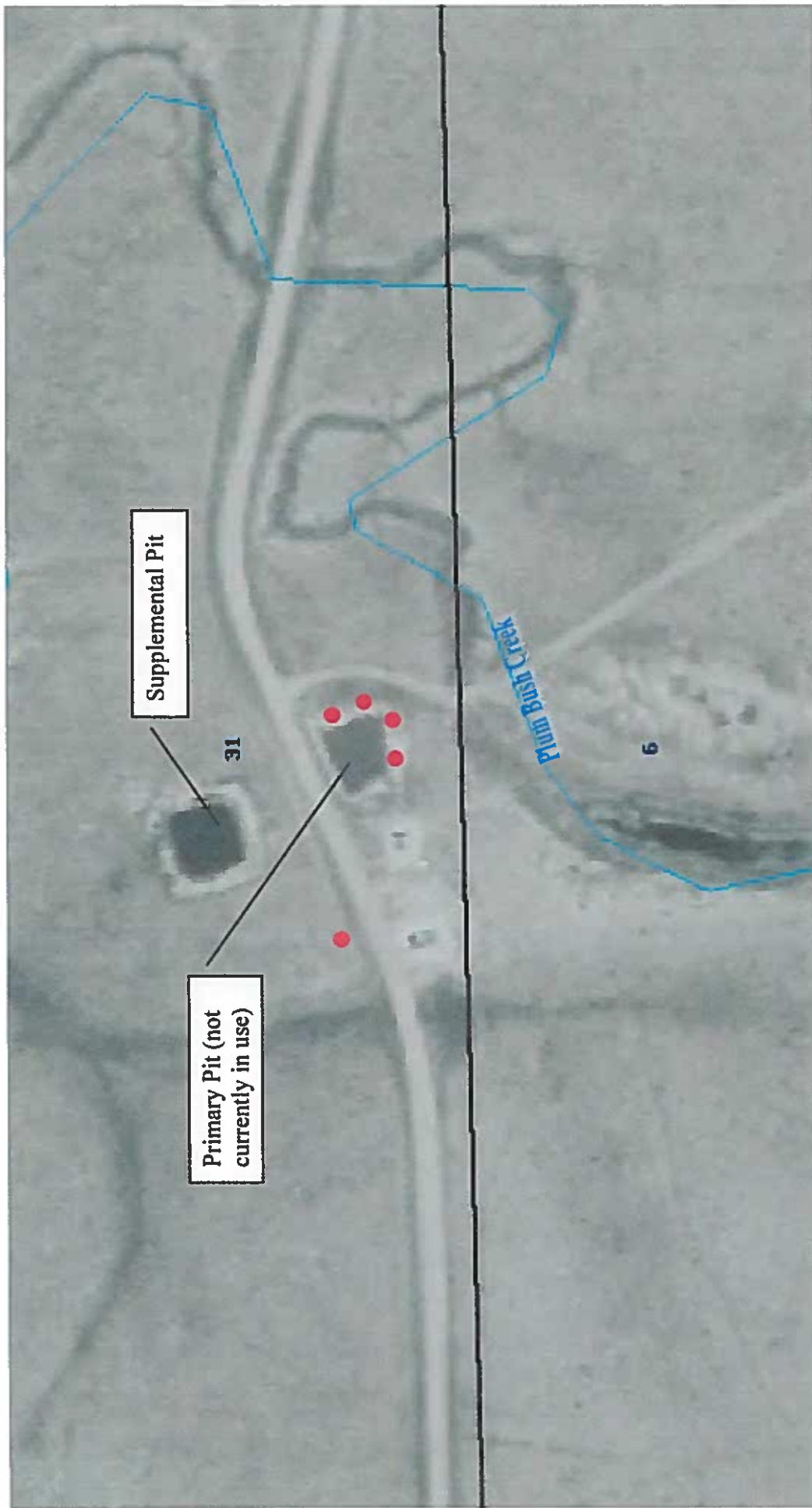
Title: \_\_\_\_\_ Date: \_\_\_\_\_

OGCC Approved: [Signature] Title: EPS Date: 1/7/08

Approved with Form 27 Attachment [Signature]

- The proposed investigation includes the advancement of five soil borings using direct-push hydraulic drilling techniques.
- Each soil boring will be sampled continuously from the ground surface to a maximum of 30 feet below ground surface (bgs) or until refusal is encountered.
- All soil samples will be field-screened using a photo-ionization detector (PID) to identify the presence or absence of volatile organic vapors.
- The sample with the highest measured organic vapor concentration will be submitted to a laboratory for analysis of gasoline range organics (GRO) and diesel range organics (DRO) using EPA modified method 8015. Soil samples from each boring will also be submitted for laboratory analysis of pH and electrical conductivity (EC), and sodium adsorption ratio (SAR).
- To assess the potential impacts to groundwater, LTE will install temporary 1-inch diameter polyvinyl chloride (PVC) monitoring wells in each of the five borings. LTE will develop each monitoring well following installation. Twenty four hours after development, LTE will return to the site to purge the wells and collect groundwater samples from each of the five monitoring wells.
- The groundwater samples will be submitted to a laboratory for the analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA method 8260. In addition, samples will be analyzed for all major cations by EPA Methods 6010, major anions by EPA Method 300.1, pH and electrical conductivity (EC), and total dissolved solids.
- LTE will make an attempt to collect two surface water samples from the upgradient and downgradient sides of Plum Bush Creek. The samples will be analyzed for the same parameters as the monitoring well water samples listed above.
- LTE will collect groundwater samples from the two shallow stock water wells mentioned in the COGCC letter dated 12/20/07.
- LTE will survey the location of each soil boring and pertinent site features using a global positioning system (GPS). LTE will also survey the relative elevations of the top-of-casing for each monitoring well such that a shallow groundwater flow direction can be measured at the site.
- Upon completion of the field work, LTE will prepare a letter report summarizing the field activities and the results of the laboratory analyses. The report will include summary tables and figures necessary to present the results of the investigation.





Site Location: NENE Sec 6, T3S, R55W

**Legend**

- Proposed Soil Boring Location

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**Figure 1**

**Proposed Soil Boring Locations  
Jolly 41X-6 Pit**

**Washington County, CO**

**Markus Production, Inc.**