MUREX® PETROLEUM CORPORATION

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April 5, 2016

Ryan Fitzpatrick
Environmental Scientist II, PG (AZ, 60038)
Groundwater Quality Program, SD DENR
523 E. Capitol Ave.
Pierre, SD 57501

Njos 34-10 – Major Modification

Dear Mr. Fitzpatrick,

Murex Petroleum proposes to plug and abandon the lower portion of the Njos 34-10 and possibly recomplete the well in the Dakota formation dependent upon the success of the P&A. This work is proposed due to the inability to pass a mechanical integrity test due to the likelihood of a hole in casing.

On the following pages, please find all application requirements for the major modification of the aforementioned well.

(1) Maps:

(a) See Document 1a for map of wells in ½ mile fixed radius area of review

(b) Not applicable

(2) The formation or formations from which oil, gas, and water wells are producing or have produced:

(a) Well previously produced from Red River B formation until 2006 when the well was recompleted and converted into an SWD

(3) The name, stratigraphic and structural description, and depth of the receiving formation or formations and the overlying confining zone or formation:

(a) Receiving Formation: Inyan Kara: 4,548-5,148'. Sandstone; light gray; fine-grained to medium-grained, angular quartz grains; silty; some calcareous cement. Shale; medium to dark gray; micaceous; fissile to blocky; soft. Shallow marine and fluvial deposits. Excellent porosity (25-30%), friable, no hydrocarbon show.

(b) Overlying Confining Zone: Mowry: 4,420-4,530'. Shale: medium – a dark gray; soft; flaky' traces of bluish-gray bentonite claystone; offshore marine deposits.

(4) The well type, construction, spud date, total depth, formation tops, record of completion or recompletion, and plugging for all oil, gas, and injection wells within the area of review, and any additional pertinent information which the secretary determines is necessary to make an

informed judgment on the issuance of a permit, including drill stem tests and well logs for all oil and gas wells identified in the area of review;

(a) See document 4a for well history and pertinent information
Well Type: Salt Water Disposal
Spud Date: 06-01-2006
Total Depth: 8,781'
Formation Tops:
Interlake 8,209'
Madison 7,075'
Minnelusa 6,190'
Minnekahta 6,025'
Pinesalt 5,705'
Dakota 4,548'

(5) Information on abandoned and active water wells, as follows:

(a) Abandoned water wells: None

(b) Active water wells: None

(6) A description of the injection well's casing and the proposed casing program, and the proposed method for testing the casing for mechanical integrity before use as an injection well;

(a) Current Casing:
9-5/8" 52.5# - 1555'
4-1/2" 11.6# & 13.5# - 8780'

(b) Proposed Casing Program:
9-5/8" 52.5# - 1555'
4-1/2" 11.6# & 13.5# - 8780'

(c) Method for Testing Casing (MIT): Set packer @ 4500', RU hot oil truck to backside of casing and pressure test to 1000 psi, must hold for 30 mins.

(7) The geologic name and the depth to and interval of all freshwater resources which may be affected by injection;

(a) Inyan Kara: 4,548-5,148'

(8) The names and addresses of the operators of the project;

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(9) Schematic drawings of the surface and subsurface construction details of the well with detailed drawings of the gauge connections;

(a) See Document 9a for surface drawing

(b) See Document 9b for subsurface drawing

(10) The source and nature of the substance or substances to be injected, its viscosity, its compatibility with the receiving formation, including stability indices, and the estimated average and maximum daily amounts to be injected. If the nature of the injected fluid is produced water,

a water quality analysis must be submitted and must include information on total dissolved solids content, chlorides, sodium, sulfates, nitrates, and hydrocarbons;

(a) See document 10a for produced water analysis to be injected

(11) The average and maximum estimated injection pressure;

(a) Maximum Injection Pressure: 1300 psi

(b) Maximum Injection Rate: 900 bpd

(12) A narrative description of any proposed production stimulation program, including a feasibility study, process description, and an explanation of how the data were determined, such as working calculations;

(a) Will attempt injectivity test if rates and pressures desired are unachievable, we will design an appropriate acid job

(13) A list of wells identified in subdivision 74:12:07:03(1) in need of corrective action or where corrective action has been performed, and a written justification describing how the corrective action will protect freshwater resources;

(a) Not applicable

(14) The injection zone characteristics, including porosity, compressibility, and intrinsic permeability;

(a) See document 14a – water analysis of injection zone

(15) The expected project life; and

(a) 30 years

(16) The surface owner's name, address, and telephone number.

Cooper Hill, LLC
Than Brengle
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603-375-3154

Sincerely,

Jakob L. Hulcy

Associate Petroleum Engineer