Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

October 25, 2019

Mr. Joseph Ogren
Project Manager
ExxonMobil Environmental Services
38 Varick Street
Brookyn, NY 11222

RE: APPROVAL FOR MONITORED NATURAL ATTENUATION STUDY
Case No. 2006-0303-BA
Former Exxon R/S No. 2-8077
14258 Jarrettsville Pike, Phoenix
Baltimore County, Maryland

Dear Mr. Ogren:

The Maryland Department of the Environment's (MDE) Oil Control Program (OCP) completed a review of the *Natural Attenuation Evaluation Report*, dated July 25, 2019, and the *Proposal for Monitored Natural Attenuation Study – Addendum*, dated September 26 2019. The *Natural Attenuation Evaluation Report* (NAER) provides the results of data collected to evaluate if subsurface conditions are conducive to natural attenuation and biodegradation of residual petroleum contamination in the project study area. The study was performed per the *Proposal for Natural Attenuation Evaluation*, dated February 4, 2019, approved by MDE on March 22, 2019.

A total of 40 monitoring wells were selected throughout the study to evaluate conditions for natural attenuation and biodegradation. Samples were collected to evaluate the presence of microbes that can degrade gasoline constituents, including methyl tertiary-butyl ether (MTBE) and, if present, evaluate if the microbes are active. Geochemical data such as dissolved oxygen (DO), pH, temperature, oxidation reduction potential (ORP), nitrate, sulfate, ferrous iron, methane, and orthophosphate were collected via field instruments and test kits for laboratory analysis. Microbial testing was conducted using Biotrap samplers and QuantArray analyses as well as performing isotopic fractionation testing to assess microbial existence, specific microbial contaminant degraders, and to demonstrate biodegradation. Based on the data evaluation, biodegradation and the potential for natural attenuation of petroleum contamination were shown to be occurring.

Site-wide ORP data were also collected from all monitoring wells throughout the Jacksonville study area. The data showed discrete areas of low ORP values to occur in the deep portion of the aquifer at 3501 Hampshire Glen Court, which also corresponded to residual petroleum concentrations observed in this area. This indicates that biodegration may be enhanced with additional dissolved oxygen.

Based on the findings, Kleinfelder, on behalf of ExxonMobil, proposes to conduct a biosparge pilot test that would introduce ambient air into the subsurface to stimulate aerobic biodegradation by increasing the dissolved oxygen. Air will be sparged at a low flowrate into MW-91C for six months at a depth of 150 feet, which will target the fracture previously identified at 145 feet. Monitoring of geochemical parameters, water levels, and biodegradation testing will be conducted at select monitoring wells (parameter testing and monitoring network is detailed in Table 5 and Figure 5 provided in the Addendum). Transducers will be used to collect temperature, pH, ORP, specific conductivity, and depth to water continuously throughout the test in wells MW-91 and MW-185. During the test, monthly groundwater gauging and sampling will be conducted at select wells. After the biosparging at well MW-91C is turned off, groundwater samples will be collected at select wells for up to a week, as noted in Figure 5 and Table 5. A Report of Results with recommendations will be submitted 45 days of receiving the post-sparge sampling results. Kleinfelder may also email a request to continue biosparging pending data results.

The MDE approves the biosparge pilot test proposal contingent upon the inclusion of MW-47C and MW-171C as part of the monitoring well network. These wells should be added to the pre-, during, and post-sparge sampling criteria (i.e., depth to water, BTEX, oxygenates, pH, temperature, ORP, DO, and ferrous ion).

Notify the case manager, Ms. Ellen Jackson, at least five working days prior to conducting field activities. If you have any questions, please contact Ms. Jackson at 410-537-3482 (*ellen.jackson@maryland.gov*) or me at 410-537-3389 (*andrew.miller@maryland.gov*).

Sincerely,

Andrew B. Miller, Chief
Remediation and State-Lead Division
Oil Control Program

cc: Joseph P. Perez, Esquire, ExxonMobil Corporation
Carlos Bollar, Esquire, Archer & Greiner, P.C.
Mr. Mark Schaaf, Kleinfelder East, Inc.
Mr. Kevin Koepenick, Manager, Groundwater Management Section, Baltimore County DEPS
Mr. Christopher H. Ralston, Program Manager, Oil Control Program
Ms. Kaley Laleker, Director, Land and Materials Administration