

# **BUCKEYE BRINE**

Treatment & Disposal

## Radiation Protection Plan

**Buckeye Brine, LLC  
Riverside Recycling Facility  
Tuscarawas, Ohio**

**A. Foreword**

Buckeye Brine, LLC is committed to conduct its operation as a constructive member of society, and to prevent by all reasonable means, the exposure of our employees and the general public to materials that are potentially hazardous to human health or the environment.

**B. General Information**

This document is the Radiation Protection Plan for the Buckeye Brine, LLC Riverside Recycling Facility. The facility treats, stores and processes aqueous fluids and sludges generated during the exploration and production of Oil and Gas.

**Street Address:**

6505 State Route 36 Rear  
Tuscarawas, Ohio 44682

**Mailing Address:**

23986 Airport Road  
Coshocton, Ohio 43812

The person at the Riverside facility responsible for radiation protection is:

**Name**

**Position**

**Phone**

David A. Durakovich

Vice President

313-790-6483

**C. Background**

Buckeye Brine, LLC's Riverside Recycling Facility receives, off-loads, stores, transfers, recycles, and treats aqueous based residuals from the exploration and production of Natural Gas and Crude Oil.

During the production of crude oil and natural gas, Naturally Occurring Radioactive Materials (NORM) are generated. The predominant radioisotopes present are Radium 226 and Radium 228, and their respective progeny, particularly Radon gas.

It has been determined that the major portion of the radioactive salts have been converted to an insoluble state prior to acceptance at the facility, and generally reside with solids present in the liquid brine.

#### **D. Activity Levels**

Materials received are well below the levels identified by DOT as requiring placarding and labeling as radioactive, and are thus not considered hazardous by DOT.

Analyses of brine received show very low levels of activity, typically well below 1 pCi/gram as Radium 226. With natural environmental background levels typically up to 2 pCi/gram, identification of Radium isotopes is not possible without exhaustive laboratory analysis.

Solids generated during the initial drilling and Hydraulic Fracturing stages of production tend to be higher than received waters, and tend to vary widely based on source geology. However, the activity levels are quite often below 5 pCi/gram above background, and are often suitable for direct placement in permitted landfills in Ohio and most other states.

Solids generated from the processing of various liquids and solids associated with the produced waters generated in the production of oil and gas from unconventional operations are often higher in Radium 226 than other materials, and require closer monitoring than other sources. Activity levels of 200 pCi/gram on a dry basis, while not a health threat in and of itself with incidental exposure, have been seen.

#### **E. Initial Monitoring**

All traffic entering the facility will be subject to monitoring.

All vessels intended to be processed in the solids facility shall be scanned using a handheld scintillation monitor.

Readings in excess of those indicated in Appendix 1, based on material type and transport vessel type will require management authorization to unload.

Samples may be required to be taken to verify material characteristics, particularly water content, prior to authorization to accept.

#### **F. Storage Tank and Processing Areas**

In order to insure minimal employee exposure to NORM, monitoring of the storage tank and processing areas according to the schedule in Appendix 2 will be performed and recorded.

Periodic monitoring will be conducted using a handheld scintillator at fixed points within the facility, and

Fixed dosimeters will be placed at high occupancy areas of the facility and processed quarterly.

Appropriate actions will be taken based on the results of the readings obtained.

Levels above those identified in Appendix 2 will require investigation and potential mitigation based on the levels obtained.

### **G. Personnel Monitoring**

All regular personnel working within the active portion of the facility shall be required to wear dosimeters which shall be processed quarterly. Additional and/or corrective actions shall be performed if levels above those as determined as acceptable by a health physicist are encountered.

### **H. Generated Solids Monitoring**

Solids generated within the facility, regardless of origin shall be monitored prior to shipment. As each disposal outlet requires different testing and monitoring prior to acceptance, the criteria and specifications for each location are listed in Table 3.

### **N. Employee Training**

All employees are trained in general, safe work practices and are given specific instructions to hazard awareness, preparedness inspections, spill prevention and spill response. Further training in radiation exposure and monitoring are given initially and on a recurring basis.

Review of readings obtained from fixed dosimeters and personnel dosimeters are reviewed quarterly.

Additional training will be provided as needed if the profile of activity levels change significantly from previous levels.