



November 2011

**Interim Sampling & Analysis Protocol for Gas Well Drill Cuttings**

Cuttings from the drilling of wells to tap natural gas in the Marcellus Shale and other deep shale formations may contain elevated concentrations of heavy metals and radionuclides as well as contaminants associated with drilling fluids. Pursuant to the Advisory Regarding Gas Well Drill Cuttings (November 29, 2011), facilities in New Jersey seeking to accept such materials shall characterize the materials using the analytical protocol prescribed below prior to their receipt.

To properly characterize the cuttings, samples from each well shall be collected at the frequency specified in the table below. Sampling of the materials should be done in accordance with the concepts of the Technical Requirements for Site Remediation (TRSR – N.J.AC. 7:26E) and the Field Sampling Procedures Manual (FSPM).

Volume of Cuttings per Well (cubic yards)	Number of Samples
0 to 20	1
20.1 to 40	2
40.1 to 60	2
60.1 to 80	2
80.1 to 100	2
100.1 to 200	3
200.1 to 300	3
300.1 to 400	4
400.1 to 500	4
500.1 to 600	5
600.1 to 700	5
700.1 to 800	6
800.1 to 900	6
900.1 to 1,000	7
1,000.1 to 2,000	8
2,000.1 to 3,000	9
3,000.1 to 4,000	10
4,000.1 to 5,000	11
5,000.1 to 6,000	12
6,000.1 to 7,000	13

7,000.1 to 8,000	14
8,000.1 to 9,000	15
9,000.1 to 10,000	16
10,000.1 to 11,000 *	17

\*With volumes greater than 10,000 cubic yards, the sampling rate is 1 per additional 1,000 cubic yards.

The collected samples shall be analyzed by DEP-certified laboratories for the parameters specified below. The analysis includes radioactive constituents because these cuttings may contain technologically enhanced naturally occurring radioactive materials (TENORM).

Laboratories certified by NJDEP to perform analyses can be found at the following website: [http://datamine2.state.nj.us/DEP\\_OPRA/OpraMain/categories?category=Certified+Laboratories](http://datamine2.state.nj.us/DEP_OPRA/OpraMain/categories?category=Certified+Laboratories)

**CHEMICAL ANALYSES:**

For chemical analysis, samples from each well from which cuttings are received shall be analyzed for the following:

1. USEPA TCL+30 without polychlorinated biphenyls (PCBs) or pesticides
2. USEPA TAL metals without cyanide
3. Extractable petroleum hydrocarbons

Analysis shall be conducted using either the following USEPA CLP Methods or USEPA SW-846 Methods in addition to the NJDEP extractable petroleum hydrocarbons method:

USEPA CLP Methods:

Statement of Work SOMO1.2 (for volatile and semivolatile organic compounds)

Statement of Work ISMO1.2 (for inorganic compounds to include mercury)

SW 846 Methods:

SW 846 Method 8260C (for volatile organic compounds)

SW 846 Method 8270D (for semivolatile organic compounds)

SW846 Method 6010C (ICP) or 6020A (ICP MS) (for metals)

SW846 Method 7471B (for mercury)

NJDEP Method:

Analysis of Extractable Petroleum Hydrocarbon Compounds (EPH) in Aqueous and Soil/Sediment/Sludge Matrices NJDEP EPH 10/08, August 2010 Revision: 3

**RADIONUCLIDES:**

For each sample required in the table above, a 1 kg sample consisting of five (5) sample aliquots shall be collected, composited and analyzed for radioactivity as follows:

Samples shall be analyzed by gamma spectroscopy for naturally occurring radioactive materials.

Analysis shall include uranium, thorium, and radium. Samples shall be dried, crushed and sealed for 21 days prior to analysis. If the results indicate Radium-226 plus Radium-228 is above 5

pCi/g, then the material may only be accepted at a site possessing a radioactive materials license.

Approved analytical methods include, but are not limited to the following:

1. Gamma Spectroscopy: DOE 4.5.2.3
2. EPA 901.1
3. HASL Ga-01-R