MEMORANDUM

TO: APPLICANTS FOR SALT WATER DISPOSAL WELLS
FROM: HEATHER BARBARE, ENVIRONMENTAL HEALTH
SUBJECT: GROUNDWATER SAMPLING PLAN GUIDANCE
DATE: FEBUARY 2015

Weld County Department of Health & Environment (WCDPHE) has prepared this Groundwater Sampling Plan Guidance for Applicants proposing Class II Waste Disposal Facilities in Weld County. This memorandum should be used for guidance proposes only and information provided is not considered regulatory requirement. Additionally, this memorandum is not intended to provide the extent of information that is required for a Groundwater Sampling Plan, but rather is intended to provide a starting point for applicants.

Class II Waste Disposal Facility Groundwater Sampling Plan Considerations:

A ground water monitoring system must consist of a sufficient number of monitoring wells installed at appropriate locations and depths which will yield ground water samples that represent the quality of background groundwater that is not potentially affected by possible sources of contamination. A ground water monitoring system must also consist of a sufficient number of monitoring wells installed at appropriate locations and depths which are capable of detecting ground water contamination located hydraulically downgradient of possible sources of contamination.

Proposed well construction information should be provided. Wells should be designed and installed in accordance with the "Water Well and Pump Installation Contractor's Act" Title 37, Article 91, Part 1, CRS, as amended. Groundwater monitoring well location and elevation should be surveyed by a Colorado licensed surveyor.

Number of monitoring wells should be determined based on site-specific technical information that must include saturated thickness, groundwater flow rate, groundwater flow direction, seasonal and temporal fluctuations of groundwater flow, geology of saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer. Applicant should include a commitment to installation of additional groundwater monitoring wells if deemed necessary.

Laboratory groundwater sampling analysis should include constituents listed in COGCC Table 910-1 and should include, at a minimum: benzene, toluene, ethylbenzene,

xylenes (BTEX), total dissolved solids (TDS), chlorides, and sulfates. Additionally, recycling facilities or a facility planning on conducting recycling activities may include in their groundwater sampling the following analytical analysis: metals analysis, volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). These may differ from the compounds listed on the COGCC Table 910-1. Please see Appendix A attachment.

Field parameters should include pH, specific conductance, temperature, and observations (odor, color, etc.). Additionally, measurements of non-aqueous phase liquids (NAPLs) should be conducted and reported.

Groundwater monitoring shall be conducted quarterly by a third party. Groundwater quality data should be statistically evaluated relative to background concentrations. Additionally concentrations should be compared to both COGCC Table 910-1 standards and CDPHE WQCC standards and classifications at points of compliance.

Leak detection well monitoring should be conducted in conjunction with groundwater sampling events and if liquid is detected in leak detection wells it should be sampled for groundwater sampling constituents.

Groundwater Monitoring Plans should include a Sampling and Analysis Plan (SAP) and a Quality Assurance Quality Control (QAQC) plan.

Groundwater Monitoring Plans should have figures (to scale) showing proposed groundwater monitoring well locations, sampling methods and procedures, monitoring well installation procedures, laboratory certification information, groundwater data evaluation procedure information, reporting procedures and schedule, commitment to WCDPHE notification and remedial action should there be a groundwater monitoring detection showing a statistically significant increase over background, detection greater than groundwater standards, or indication that a leak/spill/release has occurred.

Groundwater Monitoring Plans should include a commitment to provide quarterly information to WCDPHE in a timely manner in Groundwater Sampling Reports. Groundwater sampling reports should include all sampling information and elements described in the Groundwater Sampling Plan and presented in this memo. This includes (but is not limited to): background information and description of quarterly activities, site location, sampling dates, significant events or changes, analytical results compared to applicable standards, statistical analysis (as available), quarterly groundwater elevation data, leak detection information and sampling results, potentiometric surface maps, laboratory reports with chains of custody, current/historical fluid levels, field sheets, monitoring well information, and any deviations from the groundwater monitoring plan.

Monitoring well information should be submitted to WCDPHE to include well total depth, casing elevation, ground elevation, water elevation, screen depth, screen interval, well integrity inspections, and any damage to wells.

References can be made to COGCC Model Sampling and Analysis Plan Rules 609 and 318A.e(4) Version 1 May 1, 2013; to CDPHE Regulations Pertaining to Solid Waste Sites and Facilities 6 CCR 1007-2, Part 1; and CDPHE Standard Operating Procedures for Well Installation and Groundwater Sampling Activities (https://www.colorado.gov/pacific/cdphe/monitor-well-SOPs)

Please contact WCDPHE with any questions.

Appendix A
Skinner List

TABLE 4-5

APPENDIX VIII HAZARDOUS CONSTITUENT SUBSET FOR PETROLEUM INDUSTRY STUDIES* (SKINNER LIST)

Metals	Semi-Volatile Base/Neutral Extractable Compounds
Antimony	Anthracene
Arsenic	Benzo(a)anthracene
Barium	Benzo(b)fluoranthene
Beryllium	Benzo(k)fluoranthene
Cobalt	Bis(2-ethylhexyl)phthalate
Cadmium	Benzo(a)pyrene
Chromium	Butyl benzyl phthalate
Lead	Chrysene
Mercury	Dibenz(a,h)anthracene
Nickel	Dichlorobenzenes
Selenium	Diethyl phthalate
Vanadium	Dimethyl phthalate
	7,12-Dimethylbenz(a)-anthracene
	Di(n)octyl phthalate
	Di(n)butyl phthalate
Volatile Compounds	Fluoranthene
Benzene	Indene
Carbon disulfide	1-methylnaphthalene
Chlorobenzene	Naphthalene
Chloroform	Phenanthrene
1,2-dichloroethane	Pyridine
Ethylbenzene	Pyrene
Ethylene dibromide	Quinoline
Methyl ethyl ketone	
Styrene	Semi-Volatile Acid Extractable Compounds
Toluene	
Xylene(m-, o&p)	p-Cresol
1,4-Dioxane	m-Cresol
	o-Cresol
	2,4-dimethylphenol
	Phenol
	2,4-dinitrophenol
	Benzenethiol
	4-nitrophenol

* "Petitions to Delist Hazardous Waste - A Guidance Manual," EPA/530-SW-85-003, April 1985.