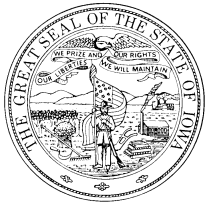


IOWA DEPARTMENT OF NATURAL RESOURCES



Beneficial Use Determination: Solid By-Product Management Plan

Analytical Testing Report

DNR Certified Lab: #113 - QC Analytical Services, LLC
 Lab Report Date: September 20, 2023
 By-Product Generator: Linwood Pile 18
 City: Davenport State: IA Zip: 52804
 By-Product Name: LKD/Off-Spec Material (Sampled 8-15-23)

Send completed report form(s), laboratory analytics, and supplemental Solid By-Product Management Plan (SBMP) documentation to:

Iowa Department of Natural Resources
 Land Quality Bureau
 Solid Waste Section
 502 E 9th St
 Des Moines, IA 50319-0034

For questions concerning this report form please contact the DNR at (515) 725-8351.

ANALYTICAL TESTING RESULTS

Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846).

Required		Synthetic Precipitation Leaching Procedure (EPA Test Method 1312)			Total Metals	
*	Contaminant	MCL	10 X MCL	Test Result	Regulatory Limit	Test Result
<input checked="" type="checkbox"/>	Antimony	0.006 mg/L	0.06 mg/L	<0.005 mg/L	31 mg/kg	<6.1 mg/kg
<input checked="" type="checkbox"/>	Arsenic	0.010 mg/L	0.10 mg/L	<0.01 mg/L	17 mg/kg	3.3 mg/kg
<input checked="" type="checkbox"/>	Barium	2.0 mg/L	20.0 mg/L	0.112 mg/L	15,000 mg/kg	12 mg/kg
<input checked="" type="checkbox"/>	Beryllium	0.004 mg/L	0.04 mg/L	<0.0002 mg/L	110 mg/kg	<0.1 mg/kg
<input checked="" type="checkbox"/>	Boron				16,000 mg/kg	6.3 mg/kg
<input checked="" type="checkbox"/>	Cadmium	0.005 mg/L	0.05 mg/L	<0.004 mg/L	70 mg/kg	0.097 mg/kg
					** (Total)	2.1 mg/kg
<input checked="" type="checkbox"/>	Chromium	0.1 mg/L	1.0 mg/L	<0.001 mg/L	(Hexavalent - VI)	mg/kg
					(Trivalent - III)	mg/kg
<input checked="" type="checkbox"/>	Cobalt				23 mg/kg	0.91 mg/kg
<input checked="" type="checkbox"/>	Copper	1.3 mg/L	13.0 mg/L	<0.002 mg/L	15,000 mg/kg	0.73 mg/kg
<input checked="" type="checkbox"/>	Fluoride	4.0 mg/L	40.0 mg/L	0.2 mg/L	4,700 mg/kg	1.61 mg/kg
<input checked="" type="checkbox"/>	Lead	0.015 mg/L	0.15 mg/L	0.00398 mg/L	400 mg/kg	5.9 mg/kg
<input checked="" type="checkbox"/>	Lithium				160 mg/kg	4.5 mg/kg
<input checked="" type="checkbox"/>	Manganese				10,000 mg/kg	320 mg/kg
<input checked="" type="checkbox"/>	Mercury	0.002 mg/L	0.02 mg/L	<0.0002 mg/L	23 mg/kg	<0.03 mg/kg
<input checked="" type="checkbox"/>	Molybdenum				390 mg/kg	1.8 mg/kg
<input checked="" type="checkbox"/>	Nickel				1,500 mg/kg	6.2 mg/kg
<input checked="" type="checkbox"/>	Selenium	0.05 mg/L	0.5 mg/L	<0.005 mg/L	390 mg/kg	<0.5 mg/kg
<input checked="" type="checkbox"/>	Silver				370 mg/kg	<0.05 mg/kg
<input checked="" type="checkbox"/>	Thallium	0.002 mg/L	0.02 mg/L	<0.005 mg/L	0.78 mg/kg	<0.5 mg/kg
<input checked="" type="checkbox"/>	Vanadium				350 mg/kg	18 mg/kg
<input checked="" type="checkbox"/>	Zinc				23,000 mg/kg	2.4 mg/kg

*Required contaminant

**If Total Chromium \geq 210 mg/kg, further analysis shall be conducted to determine hexavalent and trivalent results.

Toxicity Characteristic Leaching Procedure (EPA Test Method 1311) - [Regulatory Limits](#)

Metals				Volatile Organic Compounds			
*	Contaminant	Regulatory Limit	Test Result	*	Contaminant	Regulatory Limit	Test Result
<input checked="" type="checkbox"/>	Arsenic	5.0 mg/L	<0.3 mg/L	<input type="checkbox"/>	Benzene	0.5 mg/L	mg/L
<input checked="" type="checkbox"/>	Barium	100.0 mg/L	<0.5 mg/L	<input type="checkbox"/>	Carbon tetrachloride	0.5 mg/L	mg/L
<input checked="" type="checkbox"/>	Cadmium	1.0 mg/L	<0.02 mg/L	<input type="checkbox"/>	Chlorobenzene	100.0 mg/L	mg/L
<input checked="" type="checkbox"/>	Chromium	5.0 mg/L	<0.02 mg/L	<input type="checkbox"/>	Chloroform	6.0 mg/L	mg/L
<input checked="" type="checkbox"/>	Lead	5.0 mg/L	<0.1 mg/L	<input type="checkbox"/>	1,2-Dichloroethane	0.5 mg/L	mg/L
<input checked="" type="checkbox"/>	Mercury	0.2 mg/L	<0.002 mg/L	<input type="checkbox"/>	1,1-Dichloroethylene	0.7 mg/L	mg/L
<input checked="" type="checkbox"/>	Selenium	1.0 mg/L	<0.15 mg/L	<input type="checkbox"/>	Methyl ethyl ketone	200.0 mg/L	mg/L
<input checked="" type="checkbox"/>	Silver	5.0 mg/L	<0.02 mg/L	<input type="checkbox"/>	Tetrachloroethylene	0.7 mg/L	mg/L
				<input type="checkbox"/>	Trichloroethylene	0.5 mg/L	mg/L
				<input type="checkbox"/>	Vinyl chloride	0.2 mg/L	mg/L
Pesticides				Semi-Volatile Organic Compounds			
*	Contaminant	Regulatory Limit	Test Result	*	Contaminant	Regulatory Limit	Test Result
<input type="checkbox"/>	Chlordane	0.03 mg/L	mg/L	<input type="checkbox"/>	o-Cresol	200.0 mg/L	mg/L
<input type="checkbox"/>	Endrin	0.02 mg/L	mg/L	<input type="checkbox"/>	m-Cresol	200.0 mg/L	mg/L
<input type="checkbox"/>	Heptachlor (and its epoxide)	0.008 mg/L	mg/L	<input type="checkbox"/>	p-Cresol	200.0 mg/L	mg/L
<input type="checkbox"/>	Lindane	0.4 mg/L	mg/L	<input type="checkbox"/>	Cresol	200.0 mg/L	mg/L
<input type="checkbox"/>	Methoxychlor	10.0 mg/L	mg/L	<input type="checkbox"/>	1,4-Dichlorobenzene	7.5 mg/L	mg/L
<input type="checkbox"/>	Toxaphene	0.5 mg/L	mg/L	<input type="checkbox"/>	2,4-Dinitrotoluene	0.13 mg/L	mg/L
				<input type="checkbox"/>	Hexachlorobenzene	0.13 mg/L	mg/L
				<input type="checkbox"/>	Hexachlorobutadiene	0.5 mg/L	mg/L
				<input type="checkbox"/>	Hexachloroethane	3.0 mg/L	mg/L
				<input type="checkbox"/>	Nitrobenzene	2.0 mg/L	mg/L
				<input type="checkbox"/>	Pentachlorophenol	100.0 mg/L	mg/L
Herbicides				<input type="checkbox"/>	Pyridine	5.0 mg/L	mg/L
*	Contaminant	Regulatory Limit	Test Result	<input type="checkbox"/>	2,4,5-Trichlorophenol	400.0 mg/L	mg/L
<input type="checkbox"/>	2,4-D	10.0 mg/L	mg/L	<input type="checkbox"/>	2,4,6-Trichlorophenol	2.0 mg/L	mg/L
<input type="checkbox"/>	2,4,5-TP (Silvex)	1.0 mg/L	mg/L				

*Required contaminant

BY-PRODUCT GENERATOR CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Signature: _____ Date: 2 September 2023
 Printed Name: Darin S. Osland Title: Environmental Manager

Laboratory Report

Linwood Mining
 Darin Osland
 401 East Front Street
 Davenport, IA 52804

Date Received: 08/16/23 14:14
Date Reported: 09/20/23 11:29
Project: Beneficial Reuse
 Beneficial Reuse

Analyte	Result	Units	Analyzed	Analyst	Method	Notes
Sample ID: Stockpile 18			Date Sampled: 08/15/23 13:50		Date Received: 08/16/23 14:14	
Lab No.: 23H1648-07			Sampled by: DO			
Classical Chemistry Parameters						
Fluoride	1.61	mg/kg	08/28/23 16:13	EV	SM 4500 F D-1997	
Metals by EPA 6000/7000 Series Methods						
Silver	<0.050	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Aluminum	1600	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Arsenic	3.3	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Boron	6.3	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Barium	12	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Beryllium	<0.10	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Cadmium	0.097	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Cobalt	0.91	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Chromium	2.1	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Copper	0.73	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Lithium	4.5	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Manganese	320	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Molybdenum	1.8	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Nickel	6.2	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Lead	5.9	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Antimony	<6.1	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Selenium	<0.50	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Thallium	<0.50	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Vanadium	18	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Zinc	2.4	mg/kg	08/18/23 16:38	kc	EPA 6010C	
Mercury	<0.030	mg/kg	08/27/23 15:31	kc	EPA 7471B	
SPLP by EPA 1312						
Antimony	<0.00500	mg/L	08/25/23 13:15	kc	EPA 200.7	
Arsenic	<0.0100	mg/L	08/25/23 13:15	kc	EPA 200.7	
Barium	0.112	mg/L	08/25/23 13:15	kc	EPA 200.7	
Beryllium	<0.000200	mg/L	08/25/23 13:15	kc	EPA 200.7	
Cadmium	<0.00400	mg/L	08/25/23 13:15	kc	EPA 200.7	

Analysis Certified by:



 Randall Wanke, Laboratory Director

Linwood Mining 401 East Front Street Davenport IA, 52804	Project: Beneficial Reuse Beneficial Reuse Client Contact: Darin Osland	Reported: 09/20/23 11:29
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Analyte	Result	Units	Analyzed	Analyst	Method	Notes
Sample ID: Stockpile 18			Date Sampled: 08/15/23 13:50		Date Received: 08/16/23 14:14	
Lab No.: 23H1648-07			Sampled by: DO			
Chromium	<0.00100	mg/L	08/25/23 13:15	kc	EPA 200.7	
Copper	<0.00200	mg/L	08/25/23 13:15	kc	EPA 200.7	
Fluoride	0.200	mg/L	08/28/23 14:46	EV	SM 4500 F D-1997	
Lead	0.00398	mg/L	08/25/23 13:15	kc	EPA 200.7	
Mercury	<0.000200	mg/L	08/27/23 15:20	kc	EPA 245.1	
Selenium	<0.00500	mg/L	08/25/23 13:15	kc	EPA 200.7	
Thallium	<0.00500	mg/L	08/25/23 13:15	kc	EPA 200.7	
TCLP Extraction by EPA 1311						
Arsenic	<0.300	mg/L	08/24/23 14:27	kc	EPA 6010C	
Barium	<0.500	mg/L	08/24/23 14:27	kc	EPA 6010C	
Cadmium	<0.02	mg/L	08/24/23 14:27	kc	EPA 6010C	
Chromium	<0.02	mg/L	08/24/23 14:27	kc	EPA 6010C	
Lead	<0.100	mg/L	08/24/23 14:27	kc	EPA 6010C	
Mercury	<0.00200	mg/L	08/27/23 15:24	kc	EPA 245.2	
Selenium	<0.150	mg/L	08/24/23 14:27	kc	EPA 6010C	
Silver	<0.02	mg/L	08/24/23 14:27	kc	EPA 6010C	