

[DATE], 2011

CERTIFIED MAIL#
RETURN RECEIPT REQUESTED

Mike McDonald, Chairman
Fremont County Solid Waste Disposal District
POB 1400
Lander, Wyoming 82520

RE: Solid Waste Chapter 2 Operating Permit
Sand Draw Landfill, SHWD File #10.195

Dear Mr. McDonald:

This letter constitutes a Wyoming Department of Environmental Quality, Solid Waste Chapter 2 operating permit for the Sand Draw landfill (SHWD File # 10.195).

On May 17, 2011, the Wyoming Department of Environmental Quality, Solid and Hazardous Waste Division (Department) completed its final review of the December 23, 2010 renewal permit application for the facility identified above. The Department determined this application (including the major amendment) to be complete and technically adequate.

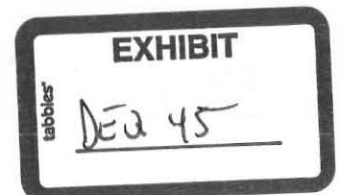
The financial assurance mechanism provided for this facility is the State Guarantee Trust Account. The annual premium payment for this facility (\$1716.74) was received by the Department on XXXXX.

On XXXXXX date, Department personnel conducted an inspection of this facility. A copy of the inspection report is enclosed. This inspection indicated that this facility was being operated in general compliance with the Solid Waste Rules and Regulations.

The operator of the facility authorized by this permit shall be responsible for complying with the terms of the permit application specified above and this permit. Based on the Department's permit application review and/or the Department's inspection of this facility, the Department has concluded that this permit shall be issued under the following conditions:

Permit Condition #1

The operator of this facility shall remove all documents from the permit application, including but not limited to appendices V and Y, which have not been signed and stamped by a Wyoming Professional Engineer (P.E.) or Professional Geologist (P.G.) as required in Chapter 2, Section 2(b)(ii) of the Solid Waste Rules and Regulations.



Permit Condition #2

The operator of this facility shall submit a lifetime renewal permit application within 270 to 180 days of the expiration of this renewal permit.

Permit Condition #3

No later than October 1, 2013, the operator of this facility shall demonstrate that the facility is not altering and will not alter groundwater. If the operator fails timely to make such a demonstration, then (i) the original eighty (80) acres shall cease receipt of waste no later than December 31, 2018 and promptly begin closure activities, and (ii) the lifetime renewal permit shall include either a performance based design or an engineered containment system design for all units of the expansion area(s) that will receive waste after December 31, 2018.

Permit Condition #4

The operator of this facility shall implement the following litter control plan:

Daily inspection and collection activities are completed on-site. Weekly inspection and collection activities are completed along the access road from Wyoming Highway 135 (a.k.a. Sand Draw Road). Quarterly inspection and collection are completed on adjacent off-site areas. In the event that daily on-site inspections identify significant off-site accumulations of litter, off-site areas will be inspected and collected within one week. Records of litter collection activities are recorded.

The operator of the facility authorized by this permit shall be responsible for complying with the terms of the permit application specified above and this permit. The operator of the facility authorized by this permit shall allow the administrator or an authorized representative, upon the presentation of credentials and other documents as may be required by law to enter upon the operator's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit, to have access to and to copy, at reasonable times, any records that must be kept under the conditions of this permit; to inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and to sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the appropriate rules and regulations of the Department, any substances or parameters at any location.

This permit is valid for four (4) years from the date of this letter. In order to renew this permit, a renewal (lifetime) permit application shall be submitted within 270 to 180 days prior to the expiration of this permit. Prior to the preparation of a renewal (lifetime) permit application, the Department strongly recommends a face-to-face pre-application meeting with the operator, manager, consultant and the Department.

Failure to comply with this permit may be grounds for permit revocation under the provisions of Chapter 1, Section 4(b) of the Wyoming Solid Waste Rules and Regulations.

If you are unable to accept any of the conditions in this permit, you must appeal this permit by sending a letter stating your objections to the Environmental Quality Council, Herschler Building, 122 West 25th Street, Cheyenne, Wyoming 82002, within sixty (60) days of your receipt of this permit.

If you have any questions regarding the Department's review, inspection or this permit, please feel free to contact Patrick Troxel at 307.335.6950.

Sincerely,

Carl Anderson, PhD
Administrator
Solid and Hazardous Waste Division

John V. Corra
Director
Department of Environmental Quality

Encl. : Inspection Report dated XXXXX
copy : Bob Doctor, Program Manager, Casper Office (w/o encl.)
: Patrick Troxel, Lander Office # SHWD File # 10.195 (w/o encl.)
: Charlie Plymale, I&C Lander Office (w/o encl.)
: Cheyenne SHWD File # 10.195 (w/ encl.)

APPENDIX Y

GROUNDWATER REPORT (SIEGEL 2010)



Trihydro

EXHIBIT

DEJ 46

tabbles

224 Stolp Avenue
Syracuse
New York 13207

March 24, 2010

Donald Connell
Fremont County Solid Waste District
P.O. Box 1400
Lander, WY 82520

Dear Mr. Connell:

This letter report constitutes an addendum to my reports:
"Compartmentalization of Ground Water at the Sand Draw #2 Landfill Site:
Assessing Independent and Multidisciplinary Approaches, "The Hydrogeologic
Integrity of the Sand Draw Sand#1 Landfill, Fremont County, Wyoming". In these
reports, I concluded that 1.) water found in monitoring wells at the Sand Draw
Landfill occurs in isolated perched water bearing zones, in contrast to a continuous
water bearing zone suggested by visualization in "potentiometric surface map"
form in engineering reports, 2.) recharge replenishment by modern precipitation
does not occur to the water-bearing zones in any meaningful way and 3.) an
extensive liner system for new landfill cells would not be needed to protect a water
table-- any leachate produced by degradation of the waste could not plausibly reach
the perched water bearing zones underneath, let alone the regional water table over
200 feet deep.

I used six independent lines of scientific evidence to come to my conclusions:

1. Dry claystone and siltstone with low permeability laterally separate water-bearing sandy zones penetrated by drilling.
2. Water levels in monitoring wells do not systematically rise after snowmelt, indicating that they are not recharged at that time of the year when recharge happens in the arid west. The water bearing zones cannot be the regional water table for this reason alone. What small water level changes occur (small enough to be caused by measurement errors or even barometric pressure changes) do not correlate between wells, clearly showing lack of hydraulic connection between them.
3. Detailed high precision earth resistivity geophysical survey data show no continuous water bearing zone, and barely the perched zones.
4. Seismic reflection studies show no continuous water bearing zone
5. Tritium activities (concentrations) in the ground water show little or no water recharged (replenished) the water-bearing zones since the mid 1960's.

6. Chemical and tritium concentration in groundwater do not systematically increase from high to lower water level elevations, completely opposite from what actually occurs in groundwater flow systems.

7. The stable isotopes of the ground water at the Sand Draw landfill are not the same as that now falling as precipitation, showing that modern replenishment has not reached the water-bearing zones in a long time, and that the sampled groundwater was recharged when the climate was very different than that today, perhaps thousands of years ago.

Since these reports, Fremont County obtained high precision radiocarbon dates for the age of water tapped by selected monitoring well and the shop well at Sand Draw landfill to determine how old the water might really be.

Bombardment of nitrogen by cosmic radiation naturally produces carbon-14 in the high atmosphere. Every 5,200 years, half of this carbon isotope decays away. Plants incorporate some of this naturally radioactive carbon as part of their tissues, which then turn back into carbon dioxide and water when the plants die and decay. Naturally, the amount of carbon-14 is balanced by the biological and geochemical systems in hydrosphere. However, when precipitation passes through the soil zone and dissolves some of the carbon dioxide in it, and then recharges the water table, the carbon-14 can no longer be replenished. From that point on, the amount of the radioisotope remaining as dissolved inorganic carbon after radioactive decay can be used to also determine when the ground water was recharged by precipitation.

Raw carbon-14 radioactivity is converted to percent modern carbon, which then can be converted to apparent carbon-14 groundwater age. In practice, accurately determining when recharge occurred from carbon-14 activity can be complicated because of chemical reactions that occur when the dissolved carbon dioxide in the ground water reacts with minerals in soils and rock and ancient organic matter in the aquifer (e.g. coal) Without taking these processes into account, measured carbon-14 ages may be older than actually present. Because of the potential complexity in getting accurate dates, some regulatory agencies view measuring ground water ages as semi-quantitative. For example, the State of Minnesota classifies its ground water as "recent, mixed, and vintage" based on tritium and carbon-14 analyses (http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html).

I chose to use a similar approach to determine if recharge to ground water at the Sand Draw site last occurred within the last hundred years, many hundreds of years ago, or thousands of years ago. If water falling on a potential landfill site can naturally reach the water table below every year or even every decade, it may be reasonable to engineer liner systems to preclude leachate generated under a landfill at the same site from also recharging aquifers underneath. But if measurable

recharge has not happened for thousands of years ago, then potential contamination can not occur in the context of human time frames.

Table 1.0 below shows the results of this analysis.

BETA	Received	Due	Submitter No.	Service	Material Pretreatment	Measured Age	13C/12C	Conventional Age	2 Sigma Calibration (Click Link to Retrieve Plot)	Report Completed
254883	Wednesday, September 23, 2009	Wednesday, October 28, 2009	R-90	AMS Standard Delivery	Water DIC: carbonate precipitation	21900 ± 75/60 BP	-19.8 ‰	22,300 ± 7,200 BP		Monday, October 29, 2009
254552	Wednesday, September 23, 2009	Wednesday, October 28, 2009	R-18	AMS Standard Delivery	Water DIC: carbonate precipitation	16960 ± 70/60 BP	-27.0 ‰	17,180 ± 7,200 BP		Monday, October 29, 2009
254550	Wednesday, September 23, 2009	Wednesday, October 28, 2009	R-12	AMS Standard Delivery	Water DIC: carbonate precipitation	4480 ± 70/40 BP	-21.8 ‰	4,200 ± 7,400 BP		Monday, October 29, 2009
254550	Wednesday, September 23, 2009	Wednesday, October 28, 2009	Shop Well	AMS Standard Delivery	Water DIC: carbonate precipitation	8790 ± 70/40 BP	-11.1 ‰	6020 ± 7,400 BP		Monday, October 29, 2009

Table 1.0 Radiocarbon analysis of water from three monitoring wells and the shop well at the Sand Draw landfill.

The columns of interest are those labeled "measured age" before present (BP) and "conventional age" before present. The ages are almost identical and the small differences between related to subtle isotopic corrections that do not change my fundamental conclusion: the water tapped by the monitoring wells and shop well entered the ground as precipitation many *thousands* of years ago. Even halving the measured age, a common additional correction done to incorporate potential dissolving minerals in the rock, produces the same result--the last time water reached the perched water-bearing zones was *thousands* of years ago.

These results agree, enhance, and support all the other lines of evidence that the water-bearing zones at Sand Draw are *compartmentalized* and *isolated* from any regional water table found deeper. The regional water table, yet unidentified under the landfill site, receives its replenishment from recharge on alluvial fans immediately adjacent to the Wind River Range, and from the Wind River itself when it rises with spring snowmelt.

I repeat my conclusions stated before:

- 1.) Water found in monitoring wells at the Sand Draw Landfill occurs in isolated perched water bearing zones, in contrast to a continuous water bearing zone suggested by visualization in "potentiometric surface map" form in engineering reports
- 2.) Recharge replenishment by modern precipitation does not occur to the water-bearing zones in any meaningful way
- 3.) An extensive liner system for new landfill cells would not be needed to protect a water table--any leachate produced by degradation of waste could not plausibly

reach the perched water bearing zones underneath, let alone the regional water table over 200 feet deep.

Donald I. Siegel, PhD.

A handwritten signature in black ink, appearing to read "Donald I. Siegel". The signature is written in a cursive style with a large initial "D".

Hydrogeologist

Quick Search:

Search

BETA	Received	Due	Submitter No.	Service	Material Pretreatment	Measured Age	13C/12C	Conventional Age	2 Sigma Calibration (Click Link to Retrieve Plot)	Report Completed
264863	Wednesday, September 23, 2009	Wednesday, October 28, 2009	R-9D	AMS-Standard delivery	{water DIC}: carbonate precipitation	21900 +/- 110 BP	-10.8 o/oo	22130 +/- 110 BP		Monday, October 19, 2009
264862	Wednesday, September 23, 2009	Wednesday, October 28, 2009	R-18	AMS-Standard delivery	{water DIC}: carbonate precipitation	16900 +/- 70 BP	-7.7 o/oo	17180 +/- 70 BP		Monday, October 19, 2009
264861	Wednesday, September 23, 2009	Wednesday, October 28, 2009	R-12	AMS-Standard delivery	{water DIC}: carbonate precipitation	4480 +/- 40 BP	-21.0 o/oo	4550 +/- 40 BP		Monday, October 19, 2009
264860	Wednesday, September 23, 2009	Wednesday, October 28, 2009	Shop Weil	AMS-Standard delivery	{water DIC}: carbonate precipitation	5790 +/- 40 BP	-11.1 o/oo	6020 +/- 40 BP		Monday, October 19, 2009



Office (307) 856-0866
 Cell (307) 851-7046
 www.precision-labs.com
 info@precision-labs.com

Laboratory Analytical Report

SAMPLE COLLECTION	LABORATORY ANALYSIS	GAS MEASUREMENT	EMISSIONS TESTING
Customer Name:	Fremont County Solid Waste Disposal Department	Order ID:	10012202
Project ID:	Landfill	Report Date:	2/2/2010

Lab Sample ID:	10012202-01	Date	Time
Customer Sample ID:	Sand Draw Landfill Office	Collection:	1/22/2010 11:00 AM
Matrix:	Aqueous	Received:	1/22/2010 11:00 AM

Notes:

Analyses	Result	Units	RL	Qual.	Method	Analysis Date/Time	Analyst
Alkalinity, Bicarbonate (HCO ₃)	200	mg/L	2		SM 2320 B	1/22/2010 4:45:00 PM	LW
Alkalinity, Carbonate (CO ₃)	18	mg/L	2		SM 2320 B	1/22/2010 4:45:00 PM	LW
Alkalinity, Hydroxide (OH)	ND	mg/L	2		SM 2320 B	1/22/2010 4:45:00 PM	LW
Bromide	ND	mg/L	1		EPA 300.0	1/25/2010 3:51:00 PM	LW
Calcium	6.7	mg/L	1		ASTM D 6919-03	1/25/2010 3:51:41 PM	LW
Chloride	14	mg/L	1		EPA 300.0	1/25/2010 3:51:41 PM	LW
Conductivity	1150	µS/cm	10		SM 2510 B	1/22/2010 4:15:00 PM	LW
Iron	0.08	mg/L	0.05		EPA 200.7	1/25/2010 10:56:00 PM	CL
Magnesium	ND	mg/L	1		ASTM D 6919-03	1/25/2010 3:51:41 PM	LW
Manganese	ND	mg/L	0.02		EPA 200.7	1/25/2010 10:56:00 PM	CL
pH	8.79	s.u.	0.01		EPA 150.1	1/22/2010 4:29:00 PM	LW
Potassium	ND	mg/L	1		ASTM D 6919-03	1/25/2010 3:51:41 PM	LW
Sodium	290	mg/L	50		ASTM D 6919-03	1/25/2010 3:00:16 PM	LW
Strontium	0.08	mg/L	0.02		EPA 200.7	1/25/2010 10:56:00 PM	CL
Sulfate	310	mg/L	50		EPA 300.0	1/25/2010 3:00:16 PM	LW

Definitions:

ND-Not Detected at the reporting limit

RL-Analyte Reporting Limit

H-Holding times for preparation or analysis exceeded

S-Spike Recovery outside accepted recovery limits

J-Analyte detected below quantitation limits

M-Matrix Effect

D-Diluted out of recovery limits

L-Analyzed by a contract laboratory



Chain of Custody & Analytical Request Record

29 Country Acres, Riverton, WY 82501 • 55 Pinedale South Rd, Pinedale, WY 82941
 Toll Free (866) 985-0866 • Email Info@Precision-Labs.com • www.Precision-Labs.com

Lab Use Only

Custody Seal: Y/N or NA | Intact: Y/N or NA | Signature Match: Y/N or NA | Receipt Temperature (°C):

Company Name: Fremont County Solid Waste Disposal

Contact Information: Name: Don Connell Phone: 332-7040 Email: fcsydd@wyoming.com Address: _____

Report Preferences: Email Mail Fax

Sample Origin (State): WY

Report Mailing Address: PO BOX 1400, Lander WY 82520

Project Name, PWS #, Permit #: _____

Invoice Preferences: Open Invoice Oildex Hard Copy

Purchase Order: _____

Invoice Contact Information: Name: _____ Phone: _____ Email: _____ Address: _____

Sampler Name: CORY FABRIZIUS

Quote/Bottle Order: _____

Regulatory Agency

UST Drinking Water

NPDES RCRA-EPA

OTHER WOGCC

Sample Identification (Name, Location, Interval, Etc.):	Collection Date:	Collection Time:	Number of Containers:	Sample Matrix: <small>Water (W), Gas (G), Soil (S), Solids (SB), Liquefied Gas (LQ), Other (O)</small>	Analysis Requested:										Normal Turnaround	Rush 3-5 Days	Urgent! <3 Days	Sample Comments:
					Ca, Mg, Na, K, Fe, Mn, Sr	SO4, Cl, Br	Conductivity	pH	Alkalinity									
<u>SAND DRAW LANDFILL OFFICE</u>	<u>1/21/10</u>	<u>11:00</u>	<u>2</u>	<u>W</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>10012202</u>
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Relinquished By: (Printed & Signature)

[Signature]

Date & Time:

1/21/10 11:00

Shipped By:

HAND

Received By:

CORY FABRIZIUS

Date & Time:

1/21/10 11:00

Relinquished By: (Printed & Signature)

Date & Time:

Sample Disposal:

Return to Client
 Lab Disposal

Received By:

Date & Time:
