

## 2.0 Reporting Requirements

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This report has been completed in accordance with the requirements of Permits PR-16078 Section 9.3, Subsections (a) to (j), of The Environmental Management Act Permit No.: PR-16078

### 9.3(a) The category and tonnage of waste received, recycled and discharged for the preceding calendar year

A summary of the waste streams / materials received at the Tervita Northern Rockies Secure Landfill is provided in the table below. Table 1 breaks down the waste substances and volumes accepted in 2016.

Table 1 – 2016 Waste Substance and Summary

Substance	Tonnage
Landfill Cement	14.57
Construction & Demolition Material	241.86
Contaminated Soil - Crude oil/Condensate	397.47
Contaminated Soil - Mercury/Metals	2,522.61
Contaminated Soil - Produced/Salt Water	1,095.63
Contaminated Soil - Refined Fuels/Oils	5,328.58
Desiccant	93.42
Frac Sand - Non-Radioactive	237.36
Sulphur	72.14
Miscellaneous Waste - Industrial	2,199.72
Drilling Waste Hydrocarbons	21,305.05
Drilling Waste Gel Chemical	588.93
Liner Disposal	15.7
<b>Total 2016 Tonnage</b>	<b>34,113.04</b>

In 2016, 48,397.50 m<sup>3</sup> of leachate from the Landfill was processed and disposed of at approved Oilfield Waste Management Facilities.

Analysis was done between 2013 to 2016 for waste types received to determine trends. In September 2013, Tervita switched internal reporting and coding systems, thus not all 2013 data will be consistent with 2014 and 2015. See Table 2 and Graph 1 for the trend analysis.

Table 2 - Waste Types Received from 2013-2016

<b>Waste Number</b>	<b>Substance</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
1	Drilling Waste KCl	3168.9	0.00	0.00	0.00
2	Drilling Waste Advanced Gel Chem	0.00	3,107.48	964.02	0.00
3	Drilling Waste Gel Chem	4652.04	14,399.11	1,948.81	588.93
4	Drilling Waste Hydrocarbon	46612.03	51,892.68	50,433.64	21,305.05
5	Desiccant	0.00	37.22	28.80	93.42
6	Incinerator Ash	0.00	3.75	0.00	0.00
7	Produced Sand	0.00	908.80	1,821.50	0.00
8	Flare Pit Material	0.00	743.67	0.00	0.00
9	Lime	0.00	142.00	0.00	0.00
10	Miscellaneous Wastes	6168.24	4,590.19	4,603.08	2,199.72
11	Hydrocarbon Contaminated Material	8528	7,926.34	0.00	0.00
12	Cement	5.88	110.02	32.78	14.57
13	Cement Returns (Dry)	0.00	1,295.32	0.00	0.00
14	Frac Sand (non-radioactive)	3320.85	934.90	40.81	237.36
15	Contaminated Soil w/ Sulphur	0.00	0.00	55.83	0.00
16	Contaminated Soil w/ Refined Fuels	25482.54	3,295.24	1,760.19	5,328.58
17	Contaminated Soil w/ Produced / Salt Water	8306.31	4,431.12	7,453.41	1,095.63
18	Contaminated Soil w/ Mercury / Metals	1253.5	292.45	868.60	2,522.61
19	Contaminated Soil w/ Crude oil / Condensate	835.35	241.22	169.53	397.47
20	Contaminated Soil (chemical / Solvent)	172.02	0.00	0.00	0.00
21	Construction / Demolition	330.1	279.70	379.29	241.86
22	Liner Disposal	0.00	92.94	89.02	15.70
23	Catalyst Non-Sulphur	131.44	0.00	0.00	0.00
24	Sulphur	39.74	0.00	0.00	72.14

## 2.0 Reporting Requirements

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This report has been completed in accordance with the requirements of Sections 9.3, Subsections (a) to (j), of The Environmental Management Act Permit No.: PR-17150.

### 9.3(a) The category and tonnage of waste received, recycled and discharged for the preceding calendar year

A summary of the waste streams / materials received at the Tervita Silverberry Secure Landfill from January 1, 2016 to December 31, 2016 are in Table 1.

**Table 1 – Waste Substance Summary**

Substance	Tonnage
Cement - Landfill	63.29
Construction & Demolition Material	2.95
Contaminated Soil - Chemical/Solvent	34.26
Contaminated Soil - Crude Oil/Condensate	2,008.96
Contaminated Soil - Mercury/Metals	3,287.51
Contaminated Soil - Produced/Salt Water	11,719.03
Contaminated Soil - Refined Fuels/Oils	16,974.64
Contaminated Soil w/ Sulphur	507.4
Desiccant	74.47
Frac Sand - Non Radioactive	130.33
Incinerator Ash	101.17
Hydrocarbon Contaminated Material	27,905.59
Contaminated Process Material	27,613.27
Sulphur	794.57
Miscellaneous Wastes - Industrial	1,289.74
Drilling Waste Hydrocarbons	99,029.39
Drilling Waste - Gel Chemical	16,879.54
NORM Waste	9,466.29
Drilling Waste - Advanced Gel Chemical	8,609.56
Liner Disposal	1238.68
Re-frac Brick - Non NORM	42.5
Non-friable Asbestos	79.12
<b>Total Tonnage 2016</b>	<b>227,852.26</b>

In 2016, 51,936 m<sup>3</sup> of leachate from the Landfill was processed and sent for deepwell disposal at one of Tervita's Oilfield Waste Management Facilities. The 2016 Leachate Disposal Volume Summary is included as Attachment 1. Analysis was done on 2013 to 2016 waste types received to determine trends. In September 2013, Tervita switched internal reporting and coding systems, so 2013 totals are combined volumes from the two separate systems. See Table 2 and Graph 1 for the trend analysis.

**Table 2: Waste Types Received in 2013 to 2016**

<b>Waste Number</b>	<b>Substance</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
1	Catalyst Non-Sulphur	16.87	343.25	135.99	0.00
2	Catalyst Sulphur	26.44	69.11	133.52	0.00
3	Cement	970.09	2,019.14	26.62	63.29
4	Construction & Demolition Material	0.00	184.40	79.94	2.95
5	Contaminated Soil (Chemical/Solvent)	146.86	610.64	455.30	34.26
6	Contaminated Soil (Crude Oil/Condensate)	41,029.72	28,432.98	11,522.66	2,008.96
7	Contaminated Soil (Mercury/Metals)	29,007.38	6,931.11	259.52	3,287.51
8	Contaminated Soil (Produced/Salt Water)	30,377.42	35,230.80	28,264.36	11,719.03
9	Contaminated Soils (Refined Fuels / Oils)	35,727.17	16,735.90	16,650.13	16,974.64
10	Contaminated Soils (Sulphur)	109.81	205.44	33.62	507.40
11	Desiccant	73.44	4.17	102.03	74.47
12	Frac Sand ( Non- Radioactive)	677.20	154.03	179.85	130.33
13	Incinerator Ash/ Buffer	10,733.76	6,518.82	4,813.56	101.17
14	Sand Produced	0.00	38.21	147.19	0.00
15	Flare Pit Material	36,050.25	29,530.04	19,801.29	0.00
16	Hydrocarbon Contaminated Material	14,022.33	11,432.67	12,452.99	27,905.59
17	Lime Sludge	0.00	238.02	0.00	0.00
18	Contaminated Process Material (Pad Waste)	0.00	6,172.69	38,499.96	27,613.27
19	Sulphur	1,673.96	1,252.75	784.40	794.57
20	Misc. Waste Industrial	48,539.95	37,690.38	8,786.13	1,289.74
21	Drilling Waste Hydrocarbons	386,367.57	273,564.65	235,227.71	99,029.39
22	Drilling Waste Gel Chemical	89,634.66	17,355.56	14,501.63	16,879.54
23	NORM	27,783.78	16,775.32	8,133.21	9,466.29
24	Drilling Waste Advanced Chemical	76,916.30	49,559.34	40,874.71	8,609.56
25	Liner Disposal	0.00	1,348.42	888.33	1,238.68
26	Refractory Brick - Non-NORM	0.00	0.00	0.00	42.50
27	Non-Friable Asbestos	0.00	0.00	0.00	79.12