

ORIGINAL

ILLINOIS POLLUTION CONTROL BOARD

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STATE OF ILLINOIS  
Pollution Control Board

IN THE MATTER OF:

PROPOSED AMENDMENTS TO  
REGULATION OF PETROLEUM  
LEAKING UNDERGROUND STORAGE  
TANKS (35 ILL. ADM. CODE 732)

R01-26  
(Rulemaking – Land)

*P.C. #3*

COMMENTS OF ROBERT CARSON

Introduction

My name is Robert Carson. I am a senior project manager at Goodwin Environmental Consultants, Inc. My responsibilities at GEC include geotechnical engineering and preparation of Leaking Underground Storage Tank reports and Corrective Action Plans. My professional experience consists of four years of work as a geotechnical engineer, seven years as a permit writer and remediation program supervisor in the Illinois Environmental Protection Agency Bureau of Land, three years as an environmental compliance manager in industry, 2-1/2 years of remediation experience at a Department of Energy site, and 3-1/2 years of experience with LUST projects in Illinois.

My education includes a B. S. degree in Civil Engineering, B. S. degree in Earth Science, and M. S. degree in Civil Engineering (May 2001). I am licensed as a Professional Engineer in the State of Illinois.

35 Ill. Adm. Code § 732, Appendix C, Backfill Volumes

I wish to comment on the Board's proposal to revise Appendix C of the regulation. In the past, this appendix provided guidance on the allowable volume of backfill that could be removed during early action. The amendment proposes the addition of tonnages associated with these backfill volumes. This addition to the appendix is beneficial because the weight of contaminated soil disposed at a landfill is routinely determined, but the volume of removed backfill is difficult to determine.

My concern with the proposed regulation is that these tonnages are not representative of field conditions, and are inconsistent with the default soil bulk densities ( $\rho_b$  or  $\rho_s$ ) identified in 35 Ill. Adm. Code § 742.

The unit weight for removed backfill used in developing the table in the proposed regulation was 100 lbs/ft<sup>3</sup> (bulk density = 1.60 g/cm<sup>3</sup>); the unit weight for replacement backfill used in the table was 103.7 lbs/ft<sup>3</sup> (bulk density = 1.66 g/cm<sup>3</sup>). Presumably, the backfill material being removed is sand. This proposed bulk density is not representative of field conditions, and is inconsistent with the default value for sand bulk density in 35 Ill. Adm. Code § 742, Appendix C, Tables B and D. In Appendix C, Table B, the default dry bulk density for sand is 1.8 g/cm<sup>3</sup>. Even with no moisture content considered, the unit weight of the sand would be:

$$\begin{aligned}\gamma_{\text{dry}} &= 1.8 \times 62.4 \text{ lbs/ft}^3 \\ &= 112.32 \text{ lbs/ft}^3\end{aligned}$$

where  $\gamma_{\text{dry}}$  = dry unit weight of soil, lbs/ft<sup>3</sup>

When the moisture content of the sand is considered, the discrepancy increases. A typical moisture content for sand excavated from a UST excavation is 10%.

$$\begin{aligned}\gamma_{\text{wet}} &= \rho_{\text{dry}} \times 62.4 \text{ lbs/ft}^3 \times (1 + \omega) \\ &= 1.8 \times 62.4 \times (1 + 10\%/100\%) \\ &= 123.55 \text{ lbs/ft}^3\end{aligned}$$

where  $\gamma_{\text{wet}}$  = moist unit weight of soil, lbs/ft<sup>3</sup>  
 $\rho_{\text{dry}}$  = dry bulk density of soil, g/cm<sup>3</sup>  
 $\omega$  = moisture content (weight basis), %

The Board should adopt an as-excavated unit weight of between 120 and 125 lbs/ft<sup>3</sup> for backfill removal in this table.

Backfill (replacement) sand will typically be drier than the backfill sand removed from the excavation. A moisture content of 5% is probably representative. This would make the backfill (replacement) unit weight:

$$\begin{aligned}
 \gamma_{\text{fill}} &= \rho_{\text{dry}} \times 62.4 \text{ lbs/ft}^3 \times (1 + \omega) \\
 &= 112.32 \text{ lbs/ft}^3 \times 1.05 \\
 &= 117.93 \text{ lbs/ft}^3
 \end{aligned}$$

The Board should adopt a unit weight of approximately 118 lbs/ft<sup>3</sup> for backfill replacement in this table. My suggested corrections are shown in the following table.

### 35 III. Adm. Code § 732, Appendix C Suggested Corrections

Volume of Tank gallons	Backfill Removal c.y. <sup>1</sup>	Backfill Removal Tons <sup>2</sup>	Backfill Removal Tons <sup>3</sup>	Backfill Replacement c.y. <sup>4</sup>	Backfill Replacement Tons <sup>5</sup>	Backfill Replacement Tons <sup>6</sup>
<285	54	73	90	56	78	89
285 to 299	55	74	91	57	80	91
300 to 559	56	76	93	58	81	92
560 to 999	67	91	111	70	98	112
1,000 to 1,049	81	109	135	87	122	139
1,050 to 1,149	89	120	148	96	134	153
1,150 to 1,999	94	127	156	101	141	161
2,000 to 2,499	112	151	186	124	174	198
2,500 to 2,999	128	173	213	143	200	228
3,000 to 3,999	143	193	237	161	225	256
4,000 to 4,999	175	236	291	198	277	315
5,000 to 5,999	189	255	314	219	307	349
6,000 to 7,499	198	267	329	235	329	374
7,500 to 8,299	206	278	342	250	350	398
8,300 to 9,999	219	296	364	268	375	427
10,000 to 11,999	252	340	418	312	437	497
12,000 to 14,999	286	386	475	357	500	569
>15,000	345	466	573	420	588	669

#### NOTES

1. Backfill removal volume from proposed regulation.
2. Backfill removal tonnage from proposed regulation.
3. Backfill removal tonnage based on unit weight of 123 lbs/ft<sup>3</sup>.
4. Backfill replacement volume from proposed regulation.
5. Backfill replacement tonnage from proposed regulation.
6. Backfill replacement tonnage based on unit weight of 118 lbs/ft<sup>3</sup>.



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