Section III

CHANGES IN THE WASTE STREAM OVER TIME

Like most things in our fast paced society, waste composition changes over time.
Eight of the landfills that were studied in 1999 were observed again in 2008. Comparing the change in waste sectors and components for those eight facilities provides an opportunity to see trends in the Missouri waste composition.

The MSW Sector was 59.6% in 1999. The MSW sector at the eight landfills that were observed in 2008 remained virtually the same at 58.3%. The landfills with the greatest change had major changes in service providers delivering waste and/or other facilities nearby that opened or closed.

Table III-1: Changes in the MSW Sector

Facility-MSW	2008	1999
Black Oak	96.6%	95.0%
Columbia	64.0%	58.0%
Courtney Ridge	33.2%	59.0%
Fred Weber	46.8%	31.0%
Lemons	59.8%	71.0%
Maple Hill	53.7%	78.0%
Prairie View	69.2%	77.0%
St. Joseph	53.7%	25.0%
Statewide	**58.3%**	**59.6%**

The Construction Sector was 5.5% in 1999. The 2008 study found construction waste was drastically reduced to 1.6%. As noted earlier in the report, new home construction was down drastically in 2008 which translated into a drop in construction waste.

Table III-2: Changes in the Construction Waste Sector

Facility-Construction	2008	1999
Black Oak	0.2%	0.5%
Columbia	5.0%	7.4%
Courtney Ridge	1.3%	4.8%
Fred Weber	3.1%	16.0%
Lemons	0.4%	0.4%
Maple Hill	0.2%	0.8%
Prairie View	0.7%	0.7%
St. Joseph	1.7%	3.7%
Statewide	**1.6%**	**5.5%**

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Table III-3: Changes in Demolition Waste Sector

The demolition waste sector remained relatively constant between 1999 and 2008. In 1999 the demolition waste sector was 13.0%. The 2008 demolition waste sector was 0.2% more (13.2%). The same economic conditions that caused a drop in the construction sector did not seem to affect the demolition waste sector.

Facility-Demolition	2008	1999
Black Oak	1.8%	1.0%
Columbia	22.1%	13.7%
Courtney Ridge	11.0%	7.0%
Fred Weber	16.4%	34.4%
Lemons	14.4%	7.3%
Maple Hill	6.0%	8.3%
Prairie View	12%	6.8%
St. Joseph	16%	20.9%
Statewide	**13.2%**	**13.0%**

Table III-4: Changes in Industrial Waste Sector

The Industrial Waste Sector was 11.8% of the total waste stream in 1999. That percentage dropped 1.1% in 2008. Seven of the eight landfills were close to 1999 percentages.

Facility-Industrial	2008	1999
Black Oak	1.1%	1.6%
Columbia	5.9%	18.1%
Courtney Ridge	20.7%	20.0%
Fred Weber	8.5%	6.8%
Lemons	21.7%	20.8%
Maple Hill	4.8%	10.8%
Prairie View	12.9%	14.9%
St. Joseph	21.8%	22.9%
Statewide	**10.7%**	**11.8%**

Table III-5: Changes in 'Other' and Special Waste Sector

The 'Other' waste sector and the special waste sector were combined in 1999. There were significant changes between the two studies. The statewide percentage increased by 5.9% from 1999 to 2008. Most of that increase was contaminated soil.

Facility-Special & Other	2008	1999
Black Oak	0.3%	1.4%
Columbia	3.0%	2.9%
Courtney Ridge	32.8%	9.1%
Fred Weber	25.2%	11.6%
Lemons	3.6%	0.5%
Maple Hill	35.4%	2.3%
Prairie View	5.1%	0.9%
St. Joseph	7.0%	27.4%
Statewide	**16.0%**	**10.1%**

The waste sector percentages for the 15 landfills and transfer stations that were observed were fairly similar to the percentages found in 1999 in three of the five sectors. The MSW sector (59.6% in 1999 vs. 58.3% in 2008) was relatively the same, changing less than 1% over the last decade. The demolition waste sector (13.0% in 1999 vs. 13.2% in 2008) was almost identical. The industrial waste sector (11.8% in 1999 vs. 10.7% in 2008) was lower but not significantly so.

Two of the waste sectors changed noticeably. The construction waste sector was less than a third (5.5% in 1999 vs. 1.6% in 2008) of what it was a decade ago. The Special/Other waste sector was significantly higher (10.1% in 1999 vs. 16.0% in 2008) than it was ten years ago. The statewide changes in the major waste sectors are displayed in the chart below.

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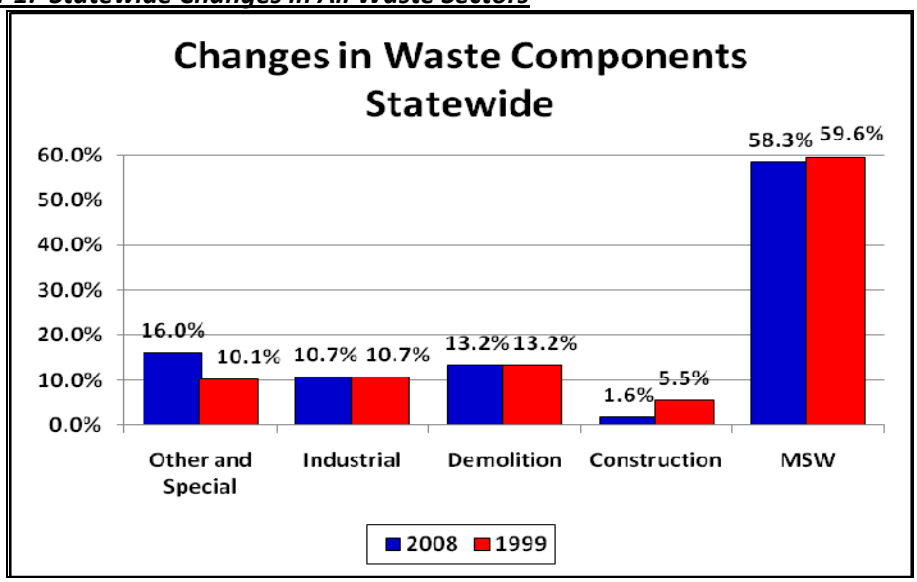
Chart III-1: Statewide Changes in All Waste Sectors



DIFFERENCES IN THE WASTE STREAM BASED ON DEMOGRAPHICS

Missouri has three distinct demographic divisions. According to U.S. Census estimates the 2007 Missouri population was 5,842,713.

- 62% live in either the St. Louis Metro area or the Kansas City Metro area
- 11% live in one of the small metro areas (Springfield, Joplin, Columbia, or St. Joseph)
- 27% live in rural areas

The composition and quantity of waste generated from each of these demographic units may be slightly different.

Large Metro Areas:

There are two large metropolitan areas in Missouri: Kansas City and St. Louis. Each of these areas has a different solid waste profile. **The Kansas City area** has two sanitary landfills (Courtney Ridge and the City of Lee's Summit) and one demolition landfill (Pink Hill Acres). The combined 2007 tonnage for these three landfills was 641,962. Courtney Ridge and Pink Hill Acres were observed during the study. The waste sector percentages for these landfills are listed in Table III-6:

Table III-6: Kansas City Area Waste Sector Percentages

KC Area Landfill	% MSW	% Const.	% Demo.	% Ind.	% Other	% Special
Courtney Ridge	33.2%	1.3%	11.0%	20.7%	2.4%	31.4%
Pink Hill Acres	0.0%	5.1%	93.8%	0.9%	0.1%	0.1%

If the Lee's Summit landfill composition is the same as the Courtney Ridge composition, the estimated waste sector tonnage for the Kansas City area (using the percentages in Table III-6) is estimated in Table III-7:

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Table III-7: Kansas City Area Waste Sector Tonnage

KC Area Landfill	2007 Tonnage	Estimated MSW Tons	Estimated Const. Tons	Estimated Demo. Tons	Estimated Ind. Tons	Estimated Other Tons	Estimated Special Tons
Courtney Ridge	520394	172771	6765	57243	107722	12489	163404
Lee's Summit	86909	28854	1130	9560	17990	2086	27289
Pink Hill Acres	34659	0	1768	32510	312	35	35
Total KC Area	**641962**	**201625**	**9663**	**99313**	**126024**	**14610**	**190728**

The St. Louis area has two sanitary landfills (Fred Weber and Oak Ridge), two demolition landfills (Peerless and Rock Hill) and four transfer stations that ship waste out of state (Bridgeton TS, St. Louis north TS, St. Louis south TS, and the St. Louis waste TS). The combined 2007 tonnage for these eight facilities was 2,381,243.

The Fred Weber landfill and the St. Louis north Transfer Station were observed during the study. The waste sector percentages for these facilities are listed in Table III-8:

Table III-8: St. Louis Area Waste Sector Percentages

St. Louis Area Facilities	% MSW	% Const.	% Demo.	% Ind.	% Other	% Special
Fred Weber	46.8%	3.1%	16.4%	8.6%	3.1%	22.0%
St. Louis North TS	65.1%	1.7%	8.2%	4.9%	12.7%	7.4%

If the Oak Ridge landfill composition is the same as the Fred Weber composition, the Peerless and Rock Hill composition is similar to the Pink Hill Acres composition, and all of the transfer station composition is similar, the estimated waste sector tonnage for the St. Louis area (using the percentages listed in Table III-8) is estimated in Table III-9:

Table III-9: St. Louis Area Waste Sectors

St. Louis Area Facilities	2007 Tonnage	Estimated MSW Tons	Estimated Const. Tons	Estimated Demo. Tons	Estimated Ind. Tons	Estimated Other Tons	Estimated Special Tons
Fred Weber	995443	465867	30859	163253	85608	30859	218997
Oak Ridge	149378	69909	4631	24498	12847	4631	32863
Peerless	155798	0	7946	146139	1402	156	156
Rock Hill	95808	0	4886	89868	862	96	96
North TS	202891	132082	3449	16637	9942	25767	15014
South TS	117510	76499	1998	9636	5758	14924	8696
St. Louis TS	250790	163264	4263	20565	12289	31850	18558
Bridgeton TS	413625	269270	7032	33917	20268	52530	30608
Total St. Louis Area	**2381243**	**1176891**	**65064**	**504513**	**148976**	**160813**	**324988**

Small Metro Areas:

There are four small metro areas in Missouri: Springfield, Joplin, St. Joseph, and Columbia. Joplin waste is sent to the Prairie View Landfill in Lamar, MO. However, the Joplin waste is only a portion of the waste received at Prairie View. The remaining three metro areas each have their own municipal landfill. The waste sector percentage for each facility is listed in Table III-10.

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Table III-10: Small Metro Waste Sector Percentages

Small Metro Landfill	% MSW	% Const.	% Demo.	% Ind.	% Other	% Special
Columbia	64.0%	0.5%	22.1%	5.9%	0.3%	2.7%
Springfield	50.0%	2.4%	26.9%	11.8%	6.6%	2.4%
St. Joseph	53.7%	1.7%	15.8%	21.8%	0.8%	6.2%

The estimated waste sector tonnage for each of the small metro areas (using the percentages listed in Table III-10) is estimated in table III-11:

Table III-11: Small Metro Area Waste Sectors

Small Metro Landfills	2007 Tonnage	Estimated MSW Tons	Estimated Const. Tons	Estimated Demo. Tons	Estimated Ind. Tons	Estimated Other Tons	Estimated Special Tons
Columbia	175175	112112	8759	38714	10335	526	4730
Springfield	103140	51570	2475	27745	12171	6704	2475
St. Joseph	136964	73550	2328	21640	29858	1096	8492
Total Small Metro	**415279**	**237232**	**13562**	**88099**	**52364**	**8326**	**15697**

It is difficult to find any reliable statistical similarities in the waste composition between the three small metropolitan areas. Columbia has a municipal collection service and therefore controls their waste flow to a certain degree. The St. Joseph composition depends to a large degree on where the MSW service providers take their waste (there is a nearby landfill in Kansas). Much of the Springfield city waste is collected by WCA and Allied Waste, much of which is transferred to Black Oak (WCA facility) and Prairie View (Allied Waste facility).

Rural Areas:

About 27% of Missouri residents live in rural areas. Seven rural landfills and one rural transfer station were observed during the study:

- Black Oak landfill near Hartville
- IESI Timber Ridge landfill in Washington County
- Jefferson City in Cole County
- Lemons landfill near Dexter
- Maple Hill landfill near Macon
- Prairie View landfill near Lamar
- Show Me near Warrensburg
- The Neosho Transfer Station in Newton County

The waste sector percentage for each facility is listed in Table III-12.

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Table III-12: Rural Waste Sector Percentages

Rural Landfills & TS	% MSW	% Const.	% Demo.	% Ind.	% Other	% Special
Black Oak LF	96.6%	0.2%	1.8%	1.1%	0.0%	0.3%
IESI Timber Ridge LF	78.7%	0.7%	8.0%	9.7%	0.3%	2.6%
Jefferson City LF	52.5%	0.7%	19.3%	8.3%	0.1%	19.1%
Lemons LF	59.8%	0.4%	14.4%	21.7%	0.7%	2.8%
Maple Hill LF	53.7%	0.2%	0.6%	4.7%	0.3%	35.1%
Prairie View LF	69.2%	0.7%	12.1%	12.9%	2.0%	3.1%
Show-Me LF	80.4%	0.3%	4.0%	11.1%	3.6%	0.6%
Neosho TS	57.9%	0.6%	13.1%	27.1%	0.1%	1.2%

The estimated waste sector tonnage for each of the rural area landfills and transfer stations (using the percentages listed in Table III-12) is estimated in table III-13:

Table III-13: Rural Area Waste Sectors

Rural Landfills & TS	2007 Tonnage	Estimated MSW Tons	Estimated Const. Tons	Estimated Demo. Tons	Estimated Ind. Tons	Estimated Other Tons	Estimated Special Tons
Black Oak LF	362734	350401	725	6529	3990	0	1088
IESI Timber Ridge LF	172796	135990	1210	13824	16761	518	4494
Jefferson City LF	200218	105114	1402	38642	16619	200	38242
Lemons LF	108696	65000	435	15652	23587	762	3043
Maple Hill LF	168386	90423	337	10103	7914	505	59103
Prairie View LF	581253	402227	4068	70332	74982	11625	18019
Show-Me LF	173894	139813	522	6956	19302	6260	1043
Neosho TS	18683	10817	112	2447	5063	19	224
Total Rural	**1786660**	**1299785**	**8811**	**164485**	**168218**	**19889**	**125256**

On average, rural landfills and transfer stations received a greater percentage of MSW and a smaller percentage of construction, demolition, industrial, and special waste.

Demographic Conclusions:

There are some noticeable trends when the waste sectors are compared demographically. Table III-14 lists the percentage of each major waste sector by demographic area. Chart III-2 provides the same information graphically.

Table III-14: Waste Sector Percentages by Demographic Area

Demographic Area	% MSW	% Const.	% Demo.	% Ind.	% Other	% Special
KC Area	31%	2%	15%	20%	2%	30%
St. Louis Area	49%	3%	21%	6%	7%	14%
Small Metro	57%	3%	21%	13%	2%	4%
Rural	73%	1%	9%	9%	1%	7%
Statewide	58.3%	1.6%	13.2%	10.7%	2.5%	13.5%

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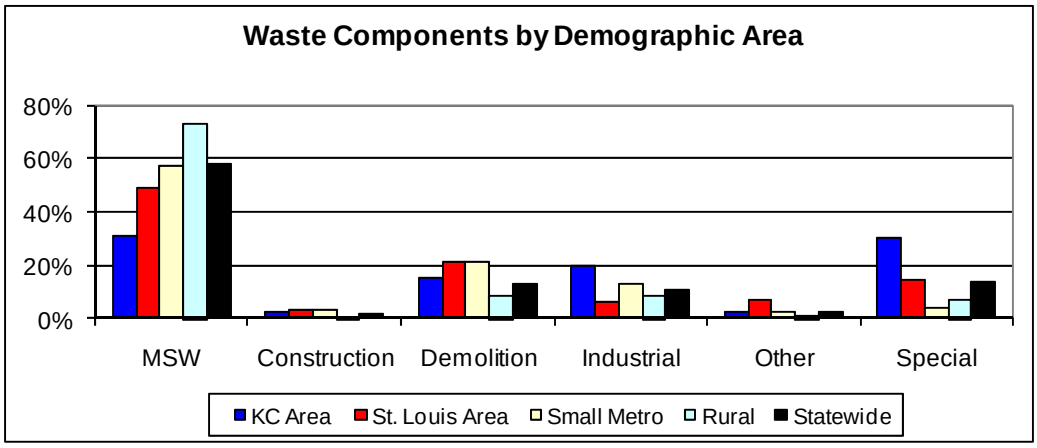
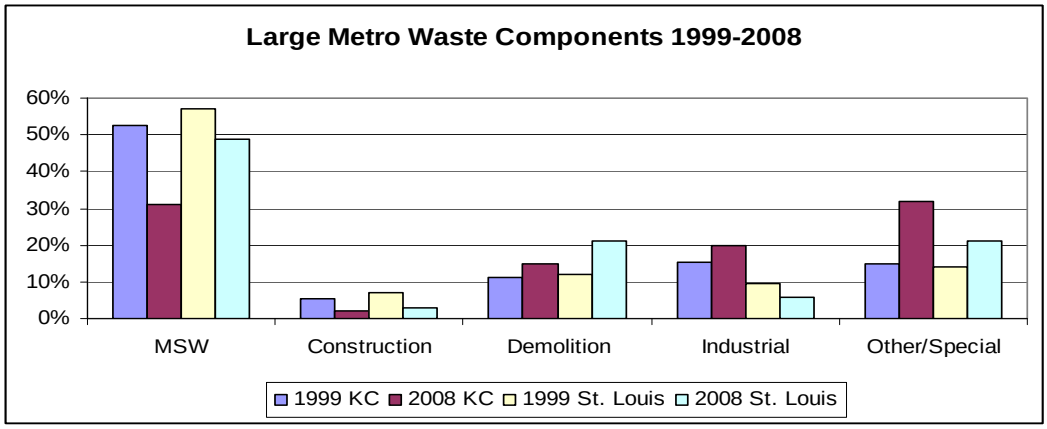
Chart III-2: Waste Sector Percentages by Demographic Area



The most noticeable difference between the demographic areas is the percentage of MSW. The MSW percentage in the large metro areas is considerably less than the statewide average percentage. In contrast the rural MSW percentage is considerably higher.
The 2008 waste sectors for the large metro were similar to the 1999 percentages with one major exception. During the observation week at the Courtney Ridge landfill in Kansas City there was a large amount of contaminated soil (2917 tons) that skewed all of the other waste sector percentages. Comparisons can be seen in Chart III-3.

Chart III-3: Waste Sector Changes in the Large Metro Areas



The Small Metro landfill waste sectors changed over the ten year period from 1999-2008. All three landfills (Columbia, Springfield, and St. Joseph) received a higher percentage of MSW in 2008. 2008 construction and demolition waste sectors were comparable to the 1999 levels but industrial and other/special waste sectors showed a lower percentage. Comparisons can be seen in Chart III-4.

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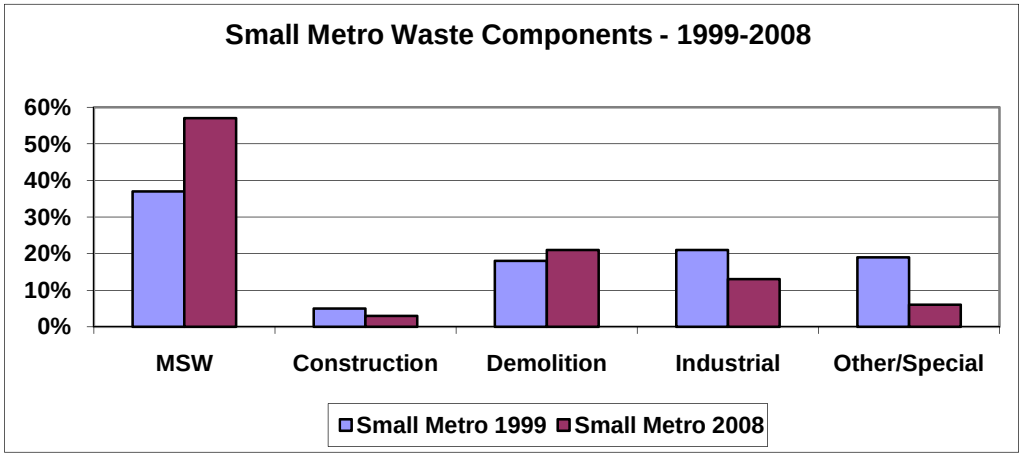
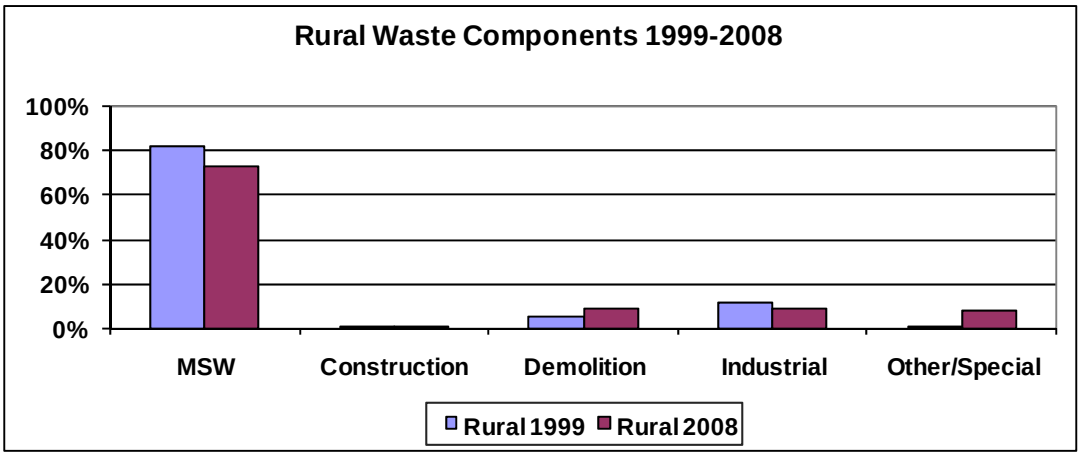
Chart III-4: Waste Sector Changes in the Small Metro Areas



The rural waste sectors changed very little in the last ten years. The percentage of MSW changed slightly (9% less in 2008 than in 1999) and there was more other/special waste due to the large amount of contaminated soil received at the Maple Hill landfill during the observation week. The percentage of the remaining waste sectors remained relatively the same. Comparisons can be seen in Chart III-5.

Chart III-5: Waste Sector Changes in the Rural Areas



Variables in the Missouri Waste Composition:

Contaminated Soil: Observing the landfills during the 1999 and 2008 study periods and writing the reports for each of these studies has shown that the largest variable from one week to the next and one landfill to the next is the amount of contaminated soil received. All other waste sectors are relatively stable and can be predicted with some degree of reliability from one week to the next. However, contaminated soil is very heavy and the amount of soil and the occurrence of projects cannot be predicted. During the 2008 study 5,548 tons (8.2% of the total waste observed) of contaminated soil was delivered to the landfills during the observation periods. This percentage could change from week to week depending on the location and scope of the contaminated soil projects.

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Service Provider Changes: Private service providers account for the vast majority of MSW waste collection in Missouri. Contracts are constantly changing and many times waste is delivered to a different landfill or transfer station because the service provider owns that facility. This changes the composition of the sectors delivered to the individual landfill or transfer station over time.

Exported Waste: Some of the waste collected in Missouri is exported to surrounding states, with Kansas and Illinois receiving the majority of the export. In calendar year 2007 approximately 2,181,426 tons of waste were exported to surrounding states (Arkansas, Illinois, Iowa, Kansas, Kentucky, and Tennessee). (Source: The Missouri Department of Natural Resources 2007 Waste Diversion Report.)

Landfill Closings: As landfills close the waste is distributed to other available landfills. In 1999 two large landfills were part of the study, Southeast in KC and the Bridgeton Landfill in St. Louis. It is difficult to determine where the waste from these closed facilities has gone and how that changed the composition of waste for these areas in 2008.

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