What is the LMO-2?

- (615 ILCS 50/4) (from Ch. 19, par. 120.2) Sec. 4. The Department of Natural Resources in allocating water from Lake Michigan shall require a metering device or other method of measuring the quantity of all water withdrawn or diverted from Lake Michigan watershed and may require any and all records, information or data which may be reasonably essential to proper accounting for such water.

(Source: P.A. 89-445, eff. 2-7-96.)
• b) As a condition of receiving an allocation of Lake Michigan water, all permittees will agree to submit to the Department proposals designed to reduce or eliminate wasteful water use and to reduce unaccounted-for flows to 8% or less, based on net annual pumpage, and procedures used to determine efficiency of water metering or accounting in permittee's system.

(Source: IL Admin Code 3730: 307b)
What is the LMO-2?

• a) Within 60 days of the end of each accounting period, all permittees shall furnish the following information and such other information relevant to the Lake Michigan allocation as the Department may require on forms provided by the Department: …

(Source: IL Admin Code 3730: 309a)
What is the LMO-2?

- The amount and percentage of water from all sources for the accounting period used for each of the following purposes:
  - Total water use
  - Pumpage to other communities, pumpage from other sources
  - Hydrant usage
  - Consumption by different uses (i.e. residential, street cleaning, sewer flushing)
  - Unaccounted for leakage
  - Unavoidable leakage
# Unavoidable Leakage

- Maximum Unavoidable Leakage (MUL) is an exemption based on the age and mileage of pipes:

## Cast Iron Pipes With Lead Joints

<table>
<thead>
<tr>
<th>Age of Pipe</th>
<th>Miles of Pipe</th>
<th>Leakage Rate $\times$ Unavoidable Leakage</th>
</tr>
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<tbody>
<tr>
<td>60 yrs. or greater</td>
<td>_________</td>
<td>$3000 \text{ g/d/}	ext{mi} = \text{__________ g/d}$</td>
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<tr>
<td>40-60 yrs.</td>
<td>_________</td>
<td>$2500 \text{ g/d/}	ext{mi} = \text{__________ g/d}$</td>
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<td>20-40 yrs.</td>
<td>_________</td>
<td>$2000 \text{ g/d/}	ext{mi} = \text{__________ g/d}$</td>
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<tr>
<td>20 yrs. or less</td>
<td>_________</td>
<td>$1500 \text{ g/d/}	ext{mi} = \text{__________ g/d}$</td>
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## All Other Types of Pipes and Joints

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<td>20 yrs. or less</td>
<td>_________</td>
<td>$1000 \text{ g/d/}	ext{mi} = \text{__________ g/d}$</td>
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## Total Leakage Calculations

9. Total Miles ________  

10. Total Maximum Unavoidable Leakage, in MGD (divide total leakage on line 9 by 1,000,000) ________________ MGD  

(Enter this amount on line 31)
Unaccounted for Flow

• $\text{(Net Pumpage} - \text{Hydrant Use} - \text{MUL}) = \text{Unaccounted for Flow}$

• Unaccounted for Flow $\div$ Net Pumpage $=$ should held below 8%
Regional water loss attributed to unaccounted for flow and maximum unavoidable leakage as percentages of net annual pumpage, 1999-2010
Regional Water Loss Attributed to Maximum Unavoidable Leakage and Unaccounted for Flow, 1999-2010
The Chicago Effect

Regional water loss attributed to unaccounted for flow and maximum unavoidable leakage as percentages of net annual pumpage, 1999-2010. Excluding the City of Chicago
The Chicago Effect

Regional water loss attributed to maximum unavoidable leakage and unaccounted for flow, excluding the City of Chicago, 1999-2010

- Water Lost (mgd)
- Year

Graph showing the water lost in mgd from 1999 to 2010, categorized by MUL, UFF, and Total (MUL+UFF).
Number of Permittees Reporting UFF Greater than 8% Total Annual Pumpage

- 1999: 18
- 2000: 30
- 2001: 29
- 2002: 27
- 2003: 25
- 2004: 26
- 2005: 29
- 2006: 30
- 2007: 33
- 2008: 40
- 2009: 38
- 2010: 36

Metropolitan Planning Council
MUL + UFF > 8%

Number of Permittees Reporting (MUL + UFF) > 8% of Total Annual Pumpage
Using pipe age to calculate leakage

- A 120-year old pipe is very different than a 60-year old pipe… but not for calculating MUL.

- A 60-year old pipe is very similar to a 59-year old… but not for calculating MUL.
Using pipe age to calculate leakage

• MUL is almost certainly an overestimate of loss in relatively new systems
• MUL is possibly an underestimate of loss in relatively older systems
• In neither case is it accurate
• Provides not incentive to actually go measure
Creating water

Number of Permittees reporting Accounted for Flow > 100% of Net Pumpage

[Graph showing the number of permittees reporting accounted for flow exceeding 100% of net pumpage from 1999 to 2010. The graph displays a general increase in the number of permittees reporting such flow from 1999 to 2003, followed by a decrease and then a steady state from 2004 to 2010.]
MUL all over the place

Community with Strong MUL Variations
Illinois, 1999-2010

% Maximum Unavoidable Leakage to Net Annual Pumpage

Year

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Permittee 1  Permittee 2  Permittee 3  Permittee 4

Metropolitan Planning Council
MUL all over the place

Reported Maximum Unavoidable Leakage for Permittee 5, 1999-2010

% Maximum Unavoidable Leakage to Net Annual Pumpage

Year

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Metropolitan Planning Council
Pipes all over the place

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UFF/MUL vs. “Non-revenue water”

• Tap water is a value added product
  – UFF/MUL don’t convey value, non-revenue water does

• In 2010, the region’s non-revenue water had a retail value of:
  – $268,811 per day
  – $98,115,845 for the year

  • Some substantial portion of that is the wasted marginal cost of producing and not selling 75 mgd
Chicago vs. Golf

• Chicago
  – 2.3 million people
  – 450 million gallons a day
  – 4,200 miles of pipe

• Golf
  – 451 people
  – 60,000 gallons a day
  – 3.1 miles of pipe
“proper accounting”

- Requires actually counting something
- Revenue vs. non-revenue water
- Real vs. apparent loss
- System-specific performance goals
- Quality data gathering… quality data analysis… quality data-driven decisions
AWWA M-36

- System-specific
- Forces quality data
- Forces data-driven introspection
- Prompts solutions even in lieu of regulatory imperative
But... Infrastructure Leakage Index is less clear from a regulatory goal standpoint than 8% UFF.
A smooth transition?

• Drop MUL, recognize most permittees will be out of 8% UFF compliance

• Continue with the LMO-2…

• While also requiring annual submission of the AWWA M-36

• Assess in 5 years whether the benefit of the AWWA M-36 is significant enough for a full regulatory switch
Getting to data accuracy

• Regular (mandatory) seminars and workshops in advance of annual reporting
• Newsletters, easy access to AWWA materials
• Direct technical assistance to those most in need
• State Revolving Fund for capital improvements in data collection?
Getting to efficient use

• Data and goal-driven investment
  – i.e. Leak repair if cost-effective
  – i.e. Conservation program if conducive to system goals

• State Revolving Fund for capital improvements in leak prevention?
The importance of relationships

• Many utility officials report little to no contact with IDNR over very long time spans
  – No seminars or workshops
  – No regular communication

• IDNR analysis of incoming data can foster more productive outreach
  – But in the absence of sustained revenue, is there capacity?
Thank You

• Paper will be out soon(ish)!

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