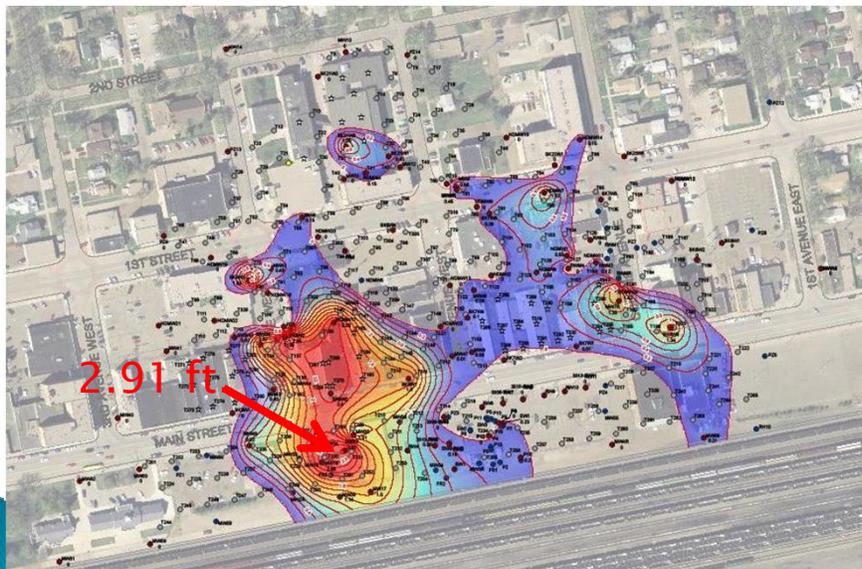


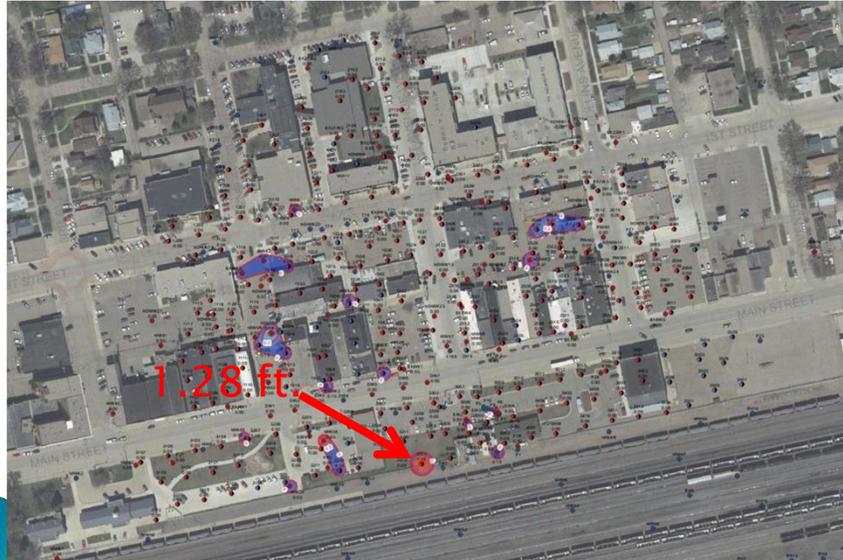
Mandan Downtown Remediation System Update

Dave Glatt
ND Department of Health
Environmental Health Section
October 15, 2013

September 2006 Fuel Thickness



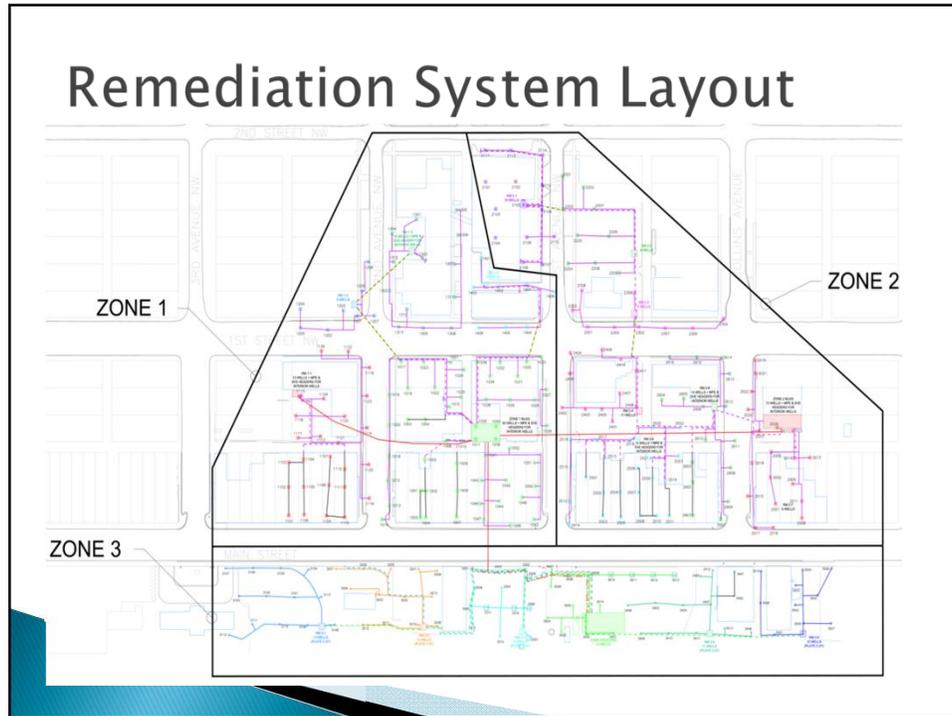
August 2013 Fuel Thickness



Cumulative Fuel Recovery

Component	Gallons
VOC Vapor	599
Gasoline Vapor	11,718
Diesel Vapor	20,929
Free Phase Liquid Fuel	77,857
Bioremediation	242,859
TOTAL*	353,962

*Note: 117,019 pounds of Methane are not included in the total number of gallons recovered.



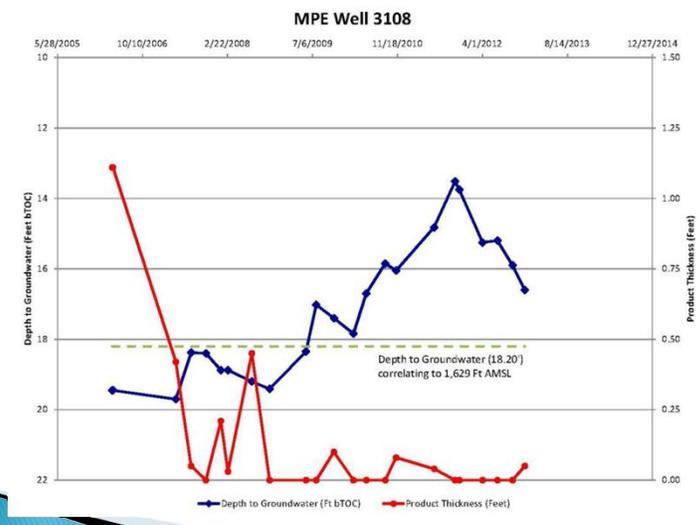
Closure Criteria Goals

- ▶ Goal = Fuel thickness < 0.02 feet for at least 2 consecutive quarters
- ▶ Minimum criteria is < 0.1 feet for at least 2 consecutive quarters
- ▶ Prefer water table elevation approximately 1629' or less
- ▶ Water table criteria is flexible due to high water table in recent years

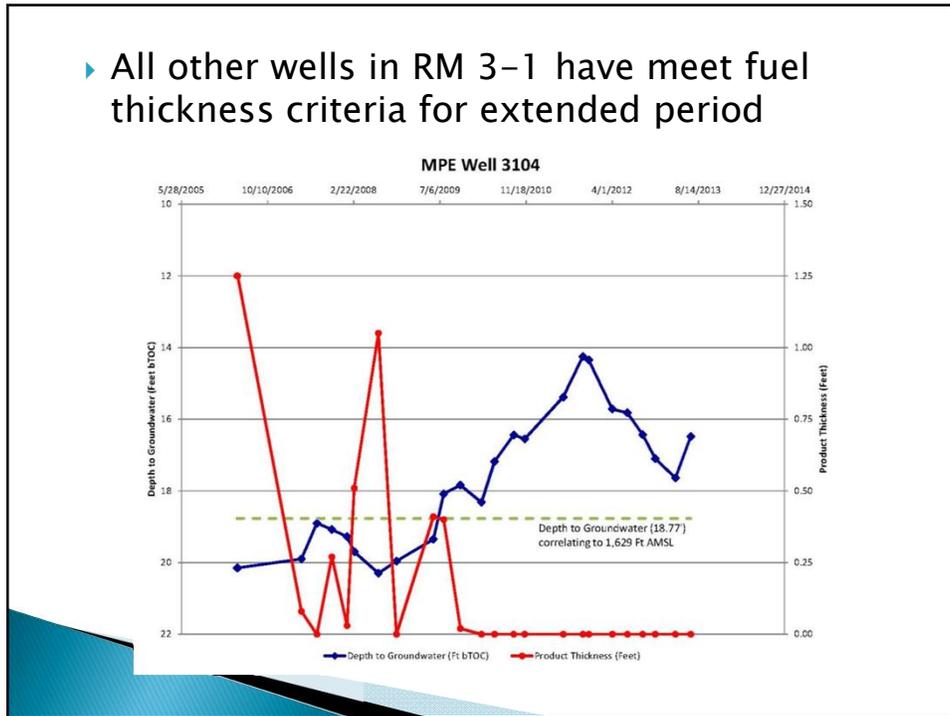
Depot Area - Remote Manifold 3-1



- ▶ Well 3108 has meet fuel thickness criteria since 2010



- ▶ All other wells in RM 3-1 have meet fuel thickness criteria for extended period



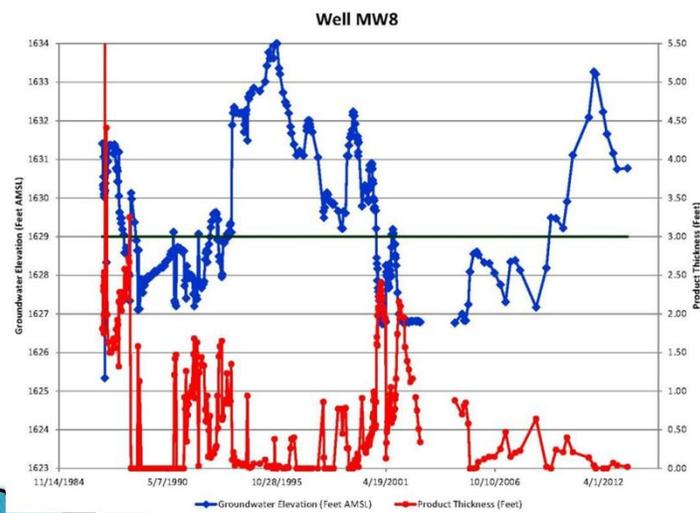
Recommendation

- ▶ Shut down operation of all wells in Remote Manifold 3-1 in the Depot Area
- ▶ Abandon all these wells except 3109 and 3111 along railyard boundary
- ▶ Keep wells 3109 and 3111 for long term monitoring
- ▶ Abandon and remove Remote Manifold 3-1 building and surface piping

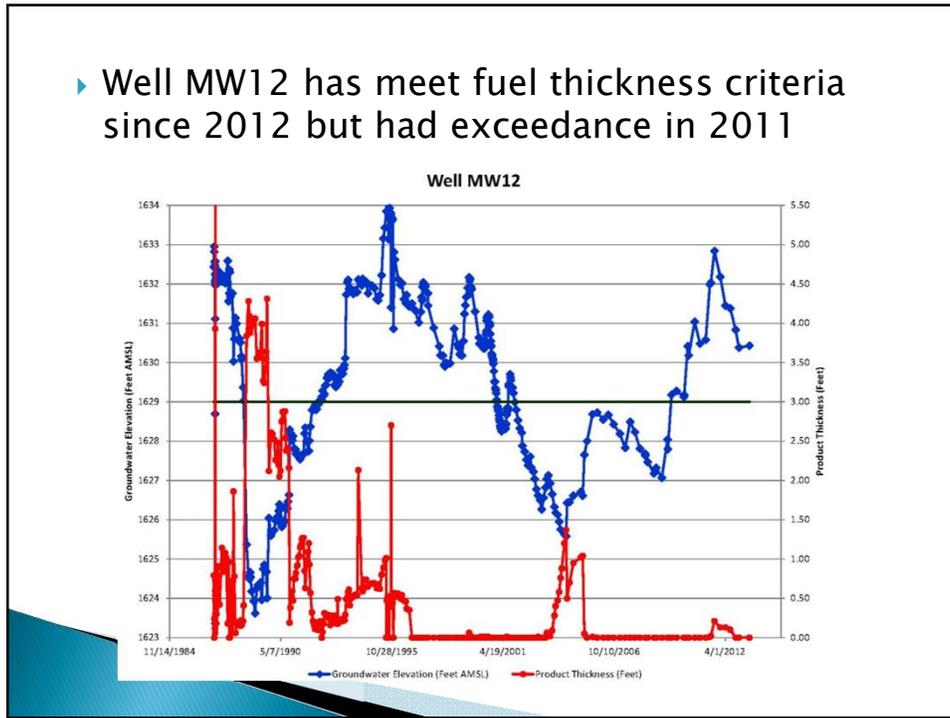
Area North of 1st Street



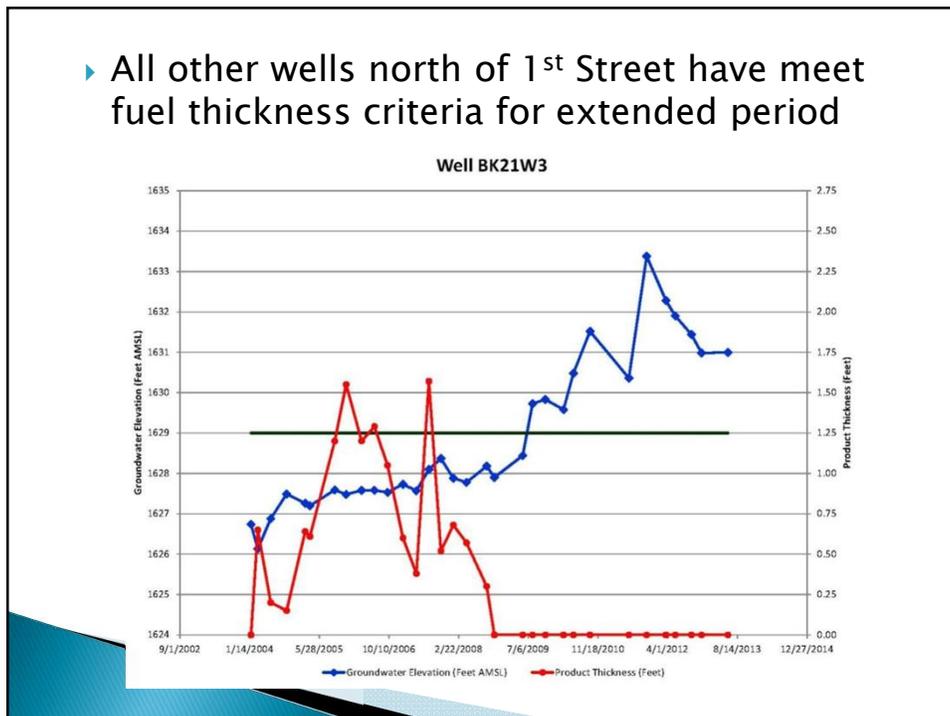
- Well MW8 has meet fuel thickness criteria since 2010 but still has trace of fuel



- ▶ Well MW12 has meet fuel thickness criteria since 2012 but had exceedance in 2011



- ▶ All other wells north of 1st Street have meet fuel thickness criteria for extended period



Recommendation

- ▶ Shut down and abandon all wells and Remote Manifold buildings in RM 1-2, 1-4, 2-2 and 2-3
- ▶ Abandon all the wells in RM 1-3 except 1309 or 1310, to use as vacuum source for focused recovery in MW8
- ▶ Abandon all the wells in RM 2-1 except 2109 to use as vacuum source for focused recovery in MW12 and LEC basement

LBG summary

MANDAN REMEDIATION TRUST
MANDAN, NORTH DAKOTA

NORTH OF 1ST STREET AREA SUMMARY OF MONITOR WELL COMPLIANCE STATUS

WELL	GRAPH PRESENTED?	COMPLIANCE STATUS			DATE RANGE FOR WHICH BOTH PRODUCT AND GW CRITERIA ARE BOTH MET		RECOMMENDATION	REMARKS
		PRODUCT	GW	BOTH	From	To		
BK21W1	Yes	Yes	No	No	N/A	N/A	Abandon	Compliant product since May 09
BK21W2	No	Yes	Yes	Yes	Mar-04	May-09	Abandon	Product never present, GW elevation >1629 since Aug 09
BK21W3	Yes	Yes	Yes	Yes	Nov-08	May-09	Abandon	No product since Nov 08, GW elevation >1629 since Aug 09
BK22W1	No	Yes	Yes	Yes	Jan-04	Oct-08	Abandon	Product never present, GW elevation >1629 since Aug 09
BK23W1	No	Yes	Yes	Yes	Feb-05	Jun-09	Abandon	Product once in 06 @ 0.01', GW elevation >1629 since Nov 09
MW-8	Yes	Yes	No	No	N/A	N/A	Retain	Product compliant since Sept 11 but GW too high, monitored since 1987
MW-9	Yes	Yes	Yes	Yes	Apr-08	Jun-09	Abandon	Product compliant since Apr 08, GW elevation >1629 since Aug 09, monitored since 1987
MW-9R	Yes	Yes	Yes	Yes	Apr-08	Jun-09	Abandon	Product compliant since Apr 08, GW elevation >1629 since Aug 09, monitored since 2004
MW-10	No	Yes	Yes	Yes	Jan-02	Jun-09	Abandon	Product compliant since 1987, GW elevation >1629 since Nov 09
MW-11	Yes	Yes	Yes	Yes	Nov-01	May-09	Abandon	Product compliant since 1996, GW elevation >1629 since Aug 09, monitored since 1987
MW-12	Yes	No	No	No	N/A	N/A	Retain	Non-compliant product in 2012, GW elevation >1629 since Aug 09
MW-13	No	Yes	Yes	Yes	Feb-02	Nov-08	Abandon if present	Product never present, monitoring ceased in Oct 08, well may not be present
MW-14	No	Yes	Yes	Yes	Feb-02	Jun-09	Abandon if present	Historic compliant product, GW elevation >1629 since Nov 09, monitoring ceased in Jul 11, well may not be present
NJMW4	Yes	Yes	Yes	Yes	Nov-08	May-09	Abandon	Product compliant since Nov 08, GW elevation >1629 since Aug 09
NJMW14	No	Yes	Yes	Yes	Apr-07	Jun-09	Abandon	Product once in 06 @ 0.15', GW elevation >1629 since Aug 09
PZ9	No	Yes	Yes	Yes	Jan-02	Sep-06	Abandon if present	Historic compliant product, monitoring ceased in Aug 06, well may not be present
PZ10	Yes	No	Yes	No	N/A	N/A	Confirm presence	Non-compliant product in 06 when monitoring ceased, well may not be present
PZ11	No	Yes	Yes	Yes	Oct-01	Jun-06	Abandon if present	Product never present, monitoring ceased in Jun 06, well may not be present
PZ12	No	Yes	Yes	Yes	Sep-00	Jul-07	Abandon if present	Product never present, monitoring ceased in Jun 07, well may not be present
PZ13	No	Yes	Yes	Yes	Jan-02	Nov-08	Abandon if present	Product never present >0.1 feet, monitoring ceased in Nov 08, well may not be present
PZ14	No	Yes	Yes	Yes	Nov-01	Sep-08	Abandon if present	Product never present, monitoring ceased in Aug 06, well may not be present

LBG summary

MANDAN REMEDIATION TRUST
MANDAN, NORTH DAKOTA

NORTH OF 1ST STREET AREA SUMMARY OF REMOTE MANIFOLD STATUS

MANIFOLD	LOCATION	RECOMMENDATION	REMARKS
RM 1-2	Near City Hall	Abandonment	All recovery wells are compliant with the product closure criteria with no historical presence of product. Recovery wells are not currently compliant with groundwater elevation criteria but were compliant for two years before the August 09 groundwater rise. Proximal well PZ13 has never had product. Proximal well PZ-9 has never had non-compliant product.
RM 1-3	County Courthouse West Lawn	Cease active remediation of recovery wells but do not abandon manifold. Abandon all recovery wells except 1310 or 1309 to provide vacuum. Initiate focused recovery in MW-8.	All recovery wells are compliant with the product closure criteria with no historical presence of product. Recovery wells are not currently compliant with groundwater elevation criteria but were compliant for two years before the August 09 groundwater rise. Proximal well MW-8 is not compliant with closure criteria.
RM 1-4	South of LEC in Alley	Abandonment	All recovery wells are compliant with the product closure criteria with no historical non-compliant product. Recovery wells are not currently compliant with groundwater elevation criteria but were compliant for two years before the August 09 groundwater rise. Proximal wells NDMW4 and MW-11 are compliant with closure criteria.
RM 2-1	LEC East Lawn	Cease active remediation of recovery wells but do not abandon manifold. Abandon all recovery wells except 2109 to provide vacuum. Initiate focused recovery in MW-12. Main system can also continue to provide vacuum for LEC basement until MW-12 becomes compliant.	All recovery wells are compliant with the product closure criteria with no historical presence of product. Recovery wells are not currently compliant with groundwater elevation criteria but were compliant for two years before the August 09 groundwater rise. Proximal wells BK21W3, BK21W2, BK21W1 and MW-10 are compliant with closure criteria. Proximal well MW-12 is not compliant with closure criteria.
RM 2-2	North of Library Square II	Abandonment	All recovery wells remaining after the construction are compliant with the product closure criteria with no historical non-compliant product. Recovery wells are not all currently compliant with groundwater elevation criteria but were compliant for two years before the August 09 groundwater rise. Proximal well PZ14 has never had product.
RM 2-3	SE corner of Library Square II	Abandonment	All recovery wells remaining after the construction are compliant with the product closure criteria with no historical non-compliant product. Recovery wells are not all currently compliant with groundwater elevation criteria but were compliant for two years before the August 09 groundwater rise. Proximal wells MW-9, MW-SR, BK22W1, NDMW14 PZ-11 and BK23W1 are compliant with the closure criteria. Proximal well PZ10 was not compliant when monitoring in the well ceased in 2006. Given the proximity of PZ10 to MW-9 and MW-SR and the compliant status of those wells, it is not likely that product exists in this area. Regardless, the presence of PZ10 should be confirmed for abandonment.

Finances

- ▶ September 2013 balance = \$7,401,801.08
- ▶ 2013 total operating cost approx. \$299,000
- ▶ Future annual operating cost will go down as sections of the remediation system are shut down

Questions?

