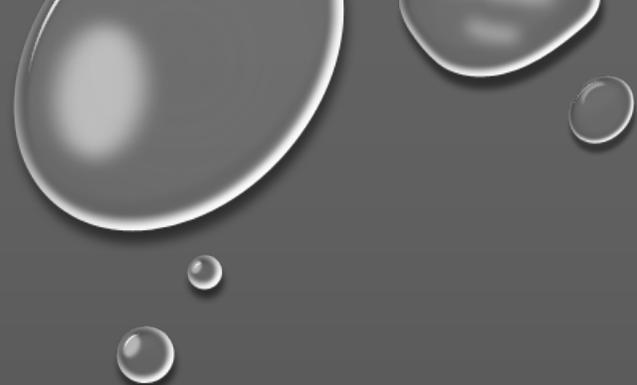


The background is a light blue gradient with several realistic water droplets of various sizes scattered across the surface. The droplets have highlights and shadows, giving them a three-dimensional appearance.

MANDAN DIESEL FUEL REMEDICATION PROJECT

PRESENTATION FOR

JANUARY 22, 2020



SITE HISTORY

- 1984 - DISCOVERED FUEL IN CONSTRUCTION OF MANDAN LAW ENFORCEMENT CENTER
- FUEL CAME PRIMARILY FROM BURLINGTON NORTHERN FUELING OPERATIONS
- 1985 - STATE ORDERS RAILROAD TO BEGIN REMOVING PRODUCT
- 2000 - REMEDIAL EFFORTS CEASE – RAILROAD CONTESTS RESPONSIBILITY FOR THE SPILL
- 2002 - STATE OF ND AND CITY OF MANDAN SUE RAILROAD
- 2004 - PARTIES AGREE TO A SETTLEMENT THAT INVOLVES \$30.25M IN CASH AND REAL ESTATE FROM THE RAILROAD.
 - MANDAN REMEDIATION TRUST CREATED
 - \$24M FOR CLEANUP
- 2005 – MANDAN REMEDIATION TRUST SET UP TO OVERSEE THE CLEANUP OF THE FUEL



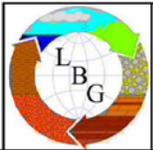
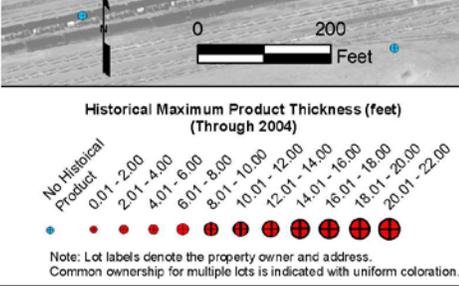
**WHERE DID
THE PRODUCT
COME FROM?**



HISTORICAL MAXIMUM PRODUCT THICKNESS

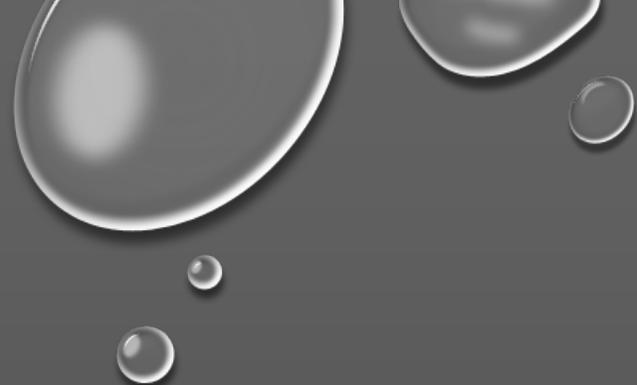


- Primary Area of Interest
- Secondary Area of Interest
- Past or Suspected Free Phase Fuel*
- Free Phase Fuel*
- October 2004 1-Foot Product Thickness Contour
- November 2003 1-Foot Product Thickness Contour
- September 2001 1-Foot Product Thickness Contour
- Historical Extent of Product
- * As defined by NDDH



Prepared By:
LEGGETTE, BRASHEARS & GRAHAM, INC.
 Professional Ground-Water and
 Environmental Engineering Services
 140 East Hinks Lane, Suite 126
 Sioux Falls, SD 57104
 (605) 334-6000

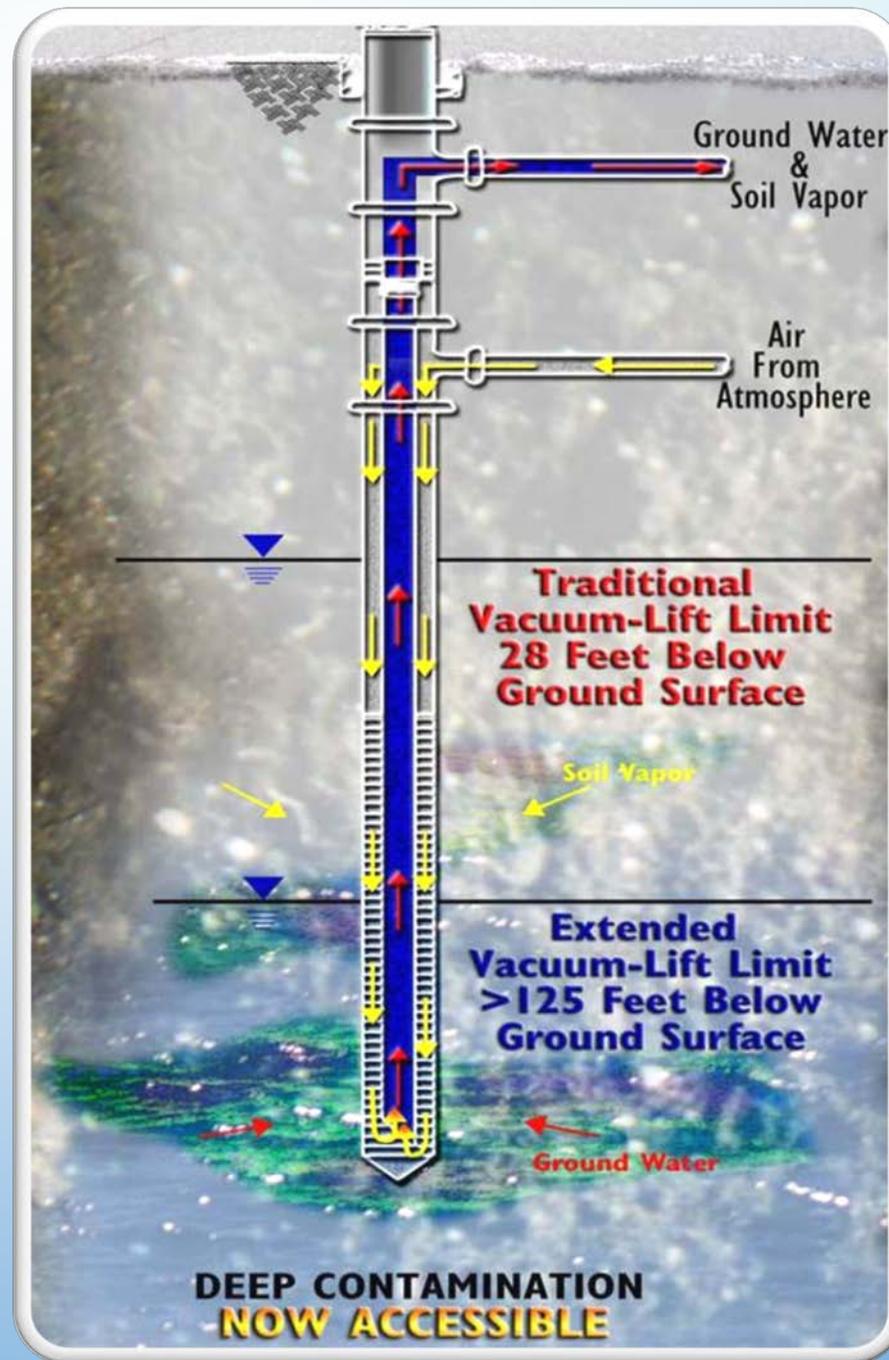
NDDH MANDAN REMEDIATION TRUST DOWNTOWN MANDAN REMEDIATION PROJECT MANDAN, NORTH DAKOTA		
HISTORICAL MAXIMUM PRODUCT THICKNESS THROUGH 2004		
FILE: G3MANDAN02D.MXD	DATE: 02/18/2005	FIGURE: 12



SETTLEMENT AGREEMENT

- THE PRIMARY PROJECT OBJECTIVES ARE TO:
 - REMOVE FREE-PHASE DIESEL
 - PROTECT HUMAN HEALTH
 - FACILITATE THE REDEVELOPMENT OF DOWNTOWN MANDAN
- THE SECONDARY PROJECT OBJECTIVES ARE TO:
 - COMPLETE THE REMEDIAL ACTIVITIES IN A MANNER THAT MINIMIZES INTRUSIVENESS
 - DEVELOP REMEDIATION STRATEGIES THAT WILL MINIMIZE COST TO PRESERVE THE REMEDIATION TRUST
- \$24 MILLION FOR SITE REMEDIATION
 - 300+ REMEDIAL WELLS INSTALLED (39 IN BASEMENTS)
 - 3 REMEDIAL BUILDINGS ERECTED
 - 20 MILES OF PIPE BURIED
 - 11 REMOTE MANIFOLDS CONSTRUCTED
 - 1 GROUND-WATER TREATMENT SYSTEM CONSTRUCTED
 - 3 EXTRACTION SYSTEMS CONSTRUCTED

MULTI PHASE EXTRACTION WELL





WELL INSTALLATION



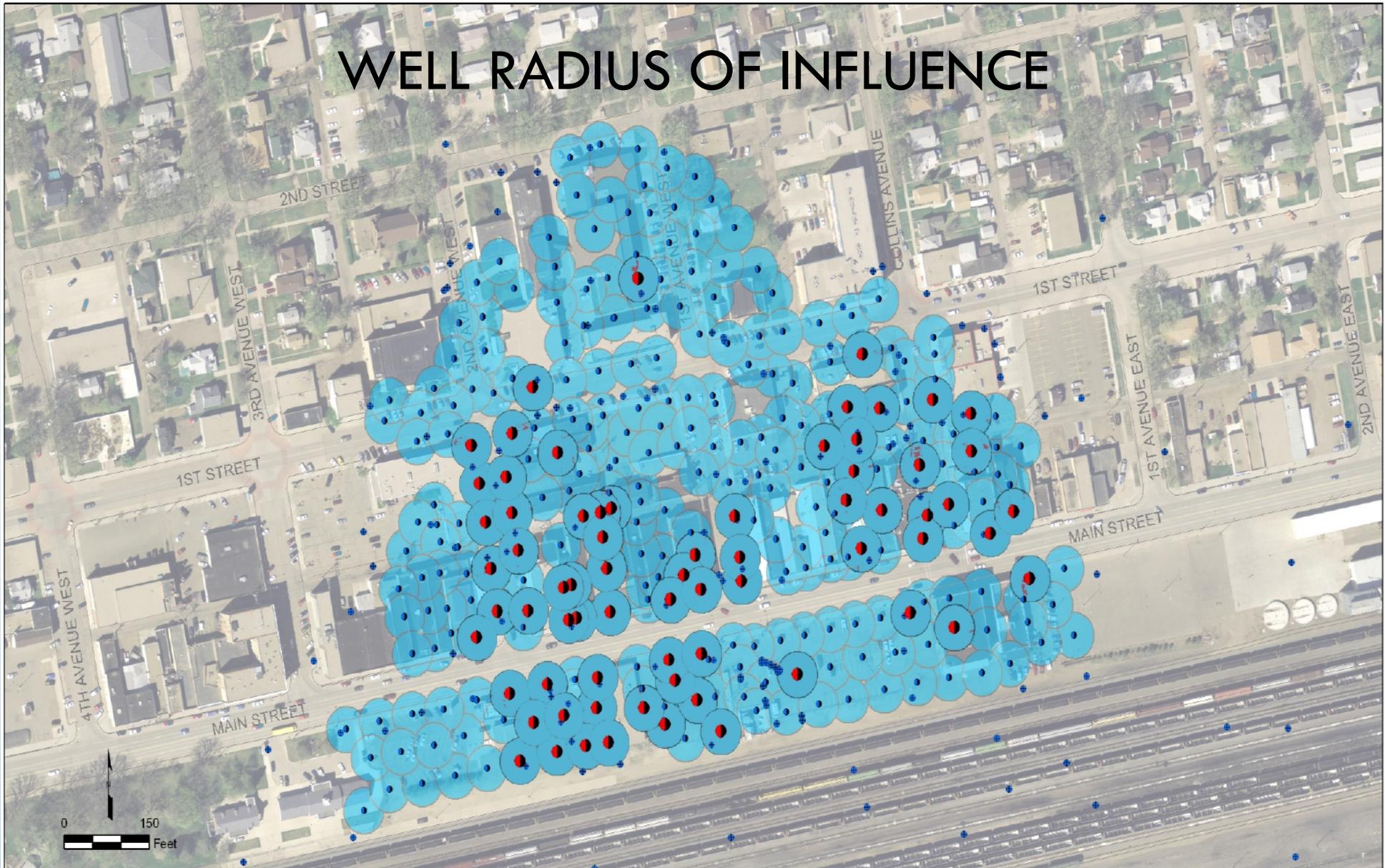
INTERIOR WELL AND PIPING INSTALLATION



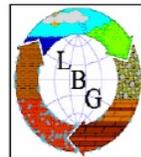


PIPING INSTALLATION

WELL RADIUS OF INFLUENCE



-  Monitoring / Remedial Well Not in MPE Mode
-  Remedial Well in MPE Mode
-  ROI (35 feet) for Wells in MPE Mode (November 2008)
-  ROI (35 feet) for Wells Not in MPE Mode (November 2008)



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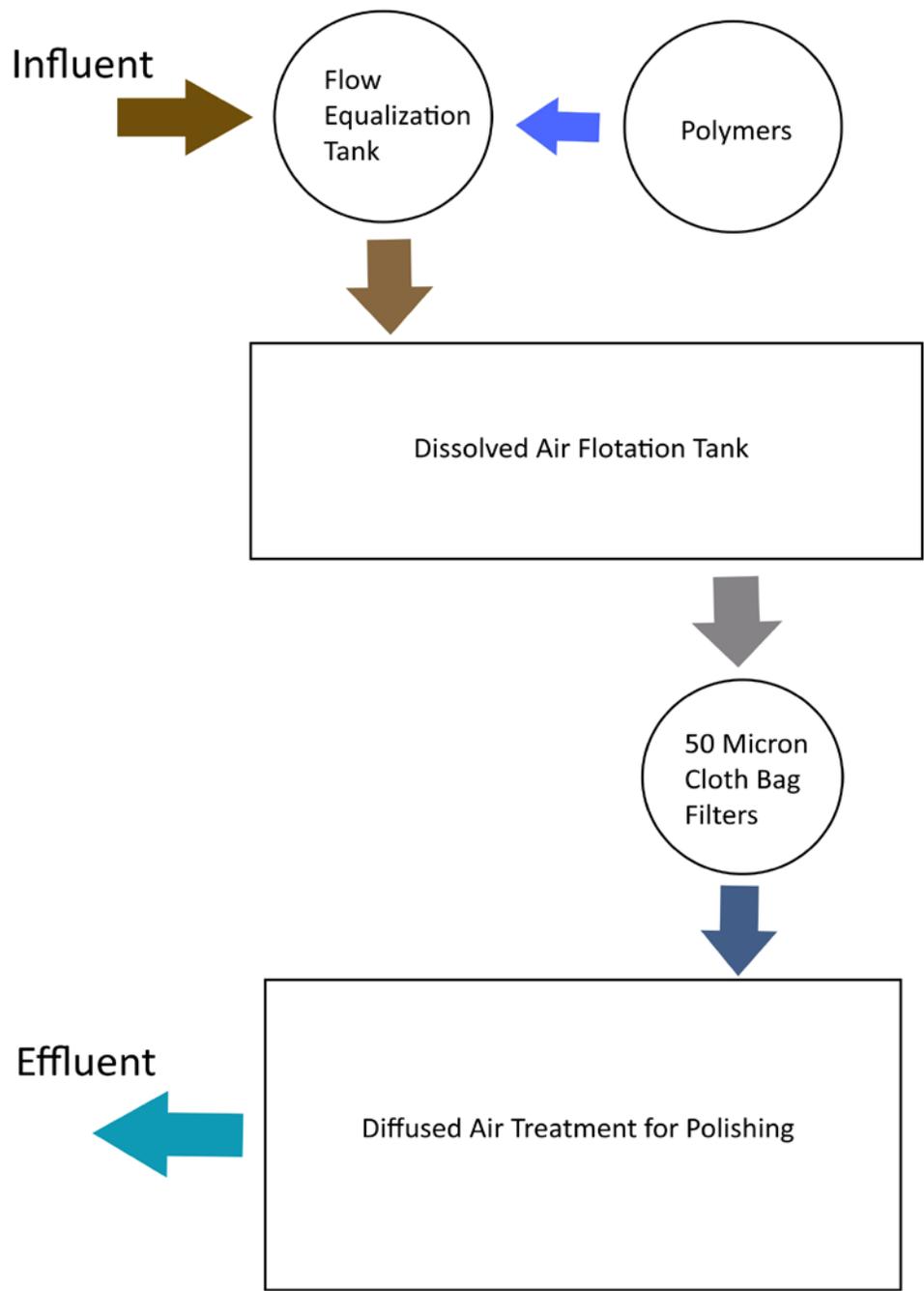
MANDAN REMEDIATION PROJECT MANDAN, NORTH DAKOTA

REMEDIAL WELLS IN MPE MODE (NOVEMBER 2008)

FILE:	G3MANDAN07E.MXD	DATE:	12/01/2008	FIGURE:	1
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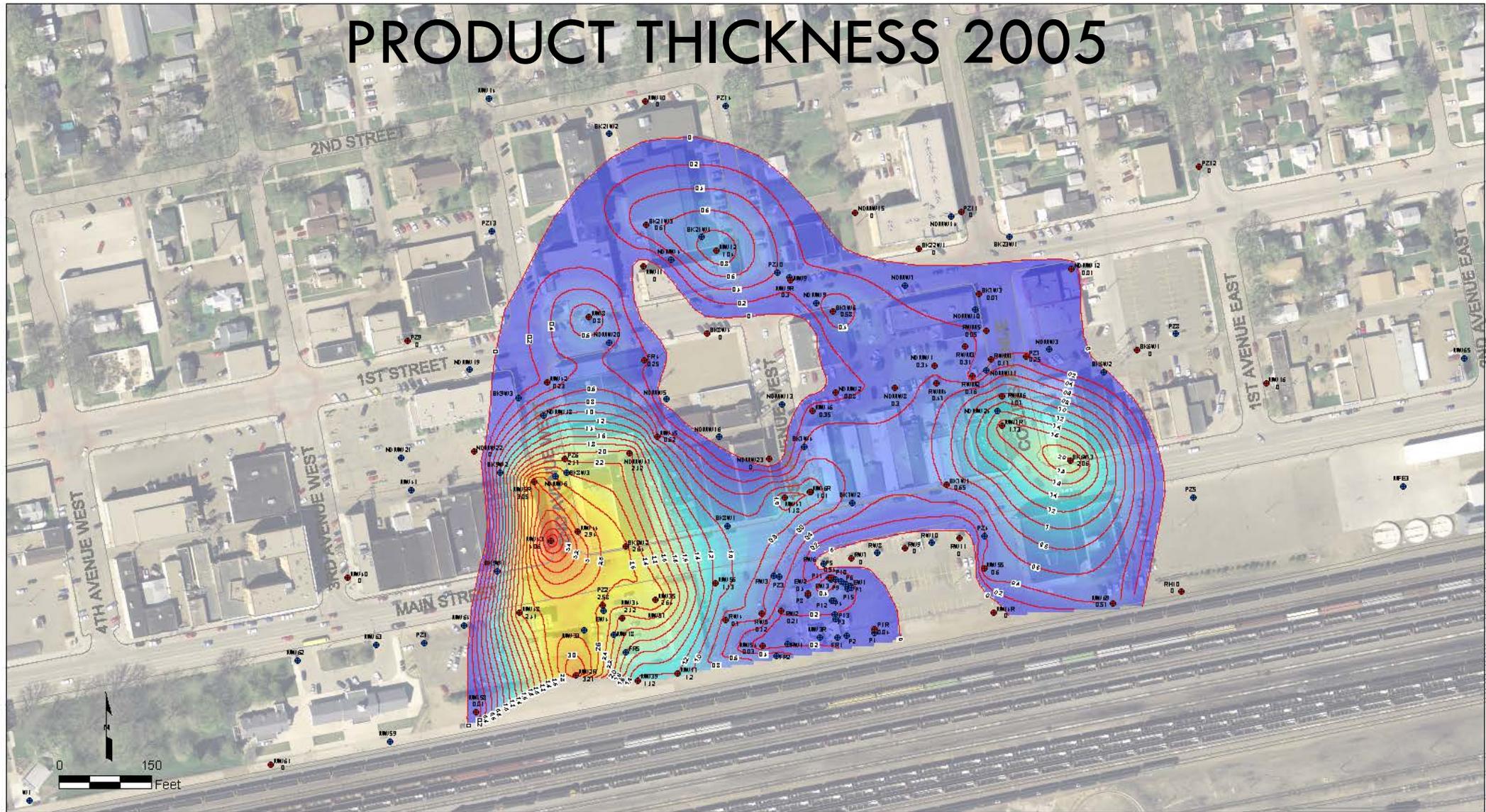


TREATMENT FACILITY



WASTE WATER TREATMENT SYSTEM SCHEMATIC

PRODUCT THICKNESS 2005

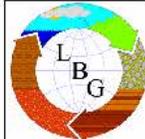


Product Thickness



— Product Thickness Contour (feet)

- Well Not Measured
- Well Measured March 2005
- 2.41 Product Thickness (feet)



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MANDAN REMEDIATION PROJECT
 MANDAN, NORTH DAKOTA

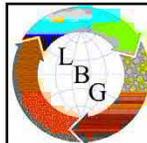
MARCH 2005 FREE-PRODUCT THICKNESS

FILE:	G3MANDAN03M.MXD	DATE:	03/31/2005	FIGURE:	15
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PRODUCT THICKNESS 2010



- Product Thickness**
- High : 1.3 feet
 - Low : 0.00 feet
- Product Thickness Contour (feet)**
- Monitoring / Remedial Well Not Measured
 - Monitoring / Remedial Well Measured
 - 0.48 Product Thickness (feet)



Prepared By:
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MANDAN REMEDIATION PROJECT
 MANDAN, NORTH DAKOTA

PRODUCT THICKNESS MAY/JUNE 2010

Source: May 2009 aerial photo (City of Mandan).

FILE: G3MANDAN07Z.MXD DATE: 07/29/2010 FIGURE: 1

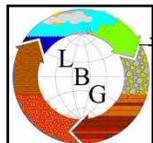
PRODUCT THICKNESS 2015



G:\GIS\Mandan\mandan08y.mxd_552015_30110.DM, NAD 1983 StatePlane North Dakota South FIPS 3002 Feet

Product Thickness
 High : 2.40 feet
 Low : 0.00 feet

Product Thickness Contour (feet)
 Monitoring / Remedial Well Not Measured
 Monitoring / Remedial Well Measured
 Product Thickness (feet)



Environmental Engineering Services
 L. B. GRAHAM & GRAHAM, INC.
 Environmental Engineering Services
 140 East Hols Lane, Suite 126
 Sioux Falls, SD 57104
 (605) 334-6000

MANDAN REMEDIATION PROJECT
 MANDAN, NORTH DAKOTA

PRODUCT THICKNESS MARCH AND APRIL 2015

FILE: G3MANDAN08Y.MXD DATE: 5/5/2015 FIGURE: 1

Source: May 2009 aerial photo (City of Mandan).

PRODUCT THICKNESS 2019



Product Thickness
 High : 1.15 feet
 Low : 0.00 feet

Product Thickness Contour (feet)
 Monitoring / Remedial Well Not Measured
 Monitoring / Remedial Well Measured
 0.05
 Product Thickness (feet)
 Remote Manifold Boundary

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK AND WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A PROFESSIONAL. DO NOT ALTER THIS DOCUMENT IN ANY WAY WITHOUT THE WRITTEN CONSENT OF WSP USA INC.

Drawn: 9/5/2019
 Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community Cross Section B-B' from LBG's 2016 Desktop Hydrogeologic Assessment.

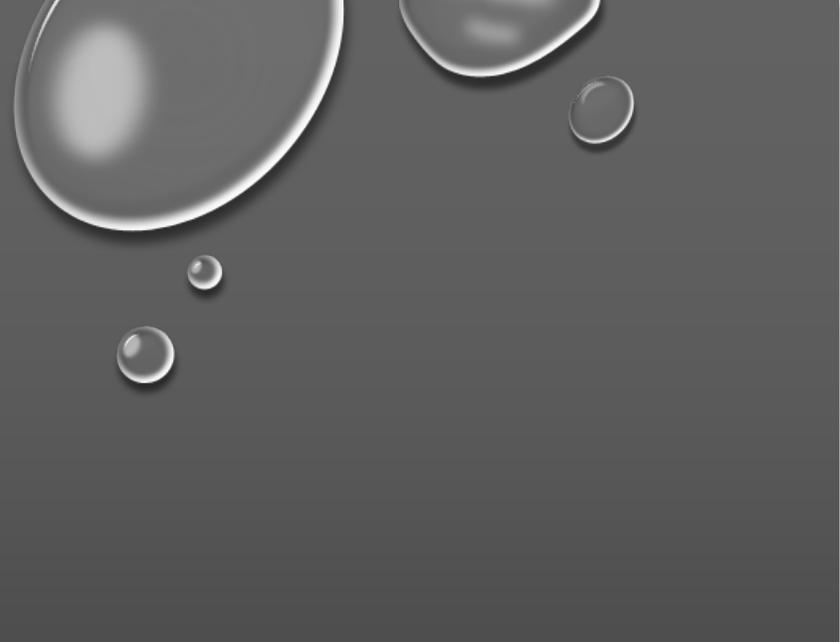
wsp WSP USA Inc.
 44CP-903 Ricebush Dr.
 Suite 102 & 104
 Houston, Michigan MI 49914-14CP

MANDAN REMEDIATION PROJECT
MANDAN, NORTH DAKOTA

PREPARED FOR
MANDAN REMEDIATION TRUST

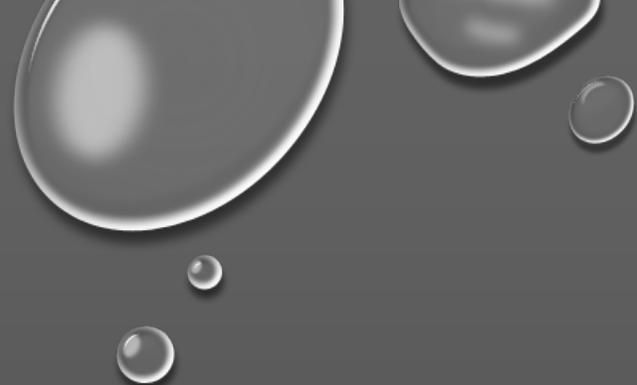
FIGURE 1
PRODUCT THICKNESS JULY-AUGUST 2019

WSP, C:\GIS\Standards\standards\m.d, 9/5/2019 4:45:42 PM, NAD 1983 StatePlane North Dakota South FIPS 5002 Feet



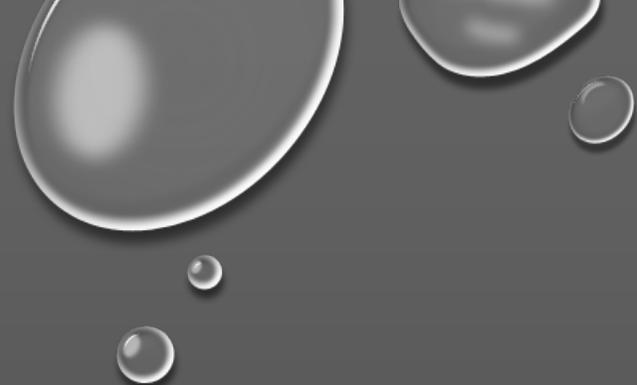
TOTAL VOLUME OF PETROLEUM RECOVERED

- FREE PRODUCT RECOVERY – 734,681 GALLONS
- VAPOR PHASE RECOVERY – 34,910 GALLONS
- TOTAL PRODUCT RECOVERY – 769,591 GALLONS



CURRENT SITE CONDITIONS

- SHUT DOWN ALL SYSTEMS IN 2018
- 2019 MONITORING
- WILL CLOSE AND DISMANTLE SYSTEM IN 2020
- SOME MONITORING WELLS WILL BE KEPT AND SITE CONDITIONS WILL CONTINUE TO BE MONITORED IN 2020



SITE CLOSURE CONSIDERATIONS

- PRODUCT THICKNESS IN MONITORING WELLS IS LESS THAN 1/10 OF A FOOT
- DECREASING AND/OR ASYMPTOMATIC SOIL VAPOR EXTRACTION MASS REMOVAL RATES
- NO PETROLEUM ODOR COMPLAINTS IDENTIFIED

FILE: UST 1739

January 6, 2020

Board of Trustees
Mandan Remediation Trust
205 2nd Avenue NW
Mandan, ND 58554

Dear Trustees:

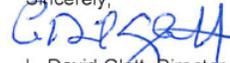
Re: Closure recommendations

The North Dakota Department of Environmental Quality (Department) has reviewed the 2018 and 2019 groundwater monitoring data from WSP USA Inc (WSP) for possible final closure and dismantling of the entire downtown Mandan remediation project. The Department reviewed the criteria for site closure based on the Mandan Remediation Trust (MRT) Closure Strategy Guidelines. Specifically:

1. Free product measured in the wells is 0.1 feet or less. Based on 2018 and 2019 monitoring results, almost all monitoring wells have met this criterion. Several wells have measured free product levels slightly above this criterion. However, the Department believes that these measurements are very close to meeting the criteria and that additional remediation using the current remediation system will not significantly reduce this amount.
2. Decreasing and/or asymptomatic SVE mass removal rates. Mass removal rates of hydrocarbons has significantly decreased since remediation began, and removal rates have tapered off for several years and have not changed. This is an indication that the amount of hydrocarbons able to be removed by the current remediation system is very low and that further remediation using the current system will not result in a significant reduction of remaining free product.
3. Hydrocarbon odor complaints from stakeholders. There have been no recent hydrocarbon odor complaints from stakeholders made to MRT or WSP.

Based on these criteria, the Department is recommending that the system infrastructure in all zones, excluding the monitoring wells, be permanently decommissioned. Decommissioning or abandonment of the system infrastructure should follow the guidelines outlined in the Mandan Remediation Project Closure Strategy Guidelines.

Sincerely,



L. David Glatt, Director
Department of Environmental Quality

LDG:LJV:mkg

cc: Mandan City Commission
Reice Haase, Governor's Office
Maggie Olson, Attorney General's Office

918 East Divide Avenue | Bismarck ND 58501-1947 | Fax 701-328-5200 | deq.nd.gov

Director's Office
701-328-5150

Division of
Air Quality
701-328-5188

Division of
Municipal Facilities
701-328-5211

Division of
Waste Management
701-328-5166

Division of
Water Quality
701-328-5210

Division of Chemistry
701-328-6140
2635 East Main Ave
Bismarck ND 58501

**SITE CLOSURE
PROPOSAL**

THANK YOU

