

Characterizing PFAS IDW from Investigative Soil and Groundwater Data

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Battelle - 6th International Symposium on
Bioremediation and Sustainable Environment
Technologies

May 9, 2023

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SUPPORTING

[DOING]

LEADING

RockGen Energy Center Facility and Site Description

Site Description

- 77.81 acres over two parcels located in the Town of Christiana/ Cambridge, WI in SW Dane County

Site History

- 1910 – Agricultural land including dairy farm on southeast portion of the property
- 1945 – Limestone quarry operated by T&T Stone Co. until 1960s
- 2000 – Construction of generation facility (facility ownership changes multiple times)

Facility Description

- Natural gas and fuel oil generation with three combustion turbines and generators, three above ground storage tanks, and support structures on 10 acres of the Site



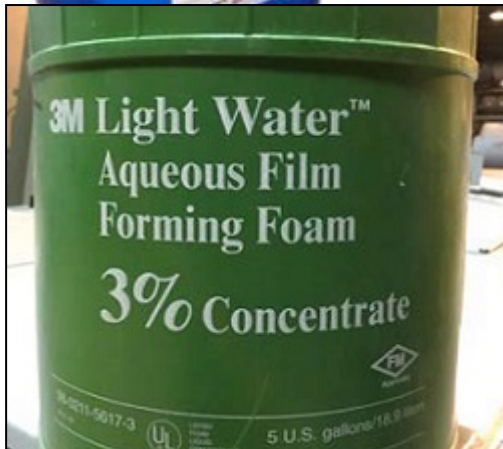
Site Geology



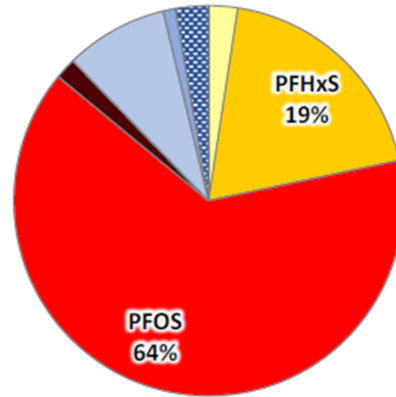
NR 700 Steps Completed/ In Progress

- March 2021 – NR 706 Hazardous Substances Discharge Notification
- April 2021 – NR 716 SIWP w/ Interim Action Options (approved within 1 week)
- Apr. 2021 – Jul. 2021 – NR 716 SI (initial) – 7 MWs (70'), 1 PZ (300'), 25 SBs
- July 2021 – NR 708 Interim Action Workplan (approved within 1 week)
- August 2021 – NR 716 Supplemental SIWP (approved within 1 week)
- September 2021 – NR 716 SIR (approved April 2022)
- Oct. 2021 – Dec. 2021 – NR 716 SI (phase 2) – 5 MPs (300')
- Apr. 2022 – Jun. 2022 – NR 708 Interim Action Construction
- October 2022 – NR 708 Remedial Action Documentation Report (approved January 2023)
- December 2022 – NR 716 Technical Assistance Meeting CSM/3D Model (memo. January 2023)
- March 2023 – NR 716 Supplemental SIWP Addendum (review requested within 2 weeks)
- April 2023 – May 2023 – NR 716 SI (phase 3) – 1 MW (70'), 3 MPs (250'), 8 SBs

Aqueous Film Forming Foam (AFFF)



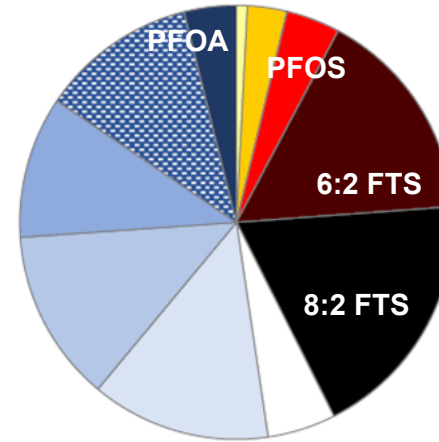
PFOS Based AFFF



1st Generation

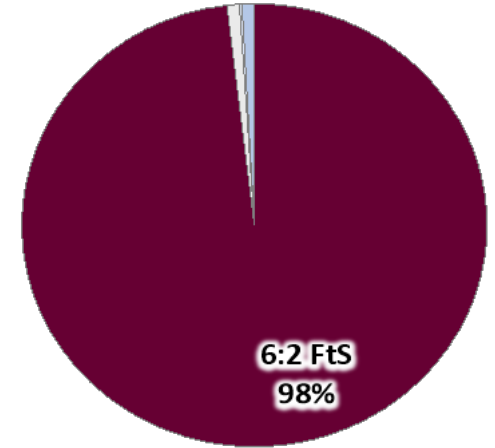
- Note: Typical composition is mainly PFOS and PFHxS

2nd Generation



8:2 and 6:2 FTS Based Foam

AFFF - Sthamex AFFF
Total = 9,681 ug/kg



Modern Fluorotelomer

Data sources:

- Swedish Chemicals Agency, 2015. Chemical Analysis of Selected Fire-fighting Foams on the Swedish Market 2014.
- D. Herzke et al., 2009. Survey, screening and analysis of PFCs in consumer products, Swerea IVF project report 09/47.



LEGEND

- DRAINAGE CHANNEL*
- APPROXIMATE AREA OF AFFF INSPECTION TESTING
- APPROXIMATE EXTENT OF SEPTIC MOUND
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- SITE EXTENT FOR PURPOSE OF INVESTIGATION

GROUNDWATER RESULTS
PIE CHART AREA PROPORTIONAL TO SUM OF DETECTED PFAS (ng/L)

- PERFLUOROBUTANOIC ACID (FFBA)
- PERFLUOROPENTANOIC ACID (FFPeA)
- PERFLUOROHXANOIC ACID (FFHxA)
- PERFLUOROHEPTANOIC ACID (FFHeA)
- PERFLUOROOCTANOIC ACID (FFOA)
- PERFLUORONONANOIC ACID (FFNA)
- PERFLUORODECANOIC ACID (FFDA)
- PERFLUOROUNDECANOIC ACID (FFUdA)
- PERFLUORODODECANOIC ACID (FFDoA)
- PERFLUOROTRIDECANOIC ACID (FFToA)
- PERFLUOROTETRADECANOIC ACID (FFTA)
- PERFLUOROSUTANE SULFONIC ACID (FFBS)
- PERFLUOROPENTANE SULFONIC ACID (FFPeS)
- PERFLUOROHXANE SULFONIC ACID (FFHxS)
- PERFLUOROOCTANE SULFONIC ACID (FFOS)
- 4:2 FLUOROTELOMER SULFONIC ACID (4:2 FTS)
- 6:2 FLUOROTELOMER SULFONIC ACID (6:2 FTS)
- 8:2 FLUOROTELOMER SULFONIC ACID (8:2 FTS)
- PERFLUOROOCTANE SULFONAMIDE (PFOSA)

NOTES

- SAGE MAP IMAGERY FROM DANE COUNTY, 2020.
- PARCEL BOUNDARIES ACQUIRED FROM WISCONSIN STATE CARTOGRAPHER'S OFFICE PARCEL DATA.
- * = DRAINAGE CHANNEL APPEARS TO BIFURCATE; MAP SHOWS CHANNEL THAT APPEARS TO BE PRIMARY DRAINAGE PATHWAY.
- GROUNDWATER RESULTS FROM SAMPLES COLLECTED JULY 14-21, 2021.

0 200 400 Feet
1" = 200' 1:2,400

PROJECT: BRTS #02-13-587841
ROCKGEN ENERGY CENTER
2348 CLEAR VIEW RD, TOWN OF CHRISTIANA
DANE COUNTY, WISCONSIN 53623

TITLE: GROUNDWATER RESULTS PIE CHARTS
JULY 2021

DRAWN BY: G. CORRELL	FIELD NO.: 43788
CHECKED BY: L. ALBERT	
APPROVED BY: J. PAMPT	FIGURE 12
DATE: SEPTEMBER 2021	

TRC
700 Islandwood Trail, Suite 2000
Madison, WI 53717
Phone: 608.262.3900
www.trcinc.com

FILE NO.: 43788-SR-02_GW_PIE_RESULTS_2021 JULY 2021

Plot Date: 9/26/21, 11:10:10 AM by: GDC/PH/LL - JAR/S/L, April 16/15/17 - GeoData System: MDE 1481010101 from Wisconsin State GIS 4/16/15 11:17 AM
 Path: \\trc\work\gdc\gdc\proj\02-13-587841\GIS\02-13-587841-GW_PIE_RESULTS_2021 JULY 2021.mxd

Soil Investigation



LEGEND

- MONITORING WELL
- PIEZOMETER
- GEOPROBE SOIL BORING (APRIL 2021)
- HAND AUGER SOIL BORING (MAY 2021)
- SOIL SAMPLE
- POTABLE WELL
- DEEP PRODUCTION WELL
- STORM SEWER INLET/OUTLET
- DRAINAGE CHANNEL*
- APPROXIMATE AREA OF AFFF INSPECTION TESTING
- APPROXIMATE EXTENT OF SEPTIC MOUND
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- SITE EXTENT FOR PURPOSE OF INVESTIGATION

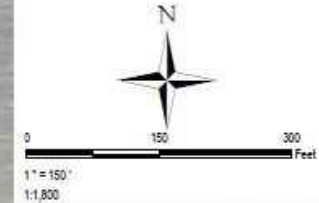
BORING/SAMPLE ID (SAMPLE DEPTH, FT BGS)

RESULTS (µg/lgal)

SOIL RESULTS FOR SELECT PFAS
(DETECTIONS OF 8.2 FTS, PFOA, AND PFOS)

NOTES

1. BASE MAP IMAGERY FROM DANE COUNTY, 2020.
2. PARCEL BOUNDARIES ACQUIRED FROM WISCONSIN STATE CARTOGRAPHER'S OFFICE PARCEL DATA.
3. * = DRAINAGE CHANNEL APPEARS TO BIFURCATE; MAP SHOWS CHANNEL THAT APPEARS TO BE PRIMARY DRAINAGE PATHWAY.



PROJECT		
BRRS #02-13-587341 ROCKGEN ENERGY CENTER 2346 CLEAR VIEW RD, TOWN OF CHRISTIANA DANE COUNTY, WISCONSIN 53523		
TITLE		
SOIL SAMPLING RESULTS MAP		
DRAWN BY	G. CORWELL	PROJECT NO.
CHECKED BY	L. AUNER	43785
APPROVED BY	J. RAMEY	
DATE	SEPTEMBER 2021	FIGURE 8
		106 Heartland Trail, Suite 3000 Madison, WI 53717 Phone: 608.828.3800 www.trcinc.com
FILE NO.		43785-02-008_SS_Results.mxd

Treatment/ Pretreatment Considerations – Onsite or Offsite?

Onsite

- Permitting
 - Timeline (3-9 months)
 - Regulatory limits?
- Discharge Point
 - Surface water available
 - Public relations/ perception issue?
 - No POTW available
- Technology(ies)
 - GAC, IX Resin, both
- Benefits
 - Cost savings for large volumes
 - Green(ish) – reduced carbon emissions vs. T&D

Offsite

- Indemnification
 - Permitted facility specifically for waste stream
- Location and Carbon Footprint
- Capacity/ Availability
- Waste Approval
- Technology
 - Incineration
 - Treatment train
- Benefits
 - Indemnification
 - Cost savings for small volumes
 - Timeline
 - Certainty for previous owner

Investigative Derived Waste (IDW) Management

- (88+) 55-gallon drums of cuttings
- (9) 1,500-gallon polytanks for drilling returns
- (1) 20,000-gallon frac tank with 3 sumps for drilling returns
- Over 50,000 gallons of drilling returns treated in permitted facility
- Solid materials disposed of in Subtitle C facility (establishes manifest)



Future Excavation

➤ 1,000 tons disposed of in Subtitle C





Call Us:

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414.294.9247

Thanks!



Email Us:

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Visit Us:

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