



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

BRUCE RAUNER, GOVERNOR

LISA BONNETT, DIRECTOR

847/294-4000
847/294-4018 (Fax)

April 18, 2016

Department of Energy - Fermilab

Ms. Katie Kosiroy

P.O. Box 2000

Batavia, IL 60510

RE: Department of Energy - Fermilab
NPDES Number: IL0025123
BOW ID Number: W0898010003

Dear Ms. Kosiroy:

On December 10, 2016, an inspection of Department of Energy - Fermilab was conducted by Chris Kallis representing the Illinois Environmental Protection Agency. The purpose of the visit was to review facility operations with regard to applicable state and federal water pollution control laws and regulations.

A copy of the inspection report is enclosed for your information.

Please contact Chris Kallis at 847/294-4000 if you have any questions regarding this inspection.

Sincerely,

DIVISION OF WATER POLLUTION CONTROL

Jay Patel, Regional Manager
Field Operations Section – Des Plaines

JP:CK:dfab:Dept.ofEnergy - Fermilab.ltr.4-13-16

Enclosure

bc: Record Unit
Regional File



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BRUCE RAUNER, GOVERNOR

LISA BONNETT, DIRECTOR

MEMORANDUM

DATE: March 29, 2016

TO: File

FROM: Chris Kallis

SUBJECT: Department of Energy- Fermilab
NPDES Permit Number- IL0026123
ID :W0898010003

Attached is a copy of a Compliance Evaluation Inspection Report for Fermilab. The inspection was conducted on December 10, 2016. This facility has been shown to be in compliance with the effluent limits and self monitoring requirements of the NPDES Permit. The facility substantially meets the Storm Water Pollution Prevention Plan requirements of the NPDES Permit.

CC: DWPC/FOS/RU
DWPC/CAS
CK



EPA

United States Environmental Protection Agency
Water Compliance Inspection Report

Section A: National Data System Coding (i.e., PCS)

Transaction Code 1|N| 2|5| 3|I|L|0|0|2|6|1|2|3| 11 12|1|2|1|1|0|2| 17 18|N| 19|N| 20|4|
Remarks
21 66
Inspection Work Days 67|0|0|1| 69 Facility Self-Monitoring Evaluation Rating 70|5| BI 71|N| QA 72|N| 73| 74 75| 80

Section B: Facility Data

Name and Location of Facility Inspected (For industrial users discharging to POTW, also include POTW name and NPDES permit number)
U.S Department of Energy- Fermilab
Kirk Road and Pine Street
Post Office Box 2000
Batavia, Illinois 60510
Entry Time/Date 9:00 a.m.- 12/10/16 Permit Effective Date 0|8|1|7|1|4|
Exit Time/Date 1:00 p.m.- 12/10/16 Permit Expiration Date 1|3|0|7|1|4|
Name(s) of On-Site Representative(s)/Title(s)/ Phone and Fax Number(s)
Katie Kosirog - Environmental Tech. - 630/840-6497
Other Facility Data
Name, Address of Responsible Official/Title/Phone and Fax Number
Mark Bollinger- Femi Site Manager
Contacted Yes No

Section C: Areas Evaluated During Inspection (Check only those areas evaluated)

X Permit X Flow Measurement X Operation & Maintenance X Storm Water
X Records/Reports X Self-Monitoring Program X Sludge Handling/Disposal Combined Sewer Overflow
X Facility Site Review X Compliance Schedules Pretreatment Sanitary Sewer Overflow
X Effluent/Receiving Waters X Laboratory X Pollution Prevention MS4

Section D: Summary of Findings/Comments

(Attach additional sheets of narrative and checklists, including Single Event Violation Codes, as necessary)

Large empty box for summary of findings and comments.

Table with 2 columns: SEV Codes and SEV Description. Includes empty rows for data entry.

Name(s) and Signature(s) of Inspector(s) Agency/Office/Phone and Fax Numbers Date
Signature of Management Q A Reviewer Agency/Office/Phone and Fax Numbers Date

CC:



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PAT QUINN, GOVERNOR

JOHN J. KIM, INTERIM DIRECTOR

INSPECTION NOTES

Facility Name: U.S. Department of Energy
Fermilab NAL

NPDES Permit Numbers: IL0026123

Basin Code: 001 - Ferry Creek
002 - Kress Creek
003 - Indian Creek
004 - Indian Creek
005 - Indian Creek
006 - Indian Creek

Inspection Type: Compliance Evaluation Inspection

Date of Inspection: December 10, 2016

Inspected by: Chris Kallis, DWPC - FOS

Interviewed: Katie Kosirog, Environmental Specialist.
Eric Korzeniowski, Environmental Specialist
Rick Hersemann, Physical Scientist

GENERAL INFORMATION

Responsible Officials:

This facility is owned by the U.S. Department of Energy and co-operated by University Research Association, Incorporated. All phone numbers are area code 630 + 840 + extension. The main responsible official is Mark Bollinger, Acting Fermi Site Manager. The director of the Environmental, Safety and Health Section is Dr. Nancy L. Grossman. The direct NPDES contact is Katie Kosirog, of the ES &H Section who can be contacted at 603\840-6497. A complete directory of Fermilab contacts can be found on the web site (WWW.FNAL.GOV).

Facility Location:

This facility covers more than 6,784 acres that is located mainly in Winfield Township in Du Page County but also crosses into Batavia Township in Kane County. The main visitor's

entrance is on Wilson Road east of Kirk Road. The main mailing address is P.O. Box 2000, Batavia, Illinois, 60510.

Facility Description:

This facility is a federal research center engaged in conducting high energy physics experiments (SIC 8733 –non commercial research organic)). The program investigates the structure of matter using the collision of particles to create new matter. These collisions take place in a “Tevatron ” tunnel and fixed target experimental area. Magnets and support facilities are used to control and direct the particles. These facilities require large amounts of cooling water for operation. Previous inspections have confirmed numerous sumps collect and drain water from building footings and from under beam line tunnels in the Tevatron, Main Injector and Experimental Areas. These include the NuMi facility which uses produces subatomic particles called neutrinos. Part of the MINOs experiment has the neutrinos transported by a sophisticated beam through a tunnel and ultimately through the earth to a receiving station on Minnesota. By design, water collected in the beam line tunnel sumps (storm water infiltration and groundwater) is conveyed to the ICW system where it serves to replenish the cooling water reservoir. This could be a pathway for radionuclides generated in the beam line tunnels to be introduced in the ICW system. In addition, water collected by these sumps can contain detectable concentrations of radionuclides (primarily tritium) that have been leached by rainwater from radioactive soil near target beams. New projects under development include the SBN Far and Near Detectors.

The main injector ponds are an interconnected group of seven ponds to cool the main Injector accelerator. Make up water from these ponds is supplied from the industrial cooling water system. Each pond has an overflow structure. Excess storm water runoff is discharged from the facility during months of high precipitation. The site encompasses 6,784 acres and is divided into four general functional areas. These include the technical areas (main ring, main injector, NuMi, technical divisions), support areas (hazardous storage building, radiation physics calibration facility), Fermilab village (residential and technical areas) and outlying areas (hazardous water storage areas, bison herd). Stormwater runoff to surface waters may also contain other minor constituents such as building sump pump discharges, floor drains, air conditioner condensate and once through chilling water.

NPDES Permit

This facility is discharging under an NPDES Permit that was issued on July 17, 2008, with an effective date of August 1, 2008 that expires on July 21, 2019. The outfalls are as follow:

- 001- NCCW and storm water effluent- avg. flow- 2.48 MGD, max- 8.5
- 002- NCCW and storm water effluent - avg. flow- 4.30 MGD, max- 14.0
- 003- NCCW and storm water effluent - avg. flow- 0.60 MGD, max- 1.5
- 004- Non-contact cooling water- avg.-intermittent discharge
- 005- Non contact cooling water- avg.-intermittent discharge
- 006- Non contact cooling water- avg.-intermittent discharge

The outfall monitoring parameters include estimation of flow, pH, Temperature and tritium. In addition, total residual chlorine is a parameter in all outfalls except 001

Receiving Waters:

Outfall 001 is tributary to Ferry Creek while Outfall 002 is tributary to Kress Creek. All the remaining outfalls are tributary to Indian Creek. All the receiving streams have a dry weather flow of zero. It appears that except for Kress Creek, all NPDES outfalls are the headwaters of each creek. Kress Creek and Ferry Creek are tributaries to the Du Page River and are in the Des Plaines River watershed, while Indian Creek is a direct tributary to the Fox River.

NPDES Permit Conditions:

This facility is authorized to discharge to Waters of the State under an NPDES permit issued on March 25, 2014, effective on April 1, 2014 with an expiration date of March 31, 2019. Attached is a copy of the permit and conditions including parameter limits. The permit requires a single monthly flow measurement reading for all outfalls. Monthly monitoring for pH, temperature and tritium is also required. Additional sampling and analysis for chlorine residual is required for Outfalls 002 and 003. Special Condition 8 of the NPDES Permit specified that discharges for all the permitted outfalls are to be limited to non-contact cooling water and storm water associated with industrial activity and shall be free of process and other wastewater discharges. The permit does require that a storm water pollution prevention plan be developed and implemented for runoff associated with industrial activity. All construction activity is covered under individual NPDES Permits.

NPDES PERMIT COMPLIANCE

Facility Site Review and Permit Verification:

At the time of the inspection, the main injector and Tevatron were on shut down. Any discharge would consist of excess recirculation water composed mainly of storm water and groundwater. The inspection included a review of all the NPDES Outfalls

Outfall 001 is located in the southeast portion of the property in nature area south of the Fermilab Village. The main source is pond historically referred to as the Ephemeral Lake. The pond was low and muddy. The location of the monitoring point is an outfall that discharges to a series of water bodies (Lake John Law and Sea of Evanescence) before becoming Ferry Creek. .

Outfall 002 is located on the northeast section of the property. A recirculation pond is used as a primary extension of the already existing Casey's Pond, which is tributary to Outfall 002. The pond has an area of six acres with a depth of six feet. The designated outfall

discharges to a transfer ditch before entering Kress Creek. The discharge was low and slightly turbid.

Outfall 003 is located in the southwest perimeter of the property, adjacent to the Illinois Prairie Bike Path. Some minor flow was noted. Duckweed and algae was noted. In the Outfall 003 watershed, is a central utility dechlorination unit. The unit is equipped with automatic chlorine residual analyzers which control the amount of chemical feed. The watershed also includes five solid waste management units.

Outfall 004 is located on the far east part of the facility. The runoff is directly related to the Minos experiment and construction was ongoing for the Liquid Argon project. Previously, dry weather flow could include pumped out ground water from the NuMI\Minos and Mini Boone complexes. The discharge was from a retention pond. The detention pond has been removed and the pump out is directed to a holding tank. It is then mixed with the other cooling water and pumped back into the cooling water recirculation system. The tank does have an emergency overflow. The runoff is now directed in a southeast direction. It was determined that the new monitoring point for Outfall 004 should be the discharge to the wetlands that drain into Indian Creek. No discharge was noted at the time of the inspection.

Outfall 005 is the pond C overflow. The pond discharges into the ditch that meanders around it by way of high level rock overflows on both ends. According to staff, it has only discharged twice since 2014. In the case of monitoring flows, measurements are taken at both ends and then totalized.

Outfall 006 is the pond D overflow. Discharges from these outfalls are intermittent and based on operational factors. This outfall is a high level rock overflow. The discharge is a sheet flow.

Self Monitoring Program:

A review of records has shown that all reports are submitted in a timely manner and in accordance with the NPDES Permit. All present NPDES Monitoring (for IL0026123) is conducted in the field by the technical staff. The monitoring procedures were shown to be in accordance with Standard Condition 10 of the NPDES Permit including representative sampling, frequency and monitoring records. An Orion Model 250-A portable meter is used for monitoring for pH and temperature. For chlorine residual, a Hach DR 2000 is used. Records indicate that both units are field calibrated and conform to 40 CFR 136 and the standard conditions of the NPDES Permit. Tritium is analyzed by the in-house radium facility using EPA Method 906 (for analysis of tritium in drinking water). Concentrations are determined by liquid scintillation counting analysis. The lab uses a tri-carb counter. Two one hour counts are conducted and the average of the two is the result. Blanks and spikes are used for quality control.

Flow measurement for Outfall 001, 004, 005 and 006 are based on a calculation using the "Francis" formula which is determined by cubic feet per second in a waterway and a weir.

For Outfalls 002 and 003, flows are calculated by measuring the depth and width of the spillway or waterway. The calculation sheets are included with the procedures.

Effluent:

A review of discharge monitoring reports has indicated no NPDES violations. No major water quality issues were noted during this inspection.

Storm Water:

A review of records has shown that the permittee has maintained storm water pollution prevention as required by the NPDES Permit. The Storm Water Pollution Prevention Plan was initially prepared on May 28, 2010 by Terracon Inc with a revised plan completed in June 25, 2014. The plan identifies mainly the RCRA storage facilities as its main source of industrial activities and significant materials. This includes the Part B permitted hazardous waste storage facility at site 55 and four active solid waste management units. These are the Village Machine Shop, CUB Piping and Clay Tile Field, Meson Hill Landfill, Meson hill Landfill and the Railhead A storage yard. In addition, Fermilab maintains a rock stockpile generated during the construction of the NuMi facility and operates the Technical Division and support areas including Roads and Grounds. These include vehicle maintenance, a salt dome and receiving warehouses. The modification to the SWPPP added the public utilities. There are areas where industrial activity could come into contact with storm water. These include tanks used for the storage brine and sodium chloride. Attached is a list of chemicals used in the tower water system, the chilled closed loop chiller system, the sludge press boiler and the regeneration system. The last annual report submitted was in March 2015.

Summary:

This facility has been shown to be in compliance with the effluent limits and self monitoring requirements of the NPDES Permit. The facility substantially meets the Storm Water Pollution Prevention Plan requirements of the NPDES Permit.

Attachments: DMR Summary
Site Map Process
Flow Diagram
Outfall Locations and Details
Recording Data
Annual SWPPP Report

Outfall 001 FERRY CREEK					
Month-Year	Date	Temp (°F)	pH	Flow (MGD)	³ H (μCi/mL)
Dec-14	12/17/2014	37.8	8.65	2.94	<0.000001
Jan-15	01/16/2015	32.7	8.49	2.25	<0.000001
Feb-15	02/09/2015	33.0	7.60	1.62	<0.000001
Mar-15	03/11/2015	35.4	8.03	1.92	<0.000001
Apr-15	04/08/2015	51.5	8.57	2.25	<0.000001
May-15	05/13/2015	61.4	8.11	2.59	<0.000001
Jun-15	06/11/2015	NF	NF	NF	NF
Jul-15	07/15/2015	80.6	7.94	2.94	<0.000001
Aug-15	08/05/2015	NF	NF	NF	NF
Sep-15	09/15/2015	87.2	7.96	0.58	<0.000001
Oct-15	NF	NF	NF	NF	NF
Nov-15	11/09/2015	56.6	8.96	1.62	<0.000001

NF=No Flow

Excursion

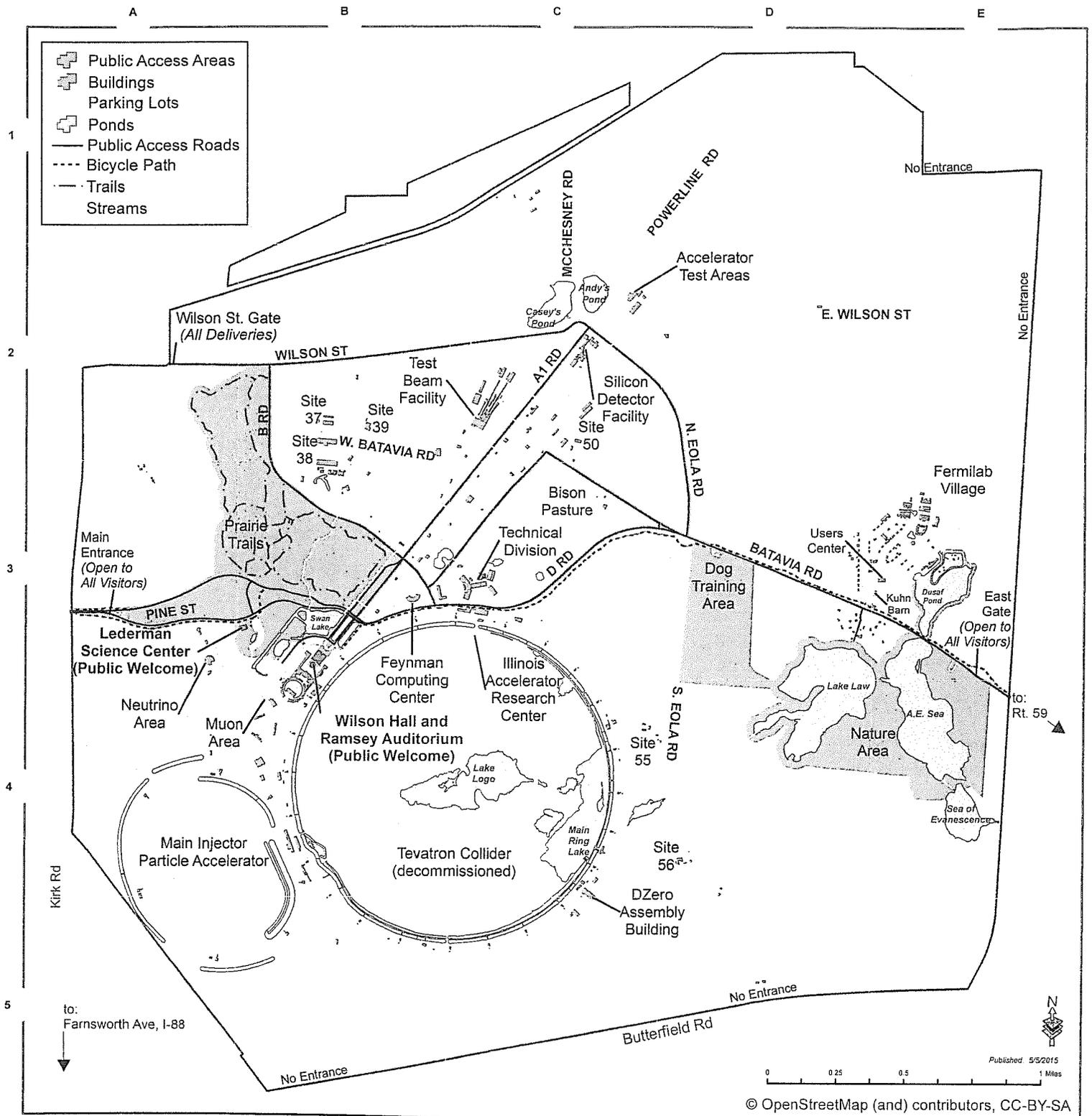
Outfall 002 KRESS CREEK

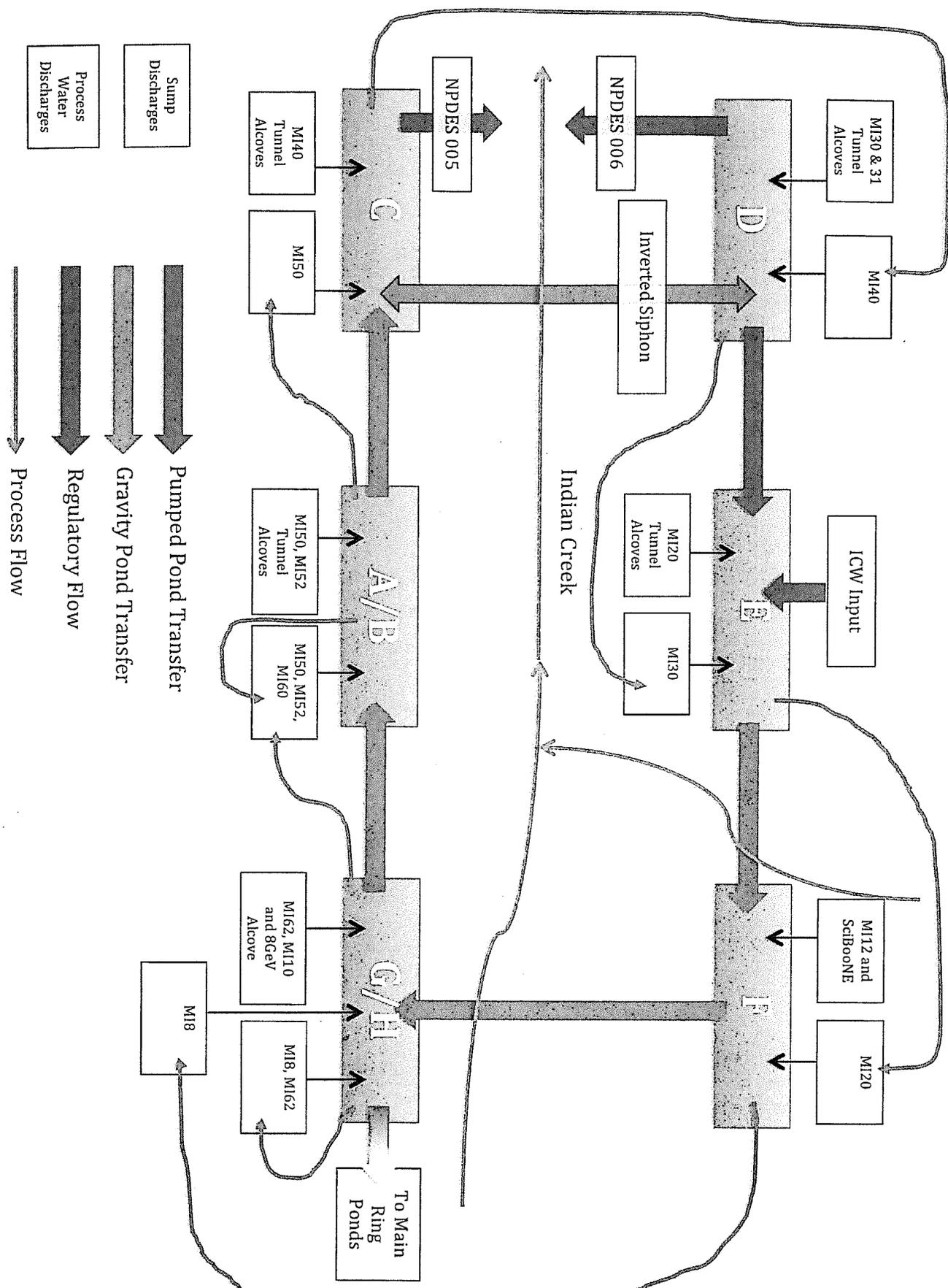
Date	Temp (°F)	pH	Flow (MGD)	Chlorine (mg/L)	Temp Upstream (°F)	Temp Downstream (°F)	³ H (μCi/mL)
12/05/2014	35.7	7.97	3.7	0.00	36	35.8	<0.000001
01/16/2015	NF	NF	NF	NF	NF	NF	NF
02/09/2015	NF	NF	NF	NF	NF	NF	NF
03/11/2015	36.5	7.83	4.8	0.0	33.6	35.6	0.0000019
04/08/2015	51.6	8.36	1.1	0.04	49.6	49.5	0.0000034
NF	NF	NF	NF	NF	NF	NF	NF
06/15/2015	77.7	7.72	8.8	0.03	77.7	77.5	<1.0
7/7/15	71.9	7.88	4.1	0.00	71.8	71.9	<0.000001
08/05/2015	72.2	7.95	3.9	0.04	73.7	73.7	<0.000001
NF	NF	NF	NF	NF	NF	NF	NF
10/28/2015	58.0	8.20	1.4	0.02	57.3	57.3	<0.000001
11/02/2015	61.4	8.21	1.4	0.02	58.7	58.8	<0.000001

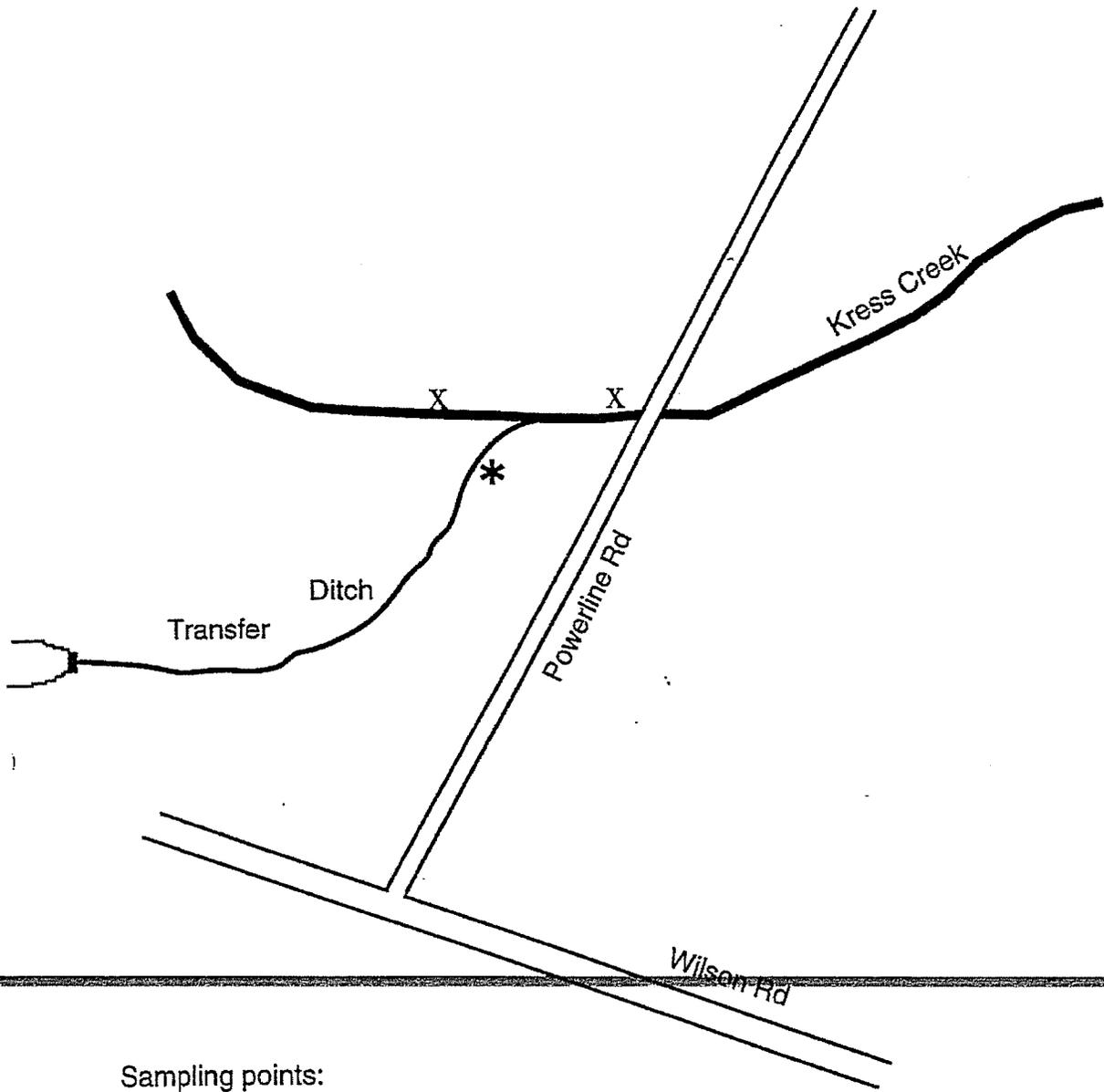
Outfall 003 INDIAN CREEK						Outfall 004	
Date	Temp (°F)	pH	Flow (MGD)	Chlorine (mg/L)	³ H (μCi/mL)	Date	Temp (°F)
12/17/2014	43.7	8.37	0.03	0.00	0.0000061	NF	NF
01/16/2015	40.7	7.8	0.03	0.00	0.0000047	NF	NF
02/09/2015	42.2	7.80	0.03	0.00	0.0000068	NF	NF
03/11/2015	43.9	8.87	0.08	0.00	0.0000031	NF	NF
04/15/2015	65.7	8.34	0.03	0.02	0.0000085	NF	NF
05/13/2015	54.7	7.11	0.03	0.02	0.0000103	NF	NF
06/11/2015	76.6	7.58	0.03	0.03	0.0000056	NF	NF
07/15/2015	73.5	7.77	0.03	0.02	0.0000019	NF	NF
08/06/2015	80.2	7.76	0.03	0.03	0.0000028	NF	NF
09/22/2015	67	7.92	0.03	0.03	0	NF	NF
10/14/2015	55.8	8.12	0.03	0.03	0.0000016	NF	NF
11/19/2015	51.0	8.30	0.03	0.02	0.0000009	NF	NF

Fermilab Site Map

For an electronic version of this map and more information on tours and things to do at Fermilab go to www.fnal.gov/pub/visiting.

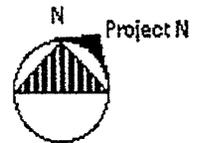




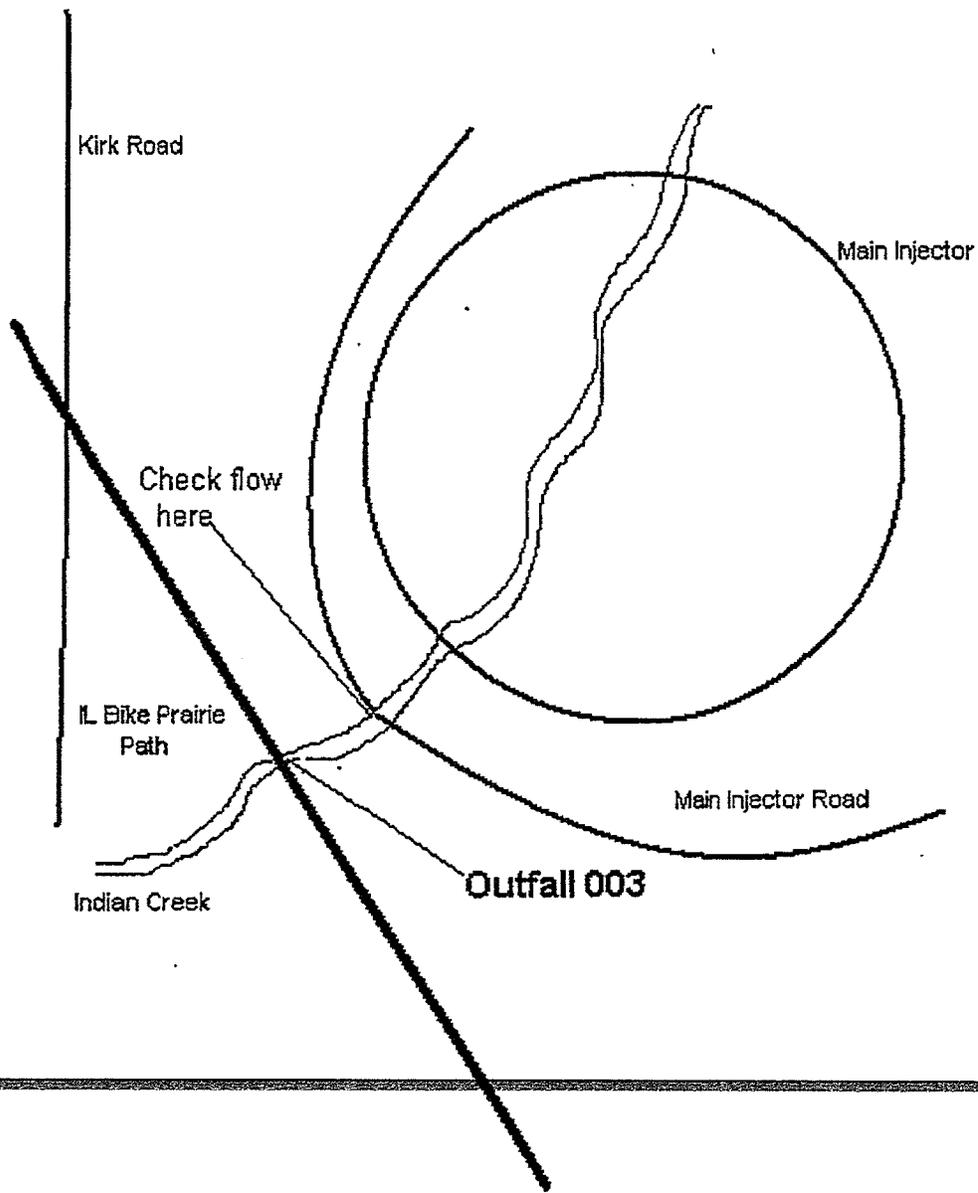


Sampling points:

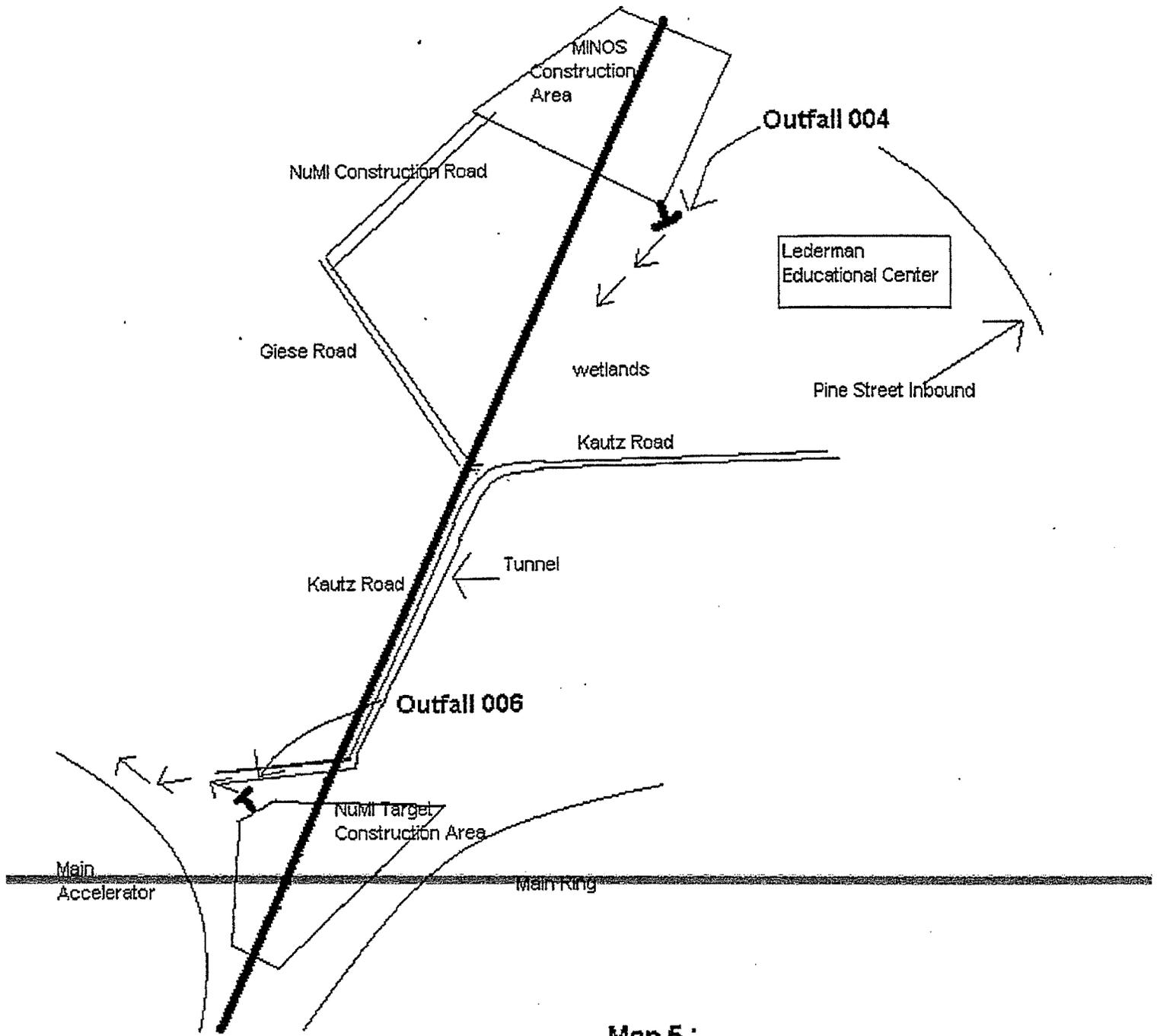
- * pH, Temperature, Chlorine, Flow
- X Temperature



	<p>Map 3: Outfall 002 Kress Creek Transfer Ditch</p>
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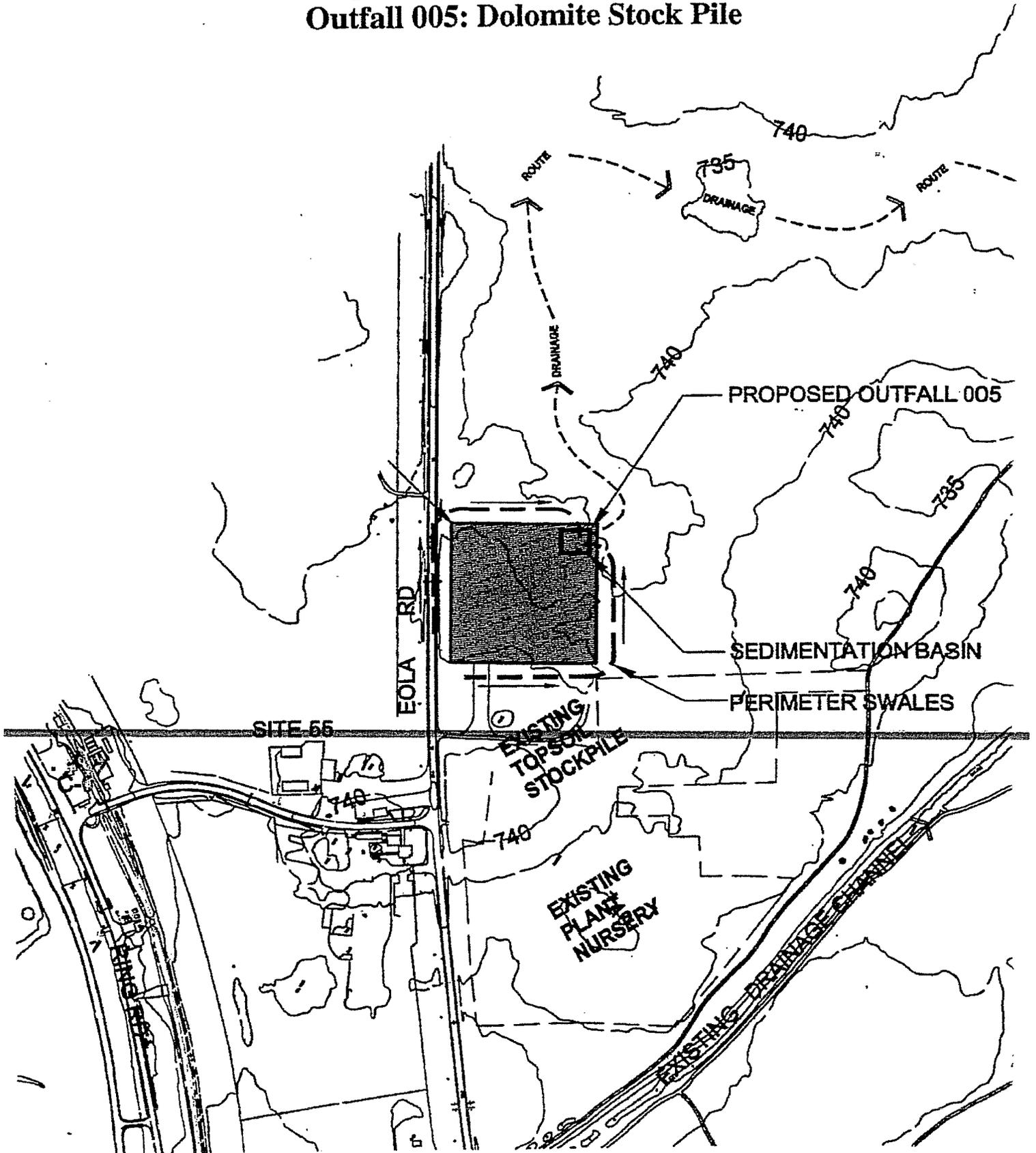


	<p>Map 4: Outfall 003 Indian Creek</p>
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Map 5 :
Outfalls 004 and 006

Map 6 Outfall 005: Dolomite Stock Pile



Date / Time	By	Parameter	Unit	Method	Sample ID	Result	Comment
7/17/15 1435	EK	pH Temp Flow	SI °F MGD	Probe " Calc	150715EK06	7.94 80.6 2.94	Not Confined 6 inches Needs to be cleared
8/5/15 1640	EK	pH Temp Flow	SI °F MGD	Probe " Calc	NO FLOW		
9/15/15 12:15	EK	pH Temp Flow	SI °F MGD	Probe " Calc	150915EK01	7.96 87.2 0.58	2 inches
10/14/15 No Flow	EK						
11/9/15 1500	EK	pH Temp Flow	SI °F MGD	Probe " Calc	151109EK05	8.96 56.6 1.62	4 inches

36

Date/Time	By	Parameter	Result	Unit	Method	Sample ID	Comments	Parties
7/7/15 1120	EK	pH	7.88	SI	probe	150707EKO1	39x2 inches wide	L M R
/	/	Temp Up	71.8	°F	"			16 ? 17
/	/	Temp Down	70 71.9	"	"			(inches)
/	/	Temp	71.9	"	"			5.13, 6.02, 5.76
/	/	Cl ₂	0.00	Mg/L	DPD			(seconds)
/	/	Flow	4.1	MGD	Calc			
8/05/15 1105	EK	pH	7.95	SI	probe	150805EKO1	92 in wide	L M R
/	/	Temp Up	73.7	°F	"			9.5 16 14
/	/	Temp down		"	"			(inches)
/	/	Temp	72.2	"	"			
/	/	Cl ₂	0.04	Mg/L	DPD			5.36, 3.79, 4.92
/	/	Flow	3.9	MGD	Calc			(seconds)
9/3/15 1535	EK	No Flow						
10/4/15 1340	EK	No Flow						
10/28/15 1515	EK	pH	8.20	SI	probe	151028EKO1	45 in wide	L R M
/	/	Temp Up	57.3	°F	"			16 16.5 18
/	/	Temp Down	57.3	"	"			(inches)
/	/	Temp	58.0	"	"			7.85, 8.03, 8.15
/	/	Cl ₂	0.02	Mg/L	DPD			(seconds)
/	/	Flow	1.4	MGD	Calc			
11/2/15 1415	EK	pH	8.21	SI	probe	151102EKO1	47 in wide	L R M
/	/	Temp Up	58.7	°F	"			18 21 17.5
/	/	Temp Down	58.8	"	"			(inches)
/	/	Temp	61.4	"	"			9.87, 8.98, 9.15
/	/	Cl ₂	0.02	Mg/L	DPD			(seconds)
/	/	Flow	1.4	MGD	Calc			
12/2/15 1620	EK	pH	7.99	SI	probe	151202EKO5	39x3 +6 inches wide	L R M
/	/	Temp Up	41.1	°F	"			8 8.5 21.2
/	/	Temp Down	41.4	"	"			(inches)
/	/	Temp	44.0	"	"			6.57, 5.96, 6.13
/	/	Cl ₂	0.02	Mg/L	DPD			(seconds)
/	/	Flow	1.4	MGD	Calc			

Date/Time	By	Parameter	Result	Unit	Method	Sample ID	Comments
9/22/15 1345	EK	pH Temp Cl ₂ Flow	7.92 67.0 0.03 0.03	SI °F Mg/L MGD	probe " DPD Calc	150922EKO1	1/8"
10/14/15 1335	EK	pH Temp Cl ₂ Flow	8.12 55.8 0.03 0.03	SI °F Mg/L MGD	Probe " DPD Calc	151014EKO1	1/8"
11/11/15 1430	EK	pH Temp Cl ₂ Flow	8.30 51.0 0.02 0.03	SI °F Mg/L MGD	Probe " DPD Calc	151119EKO1	1/8"

Outfall 004 MINOS Pond

Notched No.

57

Date/Time	By	Parameter	Result	Unit	Method	Sample ID	Comments
8/11/14 0837	EK/KK	NO FLOW					
9/16/14 0955	EK	No Flow					
8/3 9/11/14 1000	EK	pH Temp Flow	8.22 57.0 70000 gallons	SI °F Total	Prep " Calc	140919EK01	Did Not Reach Creek.
10/9/14 1135	EK	No Flow					
11/20/14 0900	EK/KK	No Flow					
12/17/14 1130	EK	No Flow					
1/14/15 1044	EK	No Flow					
2/10/15 0909	EK	No Flow					
3/11/15 1120	EK	No Flow					
4/15/15 1350	EK	No Flow					
6/13/15 1013	EK	No Flow					
6/11/15 1130	EK	No Flow					
7/15/15 1059	EK	No Flow					
8/6/15 1000	EK	No Flow					
9/3/15 1458	EK	No Flow					
10/14/15 1540	EK	No Flow					
11/9/15 1056	EK	No Flow					

Date/Time	By	Parameter	Result	Unit	Method	Sample ID	Comments
10/13/15 1505	EK	No Flow					
11/9/15 1106	EK	No Flow					

Date / Time	By	Parameter	Result	Unit	Method	Sample ID	Comments
11/4/13 0931	EK	No Flow					
12/10/13 0855	EK	No Flow					Frozen (partially)
1/13/14 1547	EK	No Flow					
2/19/14 1116	EK	No Flow					
3/10/14 1315	EK	No Flow					
4/9/14 1358	EK	No Flow					
5/8/14 1104	EK	No Flow					
6/13/14 0908	EK	No flow					
7/17/14 1103	EK	No Flow					
8/11/14 0835	EK	No Flow					
9/16/14 0938	EK	No Flow					
10/1/14 1125	EK	No Flow					
11/20/14 0934	EK	No Flow					
12/17/14 1123	EK	No Flow					
1/16/15 1055	EK	No Flow					
2/10/15 0855	EK	No Flow					
3/11/15 1110	EK	No Flow					
4/15/15 1339	EK	NO Flow					
5/13/15 0955	EK	No Flow					
6/11/15 1125	EK	No Flow					
6/16/15 0930	EK	pH	8.12	SI	Probe	150616EKO2	Temp Up : 70
		Temp	78.0	°F	Probe		Temp Down : 71.3
		Flow	0.98	MGD	Calc		
7/15/15 1048	EK	No Flow					
8/6/15 0940	EK	No Flow					
1/3/15 1445	EK	No Flow					
3/14/15 1108	EK	No Flow					
4/1/15 1110	EK	No Flow					