

WV DEP Office of Special Reclamation T&T Treatment Facility

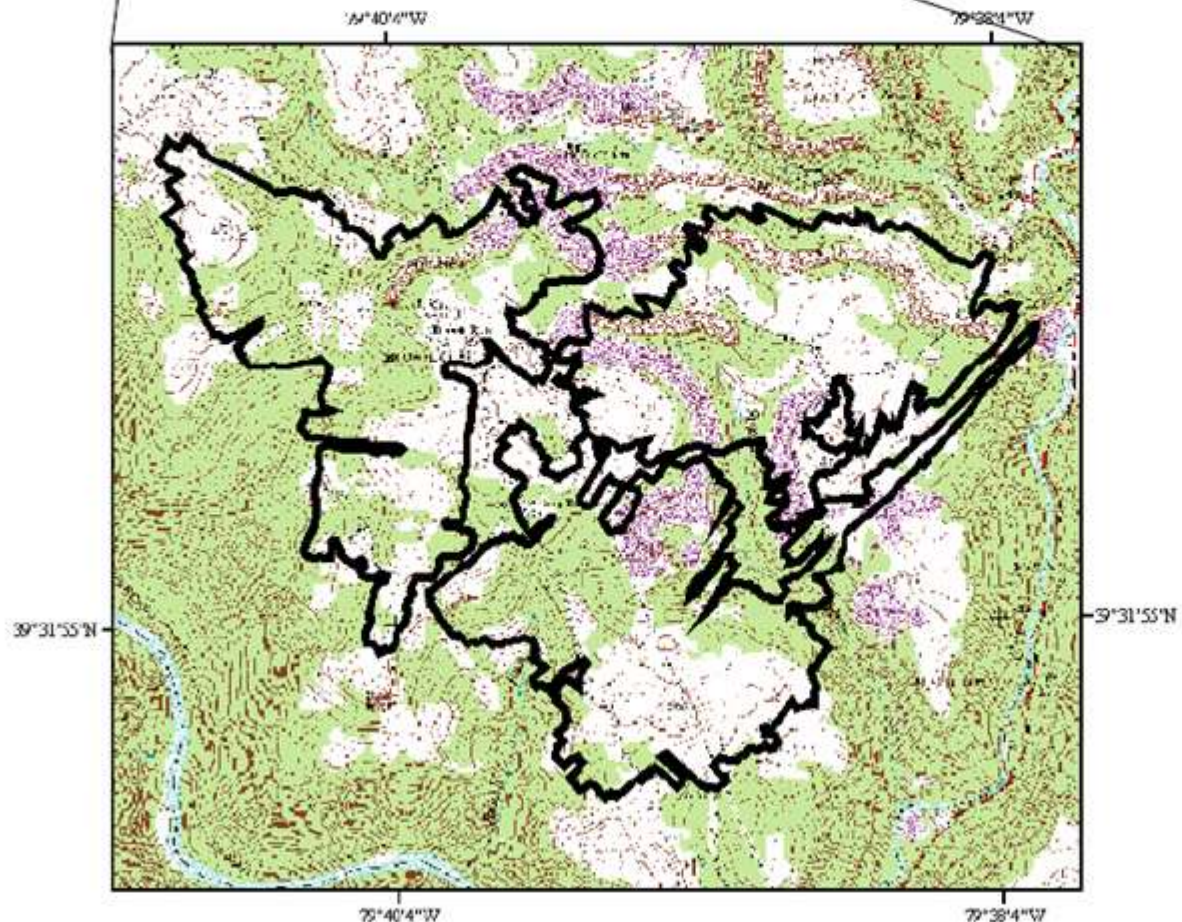
**Construction Update by Larry Riggleman & David McCoy
March 27, 2018**



T&T Mine Complex

Preston County, West Virginia

1400 acres total

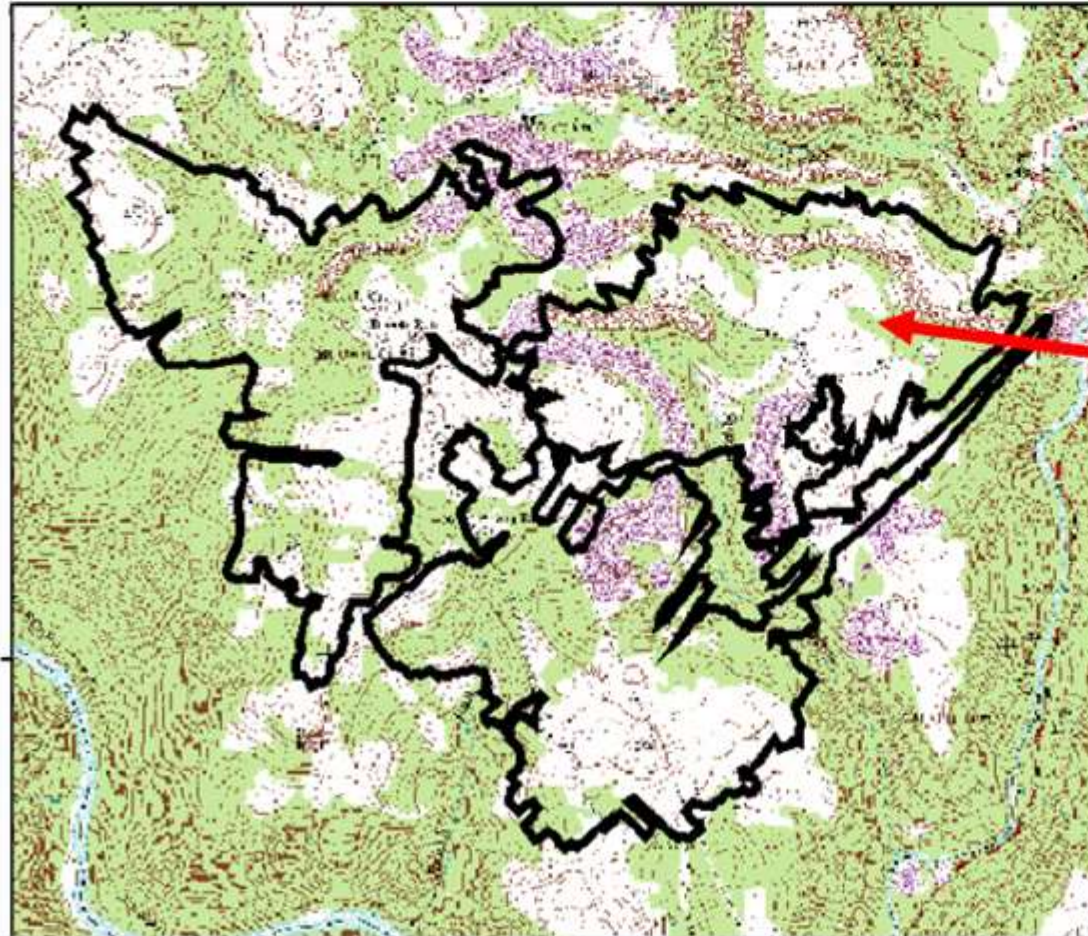


0 700 1,400 2,800 Meters



1. History of Ruthbell and T&T Mines

- **Upper Freeport coal, 6-9 feet thick**
- **Ruthbell #1 Mine - Room and Pillar method**
- **T&T #2 and #3 – Room and Pillar & retreat**



**Ruthbell #1 Mine
abandoned**

Ammonia Treatment System

Sludge Pumping

Dry seals

Wet seal



EVENTS AT T&T SITE

- < **March 1994 First “Blow out”**, estimated 25,000 gpm flowed out of portal for 3~4 days
- < **April 1995 Second “Blow out”...**
- < **Official Forfeiture Date was 10/31/1995**
- < **January 2003 High Flow Event**, Pattern of occurrence every 10 years +/-
- < **2007 Plans to switch all remaining sites from Ammonia chemical to Hydrated Lime chemical (Omega, DLM, F&M, T&T)**
- < **2012 First Plant designed with clarifier was Omega**
- < **2013~2014 Planning on T&T and decided on adding Ruthbell #3 (Preston Energy) water to plant**
- < **2015 Bid out project with two 50 Feet Diameter Clarifiers, but had another High Flow Event (estimated flow at 5000 gpm acidity >3000 ppm, March 2015 started redesign**

Blowout above seal!



March 1994
1st Blowout
(above seal!)

25,000 gpm
out of portal
for 3 to 4
days!

1994 Cheat River Deep Mine Blowout



**T & T mine
Treatment costs were
\$ 30,000 month**

EVENTS AT T&T SITE

- < 2016 decision to add Viking Coal (Permit UO-519) and Fickey Run AML sources to Facility**
- < 2017 January started construction on facility with two 80 Feet Diameter Clarifiers**
- < 2017 December 21st, began partially treating water from T&T and Ruthbell with one clarifier**
- < 2018 March 13th One of Two Clarifiers in operation and Facility to be fully completed by July**
- < Muddy Creek line extension and pump station to be operational by June 2018**
- < Glade Run In-Stream Lime Doser system under contract, due to be completed by Dec. 2018**

HISTORY OF COST AT T&T SITE

***The Total Operation & Maintenance Cost to date: \$9,040,996**

***22 Years of Operation Average Cost \$410,954/Yr. Or \$34,246/Mo.**

This O&M included Chemicals: Caustic Soda, Hydrogen Peroxide, and Anhydrous Ammonia

Services: Snow Plowing, Sludge Pumping, Sludge Line Jetting/Cleaning, Sludge Hauling, Mowing, Surveying

Utilities: Electricity, Water Hauling, Port-A-Jon Rentals, Phone Service

Various Repairs: High Head Sludge Pumps, Tractor Parts, Truck Parts, Tanks, Signs, Electrical Repairs

CURRENT COST - T&T SITE

Engineer's Estimate: \$8.55 Million

Capital Cost: \$8.35 Million with minor Change Orders

**Anticipated O&M: \$360,000/Year OR \$30,000/Mo.
To Treat Four Sources**



**View of T&T Portals
Rt. 26
Muddy Creek
Ruthbell #3 discharge**

6. New Treatment Plant

Location
of Hydrated Lime
Treatment Plant
to treat T&T and
Ruthbelle AMD and
Viking AML

View of T&T
Rt. 26
Ruthbell #3 discharge
Plus some Viking Coal drainage



DESIGN CRITERIA - T&T FACILITY

RAW WATER:

**pH = 2.8~3.0 units, IRON = 106 mg/l, ALUMINUM = 67 mg/l
(average from four sources)**

**FLOW: Design Max. 4200 gpm (2100 gpm each clarifier), ave. 1200~1800 gpm
7600 gpm (maximum hydraulic capacity)**

RAPID MIX: 38 seconds @ 4200 gpm

FLOCCULATION: 25.2 minutes @ 4200 gpm

**CLARIFIER: Rise Rate= 0.5 gpm/s.f. @ 4200 gpm
Sidewall Depth= 16 feet**

TUBE SETTLERS: Full Coverage, 42 inch on 60 degree angle (vertical depth= 36 inches)

EFFLUENT WEIRS: 930 Feet V-Notch Weir (Each Clarifier), 3250 gal./day/L.F.

**CHEMICALS: Lime Slurry 0.2 grams/liter (normal flows) (22 tons/week)
High Flow Event = 5 ~ 6 grams/liter (100~120 tons/day)**

**Cationic Emulsion Polymer- 2~4 ppm (floc aid)
15~25 ppm (geo tubes)**

South Clarifier

**Time Lapse Camera
View Last Year Tour
at T&T Site**

4/11/2017

00:55



MT 0219 2017/04/11 13:48:24

June 26, 2017

Clarifier #2



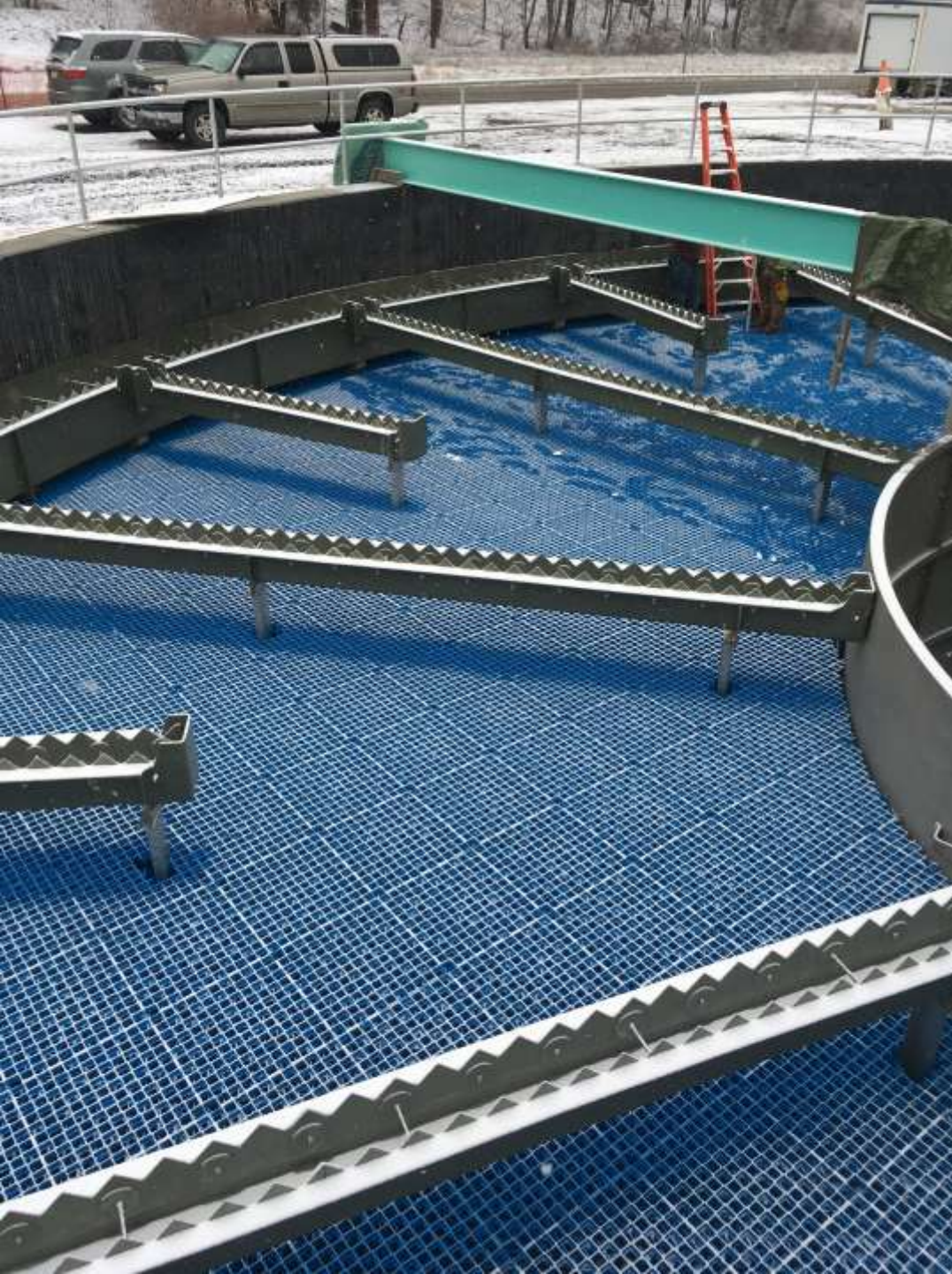
Clarifier #1 still under construction





AccuGrid over
tube settlers to
walk on





Inspection tube
for LED sludge
level sensor

South Clarifier
On Line March
13, 2018



Aug 26, 2017

Silo



Sept 28, 2017

Pump House



**Outside pumps push sludge back to clarifier
(High Density Sludge Process) or to geotubes.
Two inside pumps and lines go into pipes to
push sludge back to T&T #3.**



19/02/2018



19/02/2018



Oct 26, 2017

Control House



PLANT OVERVIEW

TOTAL INCOMING FLOW
1275 GPM

3:33:13 PM

16589

ALARM SP

PLANT RUNNING
IN AUTO MODE

PLANT IN
ALARM

FLOW

pH

pH TREND

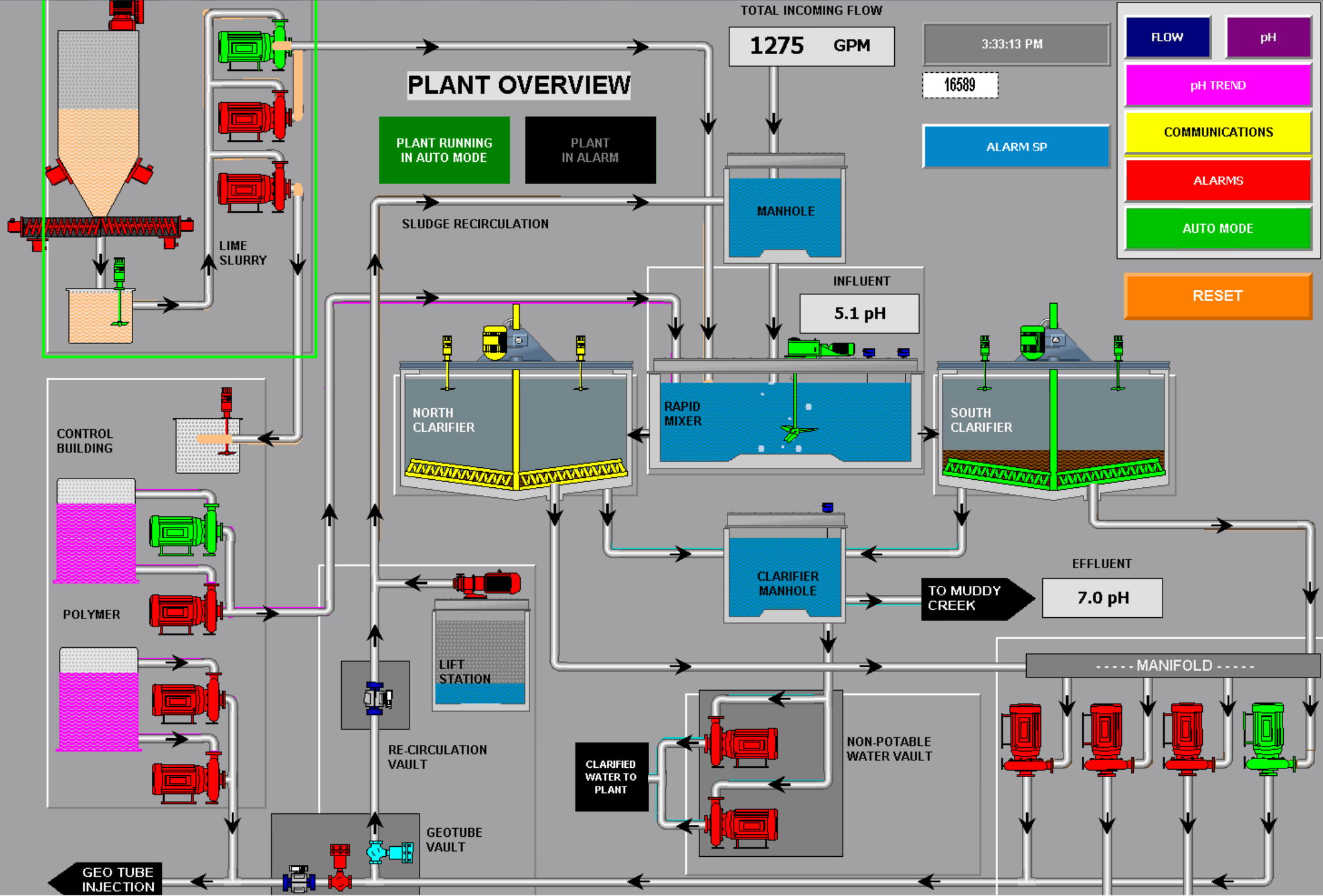
COMMUNICATIONS

ALARMS

AUTO MODE

GO TO WELCOME

RESET



CONTROL BUILDING

POLYMER

LIME SLURRY

NORTH CLARIFIER

RAPID MIXER

SOUTH CLARIFIER

CLARIFIER MANHOLE

EFFLUENT

7.0 pH

TO MUDDY CREEK

----- MANIFOLD -----

RE-CIRCULATION VAULT

CLARIFIED WATER TO PLANT

NON-POTABLE WATER VAULT

LIFT STATION

GEO TUBE VAULT

GEO TUBE INJECTION

PLANT FLOW 2/05/18

T&T FLOW
249 GPM

RUTH BELL FLOW
437 GPM

VIKING FLOW
0 GPM

RAPID MIXER FLOW
686 GPM

CLOSE

PLANT FLOW 2/22/18

T&T FLOW
1618 GPM

RUTH BELL FLOW
1311 GPM

VIKING FLOW
0 GPM

TOTAL INCOMING FLOW
2929 GPM

CLOSE

Jan 10, 2018



**Water from
Ficky Creek and
Viking Mines**



20/02/2018



THANK YOU FOR BEING PART OF THIS PROJECT!

DEP STAFF

Mike Sheehan

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SWN Energy (Financial Partnership)

Friends of Cheat (watershed group)

Mike Jenkins (Time Lapse Camera)