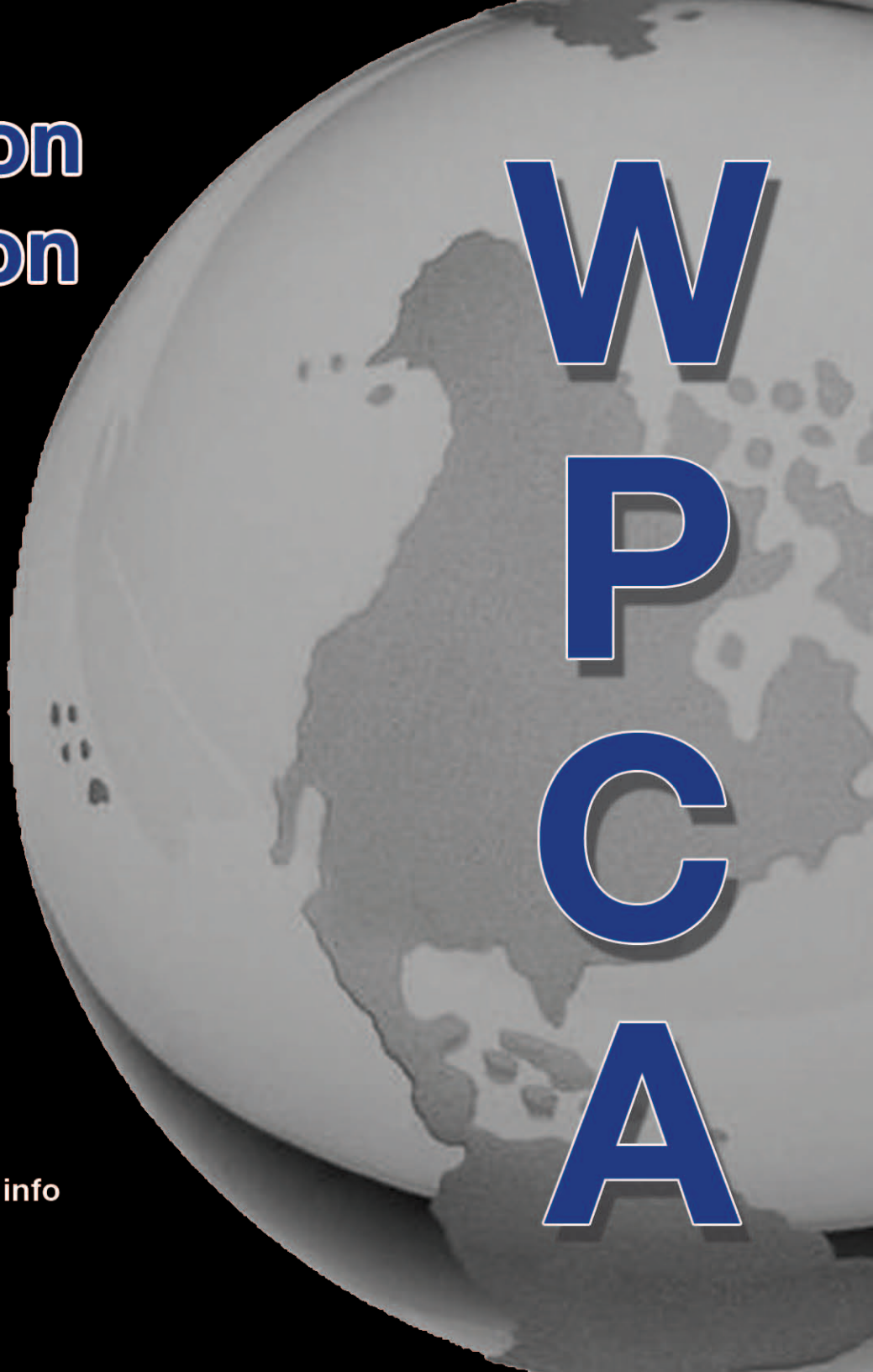
Worldwide Pollution Control Association



Dry Scrubbing O&M Training

APC/PCUG Conference
July 12-16, 2009
The Woodlands, TX

WPCA

Visit our website at www.wpca.info

White Bluff Environmental Project

Entergy Arkansas

Presenter: Camille Carmena

White Bluff Plant

- Redfield, AR on Arkansas River about 25 miles south of Little Rock
- Unit 1: 880/815 MW
- Unit 2: 880/844 MW
- Commissioned in 1980 & 81
- CE drum-type units
- Dual furnaces, tangentially fired
- PRB fuel
- Stacked precipitators
- Hot side to cold side conversion shortly after initial operation of units

Project Goals

- **Reduce both NOx and SO_2 to 0.15 lb/mmbtu, calculated on a 30-day rolling average for PRB fuel.**
- **The level of emissions reduction has been mandated by the state of Arkansas to carry out its obligations under the Clean Air Visibility Rule.**
- **The regulation also stipulates that the controls must be operational no later than October 2013.**

Project Overview

- Entergy's only FGD project (Independence Plant is not affected)
- Sargent & Lundy – Owner's Engineer
- Conceptual design studies completed including:
  - Wet vs Dry Technology
  - Draft System
  - Material Handling
  - Byproduct Disposal
- PowerAdvocate – All specifications and bid information is available online and bid proposals are submitted via a confidential, web-based application.

Wet vs Dry Study

- **Based on S&L's study and cost assessment, a lime spray dryer with baghouse was chosen as the low cost technology.**
- **Desire to accomodate higher SO_2 levels on occasions when PRB coal supply is not adequate.**

Unit 1 & 2 Design Basis

- Gross Load: 880 MW_g
- Heat Input:

  8950 mmBtu/hr
- MCR Flow Rate:

  3.7 mmACFM

  @ 318 °F & 14.58 psia
- Air heater outlet: ~300°F
- PM loading: 0.05 gr/acf

- Fuel
  - –PRB
  - –2.0 lb SO_2/mmBtu
- Water
  - –Cooling tower blowdown: 390 ppm Cl

Draft System Study

- **The decision was made to proceed with a dry FGD and fabric filter with existing ID fans and new booster fans.**
- **The design will include 2 x 50% axial-type booster fans downstream of the fabric filters.**
- **The existing ID fans will not be replaced or altered during FGD implementation.**

Other project decisions…

- **Will reuse the existing concrete chimney which has dual carbon steel liners.**
  - **Top 50’ of each liner is 316 stainless steel.**
  - **Will apply an acid-resistant coating to the top 100’ of shell to prevent damage from tip downwash.**

Other project decisions…

- **No new landfill. Byproduct will go in existing landfill.**
- **ESPs will remain in service to allow continuation of ash sales.**
- **Site visits included Louisa and Brayton Point.**
- **Based on byproduct analyses from those sites, we intend to blend:**
  - **65% byproduct**
  - **30% water**
  - **5% fly ash**

Contracts

- **Contracts:**
  - **FGD Island – furnish and erect**
  - **BOP – furnish and erect**
  - **NOx Reduction – Low NOx burners & SOFA (separated overfire air)**

Entergy White Bluff
Dry FGD Specified Scope

Dry FGD Retrofit Activities

Flue Gas

FGD Supplier

BOP EPC

Spray Dryer

Recycle Slurry

Absorber System

MECH | ELECT | STEEL

FOUND | I&C | BLDG

Baghouse

Particulate Collection

MECH | ELECT | STEEL

FOUND | I&C

Booster Fans

Flue Gas System

MECH | ELECT | STEEL

FOUND | I&C

Existing Chimney

COAT

» Auxiliary power system
» Service air
» Instrument air
» Demolition/relocation
» Water supply
» Control system installation
» Site civil work

Balance-of-Plant

MECH | ELECT | STEEL

FOUND | I&C* | BLDG

* DCS Scope of supply and installation is described in Appendix R

Lime Day Bin

Lime Slaker

Lime Slurry Feed Tank

Reagent Preparation

MECH | ELECT | STEEL

FOUND | I&C | BLDG

Rail Unloading

Lime Storage Silo

Reagent Handling

MECH | ELECT | STEEL

FOUND | I&C | BLDG

From ESP

Fly Ash Silo

By-Product Storage Silo

Pin Mixer

By-Product Handling

MECH | ELECT | STEEL

FOUND | I&C

By-Product Haul Road

Land Fill

Disposal

MECH | GEO-TECH

CIVIL

Revised: 6-26-2009

FGD Scope

- **The FGD EPC scope of work will include engineering, procurement and construction of:**
  - **reagent preparation, recycle system, spray dryers, baghouse, booster fans,**
- **DCS design and commissioning and startup.**

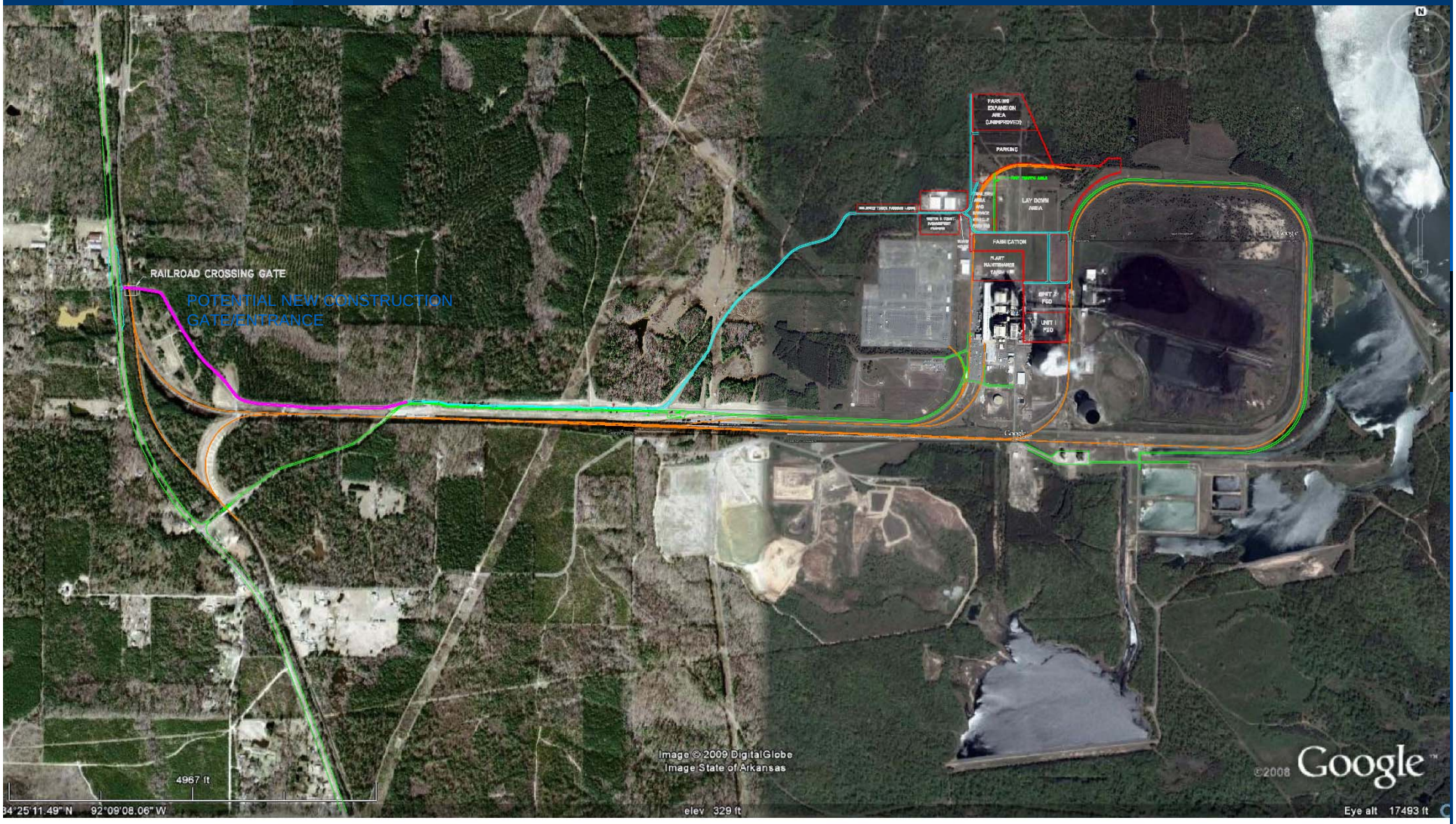
BOP Scope

- The BOP EPC contractor is expected to take responsibility for the overall project schedule.
- The BOP EPC scope of work will include engineering, procurement and construction of:
  - Reagent handling including rail spur, unloading, and storage
  - Byproduct handling including material handling systems, storage silos, discharge to trucks, and haul road
  - Process water retention pond
  - Chimney external coating
  - Auxiliary electrical system modifications and distribution systems
  - Electrical associated with the spray dryers, baghouse, booster fans
  - All foundations associated with both BOP and FGD Island contracts.
  - Supply, installation, and integration of controls for FGD Island and BOP processes
- Additionally, the BOP EPC scope will include overall project and site construction management and schedule coordination with the FGD supplier.

Schedule

- **Anticipate receiving air permit by year end.**
- **FGD RFP was issued March 2009; bids received in June 2009. Plan to award later this year.**
- **Preparing BOP RFP for issuance soon. Plan to award early 2010.**
- **Unit 1 tie-in outage – Fall 2012**
- **Unit 2 tie-in outage – Spring 2013**

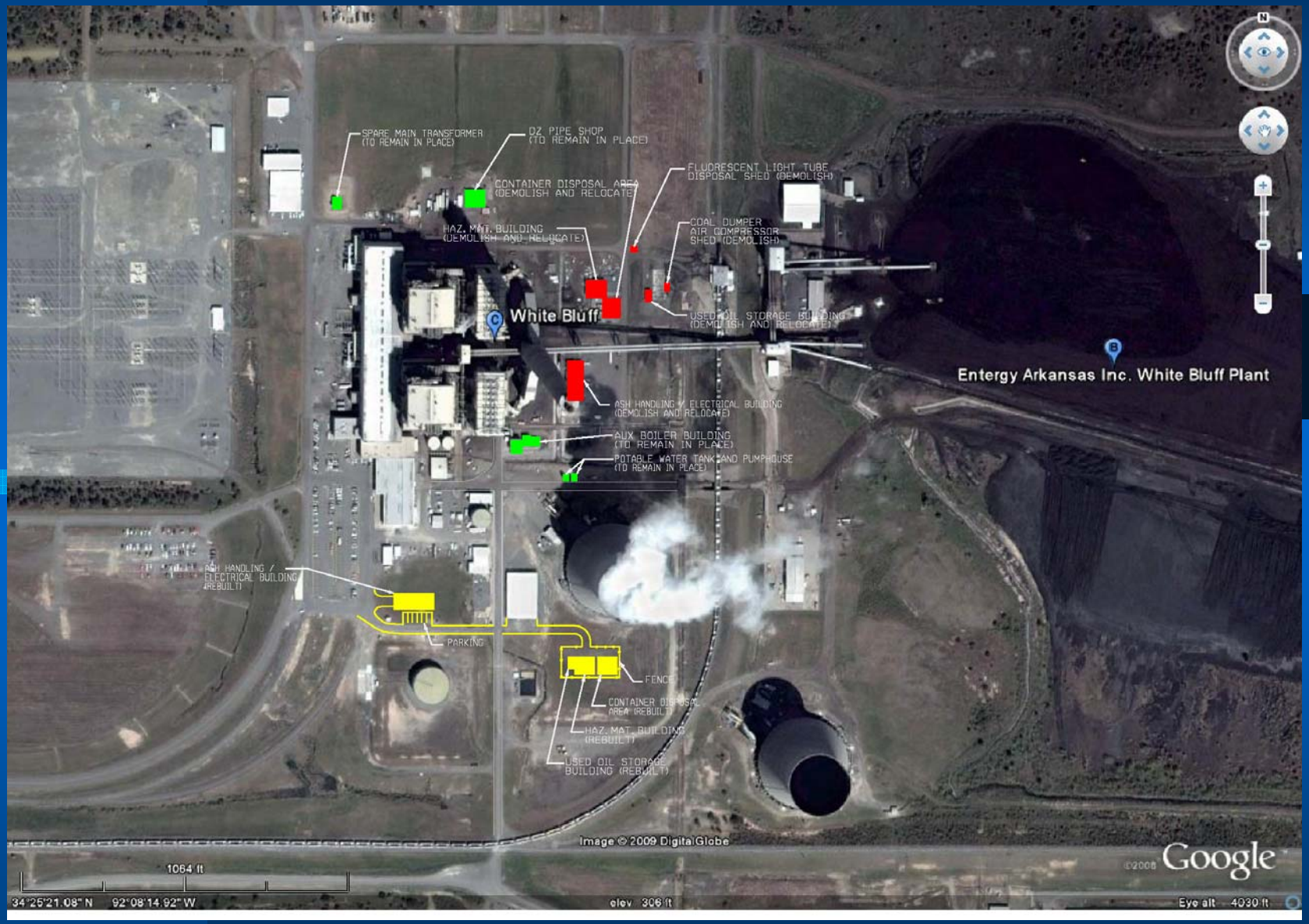
Plant Access



LEGEND:

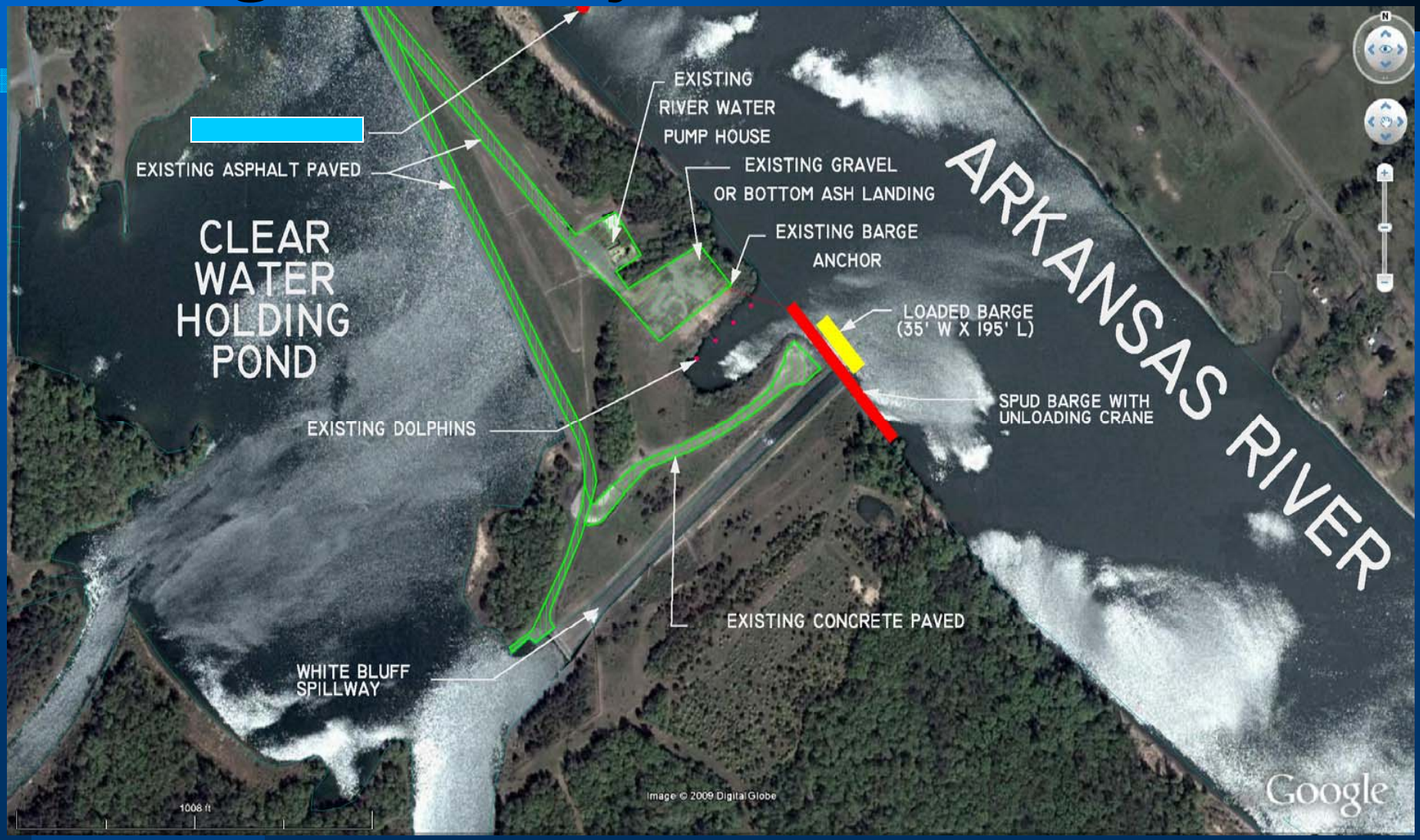
- PROPOSED CONSTRUCTION ENTRANCE ROAD
- CURRENT PLANT ACCESS ROADS
- PROPOSED PLANT ACCESS ROADS
- RAILROAD TRACK

Demolition - Relocation Plan

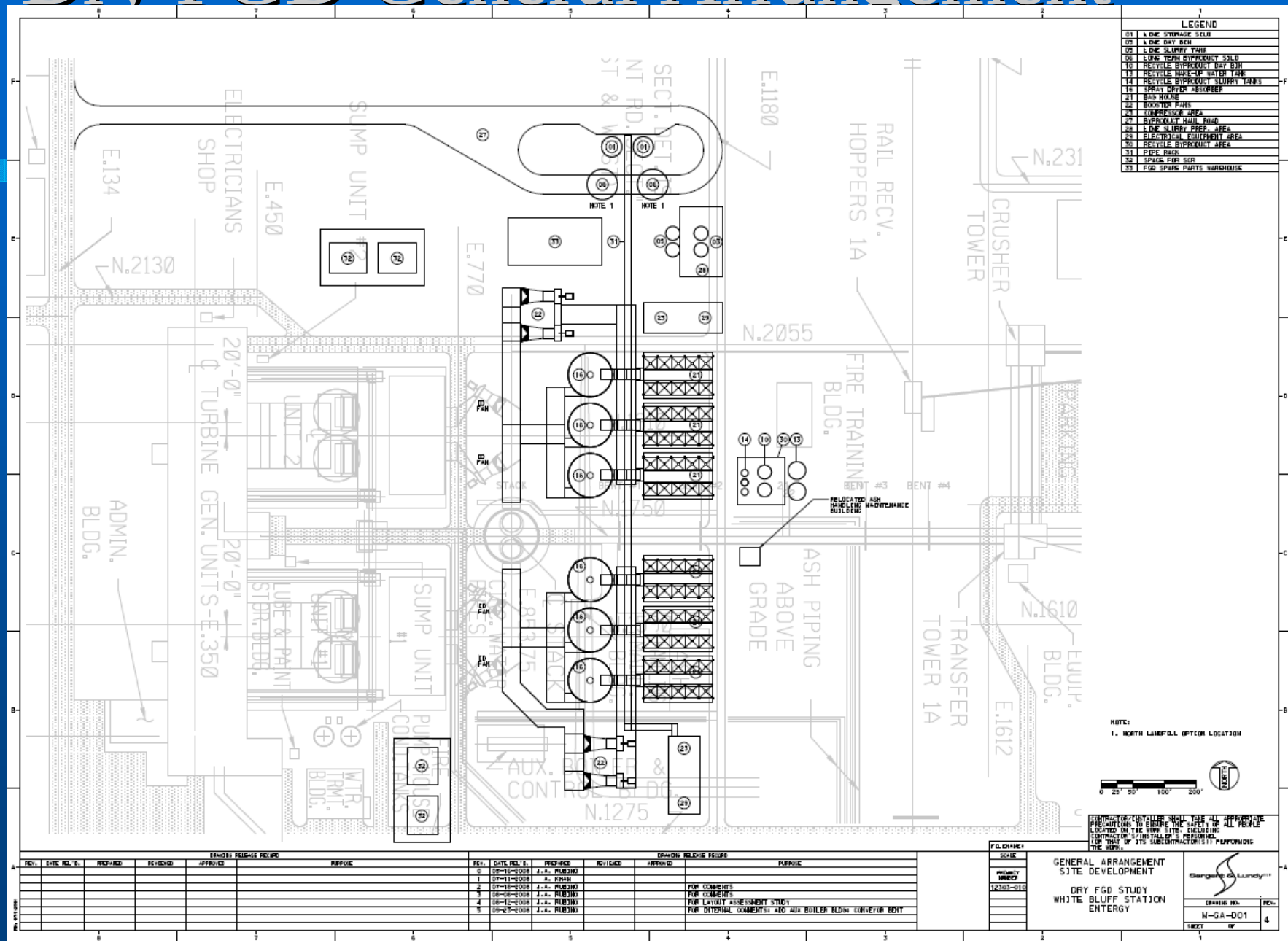


Barge Delivery Haul Road

Barge Delivery Access



Dry FGD General Arrangement



Pre-Scrubber View

Post Scrubber Rendition

Questions?