Sanford Lab: Status

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Where are we today?

GOALS:

- Shaft rehabilitation for re-entry
- Risk assessments for safe access
- Re-establish pumping systems for dewatering
- Ensure environmental compliance in water discharge
- Begin Early Science

Ross Rehab

- Ross shaft rehabilitation has been completed
  - Necessary replacements of corroded steel
  - Manned cage reached water 4/14/08
  - Level inspections conducted to identify problem areas arising since mine closed

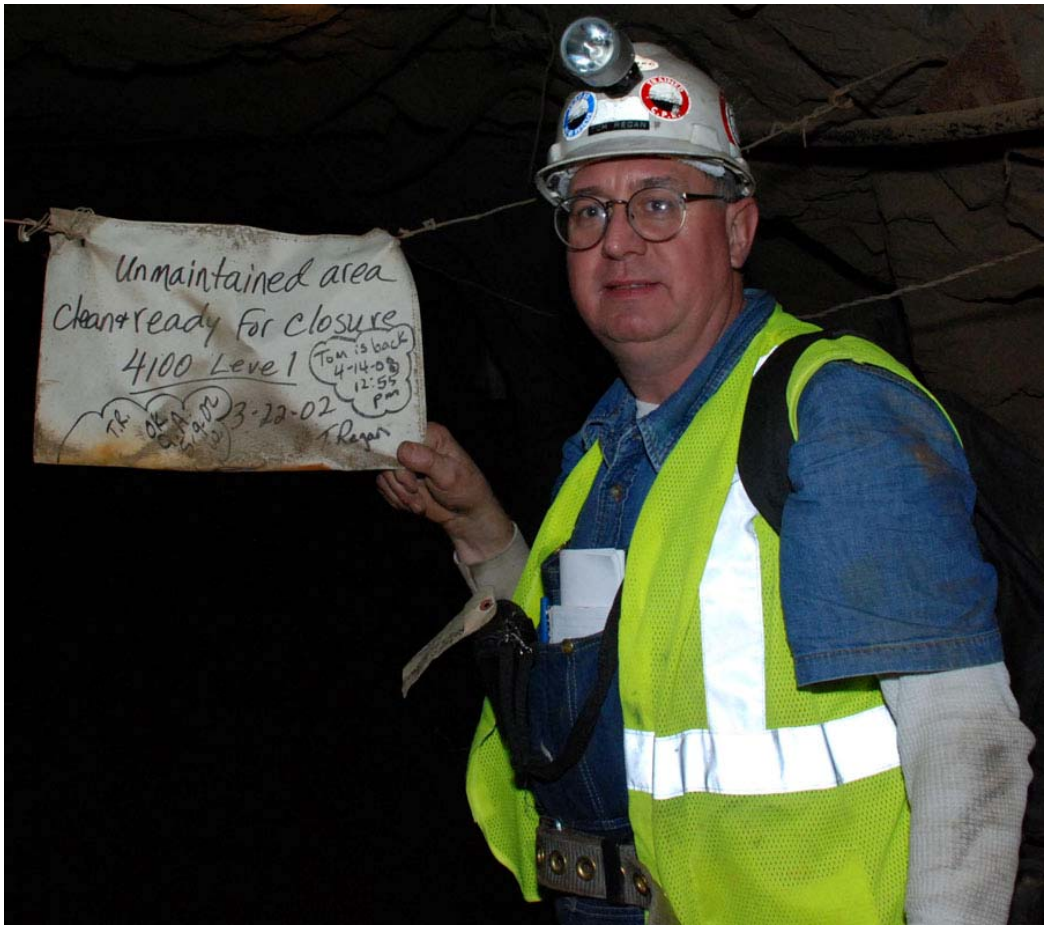
Ross Shaft Steel

All levels are inspected…

Risk/Safety Assessments

Closing the Circle

"Tom is back!"



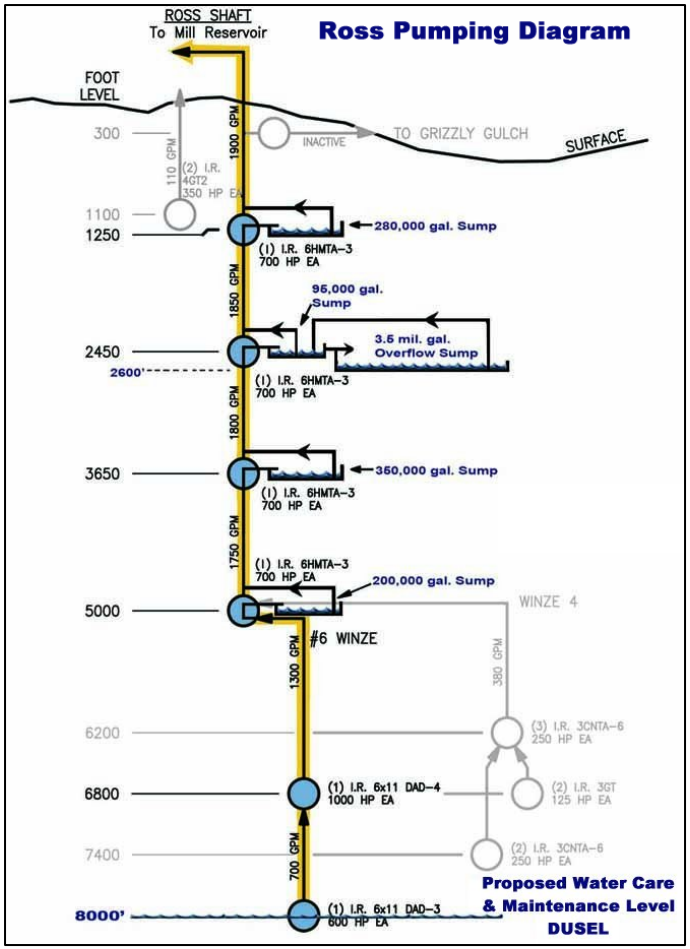
Interesting Biological Features Encountered

"Bug" at 2900

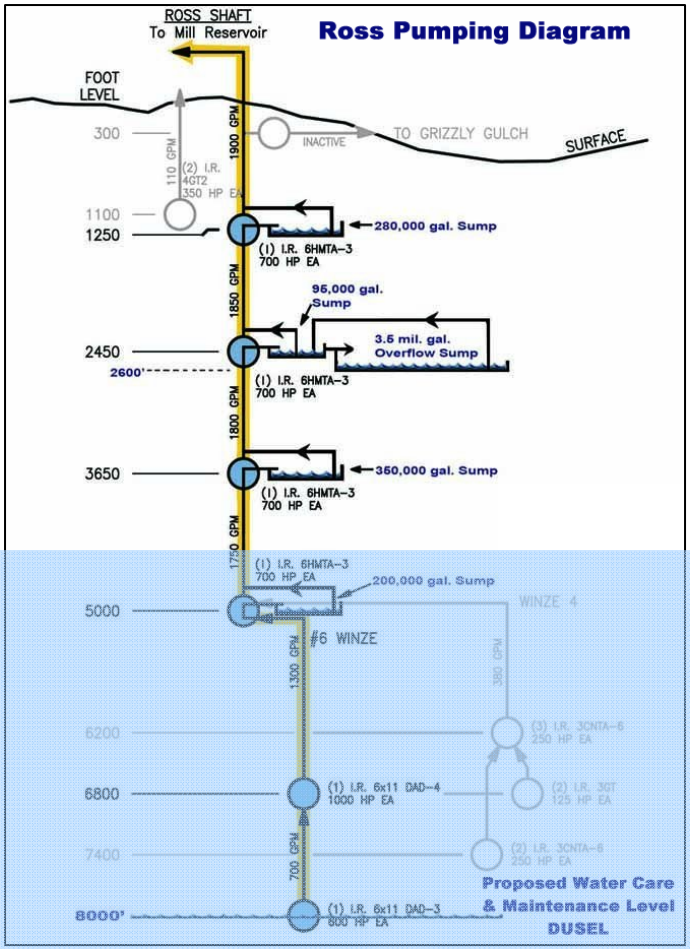
Fungal growth at 2000

Water Challenges

De-Watering Configuration

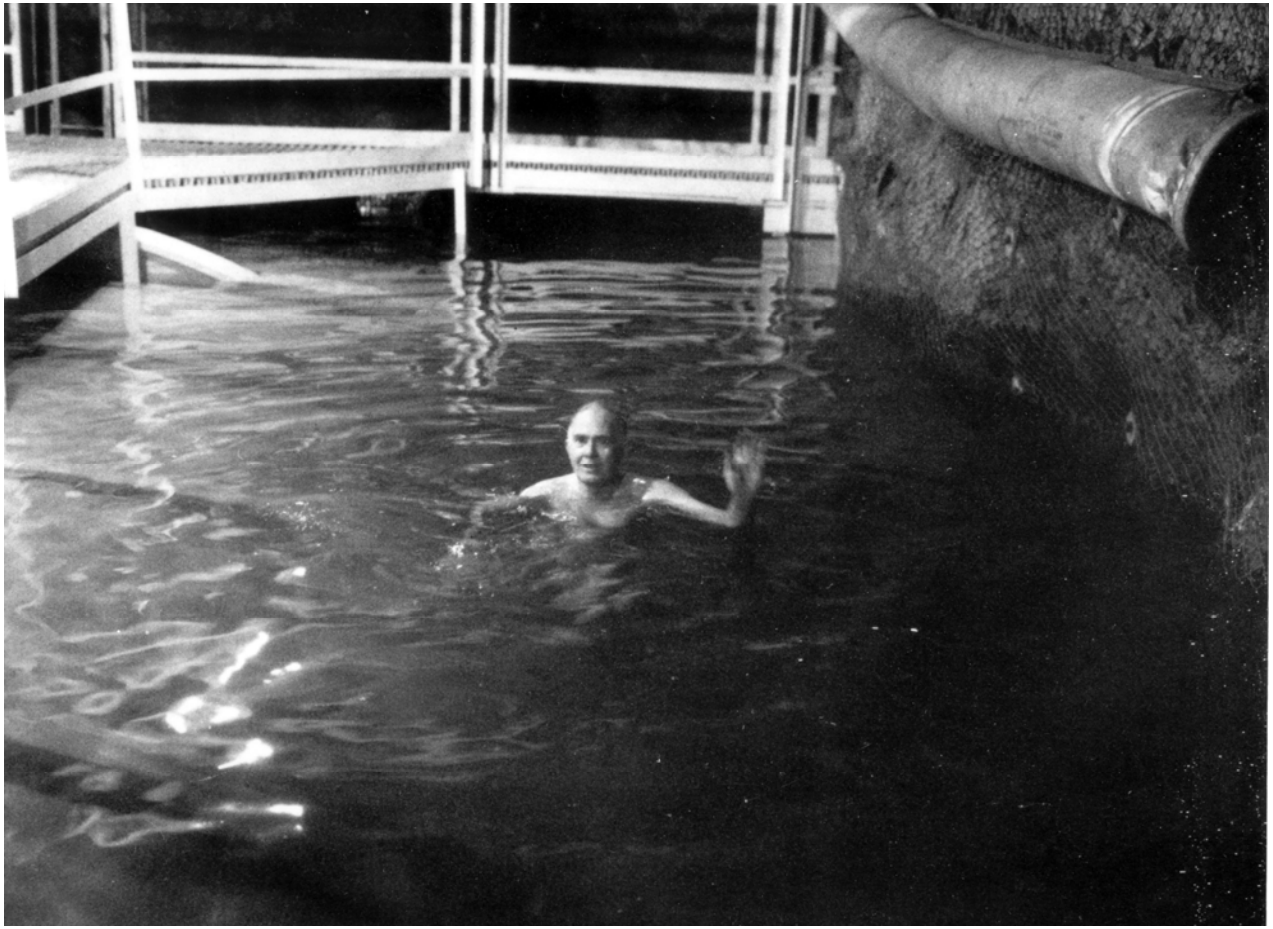


De-Watering Configuration



Water level
at 4595.3'
Oct 24, 2008

Welcome to Homestake Spa!



Status of Pumping Systems

- Pumping system has been installed and is now operational
  - Good progress being made in lowering water level
    - between levels: ~2-4 feet/day
  - Upgrading systems to increase rate of water removal
  - Wagers being made for target date of May 1 for 4850 being dry

Commissioning First Pump

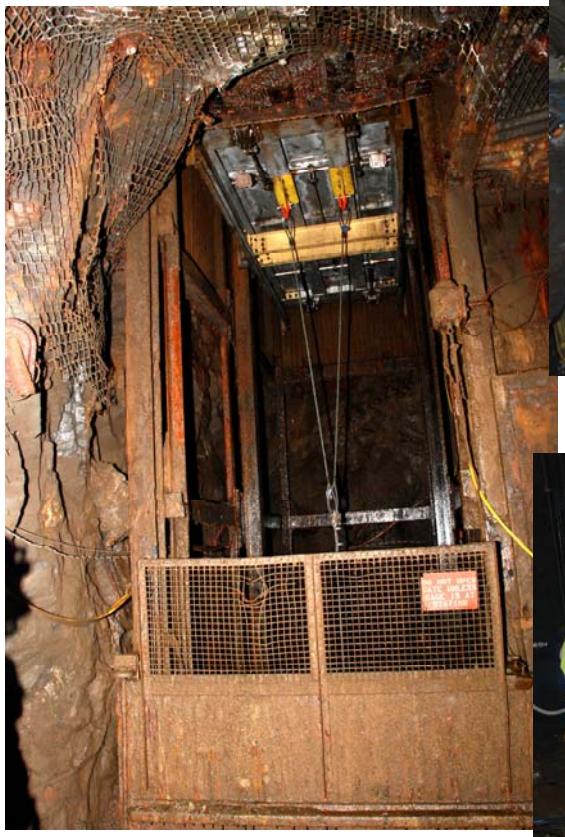
Governor inspecting the valve

First water to the surface

Focus on Water Quality

- Extensive water sampling program conducted
  - Water quality problems encountered
    - TDS (Total Dissolved Solids) above permit level
    - High iron content (turns water red)
    - Small, but unacceptable level of ammonia
- By mid-May it became clear we would need to re-commission water treatment plant!

Water Sampling



8 May, 2008

Water from main mine pool

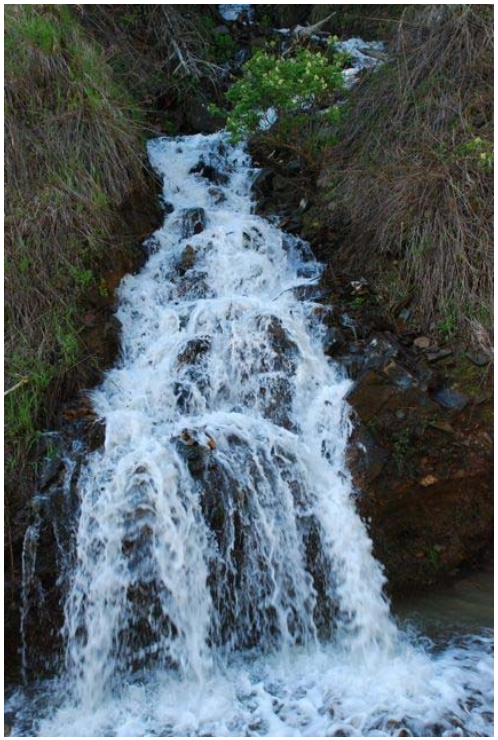
20 ppm Iron oxidized to 3+ state yields unacceptable color to water

Water Treatment Plant

Handling iron

Lamella clarifiers
+ coagulant polymers
+ flocculants
= good separation

Pure water being discharged



Local Tourist Attraction Back On Line

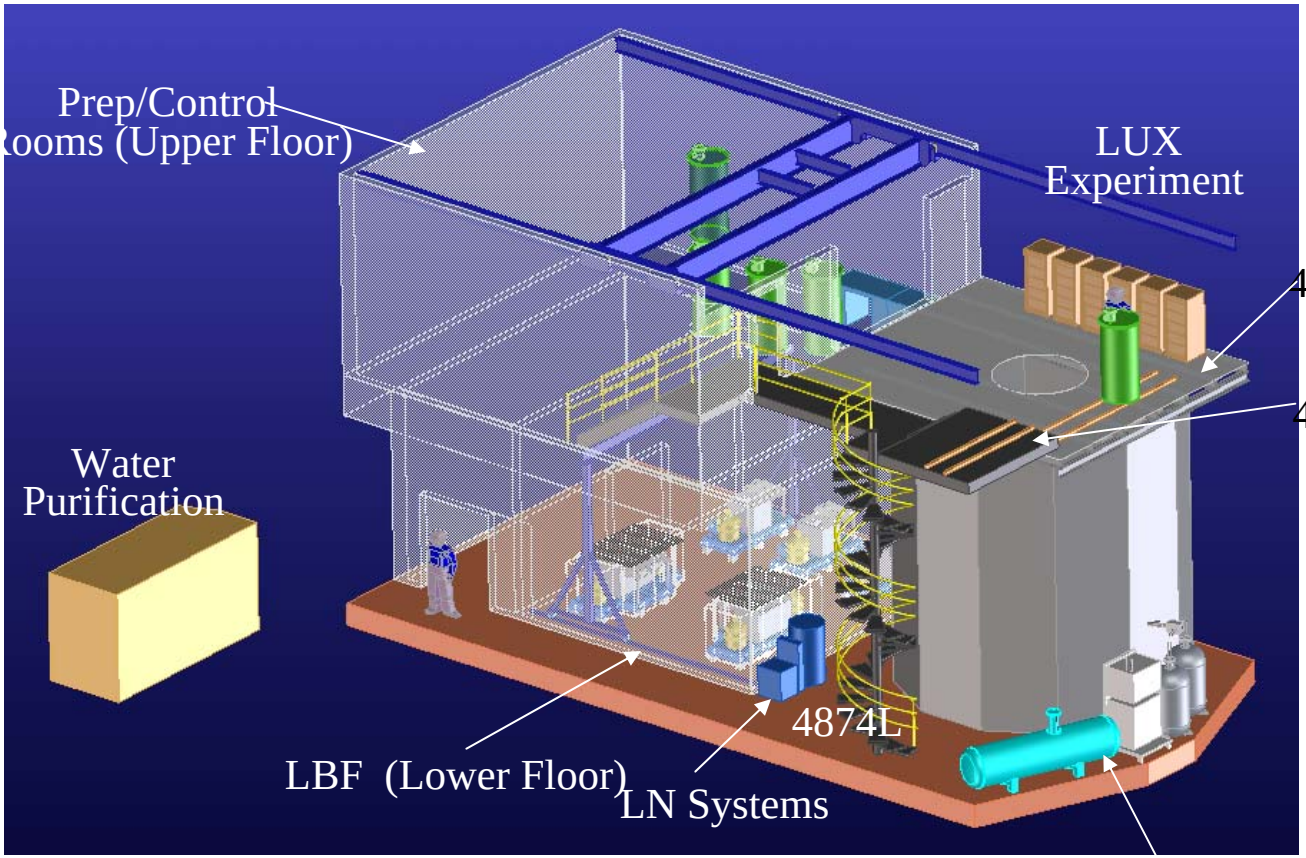
Yates Re-entry begins

- Contractor selected
- Work begins Nov 1
- Surface equipment certification done
- Expect completion at time shaft is dry

Meanwhile… Physics begins!

- LUX: search for Dark Matter with
  Liquid xenon TPC (time-projection chamber)
  - To be installed in Davis cavern (4850 L)
- MAJORANA: Neutrinoless double beta decay
  - Test of underground fabrication techniques
- LAr: Depleted argon for TPC applications
  - Initially: storage of depleted argon
  - Later: test of prototype LAr TPC devices

LUX (liquid xenon TPC) Dark Matter Search



QuickTime™ and a decompressor are needed to see this picture.

LUX Surface assembly and staging

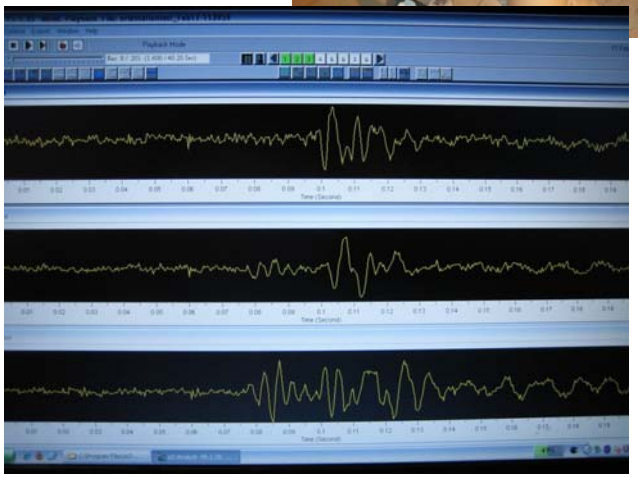
Majorana: (neutrinoless double beta decay) at 4100 L

QuickTime™ and a
decompressor
are needed to see this picture.

Focus on Geophysics

- Seismometer deployments
  - Beginning of “Transparent Earth” array
  - LIGO studies
- Hydrology sensor deployment into main body of water
  - Monitor drop in water level
  - Monitor outflow at Mill Reservoir

Geology Starts!

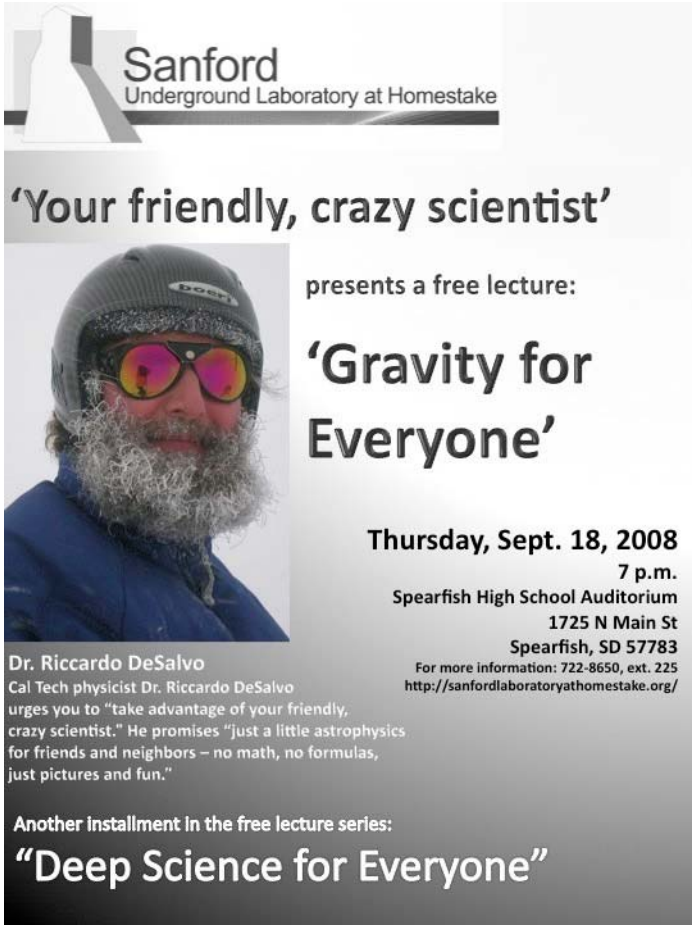


Seismometer emplacement

LIGO Group at Work

LIGO station

Everybody gets into E&O



Dr. Riccardo DeSalvo explains gravity

Great progress being made
Expect exciting times ahead!