



RESPEC

**CARISSA GOLD MINE:  
MAKING AN ABANDONED  
MINE INTO A STATE PARK**



WYOMING DEPARTMENT OF  
ENVIRONMENTAL  
QUALITY





# AGENDA

- INTRODUCTIONS
- CARISSA GOLD MINE HISTORY
- WYOMING AML INVOLVEMENT
- PROPERTY OVERVIEW
- MITIGATION EFFORTS
  - MILL ENVIRONMENTAL CLEANUP
  - MINE OPENING CLOSURE
  - STRUCTURAL STABILIZATION
  - RESTORATION
- CULTURAL AND EDUCATIONAL RESOURCE
- CLOSING STATEMENTS



# INTRODUCTIONS



## › BRETT DRAKE, PE

- / RESPEC MINE RECLAMATION MANAGER
- / 13+ YEARS EXPERIENCE MITIGATING ABANDONED MINE LANDS
- / 6 YEARS CONSTRUCTION MANAGEMENT AT THE CARISSA GOLD MINE



## › GWEN ROBSON

- / STATE OF WYOMING AML PROJECT MANAGER
- / 6 YEARS WITH THE WY-DEQ AML PROGRAM
- / NEPA AND EAMLIS MANAGER FOR WYOMING AML

# CARISSA GOLD MINE HISTORY

- ▶ SOUTH PASS CITY, WY
- ▶ GOLD DISCOVERED IN SOUTH PASS AREA IN THE 1860'S, LEADING TO WYOMING'S FIRST SIGNIFICANT GOLD RUSH





# CARISSA GOLD MINE HISTORY

- ORIGINALY FOUNDED BY MINER BARNEY TIBBALS, AND FUNDED BY JOHN SPRY OF CHICAGO
- ORIGINAL MILL BUILT IN THE LATE 1898. IN 1929, THE DEXTER MILL WAS RELOCATED FROM ATLANTIC CITY TO THE CARISSA SITE AND STILL STANDS TODAY

1903



1974



## CARISSA GOLD MINE HISTORY

- THE CARISSA PROPERTY WENT UNDER NUMEROUS OWNERSHIPS, WITH RENEWED EFFORTS TO MODERNIZE THE SITE THROUGH THE 1950'S
- THROUGH THE 1970'S THROUGH EARLY 1990'S, SEVERAL COMPANIES TOOK OPTIONS ON CARISSA AND PERFORMED LIMITED UNDERGROUND SAMPLING AND CORE DRILLING
- IN 2003, THE STATE OF WYOMING PURCHASED THE PROPERTY AND INCLUDED IT WITHIN THE SOUTH PASS HISTORIC SITE STATE PARK.





## WYOMING AML INVOLVEMENT

- IN 2003, WYOMING AML IN COORDINATION WITH WYOMING STATE PARKS AND THE WYOMING STATE HISTORIC PRESERVATION OFFICE, BEGAN WORK ON MITIGATING ENVIRONMENTAL AND PHYSICAL HAZARDS AT THE CARISSA GOLD MINE.
- INVENTORY IDENTIFIED 75 MINE-RELATED FEATURES, SEVEN DEBRIS AND SOLID WASTE DUMPS, ONE UNDERGROUND AND SIX SURFACE FUEL STORAGE TANKS
- 42 OF THESE FEATURES REPRESENTED OSM PRIORITY 1 OR 2 SAFETY HAZARDS



# PROPERTY OVERVIEW





# PROPERTY OVERVIEW





RESPEC

## MITIGATION EFFORTS

- › WORK SPANNED FROM 2003 THROUGH 2021
- › 44 CONSTRUCTION PROJECTS COMPLETED
- › MITIGATION INCLUDES
  - / ENVIRONMENTAL CLEANUP
  - / MINE OPENING CLOSURE
  - / STRUCTURAL STABILIZATION





## MILL CLEAN UP

- INITIAL TEST AND SAMPLING WAS COMPLETED USING XRF ANALYZER, SOIL/TAILINGS SAMPLING, WIPE TESTS, MERCURY VAPOR AND ASBESTOS SAMPLING.
- SAMPLES INDICATED ARSENIC, LEAD, AND THALLIUM EXCEEDED THE USEPA REGION IX REMEDIATIONS GOALS, AS WELL AS MERCURY AND CYANIDE PRESENCE



## MILL CLEAN UP

### MITIGATION EFFORTS INCLUDED:

- / PACKAGING AND DISPOSAL OF INVENTORIED WASTES
- / REMOVAL AND DISPOSAL OF TAILINGS AND WASTES FROM AND WITHIN THE TANKS
- / ENCAPSULATION OF INTERIOR TAILINGS TO CREATE CONCRETE FLOOR ON LEVEL 4, 5 & 6
- / HEPA VACUUM ALL INTERIOR SURFACES
- / SCRUB ALL SURFACES, TANKS AND ASSAY OFFICE EQUIPMENT
- / APPLY FLAT, CLEAR URETHANE TO ENCAPSULATE ANY REMNANT ARSENIC AND LEAD PARTICLES





## MINE OPENING CLOSURE: PUF





## MINE OPENING CLOSURE: CONCRETE





## MINE OPENING CLOSURE: VIEWING PLATFORM





RESPEC

## MINE OPENING CLOSURE: ACCESSIBLE DOOR





# STRUCTURAL STABILIZATION: COOKHOUSE

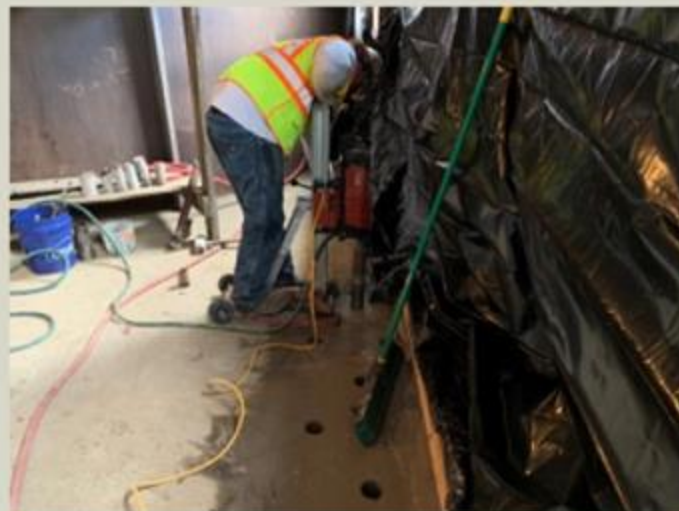
- › REMOVE ORIGINAL STACKED ROCK FOUNDATION
- › SUPPORT AND LIFT STRUCTURE METHODICALLY WITH JACKS
- › SUPPORT STRUCTURE WITH CRIBBING DURING CONSTRUCTION OF STEM WALL FOUNDATION
- › LOWER STRUCTURE ONTO FOUNDATION AND REPLACE ORIGINAL STACKED ROCK





## STRUCTURAL STABILIZATION: MILL BUILDING SOUTH WALL – P1

- › CORE INJECTION HOLES IN LEVEL 6
- › INJECT PERMEATION GROUT UNTIL REJECT OR GROUT SEEPED FROM STACKED ROCK WALL
- › PLUG INJECTION HOLES WITH CONCRETE





## STRUCTURAL STABILIZATION: MILL BUILDING SOUTH WALL – P2

- › REMOVE ORIGINAL STACKED ROCK FOUNDATION AND INSTALL SIMPLEX WALL JACKS
- › CONSTRUCT SHOTCRETE FOUNDATION WALL
- › INSTALL SOIL NAILS INTO SHOTCRETE WALL
- › REPLACE ORIGINAL STACKED ROCK WALL





## STRUCTURAL STABILIZATION: OTHER PROJECTS





## RESTORATION: HEAD FRAME AND SHAFT HOUSE

- › INSTALL PUF PLUG INTO THE MAIN SHAFT
- › CONSTRUCT CONCRETE FOUNDATION BEAMS
- › RECONSTRUCT AND ERECT THE HEAD FRAME
- › RECONSTRUCT THE SHAFT HOUSE CONJOINED TO THE HEADFRAME





## CULTURAL AND EDUCATIONAL RESOURCE

- ▶ SINCE 2013, THE CARISSA GOLD MINE HAS HAD OVER 34,000 VISITORS, INCLUDING 8,200 K-12 STUDENTS FROM WYOMING SCHOOLS
- ▶ OPENLY YEARLY FROM MAY 25 TO OCTOBER 19, GOLD RUSH DAYS ON THE SECOND WEEKEND OFF JULY
- ▶ CULTURAL AND EDUCATIONAL ASSET TO WYOMING AND HIGHLIGHTS HOW POWERFUL AML PROJECTS CAN BE TO THE PUBLIC





# THANK YOU

