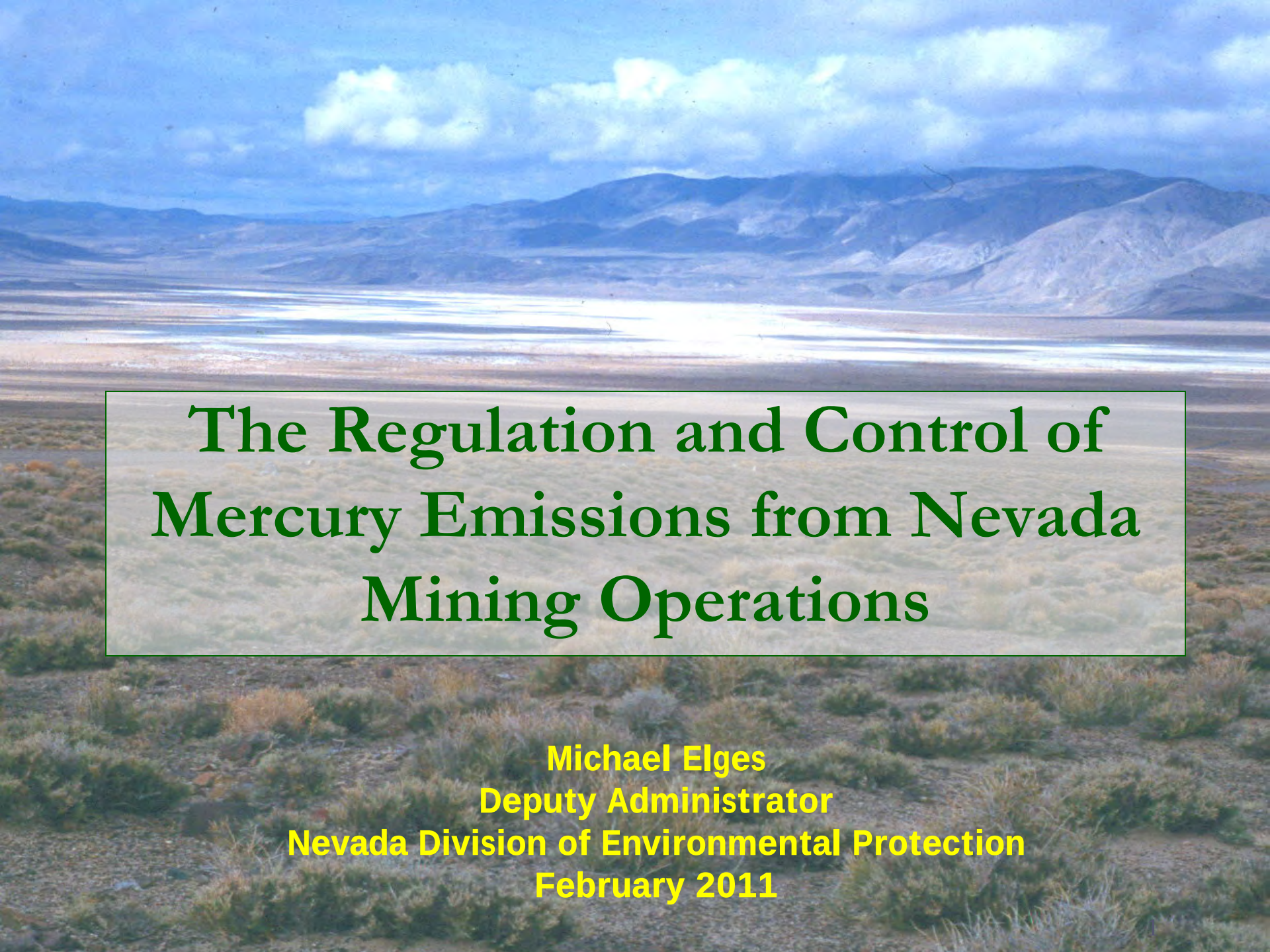

The Regulation and Control of Mercury Emissions from Nevada Mining Operations

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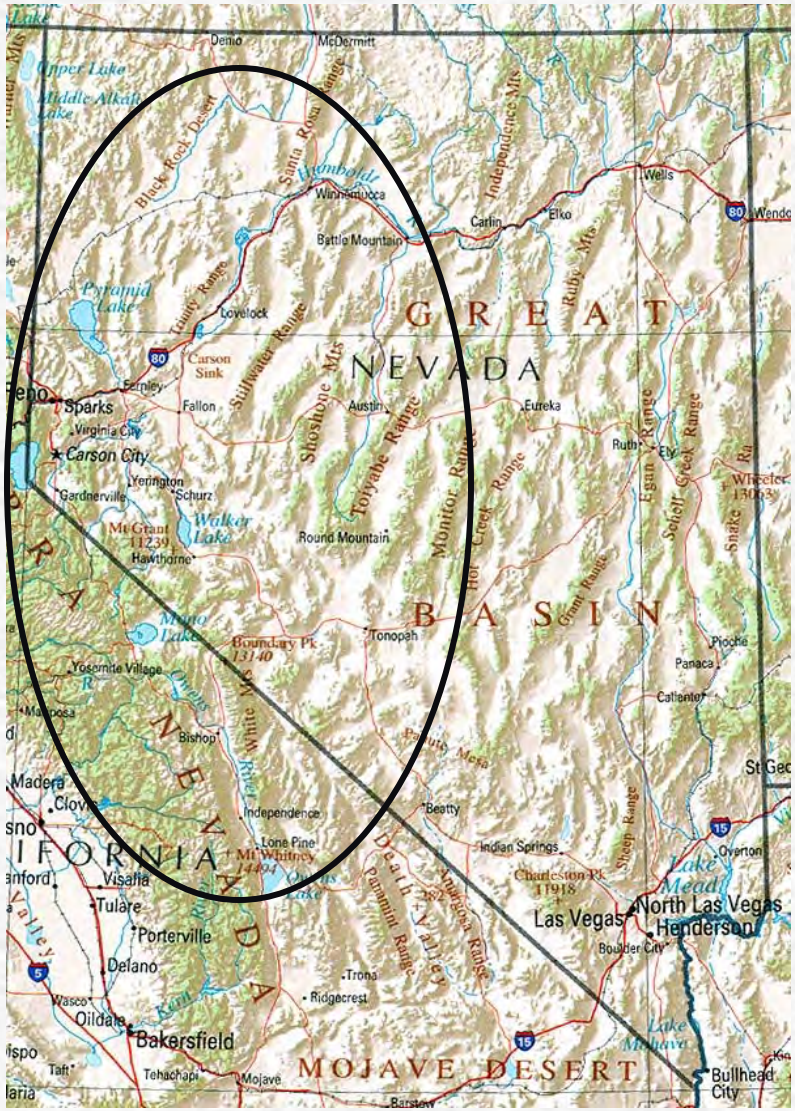
Mining in Nevada

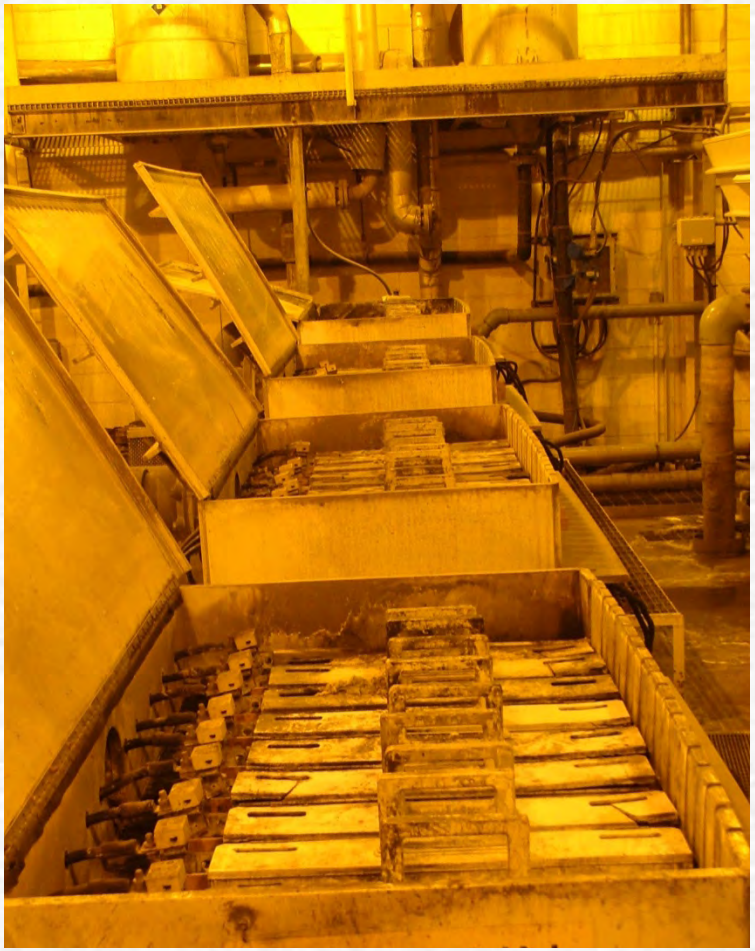
- Nevada - 4th largest gold producer in the world.
- Nevada accounts for 78% of the total US gold production.
- 2007 - Nevada produced 6 million ounces/$4.4 billion.
- 2007 - Nevada mining generated ~100,000 jobs.
- ~$200 million in state tax revenue annually.

Mercury and Mining

- Mercury not from historical mining operations.
- Mercury is not used in the gold recovery process.
- Mercury is naturally occurring and geologically concentrated along with gold - (mercury belt).
- Mercury co-located with gold deposits in ~1:1 ratio.
- Mercury is released from thermal processes utilized in modern gold recovery.
- Scale – Ounces, Pounds & Tons.



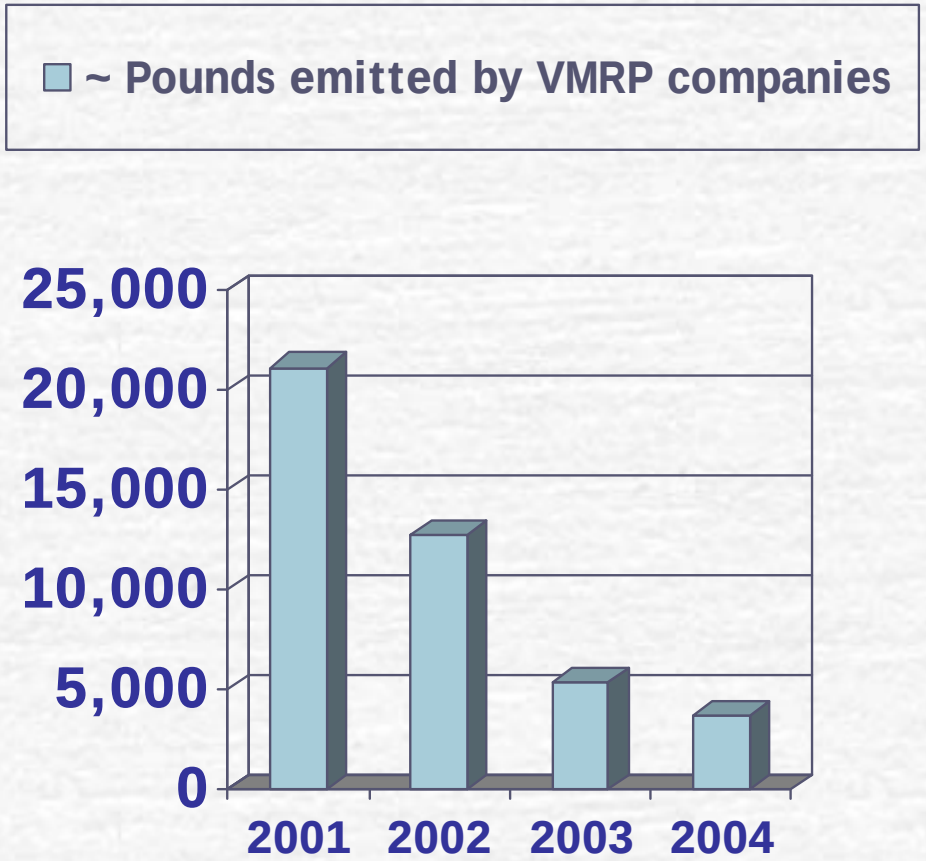
Mercury Emissions Reporting



- 2000: 1st time metal mining industry required report mercury emissions for TRI.
- TRI - Nevada mining emitted 10.5 tons of mercury in 1998.
- Four mining companies (5 facilities) accounted for more than 90% of reported emissions.
- 2002: NDEP, EPA & Four mining companies developed Voluntary Mercury Reduction Program (VMRP).

Voluntary Mercury Reduction Program

- Four VMRP companies added mercury controls at 5 mine sites.
- From a 2001 baseline of 21,098 pounds, reduced emissions by:
  - 50% in 2002
  - 74% in 2003
  - 82% in 2004



2005 Re-evaluation of Voluntary Program

- Initially envisioned extension of the VMRP to all mining facilities.
- VMRP lacked:
  - Mechanism for determining application of the best available controls,
  - Detailed infrastructure to measure, quantify and report emissions reductions,
  - Enforceable permit conditions.
- Voluntary Program transitioned to a Regulatory Program in 18 months.

Nevada Mercury Control Program

- Nevada Mercury Control Program (NMCP) Effective - March 8, 2006.
- The NMCP is a permitting program that applies to all precious metal mining facilities with thermal process units.
- The NMCP requires best available emission control technology that results in maximum reduction in mercury emissions (Nevada MACT).
- NvMACT controls - New, modified and existing thermal units.

Regulated Thermal Processes

- Nevada currently:
  ~50 permitted mines,
  ~25 with various thermal process units.
- Thermal Processes/Units:
  Roasters Autoclaves
  Hg Retorts Melt Furnaces
  Electro Winning Circuits
  Preg/Barren Solutions
  Lab Equipment
- NvMACT controls installed:
  - 24-months for existing units,
  - Prior to operation for new/modified units.

Mercury Control Technology

- State-of-the-Art Control Technology.
- Custom-engineered, not off the shelf systems.
- Performance values achieving levels well beyond original expectations.
- Examples:

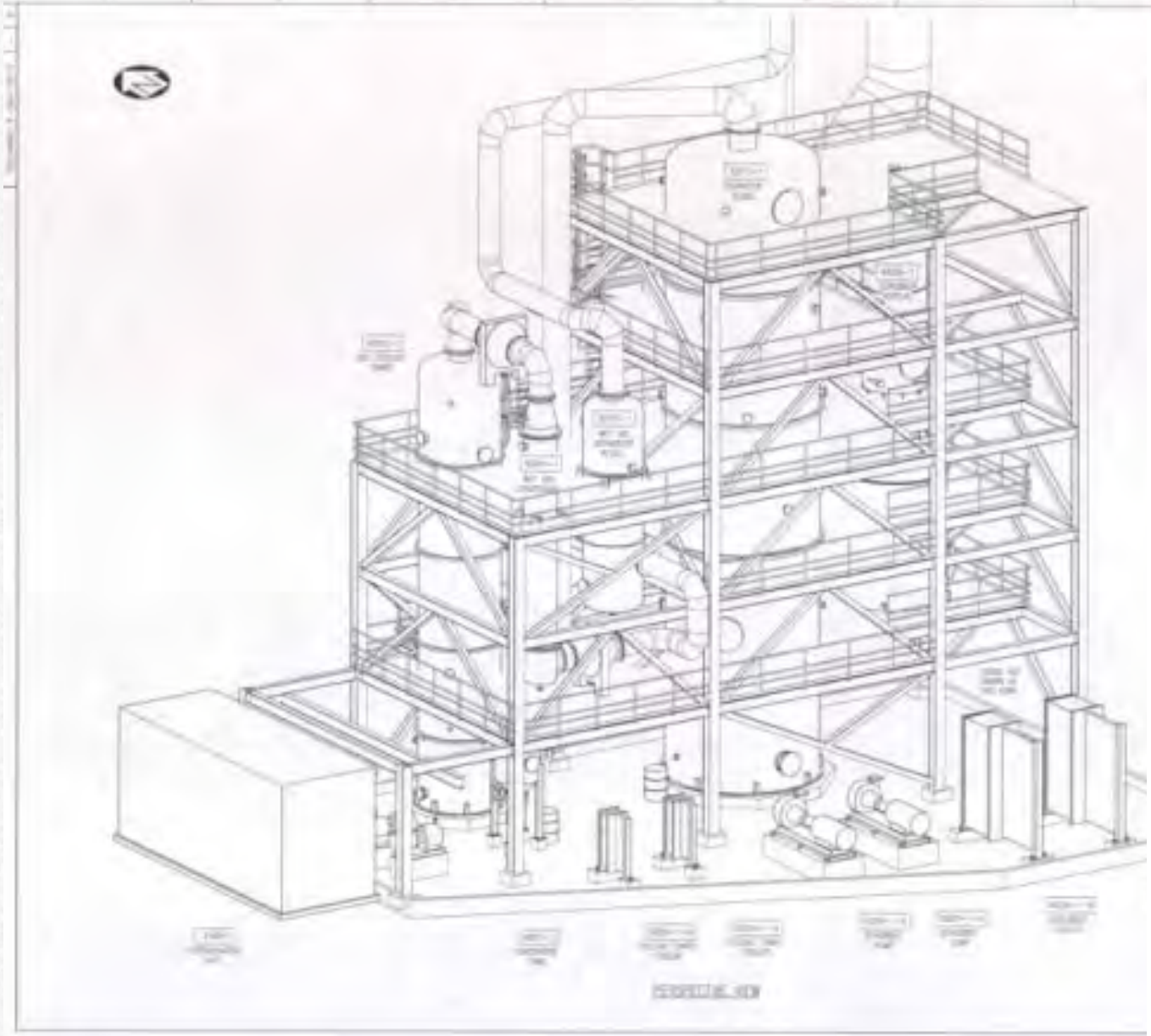
  - Autoclaves/Pre-heaters

    • Mercury controls have never before been applied before.

  - Roasters

    • Complex process systems being redesigned & upgraded for additional controls.

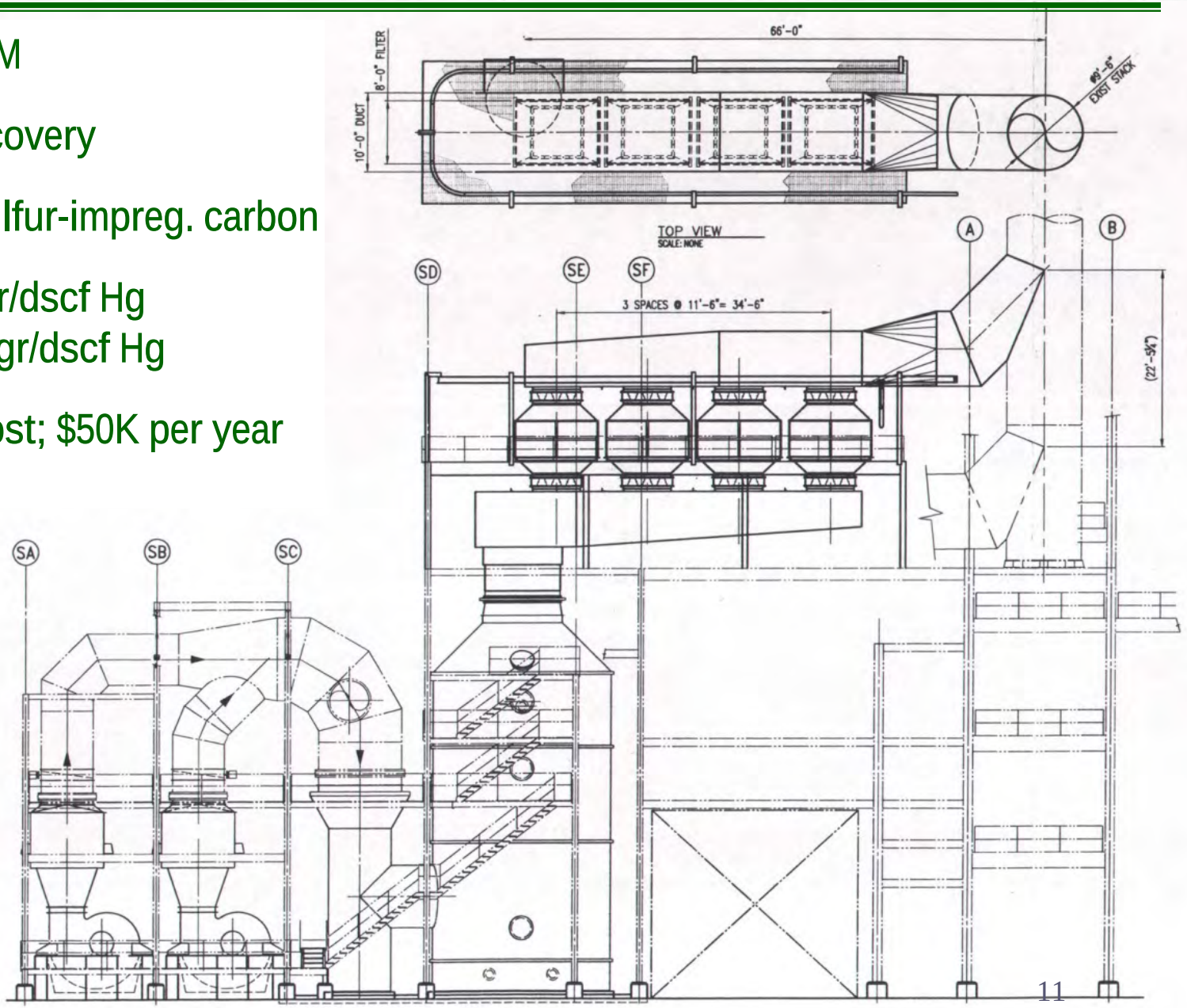
NvMACT Autoclave Example



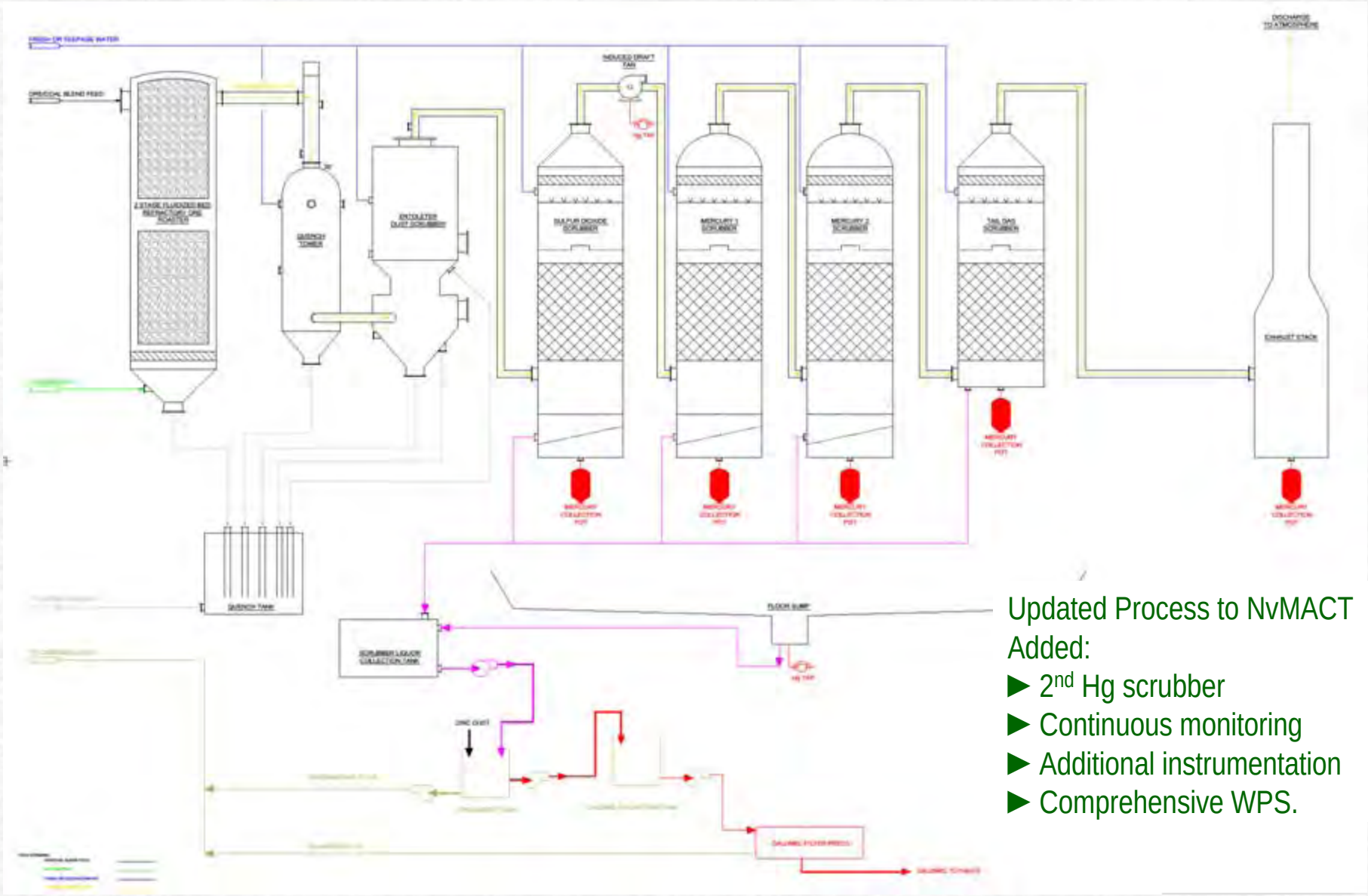
- 65’ tall structure, 100’ stack
- ~100,000 acfm / ~8,000 dscfm
- Exhaust gas exits autoclave at 203F, cooled to 39F w/ chiller/condenser
- 40,800 lbs sulfur-impregnated carbon
- $29.2M capitol cost, $2.1M annual.
- ~85% Hg emissions reduction: ($1x10^{-3}$ to $7x10^{-5}$ gr/dscf)

NvMACT Roaster Pre-heater Example

- ~100,000 ACFM
- 85-99% Hg recovery
- ~14,000 lbs sulfur-impreg. carbon
- Inlet: $3x10^{-5}$ gr/dscf Hg
  Outlet: $3x10^{-7}$ gr/dscf Hg
- $3M capitol cost; $50K per year



NvMACT: Roaster Technology Upgrade

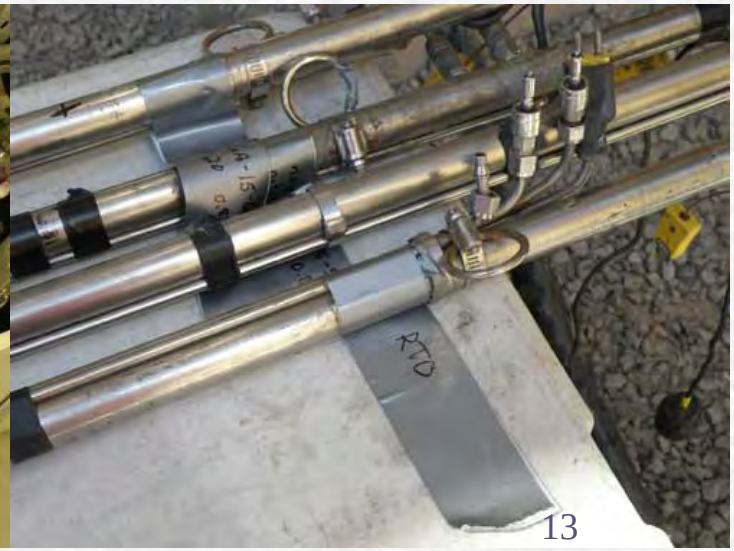


Updated Process to NvMACT
Added:

- 2nd Hg scrubber
- Continuous monitoring
- Additional instrumentation
- Comprehensive WPS.

Mercury Emissions Testing

- 2006 - Testing started with 5 VMRP facilities.
- 2007 to present – All facilities test all units annually.
- NDEP developed mercury test method (Modified Method 29)
  - High mercury concentration gas streams
  - High moisture content gas streams
  - Particulate-bound mercury

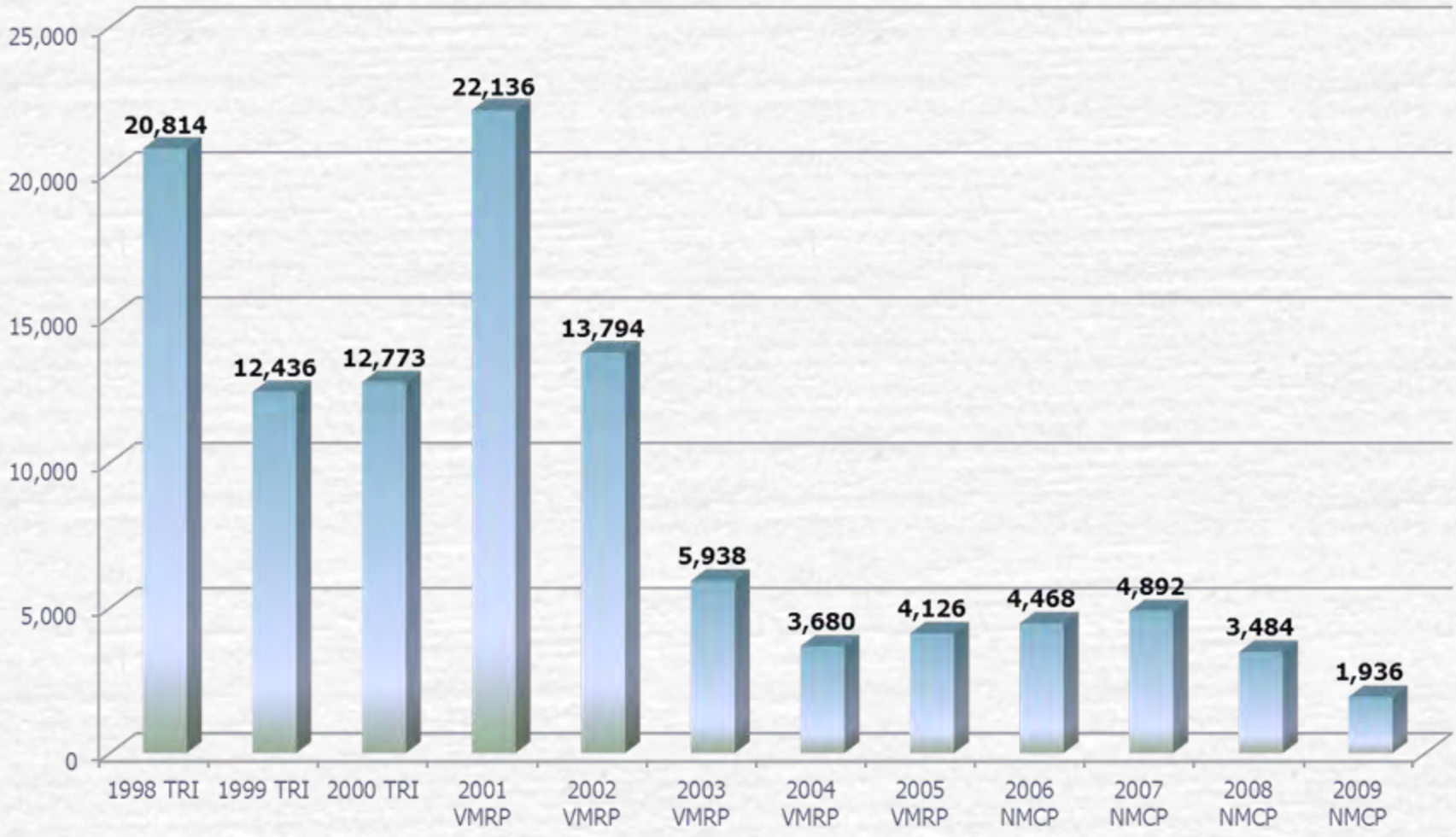


Annual Emissions Reporting

- Facilities required to report annually based on actual production and emissions test data.
- Annual Emissions Reporting – Tracks/Supports effectiveness of the Program.
- Data Online at: ndep.nv.gov/baqp/hg/aer.html

Reported Mercury Emissions

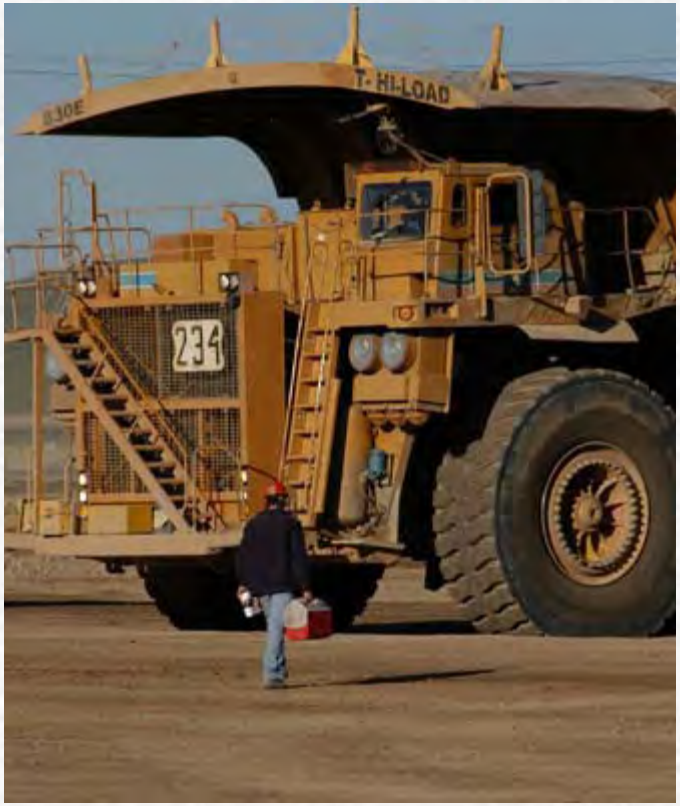
Nevada Mines
(lbs/yr)



Federal Mercury MACT

- NDEP worked closely with USEPA to develop a federal rule that works in harmony with NMCP.
- Proposed rule published April 2010.
- USEPA relied on much of the data Nevada obtained to develop the federal rule.
- Federal MACT relies on the modified Method 29 emissions test procedures developed by NDEP.
- Final rule published any day.

Summary/Conclusions



- Prior to 2002 mercury emission estimates from mining exceeded 22,000 lbs/yr.
- Through implementation of VMRP and NMCP mercury emissions dropped below 2,000 lbs/yr (2009).
- Once NvMACT controls are fully implemented projected emissions <1,000 lbs/yr.

Questions