Presentation Outline

- Project Need & Background
- Project Overview
- Current Status
- Future Schedule
Answering the Need

- Ongoing drought in the Colorado River basin
- Declining lake levels
  - 11.55 of 25.88 MAF (44.7% conservation capacity*)
  - 90% of the valley’s water supply
- Future operability of one intake is uncertain
- Need protection from potential loss of capacity

*Capacity data: http://www.usbr.gov/lc/region/g4000/hourly/rivops.html
Drought

Water Surface Elevation: **1200 ft amsl**
(2000)
Drought

Water Surface
Elevation: 1140 ft amsl
(2003)
Water Surface Elevation: **1100** ft amsl

(2/10/10 – 1101 ft)
Las Vegas Wash
Las Vegas Bay
Saddle Island
Boulder Islands
Callville Bay
Promontory Point
Hoover Dam

Water Surface
Elevation: **1060** ft amsl

(???)
May 28, 2003 – 1144 ft

Photo Source: http://earthobservatory.nasa.gov/Features/LakeMead/images/boulder_basin.jpg
Intake Sites Evaluated

- Las Vegas Wash
- Callville Bay
- Existing Treatment Facility and Intakes
- Boulder Beach
- Hoover Dam
Intake Evaluation

Evaluation Considerations:

- Suitability for water withdrawals below thermocline
- Operations and maintenance requirements
- Environmental impacts
- Permitting requirements
- Construction difficulty
- Cost
Shortlist of Intake Alternatives

- Black Island Intake
- Black Canyon Intake
- Boulder Canyon Intake
## Summary of Alternatives

<table>
<thead>
<tr>
<th>Intake Alternative</th>
<th>Suitable Intake Location</th>
<th>O&amp;M Issues</th>
<th>Enviro. Issues</th>
<th>Permit Issues</th>
<th>Construction Difficulty</th>
<th>Estimated Cost ($millions)</th>
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<tbody>
<tr>
<td>Black Canyon Intake</td>
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<td>$860</td>
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<td>Black Island Intake</td>
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<td>$1,820</td>
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Recommended Intake Alternative

Black Island Intake

- Good raw water quality benefits
- Least permitting concerns
- Least comparative cost
- Most effectively shares existing infrastructure:
  - AMSWTF
  - IPS1 and IPS2
Existing Lake Mead Water Facilities

Intake No. 1
- Intake Pumping Station No. 1 (IPS-1)
- Pumping Capacity – 600 mgd
- Supplies AMS Water Treatment Facility
- 600 mgd treatment capacity

Intake No. 2
- Intake Pumping Station No. 2 (IPS-2)
- 600 mgd Pumping Capacity
- Supplies RM Water Treatment Facility
- 300 mgd treatment capacity

Source: MapQuest
Intake Pumping Station No. 1
Intake No. 1
Intake Pumping Station No. 2
Intake No. 2
Existing Facilities
Saddle Island
Lake Mead Water Level Impacts

Current Lake Elevation 1099’ (4/22/10)

Saddle Island

Elevation 1050’

Elevation 1000’

INTAKE NO. 1

INTAKE NO. 2

Intake No. 1 Out of Service

Intake No. 2 Out of Service
Impacts of Lower Lake Level

- **If the lake level falls below 1,050 feet:**
  - Intake No. 1 will be out of service
  - Capacity will be reduced from 900 to 600 mgd

A new intake system will be needed to preserve existing capacity if lake levels continue to decline.
Project Objectives

Intake No. 3 - **Primary Objective**
- Preserve existing capacity if lake levels fall below elevation 1,050 feet

Intake No. 3 - **Secondary Objectives**
- Improve water quality
- Improve system reliability and operational flexibility
SNWA
Lake Mead Intake No. 3
Project Description
The Project – Lake Mead Intake No. 3

- Approved by SNWA Board of Directors May 2005
- Six contracts (originally), $817 Million total (est)… now three major contracts $530M (est)
- Completion 2013
“070F” - Lake Mead Intake No. 3

WATER TREATMENT FACILITY (Existing)

PUMPING STATION

ACCESS SHAFT

INTAKE TUNNEL

INTAKE SHAFT

INTAKE No. 2 CONNECTION

INTAKE 1

INTAKE 2
Intake Pumping Station No. 3
Intake No. 1
Connector Tunnel
Intake No. 2
Intake Pumping Station No. 1
Stub Tunnel
Intake No. 3
Intake Pumping Station No. 2
Intake No. 2
Technical Challenges

**Intake No. 3**
- Underground work - environment & nature
- Schedule - drought driven
- Varying ground conditions - Solid to weak & fractured
- Potential high water pressure - 17 bar
- Interfaces -
  - between contracts
  - existing facilities
- NPS area - public coordination/minimize impacts

How these are addressed....
"01"- Intake No. 3 Shafts & Tunnel
“01”- Intake No. 3 Shafts & Tunnel

Vegas Tunnel Constructors (Design-Build) ~ $447 million

**Shaft**
- ~ 600’ deep
- 30’ interior diameter

**Tunnel**
- Launch Chamber ~ 202’ long, 47’ W x 35’ H
- Starter Tunnel ~ 348’ long, 27’ W x 25’ H
- TBM tunnel
  - 20’ internal diameter
  - ~ 14,904’ long
  - 14” concrete segmental lining

**Intake Riser**
- 16’ diameter x 92’ high
- Radial inlet
Lake Mead Intake No. 3
At-a-Glance

Profile of Intake No. 3 Tunnel and Pumping Station

1101 ft amsl (February 10, 2010)  
Source: U.S. Bureau of Reclamation
Intake No. 3 – Project Site
Intake No. 3 Shafts & Tunnel
Drill & Blast -began June 2008
Intake No. 3 Shafts & Tunnel

Concrete Lining

Shaft Collar

25 July 2008
Shaft Progress – 130 feet deep - 16 September 2008

Intake No. 3 Shafts & Tunnel
Intake No. 3 Shafts & Tunnel

Shaft Progress 16 October 2008
Water control grouting
Intake No. 3 Shafts & Tunnel

Grouting Platform - Contact Grouting
Intake No. 3 Shafts & Tunnel

Headframe and Hoist
13 March 09
SHAFT PROGRESS – ELEVATION 970 (19 MARCH 09)
Intake No. 3 Shafts & Tunnel
Intake No. 3 Shafts & Tunnel

Loader in Utility Stub Tunnel - Completed 24 February 2009
“01” - Intake No. 3 Shafts & Tunnel

TBM Launch Chamber - Drill Jumbo Top Heading
Current Progress - TBM Launch Chamber
Now...

- Tunnel Boring Machine (TBM)
- Handle more challenging ground conditions (water pressure, etc)
- Herrenknecht
- 23.5’ outside diameter
Backup (Gantry Equipment)

- 585’ long
- 1500 tons