Presentation Outline

1. Expert Panel introduction and SSFL stormwater overview
2. Interim Source Removal Action (ISRA) update
3. 008/009 BMP Work Plan update

1. Expert Panel Introduction & SSFL Stormwater Overview
Expert Panel Overview

Member introductions
- Dr. Bob Gearheart, Humboldt State University
- Jon Jones, Wright Water Engineers
- Dr. Michael Josselyn, WRA Consultants
- Dr. Robert Pitt, University of Alabama
- Dr. Michael Stenstrom, Univ. California, Los Angeles

Expert Panel Scope of Work

Improve stormwater quality at NPDES outfalls 008 and 009

Outfall 008 and 009 Watersheds

536 acres
Regulation of SSFL Stormwater

SSFL surface water discharges (mostly stormwater runoff) are regulated by the LARWQCB through an NPDES permit, which requires:

– Discharge sampling during storm events, and
– Compliance with very protective numeric effluent limits for a wide list of pollutants.

Panel recommends source removal and BMPs to meet the Permit requirements.

What are Stormwater BMPs?

Erosion and sediment controls
Active treatment systems
Natural treatment BMPs

Panel Case Study Example:
Closure of the Former Rocky Flats Nuclear Weapons Site
Denver Metropolitan Area

• Contaminated site with stormwater discharges regulated under a NPDES permit with numeric effluent limits
• Natural stormwater treatment BMPs (detention basins) implemented to achieve compliance
2. ISRA update

What is ISRA?

**Interim Source Removal Action**, intended to remove sources of NPDES pollutants of concern (down to background or near background) in surface soils in 008 & 009 watersheds, not intended to constitute final cleanup.

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<td>Boeing completes most of 009 ISRA areas, NASA begins ash pile ISRAs</td>
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<td>Total cubic yards removed = 12,300 (approx. 800 truck loads)</td>
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<td>Additional cubic yards anticipated = 19,300 (approx. 1,300 truck loads)</td>
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Outfall 008
Completed ISRA Areas

HVS-2A
Oak tree area in northern portion, before excavation (looking North).
April 2009

HVS Soil Borrow Area
Before excavation (looking East).
July 2009
HVS-2A and Soil Borrow Area
After vegetation clearance; before excavation (looking Northwest). Orange fence in place to protect Quercus agrifolia (coast live oak). August 2009

HVS-2A
Excavation, and conditioning soils using water spray for dust control (looking South).

HVS-2A
During excavation, vacuuming around oak tree to protect roots (looking Southwest).
**HVS-2A**
Completed excavation (looking North).
October 2009

**HVS-2A**
Completed excavation (looking South).
November 2009

**HVS-2A and Soil Borrow Area**
After excavation; re-contoured and restored with hydroseed mulch (looking Northwest).
December 2009
Native plants and additional BMPs installed (looking South). Orange and green pin flags show plant locations. April 2010

Vegetation growth 1 year after restoration (looking Northeast). October 2010

Vegetation growth 1 year after restoration. November 2010

Left: HVS-2A (looking South). Right: HVS-2A (foreground) and Soil Borrow Area (background) (looking East).
Outfall 009-West
Existing ISRA BMPs

Outfall 009-East
Existing ISRA BMPs

How has the Panel been involved?

• Involvement in every step of ISRA
• Input on ISRA performance monitoring plan
• Development of split sampling protocol
• Analysis of ISRA performance monitoring results
• Optimizing 008/009 BMP plans based on ISRA
• Recommendations for ISRA BMPs
  – Erosion controls, revegetation
  – B1 sediment basin, culvert inlet filter
  – Ash pile channel
  – A1LF, including phytoremediation study
  – Dirt roads
ISRA Performance Monitoring

- Paired upgradient & downgradient stormwater samples have been collected for two rain seasons
- Initial findings:
  - More data are needed to conclusively assess performance
  - Observations during recent severe storms indicate that ISRA sites are stable, with little loss of sediment
  - With time, vegetation expected to improve runoff quality
3. 008 & 009 BMP Work Plan Update

008/009 Stormwater Planning Timeline

LARWQCB order creates Panel & charges them to design ENTS “to meet permit limits”
LARWQCB ISRA order requires source removal
LARWQCB requires new BMP Work Plan

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NASA decides to focus exclusively on source removal
Panel submits background reports showing natural soils contribute significantly to NPDES outfall concentrations
Panel develops new BMP Work Plan
Panel develops BMP Subarea Monitoring Plan, monitoring begins
Identify, design, and implement new treatment BMPs where necessary (through 2014)

008/009 Study Timeline

Analysis of data – e.g., NPDES monitoring, hydrologic modeling, northern drainage geomorphic assessment, and stormwater treatability monitoring
Initial analysis of ISRA performance monitoring data
Complete biofilter media performance testing study

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NPDES composite sampling recommendation
Design storm recommendation
Submit dioxin and metals background reports
Begin mercury soil phytoremediation treatability study
008/009 BMP Implementation Timeline

- **2008**
  - Begin Boeing Asphalt Removal (AR)
  - Complete Boeing Culvert Modifications (CMs)
  - Begin ISRA Source Removal
  - Complete NASA CM

- **2009**
  - Begin installing plants in Happy Valley, N. Drainage restoration areas
  - New hydroseed mix & dirt road erosion controls, N Drainage restoration phase 1

- **2010**
  - Construct 81 sediment basin
  - Begin N. drainage restoration (phase 2)

Evolution of 008/009 Stormwater Management

Most ENTS were put on hold, but Culvert Modification (CM) filters and Asphalt Removals (ARs) were constructed
Some ISRA areas have been completed.

Other ISRA areas are still planned.

New treatment BMPs have been added.
Potential BMP locations are being sampled

Evolution of 008/009 Stormwater Management

Sampling locations match original ENTS locations

Culvert Modifications (CMs)

CM9 north of Area 1 Landfill (Dec. 2010)
CM Performance

- Influent/effluent samples collected for two seasons
- Conclusions:
  - Initial result indicate water quality improvement, although more data needed to conclusively assess performance
  - Post-storm observations also demonstrate successful sediment capture

Dioxin Concentration Observations at CM Locations

Dirt Road BMP Recommendations

- Panel identified dirt roads as significant source of sediment in watersheds
- Recommended erosion controls:
  - Retire unused roads
  - Gravel
  - Straw wattle
  - Water bars, rolling dips
  - Native hydroseed mix
Revegetation

Native seedlings planted at following areas for long-term erosion control:
- ISRA construction areas (008 photos below)
- Exposed banks of northern drainage

Northern Drainage Restoration

- Northern drainage sediment & debris removal occurred as a result of DTSC and LARWQCB orders
  - 10,500 CY debris removed (approx. 700 truck loads)
- Panel recommendations for channel restoration include:
  - Control sources of in-channel sediments
  - Stabilize eroding banks
  - Grade controls
- Phase 1 complete:
  - Hydroseed
  - Rip rap bank protection
  - Native plantings along banks

Northern Drainage Current Status

Phase 1 focused on Boeing reaches
Phase 2 plan now being developed

Staked erosion control blanket along bank
Panel-Directed Stormwater Studies & Innovative Activities

- Stormwater biofiltration media performance testing
  - To compare performance of various media and support BMP design
- Phytoremediation testing study with Edenspace lab
  - To evaluate native grasses for ability to accumulate mercury and other metals
- SWMM hydrologic modeling – calibrated for both watersheds, reviewed by Dr Huber (one of SWMM’s developers)
- Nonprofit resources for BMP plant selection:
  - Pollinators Partnership
  - Wildlife Habitat Council

Biofilter media: [Image]

What’s Next – 2011 BMP Plan Activities

- Planned treatment BMP designs ongoing, then construction
  - B1 sediment basin and culvert inlet filter
  - Soil stockpile biofilter
  - Area 1 Landfill ISRA treatment BMP
- Submit BMP triggers memo to LARWQCB
  - Values to be based on stormwater background concentrations
- Submit 2010/11 subarea sampling results and new treatment BMP recommendations to LARWQCB

THE END

For more information on Outfall 008 & 009 ISRA and BMP planning, please visit: