Imperial Irrigation District
System Conservation Plan (SCP)

Board of Directors Presentation

July 28, 2009
QSA Water Conservation Implementation Process

QSA and Related Documents (37 Agreements)

- Environmental Program
- Efficiency Conservation Definite Plan
- Fallowing Program

Recommended Efficiency Conservation Program

Near-Term Actions (Refine Recommendations)

- Main Canal Seepage Interception Program
- On-Farm Pilot
- System/Measurement Pilot

Delivery System Conservation Program
   1. Delivery Gate Measurement
   2. Spill Reduction

On-Farm Conservation Program
Topics Today

• Improved Water Delivery Measurement at Delivery Gates

• Objectives and Overall Strategy of the System Conservation Plan (SCP)

• SCP Components and Estimated Costs
Water Delivery Measurement
Measurement Objectives

• **Accuracy** with the most cost-effective approach

• Continuous measurement to compute volume of delivered water

• On-site **display** of flow rate and total volume

• Low **operating costs**

• Facilitate improved lateral operation
Vocabulary

“Telemetry”

“Remote Control”

“Remote Monitoring”

“Supervisory Control and Data Acquisition”

(SCADA)
## Turnout Measurement Options

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<tr>
<th>Features</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
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### Average Delivery Performance

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Note: Average measurement error demonstrates average error of any delivery. Averaged over time at any gate. The error will be ½ or less for existing conditions. Averaged over time for the district the error is near zero.
Selected Option

- Real-time data sent to IID office and zanjero laptops (SCADA)
- On-Site display of flow rate
- Totalizer (acre-feet)
- Uniform procedures for all turnouts
- Relatively robust
Measurement Costs

Capital Costs

5,500 turnouts x $12,500 = $68.8 M

Annual Costs

5,500 turnouts x $1,750 = $9.6 M

$6.2 M Capital
$3.4 M Maintenance
Turnout Measurement - Next Steps

• Specifications
  – Performance requirements
  – Major components
  – Allow vendors to submit alternatives for consideration

• Solicit proposals

• Award two-phased contract
  – Demonstration and evaluation
  – Implementation
  – Options:
    • Turn-key (furnish, install, maintain)
    • Any other combination
System Conservation Plan (SCP)
SYSTEM SCP Program Objectives

• Reduce *system spills* by 50% or more

• Look for least cost solution to preserve revenue for on-farm conservation
Why was canal spill targeted?
Why target spill?

- It’s a big number
- It’s highly visible
- It’s unacceptable outside of Imperial Valley
- IID can’t “manage it away”
- Least cost conservation
Why target spill now?

California’s Public Trust Doctrine
(I’m not making this up):

IID’s water right is held as a Public Trust.
Why target spill now?

California’s Public Trust Doctrine

- Your water right is held as a Public Trust.

- IID’s water right is limited to water that is reasonably and beneficially used.
Why target spill now?

California’s **Public Trust Doctrine**

- Your **water right** is held as a Public Trust.
- IID’s water right is limited to water that is reasonably and beneficially used.
- **Canal spill is no longer considered reasonable and beneficial use (it used to be!)**
Why target spill now?

California’s Public Trust Doctrine

• Your water right is held as a Public Trust.
• IID’s water right is limited to water that is reasonably and beneficially used.
• Canal spill is no longer considered as reasonable and beneficial use (it used to be!)

• You have a choice: Let someone else pay to conserve spill, now........
  or eventually pay for it yourself.
What I see in the West
Everything is Connected.

IID is “SOUTH OF THE DELTA”
Examples of Grief

• Glenn-Colusa ID Pumps shut down by National Marine Fisheries.

• Klamath ID completely shut down.

• Pumping restrictions on the Delta

• San Joaquin River Restoration (Friant Water Users)
Many districts conserve water NOW and pay with transfers.

- Central California ID
- Banta Carbona ID
- San Luis Canal Company
  - Modesto ID
  - Glenn-Colusa ID

(includes on-farm and district-level actions)
Examples of investment in spill reduction.

- Central California ID
- Banta Carbona ID
- San Luis Canal Company
- Modesto ID
- Glenn-Colusa ID
- Patterson ID
- Columbia Canal Company
- Chowchilla WD
Solutions depend upon the location in IID

– Topography
– What’s downstream
– Types of canal
It’s not just the physical connections

It’s also

- How does everything tie together?
- Where does the water go?
Program Strategies

- Better control and measurement of flow rates at key points (via SCADA)
- Maintain good service to delivery gates
- Remote monitoring of spills (in real-time to Water Control and zanjero laptops)
- An integrated plan for the whole system
Framework for Reducing Spill

- Remote monitoring of tail ends of short laterals
- Intercept or connect spills, where practical
- Where there are no interties, back water out to the heading
- Use the water close to the source, if possible.
Framework for Recovering Spill

- Move extra water to other zones
- Relieve pressure on some areas

...all with some breathing time for operation and maintenance
SCP Elements

1. Integrated Information Management (IIM)
2. Mid-Lateral Reservoirs
3. Canal Interties
4. Mid-Valley Collector System

Plus, some Non-leak gates
Integrated Information Management (IIM)

The basic ideas:

It helps to know what is going on at all times.

It also helps if flows aren’t changing all the time.
Integrated Information Management (IIM)

5 New Major IIM Components

1. Lateral headgate automation (233 locations)
2. Spill monitoring (117 locations)
3. Canal intertie monitoring (30 locations)
4. Zanjero laptops
5. Incorporates delivery measurement data
IIM – Information and Control

- 233 New lateral automated headings
- 117 New spill monitoring sites
- 30 intertie monitoring sites
SCADA System Upgrades

1. Control and monitoring of new reservoir facilities
2. Control and monitoring of new automated canals
3. Upgrades to communications backbone
4. Upgrades to office computer systems, databases and networks
5. New decision support tools (add things up automatically, display useful information)
Mid-Lateral Reservoirs

3 Different Types

1. In-line gravity reservoirs on East Highline Laterals (8 AF each)

2. Pumped reservoirs on other laterals (12-75 AF)

3. Gravity reservoirs on other laterals (40, 60 AF)

Total Spill Buffer Capacity = 657 AF
Mid-Lateral Reservoirs

- 48 Identified
- 36 Selected
- 12 Future Options
East Highline Laterals
In-Line Reservoirs

Orange Lateral at Corner of Gonder Rd. and Hwy. 115

Automated Flow Control Gate

Half-Mile Long, 8-AF In-Line Reservoir

Quarter-Mile Long, 6-AF In-Line Reservoir

Flow
Profile view of EHL Reservoir

New Automated Flow Control Gate

Existing Check for WL Control

Existing Delivery Gate

Top of Lining

Ground surface
2 Different Types

1. Gravity connection to adjacent lateral via concrete-lined channel or pipeline (1,300-7,900 ft)

2. Terminal reservoirs (8-60 AF) with pump/pipeline connections to adjacent canal (2,400-4,400 ft)

Total Spill Buffer Capacity = 138 AF
Canal Interties

- 42 Identified
- 34 Selected
- 9 Future Options
Mid-Valley Collector System

4 Main Components

1. Rose Canal upgrade and reservoir (150 AF)
2. Rose extension, Rose-Moorhead reservoir (50 AF) Redwood upgrade, Moorhead upgrade
3. Westside Main Canal #1 reservoir (300 AF), pump/pipeline
4. Westside Main Canal #2 reservoir (100 AF), pump/pipeline

Total Spill Buffer Capacity = 600 AF
Main System Improvements

Mid-Valley Collector

- 4 Main System Reservoirs
- Upgrade Sperber Reservoir Outlet
- 3 Main pipelines
- 4 Upgraded canals
Mid-Valley Collector

- Spill from a huge area collects in a hole, SE of Brawley.
- There isn’t enough land to use the spill.
- The spill will be used to improve flexibility and lighten problems elsewhere.
The integrated concepts are unusual for IID.....
So it may not make sense at first.

But it’s standard stuff elsewhere.
Example:
San Luis CC

INFLOWS to the Regulating Reservoirs

OUTFLOWS from the Regulating Reservoirs

Canal discrepancies "+-" for flexible operations

Drain/Spill Recirculation to Central Reservoir via Poso Drain and Delta Canal

Central Regulating Reservoir

Reservoir

Island "C" Canal Regulating Reservoir

Drain/Spill Recirculation

Canal discrepancies "+/-" for flexible operations

These Canals are Re-Started Downstream of the Reservoirs

These Canals are Re-Started Upstream of the Reservoirs
Example: Modesto ID
Returning to the backbone of realizing about half of the spill savings in IID
Westside Main Canal
Reservoirs and Pipelines
Functions of Reservoirs and Pipelines

• Integrates operations of the East Highline Canal, Westside Main Canal, and Central Main Canal

• Converts variable intercepted spill flows into a usable supplemental supply

• Moves extra spill water to zones where it can be used
Functions of Reservoirs and Pipelines

- Shorten laterals by automatically re-starting with a controlled flow rate
- Water in cross-valley pipeline flows in both directions
- Better utilization of existing infrastructure – improves operation of Bevins and Willey Reservoirs
Main System Improvements
Will it work?

• First, there’s nothing bizarre here that hasn’t already been done elsewhere.

• Second, the specific combination of devices is always different in each district.

• Third, there aren’t a lot of magical options for taking water out of a hole and relieving pressure elsewhere. It has to work.
Will it work?

Answer: **YES**.

Assuming IID puts required resources behind it. ..

- training
- maintenance
- proper staffing
- high quality components, only
- spare parts
## Efficiency Conservation Summary

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<th>Component</th>
<th>Range of Annual Savings (AF)</th>
<th>Average Savings (AF)</th>
<th>Capital Cost</th>
<th>Average Annual Cost</th>
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<th>Range of Annual Cost ($/AF)</th>
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*Includes seepage interception system*
## SCP Implementation Costs

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<td>Non-Leak Gates</td>
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**Total Implementation Costs: $157,844,000**
# SCP Annual Costs

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<thead>
<tr>
<th>Item</th>
<th>Annual Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Costs</td>
<td>$11,668,000</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>$4,909,000</td>
</tr>
<tr>
<td>Power</td>
<td>$800,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$17,377,000</strong></td>
</tr>
</tbody>
</table>
# SCP Annual Spill Reduction Volumes

<table>
<thead>
<tr>
<th>Item</th>
<th>Range (Acre-Feet/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Information Management (IIM)*</td>
<td>13,800 - 17,000</td>
</tr>
<tr>
<td>Mid-lateral Reservoirs</td>
<td>25,700 - 31,600</td>
</tr>
<tr>
<td>Canal Interties</td>
<td>15,000 - 18,500</td>
</tr>
<tr>
<td>Mid-Valley Collector*</td>
<td>5,500 - 7,000</td>
</tr>
<tr>
<td>Minor System Improvements</td>
<td>200 - 200</td>
</tr>
<tr>
<td><strong>SCP Total</strong></td>
<td><strong>60,200 - 74,300</strong></td>
</tr>
</tbody>
</table>

* IIM and mid-valley collector are required for conservation from the other elements.
Discussion