

- **Board of Directors**  
**Engineering and Capital Programs Committee**

April 10, 2007 Board Meeting

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**9-1**

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**Subject**

Status report for the Inland Feeder Program for activities through February 2007

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**Description**

**Work Completed to Date**

The Inland Feeder Program consists of 44 miles of pipelines and tunnels that will enable Metropolitan to convey up to 1,000 cubic feet per second of State Water Project (SWP) supplies from Devil Canyon Afterbay to Diamond Valley Lake (DVL). To date, eight of nine construction contracts totaling \$542 million have been completed. These completed contracts represent 36.3 miles or 82 percent of the Inland Feeder's length. Remaining program work includes completion of the Arrowhead East and West Tunnels, which are presently under construction by a joint venture of Shea/Kenny.

The completed portion of the Inland Feeder has been in service since 2003 via an interconnection that was constructed between the Inland Feeder and San Bernardino Valley Municipal Water District's Foothill Pipeline. This connection allows Metropolitan to convey SWP supplies from the East Branch of the California Aqueduct to the Inland Feeder for delivery to DVL. Over 505,000 acre-feet of SWP water have been delivered to DVL to date through this connection.

**Arrowhead Tunnels**

**Arrowhead East Tunnel** – In late January through mid-February, the tunnel boring machine (TBM) continued to mine through very difficult geologic conditions characterized by poor rock conditions and high water inflows. The contractor has tackled these conditions with extensive grouting operations aimed at consolidating ground and stemming water flows in front of the TBM. Once grouting was completed, the TBM was able to mine through portions of the poor ground. In late February, poor ground conditions persisted and the contractor began work efforts to install a shroud on the TBM cutter head. The shroud will ultimately aid the TBM in advancing through the highly crushed rock zone. Through February, mining advanced 95 feet and another 30 feet were mined in the first few weeks of March. The total length of tunnel mined to date is 16,740 feet (75% of the tunnel's length).

**Arrowhead West Tunnel** – Difficult ground conditions were encountered in January and continued into February, and were characterized by squeezing ground conditions and moderate water inflows. The contractor systematically injected grout to improve the ground while advancing the TBM. Given the challenging ground conditions, the contractor produced a favorable month of mining performance by employing new drilling methods. The TBM advanced a total of 565 feet in February and another 270 feet were mined in the first few weeks of March. The total length of tunnel mined to date is 9,770 feet (49% of the tunnel's length).

In late January and early February, an additional geologic coring was extracted at the Devil Canyon portal site for the Arrowhead West Tunnel. This coring extended horizontally for nearly 1,000 feet into the mountain along the tunnel alignment near this west portal site. The data from this coring will be analyzed and will be used to determine if additional activities will be needed at this portal site to ensure the timely completion of the west tunnel.

**Program Management**

Staff from Metropolitan and the contractor continue to work closely to develop innovative grouting methodologies to improve performance in poor ground conditions. Executive-level meetings between

Metropolitan and the contractor were held in mid-January to continue the process of teambuilding, improving efficiency, identifying and resolving issues, and streamlining implementation of the contract amendments.

### **Budget and Schedule**

Following board authorization of the settlement agreement and contract amendment in August, staff conducted a complete review of the program budget to estimate the total projected cost to complete the Inland Feeder Program. Based on the revised September 2010 completion date of the Arrowhead Tunnels as presented to the Board in August 2006, (see [Attachment 1](#) for the Projected Cost/Expenditures), the updated total projected cost for the Inland Feeder is estimated to be \$1.13 billion. Total expenditures through February 2007 are \$918.9 million. The board-approved budget for the entire program remains at \$1.186 billion. [Attachment 2](#) shows the actual mining progress and cash flow on both tunnels compared to the planned progress and expenditures set forth in the August 2006 contract amendment.

The first seven months of payments on the contractor's incentive/risk program were discussed with the Board at the November and December 2006 Engineering and Operations Committee meetings. The incentive plan is part of the contract amendment approved by the Board in August 2006. The incentive payment to the contractor for the month of February 2007 is shown in [Attachment 1](#).

Upon completion of construction, environmental mitigation measures will continue along the Arrowhead Tunnels alignment for up to two years in accordance with the Environmental Impact Report.

### **Policy**

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Submitted per request of the Board

### **Fiscal Impact**

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Refer to [Attachment 1](#).

  
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Roy L. Wolfe  
Manager, Corporate Resources

3/19/2007  
Date

  
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Jeffrey Knightlinger  
General Manager

3/27/2007  
Date

**Attachment 1 – Inland Feeder Program Projected Cost/Expenditures and Incentive Plan Payments**

**Attachment 2 – Arrowhead Tunnels Actual vs. Planned Mining Progress and Actual vs. Planned Cash Flow**

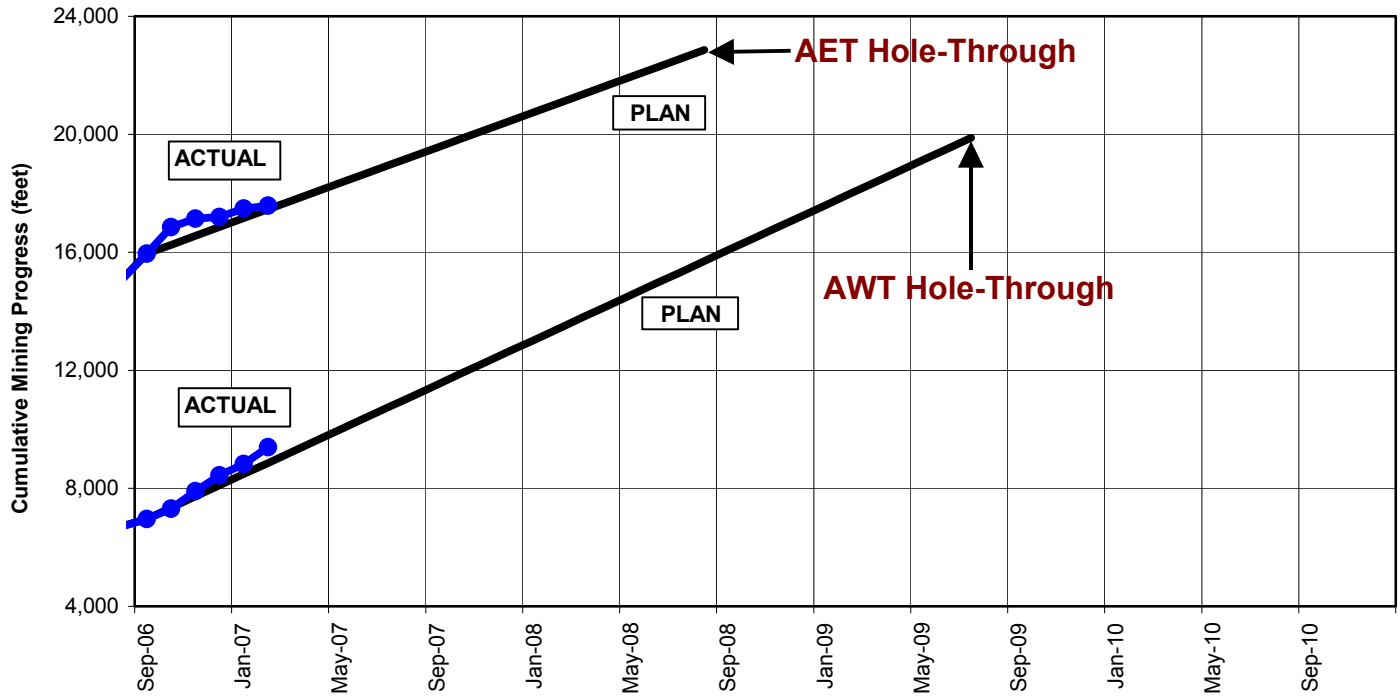
<b>Inland Feeder Program Projected Cost/Expenditures (\$ in Millions)</b>				
	Projected Cost To Complete (Updated Feb. 2007)	Expenditures This Month (Feb. 2007)	Expenditures To Date (Feb. 2007)	% Complete Based on Expenditures (Feb. 2007)
<u>Active Construction</u>				
Arrowhead Tunnels Const. Contract	\$ 397.0	\$ 4.5	\$ 210.3	53%
Construction Inspection and Support	\$ 55.0	\$ .8	\$ 35.1	64%
<b>Subtotal, Active Construction</b>	<b>\$ 452.0</b>	<b>\$ 5.3</b>	<b>\$ 245.4</b>	<b>54%</b>
<u>Other Components</u>				
Completed Projects	\$ 576.8	\$ 0.1	\$ 575.5	100%
Others (R/W, Env., Prog. Mgmt.)	\$ 101.2	\$ 0.3	\$ 98.0	97%
<b>Subtotal, Other Components</b>	<b>\$ 678.1</b>	<b>\$ 0.4</b>	<b>\$ 673.5</b>	<b>99%</b>
Expended To Date		\$ 5.7	\$ 918.9	77%
Subtotal, All Projects	\$ 1,130.1	← Projected Cost to Complete		
Remaining Budget	\$ 56.3			
Board-Authorized Budget	\$ 1,186.4	← Total Project Budget		
Length of Tunnels Mined Through 3/16/07				
Arrowhead East	16,740 ft	of 22,458 ft	(75%)	
Arrowhead West	9,770 ft	of 19,884 ft	(49%)	
Total	26,240 ft	of 42,342 ft	(62%)	

NOTE: Contractor invoices paid through February 2007 = \$210.3M  
 Overall completion = 36.3 of 44.2 miles (82%)

<b>Inland Feeder Program – Arrowhead Tunnels Incentive Plan Payments</b>				
	East/West Tunnels Cumulative Feet Mined	East Tunnel	West Tunnel	Total
May 2006 - Jan. 2007 (Previously Reported)	7,668	\$ 691,400	\$ 876,593	\$ 1,567,993
February 2007 (3)	560	\$ 97,300	\$ 125,100	\$ 224,400
<b>TOTALS</b>	<b>8,228</b>	<b>\$ 788,700</b>	<b>\$ 1,001,693</b>	<b>\$ 1,790,393 (2)</b>

(1): For Arrowhead West Tunnel, incentive program evaluation commenced in June 2006.  
 (2): Percent of maximum possible combined incentive: 63% (53% Arrowhead East Tunnel, 74% Arrowhead West Tunnel)  
 (3): Incentive Plan based on work performed during contractor monthly pay period from 1/26/06 to 2/25/07 (differs from progress in calendar month).

### Arrowhead Tunnels Actual vs. Planned Mining Progress



### Arrowhead Tunnels Actual vs. Planned Cash Flow

