

Implementation of Reclamation Plan at LaPlata Mine

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Introduction

- **LaPlata Mine Background**
- **Outline of Overall Process**
- **Examples and Discussion Process**
- **Issues and Items to Lookout For**
- **Costs**
- **Questions**

LaPlata Mine Background

- Operation was a truck shovel coal strip mine with multiple seams that dipped at approximately 30%. The mine produced 42 million tons from 1986 to 2003.
- A large amount of the spoil was placed out of pit due to the dip of the coal seam and terrain.
- The mining area was long and narrow due to the dip of the coal seams. As a result much of the reclamation effort was still left at the time mining operation ended.
- Bulk of the reclamation earth moving activities will be complete by the end of 2008.

LaPlata Mine Background



LaPlata Mine Background



Overall Process

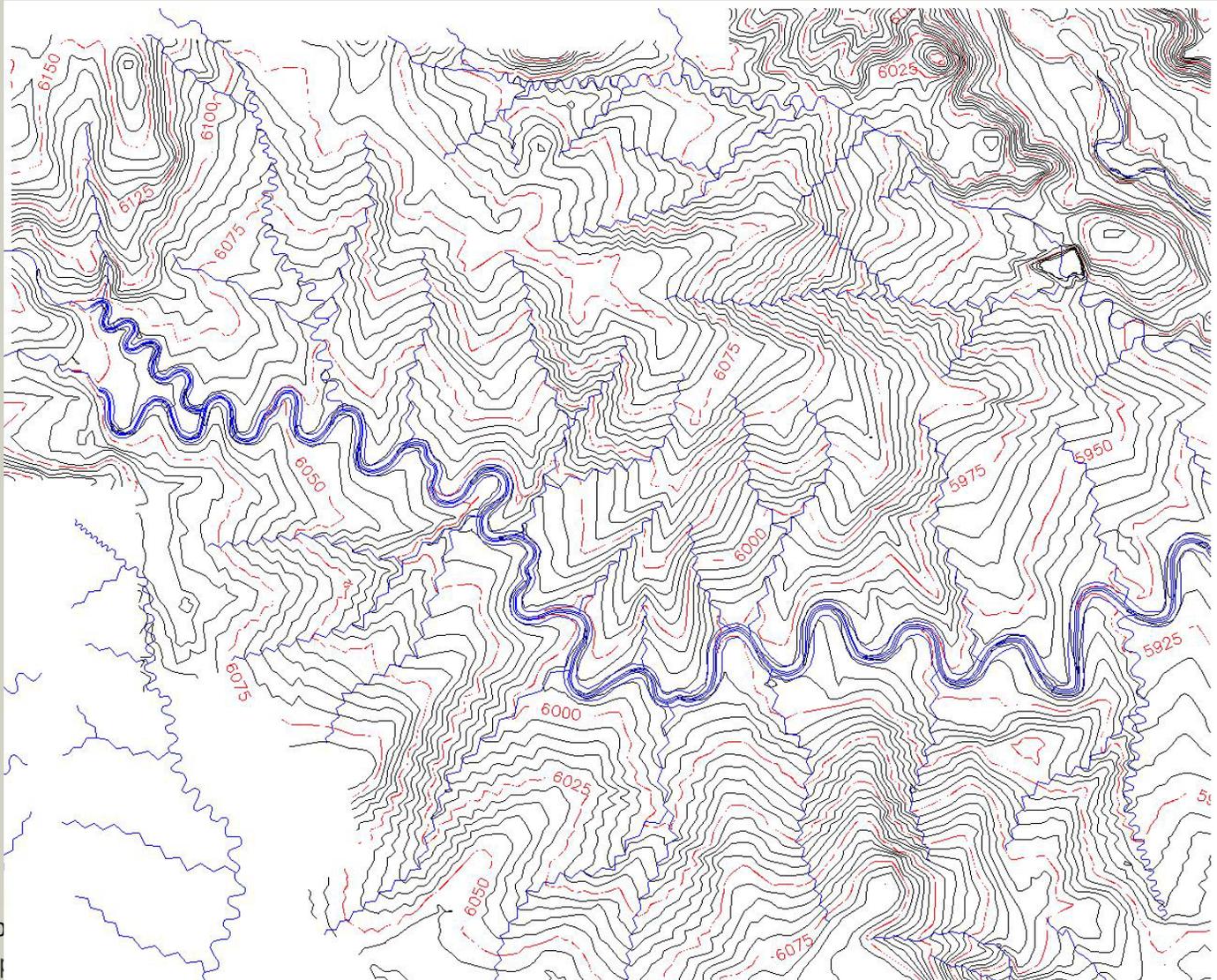
- Starting point is an overall reclamation design including channels.
- Begin by designing in shovel benches and dumps. Objective is to achieve material balance in local areas such that dozers can then create the design surface.
- Dozers then cut down the benches left from the shovel work and create the approximate design surface. Valleys and ridges exist at this point but channels are typically cut in later. Large channels will be cut in as we go.
- Final channels are then cut in and regrade surface completed. Tie in to surrounding topography is completed during these last two phases.

Overall Process Continued

- Topsoil is then laid on the surface being hauled from stockpiles that were created during the mining process.
- While topsoil is being spread, rock features are put into the channels. In addition outcrop features are also built.
- At this point it is ready for revegetation

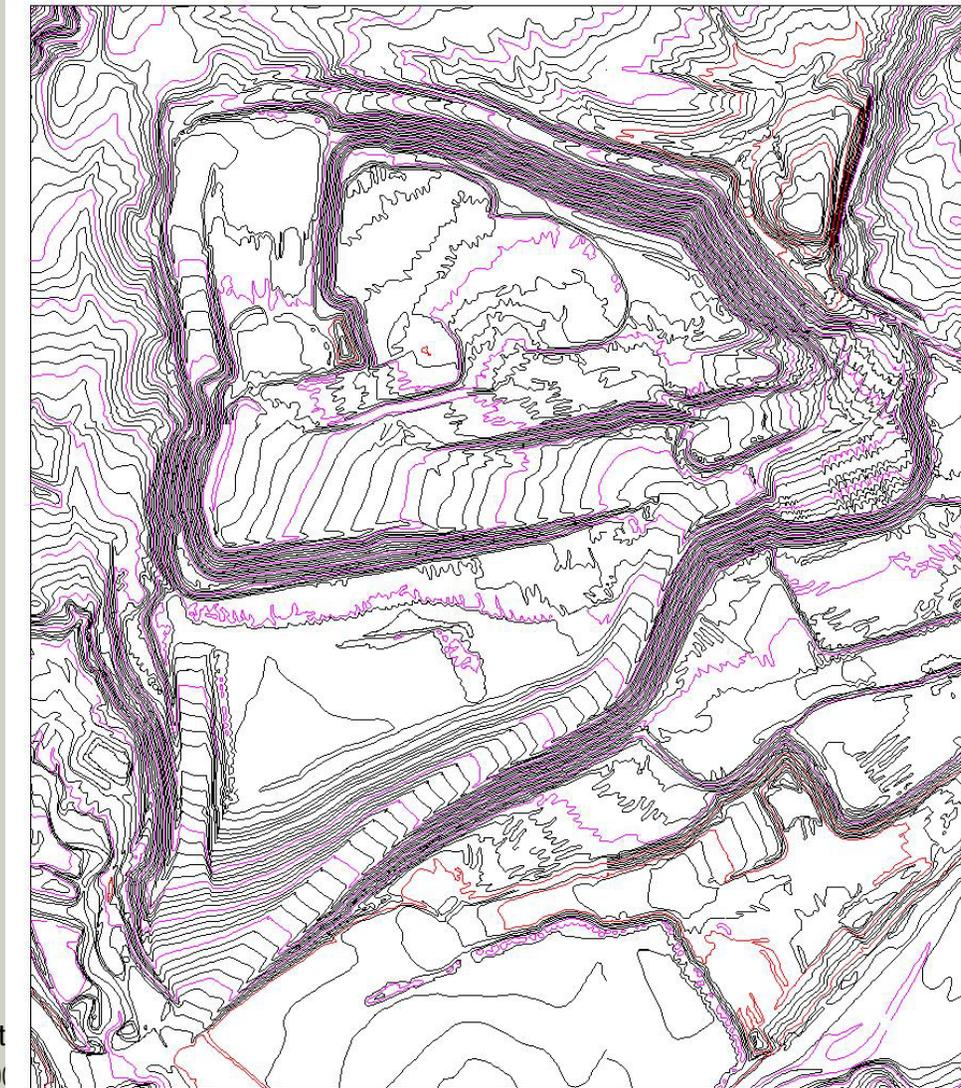
Examples and Discussion of Overall Process

- Example of Reclamation Design



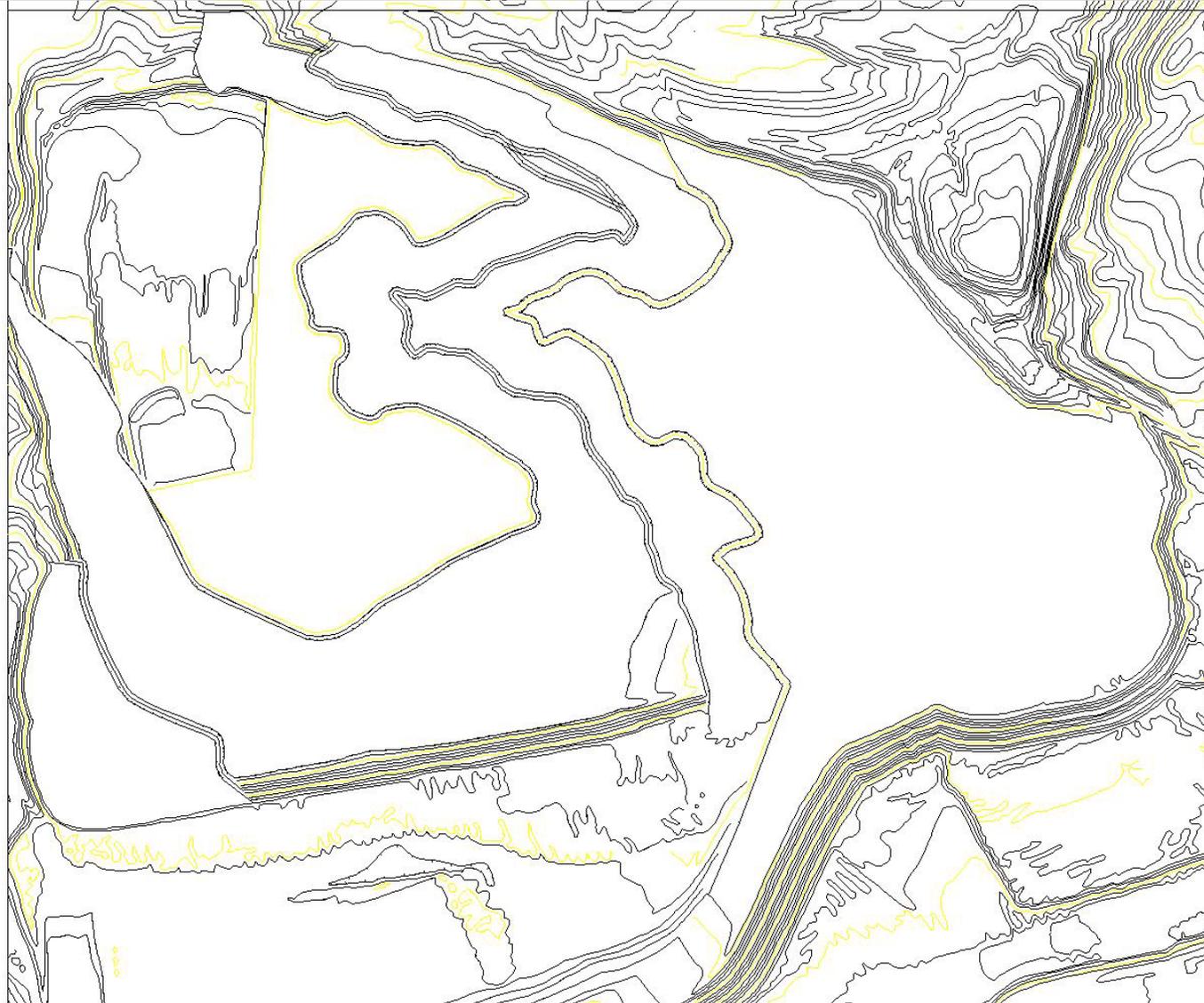
Examples and Discussion of Overall Process

- Example of Topography



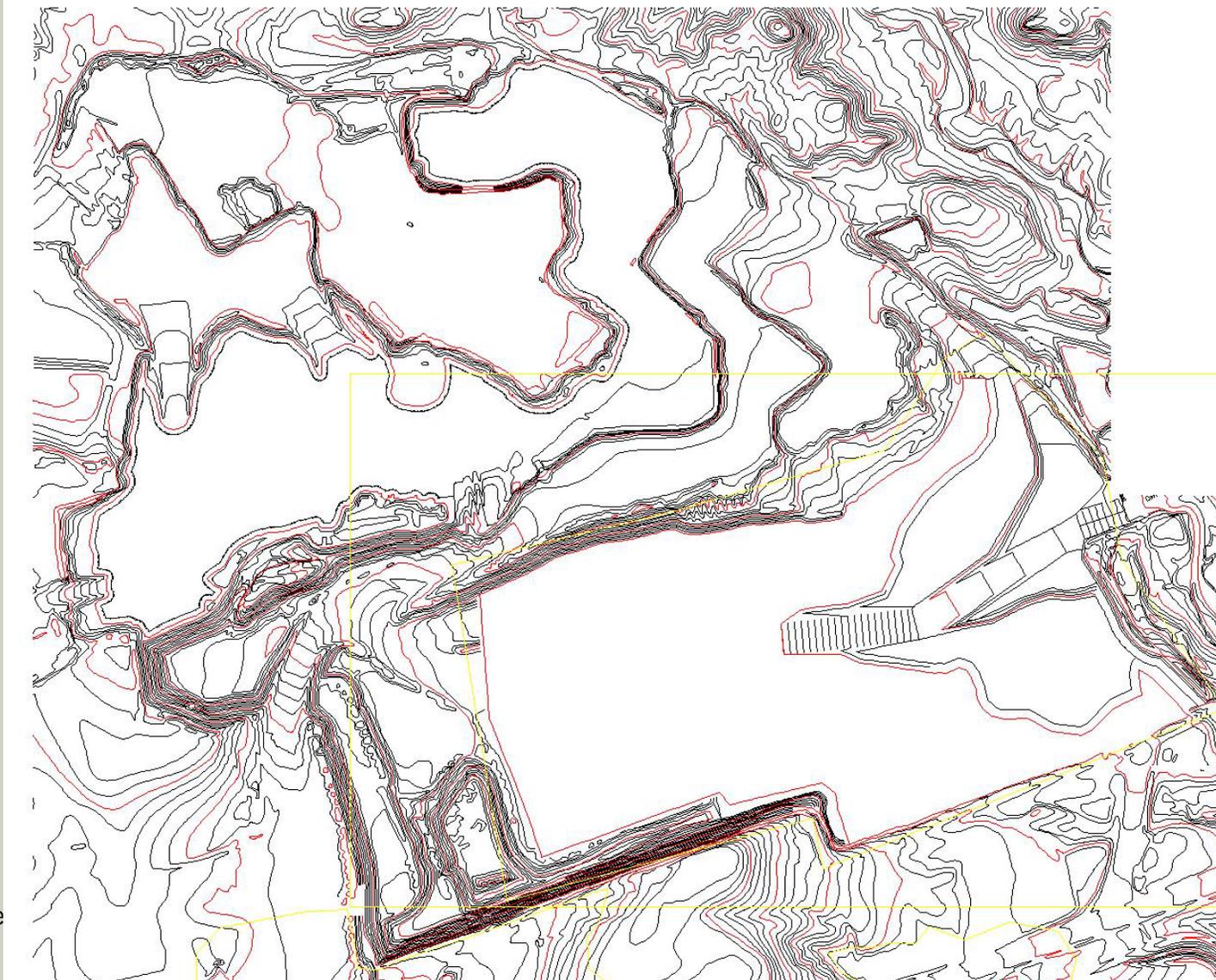
Examples and Discussion of Overall Process

- Shovel Bench Cut Design



Examples and Discussion of Overall Process

- Shovel Bench Cut Design and Dumps



Examples and Discussion of Overall Process

- Shovel Bench Cuts



Examples and Discussion of Overall Process

- Truck Dumps



Implementation of Reclamation Plan at LaPlata Mine

Examples and Discussion of Overall Process

- Dozing in Shovel Cuts



Examples and Discussion of Overall Process

- Dozing in Final Channels and Tie ins



Examples and Discussion of Overall Process

- Dozing in Final Channels and Tie ins



Examples and Discussion of Overall Process

- Topsoiling and Rock Placement



Examples and Discussion of Overall Process

- Topsoiling and Rock Placement



Examples and Discussion of Overall Process

- Final Work



Issues and Items to Lookout For

- Tie ins to surrounding topography. Need extremely good survey of area and still will have areas of field fits. Native ground under truck dumps creates issues for LPM especially in caprock areas.
- Equipment for constructing channels. We are using D10 dozers, sometimes D11's. Equipment is oversized for most of work but it is what we have and the operators have learned to make it work.
- Topsoiling! Extremely difficult in rough terrain. Access, not tearing up channels, not rolling over scrapers, control of amount of topsoil. All are made more difficult by the terrain. We use scrapers in rough and difficult to access areas, end dumps in flatter and easier access areas. Most commonly the hauls are long.

Issues and Items to Lookout For

- Rock placement in channels. Armouring in channels is done but if not done correctly it can create problems that would not have been there.
- Constructed rock outcrops. When done on a slope can concentrate water flowing down the slope and cause rills. Better if they can be placed where there is little or no water shed above them.
- Seeding operations tearing out rocks in channels. These operations also have difficulties with the terrain.

Issues and Items to Lookout For

- Tie in issue – Extremely small drainage



Issues and Items to Lookout For

- Topsoil Terrain



Issues and Items to Lookout For

- Topsoiling around channels



Issues and Items to Lookout For

- Rock Placement in channels



Issues and Items to Lookout For

- Rock Outcrops



Costs

Each operation would have to look at their application and consider impacts. The most obvious advantage is that if it is successful then it doesn't have to be redone or have significant ongoing maintenance.

Another consideration, for LPM 80-90% of the cost is in moving the spoil dumps and filling the pits. The final surface shaping is a small part of the total cost of the reclamation.

Rough terrain at LPM lends itself well to this approach.

Costs

Cost Impact areas:

- Benefit in reducing backfill costs if operations can successfully leave steeper slopes in the reclamation.
- Construction of channels is probably slightly more due to the more difficulty of construction.
- Topsoiling costs may be higher due to lower productivities in the process. Also material balance for quantity of topsoil may be a concern.
- Rock features are probably break even. Good chance there will be a reduction in cost for rip rap and channel armouring materials.

Questions?