DLDS Cost Detail
for 50% confidence factor cost estimate

Mike Neubauer
DLDS Costs

- WC475 $61,223,052 35%
- Extractors $42,768,000 24%
- Launchers $41,606,687 24%
- Gate Valves $17,015,564 10%
- Pumps and TEEs $12,728,494 7%
- Total for DLDS $175,341,797
WC475 detail costs

- WC475 $ 12,485,088
- Water cooling $ 1,248,509 \textit{10\% increase for water cooling}
- Flanges $ 3,805,074 cost for flanges 5meters/flange
- Welding $ 11,447,136 from JuliaFactory.xls (+80\% rate)
- GDC Cleaning $ 5,027,000 15 stations and tech labor(+80\% rate)
- $ 34,012,807 \textbf{SUB-TOTAL}
- $ 17,006,403 chem cleaning (50\% additional cost)
- $ 51,019,210 \textbf{SUB-TOTAL}
- $ 10,203,842 20\% ED&I
- $ 61,223,052 \textbf{TOTAL} \textit{($343/meter)}
178 km of copper pipe

- DLDS WC475 Copper Pipe
  - $135/meter for KEK experiment using 60 meters
  - $2.50 to $3.00 per pound (Rago)
  - used $70 per meter
    - $2.50/lb $61/meter 92% learning curve
    - $3.00/lb $73/meter 94% learning curve
  - $12,485,088
WC475 Relative costs

- copper pipe + cooling $13,733,597 22%
- cleaning $22,033,403 36%
- flanges ($428 per) $15,252,210 25%
- ED&I $10,203,842 17%
- $61,223,052

- could be more for cleaned copper pipe ready for install.
- could be less for flange costs
Learning Curve to Gate Valves

- Quantity: 8 per 8-pack
- 1584 gate valves
- 90% Learning Curve (starting $20K) $10,742 each
- $17,015,564 total cost of gate valves
- could be more for added waveguide transition costs
- could be less for gate valve each cost
Launcher Conceptual View
Basis for WG Bend Equivalent
Launcher

- pipe ($/meter WC475) $ 7,112 3%
- cross potents (4 @$10k ea) $ 40,000 19%
- elbow equivs (16 @$8k ea) $ 128,000 61%
- 20% ED&I $ 35,022 17%
- $ 210,135 per 8-pack

- could be more for cleaning, packaging, ready for installation
- could be less for “elbow equivalents” in bends
Extractor and feeds to accelerator for an 8-pack

- Extractor (3 @$8k ea) $ 24,000 11%
- Elbows (20 @$8k ea) $160,000 72%
- ED&I $ 36,800 17%
- $220,800 per 8-pack

- could be more for extractor details and cost to package and prepare for installation
- could be less for elbow equivalent costs
26 75 l/s pumps in the 2x2 DLDS per 8-pack in the tunnel

- Estimated location of 75 l/s pumps

RF feed from DLDS to accelerator

$16k \quad $32k

55 meters

56.3 meters

6.25 meters

450.5 meters

9 eight-packs
Estimated DLDS Pump and Tee Cost

- $740 for a 10" Tee (MDC) pg 130
- $1420 for four 10" ID flanges ($355 ea)
- $80 for a 6" flange
- $500 for a copper inner tube with drilled holes
- $2740 sub-total material
- $600 for additional handling costs
- $3340 total cost for one pump TEE

- 90% learning curved TEE cost: $1616
- 90% learning curve pump cost: $1302
- $12,728,494
Summary---DLDS Cost Elements