

Rover Readies for Second Drilling

I'm Avi Okon, the lead hardware engineer for the drill, and this is your Curiosity Rover Report.

Here we are with Curiosity's Earth-bound test double in the Mars Yard here at JPL.

Curiosity has been repositioned at a second rock target. That's where she will sample it with her drill. This second sample is intended to confirm the results from her first drilling, which is where we found evidence of an ancient environment favorable to microbial life.

After drilling, Curiosity will process and deliver the sample to her analytical instruments.

A lot of you may have been wondering how we get sample from the drill or the scoop into the instruments back in the rover.

So to collect the sample from the rock, we don't just pick up, drill into the rock and drop off the sample directly. It's a little more complicated than that.

Now we'll use this model of the drill bit assembly to illustrate.

As we drill the hole, the powder gets conveyed up this tube and gets stored in the chamber inside the drill bit assembly.

Then to move the powder out of the drill bit, we use the robotic arm wrist and turret joint and the vibration caused by the drill percussion mechanism to move the sample like so: Tap tap tap tap tap.

We continue this motion to deliver it to the CHIMRA, which is the sample, processing and delivery device.

The drill sample comes up through the sample transfer tube into the chambers into CHIMRA.

As we open her up, we could see where the sample comes in from the drill, then we would send the sample up to the scoop to take a picture of it. Once we do that, we then move the sample through the sieve and into the portion box to create a portion for the instruments inside the belly of Curiosity. And those portions are the size of a baby aspirin tablet.

To get the sample to the instruments is similar to this puzzle game that I have on my phone, where we move the sample through a series of chambers using gravity and vibration.

Curiosity uses gravity instead of mechanisms to move sample because there are

fewer moving parts.

So now I'll show you using these BBs in this model - how we move the sample from the reservoir into the scoop:

Rattle rattle rattle

And there it is.

Curiosity could do this a lot better than I can.

Now the sample is in the scoop. It still has a long way to go to get into the sieve and into the portion box to be delivered into SAM and CheMin in the belly of the rover.

This has been your Curiosity Rover Report. Check back for more updates.