

-----Original Message-----

From: Merbach Karl

Sent: Tuesday, June 15, 2010 9:23 AM

To: Ellis Robert

Cc: Oyler Mike

Subject: FW: Request for 1 gallon Milk/water/juice Jugs- Rapid City MRF

Robert,

Attached is the request from Battle Creek Gardens for 500 gallon jugs from the MRF for use in constructing a solar water heating system. I believe this is an excellent product to show the potential for reuse, other than recycling. I will request that once they are through with the jugs, they return them to the landfill for recycling. Therefore, no loss to the landfill other than the delay in recycling.

Let me know if you need further information.

Karl

-----Original Message-----

From: Ray Foster [mailto:rlf@mt-rushmore.net]

Sent: Monday, June 14, 2010 5:57 PM

To: Merbach Karl

Cc: michelle@bhhec.org; shirley@midco.net; tgomez@silvercitysd.com; Oyler Mike; Janet Nelson; Nunez, Dick

Subject: Request for 1 gallon Milk/water/juice Jugs- Rapid City MRF

Dear Karl,

This is to thank you for your help with our request for 500 milk jugs for use in constructing a low-cost solar water heating system for our local greenhouse at Battle Creek Gardens.

What will 500 gallon milk/juice/water jugs do to heat up water in the sun?

I got the plans and idea from a friend in England. I tried a mini-test to see if it had potential to work. I tried my test with two 2 foot pieces of 1 inch black poly pipe (80 PSI) hung out on the garden fence in the sun filled with water - the lower end of the pipe being blocked to keep the water in the pipe. One pipe was inside two 1 gallon jugs and the other just bare. Both were exposed to the sunshine in January 2010. The temperature of the water in both pipes was measured every 5-15-60 minutes. The average temperature of the exposed pipe water was 70 degrees Fahrenheit. The average outside temperature over the same time period of time (11:30 am until 3 pm) was 45 degrees F. The average water temperature inside the pipe inside of two 1 gallon plastic bottles was 85 F. This difference of 15 F convinced me that it would be worth while to try to get the 600 bottles needed for the 400' of pipe hung on the garden fence in the sunlight to collect hot water to warm the greenhouse in winter.

How is summer sun going to warm a greenhouse in winter?

The sun also shines in winter. In addition we have 1500 gallons of stored water underground in the greenhouse with no insulation around it. The idea is to warm up the ground under the greenhouse which is insulated to 6' down around the greenhouse from the ground outside of the greenhouse. If there is lots of heat in the summer, this ground should be warmed up in summer to give off some heat in winter inside of the greenhouse.

How did you arrive at the figure of needing 500 gallon bottles?

400 feet is 4800 inches. Each 1 gallon jug put over the pipe will fit into the jug ahead of it and cover about 8 inches of pipe with each gallon jug. 4800 divided by 8 is 600. We already have been given 100 jugs (thank you) and need 500 more.

How long will the plastic jugs last in the sun?

Our previous greenhouse had plastic jugs inside of the greenhouse to hold daytime heat overnight. The greenhouse lasted about 20 years and not all of the jugs inside the greenhouse (covered with plastic) were destroyed by the sunlight that reached them inside the greenhouse. The correct answer is that I do not know. My guess is that the jugs should last about 3-5 years in the direct sunlight. So can we come back with a request for 600 jugs in 3 - 5 years (or whenever the jugs do in fact disintegrate from the solar radiation?

Thank you sincerely for considering this request for 500 1 gallon milk/water/juice jugs that we plan to re-use to heat water in the sun to heat the greenhouse ground at Battle Creek Gardens.

Ray Foster, M.D., FACS
Resident physician
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