

Solar Distillation Unit

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Introduction

- WERC Competition
- Potable Water
- Communities
- Electricity
- Thermal Distillation Units



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Background

- Ancient Technology
- Salt
- Sixteenth Century
- Chile 1872
- U.S. Navy in WWII



naturaltherapypages.co.uk



northofseveycorners.com

Problem Statement

- Design a still with the highest efficiency
- Design a still that is cost effective
- Ensure that the brackish groundwater contaminants are removed

Brackish Water Condition

Component	Value
Conductivity	6100 $\mu\text{S}/\text{cm}$
Sulfate	3300 mg/L
Chloride	550 mg/L
Hardness (as CaCO_3)	3000 mg/L
Sodium	700 mg/L
Calcium	600 mg/L
Magnesium	375 mg/L
Silica	25 mg/L
Strontium	10 mg/L

Constraints

- Cost
- Electricity
- Location's water
- Efficiency
- Weather

Providing a low cost product at a high efficiency will allow the final design to be easily replicated and maintained.

Without an outside source of electricity, other means will be utilized to heat and pump the water throughout the system.

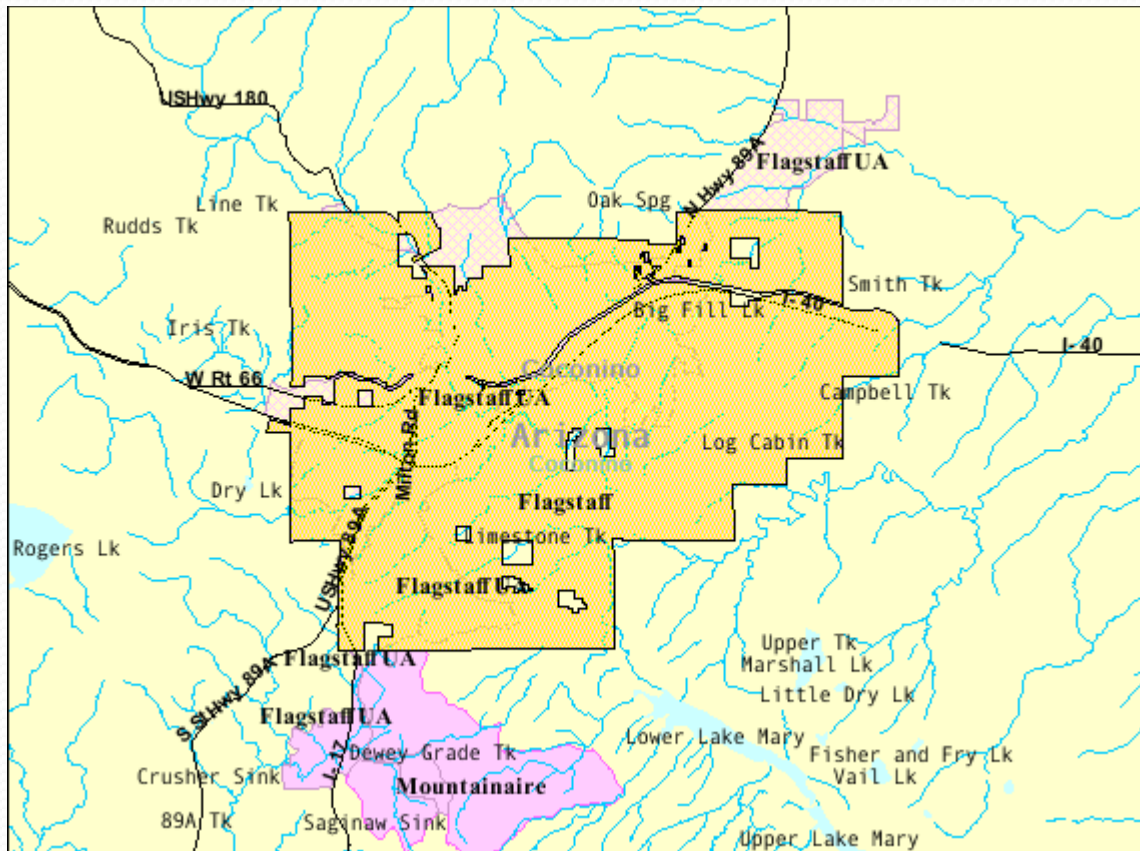
The water presented at the competition may be different than the water presented at the test site.

Theoretical water production efficiency may differ from actual efficiency of the still, resulting in lower production of water.

Due to inconsistent weather conditions, it will be difficult to have ideal heating conditions for distilling the water.

Location –Flagstaff

- Map



Location-Climate

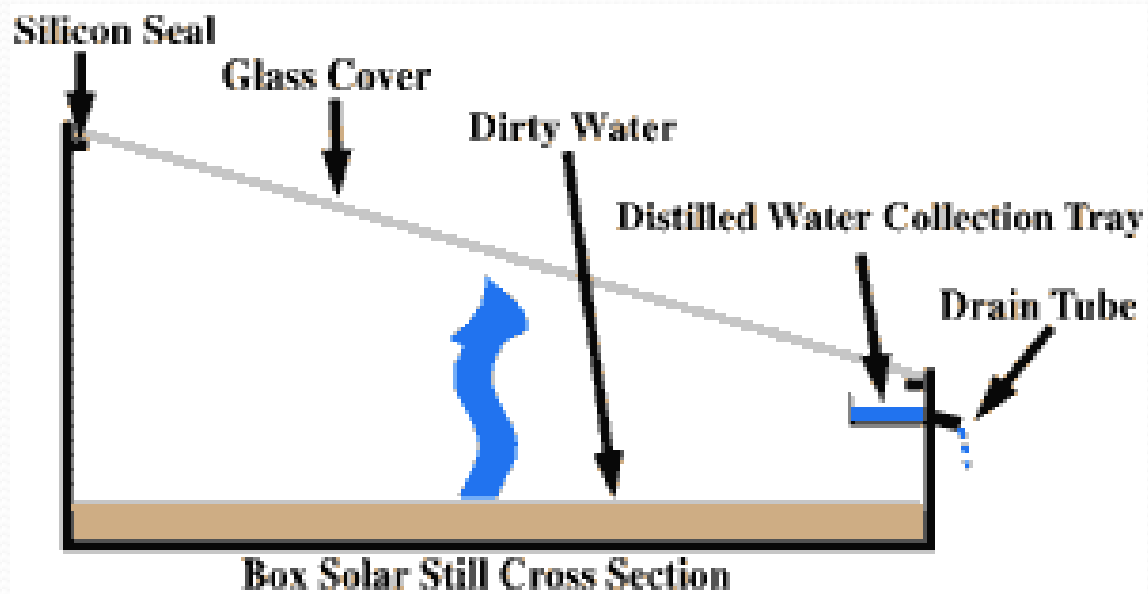
- Climate-March,2012

Average Maximum Temperature(°F)	52.9
Average Wind Speed (MPH)	8.4
Average Sky Cover	0.1
Average Relative Humidity (%)	51

- Climate-November,2011-October,2012

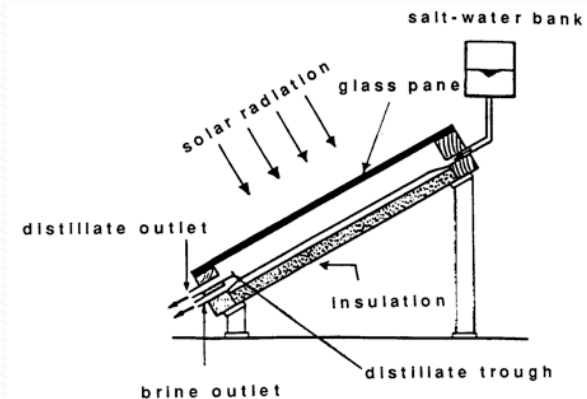
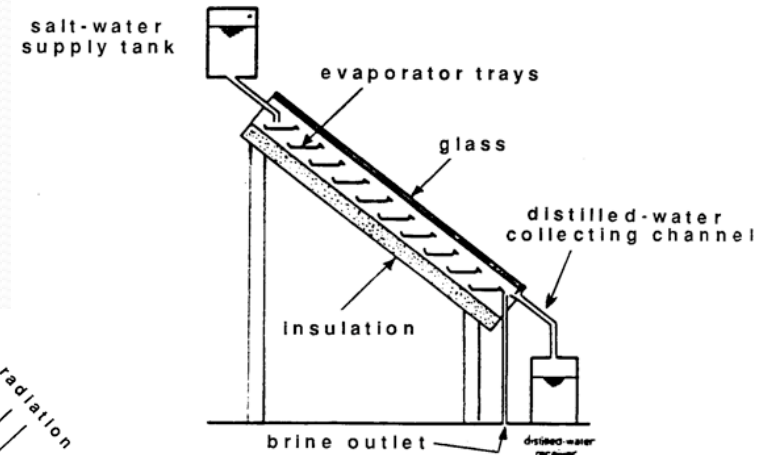
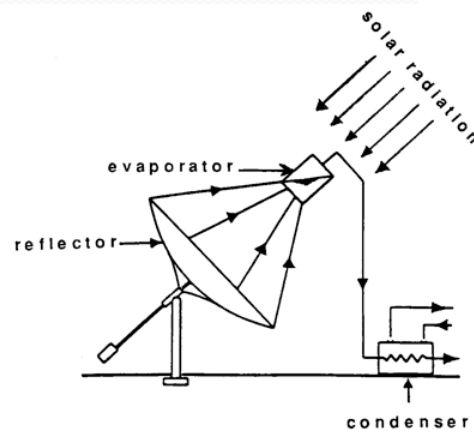
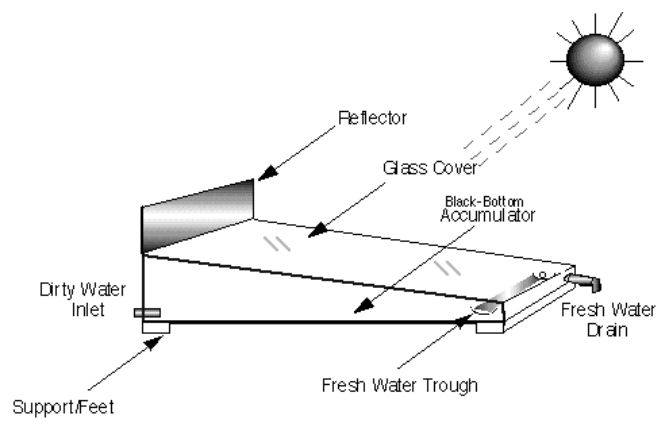
Average Maximum Temperature(°F)	62.5
Average Wind Speed (MPH)	6.6
Average Sky Cover	0.2
Average Relative Humidity (%)	51.7

Technical Process



Different Still Types

- Concentrating Collector Still
- Multiple Tray Tilted Still
- Tilted Wick Solar Still
- Basin Still





Different Materials

- Steel
- EPDM Rubber
- Butyl Rubber
- Asphalt Mat
- Cement
- Black Polyethylene
- Roofing Asphalt on Concrete
- Wood
- Fiber Glass
- Aluminum

Timeline

Task Name	October /2012				November /2012				January/2013				February/2013				March/2013					April/2013	
	7	14	21	28	4	11	18	25	6	13	20	27	3	10	17	24	3	10	17	24	31	7	14
Project Management	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█			
Research Overall Project	█	█																					
Location			█	█																			
Research and Test Materials					█				█														
Research and Test Structure						█				█													
Research and Test Cover							█				█												
Research and Test Collection System								█			█												
Building Models and Test													█	█	█	█	█	█	█	█	█		
Project Study Report									█	█	█	█	█	█	█	█	█	█	█	█			
Competition Week																					█	█	

References

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Questions?

