

DATE: 21 May 2010

TO: File

FROM: Harry Quarles

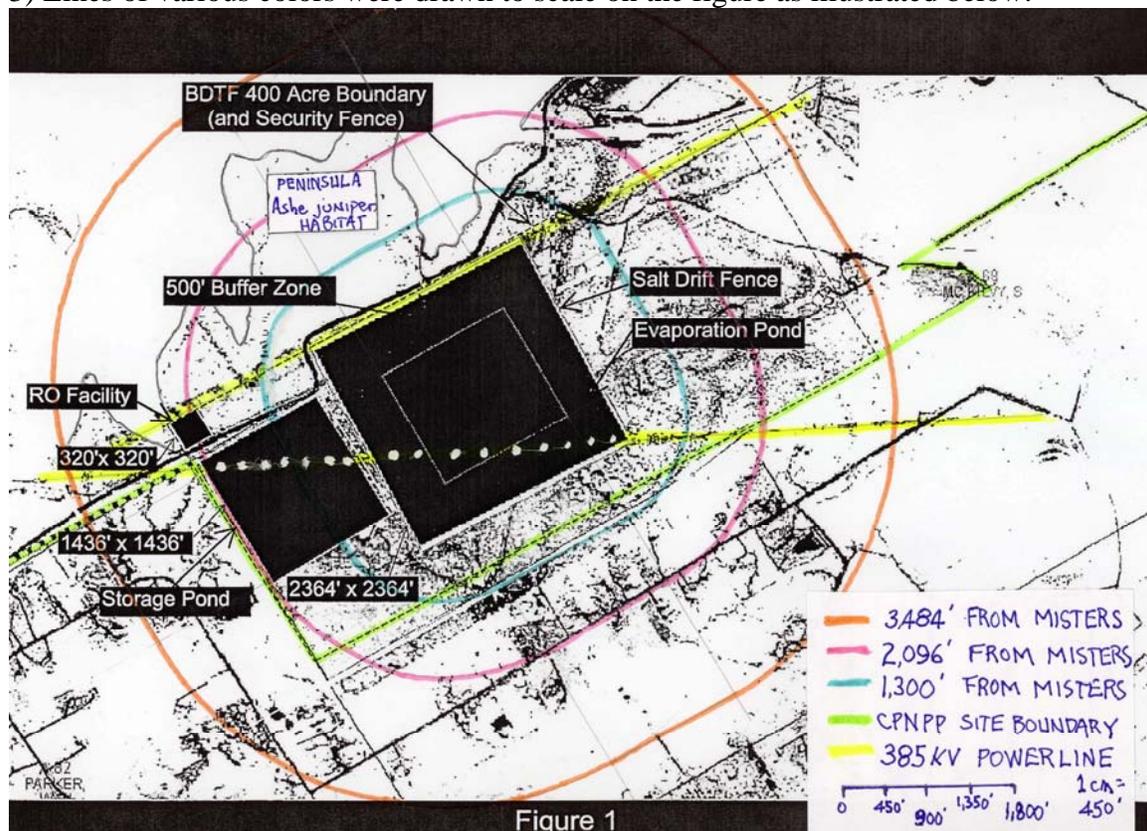
SUBJECT: Calculations concerning salt drift potential from CPNPP BDTF evaporation ponds

This memo documents how I evaluated distances, and associated areas, from the BDTF that could potentially at issue with respect to salt drift.

1) Sketch of BDTF was obtained from Luminant.

2) Distances were scaled off of the figure, 1 cm = 450'

3) Lines of various colors were drawn to scale on the figure as illustrated below:



4) The white line forming a square within the large black square represents locations of misters; this will be referred to as white square

5) From each corner of the white square arcs were drawn of lengths 1300', 2096', and 3484'. Length of side of white square is  $2364' - 1000' = 1364'$

6) These arcs were connected with lines drawn parallel to the sides of the white square at distances of 1300', 2096', and 3484'.

7) Area inside orange line was calculated and converted to acres. Formula is:  
Area =  $((\pi \times 3484^2) + (4(3484 \times 1364) + (1364^2))) / 43560 = 1354.5 \text{ ac}$

8) Area inside of orange line and outside of evaporation pond was calculated and converted to acres. Calculation is:  
 $1354.5 \text{ ac} - (2364' \times 2364') / 43560 = 1225.7 \text{ ac}$

9) Area inside of pink line was calculated and converted to acres. Formula is:  
Area =  $((\pi \times 2096^2) + (4(2096 \times 1364) + (1364^2))) / 43560 = 622.1 \text{ ac}$

10) Area inside of pink line and outside of evaporation pond was calculated and converted to acres. Calculation is:  
 $622.1 \text{ ac} - (2364' \times 2364') / 43560 = 493.8 \text{ ac}$

11) Area inside of blue line was calculated and converted to acres. Formula is:  
Area =  $((\pi \times 1300^2) + (4(1300 \times 1364) + (1364^2))) / 43560 = 327.4 \text{ ac}$

12) Area inside of blue line and outside of evaporation pond was calculated and converted to acres. Calculation is:  
 $327.4 \text{ ac} - (2364' \times 2364') / 43560 = 199.1 \text{ ac}$

13) Areas of interest were identified:

Off site small is area between green property line and blue line off of the CPNPP site;

Off site medium is the area between green property line and pink line off of the CPNPP site;

Off site large is the area between green property line and orange line off of the CPNPP site.

14) **Intersection method** was used to calculate areas for Off site large, medium, and small.

15) Graph paper with grid of approximately 2 squares per centimeter was overlaid on figure. Number of intersections falling within 2364' evaporation was counted and found to be 108.

16) Area of pond is 128.29 ac, therefore each intersection represents  $128.29/108 = 1.19$  ac per intersection.

17) Intersections within off site large, medium, and small were found to be 288, 67, and 13.5, respectively.

18) Off site small =  $13.5 \times 1.19 = 16.1 \text{ ac}$   
Off site medium =  $80.5 \times 1.19 = 95.8 \text{ ac}$   
Off site large =  $368.5 \times 1.19 = 438.5 \text{ ac}$

19) **Planimeter method** was also used for calculations.

20) Area of 128.3 ac evaporation pond traced and found to be 5.6 units; therefore each unit =  $128.3 / 5.6 = 22.9$  ac

21) Area of Off site small, medium, and large traced and found to be 0.75, 4.5 and 19.7 respectively.

22) Off site small =  $22.9 \times 0.75 = 17.2$  ac  
Off site medium =  $22.9 \times 4.5 = 103.1$  ac  
Off site large =  $22.9 \times 19.7 = 451.4$  ac

23) **Weight method** using an analytical balance was also used for calculations.

24) Area inside of orange line was cut out and weighed. It weighed 5.382 g; therefore each g =  $1354.5 \text{ ac} / 5.382 \text{ g} = 251.7$  ac

25) Weights of Off site small, medium, and large were found to be 0.061, 0.391, and 1.682 respectively.

26) Off site small =  $251.7 \times 0.061 = 15.4$  ac  
Off site medium =  $251.7 \times 0.391 = 98.4$  ac  
Off site large =  $251.7 \times 1.682 = 423.4$  ac

27) In DEIS the following acreages were reported based on consideration of all of the methods above:

Off site small = about 16 ac (Land Use)  
Off site medium = about 96 ac (Terr Ecology)  
Off site large = about 438 ac (Terr Ecology and Land Use)  
Area beyond the pond (at 1300') = about 199 ac (Terr Ecology and Land Use)  
Area beyond the pond (at 2096') = about 494 ac (Terr Ecology)  
Area beyond the pond (at 3484') = about 1226 ac (Terr Ecology and Land Use)