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NTC ORLANDO
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LETTER REGARDING ESTIMATED INVESTIGATION AND RADIUS OF INFLUENCE FOR OPERABLE UNIT 1 (OU 1) PROPOSED GROUNDWATER USE RESTRICTIONS BOUNDARY WITH ATTACHMENT NTC ORLANDO FL
6/25/1997
ABB ENVIRONMENTAL

ABB

05.01.01.0004
00216

June 25, 1997

Commanding Officer
SOUTHNAVFACENGCOM
P.O. Box 190010
2155 Eagle Drive
N. Charleston, S.C. 29419-9010

Attn: **Mr. Wayne Hansel, Code 18B7**

Subject: NTC, Orlando, Orlando, Florida
Estimated Investigation and Radius of Influence
Contract; N62467-89-D-0317/CTO 107

Dear Wayne:

During last week's OPT meeting, the relevancy of the OU1 groundwater use restriction limits were discussed. One method used to validate possible boundaries is to calculate the radius of influence within the surficial aquifer established from perceived irrigation wells placed near the landfill. To that end, ABB-ES ran a series of calculations, based on equations for an unconfined aquifer, assuming certain conditions, to analyze various influence boundaries.

The attached calculations illustrate that a two inch irrigation well pumping at 20 gallons per minute, with an assumed drawdown of 15 feet, will result in a radius of influence of approximately 210 feet. As shown on the calculation sheet, variation in drawdown greatly affects the amount of influence. A drawdown of 15 feet may be considered conservative, however, due to certain aquifer heterogeneities reported in the area around OU1, a conservative approach is advisable. If a safety factor of 1.5 is used, then the boundary should be no closer than 315 feet. ABB-ES recommends using this calculation to validate any proposed boundary to the OU1 groundwater restricted areas.

Should you have any questions or comments, please call me at (407) 895-8845.

Very Truly Yours,
ABB ENVIRONMENTAL SERVICES, INC.

John P. Kaiser
Installation Manager
Attachment

JK/cp
cc: J. Mitchell (FDEP)
N. Rodriquez (EPA)
B. Nwokike
Lt. G. Whipple
S. McCoy
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PROJECT	COMP. BY	JOB NO.
OU1	MH/JN	
	CHK. BY	DATE
	H. F.	6/25/97

Calculations

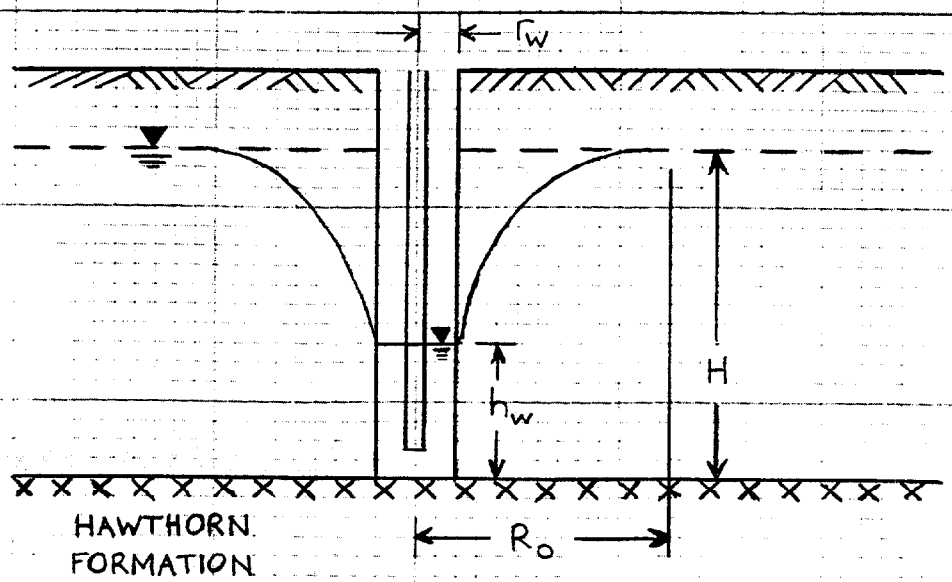
Radial Flow Equation:

$R_o = (_e[\pi k (H^2 - h_w^2) / Q]) (r_w)$ from Construction Dewatering: A Guide to Theory & Practice (Powers 1981).

where R_o = radius of influence (ft);
K = hydraulic conductivity (ft/min);
H = static height of water column in well (ft);
h_w = static height of water column in well minus drawdown (ft);
Q = flow rate (ft^3/min);
r_w = radius of the borehole of the well (ft); and
π = 3.1415927.

Assumptions:

1. Soil is homogenious and isotropic;
2. K is 0.00449 ft/min from previous slug testing performed at OU1;
3. well would be placed above the Hawthorn Formation;
4. H is 50.0 ft;
5. Q is 20.0 gal/min or 2.67 ft^3/min (based on a local irrigation firm); and
6. r_w is .250 ft.

Results:

If the water table draw down is 5 ft., then the radius of influence is 3 ft.;
if the water table draw down is 10 ft., then the radius of influence is 29 ft.; and
if the water table draw down is 15 ft., then the radius of influence is 210 ft.