Lori

North Carolina Department of Environment and Natural Resources

DIVISION OF AIR QUALITY

Michael F. Easley, Governor

William G. Ross, Jr., Secretary
B. Keith Overcash, P.E., Acting Director

September 6, 2002

MEMORANDUM
Mr. Bill Pate, Acting Branch Head
Occupational and Environmental Epidemiology Branch
Epidemiology Section
Division of Public Health
NC Department of Health and Human Services

Dear Bill,

I am seeking assistance from Occupational and Environmental Epidemiology in providing a cost-benefit analysis reflecting any improvement to public health as a result of a lowered hydrogen sulfide acceptable ambient level (AAL).

As you are aware, the AAL is a risk-based health guideline that originates from risk assessments completed by the Secretary's Scientific Advisory Board on Toxic Air Pollutants (SAB) and is implemented through the North Carolina air toxics program. For hydrogen sulfide, there are three options for AALs under consideration. Any one of the proposed options would result in a more stringent AAL than the current one.

At the last Air Quality Committee (AQC) meeting discussions included the options proposed by the SAB, possible sources of hydrogen sulfide emissions, and fate and transport of hydrogen sulfide in the environment. The Division of Air Quality (DAQ) has also been working with certain industry sectors to evaluate the costs of equipment or techniques to control hydrogen sulfide emissions. DAQ will factor these costs into an overall economic assessment to estimate the costs of a change in the hydrogen sulfide AAL. Also, as part of the overall economic assessment, the AQC is seeking information regarding costs of any public benefits of controlling hydrogen sulfide emissions-- for example, such as a reduction of hospital asthma cases-- presumably due to a reduction in exposure to hydrogen sulfide emissions, be included as part of the overall economic assessment. Any assistance you can provide to help determine public benefit costs is appreciated. I can be reached at (919) 733-1476 to discuss this further.

Sincerely,

Lori Cherry

Lori Cherry, Supervisor
Toxics Protection Branch

Cc: Keith Overcash
Thom Allen
Steve Schliesser
Lee Daniel

Technical Services Section
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DIVISION OF AIR QUALITY
August 15, 2002

MEMORANDUM

TO: Bill Pate, DPH – Occupational and Environmental Epidemiology Branch

FROM: Tom Anderson, Meteorologist, AQAB

THROUGH: Jim Roller, Supervisor, Air Quality Analysis Branch (AQAB)

SUBJECT: H_2S Modeling at Weyerhaeuser – Plymouth, NC and PCS Phosphate –Aurora, NC

Per your request, I have conducted modeling analyses to determine maximum hydrogen sulfide (H_2S) impacts for two facilities in N.C. - Weyerhaeuser Corp. located in Plymouth, NC and PCS Phosphate Corp. located in Aurora, NC. As you explained, the analyses were undertaken to determine maximum 24-hour impacts for each of the facilities for you to incorporate in a presentation to the Environmental Management Commission for their consideration of possible establishment of a 24-hour AAL for H_2S. The methodology and results of the analyses are described in the following sections.

Modeling Methodology

H_2S emissions and source parameters from each of the aforementioned facilities were obtained from previously-submitted H_2S analyses. The previous analyses were submitted in order to demonstrate compliance with the 1-hour AAL of 2.1 mg/m^3, but did not include calculation of 24-hour impacts. Emission rates used in the analyses were based on permit-allowable emissions and, for each facility, were optimized to correspond to approximately 90%-99% of the 1-hour H_2S AAL.

For each facility, ISCST3 (00101) using a five-year meteorological dataset was used to evaluate impacts in simple terrain; complex terrain does not exist within the vicinity of either of the facilities. Meteorological data collected on-site, combined with upper air data from Newport, NC and Charleston, SC was used for the PCS Phosphate modeling and data from Norfolk, VA (surface) and Wallops Island (upper air) was used for the Weyerhaeuser modeling.

Direction-specific building dimensions, determined using EPA's BPIP program (95086), were used as input to the models for building wake effect determination. Receptors were placed around each of the facilities at approximately 25 meter intervals and extended outward to a distance of 2 kilometers with 100 meter spacing. For Weyerhaeuser, receptors were also placed around property owned by another company, Geo Specialty Chemicals, which is located within the Weyerhaeuser property. Previous analyses have demonstrated that cavity impacts were of no concern (either contained within the facility's property or much less than ISCST3 modeled impacts).

Modeling Results

The following table presents the maximum 1-hour and 24-hour average impacts from each of the facilities modeled. For both facilities, the maximum impact was located at the property line and

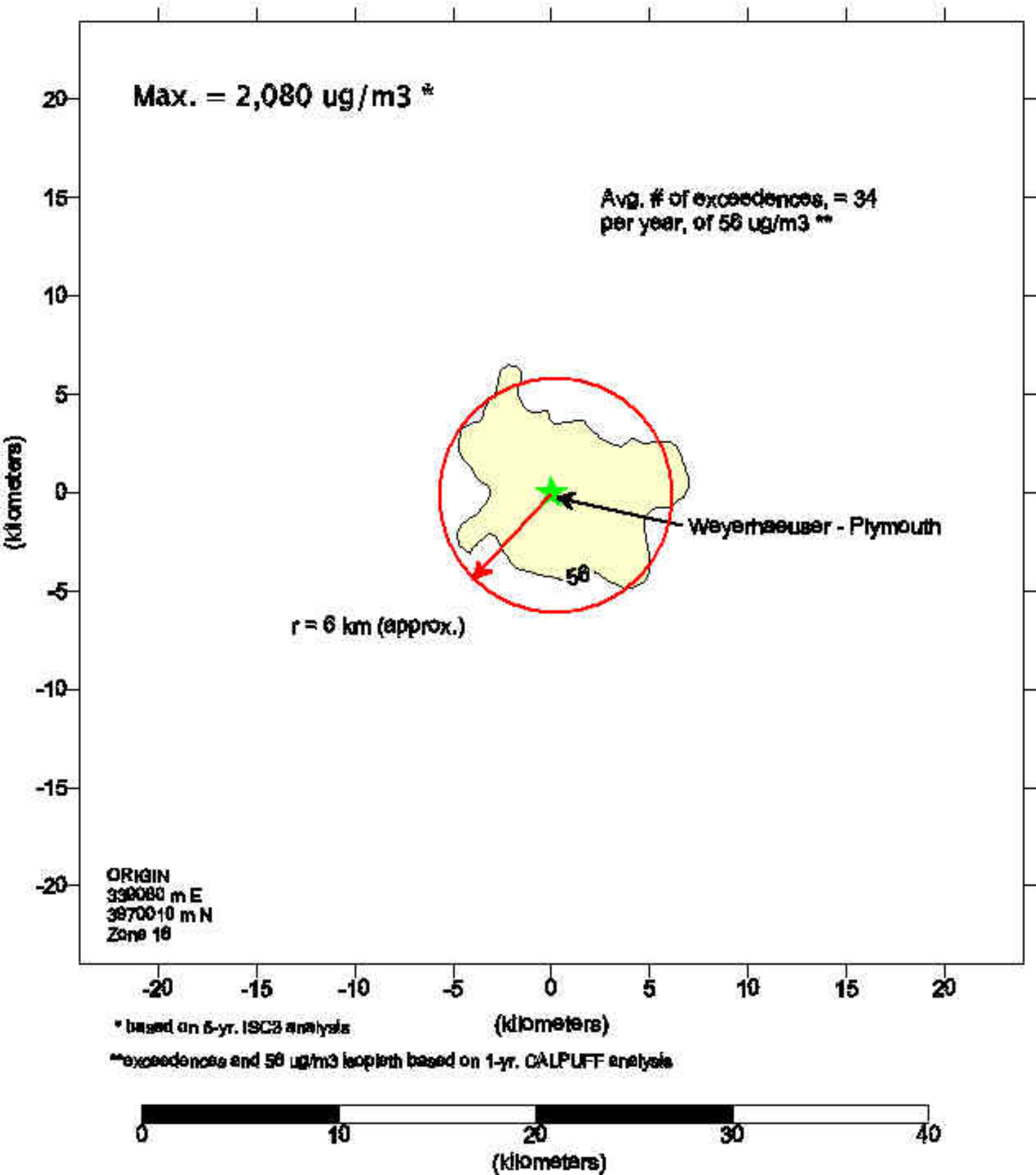
was 99% of the 1-hour AAL for Weyerhaeuser and 92% of the 1-hour AAL for PCS Phosphate. Attached figures also show the maximum impact locations at each of the facilities.

Maximum H_2S Impacts
(mg/m^3)

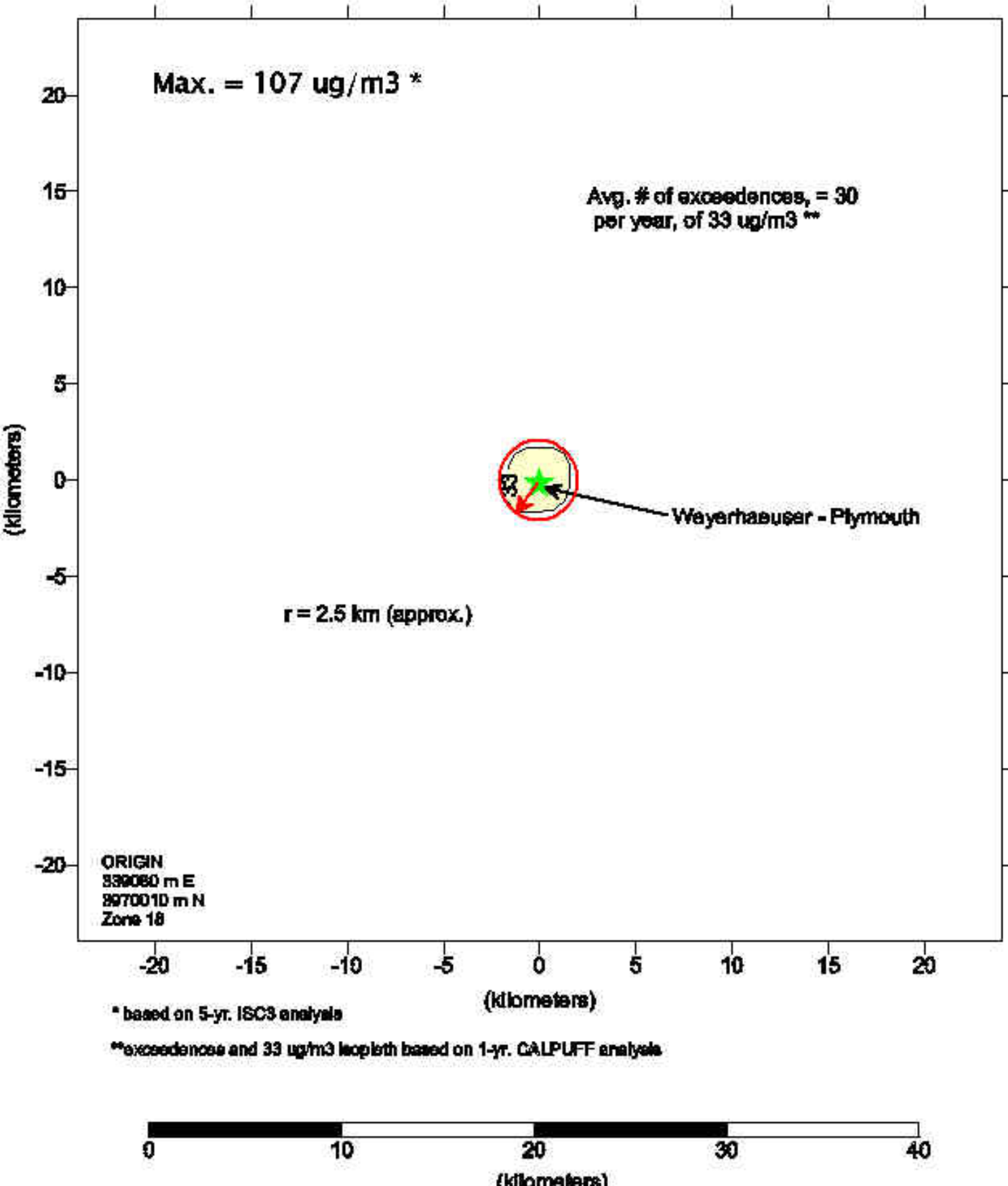
Averaging Period	Weyerhaeuser - Plymouth	PCS Phosphate	AAL
1-hour	2.08	1.94	2.1
24-hour	0.505	0.054	N/A

cc: Keith Overcash, DAQ Acting Director
Laura Butler, Permits
Richard Lasater, Permits
Ken Babb, Permits
Jim Roller, AQAB
Steve Schliesser, Toxics
Lori Cherry, Toxics

Weyerhaeuser H2S Modeled Impacts
1-hour



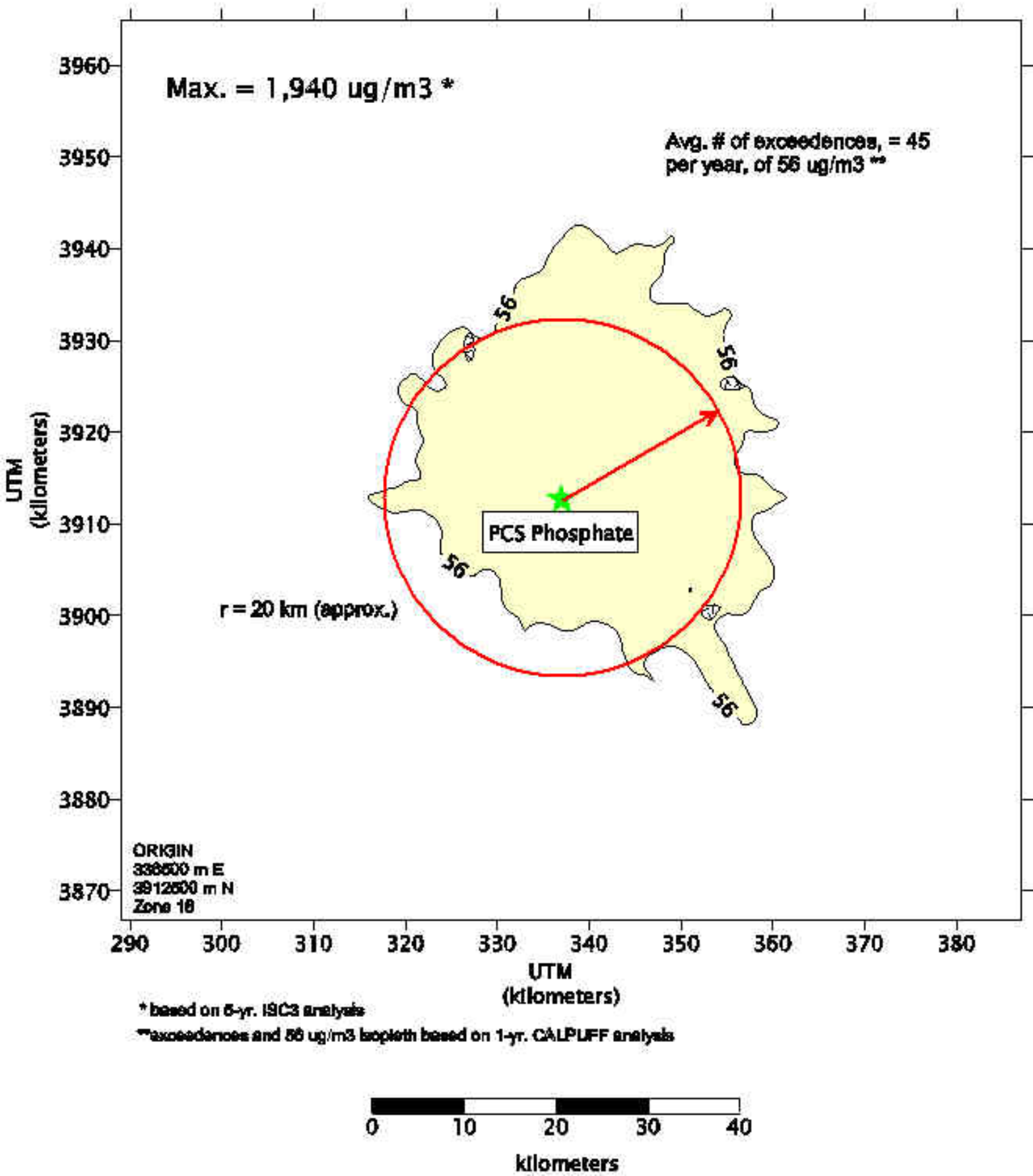
Weyerhaeuser H2S Modeled Impacts
24-hour



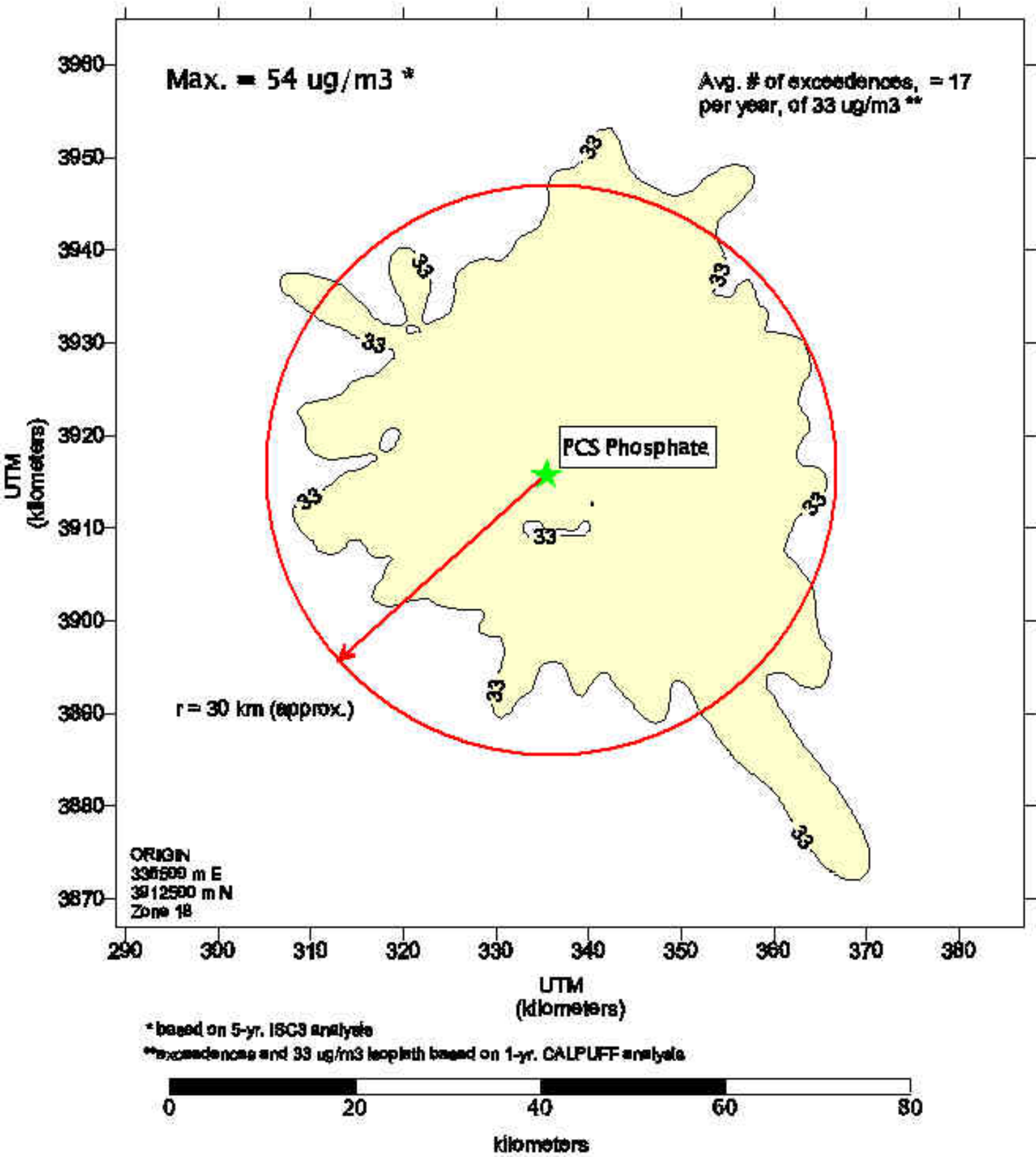
* based on 5-yr. ISC3 analysis

**exceedences and 33 ug/m3 isopleth based on 1-yr. CALPUFF analysis

PCS H2S Modeled Impacts
1-hour



PCS H2S Modeled Impacts
24-hour



DIVISION OF AIR QUALITY
February 4, 2003

MEMORANDUM

TO: Jim Roller, Supervisor, Air Quality Analysis Branch (AQAB)

FROM: Tom Anderson, Meteorologist, AQAB

SUBJECT: H_2S Modeling at Weyerhaeuser – Plymouth, NC

Per the Occupational and Environmental Epidemiology Branch's request, I have re-evaluated hydrogen sulfide (H_2S) impacts for the Weyerhaeuser Corp. facility located in Plymouth, NC following the same methodology outlined in my previous memo dated October 2, 2002. The facility was re-modeled based on the latest available information provided by the facility and included H_2S emissions from wastewater treatment operations at the facility.

Numerous point sources of H_2S that were included in the previous analysis were omitted in the re-evaluation because their emissions have either been captured and re-vented through pollution control devices or have been combined into single point sources. The attached MS-Excel spreadsheet shows the sources that were modeled, along with their H_2S emission rates.

The following table presents the "impact radius" for each averaging period - defined as the radius of a circle which would enclose the majority of the exceedences of the recently-proposed 1-hour and 24-hour H_2S AALs of 56 ug/m^3 and 33 ug/m^3, respectively. Also provided, are the average number of exceedences of the proposed AALs, along with the maximum modeled impact from an ISC3 analysis.

Weyerhaeuser Modeled H_2S Impacts

Averaging Period	Average # of Exceedences	Impact Radius	Maximum Impact (ug/m^3)
1-hour	30	40 km	15,311
24-hour	22	15 km	2,565

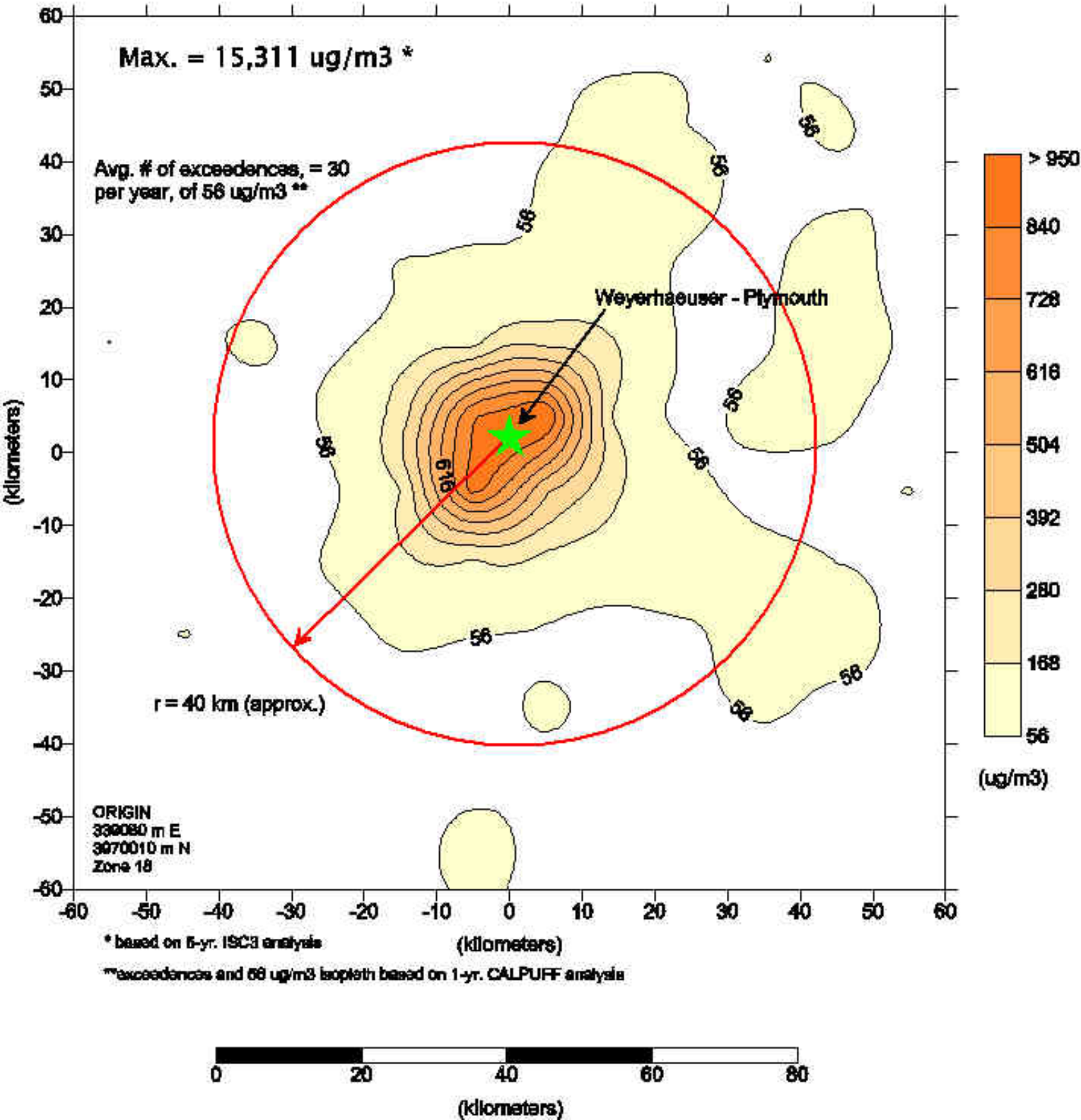
- 3 attachments -

HYDROGEN SULFIDE EMISSION RATES
WEYERHAEUSER, PLYMOUTH, NC
URS PROJECT NO. D6-00055100.48

Source Description	Source ID(s)	H_2S Emissions lb/hr
Fiberline Operations		
No. 6 Bleach Plant Scrubber	F-15, F-16	1.12E+00
No. 7 Bleach Plant Scrubber	F-30	1.04E+00
Chemical Recovery		
North & South Smelt Tanks	R-03, R-04	4.32E-01
Green Liquor Process Area	R-14, R-18, R-19	7.64E-04
Dregs Sources	R-09, R-10, R-12, R-13	4.30E-03
Weak Wash Sources	R-45, R-70, R-76	1.32E-02
East & West Slakers Scrubber	R-53, R-58	7.19E-04
Slakers Dumpster	R-57	7.19E-05
Slaker Scrubber Water Collection Tank	R-77	1.98E-03
White Liquor Sources	F-11, R-07, R-16, R-17, R-22	4.45E-03
Lime Mud Mix Tank	R-46	4.94E-03
Lime Mud Storage Tank	R-15	6.67E-05
No. 2 and 3 Lime Mud Wash Tanks	R-47, R-49	2.40E-04
Lime Mud Filters Scrubber	R-50	5.94E-03
Lime Mud Filters Vacuum System	R-65	1.80E-03
East & West Lime Filter Vacuum Pump Silencers	R-66	1.80E-03
Lime Mud Filtrate Tank	R-52	1.80E-03
No. 5 Lime Kiln	R-01A	3.38E-02
Combined Condensate Tank	R-71	1.98E-03
Power Operations		
No. 1 Hog Fuel Boiler + HVLC	PO-01A	8.21E-02
Riley Boiler (from LVHC)	PO-26A	3.83E+00
Package Boiler	PO-49	5.65E+00
Wastewater Area		
Pulp Mill Sewer Channel	PUCHANN	4.14E-02
Pulp Mill & Paper Ditches + #1 LFS Receiving	2SEW1LFT	2.09E-01
Fiber Line Sewer Lift Station	FIBLIFT	6.45E-02
Sludge Dewatering Operations	W-01, W-02	3.11E-02
Settling Pond 1	SETPOND1	3.80E+01
Settling Pond 2	SETPOND2	7.00E+01
No. 2 Lift Station	NO2LIFT	1.17E-02
Aeration Basin	AIRBASIN	2.92E+02
Riffler	RIFFLER	1.93E-02
Retention Pond #1	RETPOND1	2.20E-01
Retention Pond #2	RETPOND2	1.78E+00
Secondary Sludge Dewatering		
SSDF Landfill	LANDF3	1.04E+00
	Facility Total	415.6

Weyerhaeuser H2S Modeled Impacts

1-hour



Weyerhaeuser H2S Modeled Impacts
24-hour