CIVE 3331 - ENVIRONMENTAL ENGINEERING
Spring 2003

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Purpose: Exercises related to Lecture # 12. These exercises develop skills in selected environmental water quality problems. Direct relationships to various accreditation objectives are highlighted in **Bold** type in the following sections. The exercises start on the next page.

Relevant ABET EC 2000 Criteria: Criterion 3 Program Outcomes and Assessment

(3-a) an ability to **apply knowledge of mathematics, science,** and engineering.
(3-e) an ability to identify, **formulate**, and **solve engineering** problems.
(3-k) **an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.**

Relevant CEE Educational Objectives:

(3) Emphasize problem-identification, problem-formulation and communication skills, **problem-solving techniques** and the many facets of engineering design throughout the curriculum.

(5) Prepare every student to develop the skills for critical thinking and lifelong learning.

Relevant CEE Program Outcomes:

ii. **Students should acquire the ability to solve practical civil engineering problems by applying the knowledge of mathematics, science**, **engineering, modern techniques**, **skills and practical tools they gained in their courses.**

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Exercise_012-1

Consider a new 38% efficient 600-MW power plant burning 9000btu/lb coal containing 1% sulfur.

a) If a 70% efficient scrubber is used, what will be the sulfur emission rate (lbs/hr)?
b) Assume all the sulfur oxidizes into SO_2, how many pounds of SO_2 will be generated if a 90% efficient scrubber is used?
c) How many pounds of SO_2 per kW-h of electricity generated will be produced?

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Exercise_012-2

Compliance coal releases no more than 1.2 lb SO_2 per 10^6 Btu of heat released, without controls. What maximum percent sulfur could 12,000 Btu/lb of compliance coal contain if all the sulfur oxidized into SO_2 during combustion?

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Exercise_012-3

What AQI should be reported for the following air pollution data for the days shown.

Constituient	Day 1	Day 2	Day 3
O_3, 1hr (ppm)	0.15	0.18	0.12
CO, 8 hr (ppm)	12	9	14
PM-10, 24 hr, (μg/m3)	150	350	90
SO_2,24hr	0.12	0.28	0.14
NO_2,1hr	0.4	0.3	0.5

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