Effective Permit Writing

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Air Permit Section
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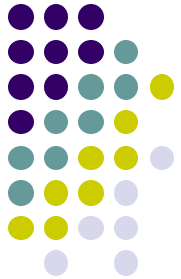
Overview



- Identify the components required in a complete permit
- Explain the function/purpose of each component
- Define the audiences using the permit
- Describe the characteristics of an effective permit
- Explain the process, tools or approaches that can be used to assure an effective permit is produced
- Work through examples to better understand the components

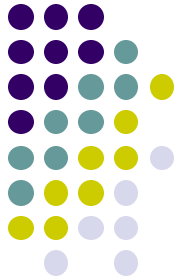
Audience – Permit User

- Examples:
  - Permitted source or other sources
  - Environmental groups and citizens
  - Permitting agency
  - Host state or local government
  - Federal government
  - Courts

Role of Permit Programs

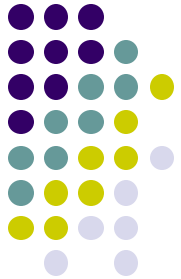
- Air Quality Management (AQM)
  - Consists of one or more programs intended to protect public health and welfare
  - Public welfare includes the economic vialbility of an area, in addition to traditional measures
  - Requires agency to balance economic and health concerns:
    - Example: Best Available Control Technology (BACT)
  - Permits one of many tools available
    - Emissions limits in SIP, NSPS, NESHAP, etc
    - NAAQS
    - Attainment plans and transportation planning

Role of Permits Programs (continued)



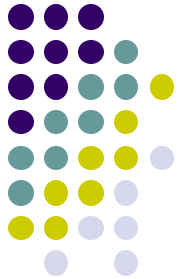
- New Source Review (NSR) permits: regulate and track new sources and modifications prior to construction to ensure:
  - Appropriate control technology is applied
  - Impacts of new emissions are acceptable

Role of Permit Programs (continued)



- Operating permits: provide information about existing and new sources to enable the agency to :
  - Ensure compliance
  - Determine and track emissions for planning and evaluation purposes

Goals of Permitting Programs

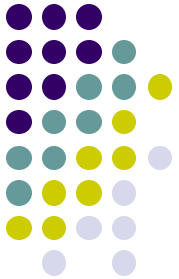


- Permits should not impose arbitrary requirements
- Each permit term and condition should further the core purpose of AQM: to protect public health and welfare
- This creates a set of corollary goals

Corollary Goals

- Require permits for all sources that are important for AQM
  - Allows permit exclusion for trivial sources
  - Permit requirements can be tailored to importance of sources
- Allocate limited air resources effectively
  - Maximize economic growth within available air resources
  - Avoid “license to pollute” more than needs, but establish a limit that reflects the uncertainty and variation in emission test data
  - Example: A source with a physical design limit of 30 tpy and a 100 tpy major source threshold is issued a permit with a 99 tpy limit

Corollary Goals (continued)

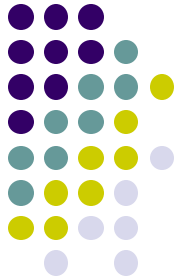


- Issue Permits
  - In a timely manner
    - Timing is extremely important to applicants
      - Can't legally construct without the permit
      - Project could be cancelled if schedule slips
      - Applicant's career/job may be on the line (really!)
    - This doesn't mean an agency has to try to meet impossible schedules
  - That are Effective, Workable and Prepared Efficiently

Permit Preparation Process

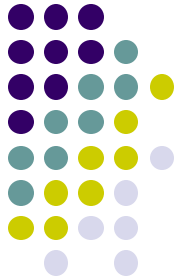
- Permit preparation steps (Figure 1)
  - Receive and review application
  - Determine completeness
    - Administratively
    - Technically
  - Evaluate application information
    - Consistency
    - Accuracy
  - Prepare draft permit and statement of basis
  - Solicit public comments
  - Prepare final permit
- This training focuses on the last 4 steps

Elements of an Effective Permit



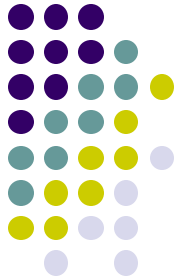
- An effective permit requires more than just the permit itself. It typically includes:
  - Cover letter
  - Permit
  - Attachments or appendices
  - Permit writer's statement of basis
  - Reference materials (optional)
- An effective permit minimizes the number of conditions.

Permit Organization



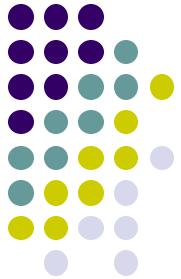
- Typical permit organization
  - Standard conditions
  - Emission limits
  - Compliance demonstration
  - Other conditions
  - Summary tables of the permit conditions, by emission unit or point
  - Reference materials (optional)

Standard Conditions



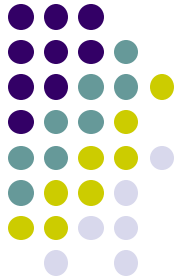
- These are conditions that are in every permit (at least all of a type of permit, example: NSR)
- Usually they have been reviewed a number of times by upper management and AG office
- Intended to establish the authority and limits of the permit
- Generally not revised by individual permit writers
- May be different sets depending on the type of permit

Standard Condition Examples



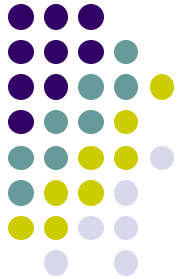
- Declarations
- Legal Authority
- General authority
- Other standard conditions
  - Definitions and reference material
  - Effective and expiration dates
  - Reporting
  - Noncompliance
  - Transfer of permit
  - Severability
  - Disclaimers

Emission Limits



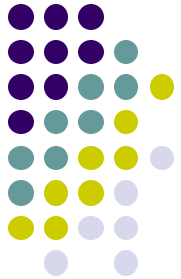
- General
  - Most important and common type of permit condition
  - Establishes limits on emissions directly and indirectly
    - Direct – 10.3 pounds per hour or 4.7 ppm
    - Indirect – fuel or raw material composition (% S), input or output limits, work practices, design specifications

Emission Limits (continued)



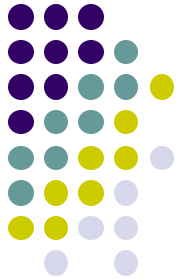
- Averaging Time
  - Terminology
    - Average (mean) – a value that represents a typical amount, rate, concentration, etc
      - May be the arithmetic mean or the median
      - Statistical techniques may be more appropriate for some data
    - Total – a value not to be exceed (during a certain time period)

Emission Limits (continued)



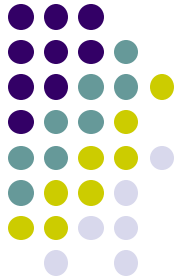
- Averaging Time must be specified!
  - Points of confusion:
    - Limits do not have inherent averaging times
    - Different ways to express averaging times:
      - Instantaneous
      - Short term (24-hour or less)
      - Long term (more than 24 hours)

Emission Limits (continued)



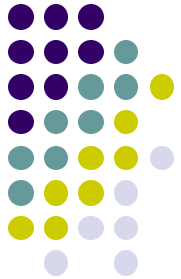
- Averaging time is critical!
  - Should be based on:
    - Type of limit
    - Data
  - Purpose of averaging times:
    - Match limit to impact or
    - Ensure compliance

Emission Limits (continued)



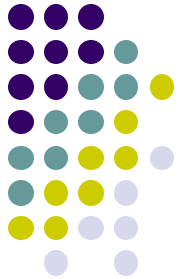
- Effect of averaging time on stringency of limit
  - Effect on an averaged result
    - For a given level of emissions such as 0.1 lb PM10 per ton a longer averaging time is less stringent that a shorter averaging time
    - Too long an averaging time would not protect against adverse effects caused by a shorter term exposure
    - An unnecessarily short averaging time has the effect of making any limit more stringent

Emission Limits (continued)



- Effect on a total
  - First effect is similar to effect on averaged result: a shorter time period makes compliance more difficult
  - Second effect is subtly different: using the same example and assuming 1 hour averaging time, the source loses part of its 249 tpy if it does not operate during any given hour

EPA Policy on Averaging Time

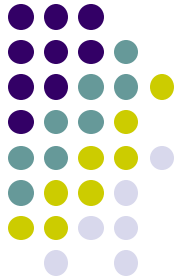


- EPA has issued policy under the NSR program for limits on:
  - Production or operating hours; and
  - Emission limits
- The policy documents don't provide clear distinctions between averages and totals

EPA Policy

- Averaging times for production and operating hour limits
  - An annual limit on tons of production
  - A daily limit on the number of hours a facility or process can operate
- Averaging times on emission limits
  - Blanket restrictions on actual emissions are virtually impossible to enforce and verify

Determining Averaging Time

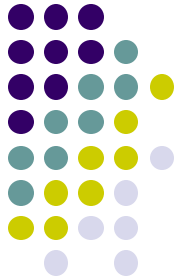


- Base on type of limit
  - Effects-based
  - Technology based
  - Applicability and other

Effects-based Limit

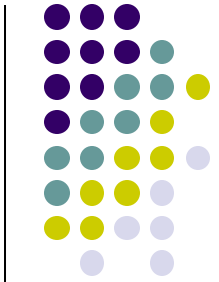
- Designed to prevent or mitigate environmental effects
- Generally, clearly authorized by statute or rule
- These conditions usually
  - Specify concentration limits or total emissions allowed; and
  - Are set at levels intended to directly protect
- Averaging times need to be based on time period specified in the underlying cap, concentration or other limit

Establishing an Effects-based Limit



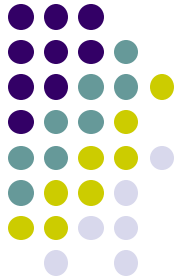
- Limit can be slightly less than the emissions rate at which an adverse impact would occur
- Can establish through dispersion modeling
- Resulting limits may be considerably higher than source's estimated rate or a technology based rate

Technology Based



- Based on the principle of reducing emissions by requiring certain minimum levels of control
- Required even if absence of the limit would not result in an adverse impact
- Intended to ensure that sources properly install, operate and maintain pollution control equipment

Technology Based (continued)

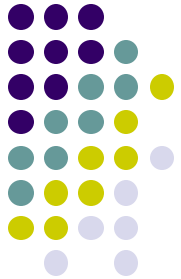


- Wide variety of forms
  - Emission limits tied to fuel or material use
  - Mandated work practices
  - Specific fuel or material composition requirements
  - Prescribed equipment design standards

Technology Based (continued)

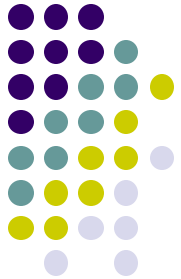
- Associated averaging time
  - Many standards have averaging times specified – use them!
  - If not specified, permit writer determines
  - No EPA guidance on technology based limits
    - Could borrow from applicability and effect based limits and assume a month is longest time
    - Clarify number of days as month can be different number of days (28, 30, or 31)
  - Goal is to minimize emissions over sources life

Applicability and Other Limits



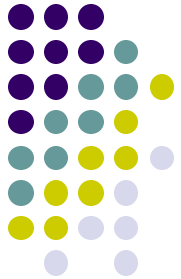
- By far the most common
  - Source could accept a limit to stay minor
  - Generally expressed ton per year (tpy)
- It does not matter for applicability purposes how the pollutant is emitted
- Violations mean not only violating limit, but emitting in major source levels

Problems and Issues with Permit Limitation



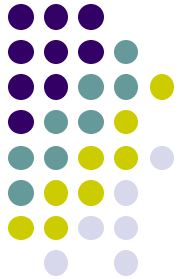
- Redundant conditions (lb/hr emission rate and tph production limit)
- Example: coal fired unit with a scrubber may have the following all regulating SO2
  - NSPS lb/mmBTU
  - SO2 limits based on source's est average
    - Parts per million, lb/hr, lb/day, tpy
  - Upper limit on sulfur content of fuel
  - Upper limit on the amount of coal burned
  - Upper limit on heat input

Problems (Continued)



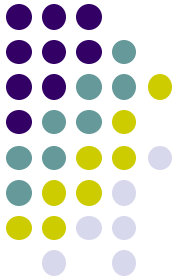
- Double duty conditions
  - Purpose of technology based and applicability limits is to ensure good pollution control and avoid major source status not protect ambient air
  - Averaging time would not necessarily correlate to effects-based limit averaging time
  - Problem if a long term technology/applicability limit is assigned a short term averaging time

Compliance Demonstration



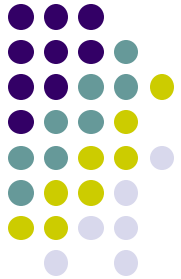
- Makes limit enforceable!
  - Can be part of same condition as limit or separate condition
- Compliance usually means both
  - Initial and
  - Continuous or periodic

Compliance



- Main components
  - What constitutes compliance
  - Monitoring requirements
  - Reporting requirements
  - Recordkeeping requirements

Compliance (continued)

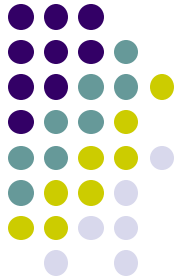


- What constitutes compliance?
  - Start with the permit conditions
    - May be an emission limit or some other requirement
    - Decide how compliance will be determined
    - Establish that approach through conditions
  - Example: An emission unit is limited to 6000 hours of operation per year to keep emissions below major source threshold of 100 tpy. Operation for 6000 hours at the estimated emissions rate and maximum capacity would result in emissions of 99 tpy.

Using Data

- Establish a hierarchy for data that provides consistency
  - Can be for establishing limits and for determining compliance
  - Doesn't have to be rigid, but need to explain when conditions differ
  - No clear EPA guidance/policy – reasonable listing
    - Reference method stack test on particular unit
    - Calibrated CEM
    - Reference method or CEM data from similar source
    - Non-reference method stack test or method calibrated CEM data on the unit where it appears to be accurate data
    - Material balance
    - Literature data for similar units
    - AP-42 factors

Evaluating Data

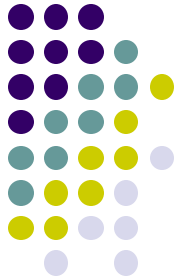


- Agencies are often faced with the task of determining what data to accept or reject and how to use the data considered valid
- Added difficulty of having only a few data points (2-3 runs/test) to determine key questions such as whether the source is complying with an emissions limit

Evaluating Data (continued)

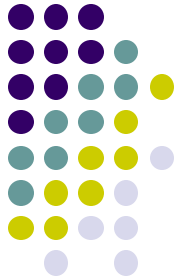
- In testing a source, whether for compliance or to establish a limit, the objective is to determine μ (mu), the true mean value of the emission rate
  - μ is the mean of the distribution of the measurements
  - The definition of the mean is the same as the more commonly used “arithmetic mean”
- Can only obtain a small number of samples from the “population” of all the samples that could have been taken

Evaluating Data (continued)



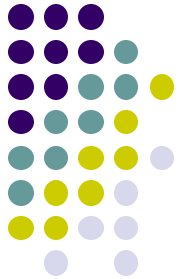
- Regardless of the quantity or quality of the data, the individual runs and test results will vary
  - Bias, which is a consistently high or low value to the true value, does not cause the variation
  - Variation from run to run or test to test occurs due to random sampling error or changes in the operation being tested or a combo of both
  - Difficult to determine which, but can calculate the amount of variation
  - Want to minimize variation

Evaluating Data (continued)



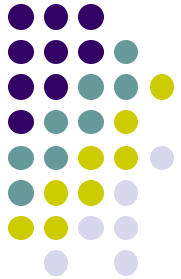
- The best estimate that can result from measurements is that the true mean (μ) of the source emissions rate is equal to the sample mean (x) [arithmetic average] of the samples
  - However, it is unlikely that the true mean and the sample mean of the test results are exactly the same.
  - The “student’s t-test” is most commonly used

Types of Evaluations



- Evaluations will generally fall into the following categories:
  - Determining whether to reject individual runs before using the data
  - Determining a reasonable emissions limit from data
  - Determining compliance with an emissions limit using data

Typical Types of Data

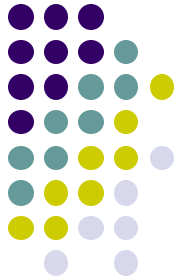


- Stack tests
  - Generally 2 to 4 runs
    - Length of run can vary as well as time between run
  - Runs are averaged to obtain one test result
  - Statistical treatment difficult due to small amount of data
- Continuous emissions monitoring
- Averaged values based on individual runs

Rejecting individual Runs

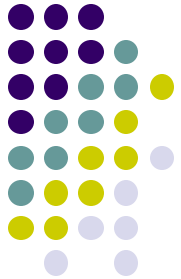
- Very difficult especially when data are limited
- First step is to determine if there are sampling or operating errors that are sufficient to reject a run or test
- Second is to determine whether there are any remaining runs that appear so different that they could be an outlier
- Third is to calculate the test result using the remaining runs

Establishing an Emissions Limit



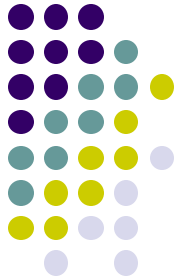
- Often, a source will have no data on a unit's emissions
  - May be a new unit
  - A proposed mod to an existing unit that may affect emission rate
  - Propose mod to an existing unit that will not affect the emissions rate
  - An existing source obtaining a Title v permit, accepting a limit due ambient problems or subject to a new or revised SIP limit

Establishing Emissions Limit (continued)



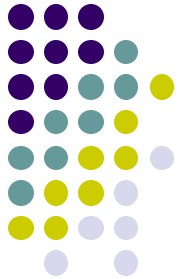
- In the first two cases, one approach is to use the best available data to determine applicability and estimate emissions, then require testing to develop a better factor
- In the remaining cases, test data from the existing source can be used to establish a reasonable limit
- The limit established depends on the degree of confidence we want to have in the result and the amount of deviation in the data

Determining Compliance



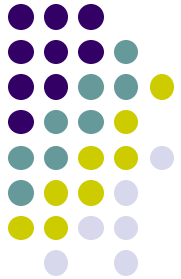
- Assume that there is a “not to exceed” limit on an emission unit
- Subsequent test results will be
  - Equal or lower, or
  - Above the limit
- Two possible errors
  - Concluding a unit meets a limit when it actually does not, and
  - Concluding that a unit does not meet a limit when it does

Determining Compliance (continued)



- The solution
  - Review data to remove test errors and process variations
  - Reject outliers to ensure valid data
  - Establish a reasonable emissions limit
  - Average all the valid test data available
    - The more data the more likely the average represents the true mean
    - Tests taken over time provide a better “average”
    - More data reduce uncertainty

Determining Whether Emissions have Increased

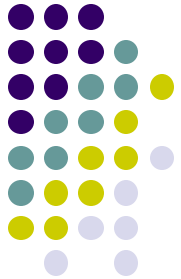


- The New Source Performance Standards (NSPS) define a modification as one where emissions increase as the result of a physical or operational change
- EPA uses the Student's t-test to determine statistically whether emissions have increased (40 CFR 60, Appendix C)

Other Conditions

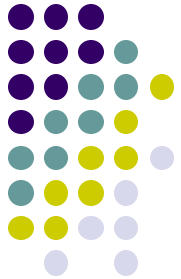
- There are several useful items that generally do not need to be enforceable
  - source description
  - Identification of emissions units
  - Equipment design and dimensions
  - Miscellaneous statements
- Any portion of the description or other information relied on that needs to enforceable can be identified as such

Other Conditions (continued)



- Administrative conditions
- Generally separately enforceable
- Examples
  - Sources must provide notice
  - Requirement to reduce or prevent adverse impacts on air quality from startups and shutdowns
  - General requirements

Summary Tables

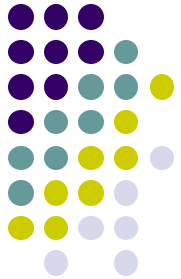


- At least three types
  - Emission limits
  - Fuel type and usage limitations
  - Required actions and submittals

Emission Limits Tables

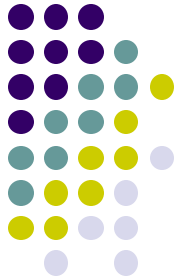
- Summarizes by pollutant
- Includes the following information
  - Pollutant
  - Emission points covered
  - Emission limit
  - Permit condition or regulatory basis

Fuel type and usage limitations



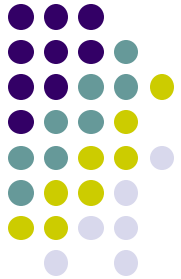
- Summarizes the fuel that can be used and any limits on amount and composition
- Includes the following information
  - Emission point
  - Fuel type
  - Use limit
  - Limitation basis

Required actions and submittals



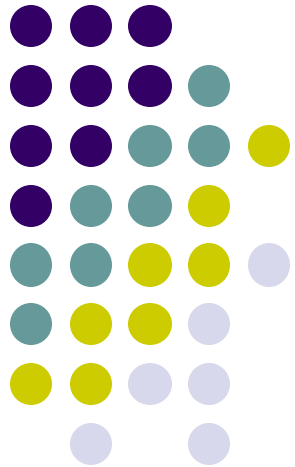
- Summarizes testing, monitoring, recordkeeping and reporting requirements by action required
- Includes
  - Action required
  - Emission point(s) to which action applies
  - Parameter or pollutant
  - Compliance determination method
  - Schedule or frequency
  - Permit conditions or attachment that provides basis

Attachments



- Provide more detail than permit conditions
- Can be referenced by permit itself
- Sometimes made separately enforceable
- Examples
  - Forms for permittee to use
  - Detailed instructions for
    - Testing
    - Data calculations
    - Control equipment operation
    - Monitoring

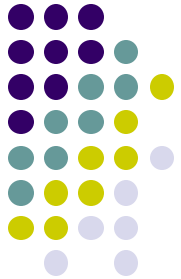
Characteristics of Effective Permits



Language

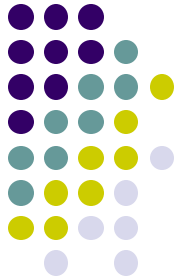
- Permit is a legal document so it will have legal terminology
  - Know your reader – keep it simple!
- Basic purpose of a permit term or condition is to tell permittee
  - What is allowed,
  - What is prohibited, or
  - What is required, including how and when

Language (continued)



- The basic purpose shapes the language
  - Statements of what is allowed define actions the permittee can decide to take or not
  - Statements of what is prohibited warn the permittee not to take a specific action
  - Statements of required action direct the permittee to take those actions

Language (continued)

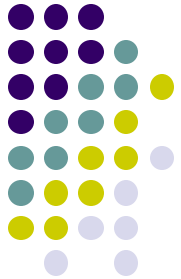


- Regardless of its purpose, each term or condition should be
  - Clear
  - Concise
  - Consistent

Organization of a Permit

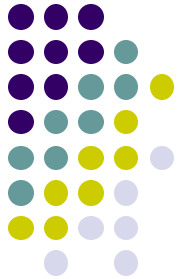
- Easy to find requirements and information in an effective permit
- Should have a standard approach with flexibility to handle all situations
- Example:
  - Cover letter
  - Table of contents
  - Facility description
  - Specific conditions for source
  - General boilerplate conditions
  - Tables
  - Attachments

Consistency within Agency



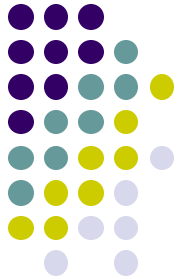
- In addition to consistency within the permit, users are aided by consistency between permits
  - Organization
  - Language
- One effective way to implement is to use good permits as templates for new permits

Accuracy



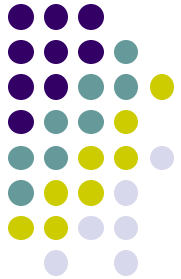
- Numbers
  - Usually the heart of the permit
  - Digits easy to transpose
  - Rounding off rules often important!
- Units
  - Easy to leave off
  - Reference conditions may be needed
- References
  - Need to specify date
  - Version cited will not always be current version

Writing Permit



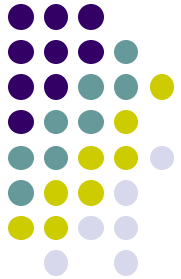
- Requires more than just a flair for writing or a knowledge of the regulations and requirements
- Many essential elements need to be pre-established

General



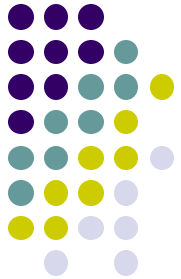
- Getting started
  - Write rapidly
    - Get words on paper
    - Use standard and prior conditions for a fast start
  - Use an outline and fill it out
  - Have the data/application nearby

General (continued)



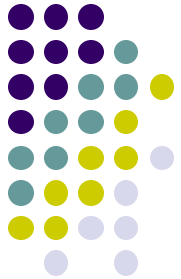
- Develop an appropriate style
  - Use objective (impartial) terms
  - Use nouns rather than adjectives
  - Arrange terms and conditions in logical order
  - Avoid wasteful sentence structure
  - Eschew officiousness (avoid gobbledygook)
  - Pay attention to sentence structure
  - Use verbs near the beginning of a sentence
  - Many terms are written from an “implied imperative” view point

Application



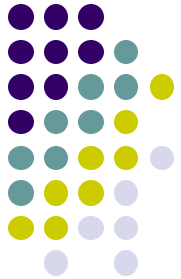
- The application is the foundation for the permit
- A good application has many of the same attributes as a good permit
  - Clear, concise, consistent, organized and accurate
- Agencies can help ensure good applications by
  - Offering training for applicant
  - Providing useful forms or a general outline
  - Encourage draft permits for applicants
  - Ensure access to other materials – rules, forms, examples, etc

Checklist



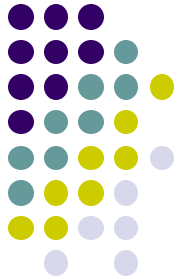
- Useful tool for
  - Determining completeness
  - Recording determinations
  - Following progress of application processing

Permit Package Outline



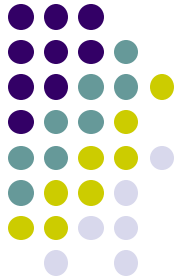
- A standard outline makes it easier to
  - Prepare a permit
  - Use the permit for future mods, inspections and compliance determinations
- No “best” approach
- Want to be consistent, but avoid being too detailed

Standard Terms



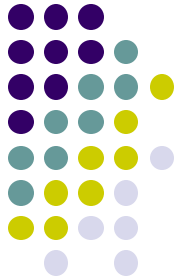
- For all sources
  - Can be an attachment
  - Print on back of “certificate”
  - Avoids inconsistencies
  - Have available as a file to insert in each permit
- For specific source categories
  - Don’t reinvent the wheel
  - Develop well written conditions for common source types

Regulations Incorporated by Reference



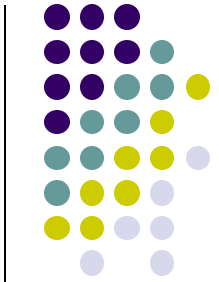
- Short regulations can be attached to permits
- Long regulations are too long to treat this way
- Instead, for any regulatory limits
  - Summarize what the regulation requires
  - Reference the regulation (including date or version) either at each cite or beginning of permit
- This means the agency must maintain a set of all versions of the regulations being referenced

Application



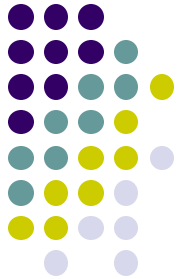
- Organization
  - Well organized applications can be split up for the permit writer, modeler, and if needed a control technology specialist to review their prospective sections
  - Standard organization, such as a mandatory outline, make it easier to find relevant information
- Cross-referencing to permit
  - Some agencies make the entire application separately enforceable by including it as part of the permit – not recommended
- Instead tie the application to the permit by a standard condition

Communications



- Although permit writing gets more emphasis, communication skills are equally important
- Reviewer should carefully document all communications
- Communications needs vary for
  - Applicant
  - Public
  - FLM

Processing



- Reviewer has overall responsibility
- No best procedure, but effectiveness of a system depends on
  - Minimizing time and effort
  - Avoiding duplication
  - Specializing to the extent warranted
  - Recognizing achievements

Example Approach

- Step 1: Reviewer scans application for completeness and fills out review
- Step 2: Reviewer determines applicability
- Step 3: Reviewer splits out modeling and other review segments as appropriate
- Step 4: Reviewer conducts technical review
- Step 5: Reviewer prepares draft permit from existing list of conditions or a model permit
- Step 6: Receives input from other reviewers and prepares public notice
- Step 7: Reviewer provides public notice

- Step 8: Review and respond to public comments, prepares proposed permit
- Step 9: Reviewer issues permit, documents all communications, reference materials and determinates
- Step 10: Inspectors determine compliance with construction and operating permit terms

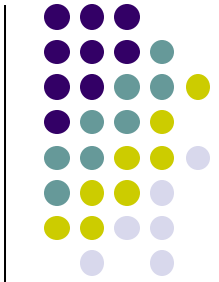
Step 4 – Technical Review

- Process
  - Reviewer not expect to be expert on process
    - Look for obvious problems or mismatches
    - Check emission estimates with known factors
    - See if proposed control levels are acceptable
  - Determine
    - Processes used to generate the product
    - Raw materials used
    - Chemical or physical reactions
    - Products
    - Pollutants emitted including quantities and conditions
    - Process operation parameters

Step 4 (continued)

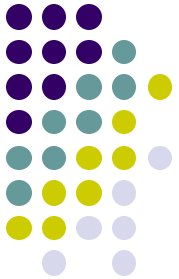
- Control equipment
  - Main purpose of review is to determine suitability of proposed control system
- Emission inventories

Documentation

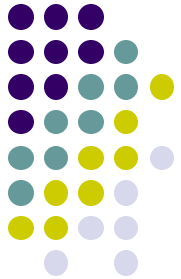


- Extremely Important!
  - Others need to understand what rules apply, what determinations were made and how data was calculated
- Keep everything related to the permit together and orderly
  - Application with all relevant updates and new or revised information
  - Permit with communications, notices, responses and decisions/actions

Recognizing Problem Permit Terms

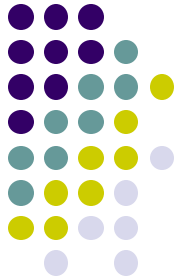


Problem Conditions



- General Problems
  - Unclear, too broad, unworkable, unnecessary or unauthorized
- Specific Problems
  - Process description treated as enforceable
  - Short or no averaging times
  - Redundant conditions
  - Incorporation of application by reference

Enforcement Implications

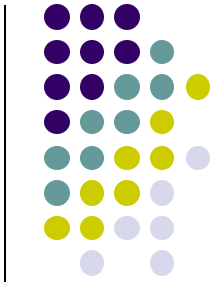


- More requirements, so more possible violations
- Coupled with credible evidence policy, additional data even more troublesome
- Numerous non-emission limit conditions can result in numerous serious violations with high penalties despite no real environmental impact

You Will Need…

- A copy of the draft or current permit
- Copy of rules
- Process:
  - Many permits cite to the authorizing rule
  - Be sure to look up the actual rule
    - May be paraphrased incorrectly

General Problems

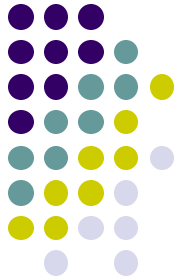


- It is difficult to write a good permit condition, just as it is difficult to right laws and regulations that say what the author means
- Results can be humorous, but can also be serious if the condition creates a situation that cannot avoid violations
- Many of these problems are simply due to poor writing

Conditions that are:

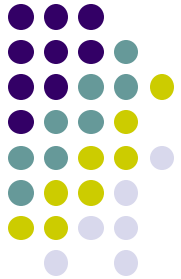
- Unclear
  - Due to sentence structure, word choice, or run-on sentences
  - Make it difficult to figure out what is required
- Too broad
  - Unintentionally applies much more extensively than intended
  - Usually creates obligation on source to comply far outside its property
- Unworkable
  - Can’t be done
  - Uses misapplied rule with the results that source will be non-compliant at times despite best efforts

Example 1: Unclear Condition



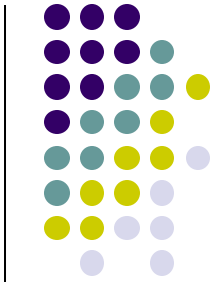
- Unless specified elsewhere in this permit, the permittee shall maintain records of all fugitive dusts complaints received. The permittee shall take appropriate corrective action as expeditiously as practical after receipt of a valid complaint. The records shall, at a minimum, include the date each complaint was received and a description of the following: the complaint, the permittee's assessment of the validity of the complaint, any corrective action taken and the date the corrective action was taken.

Example 2: Unclear Condition



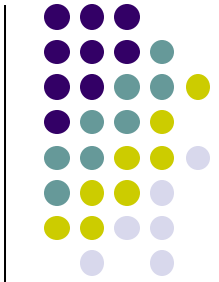
- Unless specified elsewhere in this permit, the permittee shall conduct a quarterly facility wide inspection of potential sources of fugitive emissions, during daylight hours and under normal operating conditions, to ensure the methods used to reasonably control fugitive emissions are effective. If fugitive emissions are not being reasonably controlled, the permittee shall take corrective action as expeditiously as practicable.

Example 3: Too Broad



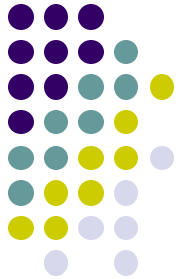
- Permittee shall not cause, allow or permit visible emissions from open areas, roadways and streets, storage piles or material handling in excess of 40%.

Example 4: Unnecessary condition



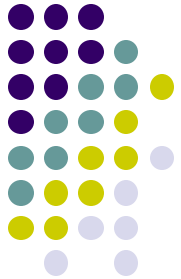
- The facility shall process (the material) at the maximum rate of 365,000 gal/yr.

Process Descriptions Treated as Conditions



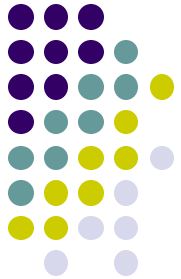
- Very common
  - Makes exact dimensions, model, make and even serial numbers enforceable
  - Limits source choice if options available
- Can still reply upon process descriptions in issuing permit

Characteristics of an Effective Permit Writing Agency



- General characteristics
  - An effective agency both
    - Protects public health and welfare and
    - Provides good service to permit applicants
  - Many of the same characteristics are needed for both tasks
    - Adequate statutory authority
    - Adequate resources
    - Effective organization
    - Knowledgeable staff
    - Consistent policy and interpretations

Characteristics (continued)



- Effective outreach
- Efficient processing of applications
- Tracking
- Maintain order of processing
- Critical path considerations
- Maintaining application integrity