GENERAL PERMITS VS INDIVIDUAL PERMITS

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PURPOSE AND REASON FOR AQUIFER PROTECTION PERMITS

- WASTEWATER – WHAT IS IN IT?
- GROUNDWATER QUALITY – WHAT IS THE CONCERN?

PURPOSE AND REASON FOR AQUIFER PROTECTION PERMITS

- WASTEWATER – WHAT IS IN IT?
- GROUNDWATER QUALITY – WHAT IS THE CONCERN?
  - CONTAMINATION OF WATER SUPPLIES WITH:
    - PATHOGENS/VIRUSES
    - ORGANICS/NUTRIENTS – ALGAE BLOOMS
    - DRINKING WATER CONTAMINANTS
      - NITRATE – BLUE BABY SYNDROME

PURPOSE AND REASON FOR AQUIFER PROTECTION PERMITS

- WHAT IS TYPICALLY MEASURED?

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- WHAT IS TYPICALLY MEASURED?

  BOD_5 – ORGANICS AND OTHERS THAT USE UP OXYGEN

  TSS – RESIDUE REMAINING AFTER EVAPORATION OF WATER

  PH – MEASURE OF ACIDIC H^+ VS BASIC OH^-

  NITROGEN – AMMONIA & NITRATE

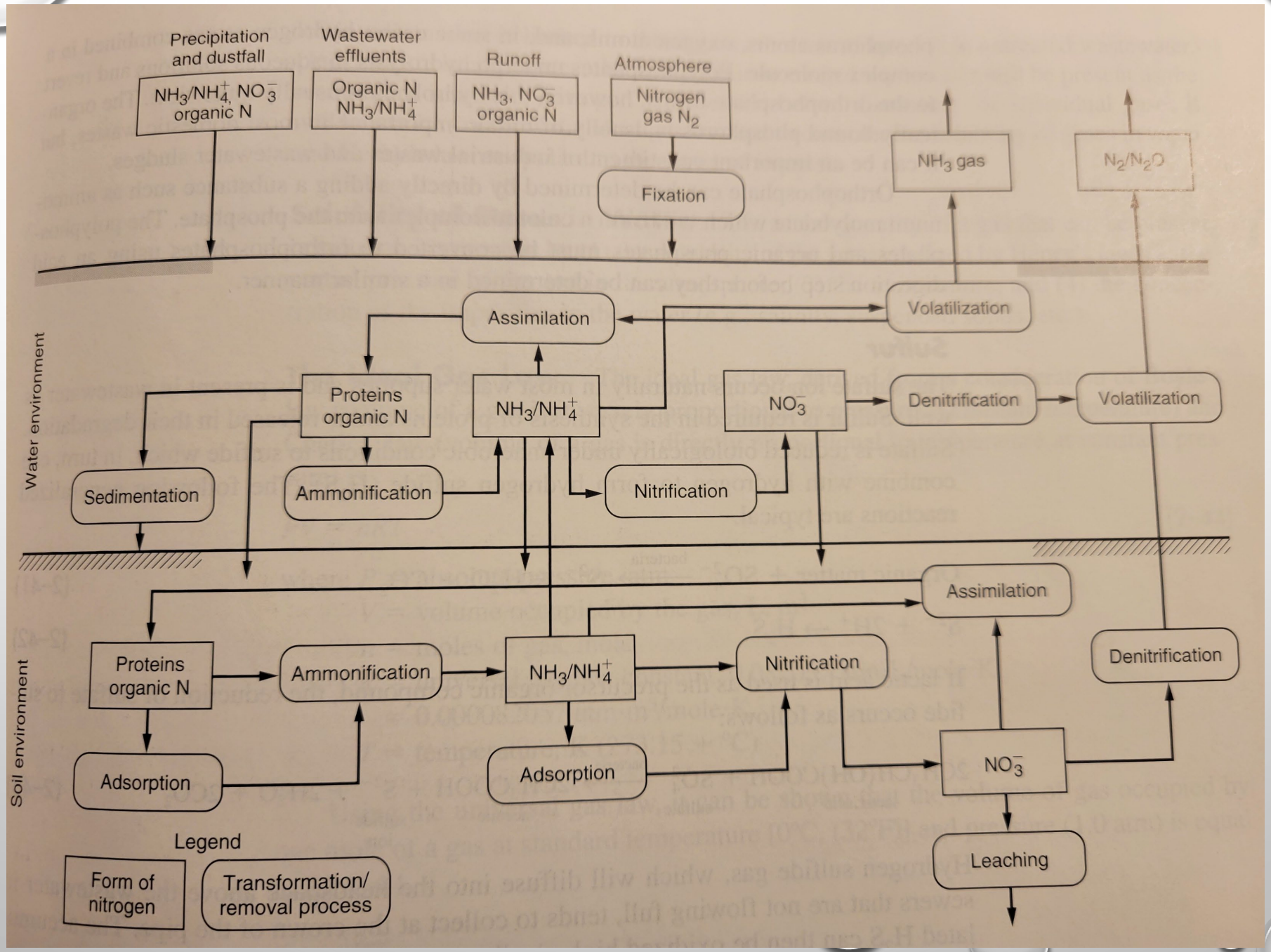
  BACTERIA

NITROGEN

N – CHEMICAL SYMBOL

NITROGEN CYCLE –

AIR - WATER - SOIL – PLANTS – ANIMALS – HUMANS


Precipitation and dustfall
NH_3/NH_4^+, NO_3^- organic N
Wastewater effluents
Organic N NH_3/NH_4^+
Runoff
NH_3, NO_3^- organic N
Atmosphere
Nitrogen gas N_2
Fixation
NH_3 gas
N_2/N_2O
Volatilization
Assimilation
Water environment
Proteins organic N
NH_3/NH_4^+
NO_3^-
Denitrification
Volatilization
Sedimentation
Ammonification
Nitrification
Assimilation
Soil environment
Proteins organic N
Ammonification
NH_3/NH_4^+
Nitrification
Denitrification
Adsorption
Adsorption
NO_3^-
Leaching
Legend
Form of nitrogen
Transformation/ removal process

NITROGEN

FORMS IN SEPTIC TANK EFFLUENT:

NH_3 – AMMONIUM – HIGH PH – OH^- – ABOVE 9.25

(WATER IS NEUTRAL+/-7)

NH_4 – AMMONIA – MEDIUM TO LOW PH – H^+

SOME NO_2/NO_3 POSSIBLE

ORGANICS

NITROGEN

FORMS IN AEROBICALLY TREATED WASTEWATER:

AMMONIA – IF NOT FULLY CONVERTED

NO_2 NITRITE – UNSTABLE

NO_3 NITRATE

NITROGEN

DEFINITIONS:

TOTAL NITROGEN – MEASURES NITROGEN IN ALL FORMS INCLUDING NH_3, NO_2, NO_3, ETC

NITRATE (AS NITROGEN) – NO_3 (AS N) – MEASURES THE NITROGEN PORTION OF THE NITRATE ION (NO_3^-)

NITROGEN

HOW ARE ORGANICS AND AMMONIA CONVERTED TO NITRATE? NITRIFICATION BY BACTERIA WITH OXYGEN

$NH_3 + 3/2O_2 \rightarrow HNO_2 + H_20$ BY NITROSOMONAS

– LOWERS PH

$HNO_2 + 1/2O_2 \rightarrow HNO_3$ BY NITROBACTER – LOWERS PH

NITROGEN

HOW IS THE NITRATE REMOVED?

BACTERIA STRIP THE OXYGEN FROM THE NO3:

$NO_3 \rightarrow NO_2 \rightarrow NO \rightarrow N_20 \rightarrow N_2$ – NITROGEN GAS

BACTERIA NEED LOW DISSOLVED OXYGEN, ADEQUATE CARBON (FOOD) AND PH 7-9 – FROM NATURAL ALKALINITY (OH^-, CARBONATES, BICARBONATES – FROM HARD WATER) OR BY ADDING ALKALINITY.

NITROGEN

SUMMARY – AMMONIA AND NITRATES:

- FOUND IN WASTEWATER
- MOVE THROUGH SOIL
- BACTERIA NEED SPECIFIC CONDITIONS TO NITRIFY AND DENITRIFY THE WASTEWATER
- NITROGEN LOADING OR NITRATE REMOVAL IS THE CONCERN FOR TREATMENT SYSTEMS FROM 3,000 TO 24,000 GPD OR MORE

AQUIFER PROTECTION PERMIT (APP) PROGRAM

- ESTABLISHED UNDER ARS §49-241, CHAPTER 2, ARTICLE 3
- REQUIRES FACILITIES THAT DISCHARGE POLLUTANTS TO OBTAIN A PERMIT – FROM MINES AND DRYWELLS TO SEWERS, SEWAGE TREATMENT PLANTS AND FISH HATCHERIES
- THE STATUTES AND CODES LIST REQUIREMENTS FOR INDIVIDUAL AND GENERAL PERMITS
- ONSITE WASTEWATER UNDER A GENERAL PERMIT FOR LESS THAN 75,000 GPD WITH CERTAIN REQUIREMENTS MET

GENERAL PERMITS ARTICLE 3, TYPE 4

- LOW RISK – LOW VOLUME
- PRE-SET WATER QUALITY LIMITS ESTABLISHED BY THE TYPE OF PERMIT/TECHNOLOGY
- GENERAL PERMITS FREE ADEQ TO FOCUS ON FACILITIES THAT HAVE A SIGNIFICANT ENVIRONMENTAL IMPACT

GENERAL PERMIT DESIGN FLOW

2001 & 2005 ARIZONA ADMINISTRATIVE CODE (ACC R18-9)

- LESS THAN 3000 GPD – GENERAL PERMIT 4.02-4.22
- 3000 TO LESS THAN 24,000 GPD – GENERAL PERMIT 4.23

GENERAL PERMIT DESIGN FLOW

2024 LEGISLATION – IN STATUTE 49-245.E-H – NOT IN CODE YET

- 3000 TO LESS THAN 75,000 GPD – GENERAL PERMIT
- 50,000 TO LESS THAN 75,000 GPD – ADDL REQUIREMENTS

GENERAL PERMIT SETBACKS

AAC R18-9-A312.C

- WELLS: 100 FT
- PROPERTY LINES: 5 FT
  - OR 50 FT WITH VACANT LOT THAT COULD DRILL A WELL
- WATERLINES: 10 FT WATER MAIN; 5 FT SERVICE LINE
- OTHER SETBACKS FOR STRUCTURAL OR SOIL COMPACTION AND AERATION ISSUES: BUILDINGS, DRIVEWAYS, SIDEWALKS, ETC.

GENERAL PERMIT VERTICAL SEPARATION AAC R18-9-A312.E

- SEASONAL HIGH WATER TABLE: 5 FT, 10 FT, OR 60 FT
- LIMITING CONDITION IN SOIL: 4 FT ACCEPTABLE NATIVE SOIL
- OR ADD TREATMENT TO REDUCE TOTAL COLIFORM BY TREATMENT SYSTEM AND/OR DISINFECTION

GENERAL PERMIT NITROGEN LOADING

AAC R18-9-A309.A.8 & E323(A)(4)

- UNDER 3000 GPD – NO LIMIT – NO TESTING REQUIRED
- 3000 GPD AND ABOVE:
  - 4.23 - 0.088 LBS OR 39.9 GRAMS/ACRE/DAY **TOTAL NITROGEN** OR JUSTIFY LOADING THAT IS EQUALLY PROTECTIVE
  - A.10 - CUMULATIVE FLOWS

GENERAL PERMIT TREATMENT & EFFLUENT QUALITY REQUIREMENTS

- BY TYPE OF ONSITE SYSTEM
  - 4.02 – SEPTIC TANK AND TRENCH/CHAMBER/BED/SEEPAGE PIT
    - TSS 75 MG/L
    - BOD5 150 MG/L
    - TN AS NITROGEN 53 MG/L
    - TOTAL COLIFORM 100,000,000 = LOG_{10} 8 CFU/100 ML

    (NOTE NO VERTICAL SEPARATION REDUCTION – 5 OR 10 FT)

GENERAL PERMIT TREATMENT & EFFLUENT QUALITY REQUIREMENTS

- BY TYPE OF ONSITE SYSTEM
  - 4.12 –TEXTILE FILTER
    - TSS 15 MG/L
    - BOD_5 15 MG/L
    - **TOTAL NITROGEN (AS NITROGEN)** 30 OR 15 MG/L (TEXTILE)
    - TOTAL COLIFORM 100,000 = LOG_{10} 5 CFU/100 ML

    (NOTE REDUCE VERTICAL SEPARATION TO 3 OR 6 FT)

Nitrogen Calculations			
Limit per rule	39.9		grams/acre/day
Effluent from Septic Tank: Assume 53 mg/l TN			
Area of Lot:	1093356	309276	SF
	25.10	7.10	Acres
Flow for Septic System:	5000	5000	gpd
	18925.00	18925.00	liters/day
Effluent Nitrogen from Septic Tank	53	53	mg/l
	0.053	0.053	g/l
	1003.03	1003.03	g/day
Total Nitrogen per Acre	39.96	141.27	g/day/acre
Effluent from Treatment	15	15	mg/l
	0.015	0.015	g/l
	283.88	283.88	g
Total Nitrogen per Acre	11.31	39.98	g/acre

Nitrogen Calculations		
Limit per rule	39.9	grams/acre/day
Effluent from Septic Tank: Assume 53 mg/l TN		
Area of Lot:	43560	SF
	1.00	Acres
Flow for Septic System:	600	gpd
	2271.00	liters/day
Effluent Nitrogen from Septic Tank	53	mg/l
	0.053	g/l
	120.36	g/day
Total Nitrogen per Acre	120.36	g/day/acre
Effluent from Treatment	15	mg/l
	0.015	g/l
	34.07	g
Total Nitrogen per Acre	34.07	g/acre

GENERAL PERMIT TREATMENT & EFFLUENT QUALITY REQUIREMENTS

- EXCLUSIONS FOR 3,000 GPD OR MORE:
  - NO SEEPAGE PITS (4.02)
  - NO AEROBIC TREATMENT SYSTEMS (4.15)
  - NO DISINFECTION DEVICES (4.20) – NO REDUCTION IN VERTICAL SEPARATION FROM DISINFECTION

GENERAL PERMIT OPTIONS FOR DISPERSAL

- SOIL ABSORPTION – TRENCH/BED/CHAMBER/DRIP EMITTERS/GRAVELLESS TRENCHES/
- SOIL ABSORPTION – SEEPAGE PIT UNDER 3K
- EVAPORATION – E-T BED
- SURFACE IRRIGATION – IF LOCAL AGENCY ALLOWS IT

GENERAL PERMIT DELEGATION

ARS 49-107

- ANY POWERS, FUNCTIONS, OR DUTIES MAY BE DELEGATED BY ADEQ TO LOCAL AUTHORITIES (I.E. COUNTIES, CITIES, ETC)

GENERAL PERMIT REVIEW AND APPROVAL

- AAC R18-A309.B - LESS THAN 3,000 GPD: SUBMIT DOCUMENTATION LISTED IN RULE
- AAC R18-9-E323: 3,000 GPD TO LESS THAN 24,000 GPD: SAME AS ABOVE PLUS
  - SHOW NITROGEN LOADING,
  - PERFORMANCE ASSURANCE PLAN

GENERAL PERMIT REVIEW AND APPROVAL

- ARS 49-254.E – 3,000 GPD TO LESS THAN 50,000 GPD: SAME AS ABOVE PLUS SERVICE PROVIDER, AND MAINTENANCE, MONITORING, RECORD KEEPING, AND REPORTING PER MANUFACTURER
- ARS 49-254.F – ADEQ MAY REQUIRE ADEQUATE FINANCIAL ASSURANCE – NOT CLEAR IF THIS WILL BE THE SAME AS INDIVIDUAL PERMIT

GENERAL PERMIT REVIEW AND APPROVAL

- REGULATORY AGENCY REVIEW
- FEE PAYMENT – LUMP SUM
- NOTE: UNKNOWN FEE PAYMENT METHOD FOR 24,000 GPD AND ABOVE

GENERAL PERMIT CONSTRUCTION
AAC R18-9-A309.C.2

- AGENCY REVIEW OF INSTALLATION 4.02
- ADDITIONAL REQUIREMENTS FOR 4.03 TO 4.23 –
  - AS-BUILT PLANS AND FINAL O&M MANUAL,
  - SERVICE CONTRACT FOR 4.03, 4.08-4.15, 4.16 W/PUMP, 4.18-4.22
  - CERTIFICATE OF COMPLETION,
  - NAME OF INSTALLER,
  - DOCUMENT WATERTIGHTNESS TEST

GENERAL PERMIT
FINAL DISCHARGE PERMIT

- UPON COMPLETION OF REQUIREMENTS:
  - DISCHARGE PERMIT ISSUED
  - ALLOWS FACILITY TO COMMENCE OPERATION

GENERAL PERMIT OPERATION AND MAINTENANCE

- 4.02 – NO REQUIREMENTS
- SERVICE CONTRACT FOR ONE YEAR FOR 4.03, 4.08-4.15, 4.16 W/PUMP, 4.18-4.22
- 4.23 – ANNUAL REPORTING AND FEE, IF APPLICABLE
- ARS 49-245.E - FOR 3,000 TO LESS THAN 75,000 GPD – OPERATED BY SERVICE PROVIDER FOR MAINTENANCE, MONITORING, RECORD KEEPING, AND REPORTING PER MANUFACTURER AND ADEQ; LIKELY TO HAVE AN OPERATING FEE.

INDIVIDUAL PERMITS

- TAILORED FOR FACILITIES WITH UNIQUE CHARACTERISTICS OR LARGE FLOWS
- POSE HIGHER ENVIRONMENTAL RISK
- MORE COMPREHENSIVE REVIEW PROCESS
- CUSTOMIZED TO SPECIFIC FACILITY'S OPERATIONS

INDIVIDUAL PERMIT DESIGN FLOW

- AAC R18-9- 24,000 GPD AND ABOVE NEEDS INDIVIDUAL PERMIT
- ARS 254-49.E – 75,000 GPD AND ABOVE NEEDS INDIVIDUAL PERMIT
- MAY HAVE A LOWER FLOW IF THERE IS A REASON THE FACILITY CANNOT MEET THE GENERAL PERMIT REQUIREMENTS
  - ALLOW MULTIPLE PARCELS TO CONNECT TO ONE SYSTEM
  - NITROGEN LOADING CANNOT BE MET – INDIVIDUALLY OR CUMULATIVELY
  - EXISTING ONSITE SYSTEM ALTERATION – PERMITTED BEFORE CURRENT RULES WERE IMPLEMENTED AND NOW NEEDS INDIVIDUAL PERMIT

INDIVIDUAL PERMIT SETBACKS

FROM TREATMENT FACILITY TO NEAREST PROPERTY LINE OF ADJACENT DWELLING, WORKPLACE, OR PRIVATE PROPERTY:

Sewage Treatment Facility Design Flow (gallons per day)	No Noise, Odor, or Aesthetic Controls (feet)	FullNoise, Odor, and Aesthetic Controls (feet)
3000 to less than 24,000	250	25
24,000 to less than 100,000	350	50
100,000 to less than 500,000	500	100
500,000 to less than 1,000,000	750	250
1,000,000 or greater	1000	350

INDIVIDUAL PERMIT SETBACKS

VERTICAL SEPARATION:

IF LIMITED SEPARATION, TREATMENT MUST MEET AQUIFER WATER QUALITY STANDARDS (AWQS) AND SAMPLING AND TESTING WILL BE REQUIRED TO CONFIRM THE TREATMENT IS WORKING.

INDIVIDUAL PERMIT EFFLUENT QUALITY

- EFFLUENT QUALITY: FOR SUBSURFACE DISPERSAL: MEET AWQ STANDARDS (IE DRINKING WATER STANDARDS)
  - BOD5: NOT A DRINKING WATER MEASUREMENT
  - TSS: NO MCL – TURBIDITY MCL IS 1 NTU
  - NITRATE: 10 MG/L **NITRATE (AS NITROGEN) (NO3-N)**
  - NITRITE: 1 MG/L
  - AMMONIA: NO LIMIT – RECOMMENDED <0.5 MG/L
  - BACTERIA: ZERO
  - MANY OTHER METALS, ORGANICS, AND RADIO CHEMICALS
- EFFLUENT QUALITY OF REUSE AND DISCHARGES INTO A SURFACE WATER

INDIVIDUAL PERMIT EFFLUENT QUALITY

- IDENTIFY POINT OF COMPLIANCE:

LOCATION WHERE AQUIFER WATER QUALITY STANDARDS WILL BE MET.

IT COULD BE A LOCATION OR IT COULD BE A DRILLED MONITORING WELL.

- SOIL AQUIFER TREATMENT MAY BE CONSIDERED BEFORE THE EFFLUENT REACHES GROUNDWATER – SOIL BACTERIAL REMOVAL/ FILTRATION/ ADSORPTION
- IMPAIRED GROUNDWATER – SHOW NO ADDITIONAL DEGRADATION

INDIVIDUAL PERMIT BADCT

BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY

- REVIEW ALTERNATIVES FOR TREATMENT FOR ADVANTAGES/DISADVANTAGES/ECONOMICS/SITE CONDITIONS/HYDROLOGY

INDIVIDUAL PERMIT DISPERSAL OPTIONS

- SUBSURFACE – REQUIRES THE SPACE FOR THE TRENCHES OR CHAMBERS
- INJECTION WELLS OR SEEPAGE PITS ARE AN OPTION
- SURFACE DISCHARGE – REQUIRES NPDES PERMIT
- REUSE GENERAL PERMIT – IRRIGATION, DUST CONTROL, LAKES/PONDS, ETC – REQUIRES TERTIARY TREATMENT (FILTER) AND DISINFECTION

INDIVIDUAL PERMIT DELEGATION

- **NO DELEGATION** TO LOCAL AUTHORITIES
- OVERSIGHT & PERMITTING REMAIN SOLELY WITH ADEQ

REVIEW AND APPROVAL PROCESS

- PRE-APPLICATION MEETING – NO FEE
  - DISCUSS THE PROJECT & APPLICATION REQUIREMENTS

REVIEW AND APPROVAL PROCESS

- APPLICATION – DOCUMENTS TO SUBMIT:
  - CONSTRUCTIONS PLANS, SPECS, DESIGN REPORT WITH BADCT
  - HYDROGEOLOGICAL STUDY
  - EVIDENCE IT MEETS ZONING & AREAWIDE WASTEWATER PLAN (208)
  - OWNER'S FINANCIAL CAPABILITY AND ASSURANCE MECHANISM
  - CONTINGENCY & EMERGENCY PLANS
  - OPERATION & MAINTENANCE PLAN & COSTS
  - CLOSURE AND POST CLOSURE PLAN & COST
  - PROPOSED DISCHARGE LIMITS, MONITORING, COMPLIANCE SCHEDULE
  - TECHNICAL CAPABILITY FOR DESIGN, OPERATION, CONSTRUCTION

INDIVIDUAL PERMIT REVIEW AND APPROVAL PROCESS

- ADMINISTRATIVE REVIEW
- TECHNICAL REVIEW
- DRAFT PERMIT
- PUBLIC NOTICE – 30 DAYS
- FINAL PERMIT ISSUED – BEFORE CONSTRUCTION
- FEES: $181 CURRENT HOURLY RATE FOR STAFF REVIEW OF EACH PART OF PERMIT, WRITING PERMIT, MEETINGS, ETC. - MAXIMUM $220,000+/-

INDIVIDUAL PERMIT CONSTRUCTION

- PART OF COMPLIANCE SCHEDULE:
  - AS-BUILT PLANS, ENGINEER'S CERTIFICATE AND FINAL O&M MANUAL
  - START-UP
  - SAMPLING AND REPORTING

INDIVIDUAL PERMIT OPERATION AND MAINTENANCE

- FOLLOW O AND M MANUAL AND PERMIT REQUIREMENTS FOR SAMPLING, TESTING, REPORTING
- ANNUAL FEES – VARY BASED ON FACILITY

INDIVIDUAL PERMIT FACILITY EXPANSION

- PERMIT AMENDMENT IS REQUIRED.
- SIMILAR PROCESS AS THE ORIGINAL INDIVIDUAL PERMIT WITH EXISTING FACILITY OPERATIONAL HISTORY ADDED.

GENERAL VS INDIVIDUAL

GENERAL	INDIVIDUAL
DESIGN FLOWS 0.003 > 0.024 MGD or 0.075 MGD	DESIGN FLOWS =/> 0.024 MGD or 0.075 MGD
SETBACKS – 5 OR 50 FT TO P/L	SETBACKS – 25 TO 1000 FT TO P/L
LOADING – SPECIFIC LIMITS ON TOTAL NITROGEN PER ACRE	MEET AWQS OF 10 MG/L FOR NITRATE AS NITROGEN
EFFLLUENT QUALITY – BASED ON TREATMENT METHOD	EFFLUENT QUALITY – AWQS FOR ALL POTENTIAL CONTAMINANTS
DISPOSAL – APPROVED SUBSURFACE DISPERSAL METHODS	DISPERSAL – SHOW NO IMPACT ON GW QUALITY; ALSO REUSE, SURFACE DISCHARGE OPTIONS
DELEGATION – SOME TO LOCAL AUTHORITIES	DELEGATION – NONE - SOLELY WITH ADEQ
REVIEW – AGENCY ISSUES CA	REVIEW – ADEQ ADMIN. & TECHNICAL
CONSTRUCTION	PERMIT WRITING AND PUBLIC NOTICE THEN ISSUANCE; CONSTRUCTION AS PART OF COMPLIANCE SCHEDULE
PERMIT FEES – LUMP SUM, SET BY AGENCIES	PERMITS FEES – MORE COSTLY, SET BY ADEQ
O&M – FOR 1 YR <3K IF TRTMT >3K: SERVICE PROVIDER, OPERATION FEE, PER PLAN	O&M – PER APPROVED PLAN, OPERATION FEE, SAMPLE TESTING AND REPORTING

QUESTIONS?