



An Aging Industry: Preparing the Next Generation of Wastewater Operators



2016-2017 Renewal Cycle

- End of renewal cycle: December 31, 2017
- 20 TCH (10 TCH Safety Related – maximum)
- 5,547 renewals went out – 4,237 already processed (as of 1/5)
- **IF** you are have having any issues you can call me or Paul Spina (NEIWPCCC)

978-349-2516 (Paul Spina, NEIWPCCC)

617-292-5867 (John Murphy, DEP)



License Totals

2007: 5,795

2009: 5,713

2011: 5,517

2013: 5,642

2015: 5,609

2017: 5,547



Facility Grades and Certified Operators

<u>Facility</u>	<u>Total</u>		<u>Operators</u>	<u>Active</u>	<u>Inactive</u>	<u>Total</u>
1M	43		1M	20	23	43
2M	145		2M	250	135	385
3M	110		3M	106	173	279
4M	256		4M	444	235	679
1I	674		1I	288	71	359
2I	455		2I	886	318	1204
3I	241		3I	144	72	216
4I	143		4I	212	117	329
5C	60		5C	379	164	543
6C	41		6C	333	173	506
7C	33		7C	413	97	510
<u>Total</u>	2201		<u>Total</u>	3475	1578	5053



Exam Passing Rates (2016 & 2017)

		2016		
	<u>Total</u>	<u>Pass</u>	<u>Fail</u>	
1I	102	49	53	48.0
2I	202	110	92	54.5
3I	33	3	30	9.1
4I	21	7	14	33.3
1M	25	18	7	72.0
2M	91	42	49	46.2
3M	41	26	15	63.4
4M	181	48	133	26.5
5C	88	29	59	33.0
6C	170	27	143	15.9

		2017		
	<u>Total</u>	<u>Pass</u>	<u>Fail</u>	
1I	94	367	57	39.4
2I	280	141	139	50.4
3I	34	11	23	32.4
4I	58	7	51	12.1
1M	30	15	15	50.0
2M	105	53	52	50.5
3M	49	33	16	67.3
4M	220	65	155	29.5
5C	110	42	68	38.2
6C	189	40	149	21.2



Exam Rates (2013, 2014, 2015)

		2013			
	<u>Total</u>	<u>Pass</u>	<u>Fail</u>		
1I	71	42	29	59.2	
2I	186	130	56	69.9	
3I	24	6	18	25.0	
4I	56	8	48	14.3	
1M	27	19	8	70.4	
2M	78	45	33	57.7	
3M	73	49	24	67.1	
4M	136	45	91	33.1	
5C	81	23	58	28.4	
6C	116	30	86	25.9	

		2014			
	<u>Total</u>	<u>Pass</u>	<u>Fail</u>		
1I	95	48	47	50.5	
2I	222	125	97	56.3	
3I	42	5	37	11.9	
4I	29	6	23	20.7	
1M	15	14	1	93.3	
2M	117	54	63	46.2	
3M	51	27	24	52.9	
4M	178	48	130	27.0	
5C	100	22	78	22.0	
6C	119	12	107	10.1	

		2015			
	<u>Total</u>	<u>Pass</u>	<u>Fail</u>		
1I	97	42	55	43.3	
2I	228	115	113	50.4	
3I	29	9	20	31.0	
4I	37	6	31	16.2	
1M	30	22	8	73.3	
2M	132	55	77	41.7	
3M	40	20	20	50.0	
4M	175	50	125	28.6	
5C	101	28	73	27.7	
6C	122	19	103	15.6	

Wastewater Board of Certification recommends...

- Exams are taken in chronological order
- Specific courses to be taken before each exam
 - Roadmap to Certification
- However, these are just Board recommendations they are not required
- The Board has seen success in approaching exams and trainings this way



Building a Knowledge Base

- Each wastewater exam passed and grade level achieved for your license provides a foundation to build upon for being able to pass a more advanced wastewater exam.
- Grades 1/2 present operational basics
- Grades 3/4 cover standard facilities
- Grades 5/6 detail the advanced techniques



Roadmap to Certification

- Grade 1M-2M
 - Basic Operations of Municipal WWTP (6 sessions)
 - Basic Wastewater Math (3 sessions)
 - Basic Wastewater Lab (4 session)
- Grade 3M-4M
 - Intermediate Operations of Municipal WWTP (3 sessions)
 - Basic Math Review
 - Process Control Lab
- Grade 5C-6C
 - Advanced Operations of Municipal WWTP (3 sessions)
 - Advanced Math Review
 - Review for Industrial Certification Exams (Gr. 1I-2I)
 - Advanced Pump Course



MWOT Program

Massachusetts Wastewater Operator Training (MWOT) Program

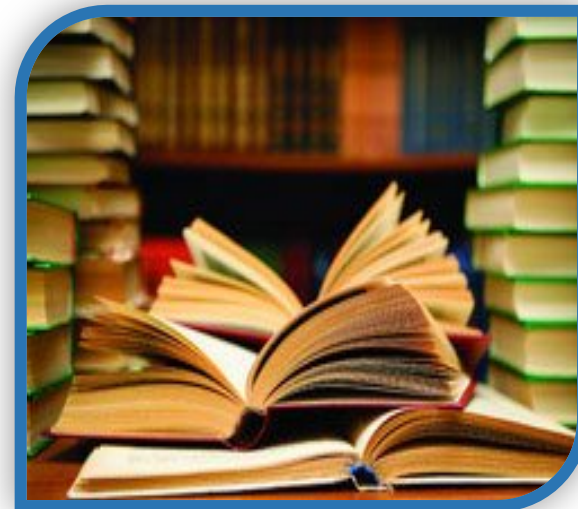
(Courses are offered each Spring and Fall through NEIWPCC):

- Advanced Industrial Wastewater Treatment (Grades 3I-4I) – (3 week)
- Advanced Math Review for Municipal Wastewater Operators
- Adv. Operation of Municipal WWTO (Grades 5-6C) – (3 week)
- Basic Industrial Wastewater Treatment (Grades 1I-2I) – (5 week)
- Basic Math Review for Wastewater Operators
- Basic Operation of Municipal WWTP (Grades 1-2M) – (6 week)
- Basic Wastewater Laboratory – (4 week)
- Basic Wastewater Math – (3 week)
- Int. Operation of Municipal WWTP (Grades 3-4M) – (3 week)
- Laboratory Math
- Municipal Wastewater Operation Review
- Review for Industrial Certification Exams (Grades 1I, 2I, 5C & 6C)
- Wastewater Pumps & Hydraulics – (2 week)




Preparing for the Licensing Exam

- Develop a strategy
- In addition to taking training courses, operators will need to study at home, or at work, to prepare for the exam
- Some operators will need to take additional courses to prepare for the exam



The Exam

Massachusetts Board of Certification of Wastewater Treatment Plant Operators



SCORE REPORT

MUNICIPAL WASTEWATER TREATMENT PLANT OPERATOR - GRADE 3 EXAMINATION

You have **passed** this examination. Your score
The passing score is 65%

Content Area	Your Score / Max Score
1. Activated Sludge	3/04
2. Advanced Treatment	3/03
3. Characteristics	9/10
4. Chemical Feeders	1/01
5. Chemical Pretreatment	1/02
6. Disinfection	6/07
7. Electrical Concepts	1/02
8. Electrical Equipment	8/13
9. Emergency Response	1/01
10. Finances	1/01
11. Flow Measurement	2/02
12. Hydraulic Concepts	2/02
13. Laboratory	6/07
14. Measuring Systems	2/02
15. Mechanical Equipment	1/01
16. Plumbing	3/04
17. Preliminary Treatment	1/01
18. Primary Treatment	3/04
19. Processes	2/02
20. Rotating Biological Contactor	1/01
21. Rules & Regulations	2/02
22. Science	2/02
23. Secondary Treatment	1/01
24. Solids Handling	1/01
25. Sources	2/03
26. Trickling Filters	3/03
27. General Safety	4/08
28. Security	1/01
29. General Math	9/09
TOTAL	82/100

See page 2 for additional information.

This examination was developed solely by the Certification Commission for Environmental Professionals (C2EP) as commissioned by the Association of Boards of Certification (ABC) for the Massachusetts Board of Certification of Wastewater Treatment Plant Operators. Examination administration was provided by Applied Measurement Professionals, Inc. (AMP).

Page 1 of 2

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- License examinations can have questions from as many as 30 different content areas.
- This is why the emphasis is on developing and building your knowledge base.
- Training will not cover all exam materials.



Preparing for the Exam

- NEIWPCC and MWPCA offer additional training courses to prepare for the exam or maintain TCH compliance.
- Regulations to review:
 - 314 CMR 12.00: O&M Standards for WWTP
 - 257 CMR 2.00: Certification of Operators
 - 40 CFR 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants
 - 40 CFR 503: Standards for the Use or Disposal of Sewage Sludge



Next Generation of Operators

- Roadmap to Certification
- Wastewater Management Program
- MWOT Program
- NEWEA Veterans Workforce Initiative
- Offering WW Exam at technical high schools, colleges with WW Programs.
 - MA Maritime
 - Minuteman Tech
 - Upper Cape Tech

Need more mentoring programs, internships, public outreach, tours – make more people aware of the WW industry.



Management Programs: Where it all Began

- Rhode Island Wastewater Boot Camp
 - Designed to equip operators with the tools and network they need to excel in management positions
- The other New England states quickly followed suit
 - Maine Management Candidate School
 - Connecticut Wastewater Management Program
 - Massachusetts Wastewater Management Training Program
 - New Hampshire Wastewater Management Training School
 - Vermont Wastewater Management Program



Aging Workforce

- As of 2017 there were 5,547 wastewater operators in MA
 - According to a NEIWPCCC survey roughly 40% of individuals who have attended an NEI training are 54 or older
- Many operators approaching retirement
 - Evident need to prepare the next generation
 - Loss of institutional knowledge
 - Succession planning
- Well equipped to train operators for entry level positions
 - Looking to ensure individuals are ready to move into management.



MA Management Program

- The Massachusetts Management Program had a strong start and graduated two full classes in 2010 & 2012
- Unable to fill subsequent classes
- Shifted to an “a la carte” approach in 2013
 - Operators could take classes as they were offered
 - 3 years to complete program
 - 10 required courses & 2 electives



“A La Carte” Management Program

Pros

- Operators were able to take classes when they had the time
- More flexibility in choice of classes
- No monetary commitment upfront

Cons

- Much longer timeframe required to graduate
- No sense of camaraderie or networking
- Less structure
- Difficult to track



Revitalization of the Program

- In 2017 NEIWPCCC, in coordination with MassDEP and MWPCA, shifted the program back to a 1 year suite of classes.
 - 12 classes offered once a month
 - Covered a wide variety of topics including:

Becoming a Better Leader	Engineering Design & Blueprint Reading
Introduction to Management	Laboratory Procedures & Microbiology
NPDES Permitting & State Regulations	Finance & Budgeting
Preventative Maintenance	Asset Management
Advance Biological Nutrient Removal	Lessons Learned: Are You Ready to Lead?
Communications & Public Relations	Job Shadowing



Becoming a Better Leader

- Focused on the softer skills involved with management
 - Identifying personal habits
 - Personality test
 - Controller
 - Promoter
 - Supporter
 - Analyzer
 - How to deal with difficult people
 - Team building exercises

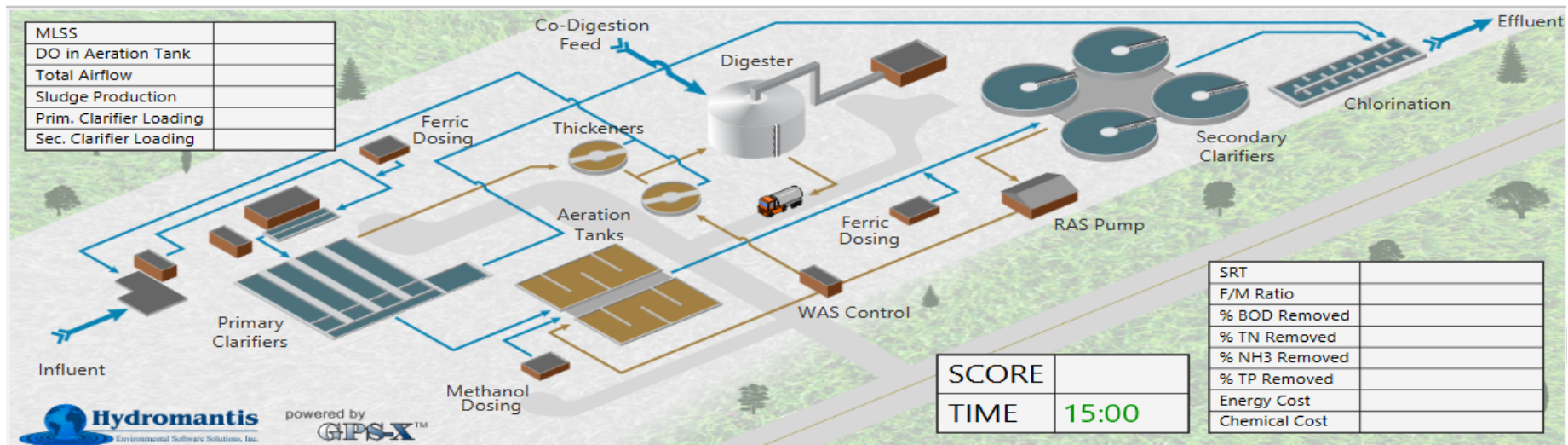
“Most people do not listen to understand, they listen to reply”

-Stephen R. Covey



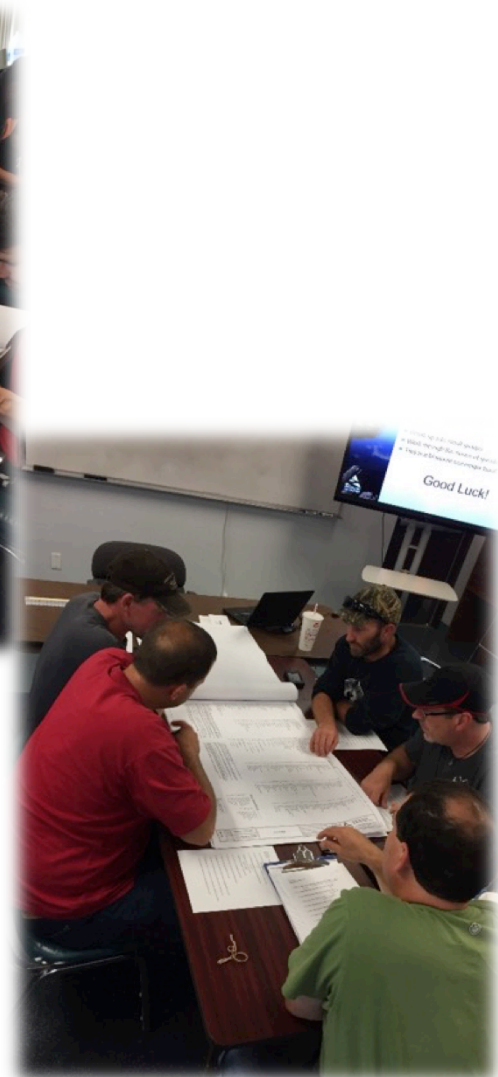
Advanced Biological Nutrient Removal

- Class combined lectures with computer simulations to explore the theoretical and practical aspects of nutrient removal
 - Biological Nitrogen Removal
 - Biological Phosphorus Removal
 - Chemical Phosphorus Removal
- Hands-on approach allowing operators to witness process changes in real time



Engineering Design & Blueprint Reading

- Introduced the class to the concepts of facility planning and design.
- Covered process and instrumentation diagrams as well as preliminary and final design.
- Provided hands-on training in blueprint reading.
- Valuable asset when working on upgrades and new equipment installation.



Deer Island Tour & Job Shadowing



Graduation



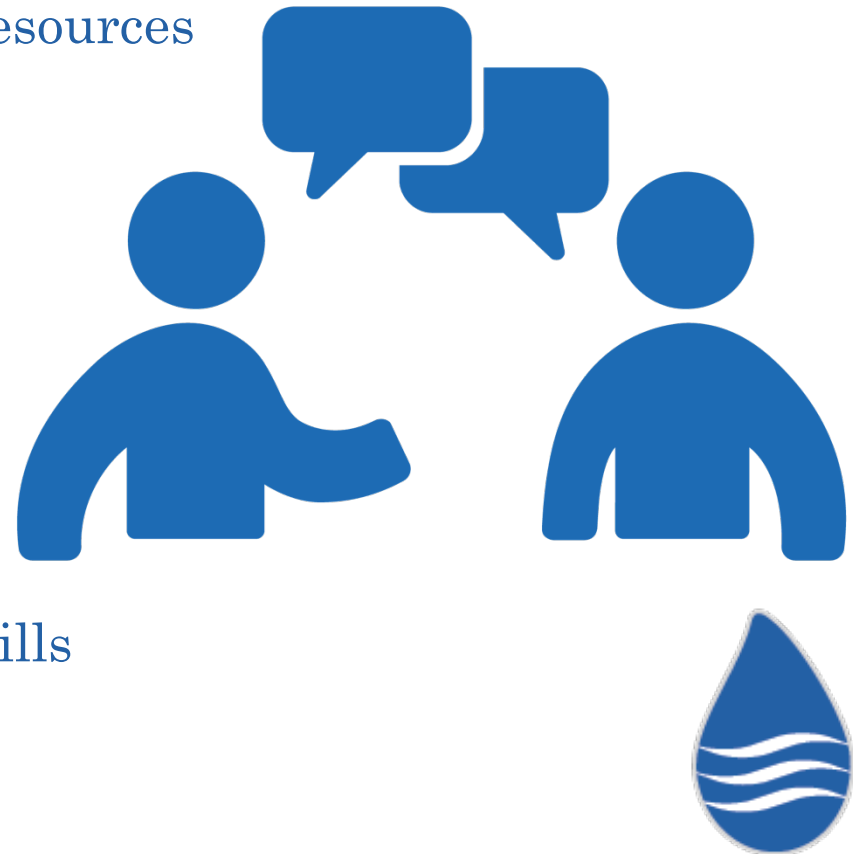
MassDEP

Commonwealth of Massachusetts
Department of Environmental Protection



Benefits of the Management Program

- Networking: developing a web of resources
 - Vendors
 - Engineers
 - Regulators
 - Peers
- Confidence
- Understanding of the industry
- Refined managerial & technical skills



Future Plans

- Reassess 2017 program
- Identify areas improvement
 - Hands-on activities
 - Contact list
 - Regular communication
- Launch the 2018 Massachusetts Management Training Program in the late fall or early winter.



Questions?



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