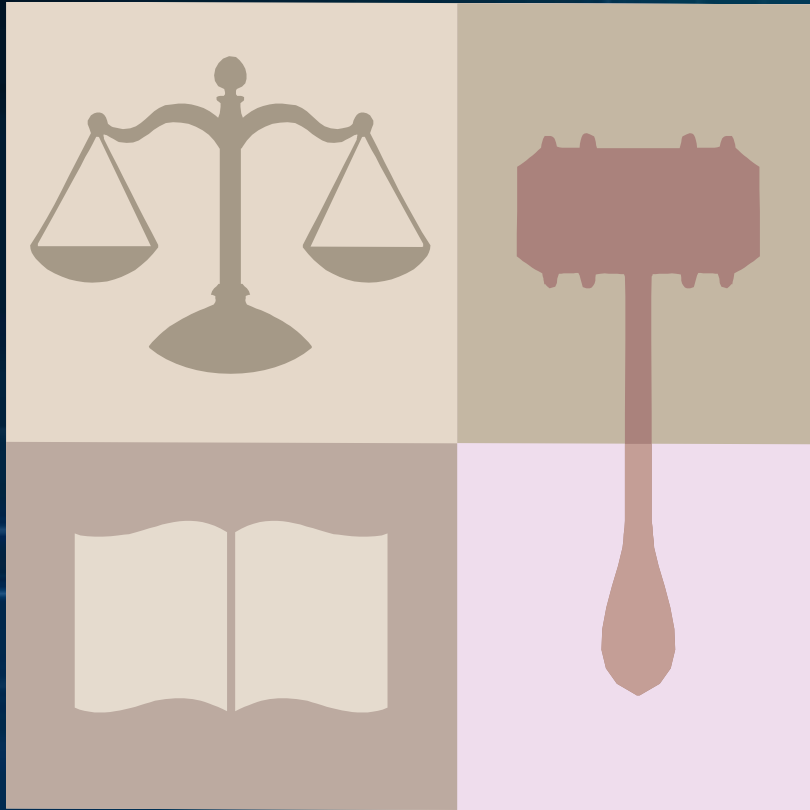


Adapting MARSSIM for a University/Academic Campus Laboratory Closure

A CASE STUDY OF THE UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY FACILITIES IN ATHENS, GEORGIA

Disclaimer



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Contact Information:

Todd Baker

baker.todd@epa.gov

Voice: 919-541-4307



Acknowledgements

- **Kathryn Snead**, US EPA MARSSIM Workgroup Chair
- **Ritchie Buschow**, US EPA RTP, NC Radiation Safety Officer
- **Beverly McKim**, US EPA, Supervisory Engineer
- **Jim Kitchens**, US EPA (retired)
- **CDR Jim Bellah**, US EPA Athens, GA
- **Heath Downey**, Radiation Safety & Control Services
- **Tyler Henningsen**, Wood Inc.. Sr. Environmental Scientist

Objectives

- Discuss the general timeline / sequence
- Examine the strategy used to achieve time critical milestones
- Review the cost
- Summarize

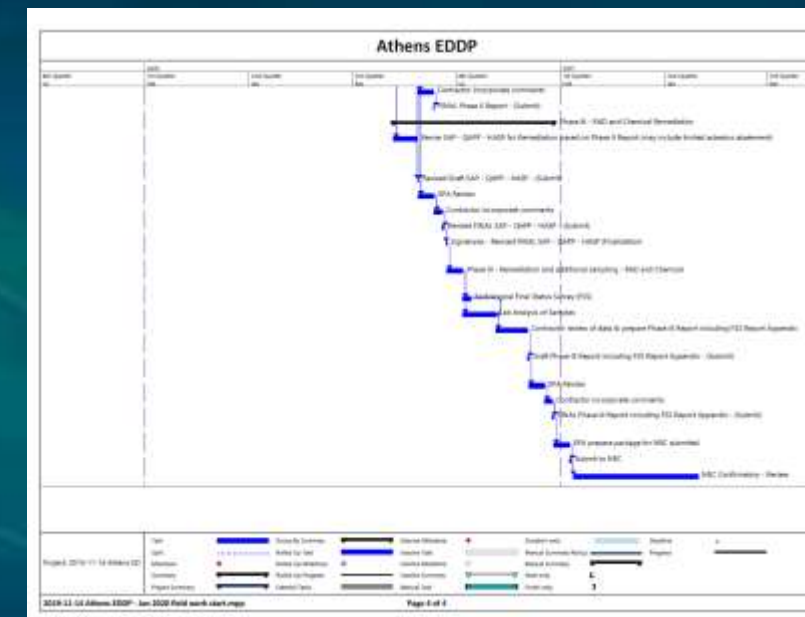
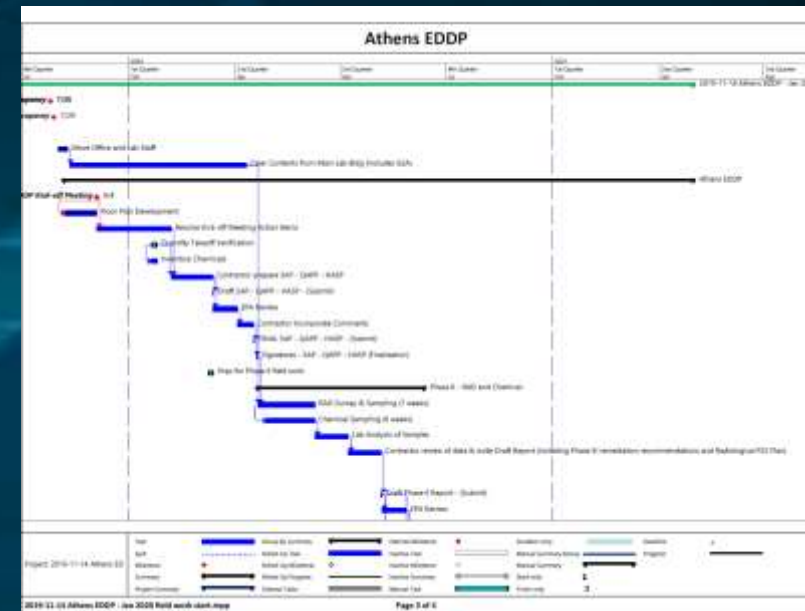
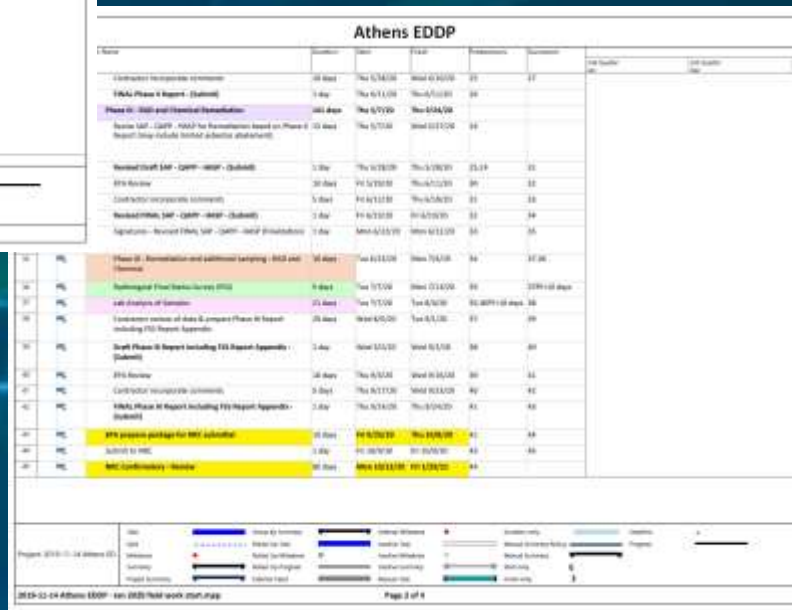
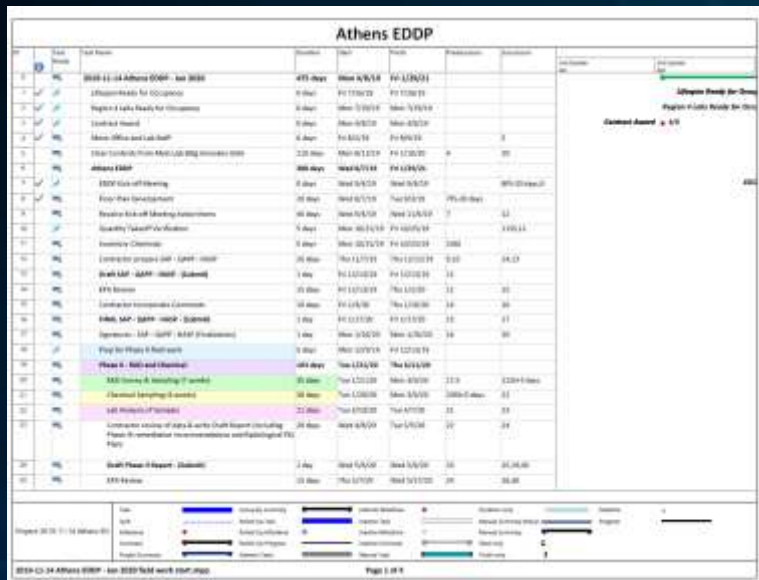


Timeline

- October 2017 Planning Began based on consolidation master planning
- July 2018 Contractor Site Visit
- April 18, 2019 Contract Award
- September 2019 Kick Off Meeting
- January – March 2020 Field Work
- June – July 3, 2020 Remediation & Final Status Survey
- September 2020 Report
- October 2020 License Termination Requested
- November 2020 NRC granted “unrestricted release” **Unexpected!**



Value of a True Schedule



MARSSIM* Document Overview



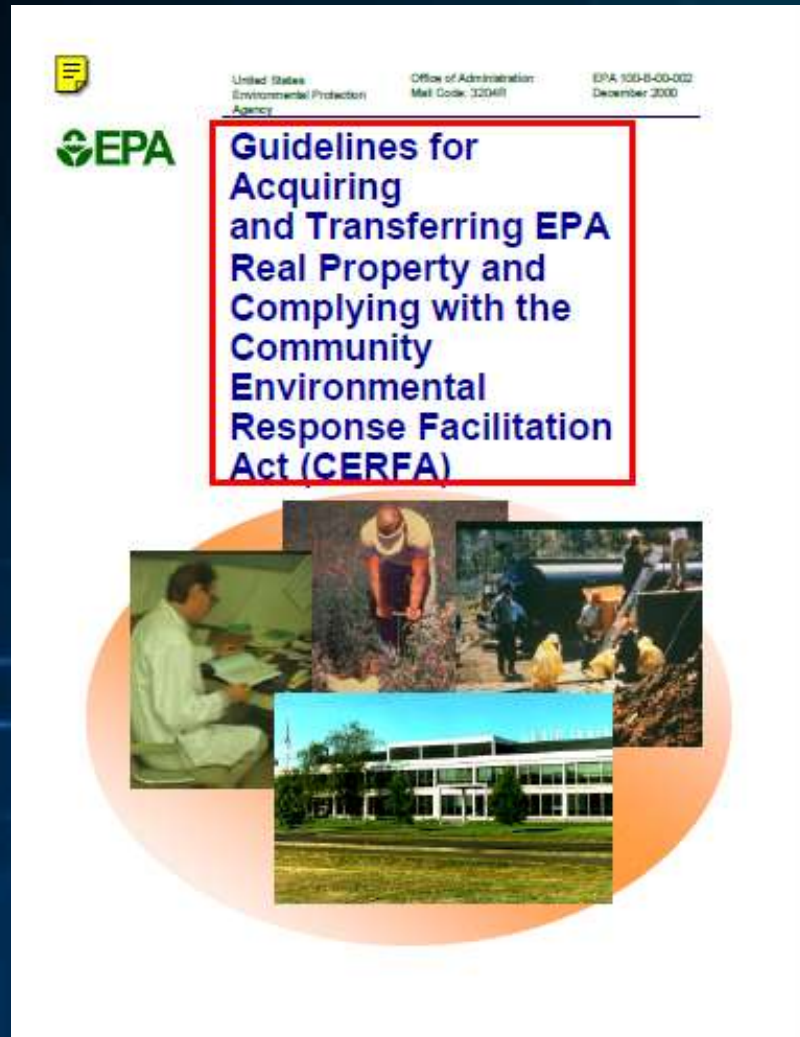
Four Federal Agency Members

- 1) Department of Defense (Air Force, Army, and Navy representatives)
- 2) Department of Energy
- 3) Environmental Protection Agency
- 4) Nuclear Regulatory Commission

State Observers

*Multi-Agency Radiation Survey and Site Investigation Manual

EDDP* Document Overview



Three Phases

- **Phase I - Preliminary Survey and Site Investigation**
- **Phase II - Confirmatory Sampling**
- **Phase III - Characterization Sampling, Cleanup, and Decontamination**

For handling all Recognized Environmental Hazards and Property Transfer Issues

*Environmental Due Diligence Process

Potential Hazardous Contaminants of Concern

- Resource Conservation and Recovery Act (RCRA) 8 metals (arsenic, barium, cadmium, total chromium, lead, mercury, selenium, silver)
- Hexavalent chromium
- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Polychlorinated Biphenyls (PCBs)
- Dioxins
 - pH
- Perchlorates
 - Asbestos Containing Material

Licensed Radioactive Materials

Radioisotopes Used	Radioactive Half-life
Hydrogen-3	12.3 years
Carbon-14	5,760 years
Phosphorus-32	14.3 days
Sulfur-35	87.1 days
Chlorine-36	301,000 years
Iron-59	44.5 days
Nickel-63	100.1 years
Zinc-65	244.1 days
Cesium-137	30.0 years



Radionuclides of Concern for Final Status Survey

Table 2: Radionuclides of Concern - NRC Screening Values for Unrestricted Release

Radionuclides	Symbol	Direct Static Measurement Values ^a (dpm/100cm ²) ^b	Concentration Values (pCi/g) ^c
Hydrogen-3 (Tritium)	H-3	1.20E+08	1.1E+02
Carbon-14	C-14	3.70E+06	1.2E+01

Source: NUREG - 1757, Vol. 1, Rev. 2, Appendix B and NUREG-5512, Vol. 3





Figure 1: EPA Athens Georgia Site Location Map



Radiological Sample and Survey Locations

- Lab Vacuum system
- Exhaust hoods and ductwork
- Lab Countertops and Cabinets
- Walls and Floors
- Sink Traps
- Floor Drains and Cleanouts
- Cold Rooms
- Snorkel (spot) exhaust
- Roof penetrations of concern
- Flexible Localized Exhaust
- HVAC System & General Exhaust
- Ceilings and Overhead
- Building Exteriors

Instrument Staging



Instrument Cart







36 ft²

RANGE 140-280 cpm

1-23-20

08:50

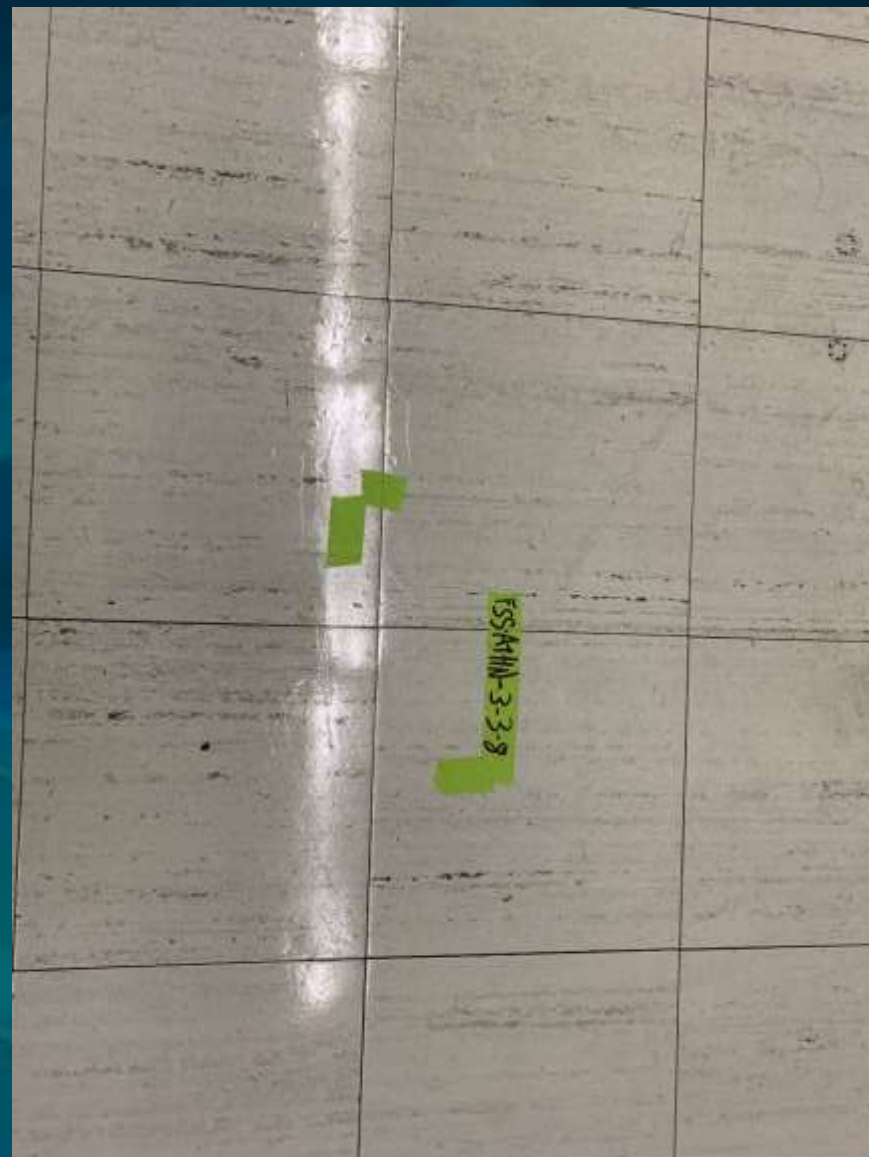
CM

Janitorial Mop Sink Closet



Administrative Areas





Fume Hood Cup Sink Contamination



SS-2 Floor Contamination



Radiological Results

- 4 Locations exceeded investigational screening levels for direct measurements (Fixed contamination)
 - Two were remediated by removal (Fume hood cup sink and SS-2 floor surface)
 - Two were determined to be NORM by offsite analysis (Counter top and Cinderblock wall)
- One Location exceeded investigational screening levels for smear/swipe samples. (Removable contamination)
 - Countertop was remediated by removal.

Combined Project Cost



\$ 1,357,934.22

Thank you!

Todd Baker

baker.todd@epa.gov

Voice: 919-541-4307





References

- Guidelines for Transferring EPA Real Property and Complying with the Community Environmental Response Facilitation Act (CERFA), December 2000
- American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, E 1527-05
- ASTM Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process, E1903-11
- Consolidated Decommissioning Guidance; NUREG-1757; Published September 2006

Table 9: Direct Static Measurements Summary

Item	Count	Net Beta dpm/100cm ²			
		Avg	Stdev	Min	Max
Vacuum System Strainer	1	-4,586.78	N/A	-4,586.78	-4,586.78
Exhaust Hoods and Ductwork Systems	42	-494.38	1,233.41	-4,338.84	1,942.15
Laboratory Countertops and Cabinets	72	-560.00	2,035.57	-4,000.00	10,067.00
Wall & Floor	274	230.20	3,132.88	-15,268.82	33,510.64
Snorkel Exhausts	10	758.18	437.11	-186.01	1,517.86
Flexible Exhausts	5	267.86	645.39	-290.18	1,361.61
HVAC System and General Exhausts	43	154.32	793.03	-1,592.26	2,433.04
Ceilings and Overheads	17	399.46	1,651.76	-1,932.62	3,067.38
Roof Surface	10	12,026.60	2,302.43	8,031.91	15,106.38
Exterior Wall Surfaces	4	-757.98	949.91	-2,180.85	-212.77

Table 10: Removable Measurements Summary

Item	Count	H-3 window dpm/100cm ²				C-14 window dpm/100cm ²				Beta window dpm/100cm ²			
		Avg	Stdev	Min	Max	Avg	Stdev	Min	Max	Avg	Stdev	Min	Max
Vacuum System Strainer	1	-1.09	NA	-1.09	-1.09	-1.92	NA	-1.92	-1.92	4.75	NA	4.75	4.75
Exhaust Hoods & Ductwork Systems	22	0.93	4.49	-7.13	7.73	2.08	1.81	-1.83	4.97	1.06	2.49	-2.64	7.68
Laboratory Countertops & Cabinets	72	31.36	288.13	-11.32	2,442.00	19.65	174.90	-5.39	1,482.96	5.12	33.40	-2.05	284.16
Walls & Floors	274	-0.35	5.60	-63.27	11.32	-0.20	2.13	-5.88	5.57	-0.17	1.71	-5.28	4.51
Sink Traps	82	0.73	6.71	-15.05	23.98	0.18	2.02	-4.37	9.04	-0.05	2.65	-5.35	13.21
Floor Drains & Cleanouts	70	-1.57	4.52	-12.32	7.04	-0.33	1.77	-4.46	2.75	-0.37	1.73	-3.42	4.53
Snorkel Exhausts	10	-0.25	1.97	-4.57	2.13	-2.00	1.55	-4.02	0.87	4.15	1.88	0.96	6.84
Roof Penetrations of Concern	4	6.41	15.73	-6.68	29.08	-0.68	3.20	-3.86	3.75	6.66	4.64	3.44	13.52
Flexible Exhausts	5	1.48	5.10	-1.74	10.21	-2.79	0.50	-3.37	-2.14	3.18	1.79	1.58	6.22
HVAC System & General Room Exhausts	43	0.88	4.05	-6.17	13.10	0.20	2.35	-7.50	5.99	-0.22	2.43	-3.82	7.17
Ceilings and Overheads	17	-9.15	13.42	-55.05	1.63	0.46	1.33	-2.33	2.71	0.49	1.37	-2.69	2.46
Exterior Surfaces	14	1.65	2.25	-1.21	5.68	-0.07	1.91	-3.13	3.86	0.40	1.39	-1.88	3.00
Background (estimated)	---	22	---	---	---	23	---	---	---	72	---	---	---

Note: Liquid Scintillation Counter windows – H-3 1.65 - 12.2 kiloelectron volt (keV); C-14 12.2 - 55 keV; beta 55 – 22,000 keV.

Title and Content Layout with List

- Click to edit Master text styles
 - Second level
 - Third level
 - Fourth level
 - Fifth level

Title and Content Layout with Chart



Two Content Layout with Table

- First bullet point here
- Second bullet point here
- Third bullet point here

Class	Group 1	Group 2
Class 1	82	95
Class 2	76	88
Class 3	84	90

Title and Content Layout with SmartArt

