Date: 04-23-24

Re: Addendum No. 1 to the Bidding Documents for UMA-LAC Dental Clinic

This ADDENDUM is issued to modify, explain or correct the Drawings and Specifications, and is hereby made a part of the Contract Documents.

NOTICE TO ALL BIDDERS: Please read the entire ADDENDUM for references to all aspects of the Work. This ADDENDUM shall be binding upon the Contractor and he shall furnish and install labor and materials indicated to be furnished and installed by him herein even though such Work is not graphically mentioned in the Drawings and Specifications.

Bidder shall acknowledge receipt of the ADDENDUM on the Bid Form by writing the addendum number for each addendum in the space provided.

GENERAL

A. Refer to the Attendance list, attached, for a list of contractors in attendance at the non-mandatory pre-bid walk through conducted on Thursday, April 18, 2024.

B. Items discussed at the pre-bid meeting:
   1. Project summary: The project scope will expand the existing Dental Teaching Lab at the Lewiston-Auburn campus of the University of Southern Maine (USM) and will add three new Dental Chairs, a Panoramic 2D/3D Y-Ray machine and new Office space. The existing Pre-Lab and Sterilization areas will remain, for shared use between the new and existing Dental Lab areas.
   2. The project scope will add a new air compressor and new vacuum pump to be tied in parallel to the existing equipment to serve the new and existing Dental Labs.
   3. HVAC and electrical upgrades as required to facilitate the project scope shall be included as outlined on the contract documents. The electrical power for the renovation space shall be fed from the main electrical room in the Franco-American space on the first floor, from existing panels.
   4. The project scope will add an undercabinet dental washer in the existing Sterilization Lab to the right of the existing sink. This will require that the existing counter top be extended using material from the existing casework which is scheduled for removal in the existing Lab. A detail clarify the scope for this work will be issued in an upcoming addendum.
   5. The project scope will require removal and replacement/reinstallation for suspended acoustical tile ceiling systems within the renovated areas, within the second floor corridor outside the renovated areas, and in the first floor areas below the renovated areas. Clarification on the requirements for this removal and replace/re-installation will be issued in an upcoming addendum.
   6. USM will be responsible for any/all required revisions to the existing Tel/Data systems as required to facilitate the project scope. Division 26 shall provide required pathways and backboxes. The general contractor shall coordinate the work.
   7. Minuteman maintains the security and fire alarm systems at the facility for USM. Any and all required shutdowns for these systems shall be coordinated with Minuteman through USM.
   8. USM shall furnish and install all Dental Equipment through Patterson Dental. The general contractor shall coordinate the schedule for installation to facilitate the overall project schedule.

9. All questions associated with the project shall be forwarded to Anthony Davis at Salas O'Brien by close of business on April 29, 2024. Responses will be issued in the final addendum to be issued on May 03, 2024.
10. The University of Maine and the LAC staff will identify any specific dates/times that access into spaces is not available for the duration, as well as any teaching dates/times in the existing lab that would prohibit any construction activities. This information will be published in the final addendum to be issued on May 03, 2024.
11. The project will require 100% Performance and Payment Bonds.
12. The work shall be completed in a manner which maintains the existing systems operational until such time as the new systems are fully commissioned and operational so that, at no time, with the exception of strictly scheduled shutdowns, are the existing systems ever off line.
13. The project scope requires work in the first floor ceiling space below the renovation area. This work will be conducted in occupied areas and shall be strictly coordinated with USM.
14. The contractor will be responsible for all permits associated the work.
15. The contractor will be assigned parking along the street in front of the building. Laydown space will be coordinated during construction.
16. The work shall be completed under a lump sum contract, the successful contractor will be responsible for all work incidental to the contract requirements such as ceiling removal/replacement, firestopping, and cutting/patching.

ITEMS ASKED/DISCUSSED AT THE PRE-BID WALKTHROUGH:

A. What is the existing floor to deck height at each floor within the renovated areas??
Response: Based upon a review of the as-built drawings, the deck height at the first floor is approximately 13' 2". The deck height at the second floor varies as there is a pitched roof above, pitching up to a framed metal stud ceiling joist system at approximately 11'10" above finished floor.
B. Will any lead shielding be required for the proposed X-Ray equipment?
Response: No, refer to the attached Dental Radiation Shielding Assessment report recently conducted by Physics Consultants for a detailed analysis.
C. Sheet A-4, in the North Elevation, appears to require new windows, doors, and exterior improvements. Is this included in the project scope?
Response: No, the only work associated with the project scope will be replacement for the existing louvers at that façade. This will be clarified in an upcoming addendum.
D. Material Note 3 on Sheet A2 references attic stock for floor infill to the extent available. Does the owner have any attic stock?
Response: No, there is no available attic stock. The contractor will be responsible for matching existing as specified. Also, no attic stock is available for the acoustical ceiling tile.
E. Will a bid bond be required for this project?
Response: Yes, a bid bond of 5% of bid amount is required to accompany the bid submission. The details are in the "advertisement for bid" in the specs, 00 11 13. (On page 11).

Attachments: Pre-Bid Attendance Sheet; Dental Radiation Shielding Assessment Report

END OF ADDENDUM #1

LAC DENTAL LAB EXPANSION PROJECT, CONTRACTOR SIGN-IN

Date: 18APR2024

	COMPANY NAME	REPRESENTATIVE NAME	CONTACT INFO (PHONE/EMAIL)
*	TURNER	PATRICK CARROLL	617 828 0956 RCARROLL@TCCO.COM
	Turner	Adam Parys	6172010718 aparyse@tcco.com
	TURNER	DEVIN MAHO	207-210-3758 DMAHO@TCCO.COM
*	BENCHMARK	CHRIS BIRCH	207-591-7600 KRICE@BENCHMARKCONSTRUCTION.ORG
	~~JOE~~		
*	PENOBSCOT GENERAL CONTRACTORS	JOE CAMPBELL	207-317-0661 JCAMPBELL@PENOBSCOTGC.COM
*	PGC	Bob Dwyer	207-478-9703
*	H.E. Callahan Construction Co.	Michael Walsh	207-572-3400 Bid@hecallahan.com
*	PM CONSTRUCTION Co, Inc	KARL BACON	207.423.2099 KBACON@PMCONSTRUCTION.COM
*	OPTIMUM CONSTRUCTION	SEBASTIEN LECLERC	207-747-9580 SLECLERC@OPTIMUMCONSTRUCTION.COM

PHYSICS CONSULTANTS INC
RADIATION PHYSICS SERVICES

04/20/24

Mark Russell
UMA - Lewiston Dental Center
51 Westminster Street, Suite 162
Lewiston, ME 04240

Enclosed are the shielding recommendations for the dental x-ray room(s) that we have prepared for your facility. Please print out a copy for your files.

The Radiation Control Program requires a copy of this report for their records. After you save this report to your computer, please upload it to your online facility file by going to this link and choosing "Upload Documents:"
https://www1.maine.gov/cgi-bin/online/licensing/begin.pl?board_number=8000

For your security, you will be required to enter your Facility ID and your 6 digit access code. This is the same code you receive from the State by postcard each year to renew your registrations. If you do not know your access code, please contact the Radiation Control Program at 207-287-5676 or email them at **radiation.dhhs@maine.gov.**

State of Maine Regulations also require that all new dental x-ray equipment be inspected by a qualified expert within 1 year of installation. Please contact us when you know the installation date of your unit so we can schedule an inspection. Also, if you change the use of adjacent rooms in the future you should contact us as the shielding requirements may change. As a courtesy we have enclosed a draft copy of Radiation Safety Rules. You should modify these to express the rules at your facility. The State requires that a copy be posted at each control area. We have also attached a copy of Maine Rules relating specifically to dental x-ray units.

Sincerely,

Ryan Zipper, MS
Radiological Physicist

PO Box 295, Gray, ME 04039
Main: 207 773-1313 Fax: 207 772-9050
Web: pciphysics.com Email: admin@pciphysics.com

PHYSICS CONSULTANTS INC
RADIATION PHYSICS SERVICES

DENTAL RADIOGRAPHIC
X-RAY SHIELDING RECOMMENDATIONS

UMA - Lewiston Dental Center
51 Westminster Street, Suite 162
Lewiston, ME 04240
04/20/24

SUBJECT: Report of Radiation Protection Recommendations for dental x-ray installations.

CONDITIONS OF REPORT: This report is based on calculations made by the undersigned in accordance with the recommendations of the National Council on Radiation Protection and Measurements (NCRP) as set forth in NCRP Report 145, "Radiation Protection in Dentistry", and other published reports. The report is also in compliance with the recommendations and the rules of the state. The location and composition of walls, position of equipment, doors and windows, and information about the use of adjacent areas is furnished by the client. It is assumed to be accurate but has not been verified. If the room configuration, use of adjacent areas, or machine placement changes, the assumptions and therefore the shielding recommendations in this report may no longer be valid. If changes occur it is the owners responsibility to contact PCI for revised shielding recommendations.

SYMBOLS AND TERMS USED IN THIS REPORT

Primary Barrier	A radiation protection barrier that may be impinged upon by the primary or useful radiation beam.
Secondary Barrier	A radiation protection barrier that may not be impinged upon by the primary beam, but will be impinged upon by leakage and scatter radiation.
Controlled Area	An area in which radiation exposure is limited to workers who wear radiation dosimeters and which is under the supervision of the radiation safety officer.

Uncontrolled Area	An area in which a member of the general public may be exposed to radiation and which is not under the supervision of the radiation safety officer.
Workload (W)	The maximum expected time per week during which the x-ray machine is producing x-rays, expressed in milliampere-minutes per week (mA-min/wk). The workload for this report was obtained from the owner and/or recommendations listed in NCRP Report No. 145.
Use Factor (U)	The maximum expected fraction of the workload during which the useful or primary x-ray beam will strike the barrier in question. (NOTE: for a secondary barrier, U is always 1.0.
Occup Factor (T)	The maximum expected fraction of the workload during which the area behind a barrier may be occupied by any one person.
Dist Factor (D)	The distance from the radiation source to the position of occupancy referred to by the occupancy factor, measured in meters.

SHIELDING MATERIALS: When specified, shielding materials are defined below.

Concrete	Assumes "standard weight" concrete of 147 lbs/cubic foot.
Solid-core door	Assumes AWI type PC-5 (solid wood core) or C-45 (mineral core) or equivalent door.
Lead	Assumes commercially available lead sheet glued to a sheet of gypsum wallboard installed lead inward with nails or screws. The lead thickness recommended is the minimum thickness and it may be less expensive to install thicker lead than the amount specified. Where the edges of two lead sheets meet the continuity of shielding must be insured in the joints. Steel nails or screws used to secure lead need not be covered with lead discs or supplementary lead.
Sheetrock	Assumes commercially available gypsum wallboard of approximate density of .75 grams/cubic cm. When one sheet of wallboard is placed over another the side edges should be staggered. The thickness recommended is the minimum. Additional may be added. Unless otherwise noted standard walls are considered to be two sheets of 5/8" wallboard which is equivalent to 0.1 mm lead.

Bucky/Cassette	For units that have a fixed bucky and cassette holder, these items are considered shielding as outlined in NCRP 147 Table 4.6. For the purposes of this report the attenuation of the bucky/cassette holder is considered to be a minimum of 8 cm sheetrock.

ASSUMPTIONS USED IN REPORT

For each barrier, certain listed assumptions regarding type of barrier, machine placement, type of occupancy, values of W, U, T, and D, have been made. The calculations of the barrier have been made based upon these assumptions and upon currently recommended levels of maximum allowable dose.NOTE: in no case are the assumptions of such a nature as to restrict or hinder the proper use and operation of the x-ray machine.

The following currently recognized Maximum Permissible Doses have been used in this report:

1. Controlled Areas - The MPD for controlled areas is 10.0 millirem per week (mRem/wk) or 0.1 millisievert/wk (mSv/wk).

2. Uncontrolled Areas - The MPD for uncontrolled areas is 2.0 mRem/wk (0.02 mSv/wk).

DENTAL X-RAY SHIELDING RECOMMENDATIONS

UMA - Lewiston Dental Center
51 Westminster Street, Suite 162
Lewiston, ME 04240
04/20/24

Dental shielding recommendations are based on data obtained from NCRP Report 145, "Radiation Protection in Dentistry", and other published data. The thickness of shielding recommended is the minimum required to meet current regulations. Additional shielding may be added at the discretion of the owner. Room dimensions, equipment location, and existing shielding information used in this report have been supplied by the owner. They are believed to be correct but have not been verified.

Room: Treatment Rm 4 Workload 3.0 mAmin/wk kVp = 65
Machine type: Fixed Intraoral

Wall A	Distance:	2	meters			Adjacent:	Hallway
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	0.2	WUT:	0.02
	Total shielding recommended =			0	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
	Additional shielding recommended=			**NONE**			

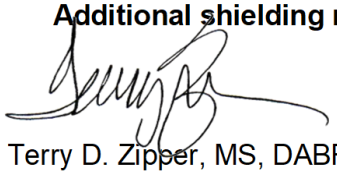
Wall B	Distance:	2	meters			Adjacent:	Control
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	1	WUT:	0.12
	Total shielding recommended =			1	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
	Additional shielding recommended=			**NONE**			

Wall C	Distance:	2	meters			Adjacent:	Occupied
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	1	WUT:	0.12
	Total shielding recommended =			1	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
	Additional shielding recommended=			**NONE**			

Wall D	Distance:	2	meters			Adjacent:	Laboratory
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	0.5	WUT:	0.06
	Total shielding recommended =			0.5	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
	Additional shielding recommended=			**NONE**			

Ceiling	Distance:	2.4	meters			Adjacent:	Roof
	Controlled area?		No			Barrier:	Secondary
	Use factor	1		Occupied	0.05	WUT:	0.15
	Total shielding recommended =			0	cm sheetrock		
		Existing shielding =		3	cm sheetrock		
	Additional shielding recommended=			**NONE**			

Floor	Distance:	1.41	meters			Adjacent:	Occupied
	Controlled area?		No			Barrier:	Secondary
	Use factor	1		Occupied	1	WUT:	3
	Total shielding recommended =			0	cm sheetrock		
		Existing shielding =		3	cm sheetrock		
	Additional shielding recommended=			**NONE**			



Terry D. Zipper, MS, DABR
Certified Radiological Physicist

DENTAL X-RAY SHIELDING RECOMMENDATIONS

UMA - Lewiston Dental Center
51 Westminster Street, Suite 162
Lewiston, ME 04240
04/20/24

Dental shielding recommendations are based on data obtained from NCRP Report 145, "Radiation Protection in Dentistry", and other published data. The thickness of shielding recommended is the minimum required to meet current regulations. Additional shielding may be added at the discretion of the owner. Room dimensions, equipment location, and existing shielding information used in this report have been supplied by the owner. They are believed to be correct but have not been verified.

Room: Treatment Rm 5 Workload 3.0 mAmin/wk kVp = 65
Machine type: Fixed Intraoral

Wall A	Distance:	2	meters			Adjacent:	Occupied
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	1	WUT:	0.12
	Total shielding recommended =			1	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
Additional shielding recommended=				**NONE**			

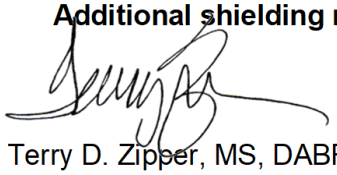
Wall B	Distance:	2	meters			Adjacent:	Control
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	1	WUT:	0.12
	Total shielding recommended =			1	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
Additional shielding recommended=				**NONE**			

Wall C	Distance:	2	meters			Adjacent:	Occupied
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	1	WUT:	0.12
	Total shielding recommended =			1	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
Additional shielding recommended=				**NONE**			

Wall D	Distance:	2	meters			Adjacent:	Sterile
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	0.25	WUT:	0.03
	Total shielding recommended =			0	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
Additional shielding recommended=				**NONE**			

Ceiling	Distance:	2.4	meters			Adjacent:	Roof
	Controlled area?		No			Barrier:	Secondary
	Use factor	1		Occupied	0.05	WUT:	0.15
	Total shielding recommended =			0	cm sheetrock		
		Existing shielding =		3	cm sheetrock		
	Additional shielding recommended=			**NONE**			

Floor	Distance:	1.41	meters			Adjacent:	Occupied
	Controlled area?		No			Barrier:	Secondary
	Use factor	1		Occupied	1	WUT:	3
	Total shielding recommended =			0	cm sheetrock		
		Existing shielding =		3	cm sheetrock		
	Additional shielding recommended=			**NONE**			



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DENTAL X-RAY SHIELDING RECOMMENDATIONS

UMA - Lewiston Dental Center
51 Westminster Street, Suite 162
Lewiston, ME 04240
04/20/24

Dental shielding recommendations are based on data obtained from NCRP Report 145, "Radiation Protection in Dentistry", and other published data. The thickness of shielding recommended is the minimum required to meet current regulations. Additional shielding may be added at the discretion of the owner. Room dimensions, equipment location, and existing shielding information used in this report have been supplied by the owner. They are believed to be correct but have not been verified.

Room: Treatment Rm 6 Workload 3.0 mAmin/wk kVp = 65
Machine type: Fixed Intraoral

Wall A	Distance:	2	meters			Adjacent:	Occupied
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	1	WUT:	0.12
	Total shielding recommended =			1	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
Additional shielding recommended=				**NONE**			

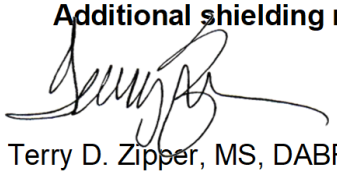
Wall B	Distance:	2	meters			Adjacent:	Control
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	1	WUT:	0.12
	Total shielding recommended =			1	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
Additional shielding recommended=				**NONE**			

Wall C	Distance:	2	meters			Adjacent:	Imaging
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	0.2	WUT:	0.02
	Total shielding recommended =			0	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
Additional shielding recommended=				**NONE**			

Wall D	Distance:	2	meters			Adjacent:	Occupied
	Controlled area?	No				Barrier:	Primary
	Use factor	0.4		Occupied	1	WUT:	0.12
	Total shielding recommended =			1	cm sheetrock		
	Existing shielding =			3	cm sheetrock		
Additional shielding recommended=				**NONE**			

Ceiling	Distance:	2.4	meters			Adjacent:	Roof
	Controlled area?		No			Barrier:	Secondary
	Use factor	1		Occupied	0.05	WUT:	0.15
	Total shielding recommended =			0	cm sheetrock		
		Existing shielding =		3	cm sheetrock		
	Additional shielding recommended=			**NONE**			

Floor	Distance:	1.41	meters			Adjacent:	Occupied
	Controlled area?		No			Barrier:	Secondary
	Use factor	1		Occupied	1	WUT:	3
	Total shielding recommended =			0	cm sheetrock		
		Existing shielding =		3	cm sheetrock		
	Additional shielding recommended=			**NONE**			



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PHYSICS CONSULTANTS INC
RADIATION PHYSICS SERVICES

DENTAL CBCT SCANNER
RADIATION SHIELDING RECOMMENDATIONS

UMA - Lewiston Dental Center
51 Westminster Street, Suite 162
Lewiston, ME 04240

Scanner: Dexis OP 3D **Date:** 4/20/24

TERMS

Distance - is the actual distance from the radiation source to the calculation point.

Reference dose rate - is the dose rate (mRad/scan) to a reference point provided by the manufacturer in either graphic or text form.

Reference distance - is the distance from the x-ray source to the reference dose rate.

Computed dose rate - is the dose rate (mRad/week) at the actual distance determined by calculating an inverse square correction of the reference dose rate.

Maximum weekly dose - is 2 mRem per week for the general public and 10 mRem per week for radiation workers.

Occupancy factor - is used to account for utilization of an area adjacent to the CT scanner. Areas of full occupancy have a factor of 1.

Allowable dose per week - is the Maximum weekly dose divided by the occupancy factor.

Controlled/Uncontrolled area - is an area accessable by only radiation workers (controlled), or by the general public (uncontrolled).

Workload - is the number of scan slices anticipated per week, based on an eight hour day.

Shielding Materials - When specified, the shielding materials are defined as follows:

Concrete - assumes "standard-weight" concrete of 147 lbs/cubic foot.

Solid-core door - assumes AWI type PC-5 (solid wooden core) or C-45 (mineral core) or equivalent door.

Lead - assumes commercially available lead sheet glued to a sheet of gypsum wallboard installed lead inward with nails or screws. The lead thickness recommended is the minimum thickness, and at times it may be less expensive to install thicker lead than specified. Where the edges of two lead sheets meet, the continuity of shielding must be insured in the joints. Steel nails or screws used to secure lead need not be covered with lead discs or supplementary lead.

ASSUMPTIONS USED IN THIS REPORT

This report is based on information obtained from the manufacturer and facility. The information is believed to be correct but has not been verified by Physics Consultants, Inc. For each barrier, certain listed assumptions regarding type of barrier, machine placement, type of occupancy, distance, and workload have been made. The calculations are based on these assumptions and upon presently recommended levels of maximum permissible dose. If the room configuration, use of adjacent areas or machine placement changes, the assumptions and therefore the shielding recommendations may no longer be valid. If changes do occur, you should contact PCI for revised recommendations.

DATA

Pts/day = 2 **Scans/pt 1** **Scans/wk**
Pan Workload= 6 Scans/wk **CBCT Workload = 4**
Cephalometric Workload = 0 Scans/wk **Room: Pan/Ceph**

HVL: lead (mm) 0.15 gypsum (cm) 1.6 concrete (cm) 2

NOTE: 1.25" gypsum wallboard = 0.1 mm lead equivalent.

CALCULATIONS (Refer to Fig 1)

WALL A: *Uncontrolled Area* *Maximum weekly mR =* 2
Adjacent to: Office *Distance X (ft)=* 3
Reference dose rate= 0.86 *Ref. distance(ft)=* 1.6
Computed dose rate= 2.43 *mRem/wk at distance X*
Occupancy factor= 1.00 *Allowable dose/wk =* 2
Shielding required= 0.04 *mm lead* 0.6 *cm concrete*
1.3 *cm gypsum wallboard*
Shielding present= 0.10 *mm lead*
Additional shielding required= 0.00 *mm lead*

No additional shielding required.

WALL B: *Uncontrolled Area* *Maximum weekly mR =* 2
Adjacent to: Occupied *Distance X (ft)=* 7
Reference dose rate = 0.86 *Ref. distance(ft)=* 1.6
Computed dose rate = 0.45 *mRem/wk at distance X*
Occupancy factor= 1.00 *Allowable dose/wk =* 2
Shielding required= 0.00 *mm lead* 0.00 *cm concrete*
0.00 *cm gypsum wallboard*
Shielding present= 0.10 *mm lead*
Additional shielding required= 0.00 *mm lead*

No additional shielding required.

WALL C: *Uncontrolled Area* *Maximum weekly mR =* 2

Adjacent to: Operatory *Distance X (ft)=* 6

Reference dose rate = 0.86 *Ref. distance(ft)=* 1.6

Computed dose rate= 0.61 *mRem/wk at distance X*

Occupancy factor= 1.00 *Allowable dose/wk =* 2

Shielding required= 0.00 *mm lead* 0.00 *cm concrete*

0.00 *cm gyp wallboard*

Shielding present= 0.10 *mm lead*

Additional shielding required= 0.00 *mm lead*

No additional shielding required.

CEILING *Uncontrolled Area* *Maximum weekly mR =* 2

Adjacent to: Roof *Distance X (ft)=* 8.5

Reference dose rate = 0.86 *Ref. distance(ft)=* 1.6

Computed dose rate = 0.30 *mRem/wk at distance X*

Occupancy factor= 0.05 *Allowable dose/wk =* 40

Shielding required= 0.00 *mm lead* 0.00 *cm concrete*

0.00 *cm gyp wallboard*

Shielding present= 0.10 *mm lead*

Additional shielding required= 0.00 *mm lead*

No additional shielding required.

FLOOR *Uncontrolled area* *Maximum weekly mR =* 2

Adjacent to: Occupied *Distance X (ft)=* 4

Reference dose rate = 0.86 *Ref. distance(ft)=* 1.6

Computed dose rate = 1.37 *mRem/wk at distance X*

Occupancy factor= 1.00 *Allowable dose/wk =* 2

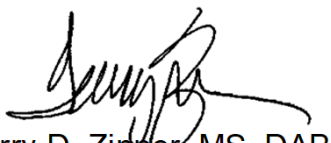
Shielding required= 0.00 *mm lead* 0.00 *cm concrete*

0.00 *cm gyp wallboard*

Shielding present= 0.10 *mm lead*

Additional shielding required= 0.00 *mm lead*

No additional shielding required.



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Certified Radiological Physicist

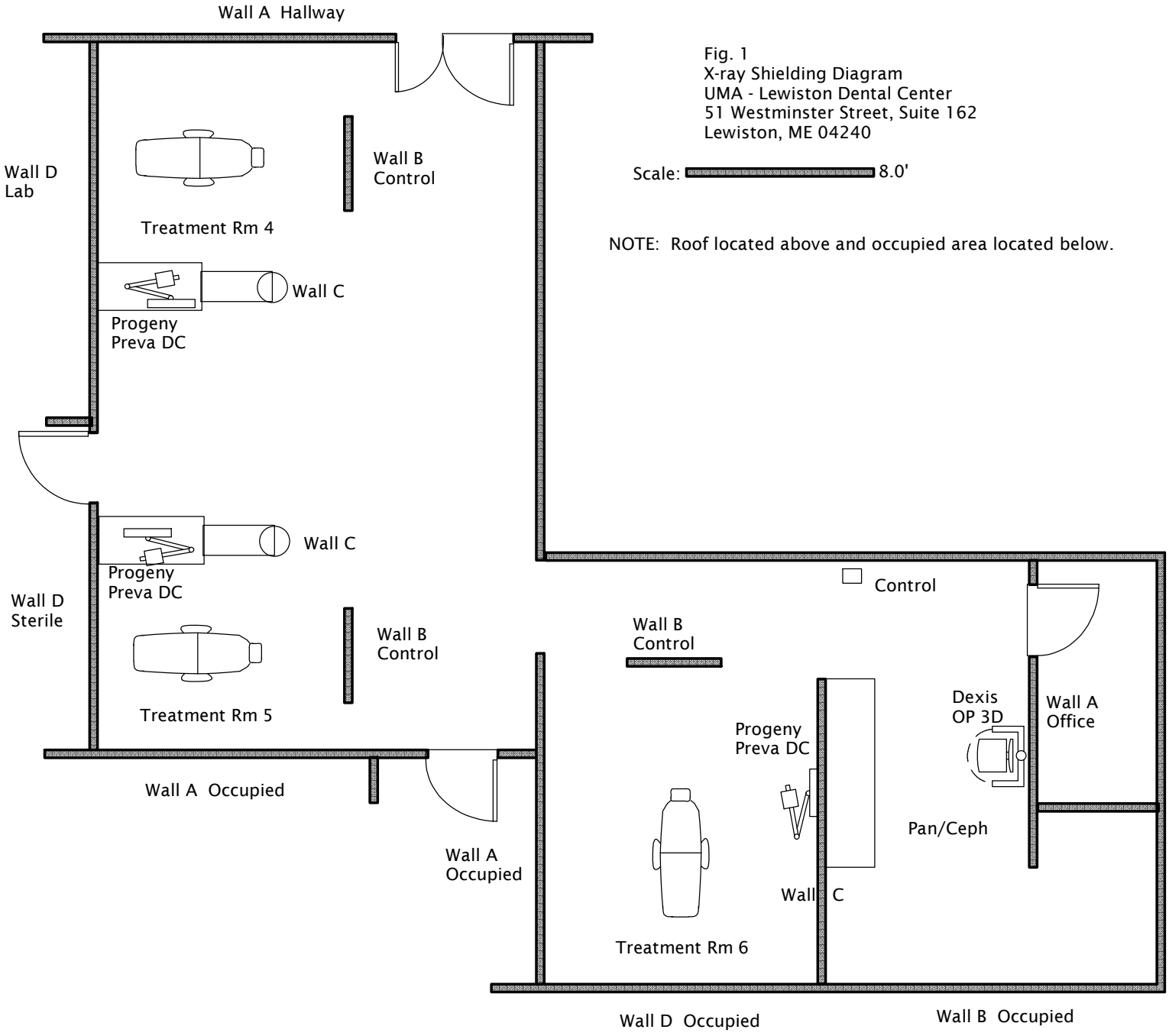

Fig. 1
X-ray Shielding Diagram
UMA - Lewiston Dental Center
51 Westminster Street, Suite 162
Lewiston, ME 04240

Scale: 8.0'

NOTE: Roof located above and occupied area located below.

NOTE: PLEASE MODIFY THESE DRAFT RULES TO FIT YOUR FACILITY.
NOT TO BE POSTED AS IS.

TYPICAL RULES FOR DENTAL RADIATION SAFETY

Individuals operating dental x-ray systems shall be adequately instructed in safe operating procedures and shall be competent in the safe use of the equipment. Only the dentist, licensed hygienist, or dental assistant licensed to take x-rays may operate the x-ray unit.

1. All persons, except the patient, shall be outside the room or at least 6 ft. away from the x-ray tube during the exposure, unless an assistant is required to hold the patient.

   Priority for obtaining an assistant shall be as follows:

   FIRST PRIORITY - Family member beyond reproductive age.

   SECOND PRIORITY - Family member within reproductive age.

   THIRD PRIORITY - Office personnel other than dental assistant or hygienist beyond reproductive age.

2. The assistant shall wear a lead apron and stand outside of the direct beam. No individual shall be used routinely to hold the patient.

3. The operator must be able to observe the patient during the entire procedure.

4. All patients shall be shielded with a lead drape or apron and thyroid collar during the radiograph, unless it would interfere with the exam.

5. The radiation exposure to the patient shall be the minimum required to produce acceptable diagnostic radiographs.

6. This facility will comply with the rules relating to dental x-ray machines as specified by the State Radiation Control Program.

NOTE: THIS IS AN EXAMPLE. YOU MUST MODIFY THESE RULES TO APPLY TO YOUR FACILITY

F.8.C(4)

8. Intraoral Dental Radiographic Systems and Podiatric Systems. In addition to the provisions of F.3, F.4, and F.5, the requirements of F.8 apply to x-ray equipment and associated facilities used for dental radiography. Requirements for extraoral dental radiographic systems are covered in F.7.

A. Source-to-Skin Distance. X-ray systems designed for use with an intraoral image receptor shall be provided with means to limit source-to-skin distance, i.e., SSD, to not less than:

(1) 18 centimeters if operable above 50 kVp, or

(2) 10 centimeters if operable at 50 kVp.

B. Field Limitation. Radiographic systems designed for use with an intraoral image receptor shall be provided with means to limit the x-ray beam such that:

(1) if the minimum SSD is 18 centimeters or more, the x-ray field at the minimum SSD shall be containable in a circle having a diameter of no more than 7 centimeters; and

(2) if the minimum SSD is less than 18 centimeters, the x-ray field at the minimum SSD shall be containable in a circle having a diameter of no more than 6 centimeters .

C. Radiation Exposure Control for Certified and Non-Certified Systems.

(1) Exposure Initiation

(a) Means shall be provided to initiate the radiation exposure by a deliberate action on the part of the operator, such as the depression of a switch. Radiation exposure shall not be initiated without such an action; and

(b) It shall not be possible to make an exposure when the timer is set to a "zero" or "off" position if either position is provided.

(2) Exposure Termination

(a) Means shall be provided to terminate the exposure at a preset time interval, preset product of current and time, a preset number of pulses, or a preset radiation exposure to the image receptor.

(b) An x-ray exposure control shall be incorporated into each x-ray system such that an exposure can be terminated by the operator at any time, except for exposures of one-half (1/2) second or less.

(c) Termination of an exposure shall cause automatic resetting of the timer to its initial setting or to "zero"

(3) Exposure Indication. Means shall be provided for visual indication observable at or from the operator's protected position whenever x-rays are produced. In addition, a signal audible to the operator shall indicate that the exposure has terminated.

(4) Exposure Duration (Timer) Reproducibility. With a timer setting of 0.5 seconds or less, the difference between the maximum exposure time (Tmax) and the minimum exposure time (Tmin) shall be less than or equal to 10 percent of the average exposure time (T), when four timing tests are performed:

D. X-Ray Control.

(1) Each x-ray control shall be located in such a way as to meet the following requirements:

(a) stationary x-ray systems shall be required to have the x-ray control permanently mounted in a protected area, and the operator is required to remain in that protected area, or 6 feet away and out of the useful beam during the entire exposure; and

(b) mobile and portable x-ray systems which are:

(i) used for greater than 1 week in the same location, i.e. a room or suite, shall meet the requirements of F.8.D(1)(a);

(ii) used for greater than 1 hour and less than 1 week at the same location, i.e., a room or suite, shall meet the requirements of F.8.D(1)(b)(i) or be provided with a 6.5 (1.98m) foot high protective barrier which is placed at least 6 feet (1.98m) from the tube housing assembly and at least 6 feet (1.98m) from the patient; or

(iii) used to make an exposure(s) of a patient at the use location shall meet the requirement of F.8.D(2)(b)(i) or (ii) or be provided with a method of x-ray control which will permit the operator to be at least 6 feet (3.66m) from the tube housing assembly and out of the useful beam during an exposure.

(2) The x-ray control shall provide visual indication observable at or from the operator's protected position whenever x-rays are produced. In addition, a signal audible to the operator, if available to the unit, shall indicate that the exposure has terminated.

E. Exposure Reproducibility. The coefficient of variation shall not exceed 0.10 when all technique factors are held constant. This requirement shall be deemed to have been met if, when 4 exposures are made at identical technique factors, that the value of the average exposure (E) is greater than or equal to 5 times the maximum exposure (Emax), minus the minimum exposure (Emin):

i.e., E > 5(Emax- Emin). operator shall indicate that the exposure has terminated.

F. Administrative Controls.

(1) Patient and film holding devices shall be used when the techniques permit.

(2) The tube housing and the PID shall not be hand-held during an exposure.

(3) The x-ray system shall be operated in such a manner that the useful beam at the patient's skin does not exceed the requirements of F.8.B.(1).

(4) Dental fluoroscopy without image intensification shall not be used

G. Additional Requirements Applicable to Certified Systems Only. Only diagnostic x-ray systems incorporating one or more certified component(s) shall be required to comply with the following additional requirements(s) which relate to that certified component(s).

(1) Reproducibility. When the equipment is operated on an adequate power supply as specified by the manufacturer, the estimated coefficient of variation of radiation exposures shall be no greater than 0.05, for any specific combination of selected technique factors.

(2) Linearity. When the equipment allows a choice of x-ray tube current settings and is operated on a power supply as specified by the manufacturer in accordance with the requirements of applicable Federal standards, for any fixed x-ray tube potential within the range of 40 percent to 100 percent of the maximum rating, the average ratios of exposure to the indicated milliampere-seconds product, obtained at any 2 consecutive tube current settings shall not differ by more than 0.10 times their sum, where X1 and X2 are average mR/mAs values obtained at each of 2 consecutive tube current settings.

(3) Accuracy. Deviation of technique factors from indicated values shall not exceed the limits specified for that system by its manufacturer. In the absence of the manufacturer's specifications the deviation shall not exceed 10% of the indicated value.

(4) Timers. Termination of exposure shall cause automatic resetting of the timer to its initial setting or to "zero".

. (5) Beam Quality. All certified dental x-ray systems manufactured on or after December 1, 1980, shall have a minimum half-value layer not less than 1.5 millimeters aluminum equivalent. Systems operating above 70 kVp are subject to the filtration requirements of F.5.E.(1).