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Test Equipment and Repair Facility

The company has an on-site test equipment and repair facility. Much of the test equipment contains a radiation source. Normal practice inside the facility is to limit the time of exposure of employees working on this equipment as a method of control. However, the company is looking at the possibility of installing lead shields or increasing the distance from the source, thus increasing employee time working on equipment. Based on the following information determine the employee's exposure:

Location	Employee	Distance (Initial)	Distance (Proposed)	Intensity (Initial)	Intensity at proposed distance
Bench #3	Rita Ray D'Ashun	0.5 ft.	2 ft.	110 mrem/h	Unknown
Bench #5	Robert Long	1 ft.	3 ft.	137 mrem/h	Unknown
Bench #6	Paul Row	0.75 ft.	1.5 ft.	102 mrem/h	Unknown

Based on this information, determine the employee's actual exposure rate to the radiation source. Show your work (either in the report or as an appendix).

The second option under consideration is to install lead shields in order to reduce the employee's dose rate. Using the information provided in the table above, determine the intensity at the same distances listed above if a 5 cm lead shield was placed between the source and the detector. [μ for lead, (662 keV gamma ray) = 1.23 cm^{-1}]

Radar Testing Facility

As part of your assessment, you have been asked to evaluate the estimated power density levels for both near and far fields. When there is no gain listed in the problem, always defer to a gain of 10. You have conducted your assessment and measurements with the following data:

Location	Diameter (cm)	Antenna Power (watts)	Power Density (Near Field) (mW/cm ²)	Power Density (Far Field) (mW/cm ²)
Radar Unit #1	48 in	50,000		
Radar Unit #2	26	110,000		

Laser Laboratory

Acme Manufacturing is currently considering constructing a laser laboratory, which will contain Class III, IIIA, and IIIB lasers. Identify the safety control measures that the client must consider before proceeding to the design phase of the project.

Respond to the details in each section, and format your report in APA style. Include *at least* each of the following in your report for this unit:

- Introduction-briefly describe why the studies were performed (*why you started the study*).
- Report details-briefly discuss the details of the scenario (*what you found from the study*).
- Conclusions and recommendations-briefly describe your recommendations based on your findings (*what you recommend to resolve any deficiencies*).
- Appendix-Measurements and calculations (show your work).
- At least one page (double-spaced) in length (*not including the reference page and appendices*).

Prepare your report in a word-processing application (i.e., Word) using APA formatting for all references and in-text citations.

Unit IV Project

Hazardous Noises Report

After receiving good remarks from your previous work, you hear that Acme Manufacturing Co. has asked you and BSCI to return for some additional work. BSCI has been contracted by Acme Manufacturing Co. to conduct a study to determine employee exposures to noise. In addition, Acme Manufacturing Co. has requested that, while on site, you conduct a needs analysis to determine the development of a new safety training program, exhibiting training and management techniques. Explain your methodology and the steps in conducting this needs analysis. After conducting a field assessment, prepare a written report for Bob Sanders (CSP) to present to the Board of Directors. During your field investigation, you find the following field observations:

Machine Shop #1

The company has an on-site maintenance and repair facility. Inside Machine Shop #1, there are five employees that operate a variety of machines, ranging from stationary and portable grinders, drill presses, and metal shearers. Based on the information provided in the following table, determine the individual employee's exposure: (DO NOT COMBINE NOISE LEVELS)

Location	Employee	Sample #1	Sample Time #1	Sample #2	Sample Time #2	Sample #3	Sample Time #3
Stationary Grinding Wheel	Robert Jones	82 dBA	90 min	91 dBA	125 min	83 dBA	265 min
Drill Press #4	Clara Tucker	89 dBA	135 min	79 dBA	249 min	81 dBA	96 min
Metal Shear #2	Rick Starnes	75 dBA	283 min	94 dBA	39 min	84 dBA	158 min
Metal Shear #3	Jennie Gump	83 dBA	114 min	73 dBA	239 min	95 dBA	127 min
Bench Press #7	Bernie Edwards	73 dBA	203 min	79 dBA	172 min	83 dBA	105 min

Carpentry Shop #2

Inside Carpentry Shop #2, there are six machines operating almost continuously, including table saws, planers, exhaust systems, jointers, with 10 employees working in this area. To determine whether this table should be designated as a hazardous noise environment, thus requiring employees to be entered into the hearing conservation program, you must calculate combined exposures and treat the entire area as one noise source. The following table indicates the recorded measurements that you collected during your on-site assessment. Does the data from this table indicate a hazardous noise environment, and do you recommend entering employees into a hearing conservation program?

Machine	Noise Level (dBA)
Table Saw #3	92 dBA
Jointer #4	87 dBA
Table Saw #5	90 dBA
Exhaust Ventilation System	80 dBA
Planer #2	84 dBA
Drill Press #1	79 dBA

Electronic Communication Repair Shop

Acme Manufacturing is currently considering remodeling this shop in order to install a new noise absorbing wall and floor insulation. They have asked that you review the previous history of noise level exposures in this area and provide your recommendations. However, this data is given in measurements of N/m^2 , but the Project Engineer is requesting the information in W/m^2 . Given the following data, convert N/m^2 to W/m^2 and include it in your report:

Date	Location	SPL (N/m^2)
4/12/10	East Wall	0.0683 N/m^2
4/12/10	West Wall	0.0742 N/m^2
4/12/10	South Wall	0.0813 N/m^2
4/12/10	North Wall	0.0699 N/m^2

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Unit V Project

Thermal Stressors Report

Bob Sanders (your supervisor) has another job for you. Acme Manufacturing Co. was impressed by your last report, and they have asked you to return to complete another job. BSCI has been contracted by Acme Manufacturing Co. to conduct a study at one of its facilities to determine employee exposures to various thermal stressors at different times. You are to conduct this study in January and July of 2012. After collecting and recording data from the field assessments, prepare a written report for Bob Sanders (CSP) to present to the Board of Directors. During your field investigations, you find the following field observations:



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