

Appendix A –
EDF-3124-0001, *Estimate of Excavation for the NWMI Radioisotope Production Facility*

Engineering Design File

Estimate of Excavation for the NWMI Radioisotope Production Facility

Portage Project No.: 3124
Project Title: NWMI Environmental Report



TEM-9002
09/29/09
Rev. 0

1. Portage Project No.: 3124 2. Project/Task: NWMI Environmental Report

3. DCN # _____

4. Title: Estimate of excavation for the NWMI Radioisotope Production Facility

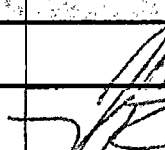
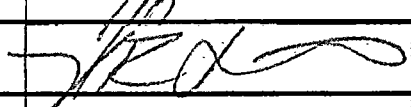
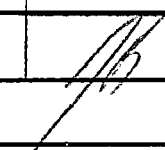
5. NPH PC or SDC: N/A

6. SSC Safety Category: N/A

7 Summary: The attached calculations provide an estimate of the volume of soil that would be required to be excavated during construction activities for the Northwest Medical Isotopes, LLC (NWMI) Radioisotope Production Facility. The total volume of soil anticipated to be excavated is 9,000 cubic yards (yd³) (with a 10 percent buffer).

8 Distribution: (Portage, Inc.)

9. Review (R) and Approval (A) Signatures:
(Identify minimum reviews and approvals. Additional reviews/approvals may be added.)

	R/A	Printed Name/ Organization	Signature	Date
Author/Design Agent	A	John Beller		2/2/15
Independent Review	R	Jim Jackson		2/2/15
Independent Review	R			
Project Manager	R/A	John Beller		2/2/15
Registered Professional Engineer's Stamp (if required)			<input checked="" type="checkbox"/> N/A	

Radioisotope Production Facility Excavation

Clear and Grub

Assume 7.4 acres at 3 inches (in.)

Excavation volume: 322,344 square feet (ft²) x 0.25 feet (ft) = 80,586 cubic feet (ft³)

Footings

General assumptions

- Average footing depth: 2 ft
- Average footing width: 2 ft

RPF Process Area

Assumptions

- Length of exterior walls: 850 ft

Excavation volume: 850 ft x 2 ft x 2 ft = 3,400 ft³

RPF Support Area

Assumptions

- Length of exterior walls: 302 ft

Excavation volume: 302 ft x 2 ft x 2 ft = 1,208 ft³

Administration Building

Assumptions

- Length of exterior walls: 400 ft

Excavation volume: 400 ft x 2 ft x 2 ft = 1,600 ft³

Total footings excavation volume: 3,400 ft³ + 1,208 ft³ + 1,600 ft³ = 6,208 ft³

Tank Pit and High-Integrity Container (HIC) Storage Area

General assumptions

- Tank pit surface area: 2,870 ft²
- HIC storage surface area: 2,987 ft²
- Add ½-ft excess excavation: 178 ft²
- Excavation depth: 15.5 ft

Total area: 2,870 ft² + 2,987 ft² + 178 ft² = 6,035 ft²

Total hot cell excavation volume: 6,035 ft² x 15.5 ft = 93,543 ft³

Irradiated Target Receipt and Transfer Area to Hot Cell

General assumptions

- Surface area: 62 ft x 13 ft = 806 ft²
- Add ½-ft excess excavation: 75 ft²
- Depth: 9 ft

Total area: 806 ft² + 75 ft² = 881 ft²

Total irradiated target receipt and transfer area excavation volume: 881 ft² x 9 ft = 7,929 ft³

Waste Management Area Truck Ramp

General assumptions

- Depth: 6 ft
- Ramp length to get to 6 ft: 60 ft
- Ramp length at 6 ft: 127 ft

Surface area at 6-ft depth (level): $27 \text{ ft} \times 127 \text{ ft} = 3,429 \text{ ft}^2$

- Add ½-ft excess excavation: 154 ft^2

Total excavation surface area: $3,429 \text{ ft}^2 + 154 \text{ ft}^2 = 3,583 \text{ ft}^2$

Total excavation volume at maximum depth (6 ft): $3,583 \text{ ft}^2 \times 6 \text{ ft} = 21,498 \text{ ft}^3$

Surface area of ramp angle to depth (6 ft): $27 \text{ ft} \times 60 \text{ ft} = 1,620 \text{ ft}^2$

- Add ½-ft excess excavation: 87 ft^2

Total ramp angle excavation surface area: $1,620 \text{ ft}^2 + 87 \text{ ft}^2 = 1,707 \text{ ft}^2$

Total ramp angle excavation volume: $\frac{1}{2} \times (1,707 \text{ ft}^2 \times 6 \text{ ft}) = 5,121 \text{ ft}^3$

Total truck ramp excavation volume: $5,121 \text{ ft}^3 + 21,498 \text{ ft}^3 = 26,619 \text{ ft}^3$

Total RPF Excavation

Clear and grub:	80,586 ft ³
Footings:	6,208 ft ³
Tank pit and HIC storage area:	93,543 ft ³
Irradiated target receipt/transfer area:	7,929 ft ³
Waste management truck ramp:	<u>26,619 ft³</u>
Total	214,885 ft ³ → 7,959 yd ³
Add 10% extra	<u>21,489 ft³ → 796 yd³</u>
Total with 10% Extra	236,374 ft ³ → 8,755 yd ³

Use 243,000 ft³ → 9,000 yd³ for Environmental Report calculations

Figure 1 presents the facility and locations outlined.

[Proprietary Information]

Figure 1. Radioisotope Production Facility Layout

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