Bringing State-of-the-Art Technology to a Developing Country:

A Capacity Building and Knowledge Transfer Success Story

Jim Galligan – TerraTherm, Inc.

Gorm Heron, John Bierschenk, Richard Michalewich and Stanley Walker, Glenn Anderson, Tim Burdett, Dzung Tran, Christopher Pruitt - ***TerraTherm, Inc.***
Kent Sorenson, Peter Chenevey – ***CDM Smith***

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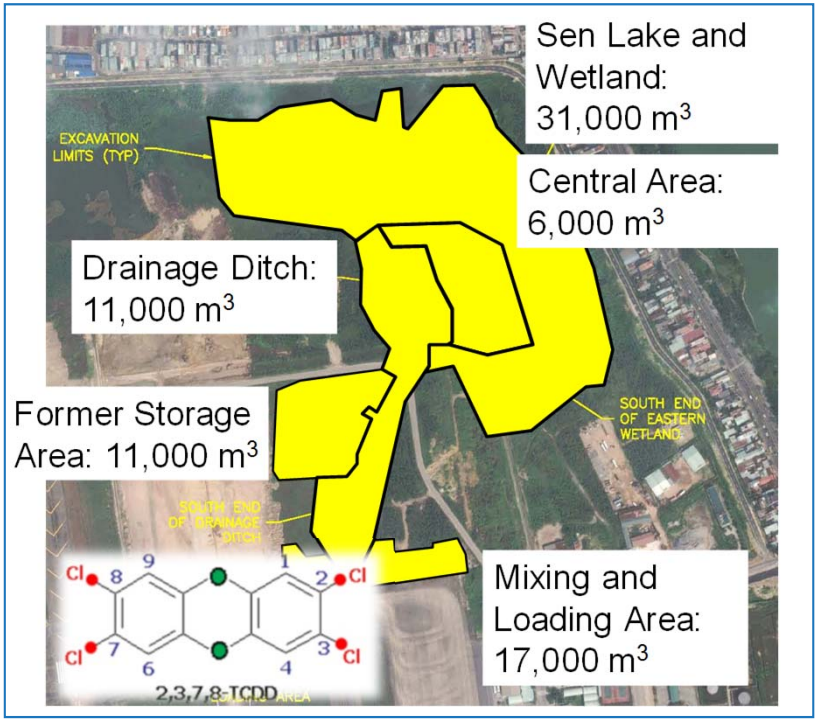
Acknowledgements

The Danang Airbase project was funded by USAID and USAID has approved TerraTherm's use of project data for this presentation

Dioxin Contamination at Danang Airbase



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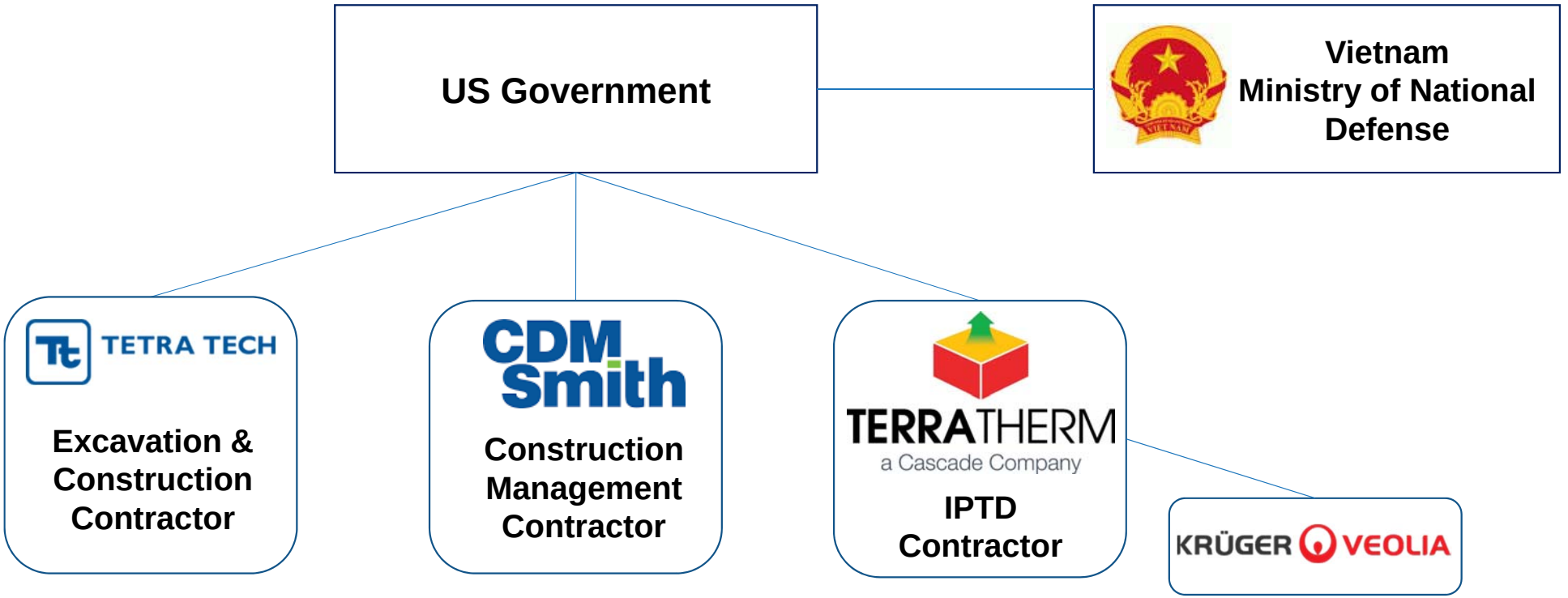
Danang Project Team



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Supporting the Mission

- Delivering “Aid from the American People”
  - End extreme poverty
  - Promote development of free, peaceful and self-reliant societies
  - Help people and governments in developing nations build human capital

- Critical objective for Danang Project: **Capacity Building**
  - **Teach, train, transfer knowledge**

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What Was Accomplished?

- Implemented first-of-its-kind remediation system supported by local Vietnamese contractors & employees
- Trained local Vietnamese workers to international safety standards; Worked >400,000 hours without lost time incident
- Treated >87,000 m^3 soil/sediment
  - Starting with high levels of dioxin (mean 56,000 ppt)
  - Treated to <150 parts per trillion (ppt); Most treated below <1 ppt.
- *Significantly reduced the risk of dioxin exposure to the people and environment of Vietnam for an improved quality of life*

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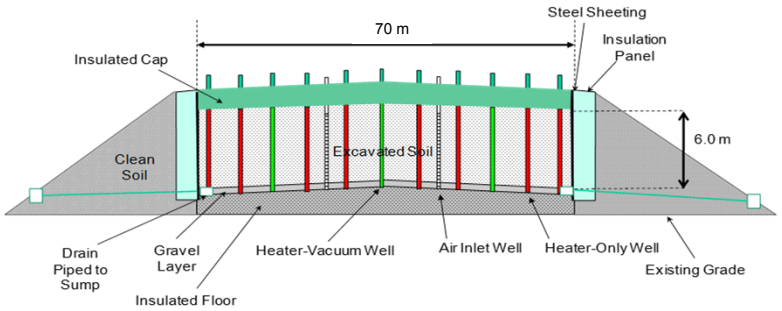
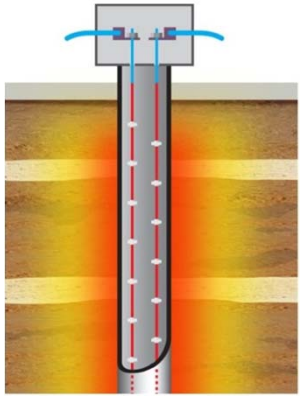
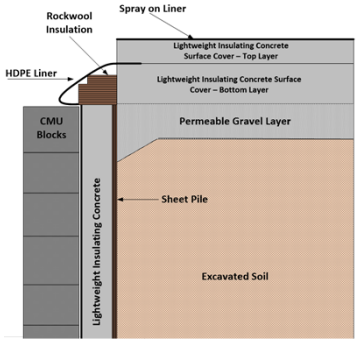
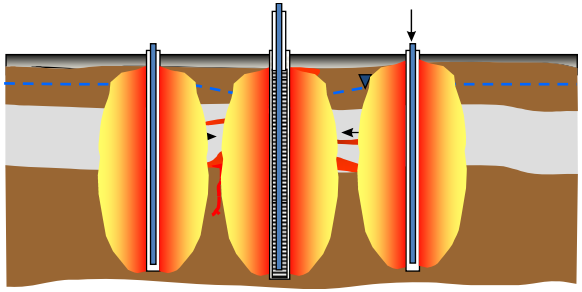
IPTD® Technology

- Thermal Conduction Heating (TCH)
- IPTD® = Aboveground TCH
- Treatment Goal:
  - Soil & sediment: <150 ppt
  - 325°C for ~21 days









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IPTD® System Construction

IPTD® pile construction & filling

Heater can installation

Insulating cover

Heater installation

Vapor & liquid treatment plant construction

Completed surface – Phase 2

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IPTD® System in Operation

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Local Weather Challenges

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IPTD® System Operation

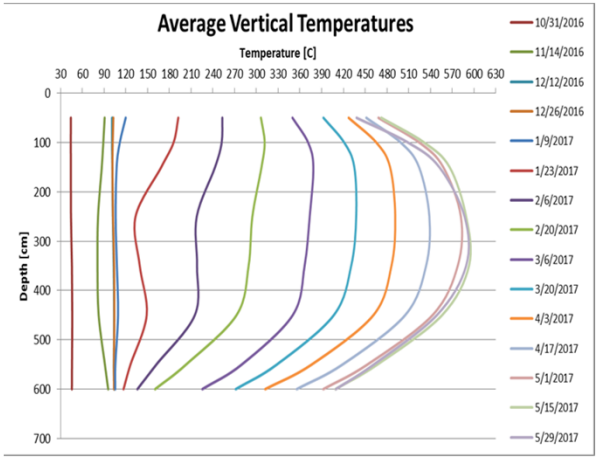
Phase 1 (2014/2015)

- 43,348 m^3
- Heated 413 days
- Mean Post-treatment: 8.9 ppt TEQ Dioxin
- ~90% - 97% DRE

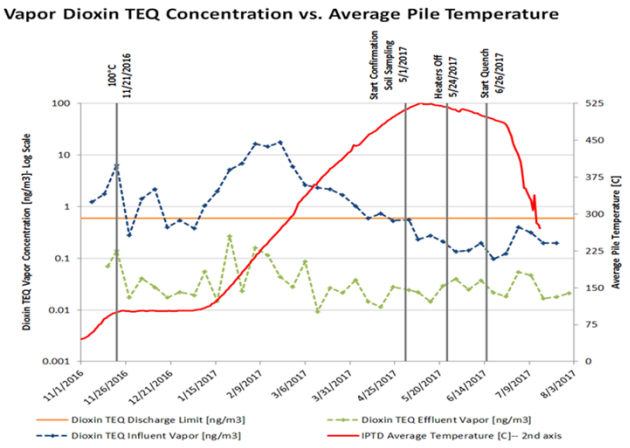
Phase 2 (2016/2017)

- 43,747 m^3
- Heated 205 days
- Mean Post-treatment: 0.199 ppt TEQ Dioxin
- >99.99% DRE

Temperature Monitoring



Plant Effluent Monitoring



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Capacity Building: How?

- Identify & pre-qualify local partners and suppliers
- Communicate standards and expectations
- Provide training
- Work together to achieve goals
- Collaborate & communicate with Government officials
- Provide learning opportunities for Government officials & public

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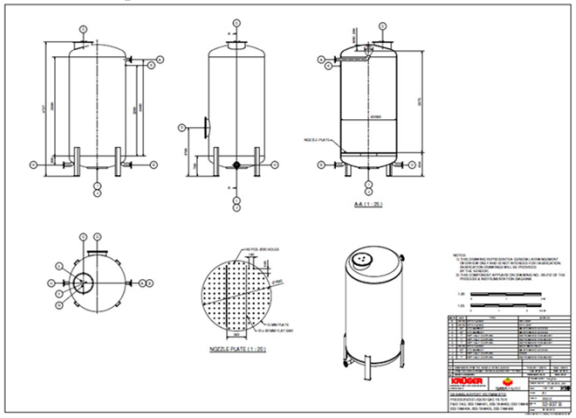
Capacity Building: Partners & Suppliers

- Identify Partners & Suppliers
- Communicate standards and expectations



4-1: The Supplier shall supply the documentation as listed here below within the period specified / *Bên bán phải cung cấp các tài liệu trong danh sách bên dưới trong thời gian cụ thể.*

Tick if required *Đánh dấu nếu yêu cầu*		Description of documents *Mô tả tài liệu*	Issuer *Người phát hành*	Quantity *Số lượng*	Language *Ngôn ngữ*	Time for submission *Thời gian giao*
Technical Documents / *Các tài liệu cần có*						
	x	Purchase order acknowledgement copy / *Xác nhận đặt hàng*	EVNCEMC	1	English	After signing PO
	x	Detail programme of manufacture and delivery / *Kế hoạch chi tiết việc sản xuất và giao hàng*	EVNCEMC	1	English	After approving design
		Document submission schedule / *Kế hoạch bàn giao tài liệu*				
	x	QA/QC Plan / *Kế hoạch Quản lý Chất lượng*	EVNCEMC	1	English	After approving design
	x	Drawing / Equipment layout / Technical documents *Bản vẽ / Sơ đồ thiết bị / Tài liệu kỹ thuật*	EVNCEMC	1	English	After signing PO
	x	Testing and inspection plan / *Kế hoạch nghiệm thu và thử nghiệm*	EVNCEMC	1	English	Before delivery
		Cleaning procedure / *Quy trình làm sạch*				
		Surface treatment procedure / *Quy trình xử lý bề mặt*				
	x	Welding procedures / *Các quy trình hàn*	EVNCEMC	1	English	After approving design
	x	Welder's certificates / *Các chứng chỉ đường hàn*	EVNCEMC	1	English	Before delivery
		Catalogues / Ca ta lô				
		Operation & maintenance manuals / *Hướng dẫn vận hành và bảo trì*				
		Installation manuals / *Hướng dẫn lắp đặt*				
		Handling and storage instructions / *Chỉ dẫn giao hàng và lưu kho*				
	x	Supplier to provide painting reference / *Người bán cung cấp việc tham khảo sơ*	EVNCEMC	1	English	After approving design
	x	Mill and/or material certificates / *Chứng nhận vật tư / xuất xưởng*	EVNCEMC	1	English	Before delivery
	x	Factory acceptance test report / *Báo cáo kiểm tra trước khi xuất xưởng*	EVNCEMC	1	English	Before delivery
		As built certified drawings / *Các bản vẽ hoàn công*				
	x	Quality compliance certificate / *Chứng chỉ Chất lượng*	EVNCEMC	1	English	Before delivery
		Motor test certificate / *Kiểm tra nghiệm thu mô tơ*				
	x	Leakage test report / *Kiểm tra nghiệm thu rò rỉ*	EVNCEMC	1	English	Before delivery
		Spark test survey report / *Kiểm tra nghiệm thu rò điện*				
		Hydraulic test report / *Kiểm tra nghiệm thu nước*				
		Performance testing / *Kiểm tra hoạt động*				
		Calibration certificate / *Chứng nhận hiệu chỉnh*				
		FDA certificate / *Chứng nhận FDA*				
	x	Packing List / *Danh mục hàng hóa*	EVNCEMC	1	English	Before delivery
	x	Weight certificate / *Chứng nhận khối lượng*	EVNCEMC	1	English	Before delivery

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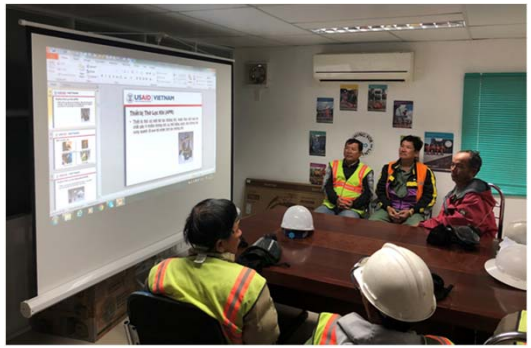
Capacity Building: Training

- Construction safety
- Health & safety
- Quality standards
- “Train-the-Trainers”



Các độc tố trên công trường

Được tính toán trong tình huống xấu nhất Giới hạn phơi nhiễm là137 µg/m^3

BẢNG TÍNH PHƠI NHIỄM BỤI BẨN

Mức độ bụi bẩn			Chỉ số an toàn cho công trường này= 4
Hóa học	Giới hạn Phơi nhiễm (mg/m3)	Hàm lượng dất tối đa (mg/kg)	Giới hạn phơi nhiễm Dựa trên Hợp chất đơn lẻ (EL Mix, mg/m3)
Dioxin (tetra)	2.00E-07	0,365	,14
			Sum
		Mức độ phơi nhiễm bụi bẩn ở hỗn hợp PEL =	0,137

Hãy tìm số đó trong bài giảng quan trắc không khí

Bảo hộ cấp độ B

- Bảo hộ cấp độ B bao gồm
  - Bộ trang phục không kín
  - Mặt nạ khí
  - Nếu được sử dụng để đi vào, người mặc phải ở cấp độ Kỹ thuật viên
  - Có thể được sử dụng cho dây chuyền khử nhiễm độc
- Sự khác biệt chính so với cấp độ C là thiết bị thở độc lập (SCBA)

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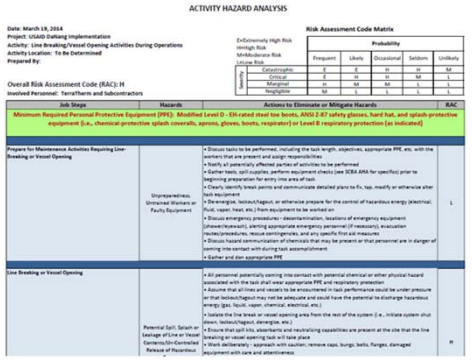
Capacity Building: Training

- Provided 1,396 individual trainings
- Over 6,300 hrs of training to VN staff



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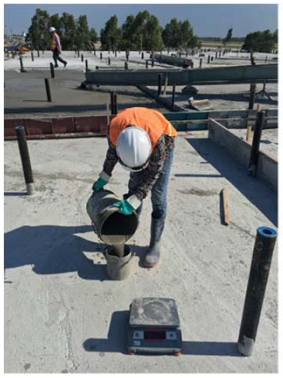
Capacity Building: Quality Standards

- International quality standards
  - Manufacturing
  - Construction
- On-site quality control inspections



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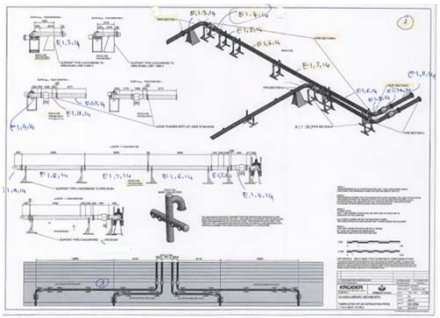
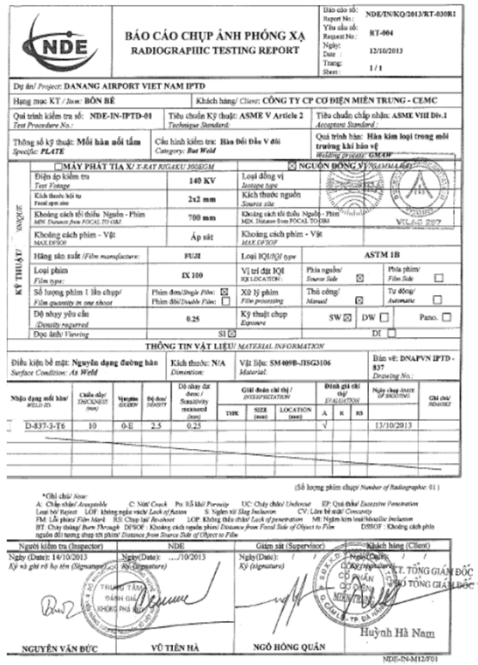
Capacity Building: Quality Standards

- International quality standards
  - Manufacturing
  - Construction
- Manufacturer QC Documentation





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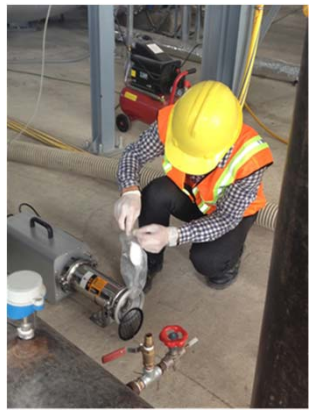
Capacity Building: Collaboration

- Split samples with GVN scientists
- Data sharing
- GVN scientists conducted parallel sampling & analysis at local VN labs



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Capacity Building: Collaboration

- Coordination meetings with GVN officials
- Technical workshops for scientists & regulators
- Community outreach meetings

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Capacity Building: Results

- Technical success! Project remediated dioxin contamination, improving conditions in the local environment

- Implemented "first-of-its-kind" innovative technology approach with major contributions by local Vietnamese workforce
  - Large Vietnamese workforce trained to international standards for safety & quality
  - Major equipment fabrication and construction activities performed by local Vietnamese contractors
- Enhanced collaboration with Vietnamese scientists & Agency representatives

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Capacity Building Model

Roles & Benefits

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Câu hỏi?

Questions?

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Thank you

Jim Galligan
TerraTherm, Inc.
+1 978-730-1214
jgalligan@terratherm.com

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