ENERGYSOLUTIONS

TeleView 3000

Fence Line Monitoring

Introduction

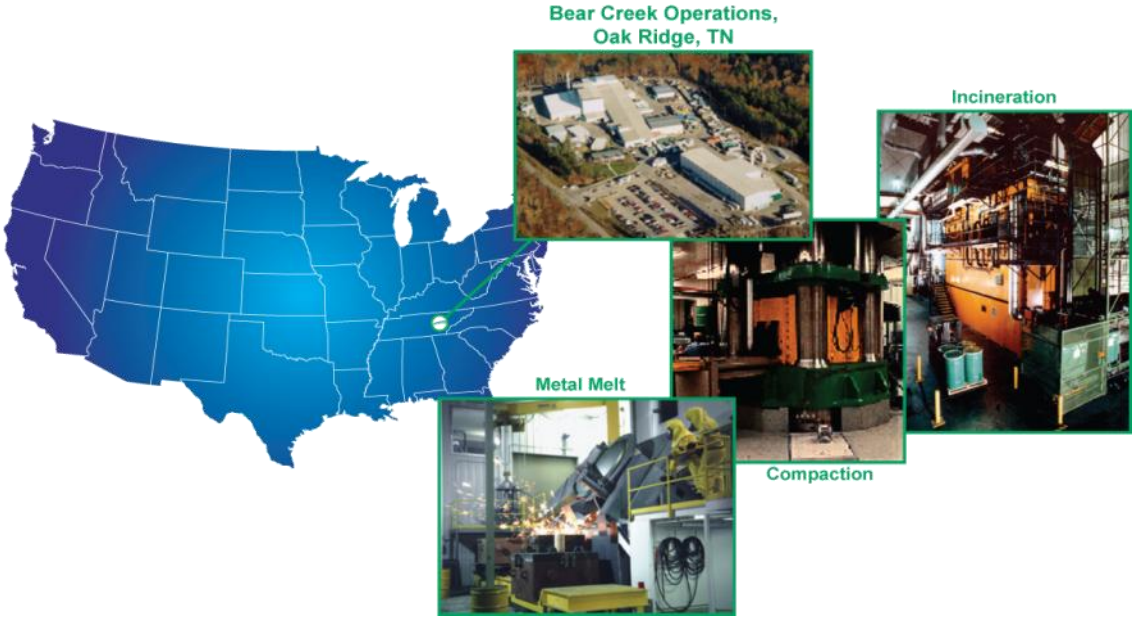
- Energy*Solutions* and Bear Creek overview
- Monitoring requirements for individual MOTP
- Fence line monitoring before TeleView
- Why TeleView?
- TeleView system
- TeleView data for compliance
- Questions

Energy*Solutions at a glance*

- International nuclear services company headquartered in Salt Lake City, Utah
- Operations in the United States, Canada, Japan, and China
- Owner of the world's largest, privately owned Class A low-level radioactive waste disposal facility (Clive, Utah)
- Primary customers include: nuclear utilities, fuel producers, medical and research facilities, US DOE, and US DOD
- License stewardship for the decommissioning of the Zion and Dairyland nuclear power plants

Bear Creek Processing Facility
Oak Ridge, TN

- Incineration
  - 2 commercial low-level radioactive units
  - Solids, liquids, oils and sludges
- Compaction
- Metal melt furnace
- Lead casting/recycle
- Commercial certification
- Mixed waste treatment permit



TN-OSHA VPP SITE since 2008

Monitoring Requirements for Individual MOTP

Compliance with annual dose limits shall be documented and based upon surveys, effluent data, and related calculations to meet:

- TEDE
  - 100 mrem/yr to the member of the public
  - Bear Creek Admin Limit – 80 mrem/yr
- External
  - 2.0 mrem in any hour
  - Bear Creek Admin Limit of 1.6 mrem in any hour
- Internal
  - Internal demonstrated using effluent stack monitoring
  - Very minimal contributing factor

Fence Line Monitoring before TeleView

- Weekly Fence Line Survey
  - Walking the fence line w/meter
  - Bicron µrem Meter
- TLD's
  - Mirion environmental TLDs
  - TDRH has TLDs at select locations
  - Changed quarterly
- Effluent Stack Monitoring
  - H-3/C-14 primary radionuclides of concern
  - Glycol sampling for H-3 with on site lab analysis
  - C-14 based on manifested activity

Why TeleView?

- Technician safety and time
  - *Snakes* and other animals
  - Heat
  - Slips, trips, and falls
  - Time savings

    Weekly Survey – 1½ - 2 Hours
- Real-time monitoring
- Increase of elevated dose containers
  - Added new high rad process
  - Container movement

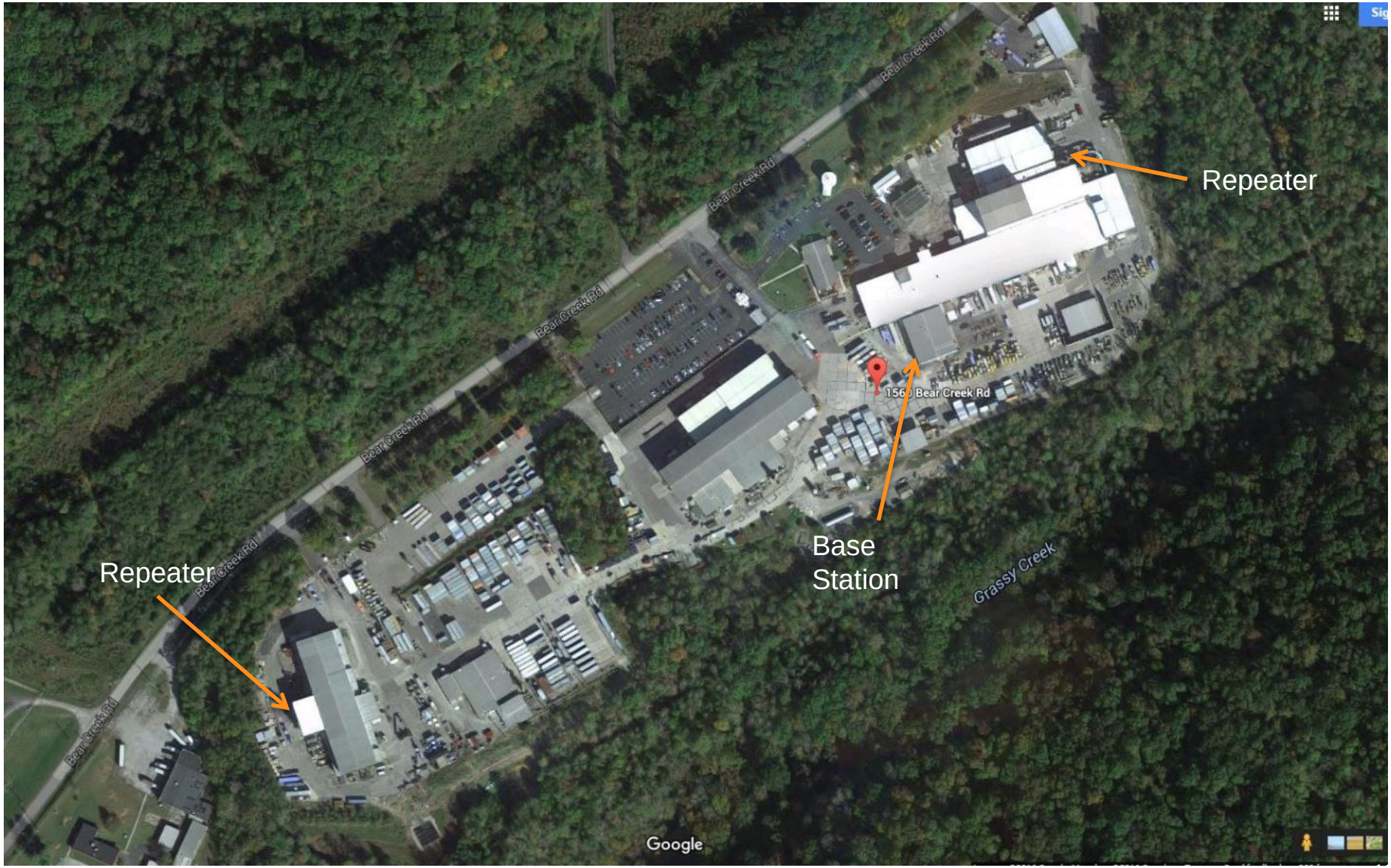
TeleView System

- 11 Mirion RDS-31iTx detectors
  - High TLD fence line locations
  - Around new high rad process
  - Crane for high rad process
    - Sky shine
- Power options
  - Battery – 2
  - Solar – 6
  - AC – 3 Crane
- 1 base station
- 2 repeaters
- TeleView software

Solar Station

Solar Station - 2 Part Set-up

Base Station & Repeater Locations



Base Station

Repeaters

TeleView 3000

ENERGYSOLUTIONS

TeleView 3000

Login

Views | Config | About

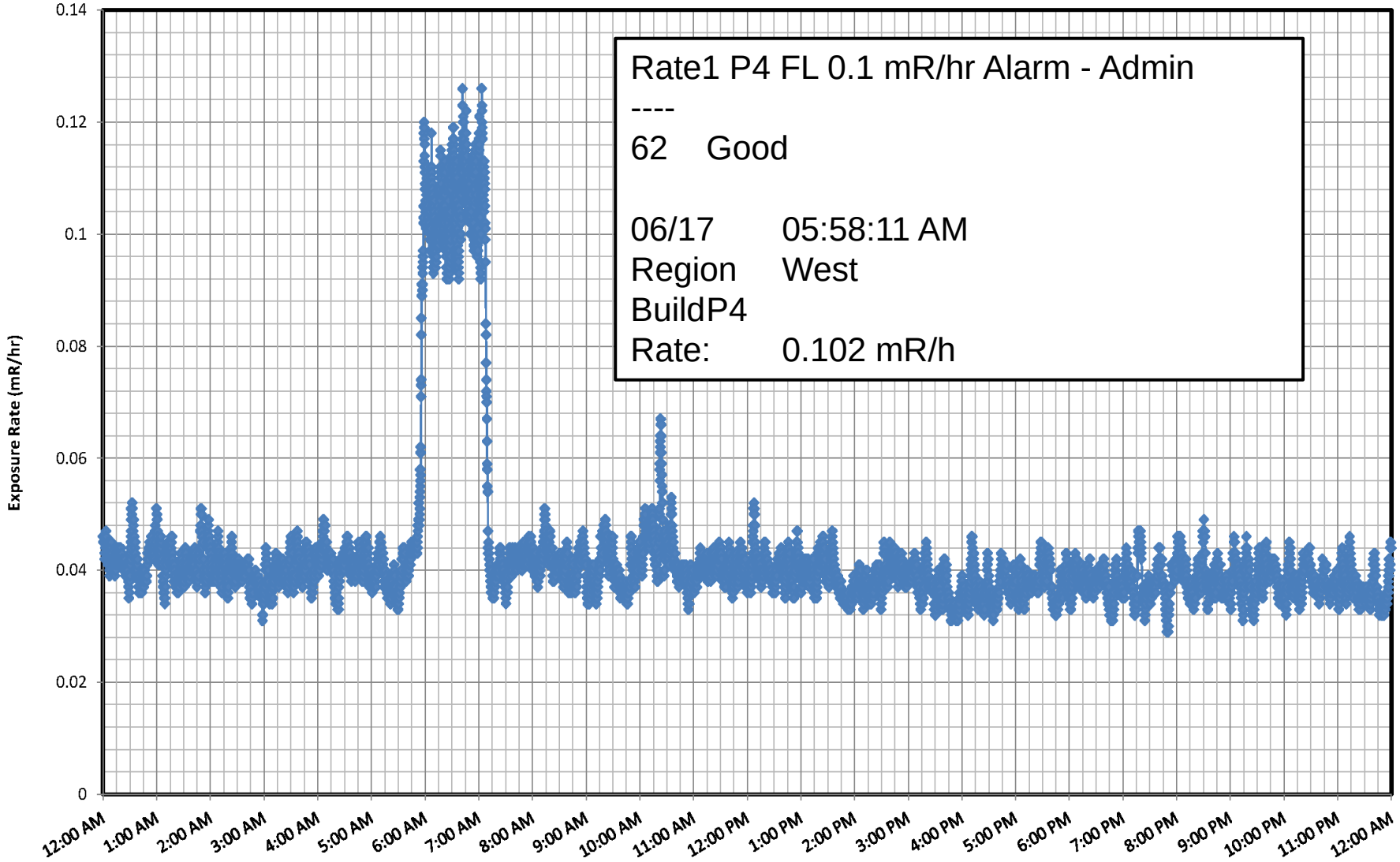
BC FenceLine		[redacted]	γ
Device Cnt:	8	High Rate:	0.048 mr/h γ
Alarm Cnt:	0	High Alarm:	

Monitoring and Forecasting with TeleView

- ***Not*** compliance data

  TLDs and effluent stack data are used for compliance
- Elevated fence line notifications to alert individuals of potential problems
- Sky shine evaluations
  - Elevated fence line not due to direct radiation
  - Crane detectors used to evaluate direct radiation in overhead of building
  - Helps identify storage locations impacting the fence line
  - Then can use spare detector on crane hook to pinpoint areas of concern
- Examples of TeleView data assessment

Elevated Fence Line



Temporal Summary

- Daily average at each location
- Color coded to show trending of interest

1st QUARTER

Location	Jan 1	Jan 2	Jan 3	Jan 4	Jan 5	Jan 6	Jan 7	Jan 8	Jan 9	Jan 10	Jan 11	Jan 12	Jan 13	Jan 14	Jan 15	Jan 16	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22	Jan 23	Jan 24	Jan 25	Jan 26	Jan 27	Jan 28	Jan 29	Jan 30	Jan 31
09	47	46	48				43	43	44	43	43	43	42	40	35	34	34	33	32	32	33	35	33	33	37	38	38	38	39	39	41
49	56	56	56				54	53	54	54	53	53	51	51	51	51	51	50	48	48	48	50	48	48	47	47	44	43	43	44	43
62	29	29	29				33	32	32	32	32	33	39	49	41	39	39	37	38	43	38	35	34	34	38	38	49	47	35	34	34
70	18	17	17				18	18	18	18	18	19	19	20	20	20	19	19	20	21	20	21	20	20	21	20	22	22	22	21	21
74	17	17	18				18	18	18	17	18	19	19	20	20	20	19	19	21	22	21	22	21	21	21	22	22	23	22	21	20
79	20	21	20				20	20	20	20	21	22	22	22	22	22	22	22	23	24	24	24	23	23	24	23	24	24	23	22	22
81	18	18	19				19	19	19	19	19	19	19	19	19	19	19	19	20	21	20	21	20	19	20	20	20	20	20	20	19
88	28	28	28				28	28	28	28	28	30	30	31	32	31	31	30	30	31	31	32	30	30	32	30	30	28	28	28	27

Location	Feb 1	Feb 2	Feb 3	Feb 4	Feb 5	Feb 6	Feb 7	Feb 8	Feb 9	Feb 10	Feb 11	Feb 12	Feb 13	Feb 14	Feb 15	Feb 16	Feb 17	Feb 18	Feb 19	Feb 20	Feb 21	Feb 22	Feb 23	Feb 24	Feb 25	Feb 26	Feb 27	Feb 28	Feb 29
09	41	41	41	42	42	42	42	42	43	43	43	44	43	43	44	45	44	39	39	42	42	43	41	37	35	36	37	39	40
49	43	43	45	46	46	47	47	47	47	46	47	46	46	46	47	47	46	46	46	46	47	47	47	46	45	45	46	46	45
62	33	32	32	35	41	34	32	33	36	34	35	35	34	35	35	36	33	39	50	50	50	53	56	56	54	55	68	65	51
70	21	20	21	21	23	21	21	22	21	21	20	20	20	20	21	22	22	21	20	20	20	22	23	22	20	20	20	20	20
74	21	21	21	21	24	21	21	23	22	21	21	21	21	21	21	23	23	21	20	19	19	22	23	22	20	20	20	20	20
79	22	22	23	23	27	23	23	25	23	22	22	22	22	22	23	25	27	25	22	21	21	25	28	27	22	22	22	23	23
81	20	19	20	20	24	20	20	22	20	19	19	19	19	19	20	23	27	23	20	19	19	26	30	27	21	21	21	21	22
88	28	29	28	28	36	29	29	41	29	29	28	28	28	28	29	39	49	39	37	34	35	48	49	50	38	36	36	37	38

Location	Mar 1	Mar 2	Mar 3	Mar 4	Mar 5	Mar 6	Mar 7	Mar 8	Mar 9	Mar 10	Mar 11	Mar 12	Mar 13	Mar 14	Mar 15	Mar 16	Mar 17	Mar 18	Mar 19	Mar 20	Mar 21	Mar 22	Mar 23	Mar 24	Mar 25	Mar 26	Mar 27	Mar 28	Mar 29	Mar 30	Mar 31	Location
09	39	38	39	40	40	40	41	40	43	45	43	43	42	40	35	35	38	38	39	38	39	41	42	46	48	48	49	49	49	49	49	09
49	44	45	45	45	46	46	47	47	48	49	50	50	49	51	51	51	52	53	53	53	53	53	55	54	54	54	54	53	53	52	54	49
62	32	30	31	31	32	31	31	32	31	37	46	39	39	41	43	42	41	39	31	31	30	28	31	36	37	36	36	37	37	41	36	62
70	20	20	20	20	20	20	20	20	19	20	22	22	22	22	22	23	22	22	22	22	21	21	21	22	22	22	22	23	24	24	24	70
74	21	21	21	21	21	20	20	19	20	21	23	22	23	23	23	25	23	24	24	24	23	23	23	24	24	24	24	25	26	27	27	74
79	24	24	24	23	23	23	23	22	22	23	25	24	25	26	26	28	26	26	26	26	27	27	27	27	27	27	27	27	29	32	31	79
81	22	23	22	21	20	20	20	20	22	24	26	25	25	24	22	25	22	22	22	22	26	31	31	26	23	23	23	24	27	27	27	81
88	37	36	37	37	35	34	34	34	35	34	39	33	33	34	34	44	32	34	32	32	32	35	34	33	33	33	33	33	34	35	35	88

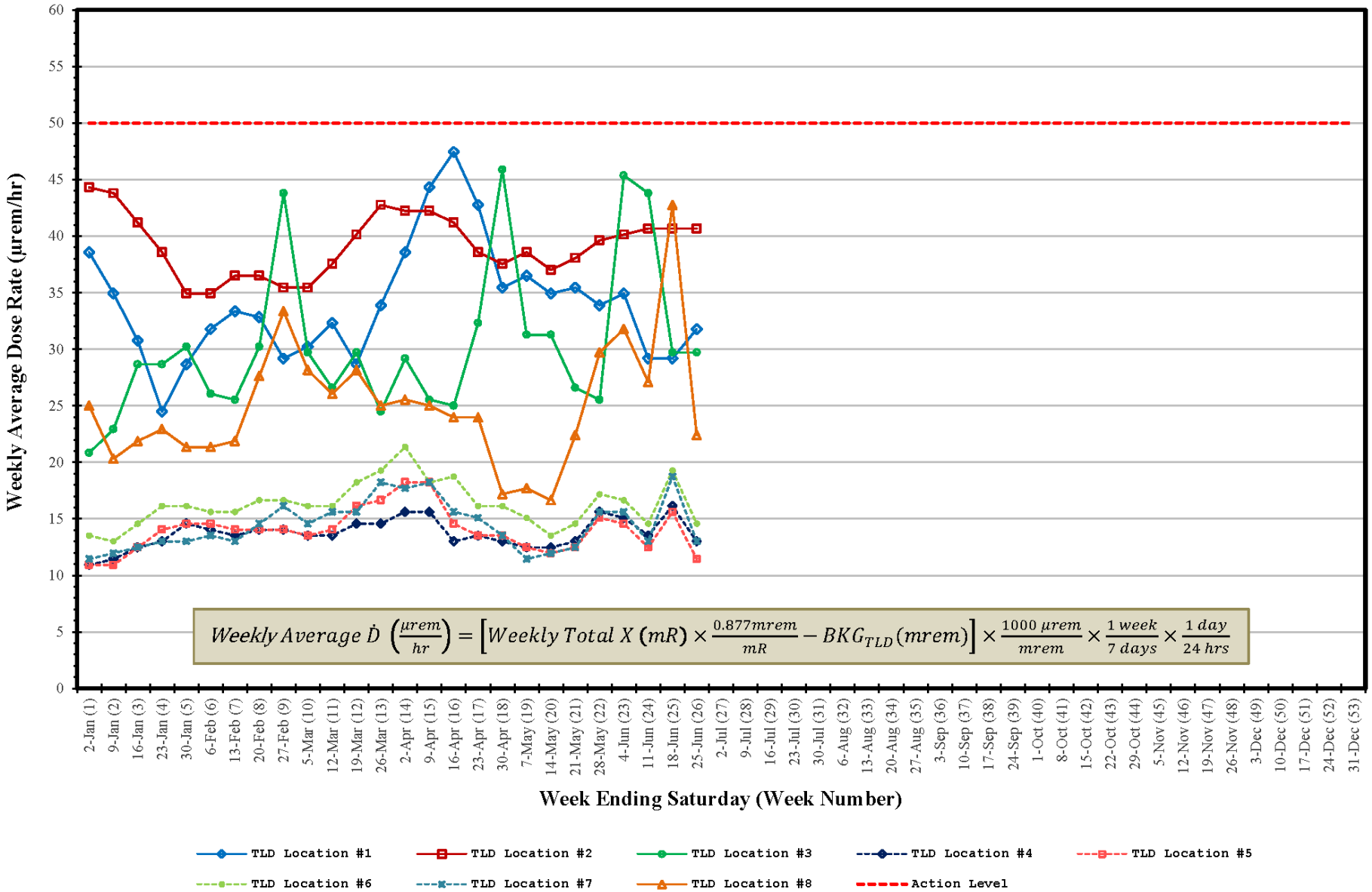
2nd QUARTER

Location	Apr 1	Apr 2	Apr 3	Apr 4	Apr 5	Apr 6	Apr 7	Apr 8	Apr 9	Apr 10	Apr 11	Apr 12	Apr 13	Apr 14	Apr 15	Apr 16	Apr 17	Apr 18	Apr 19	Apr 20	Apr 21	Apr 22	Apr 23	Apr 24	Apr 25	Apr 26	Apr 27	Apr 28	Apr 29	Apr 30
09	49	50	50	55	56	58	58	58	56	59	59	57	58	62	58	62	72	66	48	47	47	47	47	48	46	44	45	45	44	46
49	54	54	54	54	53	52	53	53	53	53	53	53	54	54	50	49	49	49	49	49	49	49	48	48	48	49	48	47	48	49
62	41	41	41	38	35	35	34	31	27	28	32	36	32	38	40	31	31	35	35	35	36	51	66	66	72	79	51	51	51	45
70	23	23	23	23	23	24	23	21	20	20	20	20	20	20	20	20	19	20	20	20	20	22	20	20	20	20	20	20	20	20
74	26	26	26	26	27	29	27	24	22	23	23	21	21	21	21	20	20	20	21	21	21	22	20	20	20	20	20	20	20	20
79	31	31	31	30	33	35	32	29	28	28	28	26	26	26	26				25	25	25	26	23	23	23	24	23	23	23	23
81	26	26	26	26	27	28	27	24	24	24	24	23	22	23	23	21	21	21	22	22	22	23	20	20	20	21	20	20	21	20
88	34	34	34	34	34	35	34	31	32	31	38	31	31	31	35	30	30	31	34	41	32	33	24	24	24	24	25	25	25	26

Location	May 1	May 2	May 3	May 4	May 5	May 6	May 7	May 8	May 9	May 10	May 11	May 12	May 13	May 14	May 15	May 16	May 17	May 18	May 19	May 20	May 21	May 22	May 23	May 24	May 25	May 26	May 27	May 28	May 29	May 30	May 31
09	45	46	47	47	48	46	47	47	46	44	44	44	44	45	47	47	45	46	47	45	43	43	44	43	43	43	44	45	45	45	45
49	49	48	48	49	49	49	49	49	49	48	48	47	46	47	47	46	47	49	49	51	51	51	51	51	51	50	50	49	49	49	50
62	44	41	35	39	42	42	39	39	38	37	41	42	45	44	43	38	33	34	36	34	31	31	32	33	37	40	32	33	34	33	33
70	19	19	20	20	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	21	21	22	23	23	22	24	24	23	23	23	25
74	19	19	20	19	19	19	18	19	18	18	19	19	19	19	19	19	19	18	18	21	21	21	22	23	21	24	24	22	22	22	23
79	23	23	23	22	22	21	21	21	21	20	21	21	21	21	21	21	21	21	23	23	23	24	25	24	25	25	24	25	25	27
81	20	20	20	19	18	18	18	18	17	18	18	18	19	19	19	19	19	19	21	21	21	22	23	22	23	24	24	23	23	26
88	25	25	27	26	19	23	23	23	23	23	24	25	26	25	25	25	23	25	31	54	33	33	40	40	39	39	42	40	39	40	66

Location	Jun 1	Jun 2	Jun 3	Jun 4	Jun 5	Jun 6	Jun 7	Jun 8	Jun 9	Jun 10	Jun 11	Jun 12	Jun 13	Jun 14	Jun 15	Jun 16	Jun 17	Jun 18	Jun 19	Jun 20	Jun 21	Jun 22	Jun 23	Jun 24	Jun 25	Jun 26	Jun 27	Jun 28	Jun 29	Jun 30	Location
09	45	45	44	46	47	44	36	34	35	36	36	36	37	37	36	37	41	42	43	43	41	41	41	40	42	44	47	45	41	44	09
49	51	52	51	51	51	51	51	51	51	52	52	52	52	52	52	52	52	51	52	51	51	52	52	52	51	51	52	52	51	52	49
62	33	33	91	147	145	77	33	33	33	32	32	32	37	42	39	39	43	38	38	39	39	40	41	40	39	39	42	39	34	33	62
70	23	22	20	20	20	20	20	20	19	19	19	20	22	27	27	27	24	19	19	19	19	20	20	20	19	19	19	19	19	19	70
74	22	22	20	19	19	19	20	19	19	19	19	19	22	26	25	25	24	18	18	18	18	18	19	18	18	18	18	18	18	18	74
79	24	24	22	22	21	22	22	22	22	22	22	22	22	25	30	30	30	27	22	22	22	22	22	21	21	21	21	21	22	22	79
81	22	23	20	20	19	20	20	21	21	21	20	20	24	30	30	30	26	20	20	20	20	21	19	19	19	19	19	20	20		81
88	38	46	35	33	33	35	39	35	36	35	35	35	48	68	67	66	58	33	33	33	32	30	32	28	27	27	27	27	30	30	88

Weekly Average Dose Rate



$$Weekly\ Average\ \dot{D}\ \left(\frac{\mu rem}{hr}\right) = \left[Weekly\ Total\ X\ (mR) \times \frac{0.877 mrem}{mR} - BKG_{TLD}(mrem)\right] \times \frac{1000\ \mu rem}{mrem} \times \frac{1\ week}{7\ days} \times \frac{1\ day}{24\ hrs}$$

Questions

ENERGYSOLUTIONS