



Integrating a Safety Culture into a Radiation Dose ALARA Program

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BBWI AMWTP Overview

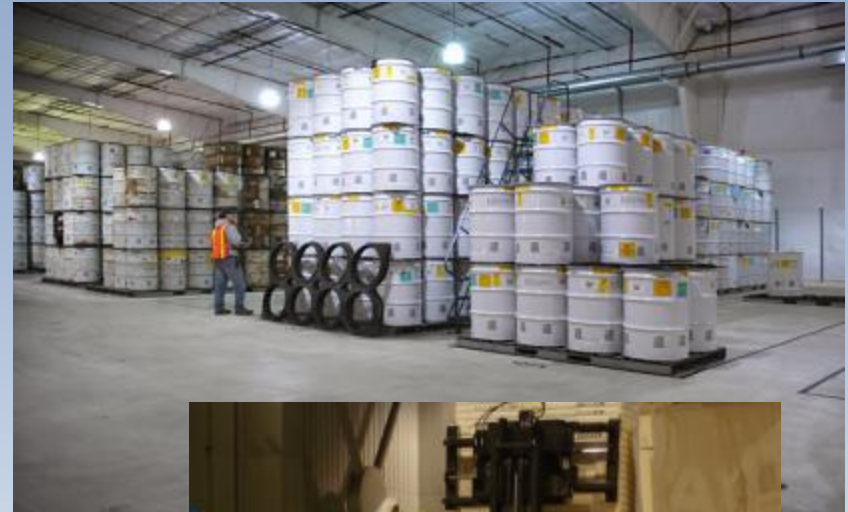
- Large volume of waste (65,000 m³ of stored transuranic mixed waste)
- Average ~800 drum movements per day
- Dose rates typically <1 mrem/hr (gamma and neutron)
- Small population of waste containers with higher dose rates (up to 200 mrem/hr)





Obstacles

- Large volumetric source of low-level radiation exposure
- Worker awareness of low dose rate fields contributing to their dose
 - Misconceived ideas that AMWTP is an “alpha only” facility and that alpha contamination is the only radiological concern
- Worker awareness of waste containers emitting more substantial radiation dose rates
- Unique opportunities for unexpected exposure rate situations during retrieval





Dose Reduction Methods

- Electronic Dosimeters (EDs) have been used as an effective ALARA tool by:
 - Producing audible chirps to create worker awareness
 - Set to user preference for a single ionizing event or desired increments of 0.1 mrem
 - AMWTP's General Use EDs set to alarm:
 - 15 mrem (dose)
 - 50 mrem (dose rate)





Dose Reduction Methods (Cont'd)

- Estimating/tracking dose during special work evolutions
 - Telemetry allows for remote real-time monitoring
 - Extremely useful for new or first time work evolutions or when processing results in removal of shielding (drum and liner lids) from waste materials





Dose Reduction Methods (Cont'd)

MGP DMC 2000x

- Wide response range (X-ray and gamma >20 KeV)
 - Sensitive to low E photons (Am-241) which are major radiological component of our waste
- Dose tracking software available
- Telemetry available for special projects with higher expected dose rates
- ~\$300 each
- Lightweight, rugged, use standard calculator batteries





Dose Reduction Methods (Cont'd)

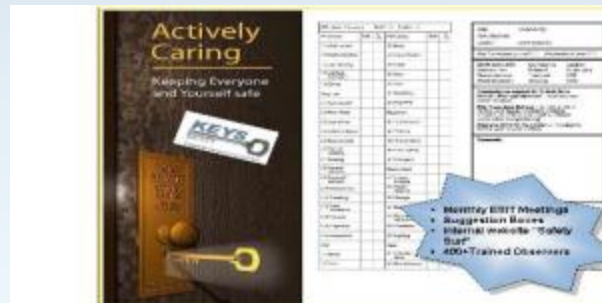
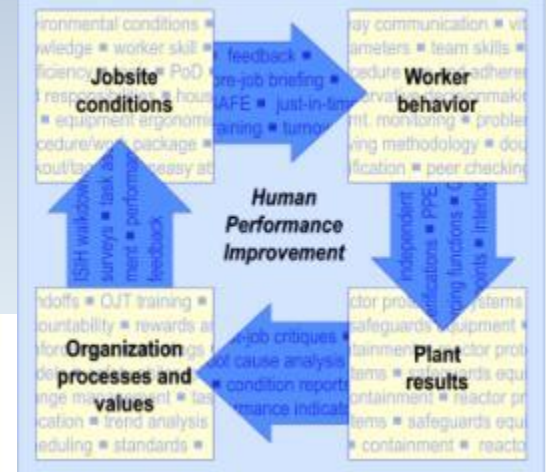
- Increased Visibility
 - Highly visible labels have been placed on drums with dose rates >40 mrem/hr @ 30 cm
 - Segregation or isolation of higher dose rate drums
- Increased communications
 - Discussing dose reduction techniques during pre-job briefings
 - ALARA project indicator (stoplight)
 - ALARA webpage





Worker Safety Culture

- AMWTP has cultivated a strong safety culture as demonstrated by the success of our other safety programs
 - Like many other programs ALARA programs are designed to increase worker safety
 - The ALARA program is able to tap into the existing desire the workers possess to keep themselves and everyone around them safe





Worker Safety Culture (Cont'd)

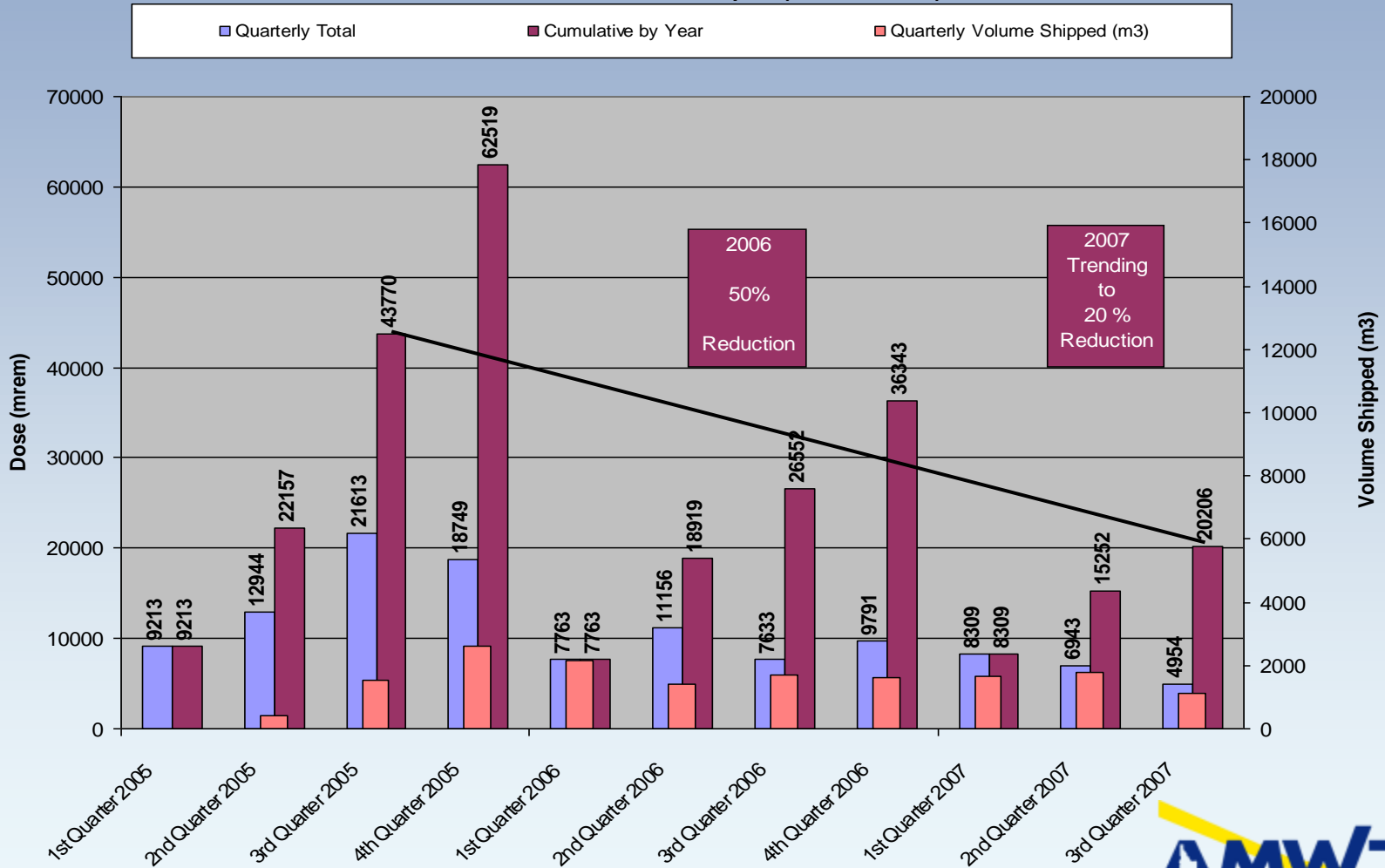
- Worker involvement at all levels is solicited and expected at quarterly ALARA committee meetings
 - This allows for the workforce to be invested in ALARA developments and provide ALARA suggestions
- ALARA suggestion box





Results

AMWTP Dose Trend Report (as of 09/30/07)





Results (Cont'd)

Quarter	Average Dose per Quarter	Dose Reduction
2 nd -4 th 2005	17.8 REM	Baseline
1 st -4 th 2006	9.1 REM	~49% from 2005
1 st -3 rd 2007	6.7 REM	~26% from 2006 and ~62% from 2005



Conclusion

- Simple tools such as EDs and special labels provide *instant feedback* to workers, allowing for an immediate behavior modification.
- Providing the right tools, knowledge base, and encouragement for worker involvement are effective dose reduction methods.
- ALARA programs integrated into ISMS benefit from and contribute to a healthy safety culture.