Source Identification Efforts

Kaiser Aluminum Trentwood

New Jersey Water Environment Association

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May 15, 2013

Agenda

- *Trentwood Background*
- *Source Control Actions*
- *"Initial" Residual Source Investigation*
- *"Second Round" Residual Source Investigation*
- *Next Steps*

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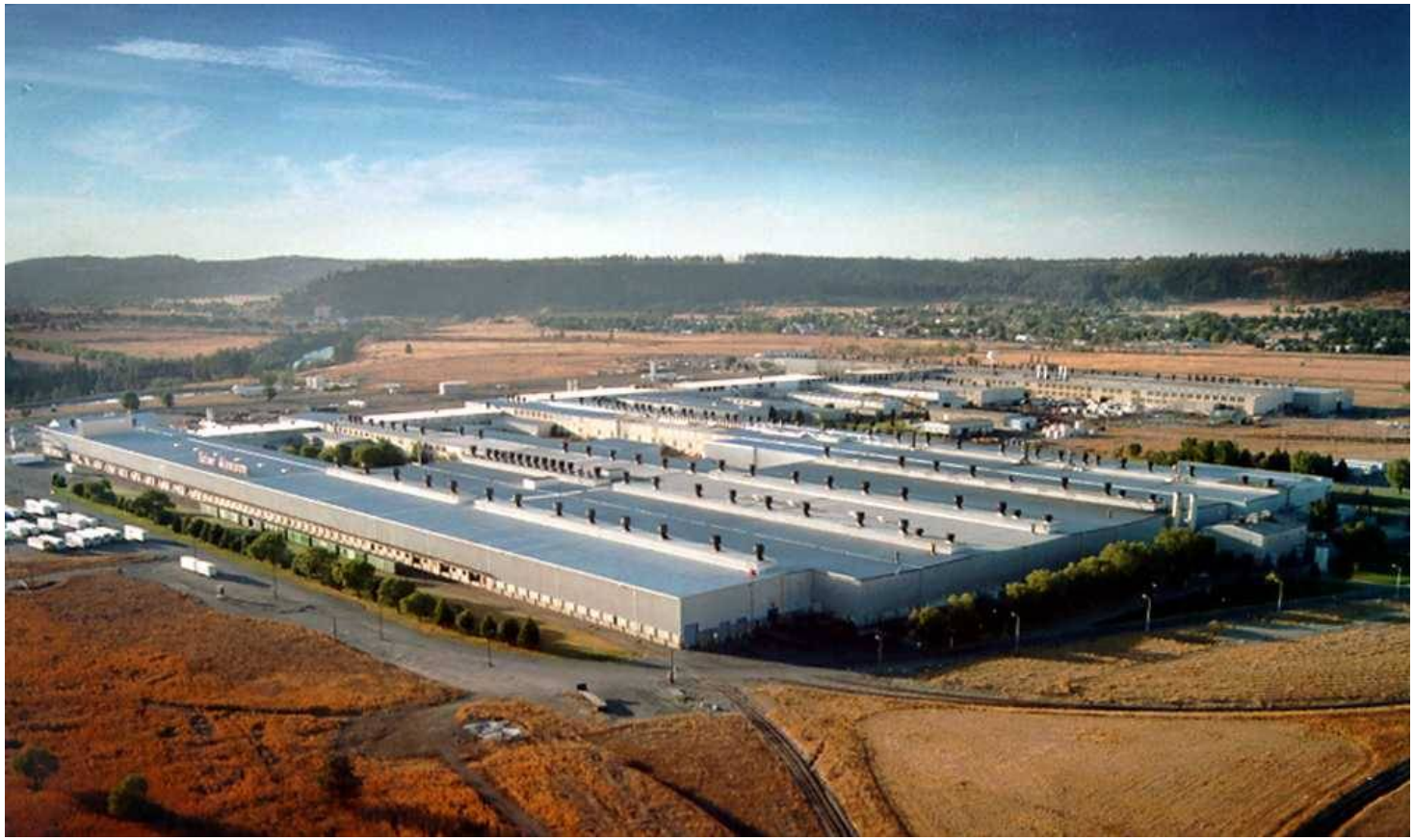
Trentwood Background

- *Defense Plant Corporation (Plancor 524)*
  - *Site selection approved on February 1, 1942*
  - *First soil borings made February 2, 1942*
  - *First metal produced December 7, 1942*
- *Kaiser leased Trentwood in 1946*
- *Kaiser purchased Trentwood in 1949*
- *512 acre site with ~65 acres under roof*
- *~850 employees*

Trentwood Background



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- *Trentwood Background*
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Source Control Actions

- *PCB Phase Out*
  - *Kaiser corporate program to phase out PCB usage initiated in 1978*
  - *Trentwood completed phase out in early 1990s*
    - *Electrical systems*
    - *Hydraulic systems*

Source Control Actions

- PCB Phase Out
  - Electrical systems
    - PCB containing and PCB contaminated oils removed from transformers
    - PCB containing capacitors replaced
  - Hydraulic systems
    - Hydraulic oils were replaced
    - Current hydraulic package is soy bean oil based

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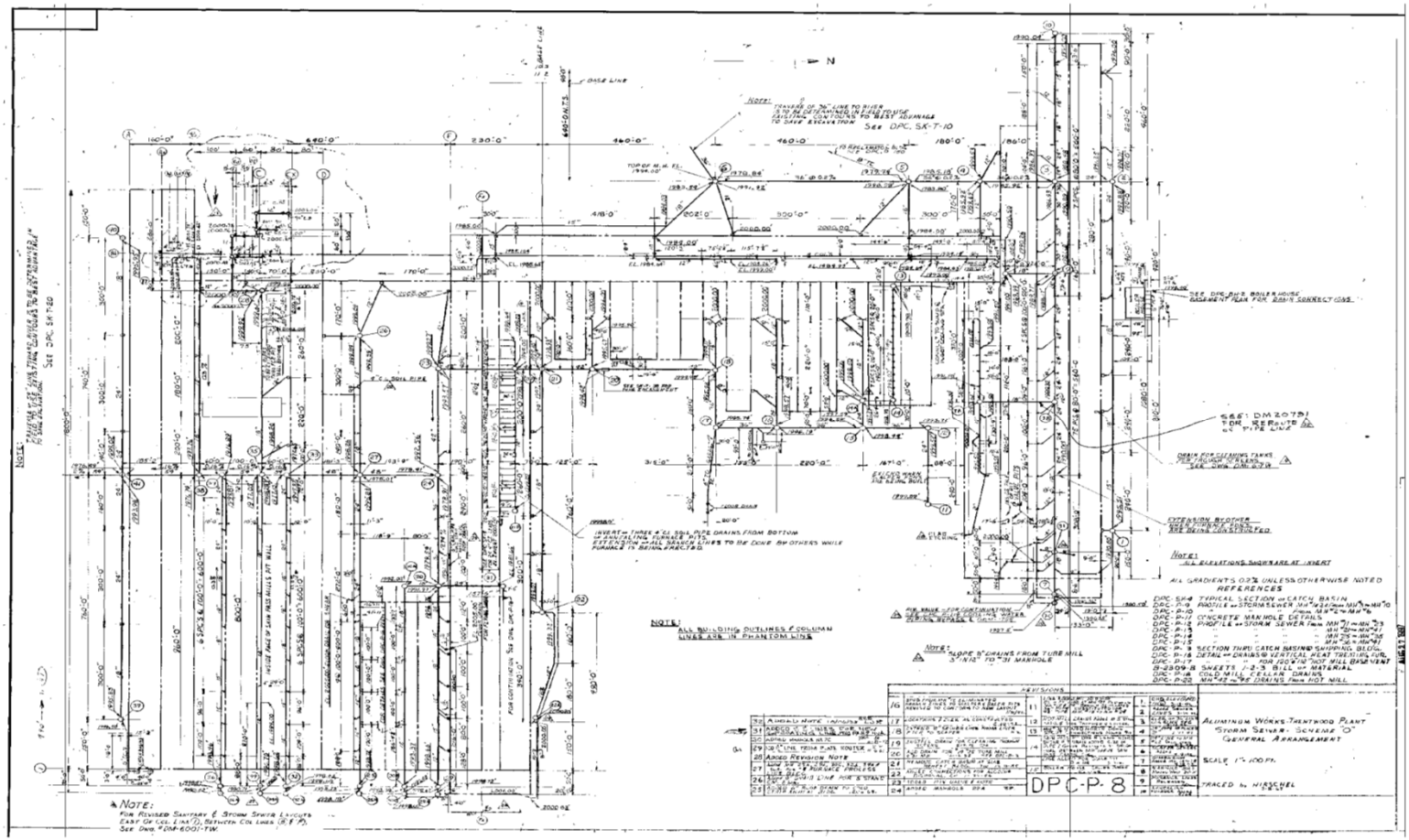
“Initial” Investigation



"Initial" Investigation

- *Investigation Methods*
  - *Internal Sampling*
  - *Manhole Surveys*
  - *Video Surveys*

"Initial" Investigation

- *Investigation Methods*
  - *Internal Sampling*
    - *Source water*
    - *Internal outfalls*
    - *Across treatment systems*
    - *Grab sampling*
    - *Analysis by EPA Method 8082 and 1668*

"Initial" Investigation

- *Investigation Methods*
  - *Manhole Surveys*
    - *Key system confluences*
    - *Multiple methods*
    - *Grab sampling*
    - *Analysis by EPA Method 8082*

"Initial" Investigation

- *Investigation Methods*
  - *Video Surveys*
    - *Remote camera video*
    - *Straight runs after transitions to larger diameter pipe*

"Initial" Investigation

- *Investigation Results*
  - *Settling Lagoon*
    - *Grab sampling data indicated potential mobilization/pass through of solids*
  - *Sewer Sections*
    - *Manhole sediment sampling identified contaminated materials in one portion of the conveyance system*

"Initial" Investigation

- *Investigation Observations*
  - *Settling lagoon provides beneficial sediment removal*
  - *Internal sewer system contains relatively few locations where sediment has been deposited*
  - *Many internal wastewater sampling locations below the limit of detection for EPA Method 8082*
  - *Measured flow is critical to understanding source contribution*

Agenda

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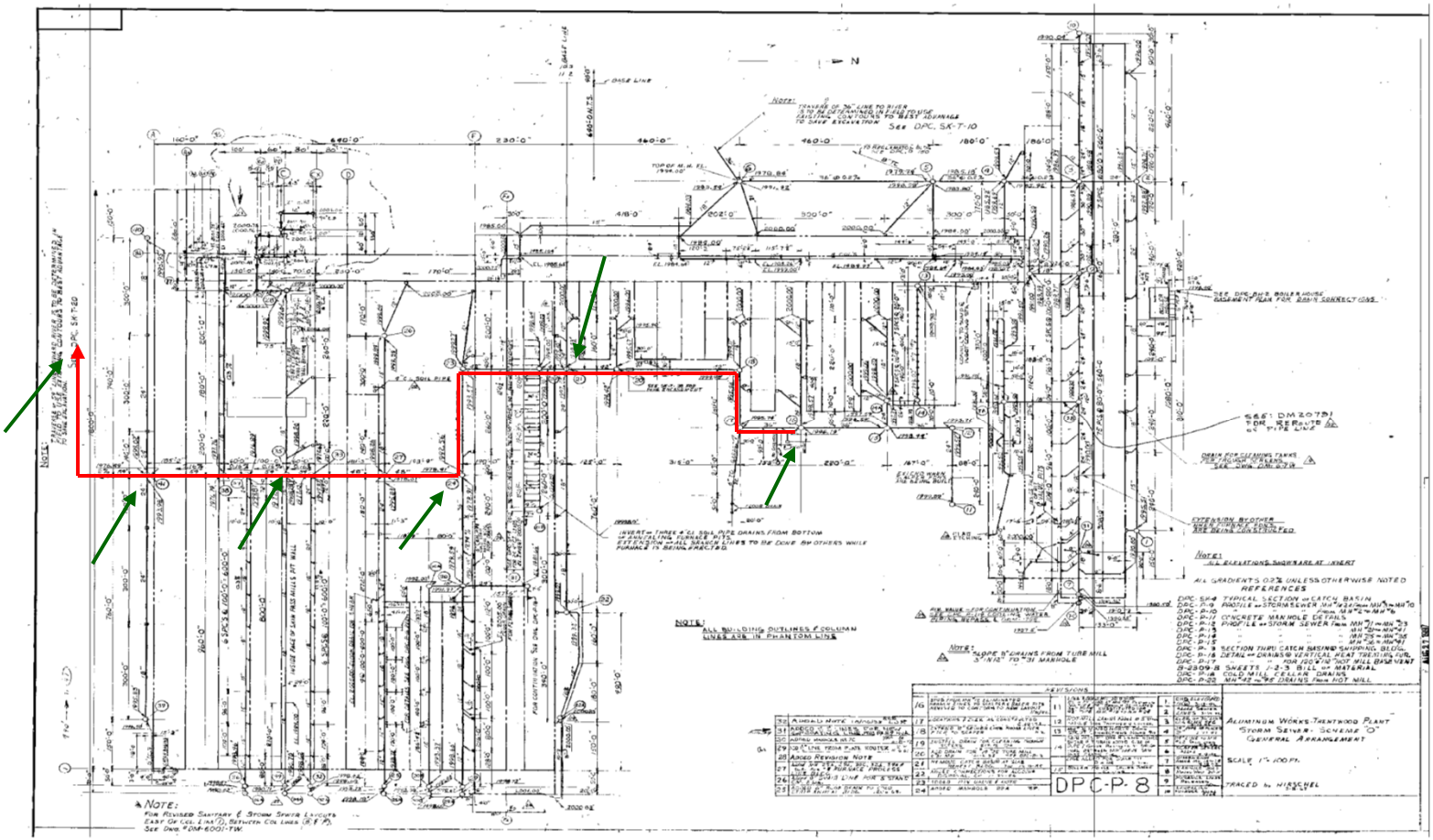
“Second Round” Investigation



"Second Round" Investigation

- *Investigation Methods*
  - *Grab Sampling*
  - *SPMD Deployment*
    - *Semi-Permeable Membrane Device*
  - *Flow Measurement by Dye Tracing*

"Second Round" Investigation

- *Investigation Methods*
  - *Intermittent Grab Sampling*
    - *Six locations*
      - *Five locations down stream of different "process areas" and one "duplicate" location*
    - *Three sampling events of 8 grabs per event on days 1, 15, and 32*
    - *Analysis by EPA Method 1668*

"Second Round" Investigation

- *Investigation Methods*
  - *Co-located SPMD Deployment*
    - *Deployment at grab sampling locations*
    - *32 day deployment period*
    - *Analysis by EPA Method 1668*

"Second Round" Investigation

- *Investigation Methods*
  - *Flow Measurement by Dye Tracing*
    - *Gather flow data on grab sampling days*
    - *Injected fixed rate of dye at know concentration upstream of first sampling location*
    - *Measured dye concentrations in each grab sample*

"Second Round" Investigation

Average Composite Sampling Results			
Sample Location	*Flow (MGD)*	*Concentration (pg/L)*	*Mass Rate (mg/d)*
MH-16	*0.22*	*6,833*	*5.6*
MH-21	*0.79*	*7,510*	*22.5*
MH-24	*1.34*	*3,757*	*19.1*
MH-35	*1.99*	*2,083*	*15.7*
MH-41	*2.03*	*3,983*	*29.9*
Outfall 004	*1.98*	*2,680*	*20.1*

"Second Round" Investigation

SPMD Sampling Results			
Sample Location	*Flow (MGD)*	*Concentration (pg/L)*	*Mass Rate (mg/d)*
MH-16	*0.22*	*32,175*	*26.2*
MH-21	*0.79*	*50,154*	*150.2*
MH-24	*1.34*	*15,711*	*79.7*
MH-35	*1.99*	*15,262*	*115.0*
MH-41	*2.03*	*74,234*	*570.4*
Outfall 004	*1.98*	*9,205*	*69.0*

"Second Round" Investigation

Sampling Results Comparison			
Sample Location	*Composites (mg/d)*	*SPMDs (mg/d)*	*Mass Ratio (SPMD/Composite)*
MH-16	*5.6*	*26.2*	*4.7*
MH-21	*22.5*	*150.2*	*6.7*
MH-24	*19.1*	*79.7*	*4.2*
MH-35	*15.7*	*115.0*	*7.3*
MH-41	*29.9*	*570.4*	*19.1*
Outfall 004	*20.1*	*69.0*	*3.4*

"Second Round" Investigation

Grab Sampling Homologue Distribution						
	MH-16	MH-21	MH-24	MH-35	MH-41	004
Mono	0.4%	0.3%	0.3%	0.4%	0.2%	0.2%
Di	7.4%	7.2%	5.5%	7.3%	6.6%	5.3%
Tri	32.9%	33.7%	28.8%	33.4%	33.8%	28.1%
Tetra	41.6%	42.5%	39.8%	40.6%	42.5%	44.5%
Penta	13.8%	13.2%	12.7%	13.3%	13.1%	16.1%
Hexa	3.0%	2.5%	4.3%	3.9%	2.4%	4.3%
Hepta	0.7%	0.6%	4.2%	1.1%	1.0%	1.3%
Octa	0.2%	0.1%	3.4%	0.1%	0.3%	0.3%
Nona	0.0%	0%	0.8%	0%	0%	0%
Deca	0.0%	0%	0.1%	0%	0.1%	0%
Total	100%	100%	100%	100%	100%	100%

"Second Round" Investigation

SPMD Homologue Distribution						
	MH-16	MH-21	MH-24	MH-35	MH-41	004
Mono	0.1%	0%	0%	0%	0%	0%
Di	5.5%	3.7%	3.2%	2.4%	3.4%	2.6%
Tri	41.7%	35.9%	34.4%	30.3%	38.9%	30.7%
Tetra	42.3%	48.4%	48.3%	50.3%	45.2%	50.0%
Penta	9.2%	10.4%	11.9%	14.3%	10.8%	14.3%
Hexa	0.9%	1.2%	1.6%	2.1%	1.3%	1.9%
Hepta	0.2%	0.2%	0.4%	0.5%	0.3%	0.4%
Octa	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Nona	0%	0%	0%	0%	0%	0%
Deca	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%

"Second Round" Investigation

- *Investigation Observations*
  - *Both methods identified a "jump" between MH-16 and MH-21*
  - *Concentration estimates from SPMDs were consistently higher than composite sample results*
  - *SPMD results appear to be less stable on a location to location basis than the composite sample results*
  - *Neither method indicates multiple source types*

"Second Round" Investigation

- *Investigation Questions*
  - *Is difference in results due to composite sampling data being collected for only 1/32 of the SPMD sampling interval?*
  - *Did the duration of the SPMD deployment impact the results?*

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Comparison Investigations

- *Direct Method Comparisons*
  - *Composite Sampling vs. SPMDs*
  - *Composite Sampling vs. "CLAM"*

Comparison Investigations

- *Direct Method Comparisons*
  - *Composite Sampling vs. SPMDs*
    - *Side by side 24-hour composites and SPMDs*
    - *10, 20, and 30 day periods*
    - *Analysis by EPA Method 1668*

Comparison Investigations

Collection Method Comparison			
Total PCB – Method 1668			
(picograms / liter)			
	10 Days	*20 Days*	*30 Days*
24-Hour	*752*	*829*	*982*
SPMDs	*6,853*	*3,106*	*4,599*

Comparison Investigations

Collection Method Comparison			
Total PCB – Method 1668			
SPMD to Composite Ratios			
	10 Days	*20 Days*	*30 Days*
24-Hour	*1*	*1*	*1*
SPMDs	*9.1*	*3.7*	*4.7*

Comparison Investigations

Composite Sampling Homologue Distribution			
	10 Day	20 Day	30 Day
Mono	0.2%	2.0%	1.7%
Di	7.7%	8.6%	9.3%
Tri	26.3%	26.3%	27.0%
Tetra	58.2%	57.9%	53.4%
Penta	4.3%	4.8%	6.0%
Hexa	3.3%	0.4%	2.1%
Hepta	0%	0%	0.5%
Octa	0%	0%	0%
Nona	0%	0%	0%
Deca	0%	0%	0%
Total	100%	100%	100%

Comparison Investigations

SPMD Sampling Homologue Distribution			
	10 Day	20 Day	30 Day
Mono	0.1%	0.1%	0.1%
Di	6.8%	6.3%	5.8%
Tri	42.8%	39.7%	40.9%
Tetra	42.7%	45.7%	45.6%
Penta	6.5%	7.2%	6.4%
Hexa	0.8%	0.8%	1.0%
Hepta	0.2%	0.2%	0.2%
Octa	0.1%	0%	0%
Nona	0%	0%	0%
Deca	0%	0%	0%
Total	100%	100%	100%

Comparison Investigations

- *Conclusion*
  - *SPMDs do not provide precise enough and consistent enough results as compared to composite sampling for low concentration internal source identification work*
  - *SPMDs no longer being considered for source identification work for internal conveyances*

Comparison Investigations

- *Direct Method Comparisons*
  - *Composite Sampling vs. "CLAM"*
    - *Side by side 24-hour composites and CLAM*
    - *Two locations*
    - *Analysis by EPA Method 1668*
    - *Preparing Work Plan for Ecology approval*

Comparison Investigations

Kaiser Aluminum Trentwood

Questions?