Managing Environmental Compliance Across Multiple Sites

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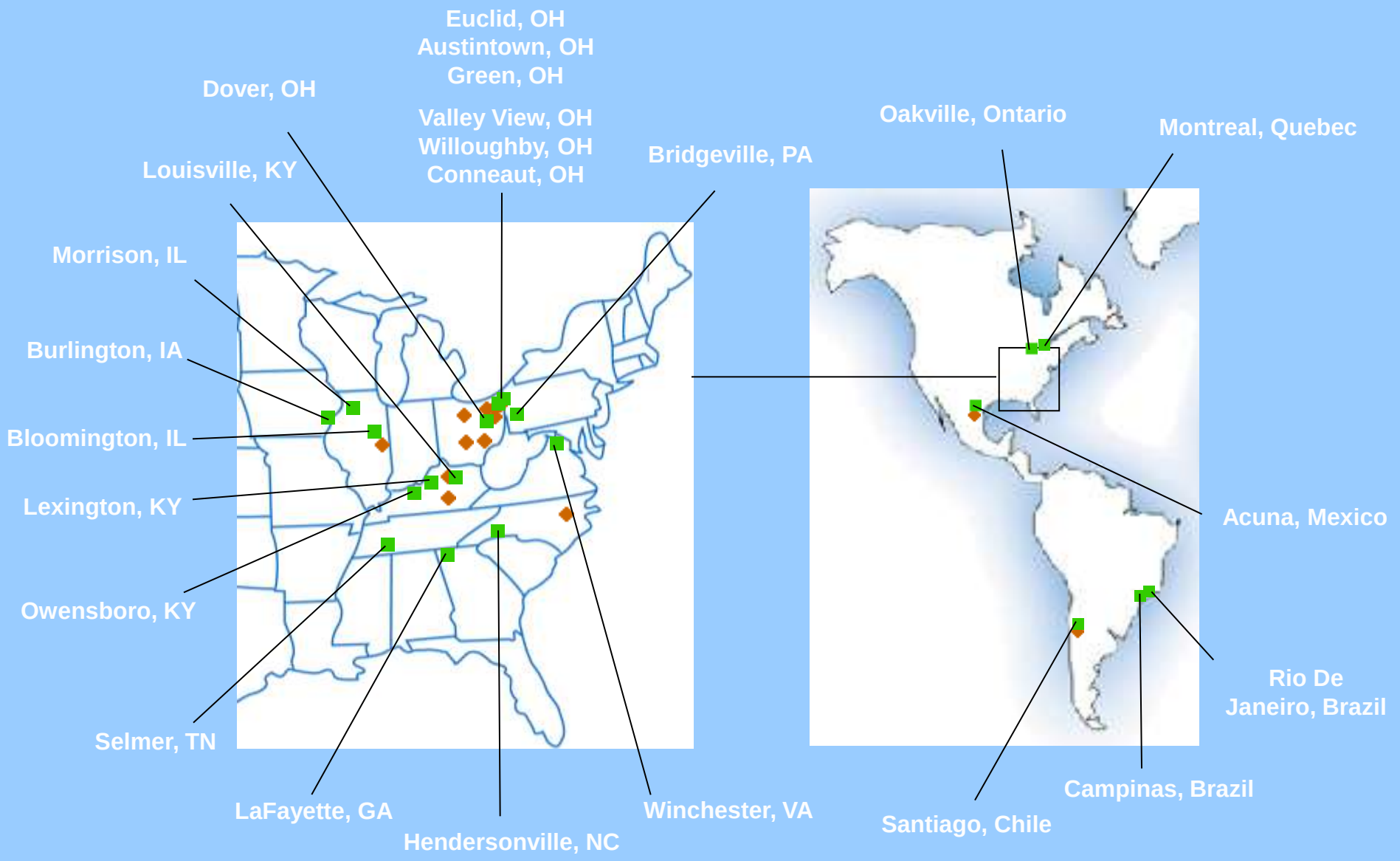
Are you responsible for Environmental Programs across multiple sites?



Someone's 'Best Practice' can be Another's 'Nightmare'

Before communicating 'Best Practices' to your Site Teams, consider:

1) Will it help the site and business to reach established goals?
2) Is it truly the 'Best' method or solution?
3) Does it apply across all sites, or is it regional or process specific?
4) Is it simply a recommendation, or a new requirement/expectation?
5) What help will site teams need to implement it?

BMPs vs RMPs

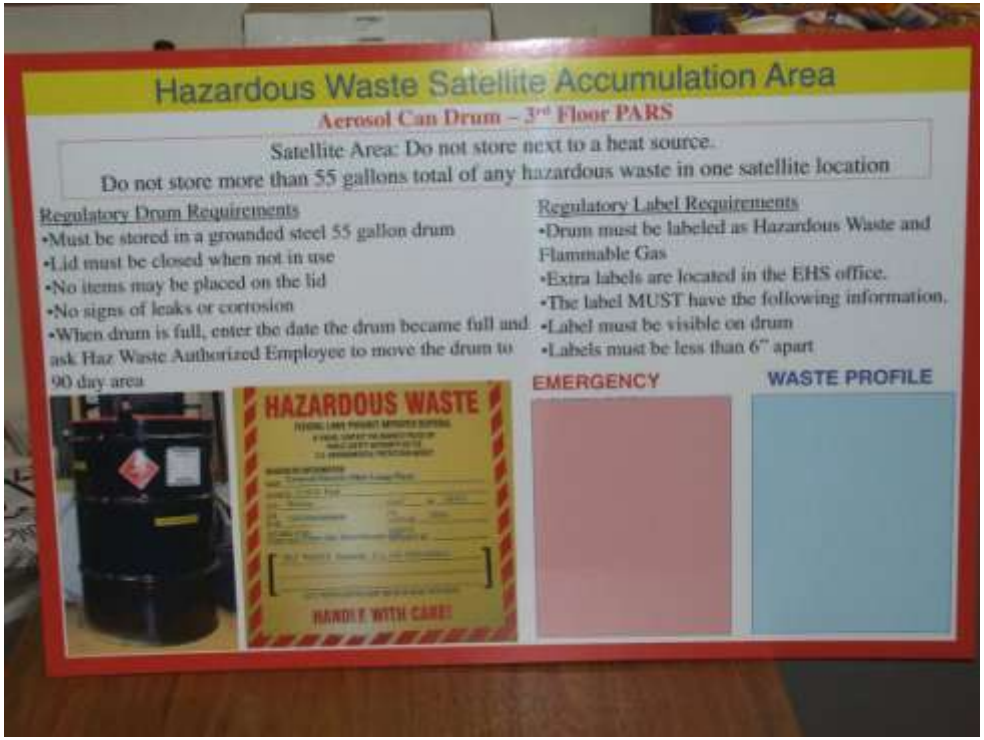
'Best' or 'Required' Management Practices?

1) Req - No outside/uncovered storage of chemicals, raw materials, or products
2) BMP - Conduct daily testing of metals across wastewater clarifier.
3) BMP - Install posters at designated waste storage areas, showing proper storage conditions (containers, labels, spill kits, etc).
4) BMP - Label all sources of air emissions and associated stacks / vents.
5) Req - Reduce / maintain all air & water pollutants to <50% of each limit.
6) Req - Seal all floor drains closed.

AVOID Unfunded Mandates!

Example - Waste Storage

Solids – Non-Volatile



Solids – Volatile

Liquids

Environmental Management

The Basic Ingredients

1) Corporate Environmental Policy
2) Environmental Management System (EMS)
3) Env Goals & Objectives
4) Staffing & Training
5) Compliance Tracking (Metrics)
6) Communication – newsletters, webcasts, email
7) Internal Audits – site level and corporate/business level
8) Firefighting – conference calls, site visits
9) Project Planning / Funding
10) Community Outreach
11) Recognition Programs – celebrating successes

Example Programs

Disclaimers:

1) What worked within one company, may not work within yours. Be sure to follow the 5 steps for evaluating 'Best Practices'.
2) Introducing concepts, rather than explaining program details.

Still, within this presentation, perhaps you will find one or two of these…

Develop Environmental Media Reviews - to supplement 'audits'

Water Program Review Week

Primary purpose: Use a structured method to ensure that each facility's discharge is properly covered under a permit when required and/or the basis for an exemption is clearly understood, documented, and filed.

- Every facility (manufacturing, warehouse, office) conducts a review.
- Select a week when site teams can focus time & energy.
  - Avoid regulatory deadlines, production outages, holidays, etc.
- Develop checklists & guidance materials
- Make it an Event!
  - Recruit a General Mgr to 'Champion' the process
  - Schedule Kick-Off and Wrap-Up calls
  - Make it FUN – eg. Kentucky Derby Theme
- Make sure resources (YOU, et al) are available throughout the week.
  - General Q & A
  - Respond to issues
  - Send daily messages / additional guidance.
- At conclusion, schedule & hold debrief calls with each site.

Water Program Review Week

- Expectations for Sites

- Read every line of all water-related permits and ensure that your site team fully understands all permit conditions and obligations.
- Complete a permit checklist to confirm that your site is currently complying with all conditions of the permit(s)
- Complete a spill prevention checklist to ensure that appropriate safeguards are in place to prevent spills/releases to the environment.
- Complete a compliance plan to ensure that solid management systems are in place to ensure on-going compliance with each permit.

Water Program Review Week

- Example Permit Checklist

YES	NO	NA	ITEM	GUIDE NOTES	Corporate EMS Cross Reference
			1) Are all water (process, sanitary, storm water) discharges either covered in the permit or exempt from needing a permit?	Review the sources that generate wastewater and compare to the list of acceptable discharges covered in the permits. If you identify a source that is not covered by a permit, then determine if it qualifies for an exemption.	Water - 2.1.1.1 2.1.6.1 2.1.7.1
			2) Are copies of all permits & authorizations (including local sewer use ordinance) available on site?	List all water-related permit types here: 1) eg. Storm water NPDES 2) eg. POTW	Water – 2.2.1.1
			3) Are all permits within the effective dates and are all renewal deadlines understood?	Ensure that permit renewal dates are loaded into Compliance Calendar as a reminder to collect data & submit required renewal applications before due date.	
			4) Have you read the entire permit(s)?	Ensure that you read <u>each</u> line of the entire permit, even if you have read it in the past.	
			5) Did you identify any regulated source of wastewater or storm water that is not clearly covered under an existing permit?	If there are any industrial sources, which generate wastewater or storm water that are not covered by a discharge permit and are not exempt from permitting, **call your business HQ Environmental Leader immediately.**	

Water Program Review Week
- Example Spill Checklist

OFFICE REVIEW	Y	N	NA
1) All discharges, pipes, sumps, and valves up to date and are on your plant drawings.			
2) All water/chemical processes and associated equipment has been evaluated for potential failures (Failure Mode & Effects Analysis, Failure Mode Fishbone).			
3) All critical equipment or processes that, due to failure, would lead to an environmental report or release defined and redundant controls have been installed.			
4) Train all employees how to recognize and report spills, leaks, or unusual events.			
PLANT INSPECTIONS			
5) All potential ways a water, chemical or material could leave the bldg. have been reviewed and prevention determined (drains, pipes, wall openings, etc.)			
6) Exposed piping is protected from breakage, including freezing.			
7) Spill containment for all exposed piping, outdoor pumps, chemical storage tanks, chemical storage areas, or chemical loading areas is in place.			

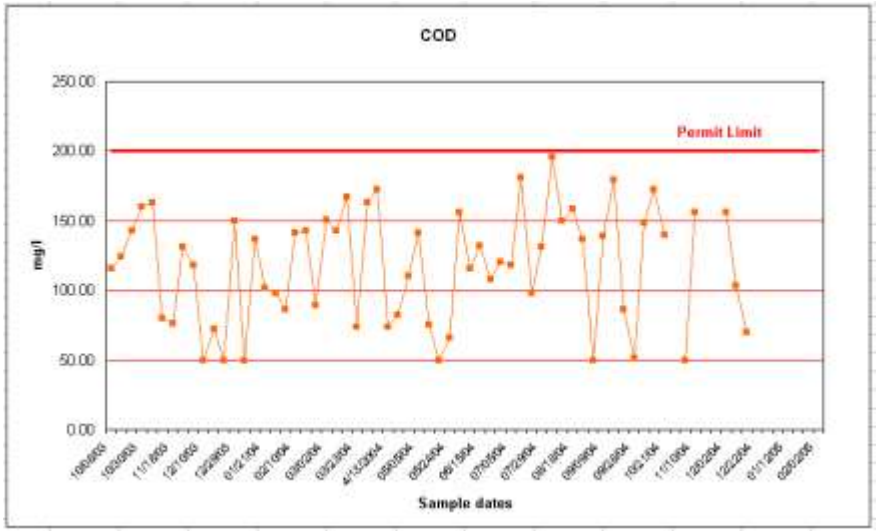
Establish an Air & Water Emissions Control Program

SPC Program (Simplified Process Control)

- **SPC Control Limits:**

- 50% of lowest permit limit
  - e.g. ½ monthly average concentration

- Special cases:
  - pH: +/ – 1 s.u.
  - Temperature: - 10 degrees F
  - Pressure Drop: +/- 20% of range
  - Flow - 90% of permit limit

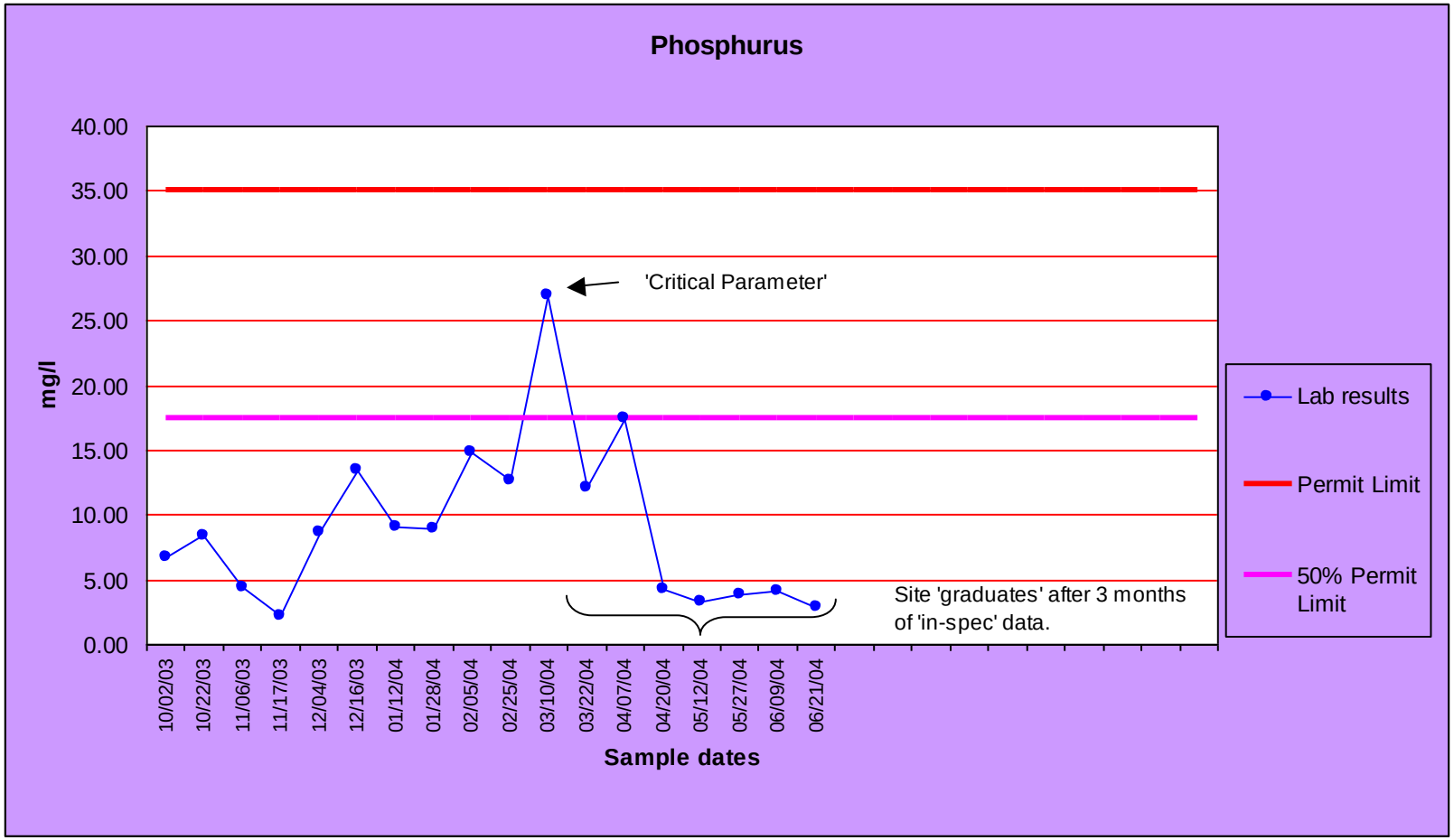


Too Close for Comfort!

Create a safe margin of compliance

SPC Program - Charting

Parameter	Units	Permit Limits			Frequency	Sample Type
		Daily max	Weekly max	Monthly Avg		
Flow						
pH Value (high)						
pH Value (low)						
BOD5						
TSS						
MBAS						
Oil & Grease						
Phosphorus						
Phenols						
Chromium (total)						
Copper						
Nickel						
Zinc						
TTO						
Lead						
Cadmium						
Silver						
Mercury						
Arsenic						
Selenium						
Cyanide						



SPC Program – Multi-Site Tracking

Sites	Critical Parameters												
	Flow	pH	BOD	COD	Fecal Coliform	O&G	Pb	Phos, Total	Sb	Se	TSS	Zn	Critical Parameters
Site A													0
Site B													0
Site C													0
Site D													0
Site E													0
Site F							1						1
Site G													0
Site H													0
Site I													0
Site J												1	1
Site K	1	1	1								1		4
Site L													0
Site M													0
Site N				1							1		2
Site O													0
Site P			1										1
Site Q		1											1
Site R													0
Site S		2		2		1					1	1	7
Site T											1		1
Site U						1							1
Site V		2											3
TOTALS	**1**	**6**	**2**	**3**	**0**	**2**	**1**	**0**	**0**	**0**	**4**	**2**	**22**

Sewer Patrol Participant

Sites with 'Critical Parameters' need additional help

SPC Program

Stack & Sewer Focus Group

Sewer Patrol Consortium - August 2008					
Time (Eastern Daylight)	Site	Parameters above 50%	General Manager	Plant Manager	EHS Lead
7:30 AM	Site F, China	Ammonia-N			
7:45 AM	Site J, China	COD, O&G			
8:00 AM	Site K, China	TSS, COD, O&G			
8:15 AM	Site N, China	COD, O&G			
8:30 AM	Break				
8:45 AM	Site O, India	TDS, Cl			
9:00 AM	Site P, Hungary	Total Salt, TDM			
9:15 AM	Site Q, Hungary	COD			
9:30 AM	Site S, Chile	Suspended Solids			
9:45 AM	Break				
10:15 AM	Site T, Canada	BOD			
10:30 AM	Site U, USA	TSS			
10:45 AM	Site B, USA	pH			
11:00 AM	Site V, USA	Boron, O&G			
11:15 AM	Site D, USA	Zn			
11:30 AM	Site Z, Brazil	pH, COD, SS, O&G, Zn			

- Site EHS Lead and Plant / General Mgr participate in bi-weekly calls.
- Site team presents root cause, corrective actions, & recent data.
- Business-level Media Experts provide technical support.

Sewer Patrol

Requirements for "Graduation"

1) Plant Manager must be involved in bi-weekly calls (Ownership!)
2) All data points must be maintained below SPC limit for ≥3 months. (or longer, to obtain 3-6 representative test results)
3) All agreed upon corrective actions must be complete, or scheduled.

Summary of Process Improvements

“Low Hanging Fruit”

- Adjust process control set-points (e.g. pH adjustment, alarm set-points, frequency of PM)
- Slow, controlled release / discharge
- Solids removal / line flushing

Source Control

- Raw material substitutions
- Procedural / Administrative controls
- Continuous monitoring w/ response (e.g. development of automated recirculation)

Improve Treatability

- New WW treatment units (eg. pH adjustment, metals removal, oil/water separators)
- Batch, treat, and release
- Zero Discharge - Recycle or Evaporate

Permit Negotiations

- Higher limits / no limits
- Fewer monitoring requirements (opportunities for defect)

Ensure Environmental Data Quality

Ensuring Data Quality

- Develop Sampling and Analysis (QA/QC) Manual
  - Site-specific sampling & analysis matrix
  - Best Practices / Procedures (Do's and Don'ts)
  - Handling of agency inspections & sampling (15 min rule, splits)
- Provide new employee training & refresher training (eg. webinars)
- Select and use quality environmental laboratories
  - Verify credentials / certifications
  - Conduct lab audits (tip: hire professional auditing firm)
  - Share Sampling & Analysis matrix & Set Expectations (next slide)
  - Avoid 'lab hopping' (no lab is perfect 100% of the time)

SPC Program

- Example List of Expectations for Contract Labs

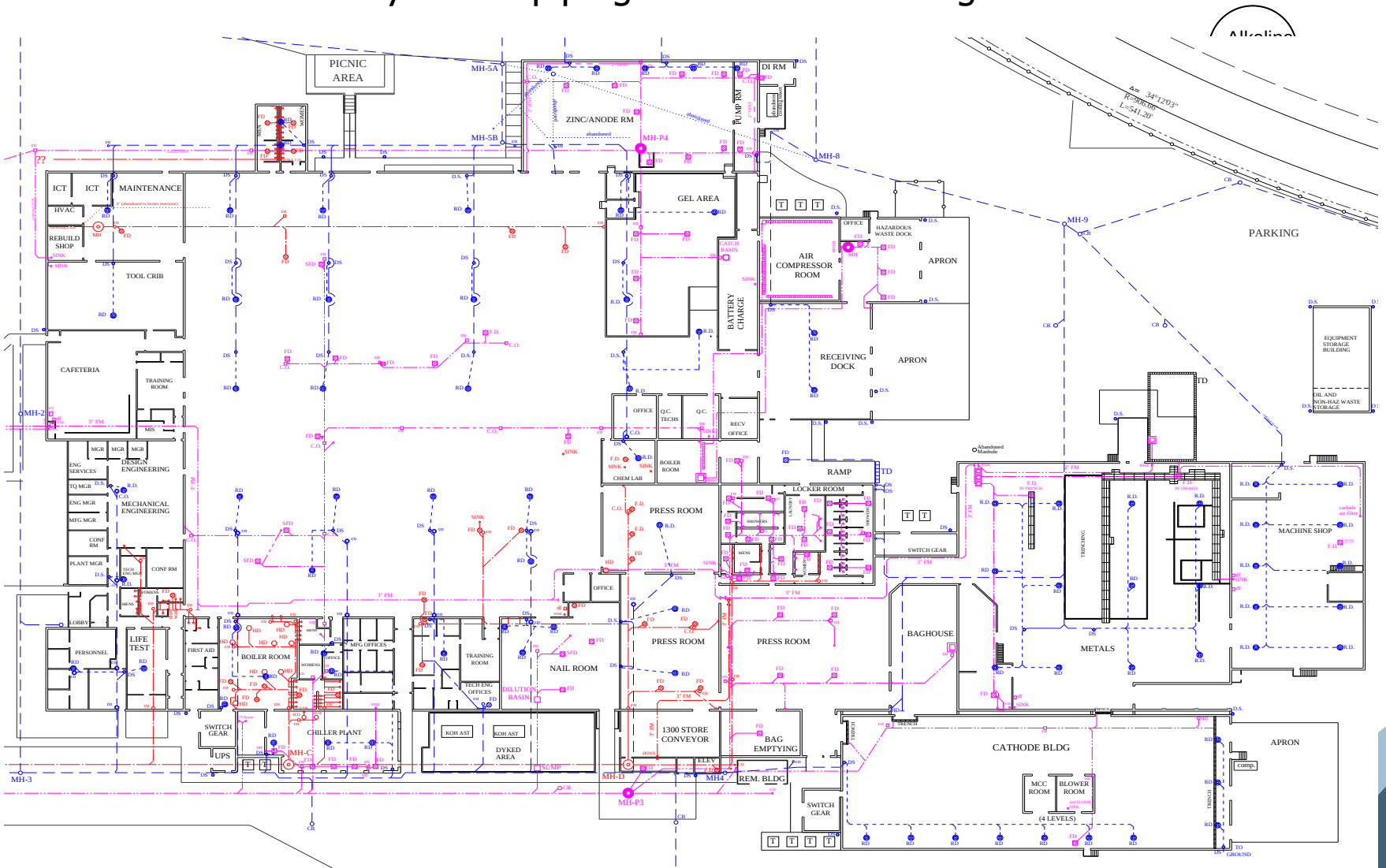
1. **All method reporting limits (RLs) should be < 25% of applicable permit limit, with few exceptions.**
2. **Warning limits (eg. SPC control limits) should be programmed into laboratory database (LIMS), for early detection & notification of elevated levels.**
3. Sufficient sample volume should be retained to perform at least one (1) repeat analysis, when requested.
4. Retained samples should be kept preserved & secure at the lab for a minimum of 30 days (90 days for metals)
5. **Final results must be received in hardcopy and/or electronically within 14 days of receipt of samples. Site specific agreements for shorter turnaround times may be required.**
6. Final analytical reports must be accompanied by the completed Chain of Custody (COC) reports.
7. Results that exceed lab-specific QA/QC criteria should be clearly marked (flagged) with explanation of what standards were not met.
8. **Final reports must be accompanied by the QA/QC data, including field or lab blanks, lab control samples, and matrix spike results (ie. Level 2 Report)**
9. Provide sites with at least 1 extra set of sample bottles with preservatives and cooler to be used for split sampling when performed by regulatory authority.
10. Notify site contact when planning significant procedural, equipment related (eg LIMS systems), QA/QC, or personnel changes.
11. **When lab error occurs, submit letter of explanation, including corrective actions, to site & business-level contacts.**
12. Schedule annual reviews with site team to identify, discuss, and document significant procedural changes.

Conduct
Environmental Media Deep Dives

- Air
- Waste / HMT
- Water / Wastewater
- Chemical Management

Water Preservation & Pollution Prevention Program

1. Create / Update water process flow diagrams and sewer maps
   - Ensure that all sources of water use are accounted for
   - Accurately reflect piping connections on diagrams



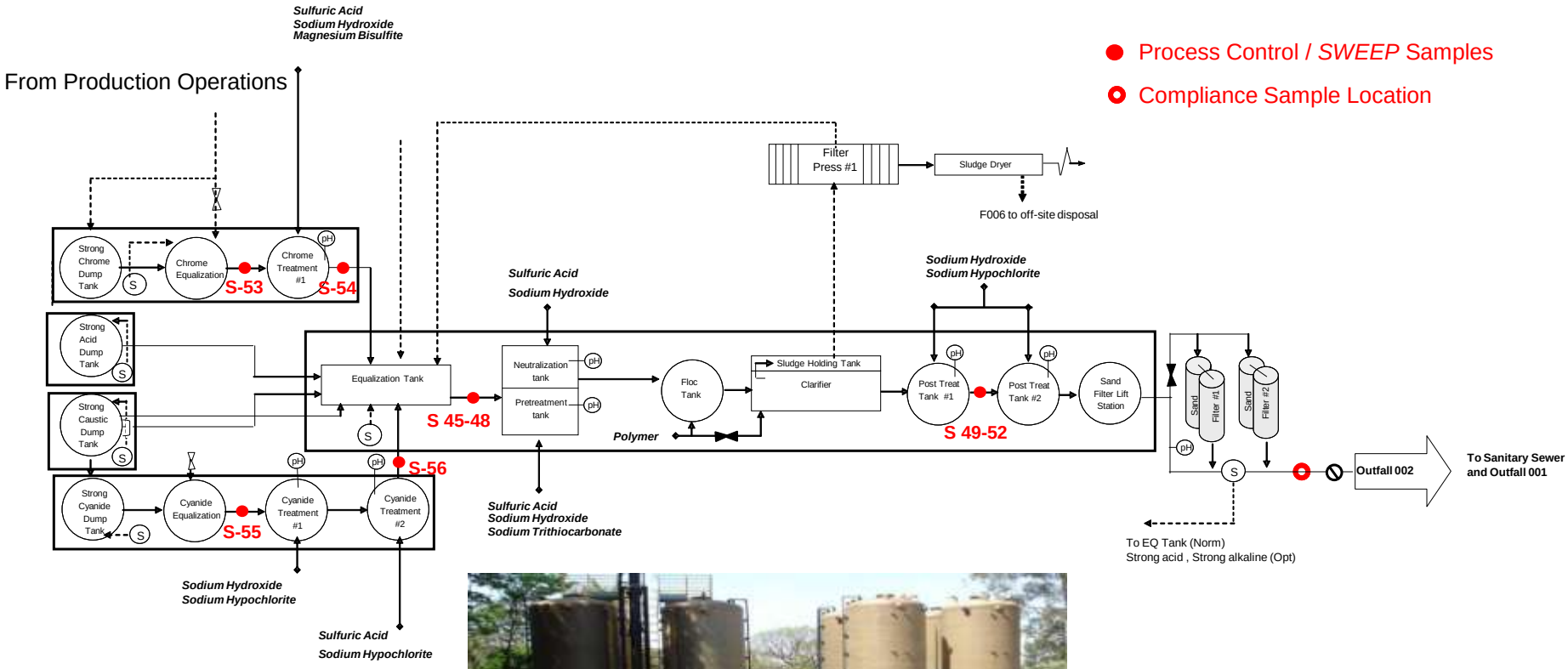
Water Preservation & Pollution Prevention Program

2. Evaluate sources and characteristics of wastewater & storm water
   – Complete water balance & mass balances for 'Pollutants of Concern'

Sample #	Sample Location	Date	Time	Temp C	pH	Conductivity (uS/cm)	Field COD (mg/l)	Field Settleable Solids (ml/L)
1	Incoming Water Supply	3-Sep-08	2:00	31.7	7.3	155		
2	Floor sweep / mop water	3-Sep-08	3:00					
3	Oil/Water Separator Effluent (Bay 9)	3-Sep-08	2:45	26	**10.7**	900		
4	West Wash Area	3-Sep-08		29	**6.0**	880		
5	Industrial Wastewater Aeration Tank	3-Sep-08	2:05	25	6.2	930		
6	North Cooling Tower	4-Sep-08		23	**8.4**	770		
7	West Cooling Tower	3-Sep-08		22	**8.5**	1070		
8	East Cooling Tower	4-Sep-08		22	**8.0**	200		
9	Test Area Cooling Tower #1	4-Sep-08		23	**9.2**	300		
10	Test Area Cooling Tower #2	4-Sep-08		24	**8.8**	710		
11	Test Area Cooling Tower #3/#4	4-Sep-08		23	7.7	230		
12	Cafeteria - Before Grease Box	4-Sep-08		23	6.6	190	562	0.01
13	Cafeteria - After Grease Box	4-Sep-08		24	**5.2**	370		**0.8**
14	Sanitary - North Leg	4-Sep-08		22	6.5	660		**6**
15	Sanitary - Middle Leg	4-Sep-08		23	**8.9**	1390		**3**
16	Sanitary - South Leg	4-Sep-08						
17	WWTP Influent	3-Sep-08		29	6.6	1360		
18a	WWTP Equalization Tank (Wednesday)	3-Sep-08		28	6.7	1405		
18b	WWTP Equalization Tank (Thursday)	4-Sep-08		23	6.7	1310	662	**2.5**
18c	WWTP Equalization Tank (Friday)	5-Sep-08						
19a	WWTP Post Anerobic (Wednesday)	3-Sep-08		27	7.1	1560		
19b	WWTP Post Anerobic (Thursday)	4-Sep-08		24	7.2	1490		**4.5**
19c	WWTP Post Anerobic (Friday)	5-Sep-08						
20a	WWTP Clarifier Influent (Wednesday)	3-Sep-08		28	7.3	1520		
20b	WWTP Clarifier Influent (Thursday)	4-Sep-08		24	7.4	1510		0.01
20c	WWTP Clarifier Influent (Friday)	5-Sep-08						
21a	WWTP Post Clarifier (Wednesday)	3-Sep-08		25	7.7	1470		
21b	WWTP Post Clarifier (Thursday)	4-Sep-08		22	7.9	1430	132	0.05
21c	WWTP Post Clarifier (Friday)	5-Sep-08						
SPC Limit				**34**	**6-8**	**na**	**na**	**0.5**
Permit Limit				**40**	**5-9**	**na**	**na**	**1.0**

Water Preservation & Pollution Prevention Program

3. Evaluate water and/or wastewater treatment operations
   – Improve treatment capabilities / efficiencies / control



Water Preservation & Pollution Prevention Program

4. Identify & eliminate risk of spills or releases to the environment
   - Develop 'What IF' scenarios, Failure Mode and Effects Analysis

5. Identify opportunities to achieve greater compliance assurance
   - Zero discharge
   - Batch discharge (hold and test prior to release)

6. Identify opportunities to reduce, re-use, and recycle water
   - Reduce water footprint
   - Save $$$

Issue
Plant-Level Environmental Awards

Example Awards

Environmental Excellence Award

Recognize site teams that demonstrate exemplary 'E-haviors' that result in significant achievements advancing the facility above and beyond compliance.

Desirable E-haviors

- Continuous improvement
- Reduced opportunity for defect
- Community Outreach / Education
- Reuse / Recycle
- Best Practice Sharing / Implementation
- Zero Impact (emissions / discharge)
- Long-term Sustainability
- LEAN Manufacturing
- Flawless Execution
- Mentoring / assisting other facilities
- Creative / Green Solutions
- Solutions for Historical issues

Pollution Prevention Award

Recognize site teams that have completed 1 or more significant environmental projects, but may have experienced an issue over the last 3 years.

Award Process:

- Sites are nominated (by self, peers, business-level EHS team).
- Eligibility is confirmed, and best candidates selected.
- Site teams awarded a plaque, banner, all-employee luncheon, & receive recognition in the business-wide newsletter.

Communicate
Issues & Solutions

Global Environmental Alert: Wastewater Treatment System Upset

Treatability issues due to Chelating Agents – Site XYZ

Incident Description:

Facility operates a zinc plating line, electropolish line, and two boilers that generate continuous wastewater streams. These streams are collected in a Pretreatment Tank, then treated using a traditional metals precipitation system. Although the system has historically performed well with all metals parameters maintained well below 50% of the permit limits, metals breakthrough started to occur during the winter months.

Root cause: A boiler feed water chemical contained an unidentified chelator. Chelating agents are counter-productive to metals precipitation & settling processes since they are designed to keep metals in dissolved, suspended state.

Site Contacts:

EHS Manager
WWTP Supervisor

Lessons Learned:

1. Do NOT use chemicals that contain chelating agents that may be introduced into a WWTP.
2. Establish expectations with suppliers & affected internal employees that may purchase or change chemical types that the ingredients can NOT contain chelating agents.
3. Phosphonic acid was not included on an intracompany list that was used during the chemical impact (MOC) review. It has since been added & the updated list posted to the EHS Website.
4. Add a descriptive checklist item to the chemical impact review for wastewater to identify if the chemical contains a chelating agent.

Opportunities for improvement:

1. Change chemical used in the boiler feed water treatment to one that does not contain a chelator.
2. If no acceptable alternative exists, then the addition of special (expensive) WWT chemicals will likely be required to counteract the chelator and restore good wastewater quality.

Summary of Lessons Learned - 2009

1) **Accurate** sewer diagrams and **understanding** of all wastewater sources are both critical to ensuring that unpermitted discharges do not occur. Follow the Water E-Framework guidance!

2) Strive to **eliminate** risk, rather than manage it. Identify and implement long-term solutions. Process capability may not be sufficient.

3) **Carbon settles** - Inspect air control devices upon re-filling and routinely thereafter, to ensure that streams are being treated properly.

4) “Seeing is believing” - identify and implement means to **visually confirm** that control equipment is doing its job.

5) “Out of Sight, Out of Mind” - Ensure that inspections and walk-thrus cover **all areas** of the plant.

6) Piping Design - Ensure proper material of construction and **minimize exposure** to environment in the event of a failure.

7) **Minimize** administrative controls - “To error is human” , but we know that exceedances are unacceptable.

8) Sampling issues will become **magnified** upon receipt of analytical results. Ensure that sampling location will yield samples representative of entire discharge. Beware of the presence of sediments.

9) Water usage affects discharge concentration - track water usage to **predict** impact on pollutant levels.

Do your programs cover all areas of risk?

Align Programs (Sustainability Tools) to Address Risks

Wastewater Risk Areas	Sustainability Tools							
	Comp Audits & Self-Assessments	Focus Groups-Sewer Patrol Quick Hits	E Framework Validations	Water Mgmt Review Week	Water SWEEPs	SPCC & SWPPPs	HQ EHS Alerts / Guidance Docs	NPI / MOC Program Updates
	Bi-Annual	Monthly	Annual - Site Scoring Tri-Annual - HQ Validation	Tri-Annual	One Time	Annual	On-Going	On-Going
Permit Coverage / Authorization	✓			✓	✓		✓	✓
Wastewater SPC Control (<50%)		✓	✓		✓			
Accuracy of Sewer Maps			✓		✓			✓
POC Risk Management			✓	✓	✓	✓		
Source Characterization		✓	✓		✓			
WWTP Operational Control		✓	✓		✓		✓	
Spill Prevention	✓			✓	✓	✓		
Std Operating Procedures			✓					✓
Preventative Maintenance			✓					✓
Training			✓	✓		✓	✓	
Management of Change			✓					✓

Overlap Builds Confidence!

Develop Communication Plan

Example Communication Plan

Communication Activity	Participants	Media	Duration	Timing / Frequency
Environmental "Huddle"	Americas E-team	Teleconference	30 min	Weekly / Wed 9-930am
EHS Staff Call	Global EHS Team	Teleconference	1 hour	Monthly / 3rd Thurs 8-9am
Wastewater SPC "Sewer Patrol"	Global E-Team & Selected Site Teams	Webcast	Varies – 1-3 hrs	Bi-weekly / 2nd & 4th Tues
EHS Newsletter	Sent to all Global EHS Contacts	Email / Frontpage	NA	Monthly
Environmental Alerts	Sent to Selected Site Teams	Email / PowerPoint Slide	NA	As Needed - Approx 6 / year
Sampling & Analysis Refresher	All Global sites with Sampling Reqmts	Teleconference / Slideshow	2 hours	Annually
Env Media Review Weeks	Global E-Team & All Site Teams	Teleconference / Email / Webcasts	Mon-Fri	Quarterly (Air, Waste, Water, Chem Mgmt)

Questions?