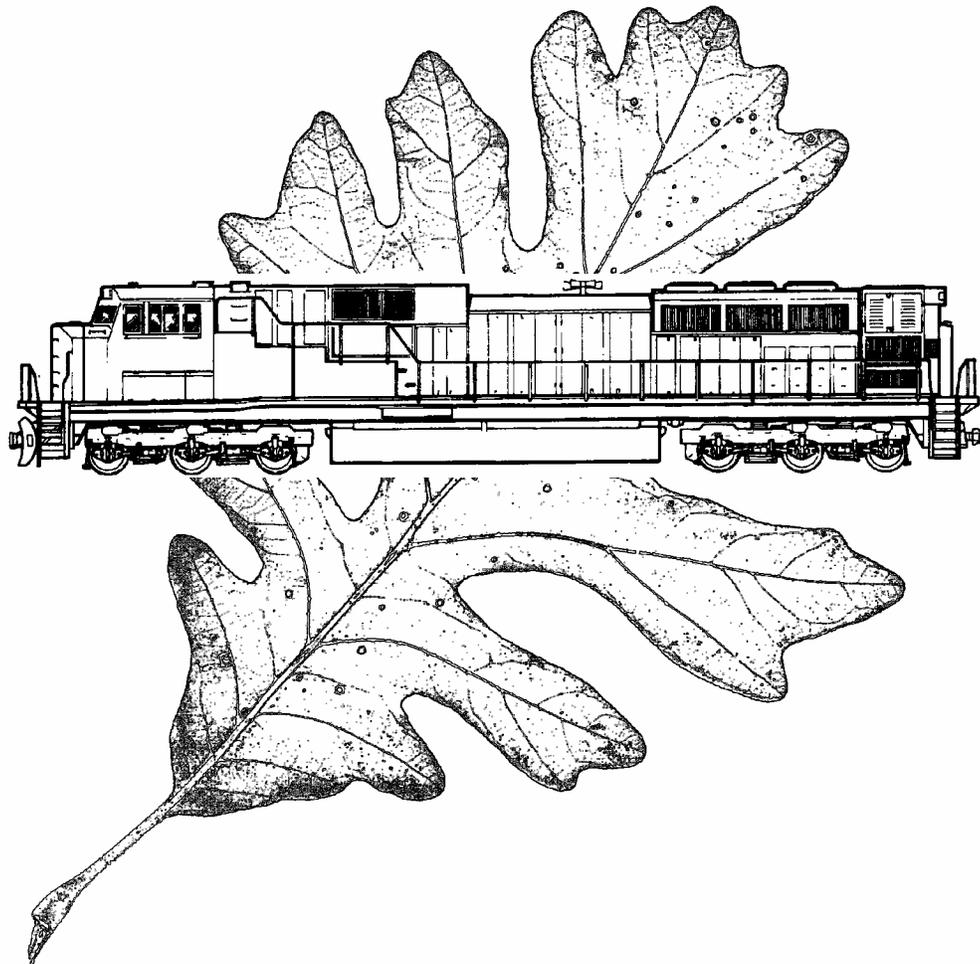

2004 Railroad Environmental Conference



Submitted Abstracts

April 2004

Railroad Engineering Program
University of Illinois at Urbana-Champaign

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Energy, Emissions, and Air Quality

1. Registering Greenhouse Gas Emissions Reductions Using DOE's Revised 1605b Reporting Program

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Abstract:

Since the railroad industry announced its goal of reducing greenhouse gas emissions intensity by 18 percent by 2012 in line with the Administration's Climate Vision program, the US Department of Energy has taken steps to revise its "1605b" voluntary greenhouse gas emissions reporting guidelines. After proposed General Guidelines were released in late 2003, a public workshop was held and comments solicited from industry and other interested parties. In summer 2004 DOE intends to issue Technical Guidelines and revised General Guidelines. Beginning in 2005, the revised 1605b guidelines will be used to register tradable emissions reductions.

This paper will describe the new reporting guidelines and implications for the railroad industry. These include external verification approaches that DOE will recommend and that the emissions trading markets will likely require for transactions in emissions reductions credits.

John C. Shideler, PhD, President of Futurepast: Inc., is an environmental management systems consultant and auditor. Since 2002 he has served as a US Expert to ISO Technical Committee 207 Working Group 5 (Climate Change) that is developing a new international standard, ISO 14064, on greenhouse gases. As a third-party auditor for environmental management systems, he conducts audits in the transportation sector for two ISO 14001 registrar organizations in the United States.

2. Emissions-reducing Hybrid Yard Locomotives.

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Abstract:

This paper discusses a true hybrid locomotive entering the extensive North American rail yard switching operations which utilize about 10,000 locomotives and rail car movers. Battery-dominant hybrid technology allows the 2,000 horsepower Green Goat® and the smaller, 1,000 horsepower Green Kid to operate while cutting oxides of nitrogen (NO_x) and dangerous particulates by 80-90% (98% with post-treatment options), Greenhouse Gases by 50+%, and diesel fuel use by 50-80% when compared to conventional locomotives of similar power ratings. Each features a small, Tier 2 compliant genset of up to 285 horsepower (200kW), depending on the anticipated workload. The lead acid batteries, with a conservatively targeted lifespan of about 7.5 to 10 years, are substantially recyclable. They are manufactured by 'recycling' aging locomotives that are either close to the end of their service life or have already been scrapped. Of additional environmental benefits are the ultra low noise footprints of both hybrid switchers which can be operated on battery power alone in sensitive areas such as close to neighborhoods, offices and in tunnels.

3. Federal PSD/Title V Exclusion of Nonroad Engines

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Abstract:

Facilities covered by the Federal Prevention of Significant Deterioration (PSD) and Operating Permits (Title V) programs are usually subject to stringent rules that may require the operation of additional monitoring systems, as well as extensive recordkeeping and reporting. These requirements may add to the complexity of the operations and may have a significant financial impact on the regulated facility.

The Federal PSD and Title V programs derive their applicability based on the aggregate air emissions from on-site equipment at each facility. Many railyards operate small combustion equipment such as gasoline-powered welders, compressors, and generators. These units may qualify as “nonroad engines.” Air emissions from nonroad engines need not be included in a facility’s aggregate air emissions when determining applicability of the Federal PSD or Federal Title V programs.

This paper discusses the definition of a nonroad engine and the application of the nonroad engine definition to portable or transportable internal combustion engines used in conjunction with units such as welders, compressors, etc. It details the negative applicability of the Federal PSD program through regulatory citations, references, and guidance documents. Finally, this paper discusses the negative applicability of the Federal Title V program.

4.A Customer Perspective – Railroad Greenhouse Gas (GHG) Reduction Strategies

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Abstract:

As companies continue to look for ways to reduce their Greenhouse Gas (GHG) emissions, all aspects of their value chain are being considered, including transportation of their products by third parties via road, rail, air or water. They are analyzing ways to improve the management of their logistics, and are considering shifts between modes of transport based on their relative GHG emissions. This is relevant to railroads, as business from these companies make up a significant portion of their revenue stream. According to Union Pacific Railroad (UPRR)¹, the automotive sector alone contributes approximately 11 percent (%) of their commodity revenue. This paper examines how one customer, Toyota Motor Sales, U.S.A., Inc., is working with rail carriers to evaluate efficiencies in rail transportation that could lead to measurable GHG reductions in their value chain.

Toyota Motor Sales, U.S.A., Inc. (TMS), is the affiliate of Toyota North America that is responsible for sales, marketing, distribution, service and parts support for Toyota, Lexus and Scion products in North America². As stated in their 2003 Environmental Report², "Our logistics operation is complex, involving shipment of both fully-assembled vehicles and individual parts and components by road, rail, ship and air transport systems... we are now evaluating established environmental activities where GHG-reduction targets will be most effective."

Concurrently, AAR is looking for ways to meet the voluntary commitment to reduce the intensity of greenhouse gas (GHG) emissions by 18 percent by 2012, as part of President Bush's "Climate VISION" initiative. According to the Bureau of Transportation Statistics³, from 1997 to 2002, truck transportation increased 28.1% while rail transportation increased 14.4%. TMS is currently planning a fact-finding meeting in March 2004 with major rail carriers to learn about initiatives being undertaken by the rail carriers, including fuel efficiency measures, fleet replacement, GHG emissions tracking, and other environmental initiatives.

¹ Union Pacific Railroad News Release, January 21, 2004,
<http://www.uprr.com/notes/investor/2004>.

² Toyota North America Environmental Report, 2003, pages 43 – 49.

3 Bureau of Transportation Statistics (USDOT) and U.S. Census Bureau, 2002
Commodity Flow Survey, Preliminary United States Data, December 2003, Table 2b.

5. Ongoing revisions on the National Ambient Air Quality Standards, and implications for the railroad industry.

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Abstract:

The National Ambient Air Quality Standards for Particulate Matter (PM NAAQS) continue to undergo significant changes. In 1987 a new Standard was implemented for airborne particles smaller than 10 μm , known as PM10. In 1997 an additional Standard was added for smaller (fine) airborne particles, known to as PM2.5.

PM2.5 is created primarily from combustion sources, and in combination with natural atmospheric processes; versus PM10 which is created primarily from the abrasion of the earth's crust (e.g. road traffic, wind blown dust). Fine particles typically have much longer lifetimes in the atmosphere, and are transported over longer distances. Local topography and meteorology have significant influences on the impacts from various source types, and thus on air quality in a given airshed.

Based on extensive study over the past ten years, EPA and the air quality community now recognize that coarse and fine particles are different types of pollutants, with different impacts on public health. Under a Consent Decree, EPA is now currently in the process of reviewing the PM NAAQS, and is scheduled to issue public notices for proposed and final rulemaking in March, 2005 and December 2005, respectively. During 2004, several important milestones regarding scientific assessment, and public review and comment are scheduled.

Current indicators are that the PM NAAQS will be modified, with a tightening of the Standards expected. Revisions in the PM NAAQS have the potential to impact the railroad industry.

This paper will present the scientific and regulatory state-of-the-art of the PM NAAQS as of late 2004. Potential implications for the industry, and opportunities for industry input will be provided. New technologies and operational strategies to address potential revisions in the PM NAAQS will be discussed.

6. Environmental Benefits of Accurate Locomotive Fuel Consumption Measurement

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Abstract:

Diesel is the main fuel source for locomotive engines in North America and many parts of the world. The properties of engine fuel make it the ideal source of mobile engines, because of its high-energy values, relative safety in storage and handling, and common availability. Diesel appears to be the fuel of choice for mobile applications, both marine and rail, for the foreseeable future. Significant advances have been made in diesel engine performance by increasing fuel economy and reducing emissions. While these improvements have made diesel internal combustion engines, more environmentally friendly, these are still significant ways to reduce fuel consumption by optimizing engine performance, reducing maintenance incidents, and avoiding faulty engine settings. This paper will explain one method of doing this with fuel consumption measurement on the locomotive.

With accurate fuel consumption measurement (FCM) available to a locomotive operator, changes in the driving method can greatly reduce fuel consumption. The operator could see, for example, that a small decrease in velocity could greatly improve fuel economy. Therefore, he has more information available to decide how best to operate his engine. A railway company could use FCM to see data for better fuel planning, strategy and training. With a historical record of fuel usage, a company planner could follow fuel usage by engine, season, and driver. Another feature could allow for tracking fuel consumption at notch levels. GPS location could be linked to FCM for knowledge of fuel usage for specific tracks and runs. This data could be used to train drivers in the best techniques to minimize fuel consumption. Slight increases in fuel consumption over a short time signals a potential maintenance or setting problem.

A FCM system must be able to provide accurate, instantaneous data about the fuel system on the engine. This requires the measurement supply and return fuel flowrate, with the difference between equaling the fuel consumption of the engine. As the engine operates, the return fuel removes heat from the injection pumps. This causes a high temperature variant in the fuel density, which must be accounted for with supply and return temperature sensors. The injection pump may also cause severe pressure pulsations in the fuel system, particularly in the return, low-pressure side. Most flowmetering instruments are affected by these pulsations, either with shortened service life or loss of accuracy. FCM flowmeters must be able to withstand and accurately measure in pulsating flows.

Risk and Liability Management

7. Use of Statistics to Assess Compliance With Michigan Part 201 Cleanup Criteria

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Abstract:

The Michigan Department of Environmental Quality (MDEQ) has developed a "Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria" (S3TM) to provide guidance on sampling of environmental media for various sampling objectives under Part 201 (Michigan's principle environmental cleanup regulation). The S3TM also helps determine when it is appropriate to use statistics and which statistical methods to use for comparing data to Part 201 cleanup criteria. The MDEQ has recently developed a statistical interface (P201 STATSOFT*) for Part 201 evaluations, which is an on-line, user-friendly tool for statistically comparing data to Part 201 criteria and background. The S3TM guidance and P201 STATSOFT were used to re-evaluate existing facility characterization data collected at a Grand Trunk Western (GTW) rail yard in Detroit, Michigan. The GTW rail yard was used historically for passenger and freight locomotive servicing and fueling. A Phase I Environmental Site Assessment (ESA) of the GTW site was completed in February 1997. The Phase I ESA identified numerous areas of potential environmental concern related to the historic servicing and fueling activities. Golder performed a Phase II ESA at the site during 1998. Facility characterization activities included drilling 36 soil borings (14 of which were completed as permanent monitoring wells), excavation of 25 test pits, and collection of 13 surface soil samples. Exceedances of Part 201 Industrial/Commercial criteria for relevant exposure pathways (i.e., soil direct contact, soil volatilization to ambient air, groundwater contact) were identified. Several Part 201 exceedances were eliminated through statistical risk assessment. This paper will discuss: The applicability of statistics for relevant exposure pathways at the site; selection of appropriate data sets (existing characterization data vs. additional random samples); and selection of the appropriate statistical method. In this study, the P201 STATSOFT was used to calculate the "Representative Concentration" for constituents of concern as the 95% upper confidence limit (UCL) for the mean concentration as described in the S3TM. Because the data sets were lognormally distributed, the "Land's Method" was used to calculate the one-sided, 95% UCL for the mean. Similar statistical risk assessment procedures can be used in other states to assess compliance with applicable criteria. This presentation will conclude with a limited survey of other states that allow the use of statistics in decision-making under the prevailing environmental regulations. The recommended statistical procedures will be compared with those outlined in Michigan's S3TM guidance.

*The intended users of P201 STATSOFT are the staff of the MDEQ and members of the regulated community involved in Part 201 evaluations.

8. When Good Analytical QA/QC Isn't Enough For the Regulatory Community

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Abstract:

This paper summarizes an innovative approach that The Burlington Northern and Santa Fe Railway Company (BNSF) applied to develop a response to questions from a regulatory agency regarding uncertainties in analytical data, and how to quantify those uncertainties using quality assurance/quality control (QA/QC) data. BNSF developed a statistical methodology to assess uncertainties or low bias in “flagged” metals data using matrix spike recovery data. BNSF’s approach allayed all concerns with data uncertainty expressed by the regulatory agency and eliminated the need to re-sample the site, saving the railroad significant investigation costs.

Nearly every state regulatory agency has implemented risk assessment guidelines to be used by the regulated community in developing remedial strategies that are protective of human health and the environment. As a part of the guidelines, regulators are ensuring that the supporting analytical data are generated with an adequate and defensible level of supporting QA/QC data. The purpose for these QA/QC protocols is to ensure an understanding of the limitations and uncertainties associated with data being used to make remedial decisions that protect the health of every stakeholder. Sometimes, however, that supporting data raises more questions than it answers.

On behalf of BNSF, RETEC was contracted to perform site characterization activities and develop a remedial strategy for a railroad site located adjacent to a former zinc smelter in Oklahoma. Surface soils over a portion of the site were determined to be impacted with arsenic, cadmium and lead above pre-determined remedial criteria. Industry standard investigation practices were utilized to characterize and delineate impacted soil. Samples collected during the investigation were submitted to a certified laboratory, and rigorous data validation was performed using the National Functional Guidelines (EPA, July 2002). In doing so, RETEC determined that a subset of site data required qualification due to matrix interferences and sample heterogeneity, resulting in the assignment of “J” qualifiers. Typically, this qualified data would be accepted at value as positive data, but the acting regulatory agency requested a better assessment of the uncertainty in the data before allowing BNSF to make remedial decisions and proceed with site clean-up. RETEC and BNSF were successful in developing a statistical approach that quantified the uncertainty of the J flagged data and provided the agency the level of comfort they needed to allow us to proceed with development of a remedial strategy for the site.

9. Integrating Engineering and Environmental Actions As A Risk Reduction Strategy

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Abstract:

The implementation of new rail lines and facilities carries significant business risks associated with cost, schedule and technical compliance. There are inherent issues associated with both traditional rail-engineering practices and with typical environmental approaches that magnify this risk. In addition, acquired habits of rail implementation teams often exacerbate the risk downside. Transportation engineers and environmental professionals must work together effectively during the implementation of rail lines and facilities to:

- Identify sources of risk
- Develop tactics and strategies to mitigate and manage the risk
- Actively deploy the necessary resources and actions

The bottom line to averting risk is saving time, money and enterprise-reputation.

This presentation provides a framework for the identification, mitigation and action that is necessary to keep rail environmental projects “on the right track”. This begins by giving rail implementation teams guidance regarding a multi-dimensional hierarchy of risks that must be understood. Discussions of a series of nine situations that often cause “blocked tracks” will be identified, along with solutions to keep the project moving forward. The solutions are each framed with respect to the specific actions that the rail engineering and the environmental professionals must accomplish in order to achieve success and actively manage risk.

10.The Strengthening Role of Institutional Controls in "Brownfield" Property Transfers

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Abstract:

So you've got a 30-acre parcel you no longer need, right in the path of encroaching gentrification. You know the history, and you have enough subsurface data to realize you won't get it cleaned up well enough for an unrestricted use, liability-free sale in your lifetime. Can you sell it and risk losing management of institutional controls (ICs) (e.g., zoning restrictions, deed notices, covenants, utility notifications, etc.)? Or should you retain ownership and forfeit the cash your company needs now?

The role of ICs in the remedy for impacted sites has been highlighted through recent "Brownfield Amendments" to the Federal Superfund law. In addition, Federal, State and local initiatives are underway regarding information systems to manage ICs, as well as establishment of legal tools to shift more responsibility to purchasers and property occupants. These programs can now provide reliable assurances to sellers, buyers, and lessees of impacted properties.

This presentation provides an overview of ICs, their increasing strengths, as well as their remaining limitations. Application of ICs to the transaction of a fictitious inactive, industrial property will be discussed.

Remediation

11. Self-Sustaining Energy Source for High Vacuum Dual-Phase Extraction System

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Abstract:

Extensive investigation at rail facilities in southern Arizona revealed a large scale free-phase fuel oil plume within a perched groundwater system approximately 70 feet below the surface. Several free-phase recovery technologies were pilot tested at the site, and a hybrid high vacuum dual-phase recovery system, consisting of bioslurping and pneumatic pumps, has been installed at the site. Currently six extraction wells are producing approximately 100 gallons of free-phase fuel oil per day.

The high vacuum dual-phase system requires approximately 40-horse power, resulting in significant energy costs. Utilizing the recovered fuel oil as an energy source for continued remedial activities has significantly reduced these cost. The recovered fuel oil is conditioned and used as fuel for a 100-kilowatt electric generator that powers the high vacuum dual-phase system. Several filtration steps, to remove suspended solids and water, are necessary to recondition the fuel oil prior to use. Although additional operation and maintenance (O&M) is required, this approach has reduced the energy cost by approximately 70 percent and eliminated all free-phase fuel oil disposal costs. A simple site evaluation procedure has been developed to evaluate the feasibility of this approach at sites impacted with free-phase hydrocarbons. The factors that must be considered are: free phase composition and condition; system power requirements; siting and permitting; and potential free-phase recovery rates over the life of the project.

Utilization of recovered free-phase hydrocarbons as an energy source not only reduces O&M costs, but is a conservationist approach to remediation that provides a substantial public relations benefit.

12.A RBCA Approach To Derive Site-specific LNAPL Clean-up Criteria

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Abstract:

A risk-based corrective action approach (RBCA) was developed to address light nonaqueous-phase liquid (LNAPL) in soil and groundwater. Because the LNAPL was shown not to pose a risk to human health, the objective of this work was to determine site-specific remedial standards for LNAPL based on criteria such as beneficial resource preservation and technical practicality. 40 CFR §280.64 stipulates that LNAPL must be removed to “the maximum extent practicable” and “in a manner that minimizes the spread of contamination to previously uncontaminated zones”. These requirements are consistent with this approach to derive site-specific LNAPL cleanup criteria based on contaminant mobility and recoverability considerations.

A conceptual model of LNAPL migration was formulated which allows LNAPL to spread until it reaches an equilibrium condition, in which the gravity forces (head) causing the spreading of the LNAPL are balanced by the resistance offered by the non-wetting fluid entry pressure of the formation. Capillary pressure models presented by Charbeneau and Chiang (1995), Parker and Lenhard (1989), and Schiegg (1984) predict that there is a minimum thickness of LNAPL which must be added to a monitoring well before the LNAPL has sufficient head to enter the formation. This minimum monitoring LNAPL thickness, or LNAPL entry pressure, was calculated based on the physical properties of the LNAPL and project site conditions to determine a site-specific target monitoring well LNAPL thickness. Results indicated that LNAPL would cease spreading on this site when monitoring well LNAPL thickness is reduced to 0.5 foot. Diminishing return predictions for LNAPL recovery were made using a series of spreadsheets programmed with analytical solutions to radial multiphase flow equations, published by API (1999). LNAPL properties and site-specific soil properties were used as input values for the multiphase flow model, and a point of diminishing return for LNAPL recovery was predicted to occur when monitoring well LNAPL thicknesses were reduced to approximately 1 foot.

Although these results indicate that LNAPL removal to “the maximum extent practicable” at the site may be quantified as a reduction in LNAPL monitoring well thicknesses to approximately 1 foot (based on the diminishing return considerations), in order for the clean-up criterion to be protective of unimpacted media, the prevention of LNAPL spreading was given precedence over the diminishing return considerations. The

clean-up criterion for this site was therefore recommended to be a permanent reduction of LNAPL thicknesses in all site monitoring wells to 0.5 foot or less.

13. Application of Innovative Approaches For The Remediation of Railroad Yards

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Abstract:

Spills of locomotive fuel, oil, and chemicals on railroad tracks and in railroad yards are a common problem. Conventional remedial methods such as excavation are expensive and can be disruptive to services and often require removal and replacement of infrastructure. Also spills often occur in areas where access is restricted by non-railroad structures such as privately owned buildings and highway overpasses. Both in situ and ex situ innovative approaches have been applied to the remediation of contaminants in these situations.

This presentation will provide a brief overview of the potential innovative technologies that can be used for remediation of railroad track and yards, highlighting their advantages and limitations. The presentation will also discuss the results of case studies involving remediation of various types of petroleum hydrocarbon spills in soil and groundwater. The case studies will include in situ bioremediation of ballast at a railroad yard in New Mexico, ex situ bioremediation of heavily contaminated soil with locomotive oil at a railroad site in California, and in situ bioremediation at a railroad site in New Jersey.

14. Biological Treatment of PAH-Contaminated Groundwater: A Rail Yard Case Study

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Abstract:

Remediation of groundwater aquifers contaminated with diesel in rail yards is often achieved using Multi Phase Vacuum Extraction (MPVE) systems. Typically, the liquid and gaseous effluents generated by these systems, even after the removal of the free phase product by an oil-water separator, are treated using expensive and short-lived activated carbon filter beds. We hypothesized that, through the substitution of these activated carbon beds by a biotreatment unit, the operation costs could be reduced and the treatment effectiveness (i.e., biodegradation vs. adsorption) could be improved.

The objectives of this research and development project are to demonstrate the effectiveness of a biotreatment unit associated with a MPVE system and to perfect its design to treat the highly charged effluents at a cost similar or lower to currently available treatment options, in a sustainable development perspective.

This three-phase project was comprised of several laboratory tests to study the characteristics of various types of organic and inorganic materials; the operation of a pilot-scale biological treatment unit; and the design and operation of a large-scale biological treatment unit linked to an existing MPVE system.

A peat-based filter bed was developed based on the physical/hydraulic performances of various types of peat and other mineral/organic materials tested in laboratory. The biological performances of seven mixes having optimal physical / hydraulic properties were then tested using 10-L lab-scale bioreactors operated in parallel during a 4-month period. The bed showing the best overall performance was retained for the next testing phase, the operation of a pilot-scale biotreatment unit.

The 750-L pilot-scale unit was installed as part of an existing MPVE system at a rail yard in Montréal to determine on-site the optimal operating conditions. The performances of this unit were evaluated under various organic loads and hydraulic residence times. Significant reduction (i.e. > 95 %) of the petroleum hydrocarbon C10-C50 and polycyclic aromatic hydrocarbon (PAH) concentrations were measured in the aqueous effluents treated by this biological treatment unit over a trial run of four months. This pilot-scale test also confirmed that not only adsorption of the hydrocarbons to the peat moss

occurred, but that biodegradation was the main process involved in the treatment, thus extending the removal capacity and the life expectancy of the bed.

The third phase of this project is currently under way and its objectives are to perfect the engineering of the air and liquid distribution systems and to validate the effectiveness of the biological treatment unit under real operating conditions and over several months of operation. The gaseous effluents treatment performance will also be determined during this phase of the project. A large-scale biotreatment unit (30 m³) has been designed and built on an existing MPVE system and its performance is currently being evaluated.

This Golder - BRI project was made possible by the contribution of the CN, the Centre d'excellence de Montréal en réhabilitation de sites, and the Fonds d'action québécois pour le développement durable and its financing partner, the Québec government.

15. Remediation of a Tank Car Maintenance Facility

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Robert W. Rittmeyer, P.E., ENSR International

J. Jay Grove, GATX

Abstract:

CERCLA Remedial Design and Remedial Action

Saegertown Industrial Area Site

General American Transportation Corporation (GATX)

A 100-acre site formerly utilized as a rail car maintenance facility was found to contain a large deposit of coal tar and related materials. PAH and PCB were identified as compounds of concern. The remedy selected for the site was on-site incineration of coal tar sludge and contaminated soil. In order to expedite remediation of the site in the most cost-effective manner possible, the following actions were taken:

? Obtained two modifications of the remedy (ESDs) that allowed for off-site use of coal tar sludge and heavily contaminated soil as supplemental fuel at a cement kiln and a utility boiler, and lightly contaminated soil as raw material substitute at a cement kiln. This resulted in lower unit disposal costs for excavated materials.

? Negotiated a Statement of Work that detailed procedures to be followed to satisfy performance standards specified in the Record of Decision. Included was a soil column approach to demonstrating compliance with the soil standard, which reduced the amount of soil excavated. Also included was a statistically designed sampling program that reduced the required number of confirmation samples.

? Prepared the Remedial Design on an expedited schedule. The 60% design deliverable was eliminated. Rather than modifying submittals to respond to EPA's comments, the comments were discussed by the design team (EPA, PADEP, ACOE and ENSR), an approach to address them was agreed upon and implemented in the following submittal. This reduced design costs and compressed the schedule. The project went from ESD to the field in 4 months.

? Negotiated Natural Resource issues associated with on-site wetlands. Prepared delineation and habitat assessments to value wetlands that would be disrupted by remediation. GATX reached a cash settlement with DOI/EPA whereby wetlands were replaced at another location. This saved \$300,000 relative to on-site mitigation costs.

? Provided support to the EPA community relations plan, and implemented a parallel program to ensure proper representation of GATX's interests.

? Secured EPA's approval to collect confirmatory samples from the bases of excavations through standing water. This reduced the amount of water that needed to be pumped and treated.

? Secured EPA's approval to discharge water collected in excavations approved for closure directly without treatment. This reduced water treatment costs.

? Successfully petitioned EPA to reduce the parameter list for post-remediation groundwater monitoring based on the results.

The cost for site remediation was reduced from the Feasibility Study estimate by 45 percent.

16. Management of Impacted Soils During Reconstruction of a Rail Transportation Corridor

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John Moe, ERM
Alan Nye, CTEH

Abstract:

Reconstruction and expansion of existing rail corridors often involves the disturbance and handling of large quantities of degraded ballast and subballast. In many instances, this material may be impacted with several chemicals of concern, including petroleum hydrocarbons, polynuclear aromatic hydrocarbons, and metals, primarily lead and arsenic. The presence of impacted material has cost, safety and schedule implications. The Caltrain/UPRR CTX project represent a typical reconstruction project.

A soil management plan (SMP) was devised for the CTX project to allow for the reuse of soil and ballast impacted with lead, arsenic, PAHs and petroleum within a 40-mile long right-way spanning 25 cities and three counties. Reuse values are based on risk calculated for several exposure scenarios. The SMP provides a legal basis for reuse within the context of California Title 22 regulations (hazwaste) and allows for the reuse of material that, if considered waste, would be characterized as hazardous waste. In the context of CTX project alone - allows for the reuse of 90 percent of the 150,000 tons to be disturbed, greatly reducing project cost and increasing the flexibility of the project schedule. Upon completion and implementation the SMP was considered a model plan by the RWQCB and DTSC, the oversight agencies.

17. System O&M and Optimization: Use of Routine Air Stripper Cleaning Program to Improve Compliance and Safety.

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Lori VanderKam, Earth Tech

Abstract:

Air stripper performance is impacted by bio-growth and mineral deposits. Scheduling maintenance based on changes in air stripper parameters (i.e. increased pressure drop or reduced flow) may result in exceeding effluent limits before cleaning. In addition, severe fouling requires the use of strong acids.

Overview of implementation of a routine cleaning program for a shallow-tray air stripper which includes cleaning the air stripper approximately every two months. Because the system is cleaned before it is severely fouled, using citric acid is sufficiently strong to remove mineral deposits and bio-growth. The citric acid is safer for the air stripper components than traditional cleaning agents (i.e. muriatic acid) allowing the trays to be cleaned in place, and is safer for the operators to handle. The routine cleaning schedule also ensure that the air stripper is cleaned before performance is degraded, preventing permit violations. Other methods for systems optimizations will be discussed.

18. Benefits of Bioslurping at a Railyard

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Ted Lietzke, Earth Tech

Abstract:

A bioslurp system designed to recover free-phase diesel fuel has been in operation for over 5 years with much success. The plume, which covered approximately 2 acres and was measured up to 4 ft thick in wells, is essentially gone. Approximately 32,500 gallons of product have been recovered to date.

Product thickness and recovery are affected by fluctuations in the groundwater elevation, however in areas that have become product free, minimal residual effects are observed. Fluctuations in the groundwater mobilize product formerly trapped in the soil below the top of the water table causing product to reappear. Groundwater samples taken from wells formerly in the plume, that are now product free, have shown little to no dissolved phase petroleum constituents. Methods used to achieve these reductions will be discussed.

After five years the run time has been reduced from 24 hours a day originally to 2 hours a day. Further reductions of the operating time are expected in the near future. Agency negotiation strategy will be overviewed on achieving goal of closure and shutdown of the remediation system.

19. Optimizing a Groundwater Remediation System to Reduce Remediation Operational Costs at a CN Railyard

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Additional Authors:
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Lori VanderKam, Earth Tech

Abstract:

A review of multiple cleanup systems at a large railyard lead to a decision to modify and enhance one system on the site and propose to the regulatory agency that another system be shut down. The review of the remediation systems at the site was undertaken as part of the development of a long-term strategy to reduce operational costs for the cleanup of the site.

A large plume of chlorinated solvents was identified on the site resulting from multiple source areas. Remediation systems were installed in the source areas to address soil and/or groundwater contamination where it was most concentrated. An additional remediation system was installed down gradient to treat the chlorinated plume before it left the railyard property. The downgradient remediation system treated the groundwater taken from deep in the aquifer by means of an air stripper and re-injected the treated water near the top of the aquifer.

The pumping rate and associated capture zone were limited by the rate of injection; therefore, the downgradient system was modified to discharge to surface waters via an NPDES permit. This allowed an increase in the pumping rate and an increase in the groundwater capture zone of the system.

Because of the increased capture zone of the down gradient system, one of the source area systems capturing groundwater for carbon treatment has been proposed for shutdown. The groundwater will be captured and treated by the down gradient system for an overall significant reduction in costs for operations at the site.

20. Free Product Recovery Without The Wait and Cost

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Abstract:

The design and subsequent installation of a passive free product recovery trench at an active locomotive fueling facility was funded primarily through the “coupling” of the project with a planned storm water piping project. Due to the success of this project, a total of four free product recovery trenches have been installed at four separate locomotive fueling facilities.

At the original site of installation, replacement of the aging storm water piping system provided an opportunity for installation of a simple but effective passive free product recovery trench. The recovery trench was designed to capture free product from both perched and deep water-bearing zones and gravity feed it to an existing wet well and water treatment plant.

The recovery system captured over 8,000 gallons of free product in the first year of operation. The success of this project inspired the installation of three additional free product recovery trenches at three separate rail yards, one of which also involved capital funds, and one which resulted from an emergency response action. Each application of the technology presented unique challenges that required modifications which ultimately resulted in success. Measurable free product has been eliminated at three of the four yards where this technology has been employed within the first year of operation. Free product recovery trenches are currently being designed for two additional locomotive fueling facilities, one of which will be in conjunction with a fueling pad and storm water piping capital project.

The realized cost savings have been most significant when coupled with capital projects; however, the cost-effectiveness and technical feasibility of the free product recovery trench technology does not necessarily depend on the involvement of capital improvements. Although the merit of this approach differs based on site conditions (as is the case with any remedial technology/approach), case studies show a cost savings of up to 75% when compared to alternative technologies, often with the elimination of measurable free product in a fraction of the time.

21. Scenic Highway Revitalization Partnership: Reclamation History for the Former Export Drum Facility

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Additional Authors:
Chet Culley, Kansas City Southern Railway

Abstract:
Please see PDF files Paul Kuhlmeier sent.

22. Use of Hydrocarbon Baildown Tests to Predict the Recovery and Volume of Free-Phase Hydrocarbons in the Subsurface

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Abstract:

Designing and selecting the most efficient remediation technology for subsurface free-phase hydrocarbon impacts at environmental sites requires an accurate estimate of the volume and recoverability of the free-phase hydrocarbons. Recovery estimates can also provide the basis for life-cycle predictions used in the cost/performance evaluation of technology alternatives. Estimating the volume and recoverability of free-phase hydrocarbons typically involves drilling and core analysis to obtain the site-specific parameters needed to model free-phase hydrocarbon distribution and behavior. These methods are relatively costly and may not be justified depending on the scope of the impacts.

Hydrocarbon baildown tests are a quick and inexpensive means of obtaining in-situ hydrocarbon transmissivity data. These data may be used to predict the mobility and initial recovery rate of free-phase hydrocarbon. However, estimates of recoverable volume require an additional parameter called the specific free-phase hydrocarbon yield. Specific free-phase hydrocarbon yield is analogous to the specific yield or storativity parameter used in groundwater hydrology (i.e., the volume of free-phase hydrocarbons yielded by a unit volume of soil). Site-specific fluid and core data are used to calculate this parameter.

RETEC recently completed a series of nine baildown tests at a facility with a range of free-phase hydrocarbon thickness. Specific free-phase hydrocarbon yield values derived from the baildown tests displayed a linear correlation with the free-phase hydrocarbon thicknesses measurements. Furthermore, site-specific fluid and capillary pressure soil core data were collected from this facility. The values of specific free-phase hydrocarbon yield obtained from core analysis were in close agreement with the baildown test results. This suggests that baildown tests may be a cost-effective alternative method of estimating the volume and recoverability of free-phase hydrocarbon in some circumstances.

23. Lead-in-Soil Remediation at a Historic Rail Yard Brownfields Site

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Abstract:

Central of Georgia Railroad Company (COG, a subsidiary of Norfolk Southern Corporation) acquired a parcel of land in 1836 for railroad operations in Savannah, Georgia. COG conducted railroad operations on the site for 127 years, from 1836 to 1963. Operations included the manufacturing and repair of railroad engines, boxcars and coaches. Prior to COG ownership, the property was part of the site of one of the bloodiest American Revolutionary War battles ever fought. The site of the battle became known as the Spring Hill Redoubt and the site became known as Battlefield Park. The site has been referred to as the most historic rail yard in the country.

Lead has been detected at concentrations requiring remediation in the fill material at the site at depths ranging from 0 to 14 feet below ground surface. There is a strong correlation between the presence of lead and the fill material, whereas native subsurface material at the site is generally free of lead and other contaminants. The site assessment was unique (for Georgia) in that the site was divided into exposure areas of approximately equal size (.5-acre), within which soil samples were collected on a grid pattern to characterize lead impacts. This soil sampling approach provided a statistically defensible position that ensured a low probability that a significantly impacted portion of the site would be missed by the sampling program. Based upon the results of this assessment, approximately 32,000 cubic yards of soil will be removed, or first stabilized to render non-hazardous and removed, and disposed.

In December 2003, the City purchased the property as part of a multi-site property deal with COG, and will remediate the site soils under Georgia's new Hazardous Site Reuse and Redevelopment (Brownfields) program. Following remediation, the site will be redeveloped to replicate the Spring Hill Redoubt and a trolley line will be installed, connecting the site to the historic River Street area.

This presentation will detail the very unique and significant property history, the property sale negotiation process, the remediation of site soils (slated to occur in the Spring – Summer of 2004), and the Brownfield redevelopment plan.

Compliance

24. Review of Current Railroad Environmental Issues

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Abstract:

The Association of American Railroads (AAR) represents the freight railroads in North America. AAR members include the railroads that operate 76 percent of the line-haul mileage, employ 90 percent of the workers, and account for 93 percent of the freight revenue of all railroads in the United States; and Amtrak. AAR also represents the Canadian railroads through the Railway Association of Canada, and three Mexican railroads including Ferromex, Ferrosur, and TFM. This presentation will discuss current regulatory, legislative, environmental awareness, and pollution prevention initiatives at AAR. Regulatory activities include the construction and development effluent guidelines, off-road diesel fuel regulation, as well as recent developments in the area of spill prevention control and countermeasure plans. On the legislative front, AAR has been tracking the energy bill to make sure research funding is authorized for locomotive emission and energy research. Environmental awareness activities include the John H. Chafee North American Railroad Employee Environmental Excellence Award, and the award for professional railroad employees. Voluntary programs include the Smartway program, and a voluntary commitment to the White House Council on Environmental Quality to reduce greenhouse gas emission intensity by 18% by 2012. The re-registration of creosote is also something that EPA has in the works for 2004.

25.Common Audit Findings during Multimedia Compliance Audits

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Abstract:

The audit team of Conestoga-Rovers and Associates (CRA) of Niagara Falls, New York conducts multimedia (air, water, and solid waste) environmental compliance audits of industrial facilities to ensure compliance with federal, state, local, and any other applicable environmental regulations. Such environmental compliance audits are usually conducted at the request of clients for developing baseline regulatory compliance status. During the auditing process, the auditors also evaluate the facility's environmental management systems and other related areas of concerns. The paper summarizes the common audit findings made during multimedia environmental compliance audits of several major industrial facilities including railroad transportation.

The proposed paper will help environmental, maintenance, and operations managers in achieving regulatory compliance by implementing proper compliance techniques.

26.Cathodic Protection 101

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Additional Authors:

Lou Koszewski, Tank Protectors, Inc.

Abstract:

SPCC regulations require that buried piping installed or replaced on or after August 16, 2002, have a protective wrapping and coating, and be cathodically protected. These regulations also require each aboveground container must be test for integrity on a regular schedule following an appropriate industry standard such as API 653. The frequency of these inspections is based on the corrosion rate of the floor or shell. Extending this inspection interval will save large amounts of money for the tank owners.

So how do cathodic protection systems work for ASTs and pipelines? What needs to be done to inspect and maintain the systems?

27. Special-Topic Panel Discussion of Federal Permits Required for Railroad Construction Projects

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Additional Authors:

Victoria Rutson, Surface Transportation Board
Roger Wiebusch, United States Coast Guard
Chandler Peter, U.S. Army Corps of Engineers
David Seep, Burlington Northern and Santa Fe Railway

Abstract:

Frequently a railroad construction project triggers the need for one or more federal authorizations. For example a new bridge over a navigable river, a capacity project that impacts wetlands, or a new competitive build-in each may require federal approval before construction can commence. It is critical that the railroad industry understand the federal rules and processes that affect construction activities.

This would be a panel presentation from three Federal Agencies along with a railroad representative that discusses several of the federal laws and regulations that may affect railroad construction activities. The panel would consist of the representatives from the Surface Transportation Board, the U.S. Coast Guard, and the Corps of Engineers, along with a rail industry representative. The Surface Transportation Board would discuss the environmental review process associated with new rail line construction projects. The Coast Guard would discuss the rules relating to the construction of a bridge over a navigable water. The Corps of Engineers would discuss the Section 404 permit program and when a rail construction project may require a permit. Representing the agencies would be the following individuals, all of whom have agreed to make presentations:

28. “Surface Water TMDLs – An Impending Storm for US Railroads?”

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Abstract:

As some of the largest private property holders in the U.S., railroads may be more exposed than any other industry to regulations involving surface and storm water management. Total Maximum Daily Load (TMDLs) requirements originate from a little enforced provision in the Clean Water Act requiring documentation of impaired water bodies and development of TMDLs to restore and maintain water quality. TMDL is a calculation of the maximum amount of a pollutant, from all sources, that may be introduced into surface water, and still assure that applicable water quality standards are achieved. Determination of a water body’s TMDLs can be highly charged and controversial process. Consequently, only a limited number of TMDLs have been developed and primarily for constituents such as nutrients, fecal coliform and suspended solids. However, it is probable many water bodies will have TMDLs for a wide range of organic and inorganic compounds in the future.

Although the direct impact of TMDLs on railroad operations at this time is unclear, recent developments in Minnesota may provide insights into what the future holds. The current approach in Minnesota is development of a state law that addresses impaired waters, the restoration of impaired waters, and the development and implementation of TMDLs through a multidimensional stakeholder process. As a stakeholder, railroads may find themselves involved in watershed discussions involving the development of TMDLs. During the development and subsequent enforcement of TMDLs for specific water bodies, it is possible point source and non-point source discharges will come under scrutiny. TMDL development may also limit future railroad expansion in a given watershed. Additionally, industrial growth (railroad customers) in some watersheds may be similarly impaired. While the TMDL focus is primarily for non-point sources, the implementation of TMDLs will ultimately affect some of the business decisions that are necessary to operate the railroad of the future.

29. Facility Assessment Compliance Evaluation (FACE)- Environmental Compliance for Small facilities

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Abstract:

Amtrak's Facility Assessment Compliance Evaluation (FACE) program was designed to assess environmental compliance at approximately 120 railroad facilities that have limited environmental impact and because of their size and limited industrial activities are not included in the Amtrak Environmental Auditing Program (EAP).

While Amtrak's Environmental Department manages the program, facility/field level staff conducts the assessments. This puts the responsibility for compliance at smaller facilities in the hands of facility and division staff. The program allows for constant monitoring, continued improvement, and promotes environmental stewardship and educational outreach.

The FACE program incorporates six key functions:

1. Review the status of compliance with applicable federal and state environmental laws and regulations, and conformance with company environmental policies, procedures and recognized industry standards at each Amtrak facility
2. Identify significant environmental risks and impacts at the facilities
3. Assess the integrity of the environmental management practices and processes employed at the sites
4. Increase awareness of environmental requirements and company expectations at the facility level
5. Enhance each facility's ability to design and implement solutions to environmental problems through root cause analysis and timely corrective action
6. Provide environmental due diligence.

With FACE incorporated into Amtrak's EMS program it acts as one of several key functions that allows Amtrak to monitor, manage and achieve environmental compliance.

30.SPCC Compliance Evaluation Process

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Abstract:

On July 17th, 2002, EPA issued a final rule amending the Oil Pollution Prevention regulation promulgated under the authority of the Federal Water Pollution Control Act (Clean Water Act). This rule addresses requirements for Spill Prevention, Control and Countermeasure Plans (SPCC Plans). The new SPCC rule as presented in 40 CFR Part 112, addresses these revisions and became effective August 16, 2002. EPA published a final rule on April 17, 2003 that extended the deadlines by which facilities must amend (or, for new facilities, prepare) and implement their SPCC plans. The compliance deadline as specified in the SPCC rule requires that SPCC plans be amended by August 17, 2004 and facility changes to achieve compliance be implemented by February 18, 2005.

This presentation summarizes the process established at UPRR to achieve and maintain compliance with the changing SPCC regulations. In the course of this effort, a step-wise process was utilized, and included:

- ? Regulatory Review – evaluation of the current and revised SPCC rule;
- ? Budget Appropriation – capital improvement, testing and plan re-certification;
- ? Resource Planning – team building, corporate, facility and technical support;
- ? Facility Inspection and Testing – API 653, secondary containment;
- ? SPCC Plan Revision and Re-Certification – database adaptations, PE certification;
- ? Verification and Documentation – maintained at both the corporate and facility level.

A goal at all UPRR facilities is to prevent oil discharges from occurring, and to ensure proactive and effective response measures. The process implemented at UPRR to achieve and maintain SPCC compliance represents a practical approach that can be used at similar railroad facilities.

31. Strategic Planning for Railcar Cleaning

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Abstract:

Railroads and Railcar leasing companies provide railcars as a service to their Shippers for the daily movement of over 25,000 commodities. Consignees (the receivers of the shipment) are responsible for emptying the cars. Occasionally, cars are refused when they reach the next Shipper because the interiors are not clean. The Railroad or Railcar leasing company must then ship the non-revenue empty to a cleaning facility. Close oversight of these facilities is required to assure that the residuals, wastes, runoff and emissions from the cleaning activity are controlled to eliminate environmental impact.

In 2003, Union Pacific embarked on a strategic initiative to evaluate its car-cleaning network and to identify the optimum locations for car cleaning facilities. Through the use of economic modeling techniques and impact studies Union Pacific is in the process of reducing car cleaning facilities to ten major switching yards. These efforts are structured toward lowering overall costs of cleaning railcars, making more cars available for loading, and creating facilities that have minimal impact on their surroundings.

Our presentation will provide specific examples of the challenges faced by Union Pacific under this railcar cleaning project, and the strategies Union Pacific is using to “plan-in” environmental protection from the start.

Environmental Management Systems

32. How Do We Measure Progress?

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Abstract:

Category - Environmental Management Systems

Typical questions frequently asked by Corporate Management with regard to the status of environmental programs include

“How do we know that we are making progress”?

“Are we doing what is necessary”? and,

“How do we measure improvement?”

Over time, we have developed, improved, and re-evaluated the measures for the major programs - air, water, waste and earth. We normally identified one or two high level indicators for use in the overall Company Business Objective matrix, and attempted to then provide additional program specific indicators which supported those high level indicators. Often those measures were often ‘stand alone’ indicators that did not provide a broad perspective for all of our programs.

As we have continued to upgrade our environmental audit process, incorporate Total Quality Management Systems principles into daily work routines, and begin building an Environmental Management System, the inter-relationships between programs became apparent. There are 4 phases to consider. The basic corporate values influence program drivers, which subsequently lead to performance indicators, and ultimately to measurable, key results.

The model is comprised of a visual aid which links to a simple spread sheet that summarizes the details. These tools now capture basic information, and can be expanded to tally more specific facts as our program continues to mature. The goal is to present data that is meaningful for everyone from the Chairman to those fueling locomotives on the ground.

33. Environmental Management Systems

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Abstract:

Environmental management and decision-making affects almost every industry sector throughout the world. When properly implemented, an Environmental Management System (EMS) can be integrated with other management requirements to assist organizations to achieve environmental and economic goals. The ISO 14001:1996 Standard specifies the requirements for an effective EMS and contains those requirements that may be objectively audited for certification or registration purposes. In North America, the automotive industry has taken a lead role in adopting the requirements of ISO 14001:1996 and requiring third party certification for its own facilities (Original Equipment Manufacturers) and those of its vendors/suppliers. Other industry sectors, including the railroad industry, are also recognizing the benefits of an EMS and are pursuing EMS implementation and/or certification.

The identification of environmental aspects and impacts and the evaluation of aspect/impact significance is one of the most important implementation activities upon which the entire EMS is based. The evaluation of significance often times includes a quantitative evaluation based on a Failure Mode Effects Analysis (FMEA). An FMEA alone; however, is limited and needs to be supplemented by other consideration factors to adequately capture all significant aspects. Such consideration factors may include regulatory considerations, high severity designations, and management priorities. The use of an FMEA type evaluation along with supplemental consideration factors provides top management with a flexible yet comprehensive approach for identifying significant environmental aspects. This paper presents such an approach and provides a sample evaluation process for significant aspects associated with typical rail yard operations.

34. New Responsible Care Management System Requirements for Railroad Industry

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Abstract:

The chemical industry and railroads have cooperated in development of a new and expanded Responsible Care Management System (RCMS) for the railroad industry. The new system will impose some additional requirements on environmental and hazardous materials management organizations in the railroad industry. The presentation will cover these additional requirements and the railroad industry's program to respond to these new requirements.

A representative of the American Chemistry Council's Responsible Care program along with one or more representatives of the railroad industry will present the elements of the RCMS for railroads. The revised system includes the use of third party audits and certification of management systems and facilities. The paper will discuss the gap analysis to be conducted by the railroads in order to implement the revised management system requirements.

Elements of the RCMS include the following:

- Policy & Leadership
- Planning (PLAN)
- Implementation, Operation & Accountability (DO)
- Performance Measurement & Corrective Action (CHECK)
- Management Systems Review (ACT)

The presentation will cover these steps and the processes and procedures that the railroad industry has in place to address these four steps.

35. Having a Successful RCMS Audit: Demonstrating How You Meet Responsible Care Management System (RCMS) Requirements at Multiple Levels and Successfully Integrating RCMS Into Your EMS

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TBA,

Abstract:

Some RCMS railroad partners will be having their first RCMS audits in 2005. Planning for the audit before it occurs will be time well spent. Meeting RCMS criteria is not the end of your effort; you still have to demonstrate how you meet them to the auditor. Just as important is how you approach integrating RCMS with your existing or developing EMS. Topics will include how to meet the new RCMS criteria without having to start over again. Also included will be techniques for understanding and addressing the Headquarters and Facility audits: what are the important issues and how can you prepare.

The presentation will describe how you can use the gap analysis and other tools to demonstrate conformance to the RCMS technical specification. Typical railroad organizational structures and cultures can challenge the environmental professional charged with this initiative. How RCMS and EMS criteria are introduced and integrated at corporate, department, and facility levels can affect the success of the system, and the audit. The presentation will identify and define specific steps to take to avoid potential pitfalls that can limit or prevent your success and describe how you can identify and manage potential roadblocks and bottlenecks. Additionally, the presentation will explore relationships between your environmental footprint, your EMS and the RCMS. Example tools and an index will be described that can help you define, measure, and reduce your environmental footprint.

36. Management Systems for EH&S and Quality Cost-Savings and Process Improvements

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Abstract:
EH&S and Quality Management System Process

The end result of a well-implemented and smoothly functioning management system is cost savings and process improvements. The management system becomes the way we do our business, seamless with operations, not compartmentalized into quality or environmental or health and safety departments, driving EH&S and quality responsibilities to the appropriate levels within the facility, and providing a process orientation for management which fosters continuous improvement. The management system provides a firm foundation for system growth, reduces process variation, reduces costs, and above all it meets or exceeds customer expectations and requirements. Then, continually improve !

The first four steps of Earth Tech's 18-step implementation process can be completed in 3 - 5 days by 1 - 2 consultants, for an organization of nearly any size. The deliverable is a complete scope, schedule, and budget for the entire implementation process. From then on, the specific role may be just as guides and mentors who are familiar with your system, or we can work side-by-side with site staff to implement every element of the management system. Overview of systemized approach to fully utilizes the EH&S and quality systems expertise within the facility as well as borrowing forms, templates, and procedures from other facilities, resulting in the most appropriate system for the rail operation. Focus on insuring success by keeping the implementation on schedule, not bogged down by excessive documentation, and by identifying shortcuts and improvements throughout the process.

37. CROMERRR - An Update on the EPA Cross-Media Electronic Reporting and Records Rule

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Abstract:

In August 2001, EPA proposed changes to Title 40 Chapter I of the Code of Federal Regulations by adding a new part 3 and revising a number of existing parts. This proposed regulation affects how regulated entities report data electronically to the EPA and more controversially, attempted to put onerous restrictions on how any data used in the EPA reporting process is managed.

These restrictions, in the record-keeping portion of the act, caused much comment from industry and pointed out many issues that the EPA had failed to consider in the formulation of the regulation. Aspects raised in the comment period have proven difficult for EPA to resolve in a timely manner. The record-keeping portion of the proposed regulation has been put on hold but reporting regulations will be implemented by mid-2004. Railroads report to the EPA under a variety of programs (e.g., TSCA) and knowledge of the upcoming act is critical in understanding how to plan for reporting compliance.

This presentation will discuss the reporting portion of CROMERRR, current issues with the record keeping portion, and how the industrial railroad client will be affected.

38. Creating Business Value with Records Management

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Additional Authors:

Tom Rigg, Burlington Northern and Santa Fe Railway

Abstract:

A recent confidential survey of railroad environmental managers explored the impacts of records management on environmental departments. This presentation expounds on the results of the survey and describes how well-managed records can increase business value and reduce the risk of regulatory actions.

The survey identified a variety of methods used to manage environmental records. While it is clear that haphazard management of records often diminishes departmental efficiency and creates liabilities, many managers may not be aware of the tangible benefits associated with systematic records management.

Have you ever asked yourself, “How should I manage my records?” Or, “Is there a better way to find my files?” Or, “How long do we need to keep these records?” This presentation will answer these questions and describe the components of a successful records management system, including:

- Records retention policy and schedule
- Record handling policy and procedures
- Organizational framework for hardcopy and electronic records
- Physical setup of hardcopy documents
- Source document controls
- Software tailored to records administration and searches

The presentation will also share potential costs, cost justification (return on investment), and tangible benefits. Attendees will leave this session with a clear set of simple “next steps” their department can take to create business value by improving their records management system.

Storm Water and Waste Water

39.SWPP Case Study: One Facility's Approach to Reducing Hydrocarbon Concentrations in Storm Water Discharges

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Additional Authors:
Brock Nelson, Union Pacific Railroad

Abstract:

A turn of the century rail yard has been experiencing significant storm water quality issues through one of its five out falls, consisting primarily of chronic elevated oil and grease concentrations in discharges, as high as 1100 ppm.

Detailed investigations revealed that several sources, most significantly sections of aged metal storm sewers, were contributors to the problem.

Several best management practices were constructed or installed to improve discharge quality.

To reduce a contaminated ground water source, improvements to the storm sewer included cured in place lining of sections of the storm sewer, sealing of old manholes, and plugging old contributory lines.

By making a minor modification to oil/water separators built into each catch basin, the efficiency of these units was improved.

Isolation valves were installed at all storm water out falls to keep any potential spills from reaching the Bay.

Finally, markings and signs were installed throughout the facility. These delineate the drains, catch basins and manholes that discharge to storm water and identify which specific out fall each of these features drains to. With these markings we expect less contaminants in the storm water due to awareness by facility stakeholders that the drainage goes directly to the Bay. The second benefit will be in the event of a spill, the correct isolation valve can be quickly and easily located.

It will take several years of monitoring to validate the effectiveness of these BMPs, but early results look promising.

40. Discharge Monitoring Reports

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Abstract:
Discharge Monitoring Reports
an Alternative to Piles of Paper
Presentation #1 of 2

Timely and accurate preparation of Discharge Monitoring Reports (DMR's) is an important element in complying with NPDES and similar permits. Coping with numerous outfalls at multiple facilities can tax the most efficient of managers who rely upon manual tracking of laboratory reports and hand completion of the forms. Use of a database to track laboratory reports and prepare the DMR's can greatly reduce the time required and reduce the opportunity for errors.

This presentation will cover the initial activities required from the perspective of permit holder and the analytical laboratory. Benefits, problem and common pitfalls will be discussed. Critical factors that must be considered for success, such as client/laboratory communication will be presented. Additional items of discussion include chain-of-custody forms and electronic data delivery.

41. Discharge Monitoring Reports Presentation #2 of 2

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Abstract:

This presentation will discuss the difficulties as well as the solutions in electronic completion of Discharge Monitoring Reports (DMR's) and provides closure to the material presented in presentation number one. The perspective of the permit holder and the compliance consultant are considered. Topics include electronic data delivery, report preparation and quality control. Program specific (local, state and Federal) DMR's are discussed.

42.The Evolution Of Railroad Compliance With Storm Water Discharge Permits

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Abstract:

Since rail operations predate environmental laws, the rail industry has had to adapt to the federal government's efforts to reduce water pollution. Prior to 1977, when the Clean Water Act (CWA) became law, mitigating water pollution was not a primary concern for most industries. Additionally, a lack of awareness of the relationships between groundwater, surface water, drinking water, and recreational water bodies existed. Since then, industrial storm water has been collected, treated, and discharged through a dynamic permitting environment.

Along with the advent of the CWA, a framework for permitting point source discharges emerged through the National Pollutant Discharge Elimination System (NPDES). Many railroad terminal facilities constructed collection systems and wastewater treatment facilities to capture and treat storm water contaminated with petroleum from vehicle fueling and maintenance areas. Treated discharges from these facilities were monitored in accordance with their permit conditions, which were naturally more stringent if the discharge was to navigable water than if the discharge was to a municipal sewer for additional treatment at Publicly Owned Treatment Works (POTW). Therefore, if a municipal sewer was available to a facility, obtaining a pretreatment permit and connecting to it was an attractive alternative. However, as communities developed, many of the municipal sewer systems and POTWs became overwhelmed with the volume of wastewater they were receiving for treatment, which resulted in combined sewer overflows, bypasses, and NPDES permit violations. These problems have resulted in municipalities discouraging storm water discharges and charging high industrial user fees.

In the 1990's, non-point source discharges were phased into the NPDES permitting framework. After much confusion among all parties involved regarding monitoring and compliance, the EPA developed the Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activities (MSGP) which targeted pollutants appropriate for specific industry types grouped by Standard Industrial Classification (SIC) codes. For the rail industry, sector P generally applies, which covers discharges from fueling and vehicle maintenance areas. The MSGP offers another permitting alternative that should be evaluated on a site-specific basis to determine if permit coverage and discharge is more appropriate than individual NPDES or pretreatment permits that may have been initiated during a different regulatory environment.

43. Designing and Building a Compact, Multi-Level and Multi-Purpose Wastewater Treatment Plant

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Abstract:

The Norfolk Southern Railway Company (NSRC) constructed a new wastewater system to treat runoff from a locomotive fueling platform located at one of its Midwestern Rail Yards. The process flow conveys the water first through a grit-chamber located at the fueling platform, then through a dual-purpose equalization basin (combination retention area, grit chamber and oil water separator), which can be operated in series or parallel flow configuration. The process water is then dosed with a chemical coagulant and pumped into a dissolved air floatation (DAF) unit, where it is further conditioned with flocculants. After being processed through the DAF, the water continues through a tertiary treatment of mixed media carbon-clay filters. The system was designed and constructed with major components installed at different elevations to allow for gravity flow as much as possible and to ease maintenance issues. Additionally, by constructing the plant vertically, the horizontal footprint of the facility was minimized. Enhancements have been added to the system to minimize labor requirements while maximizing fail-safe controls and redundant processes within the system. The plant was designed to attenuate the fifty-year storm event and have a maximum treatment capacity of approximately two hundred gallons per minute.

In addition to the industrial wastewater treatment plant, the system utilizes an in-line baffle/skimmer system to intercept and treat the water flowing through the non-contact storm water system.

By using these two systems, the water discharging from the facility is in compliance with prescribed regulatory limits.

44. Capital Improvement Project Delivery by Design/Build: Successes and Challenges

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Abstract:

Kansas City Southern Railway (KCS) procured three of four process water treatment projects using a design/build approach. All project expenditures had to be disbursed in 2003, and the bidding process didn't yield a selected firm until late April. As with many old rail yards, particularly yards transferred through historical acquisitions, there was little documentation on existing conditions. Otherwise, the plans were simple: segregate contact storm water from non-contact storm water, route contact water through an oil/water separator, and discharge the treated water to the receiving ditch through the existing discharge permit.

This is a story about controlling storm water at sites in southeast Texas, southern Louisiana, and eastern Mississippi, where "100-year" storms hit the site 4 times during the 7 weeks of construction. Where a local subcontractor evens an old score with his concrete truck. Where snakes, turtles, and alligators get to keep their homes. Where some up-front design flexibilities allow for unanticipated retrofit benefits.

Design/build project delivery isn't always pretty, and it requires a strong relationship between the client and the engineer/constructor. The contractual emphasis is on the performance, not on the details. For all the challenges, Design/Build project delivery returns timely, flexible solutions.

This presentation will discuss the potential advantages of design/build project delivery – the general types of project best suited for design/build; its advantages in terms of cost, sequencing, and overall timing. The presentation will also touch on areas of caution, where improper management and differing expectations can lead to project failure.

Design/build project delivery may be appropriate for your next project.

45. Walnut shell filtration for the removal of tree oil and suspended solids: A case study on railroad transportation wastewater treatment system design

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Abstract:

In 2000, CSX Transportation, Inc. (CSXT) decided to construct a new mainline fueling facility for their northern rail route between Chicago and Boston. CSXT chose to construct the new facility east of its Collinwood Yard in Euclid, OH.

The site selected for the fueling facility is a long narrow strip of property bounded on the west by 222nd Street, which runs beneath the railroad tracks via a viaduct, and on the north by a service road of Interstate 90. On this space limited site, CSXT needed to install the fueling facility, tank farm, pump house and wastewater treatment and equalization systems.

There are both sanitary and storm sewer systems in the area. The sanitary collection system terminates at a publicly owned treatment works (POTW), and the storm sewer system flows into Lake Erie.

During discussions with the City of Euclid, the City stated that their sanitary sewer system did not have the capacity to handle the flow from the fueling facility. The City also took issue with the flammability of the diesel fuel in the waste stream due to the processes employed at their wastewater treatment plant (WWTP). The City's refusal to permit the discharge of the waste stream into their sanitary system necessitated a NPDES Permit to discharge to the storm sewer system. The final NPDES discharge limit was 9 mg/l of oil and grease due to the accepting waters being Lake Erie. With such a low discharge limit, additional treatment beyond a standard baffled or skimming type separator was required.

Process Flow:

The process begins at the locomotive track containment system, where drips, leaks and spills of petroleum (product) are captured in a containment system. When a storm event occurs, the product is washed from the containment into the equalization system. The equalization system consists of four (4) 5-foot diameter manholes that are connected by a 36-inch pipe network to provide the volume to contain a 25-year, 1-hour storm event.

The pipe network is sloped to provide gravity flow to the wastewater treatment facility (WWTF).

Wastewater flows by gravity from the equalization system to the influent sump located inside the WWTF building. The inlet sump is fitted with an underflow baffle and belt type oil skimmer. This oil skimmer is for pretreatment to remove free oil, minimizing the loading on the rest of the system. An air diaphragm pump moves the oil collected by the belt skimmer to an oil decant tank. The process water in the sump is pumped directly to a coalescing plate interceptor (CPI) unit using progressive cavity pumps. From the CPI, process water flows to a filter feed/effluent tank where two low shear centrifugal pumps transport the process water to a walnut shell filter for final treatment. The treated water then flows to the effluent side of the Filter Feed/Effluent Tank prior to discharge into the storm sewer system and ultimately to Lake Erie.

Treatment equipment selection:

The walnut shell filter was selected over a dissolved air floatation (DAF) unit for the treatment of the wastewater due to its size, capital cost, minimal operator intervention requirements, and because it is a mechanical separation process that requires no chemicals addition.

Walnut shell filtration was developed as a more suitable method of filtering free oil and suspended solids in applications where sand filters were conventionally used. Walnut shell filters remove 90%-95% of free oils and 95%-98% of solids greater than 2 microns in size. The walnut shell filter chosen for the project contained a deep bed of 100% black walnut shells. Black walnut shells have excellent surface characteristics for coalescing and filtering oil from wastewater and have superior resilience to attrition. The filter was designed with a nutshell bed depth of 66-inches. This large depth gives excellent effluent quality, long filtration runs between backwashes, and exceptional throughput efficiency. The walnut shell filter was designed to use the raw process water for backwashing, which lowers the capital cost of the project by eliminating the need for air scour, stand-by filters, and additional storage tanks. Walnut shell filtration technology is commonly used to treat oilfield produced water, refinery wastewater, steel mill direct spray and caster water, ethylene plant quench water, copper concentrate decant and cooling water. However, the process had not been used for locomotive fueling facility wastewater treatment.

Principle of operation:

During the filtration cycle, the raw process water passes through the filter from top to bottom. As the raw process water passes through the black walnut shell media, free oil and suspended solids are removed.

After 24 hours of filtration, the raw process water is redirected to the bottom of the vessel to fluidize the media bed. A short vent step of approximately 30 seconds frees the filter of any accumulated free oil and gas in the top of the vessel. The media scrub pump is then turned on, which causes the black walnut shells to exit the vessel and circulate through the pump and media scrubbing vessel. It is the shearing action of the media passing

through the impeller of the specially designed media scrub pump that positively cleans all of the media during each backwash cycle. A media clearing step insures that all of the black walnut shells are cleared from the scrub system prior to force setting of the media bed and the return to on-line filtration.

Conclusions:

The facility operates in the manner that it was designed, in that it requires far less operator intervention than a DAF system and is considered a success. Walnut shell filtration technology has proven to be a more suitable method of filtering free oil and suspended solids in applications where sand filters are conventionally used and should be considered for use at other new and existing wastewater facility installations.

Environmental Impact

46. Marshes, Freeways and Railroads

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Abstract:

Suisun Marsh is the largest contiguous brackish water marsh remaining on the west coast of North America. The marsh is located in southern Solano County, California about 35 to 40 miles northeast of San Francisco. It is bordered on the east by the California Delta created by the confluence of the Sacramento and San Joaquin rivers, on the south by Suisun Bay, on the west by Interstate 680, the growing development of Cordelia Village and the townsite of Old Cordelia and on the north by Interstate 80, California Highway 12 and the cities of Fairfield and Suisun. There is heavy pressure for development along the west and north sides.

Cordelia is the intersection of two Interstate freeways, a state highway and truck scale and inspection station. This intersection creates traffic backups which stretch a mile or more, delaying emergency vehicles, creating an environmental hazard because of air pollutants and is the frequent site of multi-car accidents. Many solutions have been proposed but most involve intrusion in the marsh or diversions not acceptable by the local populations.

Oddly, a railroad, considered by many to be one of the worst polluters of all, maybe the solution to preserving the marsh, reducing the traffic and improving the growing air pollution problem at Cordelia.

47. Pacific Northwest Rail Corridor: Rail Operation Planning and the Environmental Process Working Hand-in-Hand

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Abstract:

The “Purpose and Need” of a rail project is effectively the commercial requirement (for both passenger and freight rail) that the project meets. These requirements must be determined before operation planning begins. The environmental documentation and approval process is facilitated by thorough and detailed operation planning that accomplishes the commercial requirements without infrastructure that needlessly exceeds the requirements.

Developing an infrastructure plan and associated operating plan to meet the commercial requirements is only the first step in the association with the environmental documentation, however. The need for every element of the project must be clearly conveyed to all readers. Thus, the environmental documentation must provide a translation for the technical explanation. The document preparer and the operations planner must work closely to ensure that every element of the infrastructure plan can be understood by the general public and that the translation does not change the meaning of the description.

The Washington State Department of Transportation (WSDOT) has completed the Environmental Impact Statement (EIS) for one major project and has finished a significant portion of another using these principles. The process includes the inclusion of a “Railroad 101” section that explains the basic requirements of rail transportation in common terms, and detailed reasons for the need of individual components at the specified locations, again, in common terms.

The close association between operation planning and environmental document preparation has been useful in successfully:

- ? educating resource agencies and the public about passenger and freight rail;
- ? justifying the selection of the incremental approach versus building a new rail corridor;
- ? applying NEPA concepts of independent utility, segmentation, and logical termini to a 400-plus mile rail corridor; and
- ? planning for a 20-year horizon while the property owners (railroads) only plan for two or three years into the future.

48. Team Approach and Agency Coordination are Keys to Successful Environmental Permitting -- BNSF Bridge 235.66

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Abstract:

Burlington Northern Santa Fe Railway (BNSF) plans to replace their existing railroad bridge over the Wisconsin River with a new bridge located 23 feet downstream of the existing bridge. The proposed project consists of realigning and reconstructing 2,100 lineal feet of track, adding additional siding and replacing the existing railroad bridge over the Wisconsin River. The project site is in floodplain wetlands at the confluence of the Wisconsin and Mississippi Rivers, located south of Prairie du Chien, Wisconsin, and the property is adjacent to the Upper Mississippi River National Wildlife and Fish Refuge, State land, and Wyalusing State Park.

HDR and BNSF worked with the multiple agencies to secure approvals and permits for project construction. The Wisconsin Department of Natural Resources (WDNR) required an Environmental Assessment, Bridge Permit, and Water Quality Certification; the US Fish and Wildlife Service (USFWS) required a Special Use Permit for temporary site use during construction; the U.S. Army Corps of Engineers (COE) required a Section 404 Permit; and the Lower Wisconsin State Riverway Board required a permit. HDR and BNSF worked together with these agencies to provide information, discuss alternatives and construction options, and coordinate permitting decisions.

After agency authorization and permitting was received, BNSF determined that site access would not be allowed from the rails. The selected contractor recommended a north access road and a 3,000-foot temporary bridge within BNSF right-of-way to access the remote site. It was determined that the proposed upland route was within an area of archaeological significance, possibly containing prehistoric burials. HDR and BNSF worked with the COE (Section 106 lead agency) and met with the Wisconsin State Historic Preservation Office (SHPO) and representatives of the Ho-Chunk Nation. Through site survey, engineering controls, contractor education, and construction monitoring the project was able to proceed through the preferred area while minimizing impacts to resources.

Overseas Railway Environmental Initiatives

49. PVTRAIN Solar Energy aboard!

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Abstract:

This presentation refers on studies and applications started by Trenitalia about new power supply system and renewable sources. The innovation consists mainly in photovoltaic technology development for railway applications, with economic and environmental advantages, mainly reduction in emissions of CO₂ and lower waste production (rechargeable batteries instead of usual type). The project consists in photovoltaic panel installation by amorphous or crystal silicon -whose bendable characteristics allow to adapt them to the vehicles imperial – on 10 vehicles (5 coaches, 2 locomotives and 3 freight wagons). These panels will provide the chopper with power supply. The chopper will be expressly drawn for this use respecting rules and regulations from FS, CEI, EN technical normative. The chopper output will supply the battery that now take supply from 3 kV cc line. We are trying – by using the photovoltaic panels - to obtain a steady battery charge that could determine a longer life of them, with less waste disposal and more energy conservation.

The testing activity will be carried out by a stand-alone system in the aim to acquire, save and process data, providing information about both electrical parameters and position by GPS in operating mode. Data will be used to compare new power supply with the existing one.

50. EcotransIT Ecological Transport Information Tool Transport it ecologically!

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Abstract:

THE EcotransIT PROJECT

To answer environmental demands, and to give Institutions and industries a tool to base their environmental and political strategies on, five of the most important European railway companies (started cooperating to create EcotransIT: an internet easy-to-use software to enable a quick and reliable comparison of the energy consumption and the polluting emissions generated, between the same origin and destination points, by the different possible freight transport modes (rail, road, sea, air and combined).

WHAT IS EcotransIT FOR ?

EcotransIT has been developed, in general, to provide companies and decision makers with a software able to support new sustainable freight strategies. Such a tool is, first of all, suitable for those Institutions that aim to promote innovative and less polluting transport policies, but nevertheless is needed by those industries that are asked to measure the improvements of their environmental performances. This is the case, for instance, of the numerous companies that have obtained a ISO 14001 certification or an EMAS registration. The reliability and the high level scientific background of EcotransIT, make it the perfect tool to quantify and evaluate the environmental impact of the logistic of supplying and delivery of raw materials and products.

HOW DOES EcotransIT WORK ?

To allow EcotransIT make its calculations, and provide the user with the values of energy consumption and polluting emissions caused by the different freight transport modes he wants to compare, it needs to fill in a simple input page.

What the user is asked to type in (for more detailed explanations please consult the help on line guide) is some information about:

- Origin and destination of the cargo;
- Transport mode to compare (to be choosed between Road, Rail, Sea, Inland waterways, Air and Combined);
- Feeder to origin and from destination (if present);
- Weight and type of goods to be transported.

The results of the calculations, based on this information, are clearly displayable in both table and graphic format. Moreover the output pages can be easily printed out to enable the user compare a number of different possible transport options.

WHAT KIND OF DATA DOES EcotransIT PROVIDE WITH ?

Tables and graphs that EcotransIT provides with in its output pages are the primary energy consumption (expressed in Mega Joule) and the main air pollutants (in total tons produced). The pollutants taken into account are:

- CO₂ (carbon dioxide): the main greenhouse gas;
- NO_x (nitrogen oxides): an air pollutant with an acid effect, nocive also for soil and water;
- SO₂ (sulphur dioxides): a substance that can cause damage such as respiratory diseases, forest dieback, acidification of soil and water and acid corrosion of buildings;
- NMHC (nonmethane hydrocarbons): which are regarded, together with nitrogen oxides, as the precursors of summer smog (ozone near ground level);
- Particles/dust: another very dangerous pollutant for the respiratory system.

51.Environmental Standards for the Procurement of New Rolling Stock

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Abstract:

Environmental Standards for the Procurement of New Rolling Stock (UIC project PROSPER)

Enhancing the environmental performance of new rolling stock is one of the ways in which the railways can be made more competitive compared to the other modes of transport. In this context the International Union of Railways (UIC) has set up the PROSPER project. The out-come of the first phase of the project is an “Environmental Guideline for the Procurement of new Rolling Stock” that assists railways to integrate environmental considerations in the pro-curement (see also <http://www.railway-procurement.org/>). The objectives of the now ongoing second phase of PROSPER are:

- Co-ordinating agreed minimum values for the environmental performance of new rolling stock amongst railways and manufacturers
- Documenting environment related legal aspects for the procurement of new rolling stock (state of the art) and
- Disseminating the results as a UIC Leaflet.

PROSPER will create an agreed business standard in the rail sector for handling environmental aspects when procuring new rolling stock. In this respect it is not the intention of PROSPER to invent the wheel once more, but instead to combine and integrate existing knowledge into one very functional product: a UIC Leaflet - serving as a guideline for imple-menting environmental requirements into the procurement process.

PROSPER actively seeks the expertise and feedback from a broad range of actors and stakeholders, especially from members of the various international working groups of UIC and UNIFE dedicated to the different aspects of the five environmental key areas:

- Noise
- Exhaust Emissions
- Energy Efficiency
- Materials, Recycling, Waste and
- Other Emissions

PROSPER II will be completed in March 2005.

52.Evaluation of energy efficiency technologies for railways

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Abstract:

Improving the energy efficiency of railways further is one of the challenges for railways in the 21st century: cost efficient operation is crucial, the availability of fossil energy resources is decreasing and rail transport is the most important component on a way to sustainable mobility, the competitive advantage with other transport modes must be kept. There is a large potential to reduce energy consumption further with energy efficiency technologies but railway energy experts are rare and often very specialized, the exchange of knowledge and experience among railways is not sufficient yet.

Therefore, the International Union of Railways (UIC) initiated the projects EVENT and EVENTComTool: In the project EVENT current information in the field of energy efficiency technologies and projects for Railways was being collated and present and future technologies were being evaluated for railway purposes with a close contact to the European Railways and the industry.

More than 120 technologies and measures, which can lead to better energy efficiency of rolling stock and train operation of railways, have been evaluated by using different criteria, e.g. the technological applicability of the measure on railways, advantages, disadvantages, necessary frame conditions, economic and environmental effects. Most promising technologies have been identified and recommendations for lanes of action for the UIC and the railways were derived.

Key aims which could be achieved with the EVENT project:

- providing a global state-of-the-art overview over energy efficiency technologies relevant for both rolling stock and train operation
- providing an overview over existing experiences and projects with railway applications
- evaluation of the technological, economic and environmental potential of energy efficiency technologies
- identification of the key success factors and impeding factors for the implementation and application of these technologies in railways
- development of guidelines and recommendations for implementation strategies and lanes of action.

The results of EVENT have been published with an interactive, user-oriented communication tool, designed and programmed in the project EVENT ComTool. With this internet-database it is possible to search for and display specific results by using technology criteria as well as supplementing and updating the existing technologies. It enables the user to have an overview of the energy-efficiency potential as a percentage,

given a fleet of wagons, locomotives and trainsets and the improvements decided (available at the UIC-web-site www.railway-energy.org).

The results of EVENT and EVENTComTool provide now the basis for the new energy efficiency strategy for future projects of the International Union of Railways.

53.Sustainability Management at German Railways – Linking Environmental Performance with Shareholder Value

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Abstract:

Sustainability has been an abstract concept in its beginnings but has been developed to a successful business model since: "Corporate Sustainability" is integrating economic, ecological and social aspects equally into corporate strategy, especially for managing chances and risks comprehensively. This approach creates shareholder value in the long term: companies with good sustainability performance feature overall superior management that results in demonstrably better financial performance. Therefore, sustainability management has become an indicator of growing interest at the capital market.

Sustainability management is especially interesting for European railway companies: A multitude of stakeholders is determining competition conditions and the business environment. Non-market aspects have a strong influence: competition distortions, disadvantageous regulations and business disruptions can be eliminated or reduced by involving stakeholders actively and by proactive consideration of environmental and social issues (for example, the climate protection program of DB led to decreased eco-tax on energy). Optimized environmental processes contribute directly to shareholder value with cost savings, for example, through increased energy efficiency. With an innovative sustainability management, it will be possible to manage the environmental and social success factors efficiently for increasing shareholder value. Furthermore, rail companies with its environmental advantage have the opportunity to occupy a seminal area within future sustainable transport systems given the increasing demand of transport, limitation of energy resources and increasing importance of climate protection. This can create additional shareholder value.

Therefore, the Executive Board of German Railways (DB) decided to implement an ambitious sustainability management, based on the successful concept of environmental management at DB, consisting of the following main elements which are linked together in a continuous improvement loop:

- assessment of the contribution of environmental and social measures to the shareholder value (based on the Environmental Shareholder Value concept)
- monitoring of the business environment and the achievement of sustainability objectives, continuous chance-risk-assessment of all relevant sustainable aspects and annual review
- clear integration of the findings into management strategy and internal processes in relevant business segments by using the concept of the Sustainability Balanced Scorecard

- committed sustainability communication and active involvement of relevant stakeholders in order to convince investors and to develop increased acceptance in the business environment.

The implementation of the sustainability management is planned to be completed in the end of 2004.

Misc.

54. Global Terrorism and Protecting Railroads from this new Threat

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Abstract:

In this time of heightened awareness as to national security, how does a railroad effectively protect its system and the public from acts of terrorism? Railroad property and the responsibility thereof stretch over vast miles with very limited means to restrict access or limit vulnerability. In essence a railroad is a public conveyance and access and use by the public are essential to their continued usefulness.

The authors have first hand experience in addressing these questions and other problems of a similar nature in taking action to protect essential transportation facilities within the San Francisco Bay Area of Northern California. The following paper presents not only the solutions they fashioned for the problems they faced in securing vital transportation facilities within the Bay Area but also the process they used to arrive at the solutions they implemented. This process, along with suggestions as to how the process can be brought to bear in the railroad security arena will be end result of the paper presented.