Assessing the Return on Pretreatment: An Evaluation of EPA Performance Measurement and PCS Modernization

Prepared For

United States Environmental Protection Agency,
Office of Planning, Analysis and Accountability and
Office of Solid Waste

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NOTE: This memo was prepared for EPA by external consultants in order to provide an overview of issues associated with measuring the return on wastewater pretreatment. The information and recommendations it contains do not necessarily represent EPA viewpoints or policy directions.

Prepared By

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MEMORANDUM

19 May 2002

TO: David Wiley, OPAA and Jan Pickrel, OWM

CC: John Hopkins, OWM and Andrew Schwarz, Industrial Economics

FROM: Doug Koplow, Earth Track, Inc. and Alexi Lownie, Industrial Economics, Inc.

SUBJECT: Assessing the Return on Pretreatment: An Evaluation of EPA Performance Measurement and PCS Modernization

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EPA's pretreatment program plays a vital role ensuring that the nation's wastewater treatment plants are able to operate efficiently and effectively. By working with dischargers to reduce or eliminate pollutants of concern at the source, the pretreatment program ensures that the flows that do reach the treatment plant will not adversely affect either the plant or the receiving media (be they bodies of water or biosolids). While critical, the role of pretreatment is not always easy to measure. In an attempt to do so, as well as to meet the objectives of the Government Performance and Results Act (GPRA), EPA has initiated an effort to model reductions in pollutant loadings. The modeling relies on updating core data on regulated facilities contained in effluent guidelines released during the past 10 years and extrapolating expected reductions per average facility to the full universe of regulated entities. EPA is also relying on activity-based metrics, such as the number of facilities permitted, in order to demonstrate performance.

This memo addresses two important areas associated with pretreatment performance measurement. First, we examine EPA's proposed pretreatment performance metrics and evaluate how well they measure actual performance of the pretreatment program and meet the objectives of GPRA. Second, we examine ongoing efforts to expand the coverage and accessibility of water data and discuss ways to modify this effort to better meet the long-term strategic and operational goals of the pretreatment program. A separate memo provides information on ways to update the estimates of affected facilities for the eleven effluent guidelines on which the planned modeling effort will be based.[1]

In the course of our work, we obtained as many internal EPA documents relating to these issues as we could; not all materials were made available to us. We supplemented written materials with telephone and e-mail correspondence with individuals involved with EPA's water initiatives, including personnel from EPA Headquarters, EPA regions, and states. To ensure as much freedom of discussion with these people as possible, we decided up front not to attribute specific comments to specific people within our report. These contacts are listed generally in the References section, however. We recognize that EPA efforts in all of the areas we examined have been going on for many years, and that it is not possible for us to have learned all of the details relating to these projects. However, we hope that this analysis will provide useful input to the Agency's long term efforts to accurately and efficiently monitor the impact of pretreatment activities.

Our basic conclusions are as follow:

- **Proposed metrics are problematic.** The proposed performance measurement metrics have many limitations, are not closely enough linked to environmental improvements, and will not facilitate accurate assessments of the value of pretreatment or enable improved operational decisions. To the extent that no alternatives exist, the Agency should be candid about the limitations of the proposed metrics and take appropriate steps to define and implement new metrics more closely linked to actual data related to pretreatment program activities in the near future.

- **Modernized PCS data structure appears robust.** The extensive modernization of the Permit Compliance System (PCS), in the form of the Integrated Compliance Information System (ICIS), seems to appropriately address many of the weaknesses in the current PCS. The proposed data fields and system design appear to meet the existing needs of the many Office of Water program areas (including pretreatment), and allow expansion for future developments. The one area that seems lacking from the current design is a link between technical measures and program economics. Such a linkage is important for good decisions to be made regarding program efficiency, whether included directly within ICIS or through integration with external cost accounting modules.

- **Concerns with the PCS modernization plan focus on data analysis and system upgrade path.** While the data structure of ICIS appears robust, we believe the Agency would benefit from focusing near-term attention and planning on the following areas:

[1] Lownie, Alexi, Campbell, Abby, and Koplow, Doug. "Potential Data Sources to Update Regulated Universe in Industries Affected by Effluent Guidelines Finalized Since 1992," Memorandum to David Wiley and Jan Pickrel, U.S. Environmental Protection Agency, from Industrial Economics, Inc., and Earth Track, Inc., May 19, 2002.

- **Ways to demonstrate the value of participating in the centralized system for state and local control authorities.** These groups have most of the necessary data to compile national trends, but have historically opted out of the national systems. ICIS will fail without them.

- **Methods to establish a more decentralized, modular system for adding functionality to ICIS.** We estimate the cost of data collection (record keeping plus reporting) that will be addressed by ICIS at between $80 and over $1.3 billion per year, a lucrative market for independent software developers. We propose a strategy of "divide and conquer" to reduce the scale of the ICIS enterprise that is under the direct control of an EPA-financed, single-contractor produced, development model. Adopting approaches more similar to those used by firms such as internet portal Yahoo! can provide a dynamic and competitive environment for applications development that we believe will provide higher value added for states and localities, more quickly, and at a lower cost than the current model.

- **Improved analytical tools to utilize the anticipated data more effectively**. The system design was based on the current program structure. Query routines and report formats have not yet integrated data elements to reflect cross-cutting program activities and concerns. Initiation of problem-focused workgroups to supplement of replace the program-focused ones that have guided the development of the data structures to date may be warranted.

- **Higher order analytics for national data**. EPA should focus on developing background analytics to spot trends and variances of concern, such as pollution prevention, new agents, discharge levels, and changes in behavior based on industry sector, geography, time of year, etc. This effort should be part of the mission for the problem-centered workgroups to address.

Although current metrics do not provide the resolution we believe EPA managers need in order to plan, improve, and justify their programs, we are confident that emerging data efforts can rectify the problem. However, making these initiatives successful will require careful and extended focus by pretreatment staff, as well as cross-program cooperation. Finally, if ICIS is structured in a modular and decentralized way, we believe EPA can achieve a much more extensive understanding of its pretreatment effort than will be possible with a highly centralized data systems approach.

I. Measuring the Impact of Pretreatment Programs

The effectiveness of the pretreatment program in protecting and improving human health and the environment is critical both in terms of justifying the program's existence and in helping the Agency prioritize its investment of human and financial resources. Performance measurement is also required by Congress under GPRA. We were asked to evaluate existing performance metrics and to identify possibilities for improving them.

A. Existing Metrics

Clean and Safe Water is one of EPA's core strategic goals. Making progress on this goal requires actions in a range of areas, including protecting watersheds, upgrading water and wastewater treatment capacity, and educating professionals and the public to better protect or purify water resources. EPA has developed annual performance goals in most of these areas; however, not all of them come under the direct control of pretreatment. Others, while not under the control of the pretreatment program will have a direct impact on the demand for pretreatment expertise and services. Exhibit 1 provides an overview of selected 2003 GPRA metrics that we judged of high relevance to the pretreatment program. These metrics involve loadings reductions, an increase in the number of regulated facilities permitted, and the development of new effluent guidelines (which will increase the required loadings reductions for specific industrial subsectors). There are also efforts to leverage the performance of existing programs through education and technical assistance.

Exhibit 1
2003 GPRA Metrics of Relevance to Pretreatment

Reducing Industrial Pollutant Discharge • Cumulative reduction in loadings for toxic pollutants for facilities subject to effluent guidelines promulgated between 1992 and 2000, as compared to 1992 levels as predicted by model projections. • Cumulative reduction in loadings for conventional pollutants for facilities subject to effluent guidelines promulgated between 1992 and 2000, as compared to 1992 levels as predicted by model projections. • Cumulative reduction in loadings for non-conventional pollutants for facilities subject to effluent guidelines promulgated between 1992 and 2000, as compared to 1992 levels as predicted by model projections.
NPDES Permit Requirements • Increase major point sources covered by current permits to 90% by 2003 (figure in 2001 is 75%). • Increase minor point sources covered by current permits to 84% (2001 value is 75%) by 2003. • Reduce loadings of toxic, nonconventional, and conventional pollutants from NPDES permitted facilities (POTWs, Industries, SIUs, CAFOs, SW, CSOs) by 500 million pounds per year by 2003. • Improve technical assistance to 775 municipal wastewater treatment plants to prevent pollutant discharge of 12,000 pounds annually.
New effluent guidelines • Achieve two new final effluent guidelines that remove 150 million pounds of pollutants from US waters by 2003.
Wastewater Treatment Facility Compliance • Provide technical assistance to roughly 800 wastewater treatment facilities under Section 104(g) of the CWA to help them maintain compliance.
Source: US EPA, "5-Year Performance Data: Annual Performance Goals and Measures," Appendix to the 2003 EPA Performance Plan.

B. Objectives of GPRA

Passed in 1993, GPRA instituted a formal system for strategic goal setting and performance measurement within federal agencies. The purpose of the law is threefold: to encourage continuous reevaluation of agency missions; to increase the efficiency with which public resources are targeted and spent; and to provide improved information to outside stakeholders, such as taxpayers and Congress. A central challenge of implementing GPRA has been to move from standard budget-based metrics (dollars spent, employees applied) to results-based metrics associated with the core strategic objectives for which the agency was created and continues to receive funding (e.g., ensuring clean water). Many agencies had difficulty developing results-based metrics (see, for example, *Selected Agency Strategic Planning Activities*, a multi-agency assessment of attempts to implement GPRA),[2] and EPA has been no exception.

Exhibit 2 illustrates the continuum in the types of possible metrics for evaluating pretreatment. The exhibit includes a selection of both actual and proposed metrics over the past eight years. At the left hand side of the table are Level 1 metrics based on resources applied, such as program funding level. The implicit assumption is that more spending will yield improved environmental quality, obviously not always the case. Moving to the right, metrics are tied more closely to the ultimate goal of the programs. Outputs are administrative products, such as permits or reports. Outcomes include a range of measured changes in the behavior of regulated parties or the emissions associated with them. As one moves to higher level outcome-based metrics, it is possible to measure improvements in the ambient environment, and ultimately in human health and ecological quality. Metrics from all of the sources evaluated have tended to be Level 1 outputs through Level 3 reductions in environmental loadings. Although EPA has made progress in including Level 4 metrics as well in the more recent Strategic Plans, the underlying annual performance measures to support these results-oriented goals remain problematic.

[2] Industrial Economics, Inc. *Selected Agency Strategic Planning Activities: Issues and Approaches of Relevance to EPA*, Draft. Prepared for the Office of Planning, Analysis, and Accountability, U.S. Environmental Protection Agency, January 21, 1999.

Exhibit 2
Current and Historic Pretreatment-Related Metrics
(Sources in Parentheses)

INPUTS	OUTPUTS		OUTCOMES					
Level 1			Level 2	Level 3	Level 4		Level 5	Level 6
Resources	**Internal EPA Actions and Activities**	**Actions by State, Local, Tribal, Other Regulatory Agencies**	**Actions and Behavioral Changes by the Regulated Community**	**Reduced Amounts and/or Toxicity of Emissions**	**Improved ambient environmental conditions**	**Changes in ambient conditions relative to health-based standards**	**Reduced exposure or body burden**	**Human and ecological health**
Selected Pretreatment-Related Metrics Proposed for FY2003 and Beyond (f) (g)								
	-# of POTWs receiving technical assistance. -# of new effluent guidelines finalized. -Increase percentage of facilities governed by current major permits to 90%; and current minor permits to 84%, by 2003.			-Reduce pollutant loadings from point sources by at least 11% in 2005 from 1992 baseline. -Pretreatment-contribution: Cumulative loading reductions (as estimated by modeling efforts) from industries governed by effluent guidelines finalized between 1992 and 1999.	-95% of population on community drinking water systems receives safe water by 2005. -30% of nation's watersheds meet water quality standards by 2005 (up from 22% in 1998).			
Selected Pretreatment-Related Metrics From Earlier Years and Analyses								
	-# and % (b) inspections, audits conducted of IUs, other permitees.(a) -# sources regulated under pretreatment program.(a) -# and extent of P2 activities.(a) -#, %, and type of enforcement actions against violators in SNC.(b) -Sponsor pilot integrated watershed NPDES permits by 2002. (d) -# sampling events conducted/year.(e) -% sampling events conducted by authority (rather than regulated entity).(e)	-# and % (b) inspections, audits conducted.(a) -Backlog of IU permits.(a) -# of Citizen complaints. (b)	-% of biosolids being land applied/beneficially reused. (a,c) -% of effluent reused.(a) -#, %, and trend for SIUs in SNC.(a,b,e). -# and % of POTWs in SNC.(b,e) -# and % of facilities in SNC that fix problem or revert to SNC.(b,e) -% IUs in compliance with all permit limits. (e) -% IUS in compliance with all reporting requirements.(e) -Reduction in NPDES and IU permit exceedances.(a) -# consent decrees, civil settlements reached with violators.(b) -Increases in treatment plant efficiency.(a)	-% of biosolids meeting Class A criteria (a) or Class A less pathogen standard.(c,e) -Reductions in pollutant loadings to and from POTW (influent and effluent). (a,e) -Amount of pollutant removed/year.(a) -Trends in emissions to air.(e) -Volume of household hazardous waste collected/ diverted.(a) -Reduction of interference/ pass through events.(a) -POTW failure of whole effluent toxicity tests due to IU discharge.(e)	-Improvement in receiving stream water quality/ meeting designated uses.(a)			

Notes: Template Structure from EPA OIG, 2001-B-000001, p. 12. Levels represent EPA Office of Chief Financial Officer (OCFO) Modified Hierarchy of Indicators. Row below is EPA/OIG's expanded hierarchy of indicators.

Sources:
(a) US EPA, "2000 EPA/State National Pretreatment Program Workshop," Summary of meeting held in Tucson, AZ.
(b) US EPA, OECA. "FY 2000/2001 RECAP OECA Performance Measures: CWA," Revised July 2000.
(c) Draft 2003 GPRA Metrics.
(d) EPA Office of Water, *Protecting the National's Waters Through Effective NPDES Permits*, June 2001.
(e) AMSA, *Performance Measures and the National Industrial Wastewater Pretreatment Program*, July 1994.
(f) "Goals and Objectives that Encompass the National Water Program," www.epa.gov/water/programs/goals.htm, obtained May 10, 2002.
(g) US EPA, "5-Year Performance Data: Annual Performance Goals and Measures," *Appendix to 2003 Performance Plan for the U.S. Environmental Protection Agency.*

C. Evaluation of Proposed Metrics to Demonstrate the Value of Pretreatment Programs

The further removed from measured changes in environmental quality, the larger the number of assumptions needed before what is measured can be linked to actual improvements in environmental quality. Examining proposed metrics for pretreatment in greater detail is instructive.

Modeling Reductions in Pollutant Loadings

The most direct measure proposed has been to estimate the cumulative reductions in pollutant loadings from industries regulated by the pretreatment program between 1992 and the present. Loadings reductions represent a mid-range (Level 3) metric. Though not directly linked to environmental gains (for which multiple water programs are involved), it is nonetheless a fairly good measure for assessing the impact of pretreatment staff and programs. In fact, during the course of our interviews with headquarters, regional, and state pretreatment staff, many felt that measuring influent and effluent loadings would be one of the best metrics for evaluating pretreatment performance.

However, the details of how this metric is to be applied suggest there are very substantial problems with it. These limitations make it of much less value in substantiating the worth of the pretreatment program.

- **Based on modeled, rather than measured, loadings reductions.** GPRA defines "program evaluation" as "an assessment, through objective measurement and systematic analysis, of the manner and extent to which Federal programs achieve intended objectives."[3] Although POTWs regularly measure their influent and effluent loads, and facilities submit Discharge Monitoring Reports to their control authorities, these actual data are not being used. Rather, OWM has chosen instead to rely on multiple levels of extrapolation rather than establish a rigorous system for centralizing past and present data on actual measurements.

- **Modeling approach captures relatively small set of the regulated community.** The metric relies on loadings reductions "for facilities subject to effluent guidelines promulgated between 1992 and 2000." There are currently 54 effluent guidelines enacted,[4] which cover an estimated 34,000 discharging industries.[5] Based on instructions from EPA regarding updating data on the

[3] Sec. 7, (b) of the Government Performance and Results Act of 1993, S. 20, passed by he Senate June 23, 1993 and accepted by the House and Senate.

[4] "Subchapter N - Effluent Guidelines and Standards," obtained from www.epa.gov/docs/epacfr40/chapt-I.info/subch-N.htm on May 10, 2002.

[5] Shiela Frace and Pat Harrigan, U.S. Environmental Protection Agency Office of Water, Engineering and Analysis Division. Presentation on the Effluent Guidelines Program as summarized in the "Final Summary: Effluent Guidelines Planning Meeting," April 2 and 3, 2001, p. 6.

regulated universe for effluent guidelines to be used in modeling, we conclude that only 11 of these will be used in the modeling effort.[6] Assuming a roughly equal number of facilities addressed by each guideline, the extrapolations would be based on modeled loading reductions from only 6,900 facilities nationwide. However, the effluent guidelines apply to direct as well as indirect dischargers. Our review of 11 effluent guidelines suggests that assuming 50 percent of these entities are indirect dischargers would be a reasonable upper bound, bringing the sample down to 3,450 indirect dischargers, or just under 12 percent of the 29,500 SIU/CIU respondents included in recent pretreatment ICRs. The true sample may actually be smaller, as it is likely that the first effluent guidelines addressed the sectors with the most acute pollution problems. If so, the loading-intensity of the more recent guidelines (1992-2000) will be lower than the average for the program lifetime. These factors suggest that even if the modeling effort is accurate and valid for the subsectors evaluated, it will not likely provide an accurate picture of loadings trends nationwide.

- **Attribution of loadings reductions to pretreatment not always clear-cut.** Just because loadings have declined in industries governed by effluent guidelines does not necessarily mean that these declines are due to the pretreatment program. This problem is exhibited in three main areas: loadings reductions from effluent guideline modeling from direct dischargers; the period over which loadings reductions from effluent guidelines will be counted; and the measurement of loadings prevention:

- **Direct dischargers.** Although effluent guidelines analyze industries that include both direct and indirect dischargers, the pretreatment program oversees only the indirect portion. Thus, unless projected load reductions from effluent guideline modeling are scaled down to reflect only the indirect discharger portion of the regulated industry, reductions attributable to pretreatment will be overstated. We did not see any discussion of this issue in the draft modeling methodology.

- **Period of attribution.** The current methodology seems to credit pretreatment with annual loadings reductions from the baseline date (1992) in perpetuity. However, the baseline conditions in the industry would have changed even without pretreatment. Normal capital replacement (with embedded technical improvements), improved ability to monitor production to reduce waste, and changes in the products demanded by the marketplace all modify the baseline. The contribution of pretreatment should be measured by comparing a changing baseline with observed behavior, rather than an assumed static baseline from the early 1990s (or earlier) to observed behavior. Thus, the Agency should evaluate whether some modification of how it takes credit for loadings reductions is appropriate to more accurately reflect its contribution on an ongoing basis.

- **Measurement of loadings prevention.** Pretreatment is successful not only when existing pollutant discharges are reduced, but when pollutant discharges that would have occurred in the absence of pretreatment do not occur. The draft document we obtained on the proposed modeling methodology did not address this point directly, though other EPA documents may. However, the

[6] These are: offshore oil and gas, pesticide manufacturing, pesticide formulating, cpulp and paper, pharmaceuticals, landfills, combustors, transportation equipment cleaning, centralized wastewater treatment, and SBDF. Based on e-mail from Jan Pickrel, U.S. Environmental Protection Agency to Doug Koplow, Earth Track, Inc., on April 10, 2002.

failure to incorporate some assessment of pollution prevention will understate the overall benefits that pretreatment has provided to the country.

- **Modeling effort will exclude or understate many of the highest risk discharges.** As noted in Exhibit 2 (see the Level 4 goals), the ultimate objective of the EPA water programs is to improve human health and the environment. However, the effluent guideline modeling methodology is not risk-weighted. In fact, the methodology notes that for industrial users, pollutant loads will be determined for "BOD, TSS, **and potentially**, metals and organic compounds."[7] [Emphasis added]. Pollutant load reductions will calculated by comparing raw pounds of loadings in the base year to those released in more current years to calculate the cumulative and annual loading reductions.[8] The loadings methodology also discusses the normalization of newer data to address changes in population or rainfall for some of the metrics, though not in enough detail to evaluate what the impact of this adjustment would be. The implications are that (a) reductions in more hazardous materials will not be treated any differently than reductions in a pound of BOD; and (b) the results will be sensitive to assumptions regarding data normalization.[9] Since many POTWs are perfectly capable of handling elevated levels of BOD simply by ensuring adequate residence times in the digesters (and surcharging contributing industries), the most important accomplishments of pretreatment in hazard reduction will be buried in massive reductions of much less hazardous materials.[10]

[7] U.S. Environmental Protection Agency. *Draft Pollutant Loadings Methodology: Summary of Findings*. September 2001, p. 3-5.

[8] EPA is aware of the limited ability to provide solid data to support its core metric for demonstrating program efficacy. According to the Agency's *2003 Annual Performance Plan*, loadings reduction data sources will rely primarily on the Permit Compliance System (PCS) for permitted facilities data including SIC codes, flow, and location data, especially for Industrial Users. The document further notes that there "are significant data gaps in PCS, including reliability issues, for minor facilities, general permits, and specific categories of discharges, such as CAFOs. Additionally, neither monitoring nor flow data are required for certain categories of general permits. The Agency, therefore, is not able to provide sufficient information to measure loadings reductions for all of the approximately 550,000 facilities that fall under the NPDES program." (U.S. Environmental Protection Agency, *2003 Annual Performance Plan and Budget Justification*, p. II-77).

[9] U.S. Environmental Protection Agency, *Pollutant Loadings Methodology*, p. 3-5.

[10] This issue came up at a recent workshop on streamlining effluent guidelines. Participants discussed ranking effluent guidelines by load reductions as a way to prioritize revisions, but were unable to come up with a metric to quantify the loading reductions. "[T]here was no consensus on what group members meant by load reduction (e.g., total pounds of a constituent, total toxic equivalent pounds, production normalized loads, etc.) and what constituents would be evaluated (e.g., the whole universe of chemicals?)." There were also discussions about whether any reduction should be normalized by production level. (U.S. Environmental Protection Agency, "Final Summary: Effluent Guidelines Planning Workshop," April 2 and 3, 2001, p. 14).

The methodology does recognize that the proposed "approach assumes that all pollutant loads reduced are of equal environmental benefit." The simplification is explained by stating that "[a]lthough this does not reflect real effects, since reducing the release of a pound of mercury has more health and environmental benefit than reducing the release of a pound of suspended solids, it is the approach that best tracks EPA's achievement of its performance goals."[11] This is perhaps more an indication of weaknesses in the chosen performance goals than a justification for the approach chosen to measure "results." EPA's strategic goal for clean and safe water focuses on water that is "clean and safe to drink," and watersheds and aquatic ecosystems that are "restored and protected to improve public health [and] enhance water quality…"[12] These goals clearly demonstrate the centrality of a risk-based approach.

- **Modeling approach relies on very old data.** Effluent guidelines estimate the regulated universe and the options for pollution control at a single point in time. EPA plans to update the estimates for the regulated universe (hence the work we have done to identify promising new data sources).[13] However, the very same issues associated with changing numbers of firms affects the options for pollution control. The Agency has attempted to mitigate this by using only "newer" effluent guidelines -- those finalized since 1992. However, the process of developing a new guideline and having it approved can take five years or more. Where a ruling is controversial, the time period can be much longer. For example, work on the Centralized Waste Treatment Effluent Guideline began in 1986, though it wasn't finalized until 2000. For many of the subsectors affected by the rule, 1989 industry data was used.[14] This situation is not uncommon, and illustrates how old the "snap-shot" of technical options can be.[15] The loadings reductions based on such old assumptions of water treatment options are unlikely to accurately reflect current practice.

- **Modeling approach generates national averages that are of little benefit for operational planning.** Effluent guidelines generate prototype control strategies and average expected load reductions. Even if accurate, the average values provide no resolution on firms that are doing much better, or much worse, than average. In many ways, the range is far more useful to improving the pretreatment program than are the averages. Examples of firms doing much better

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[11] U.S. Environmental Protection Agency, *Pollutant Loadings Methodology*, p. 4-2.

[12] U.S. Environmental Protection Agency, "Goal 2: Clean and Safe Water," *FY 2003 EPA Budget*, p. II-1. Obtained from www.epa.gov/ocfo/budget/budget.html.

[13] See Lownie, Campbell, and Koplow.

[14] Lownie, Campbell, and Koplow provides additional information on the long gestation period for many of the recent effluent guidelines.

[15] EPA notes that there are delays at the other end as well. It takes 5-7 years after issuance before limits are fully incorporated into industry permits. (Frace and Harrigan, p. 13). This adds a substantial lag to the already long span between when technical data are used in the development of effluent guidelines/categorical standards and when firms actually invest in new equipment.

than average are important to identify as case studies that serve as models for the rest of the industry. Those doing much worse than average must also be identified to prioritize outreach, inspection, and enforcement efforts. While average values can perhaps justify to Congress that pretreatment is achieving some of its intended purpose, real time data on loadings trends are needed if the information is to support the optimization of current resource expenditures to maximize environmental gain, as GPRA intended.

- **Modeling approach pre-supposes program success.** GPRA requires results-based performance measurement because there is no assumption that the implemented programs are achieving their intended results. Only through careful and continuous measurement can this be verified, and can programs be restructured for greater effectiveness. In contrast, the proposed methodology by OWM demonstrates program success by *assuming* implemented guidelines achieve a particular level of reductions, in effect assuming rather than measuring that the regulations have been successful. This assumption is unsubstantiated in cases where there is little or no supporting trend data as may be the case with metals and organics. Even where such data do exist, however, there is a question of attribution. Did the effluent guidelines cause the observed decline, or was it some other factor over which the pretreatment program had no control? While this may not be an easy question to answer definitively, it certainly warrants some consideration as it may lead to improved integration of various OW efforts, or to a restructuring of the manner in which the Agency works to bring down loadings.

<u>Other Metrics Related to Pretreatment</u>

Developing New Effluent Guidelines. This is an activity-based metric targeting regulatory development. The implicit assumption is that the new effluent guidelines will lead to reductions in loadings, which in turn, will improve environmental quality. While the direction of impact is likely to be correct, there is no way to assess whether (a) the most important effluent guidelines are being completed first; or (b) there are other initiatives within OW (or within EPA overall) that would generate more substantial improvements in water quality for the same funding. This is not to say that the Agency should stop promulgating effluent guidelines, but only to suggest that the core purpose of GPRA -- to allow funding to flow to the most effective areas in achieving agency strategic goals -- is not supported by this metric.

Number of POTWs receiving technical assistance. Also activity based, the implicit assumption is that technical assistance will help POTWs stay in compliance, which will enable them to better oversee industrial dischargers, thereby controlling loadings, which will generate environmental improvements. Again, while the causality may be directionally correct, it is also true that being able to target technical assistance based on real-time actual data on performance or proximity to environmentally-sensitive areas would leverage this spending substantially. We did not see evidence of such targeting underway.

Increase percentage of facilities under current permits. Ensuring up-to-date permits is important in helping to keep the incentive current for firms to invest in pollution controls or process changes. Nonetheless, the issue of targeting is again relevant. The first permits to be addressed should be in sensitive ecosystems, and for industries with higher hazard discharges. OW does not currently seem to have the capability for such targeting. Integration with enforcement is also critical, since up-to-date permits are only a first step in achieving up-to-date compliance. Finally, annual performance measures on the economics of permits are also warranted, as efficiency improvements can make it easier for EPA to eliminate its existing permit backlog and to avoid new backlogs in the future. Time to permit; resources to permit; cost recovery from permittees; and permit standardization and automation are all relevant factors in ensuring that permits provide an effective control to dischargers, though none are addressed in the current annual performance measures.

Increase percentage of watersheds meeting water quality standards. This performance measure is a good example of the limitations of focusing foremost on what you plan to achieve rather than on the magnitude of the underlying problem to be addressed. The goal is to make continued progress in upgrading the quality of entire watersheds. The specific wording says that by 2003, "water quality will improve on a watershed basis such that 600 of the Nation's 2,262 watersheds will have greater than 80 percent of assessed waters meeting all water quality standards, up from 500 watersheds in 1998."[16] Because POTWs are often very important dischargers into the very wathershed in which quality must be upgraded, this measure will have a trickle-down impact on pretreatment.

Though the targets are numerical, the measure itself is somewhat flawed. First, assessment may not be particularly strong; in such a case, this overall metric would be of limited value.[17] Second, while more watersheds are meeting standards than in the past, the overall percentage remains quite low, increasing from only 22% in 1998 to a target of 26.5% in 2003. Even this value is overstated, since the goal calls for only 80% of the water within these watersheds meets standards: the true target drops to 21.2% by 2003, not a particularly high figure for 30 years after the passage of the Clean Water Act. The pace of progress going forward also appears to remain slow: the goals imply 100 new watersheds meet targets every five years (based on the increase from 500 to 600 between 1998 and 2003). If this pace were linear, 100 percent of the nation's watersheds would not meet the 80% threshold until 2086! Achieving standards for all segments in all watersheds, even assuming the standards don't rise, could easily take until the next century.

Given the slow pace of progress, targeting activities towards the most important watersheds would seem critical. However, an effort to achieve GPRA objectives may encourage the exact opposite behavior. Work on the easiest areas to address could happen first, in order to meet the non-environmentally-linked numerical targets, rather than focusing on the most

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[16] U.S. Environmental Protection Agency, *2003 Annual Performance Plan and Congressional Justification*, II-52.

[17] Fran Dubrowski noted at a recent EPA workshop that only 17 percent of rivers and streams are assessed, and even here mostly for biological information. (U.S. Environmental Protection Agency, "Effluent Guidelines Workshop," p. 4). Assessment of ocean and other shoreline waters is even lower, reaching only six percent in 1996. Although statistical monitoring is encouraged to achieve a fuller picture of quality with fewer samples, states indicated that they rarely use such an approach in practice. (U.S. General Accounting Office, *Water Quality: Key EPA and State Decisions Limited by Inconsistent and Incomplete Data,* March 2000, pp. 5, 9).

ecologically-important areas. The conclusions here are that goals should be based on addressing the external problem, not on projecting forward from current activity levels; and that gaps in the linkage between agency activity levels and environmental outcomes can divert resources in sub-optimal directions.

D. Summary Evaluation of Metrics

Measuring performance is not easy. However, we are concerned that the metrics OW has chosen to evaluate the direct and indirect benefits of pretreatment will not meet any of the main goals that we believe sound performance measurement should meet. First, they are not closely enough linked to improvements in human health and the environment. More explicit linking of loadings reductions through pretreatment to particular watersheds as a percentage of total load to the water bodies would be a stronger indicator of the centrality of pretreatment in protecting these resources. Furthermore, efforts to differentiate between low hazard and high hazard loadings would also provide a much clearer picture. Second, the planned metrics will not present an accurate picture of average trends of concern. In addition to the lumping of low- and high-hazard reductions, the proposed modeling approach faces weaknesses that make extrapolations from it unlikely to yield reliable information on what is actually occurring. Third, the planned metrics do not provide rapid or high resolution feedback to decision makers to enable them to identify areas of high and low performance quickly enough to use the data in planning and resource allocation decisions.

Many of the EPA staff with whom we discussed the issue of performance measurement were concerned to hear that extrapolations from effluent guidelines, with their embedded assumptions regarding control technologies, were to form the core element in demonstrating the value of pretreatment to Congress and to EPA upper management. At the very least, they wanted there to be fairly extensive validation of the model through updated analysis and measurement. We also asked many people what metrics they would choose to demonstrate program achievements if they were unconstrained by any pre-existing decisions. We were surprised that there was fairly broad consensus on what these measures should be:

- Influent loadings
- Effluent loadings
- Biosolids loadings (regardless of how the biosolids are ultimately managed)

In addition, some people suggested the following indicators as well:

- Whole effluent toxicity test results (linking discharge to ecosystem quality)
- Releases to air (addressing multi-media transfers)
- Percentage of dischargers in full compliance (as an aggregate metric of how well the oversight mechanism was working)

An absence of better alternatives may require short-term use of metrics shown in Exhibit 1. However, the Agency should clearly communicate the limitations of these measures, their planned replacements, and the timeline over which the needed measurement and tracking infrastructure will be developed to enable the improved metrics to reach common usage.

Furthermore, credible presentation of the loadings reductions through extrapolation of modeled reductions for roughly 12 percent of the regulated facilities will likely require a much more substantial validation effort for the effluent guidelines modeling effort than seems currently to be planned.[18] Over the longer-term, a shift to actual measurement of loadings and environmental impacts seems warranted. The examples above, based on our conversations with water staff at multiple levels of government, provide some options for what measures to use. If these (or other) metrics are to become a central element in OW's long-term capability to measure the impact of its programs and to prioritize resource allocation, core milestones for achieving these capabilities should be developed and enforced.

Finally, it is clear that a central element of being able to move from extrapolations using old data to true measurements of existing activities will involve a broad based upgrading of the existing water data systems. This process has been underway for some years under the PCS Modernization effort. The next section of this memo examines the planned data system modernization in light of the pretreatment program and provides some suggestions for making the data systems improvement more effectively meet the long-term pretreatment needs.

II. Data Support for Performance Measurement and Program Optimization

Pretreatment is a data-intensive activity. There are tens of thousands of indirect dischargers, each of which must have a permit. These permits include requirements for periodic sampling and reporting of discharges. The POTWs themselves must regularly test their inflow and effluent, as well as conduct their own sampling at industrial users. Without accurate and timely data, problems can't be detected quickly and both the treatment plants and the receiving waters can be put at risk. The data problem is further complicated by the regulatory structure of pretreatment. Depending on the location of the industry, oversight (the "control authority") may be the local POTW, the state, or the EPA region. Most of the data are collected and used locally by the control authority in order to evaluate compliance. Often, it remains locally-held, making it very difficult to generate accurate information on national trends.

Historically, centralized information on industrial users and POTWs has been held primarily in the Permit Compliance System, now commonly referred to as "Legacy PCS". Developed decades ago, PCS became the main data management tool for handling the wide variety of permits issued under the National Pollution Discharge Elimination System (NPDES). The last major revisions to PCS occurred in 1985, and it has been widely criticized as being inaccurate, out-of-date, and unable to meet the current needs of many existing programs. Appendix A provides a summary of the criticisms leveled against the current system; these criticisms provide a template for analyzing its replacement, the Integrated Compliance Information System (ICIS), now under development. Phase 1 of the ICIS project focuses primary on enforcement and compliance. Phase 2 will serve to replace Legacy PCS.[19]

[18] We have received some information that validation planning is underway, but have not seen any details, so can’t comment on its adequacy.

[19] U.S. Environmental Protection Agency. *ICIS, Phase II: PCS Modernization, NPDES Data Requirements Workgroup Recommendations*, April 30, 2002.

The PCS modernization has been an extensive effort, reflecting the fact that water data has been listed as a material weakness by EPA for many years.[20] Scores of people from EPA Headquarters and Regions, States, and POTWs have been involved through many workgroups to identify what the new system should do and how it should do it. Our review focuses on three main areas. First, we examine the functional characteristics of ICIS as they relate to pretreatment, primarily in terms of what information is being collected. Second, we examine central operating issues of the evolving system. Specifically, how good is the data coverage likely to be, and how effectively are bottlenecks in the existing system being addressed? We also evaluate whether ICIS will be able to answer the core questions of the pretreatment program. Third, we assess going-forward functionality of the system. Primarily, this includes the flexibility to handle growth in the pretreatment program and the process by which the data system itself will be upgraded.

A. ICIS Functional Characteristics

Legacy PCS contained very little of the data needed for pretreatment programs to track what was happening around the country and to quickly identify trends. Early drafts of the modernized PCS continued to have important gaps that made both EPA staff and EPA's Office of Inspector General unsure of whether the huge effort underway would yield a workable system for the Office of Water. Part of the problem, they believed, was that with OECA as the lead on the modernization effort, attention had been focused primarily on compliance and enforcement, with insufficient attention paid to the needs of the Office of Water.[21]

These concerns reflect the state of knowledge towards the end of 2001 and in early 2002. In late April of 2002, a number of important documents relating to Phase II of ICIS were released. Of particular relevance are the recommendations of the NPDES Data Requirements Workgroup. These newest materials provide much greater detail on the strategic aims of the effort and the specific data the system will be collecting. As a result of our review of this new information, we feel that the ICIS plan will address most of the weaknesses in the current Legacy PCS involving data coverage.

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[20] Listing by the Office of Management and Budget began in 1999. See, for example, "Environmental Protection Agency FY 2001 Integrity Act Report: Material and Agency Weaknesses -- Permit Compliance System," 2001. Criticisms began much earlier. Data management within EPA overall was noted as a weakness under the Federal Managers' Financial Integrity Act in 1994. EPA's Inspector General criticized integration of water data in a report published in 1998 (U.S. Environmental Protection Agency, Office of Inspector General, *Information Resources Management: Office of Water Data Integration Efforts*, June 22, 1998), work on which began in 1996.

[21] See U.S. Environmental Protection Agency, Office of Inspector General, *Water Enforcement: State Enforcement of Clean Water Act Dischargers Can be More Effective*, August 2001, pp. ii, 69. This general sentiment was also expressed to us in conversations with multiple EPA (non-OECA) staff.

- **Types of Users.** The system will support four main types of users: direct users (relying on PCS as their data management system); indirect users (relying on a state or other system for local management issues, but PCS for national trends and reporting); program managers (often in EPA headquarters or regions, who use the data to track trends, allocate resources, and report to interested constituencies); and external users (such as the public or other government agencies, with an interest in tracking environmental loadings and exposures).[22]

- **Extremely Wide Range of Data to Be Collected.** Though not all data elements will be mandatory, planned fields for the new data system fill 171 pages.[23] The pretreatment-related fields include tracking inspections and inspection results, Discharge Monitoring Report due dates and results; base and seasonal permit conditions; automatic assessment of violations; tracking of enforcement actions; and base information on biosolids quality. POTW discharge data will be linked to specific discharge points, allowing improved resolution in how these data are compiled. There will also be tracking of parameters where values are below detection limits. The new system will be able to handle all elements of permitting, compliance tracking, and enforcement for a wide range of Agency programs, including pretreatment (incorporating general permits as well as individual permits), CAFOs, SSOs/CSOs, biosolids, and stormwater.

- **Planned integration of data.** The Phase II plan includes logical links between pretreatment-related fields and the quality of the receiving waters; the ability to do some degree of effluent trading; tracking of biosolids land application sites, including cumulative loadings of toxic constituents; and periodic sampling and permit levels. Existing draft templates for ICIS-generated reports focus primarily on Phase 1 enforcement functions;[24] however, descriptive materials by the NPDES Data Requirements Workgroup suggest that useful integrative reports will be developed.

While there is always a concern that the recommendations of the NPDES Data Requirements Workgroup will not be implemented, we believe they have done a good job characterizing the information appropriate for the new system to track. Our remaining concerns lie not in the functional capabilities of ICIS to hold information, but in the integration of the data fields with operational needs of the pretreatment program, and with the development path of the system itself.

[22] U.S. Environmental Protection Agency. *ICIS, Phase II: PCS Modernization, NPDES Data Requirements Workgroup Recommendations*, April 30, 2002, pp. 10-12.

[23] ICS Phase II: PCS Modernization, "NPDES Worksgroups Data Elements Matrix," April 30, 2002.

[24] These include some reports on basic facility data and inspections, but nothing associated with pretreatment-related loadings data or other core pretreatment metrics. See Booz-Allen Hamilton, *ICIS Report Specifications*, 2002.

B. ICIS Operational Characteristics

Extensive data fields create a framework for collecting useful information. However, this system remains merely a shell unless it can be populated with actual data that are accurate, timely, and easy to query.

Data Accuracy

Ensuring accurate data relating to pretreatment involves two major challenges. The first is to ensure that the data being collected by state and local pretreatment programs are accurate. Discussions with EPA regions, as well as review of a survey of state pretreatment coordinators,[25] indicate somewhat variable data quality by region. Areas of particular weakness (though not present in all geographic areas) include POTWs that are not operating effective pretreatment programs, and regions with categorical industries under a state or Regional control authority (i.e., the POTW is not delegated and does not have a pretreatment program).

Upgrading these capabilities will be a long-term process for the program. However, applying successful data quality approaches from ICIS or regional efforts nationally could be an effective lever. Region 6, for example, has multiple levels of screening and cross-checking for DMRs.[26] Similarly, EPA is developing a formal "Data and Information Quality Strategic Plan," to "prioritize recommendations for improving the quality of currently collected data."[27] Both of these efforts likely have valuable approaches for ensuring improved data quality going into the state/local/regional water systems.

However, an equally large challenge faces the pretreatment program in ensuring that the quality information that currently exists locally can be effectively integrated into the national data system. This process is critical if ICIS is to be of any value in planning national pretreatment efforts. Joint analysis by EPA and the Environmental Council of States (ECOS) suggests that the vast majority of data populating most of EPA's core databases originates with state and regional governments/authorities. In the water arena, for example, they estimate state and local authorities are responsible for collecting DMRs for 90.6 of the major facility permittees and 95.5 percent of the minor facility permittees.[28] Of the actual DMRs submitted in 1998, 83.4 percent from major

[25] Allen Gilliam, state pretreatment coordinator for Arkansas, e-mail survey of state and regional pretreatment coordinators, 2001.

[26] "Data Quality Procedures and Policies: Region 6 Quality Control of Discharge Monitoring Report," circa 2002. Accessible through the ICIS website at https://www.webworks.bah.com.

[27] Nikki Tinsley, U.S. Environmental Protection Agency, Office of Inspector General, "EPA's Key Management Challenges," Memorandum to Christine Todd Whitman, December 17, 2001, p. 5.

[28] Federal law does not require DMRs for minor facilities to be submitted into PCS, though some states do so.

facilities and 89 percent from minor facilities originated from the state/local level.[29] Furthermore, those generated at the federal level were done by EPA Regional offices. These, too, must be centralized in order to be useful for national planning. With increased delegation of oversight authority to states a continuing goal, this figure is likely to rise rather than to fall. Ensuring this information reaches EPA in a timely and accurate manner requires three lines of attack: standardizing data flows so they are properly interpreted; reducing the cost of centralization; and achieving common agreements with state/local authorities on how centralized data will be used. The ICIS team must also overcome the broad-based dislike for, and avoidance of, the PCS system by regional, state, and POTW staff.[30]

- **Data Standardization.** EPA recognizes that establishing data standards is a critical element in making increased data centralization possible. The Agency has established six data standards to date, with an additional four due for completion in 2002. However, progress has been slow, and OIG suggests that "the overall process needs to move forward in a more timely and structured manner."[31] Data translation routines are a possible interim solution (and may always be needed, since data standards are unlikely to address every area). EPA has entered into some partnerships to finance such conversion routines, though a decentralized approach (discussed at the end of the memo) may be more effective.

- **Reduced Cost of Centralization**. The National Environmental Information Exchange Network (NEIEN) aims to facilitate environmental information sharing across EPA, states, Tribes, localities, and others, by identifying procedural difficulties and technical roadblocks to the efficient flow of data. One component of the Network is the Central Data Exchange (CDX), through which NPDES data will flow into and out of EPA. The CDX is simply a data portal at EPA that will create translation and holding areas for the exchange of NPDES data between state systems and PCS. This effort is important, since the cost and errors associated with having to rekey state data in order to share information with EPA headquarters are a large barrier to information sharing. The combination of data standards and a national data exchange should dramatically reduce the effort needed to share data across governmental units.

  Parallel implementation of electronic reporting (such as for DMRs) will make sharing of data initially in electronic format very inexpensive. These efforts should also greatly reduce the time

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[29] Environmental Council of States and the U.S. Environmental Protection Agency, *Environmental Pollutant Reporting Data in EPA's National Systems: Data Collection by State Agencies*, September 30, 1999.

[30] More than half of the states/regions responding to the Gilliam survey relied on data systems that were incompatible with PCS. Some expressed strong negative opinions about Legacy PCS: "Is anything compatible with PCS?," "We have no use for PCS," "Yes, it [our system] is PCS friendly (not that PCS is…)" (Gilliam survey, 2001).

[31] Completed data standards include a facility, environmental data, chemical name, biological name, substance, and terminology reference registries. Planned for 2002 are standards in the areas of permitting, enforcement and compliance, water quality monitoring, and tribal identifiers. (Tinsley, December 17, 2001).

lags that now exist before local data enters the national systems. We have conflicting information on how extensively the automation and standardization will address data elements beyond core NPDES requirements, such as those relating to pretreatment and biosolids.[32] Such integration would be useful.

- **Incentives to Centralize**. Within a few years, it appears as though the basic infrastructure of standardizing, sharing, and storing water data will be in place. What will be much more difficult to address is how to encourage data collection agents in the relevant control authorities to adopt these techniques in a timeframe and scale necessary for the entire national system to work. While electronic reports can be processed at the national level, use of them is voluntary. Similarly, use of NEIEN is also voluntary, and requires formal agreements that stipulate exactly what data will be provided, and in what format. While sharing data using the newer approaches will be much easier and less costly than currently, it is not costless. Data conversion routines may still need to be built; agreements formalized; and control authorities may be subject to increased scrutiny (from both the public and EPA) as more data are accessible. As such, we believe OWM would benefit by carefully assessing how to make participation in the centralized system beneficial for state and local partners. Four areas come to mind:

- **Cost savings.** Adoption of electronic reporting alone should save a substantial amount of money at the state/POTW level. While there may be transition costs, EPA should develop case studies to demonstrate and quantify the magnitude of savings net of transition costs to help local decision makers "sell" the up-front investment in conversion.

- **Improved environmental quality**. Local systems may have better data than PCS, but nonetheless suffer from the types of errors common with paper-based systems: high error rates and high data conversion (key entry) costs. A third problem involves the loss of information associated with time delays in information flows. Where DMRs take months to input, rather than occurring in real time, the original conditions that caused particular problems will be long gone before the problem is discovered. EPA effort to demonstrate the tangible environmental benefits to data partners from rapid problem detection (allowing causal factors to be much more easily identified), would also be worthwhile.

- **Access to value-added analysis.** While the current focus of OWM is on estimating loading reductions, a national data system with almost real-time water data is far more powerful. EPA should make a commitment to develop enhanced query, variance tracking, and analytical capabilities (discussed below) and to share these with control authorities who provide data to EPA. Much of this information can help local pretreatment coordinators identify areas where improved controls are cost effective and to better prioritize their programs based on reducing environmental risks. Access to these resources should be contingent on acceptable data sharing agreements with EPA.

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[32] The general description of the Central Data Exchange (CDX) suggests all Agency reporting will be supported by 2004; however, it is unclear whether this includes supporting data elements, or just the required report. EPA staff with whom we spoke did not think CDX would cover all of the areas they were interested in.

- **Standardized agreements on data access.** Common concerns of states and localities with sharing more extensive water data with EPA should be identified and addressed upfront by EPA. Differential access to databases by different parties is commonly done in many fields, and a reasonable balance between oversight and privacy should be achievable for each of the four main user groups. Addressing these issues up front will allow the development of standardized data agreements, reducing costs and speeding collaboration for all parties.

Ability to Use ICIS for Pretreatment Strategic and Operational Planning

Strategic planning is most likely to be done at the federal, regional, or state level. While the ICIS data architecture is adequate to provide national trend data, this will only occur once the participating data providers (states, POTWs, and regions) hit a critical mass, ensuring that the aggregate information is statistically significant. Stated another way, ICIS represents the "top," but EPA must simultaneously focus on the "bottom-up" approach to ensure local pretreatment programs are appropriately tracking and centralizing their information. Additional work is also needed on the query capabilities and standard reports related to pretreatment that Phase II ICIS will generate. These will need to succinctly identify trends of concern to the decision makers.

Operational guidance is much more difficult, since variance analysis, rather than trends analysis, is of central importance. A specific example may be helpful. Strategic planning would benefit from a national aggregation of loadings. Average data help illustrate if pretreatment overall seems to be working; grouping loadings by type of IU can help indicate where new or revised effluent guidelines may be needed. If some IUs or POTWs are missing from this data, overall trends are not likely to be affected in any significant way. Similarly, data lags of a few months will not alter the end conclusions.

Operational planning is less forgiving. Ideally, permit exceedances would be flagged immediately upon completion of a DMR. The system would also be able to track changes in loadings for particular industries over time, helping to target outreach, inspection, and enforcement resources. Rather than averages, exceptionally high or low values would be of most interest. The links between measurement, reporting, and analysis need to be much more precise. Similarly, the data system should link technical information with cost accounting information in order to track and ultimately increase environmental returns per dollar spent. With the exception of a single field allowing the full budget for pretreatment to be entered, we did not see any evidence of an economic component within ICIS. We believe that such integration is necessary if the Agency is to fully realize the objectives of GPRA.

Query Capabilities, Variance Tracking, Trends Analysis

As noted above, the power of ICIS rests of three main elements: data architecture; data population; and data analysis. As we have not seen planned reporting formats or query functions for Phase II of ICIS, the elements discussed below should be viewed as our suggestions for useful approaches, rather than any criticism of what the PCS Modernization Team is planning. The workgroup structure of the modernization effort was based on existing program divisions within the Office of Water.[33] In reality, there are many linkages between all elements of the program. Permit backlogs increase the loadings stress on both the POTW and the environment; and may create differential cost structures for industries depending on whether their permit reflects current standards or not. Upgrades to TMDLs trigger changes throughout pretreatment, CAFOs, and wet weather programs. Similarly, the efficacy of pretreatment has a direct effect on the options for the biosolids staff. While data elements may be regulatorily-driven, it is important that the analytical tools supercede these artificial program divisions to facilitate cross-program cooperation and focus on the problems offering the greatest environmental benefits.

Towards this end, we propose OW establish problem-centered workgroups that can identify how the baseline data to be included in ICIS can best leverage OW's core mission to protect and upgrade the nation's water supplies. Our suggestions include:

- **Attribution of Loadings.** Discharge data from regulated entities (including the POTWs) can be enhanced through aggregation and links with engineering models to identify the sources and their proportionate contribution of constituents of concern. Accurate data in this area can be a powerful tool in targeting education, outreach, and enforcement. It is also a very important input to cost accounting assessments to evaluate whether particular system users are triggering disproportionately high costs on the POTW, and to develop an equitable and efficient rate structure.[34] Load attribution routines can also be used to identify promising opportunities to apply effluent trading, and to help monitor compliance with the trades once trading is allowed.

- **Source Reduction Support.** The best laboratory for promising source reduction opportunities that pass the market test is to have national data on what firms are actually doing. National aggregation of permit information, basic facility information, and DMRs should allow headquarters to quickly generate discharge profiles of particular industries. Efforts to leverage that capability should begin now, by developing tools to normalize discharges (for example, by production level) and to ensure the industrial process is clearly

[33] Workgroups included Base NPDES Program Requirements, SSO, CSO, Biosolids, Pretreatment, CAFO, Stormwater, Wetlands/Spills, and Policy Guidance and Review. (U.S. Environmental Protection Agency, Office of Enforcement and Compliance Assurance presentation, "State/Regional Roles in PCS Modernization," July 17, 2001).

[34] See Douglas Koplow and Alexi Lownie, *Cost Accounting and Budgeting for Improved Wastewater Treatment*. Prepared by Industrial Economics, Inc. for the Office of Policy Planning and Evaluation and the Office of Water of the U.S. Environmental Protection Agency. February 1998.

indicated in the system. Once these hurdles are cleared, the Agency should be able to generate a normalized loadings profile for similar industrial processes nationwide. This would be an invaluable tool in identifying the real best-in-class industries. Such firms could be given access to the Agency's special programs, as well as serve a models for lower-performing firms. Finally, this query capability would provide a clear context for inspectors to evaluate the relative performance of the plants they are visiting.

- **Early warning.** Early warnings of problems can be immensely valuable. They can facilitate rapid identification of system failures, illegal activity, or other problems, allowing the discharge to be stopped. Where failures are intermittent, rapid detection of the problem may be the only way that the conditions associated with the failure can be identified (e.g., occurs only in wet weather, or only during plant cleaning) Early warnings of high effluent loadings from POTWs or within biosolids can be rapidly linked to required upstream changes in local limits or specific permits. Early warnings of capacity shortages (either for the system overall, or only in particular parts such as lateral collection lines) can provide a planning window in which capacity expansions, or demand reduction strategies can be developed. Ideally, the early warning systems can integrate multi-media data from many information systems. However, even a water-only approach would be a very powerful tool.

- **Variance tracking.** Built in comparisons between different time periods, dischargers, or data reporters can provide important information to regulators about problems in oversight, changing external conditions, or opportunities for improvement. Some examples include:

  - **Self-test versus regulator-test.** Is there sampling bias in self-reported data? Auto comparisons between sampling done by the regulated entity versus by inspectors, and between pre-announced versus surprise inspections, can highlight potential bias. Comparisons across facilities with similar production processes can flag potential sampling bias in self-tests, even in the absence of sufficient regulator-tested data points.

  - **Time trends within a single facility.** Material changes in normalized loadings (either up or down) can signal unreported or undetected changes in pollution control equipment, equipment maintenance, or process controls within the plant. This can help prioritize actual inspections.

  - **Loadings spikes.** Even if within permit levels, spikes are indicative of changes in operating conditions that are important for the regulator and the plant owner to be aware of.

  - **New problems.** Tracking new agents showing up in samples, or linking biomonitoring problems to particular industry clusters, can help EPA identify emerging problems before they become too big.

- **Optimizing pretreatment.** Where should pretreatment resources be put first? Which industrial discharges pose the greatest environmental threat, or are most likely to interfere with POTW performance? Which trigger the highest costs within the plant to oversee and mitigate? Formalizing analytical queries to establish better links between user activities, discharge levels, capacity user, and cost can help pretreatment coordinators, as well as plant managers, to work in an integrated way to address the more severe problems first.

C. Future Flexibility

Programs change, as do technical capabilities and economic and environmental realities. ICIS faces two challenges in ensuring continued relevance. First, it must be able to easily handle data elements required by new oversight programs. The inability of Legacy PCS to do this was a major factor in its increasing obsolescence. Second, the system must continually adjust to changes in a range of external factors, including what information people want to see, programming and database technologies, and query capabilities.

Because Legacy PCS did such a poor job of integrating program changes, the ability to do so was a core criteria for the PCS Modernization effort. While we are unable to systematically evaluate ICIS in this regard, the system planners do seem to have made it relatively easy to add new fields, modify existing ones, or add entirely new program modules.

The much bigger challenge lies in the second area: continual upgrading. Active work on PCS modernization began at least by 1998. The most recent schedules show completion of the water-related modules of ICIS by the end of 2004, with linkages to other programs (pesticides, toxics, and air) being phased in in later years.[35] Focusing on water alone, the period of development has been at least six years. Development is being done primarily by a single contractor working with EPA to define system goals, functionalities, and parameters. Payment to the contractor is based on completion of the system according to the design specifications, not on whether the system is, in the end, used by the state, local, and regional authorities, who are the ultimate arbiters of whether the initiative will be successful or not.

This discussion is in not meant to imply that the current contractor is not doing a good job. Rather, its purpose is to focus on some of the risks associated with a single vendor, top-down development model for a product that is relying on local buy-in for its ultimate success. As an overview to some of the issues, Exhibit 3 compares the current ICIS development model to the Yahoo! internet portal site. The final column proposes how the ICIS model might be refined to capture the benefits associated with a more market-oriented approach. The central authority establishes the overall system standards and parameters, the look and feel of the site, and markets the overall site capabilities to users. Contracting arrangements with vendors enable Yahoo! to focus time and resources on its overall system strategy, rather than having to divert resources to develop applications and content for the hundreds or thousands of areas in which it is active. By establishing competition between current and potential partners (partners can and are replaced),

[35] Booz-Allen Hamilton. *ICIS Design Specification Phase 1, Release 1.0, Version 1.0.* Prepared for the Office of Enforcement and Compliance Assurance, December 28, 2001.

the platform manager can force continual innovation and cost reductions throughout its system. In the ICIS example, there could be multiple vendors for any module area, allowing greater customization for any single customer -- as well as market competition across solutions providers to improve performance and reduce costs for all of the module users (POTWs/state governments).

Exhibit 3
Comparison of Top-Down and Structured Partnership Development Models

Parameter	ICIS (Planned)	Yahoo! Portal	ICIS (Proposed)
What is the product?	Comprehensive data system for collecting water and other EPA data.	-Portal platform, with centralized standards. -Series of partnership agreements with content providers.	-Centralized data structure, data management, query capabilities. -Standard setting for independent application service providers.
Relationship with users	-Receptacle for state/local data. -Planning/ management system for those wishing to use it that way.	-Standardized display, performance. -Customization of user experience. -Billing, use tracking, marketing. -Frequency, intensity, and distribution of use varies widely by application.	-Open source platform, allowing pre-qualified vendors to develop applications of direct value to state/local users. -EPA HQ sets look, feel, and cross-cutting query applications.
Source of upgrading	-Periodic (every 6-8 years) updates funded by EPA, if funds available.	-Yahoo! responsible for upgrading portal and forcing upgrades to applications in some cases. -Much of the upgrade driven by application service providers who want to maintain the Yahoo! relationship.	-EPA HQ focuses on cross-cutting system design and integration, and platform upgrades. -Widely decentralized applications for functional modules done without HQ involvement so long as pre-set standards met.
Profile of upgrading	-Centralized and static. Requires long approval process. -Single solutions either work or fail.	-Dynamic and decentralized.	-Dynamic, decentralized. -Independent agents can interact with the platform for their own financial gain. -Multiple providers create a "market" for generating the best applications for end-users.
Incentive of developer to improve system	-Driven by environmental goals or litigation; no financial incentive.	Strong financial incentive.	Strong financial incentive (portion of $80 million -$1.4 billion per year on reporting can finance data systems that reduce program costs).

Upgrading of ICIS is inevitable. Aside from changes to the data architecture, there are tremendous challenges in writing value-added applications to help users see patterns and obtain data in formats that empower them do their jobs better. The standard model of government-financed software development is slow and generates infrequent upgrades. The production of these upgrades often lag years behind the need, and the upgrades are sometimes already obsolete when they are released. Often, the developing Agency can become a large bottleneck in the development of appropriate solutions. With a single contractor model, it is likely that basic functionality will be the focus through the end of 2004, with upgrades of the earlier phases not occurring until 2005 or 2006 at the earliest. Because the system is so large, and so dependent on local control authorities to be successful, we are concerned that the standard development model poses a large impediment to meeting the data needs of the pretreatment program (and of Office of Water overall).

The question is whether the structure of system development going forward can be modified in such a way that EPA ceases to be a bottleneck in system innovations, and the likelihood of establishing a system that helps local regulators in substantive ways rises dramatically. We do not have the complete answer to this challenge, but think it worthwhile to provide some ideas. Our objective is to generate an upgrade path more similar to the Yahoo! internet portal than to the single contractor model of data system development. This entails four main elements:

- **Focus on standards creation and data storage rather than on full system development.** Will the ICIS data elements and queries for biosolids be the best in the country? Even if they are, will they be the best fit for all POTWs? Will they remain best-in-class five years from now? Although the current development process has done a "fit analysis" to identify existing software that may be able to be put into the ICIS system, our discussions with Agency personnel suggest the modules would be integrated directly into the overall program, rather than used as one possible data feeder program (as the Yahoo! model does). To the extent that the centralized effort focuses on what data to collect and how to store it so a variety of query engines can assemble it in different ways, EPA can ensure an organized compilation of information without trying to develop every module independently. Setting the parameters that outside developers (be they private or municipal) need to meet in order to be acceptable to the central ICIS system would be an important area of focus as well.

- **Divide single massive system into interlocking modules.** A related element to focusing on standards rather than full content development is to divide the task into smaller pieces. The purpose of this is to make the work accessible to a larger number of parties: far more people can build a house than can build a harbor tunnel. Enabling smaller applications to be seamlessly bundled into the core system substantially reduces risks faced by third party developers of entering the market. ICIS is already being developed in phases; these may denote logical division points. However, even smaller components, such as program-based modules (e.g., biosolids, inspection and sample management, pollution prevention), where discrete groups within a POTW can decide to use a particular product, would be better.

- **Allow end-users to decide which modules work best for them**. Under the single contractor approach, EPA is "hard wiring" many decisions about system functionality into ICIS. While there is some capability to integrate local systems into the broader data infrastructure, this is constrained by two factors. First, ICIS does not appear to be explicitly built to allow modular integration of external systems. Second, the overall strategy does not seem to explicitly encourage external providers to adopt existing solutions -- or develop new ones -- to make local data management easier, and more readily integrated with the emerging central data structure. With these two pieces, we think it would be much more likely that an active market of independent application providers would develop, creating a dynamic path for upgrading system functionality, ease of use, and automatic linkages between the locate and federal systems. The competitive process also tends to keep the costs of the systems down.

- **Apply the budget that would normally support full system development towards "data bounties" for information delivered in the appropriate form.** Shifting from full system development to development of a basic infrastructure with which many external systems can easily interact has the potential to save EPA a substantial amount of money. This is because much of the development cost and risk is being shifted to the private sector, induced by the size of the potential software market. These savings can be applied to encourage development of third party systems tailored to the needs of state and local control authorities -- the very parties who's participation in ICIS is so critical. The traditional method of encouraging this development has been to provide grants for data translators or upgrades to existing systems. However, like the single contractor approach, this method is slow and requires the EPA to pick a single method or "winner" in terms of the upgrades. Instead, the Agency should leave the choice of local data modules to local authorities (simply qualifying vendors based on whether they have met the standards to interact with ICIS). Part of the financial reward to these vendors would come through a payment per report that reaches the federal data system in the proper format.

  The vendors able to add the greatest value to the local control authorities will have the highest market share. This will drive up revenues both through higher direct sales to control authorities and through generating the largest number of reports on which they earn bounties. This approach encourages the development of a decentralized and competitive marketplace in managing local water data. We believe such a dynamic system is required if the state and local managers are to see the large gains from the data systems that will be needed for rapid adoption of the new systems; and if the overall data management and query functionalities are to be upgraded in a timely and cost-effective manner. Large POTWs will likely achieve sufficient direct cost savings to invest in data systems without a federal bounty on data reports. Thus, applying all available funds to bounties that support the smaller control authorities would likely leverage available federal funds most effectively.

One important element in making a decentralized model work is that there must be a large enough market for private parties to want to get involved. The market in this case can be estimated by how much all participants in the water tracking system now spend on record keeping and reporting. This amount helps bound the potential cost savings from more effective data management systems, as well as the administrative waste should EPA's system not meet the needs of participants. "Participants" include both regulated parties (all permittees, including POTWs), and the various control authorities. While additional research would be necessary to refine the market estimate, our preliminary analysis suggests the potential opportunity for independent application developers is quite large.[36]

- **Cost of required reporting under the National Pretreatment Program is more than $80 million per year.** EPA Information Collection Requests estimate the reporting burden associated with the National Pretreatment Program. In 1999, the total annual cost to state and local governments, industrial users, and POTWs was estimated at $78.1 million per year.[37] Supplemental effluent guidelines issued for two segments of the pulp and paper industry add an additional $20.1 million per year, though only a portion of this is associated with indirect dischargers and therefore attributable to pretreatment.[38] This amount serves as a lower bound estimate.

- **ICR for National Pretreatment Program evaluates only a portion of the spending by the community directly affected by the pretreatment program.** Our review of the ICR suggests that three important cost elements are missing from the $78 million value. These include recording keeping and reporting processing costs by the federal government, costs associated with developing data systems at the control authority level; and record keeping and reporting costs for tens of thousands of industrial users who are not considered significant or categorical under existing statutes, but nonetheless must report periodically to local POTWs.

- **Similar recording keeping and reporting issues face all NPDES permittees, not just pretreatment facilities.** The similarity in data tracking requirements and the inter-relatedness of program areas in meeting overall water goals explains why ICIS is an integrated system. These same factors would enable third-party software modules to serve a much larger user base than pretreatment alone. This dramatically expands the potential market for independent software developers. Using EPA's number of approximately 550,000 NPDES permit holders, and assuming average record keeping and reporting costs are equal to those in the pretreatment area as reported in the Agency's ICR, the total spending on water-related reporting would be almost $1.4 *billion* per year.[39]

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[36] It is important to stress that independent developers need not all be private firms. Many POTWs have invested millions of dollars in internal control and reporting systems. The evolving market would give them a financial incentive to modify these programs for use in other POTWs.

[37] U.S. Environmental Protection Agency, Office of Wastewater Management. *Revision of the Information Collection Request for The National Pretreatment Program (40 CFR Part 403)*. September 1, 1999. OMB Control No. 2040-0009; 47/EPA ICR No. 0002.09.

[38] "Agency Information collection Activities: Proposed Collection; Comment Request; Minimum Monitoring Requirements for Direct and Indirect Discharging Mills in the Bleached Papergrade Kraft and Soda Subcategory of the Pulp, Paper, and Paperboard Point Source Category," *Federal Register*, Vol. 66, No. 53, March 19, 2001, pp. 15424-15426.

[39] The pretreatment ICR estimated a total burden of $78.08 million for 29,517 respondents (permittees), or an average $2,513 per respondent per year. Multiplying this figure by a total of 550,000 NPDES permittees yields the value shown above. ICR values can be found in EPA ICR

- **Benefits in terms of staff and infrastructure optimization far larger than the value of reduced reporting burdens.** Integrated national data sets can provide early warnings of problems and allow improved utilization of staff and capital resources. If realized, such capabilities could save individual POTWs millions of dollars per year. The treatment plant and associated collection infrastructure can cost hundreds of millions of dollars to build; delaying new construction, even if for only a few years, can be extremely valuable. In theory, POTWs should already be investing in software systems that enhance system optimization -- and many are. However, the lack of standardization nationwide limits the ability for standard approaches (software, data elements, query routines) to be developed for multiple POTWs, driving up costs and reducing the incentive for independent investment in software development.

All of the factors shown above suggest that current spending on record keeping and reporting by facilities affected by ICIS is hundreds of millions per year. Opportunities for improved optimization of waste water treatment capital infrastructure and POTW staff resources could well be an order of magnitude above that. While EPA's centralized approach could, in theory, achieve rapid, timely, and continuously updated solutions for affected parties to achieve efficiency improvements in these areas, history suggests this is unlikely to occur. The market size is sufficient to attract substantial interest from third party developers, and a decentralized competitive approach is more likely to achieve more tailored data management more quickly than will centralized alternatives.[40]

IV. Summary

The role of pretreatment is rather focused: protect publicly-owned wastewater treatment plants from pass-through of toxics or interference with biological or chemical processes used to treat sewage within the plant. This is accomplished through education, permitting, inspection, and enforcement functions against the potential sources of discharges of concern, primarily industries and commercial facilities. However, the lines quickly begin to blur. The more effective the pretreatment activities, the higher the quality of biosolids that the program will generate. The more effective the permitting efforts, the larger the universe of facilities over which pretreatment must be active, and the more stringent the standards (since many facilities continue to operate under outdated permits).

No. 0002.09, p. 1. Total number of NPDES permittees is from U.S. Environmental Protection Agency, *2003 Annual Performance Plan and Congressional Justification: Clean and Safe Water*, 2002, p. II-77.

[40] Note that the ultimate market for data management solutions will not be equal to the total spending on record keeping and reporting, but some fraction of that. Costs will not drop to zero under the new system; however, efficiency improvements of even 20 percent would yield annual spending on software of $16 to $280 million per year. Benefits through capital and staff optimization could generate incremental purchasing power far above these values.

Proposed performance measurement approaches rely on a very old, static picture of a small segment of the industries that pretreatment oversees. Current efforts are putting in place a data infrastructure that has the potential to dramatically improve the information on which pretreatment program planning is conducted, and by which the program's strengths and failures can be evaluated, enhanced, or corrected. However, success is not guaranteed. The standard model of data system development within EPA faces a substantial risk of not meeting the needs of the critical users; not realizing the potential learning from the data it does contain; and becoming increasingly obsolete as upgrades are underfinanced and delayed. Focusing on these issues now, to ensure a flexible, dynamic, and decentralized development path, will be necessary to ensure ICIS becomes the tool that pretreatment staff, and many others in the Agency, hope it will be.

Appendix A: Weaknesses in Legacy PCS

The most extensive critiques of existing systems were prepared by EPA's Office of Inspector General. They evaluated biosolids data in particular during March 2000, and the PCS overall in August 2001. Their comments, underscore the significant challenges associated with PCS modernization.

Of EPA's data collection overall, OIG remarked:

> *Despite the vast array of data in EPA's information systems, GAO, the states, regulated entities, and EPA itself have pointed out that the Agency does not have much of the information it needs pertaining to environmental conditions and trends and the potential human health risks of various pollutants. This makes it difficult to report on the environmental results of EPA's activities….. Further, while EPA does not currently receive all state information, a majority of the information that EPA uses for measuring and reporting is collected by states. According to the Environmental Council of States, some 94 percent of all environmental quality data in national databases originates with the states. In previous reports, the OIG, as well as others, have found data for individual states to be inconsistent, and data among various states to be incompatible.*[41]

Of PCS in particular, OIG noted:

> *EPA's Permit Compliance System -- its national permitting and enforcement system -- was incomplete, inaccurate and obsolete. The growth, variety and complexity of the regulated community had greatly outstripped the system capabilities. Hundreds of thousands of dischargers were not monitored by the system. Although many states were developing their own systems, they did not fill the information void.*[42]

Problems identified by OIG with PCS specifically were substantial, including:

- **Missing permits**. PCS was missing 400,000 storm water, 100,000 minor discharger, and 7,000 major discharger permits in their entirety.[43]

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[41] U.S. Environmental Protection Agency, Office of Inspector General, *EPA's Progress in Using the Government Performance and Results Act to Manage for Results*, pp. 14, 15.

[42] Ibid., p. ii.

[43] Ibid., p. 21. Note that these figures are much higher than those published by OWM's Permit Division. This is because the permits backlog published by OWM includes only the facilities within the existing PCS universe, not those where there are no entries at all. The Permit's Division points out that many of these missing facilities are regulated under general permits rather than plant-specific permits. However, they acknowledge that because there are six facilities governed by general permits for each one regulated by a major/minor discharge permit, this gap will be important to fill. (U.S. Environmental Protection Agency, Office of Wastewater

- **Missing and Incorrect Data.** Even where the permittee was properly included in the PCS system, OIG found other problems. In the states they examined, large amounts of data available at the state level or in paper format had never been entered into PCS. In addition, there were many errors in the data that had been entered.[44] OECA had earlier speculated that since many states no longer used EPA databases to track the information needed for their decisions, they "do not pay attention to the quality of the data given to the Agency."[45] Given that 83 percent of the data on major facilities within PCS, and 94 percent of the data on minor facilities, comes from state data collection efforts, this indicates a serious and pervasive problem.[46]

- **Missing self-monitoring reports.** Many paper-based self-monitoring reports by IUs were not input into the national system due to the high cost of data conversion. This left a much sparser picture of IU performance over time on which to base decisions.[47]

- **Improper Classification of Significant Non-Compliance (SNC).** OIG found that states differed in what they considered serious violations, flagged as SNC. Specifically, OIG found that many states did not consider failure of whole effluent toxicity tests by the POTW as a serious violation.[48] As a result, they contend that the national compliance rate is overstated. The large gaps in available data and missing permittees from PCS may also contribute to that bias.

- **Other state-level data weaknesses.** OIG found additional state-level problems with storm water compliance monitoring and slow response times for enforcement action when there were significant violations. OIG also found that the fines on dischargers rarely recovered the economic benefits of non-compliance.[49]

Management, *Interim Framework to Ensure Issuance of Timely and High Quality NPDES Permits*, July 28, 1999, pp. 2-1, 2-2).

[44] Ibid, p. 22.

[45] National Academy of Public Administration, *Evaluating Environmental Progress: How EPA and the States Can Improve the Quality of Enforcement and Compliance Information*, June 2001, chapter 2.

[46] Environmental Council of States and U.S. Environmental Protection Agency, *Environmental Pollutant Reporting Data in EPA's National Systems: Data Collection by State Agencies*, p. 1.

[47] U.S. Environmental Protection Agency, Office of Inspector General, *Water Enforcement: State Enforcement of Clean Water Act Dischargers Can be More Effective*, p. 17.

[48] Ibid., p. 19.

[49] Ibid., p. ii.

Many of these same criticisms and weaknesses of PCS were identified by EPA staff during our conversations with them. In addition, EPA staff raised the following issues:

- **Very little pretreatment data in PCS.** Indirect dischargers are required by EPA to submit a pretreatment annual report but not discharge monitoring reports (DMRs). Similarly, states are not required to upload pretreatment data to PCS. One staff person suggested that only two states actually do so. These factors severely limit the quantity and quality of pretreatment data in PCS.

- **Poor communication between OW and OECA.** From OW's perspective, the usefulness of PCS seemed to decline after oversight of PCS moved to OECA. Since that time, poor communication and coordination between OW and OECA has resulted in OW having difficulty in making use of PCS as a policy and management tool, as well as missed opportunities for the Offices to improve PCS. EPA staff we spoke with believe the most reliable - and maybe only reliable - data in PCS are the Water Enforcement National Database (WENDB) data elements submitted by major sources.

- **Cycle of negativity undermines PCS.** Multiple staff noted that as users lose confidence in the quality of a database they rely less frequently on it and become reluctant to allocate resources to gather, QA/QC, and input data. This behavior only further undermines the quality of the database and further disenfranchises the intended users.

- **Few users of PCS data.** As a result of these many factors and concerns, staff suggested it was not a surprise that there were few regular users of PCS. Other than OECA using PCS data for some targeted enforcement efforts involving SNCs, staff suggested that the only other significant use of PCS data is to fulfill Freedom of Information Act (FOIA) requests submitted by environmental technology companies looking to market their products. Occasionally, OW uses PCS data for management and planning decisions or initiatives, as it did to develop its Index of Watershed Indicators, but staff felt this was more the exception than the rule.

OIG's review of EPA's biosolids program contained similar issues relating to large gaps in coverage and quality of the supporting data. They concluded:

> *EPA does not have an effective program for ensuring compliance with the land application requirements of Part 503. Accordingly, while EPA promotes land application, EPA cannot assure the public that current land application practices are protective of human health and the environment.*[50]

Specific weaknesses included:

- Low review rate (38%) of the Part 503 reports submitted by POTWs for accuracy.

[50] U.S. Environmental Protection Agency, Office of Inspector General, *Water: Biosolids Management and Enforcement*, p. ii.

- Few EPA inspections of biosolids operations at POTWs and virtually no inspections of land application sites.
- Little or no EPA records of inspections of biosolids operations for either POTWs or land application sites.
- No cumulative records of land application history at particular sites, greatly increasing the risk of soil toxicity resulting from multiple land application of biosolids over time.

A follow-up analysis by OIG did not note any solutions to the problems raised in the 2000 audit, but did note a declining resource commitment by Headquarters in this program area.[51]

The combination of problems outlined above suggest that neither influent, effluent, or biosolids data currently available to the Agency can be considered complete and reliable. This makes it impossible to accurately track trends or target federal resources. The large gaps in existing systems increase the importance of newer data initiatives in providing the data infrastructure and coverage needed for ensuring continued progress in meeting the goals of the pretreatment program.

[51] U.S. Environmental Protection Agency, Office of Inspector General. *Status Report: Land Application of Biosolids*, March 28, 2002.

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