Natural Capital Management: An Evolutionary Paradigm for Sustainable Restoration Investment – 13455

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ABSTRACT

Unlike other forms of capital assets (built infrastructure, labor, financial capital), the supply of usable or accessible air, land, and water elements (termed Natural Capital Assets or NCA) available to enterprise processes is structurally shrinking due to increased demand and regulatory restriction. This supply/demand imbalance is affecting all forms of public and private enterprise (including Federal Facilities) in the form of encroachment, production limits, cost increases, and reduced competitiveness.

Department of Energy (DOE) sites are comprised of significant stocks of NCA that function as both conserved capital (providing ecosystem services and other reserve capacity), and as natural infrastructure (supporting major Federal enterprise programs). The current rubric of "Environmental Stewardship" provides an unduly constrained management paradigm that is focused largely on compliance process metrics, and lacks a value platform for quantifying, documenting, and sustainably re-deploying recapitalized natural asset capacity and capability. By adopting value-based system concepts similar to built infrastructure accounting and information management, "stewarded" natural assets relegated to liability- or compliance-focused outcomes become "recapitalized" operational assets able to support new or expanded mission. This growing need for new accounting and management paradigms to capture natural capital value is achieving global recognition, most recently by the United Nations, world leaders, and international corporations at the Rio+20 Summit in June of 2012.

Natural Capital Asset Management (NCAM)™ is such an accounting framework tool. Using a quantification-based design, NCAM™ provides inventory, capacity and value data to owners or managers of natural assets such as the DOE that parallel comparable information systems currently used for facility assets. Applied to Environmental Management (EM) and other DOE program activities, the natural asset capacity and value generated by EM projects and other investment and operational programming can be recorded and then allocated to mission and/or ecosystem needs as part of overall site, complex, and Federal decision-making. NCAM™ can also document post-restoration asset capability and value for use in weighing loss mitigation and ecosystem damage claims arising from past operational activities.

A prototype NCAM™ evaluation developed at the Savannah River Site (SRS) demonstrates use of this framework as an advanced paradigm for NCA accounting and decision-making for the larger DOE complex and other enterprise using natural capital in operations. Applying a quantified value paradigm, the framework catalogues the results of activities that sustain, restore, and modernize natural assets for enterprise-wide value beyond that of compliance milestones. Capturing and assigning recapitalization value using NCAM™ concepts and tools improves effective reuse of taxpayer-sustained assets, records ecosystem service value, enables mission and enterprise optimization, and assures the sustainability of shared natural capital assets in regional pools vital to both complex sites and local and regional economies.

INTRODUCTION

The national security and energy development needs of the United States continue to evolve in the post-Cold War world as new risks and requirements emerge from changing global threats and energy security demands. In light of this evolution, leadership of the Savannah River Site (SRS) has adopted a mission program plan capable of agile response to the spectrum of Department of Energy mission needs while incorporating principles of sustainable development.

Within DOE, the Savannah River Site **(**SRS) is an industrial complex dedicated to the safe stabilization, treatment, and disposition of nuclear materials, spent nuclear fuel, and radioactive waste. With an overarching goal of providing Nuclear Knowledge for the Nation, SRS has at present four primary missions: Environmental Management (or EM, responsible for cleaning up the Cold War legacy and preparing for Long Term Stewardship); National Nuclear Security Administration (NNSA)-Defense Program (DP); NNSA Nuclear Non-Proliferation Program; and the Savannah River National Laboratory (SRNL). The SRS is situated on 198,344 acres (310 square miles) and has a workforce of 12,000 people with an annual budget of approximately $2 billion. There are over 7 million square feet of buildings containing millions, if not billions of dollars worth of equipment. The chart below illustrates the capital asset categories these statistical descriptions represent used to conduct and sustain the overall SRS enterprise.

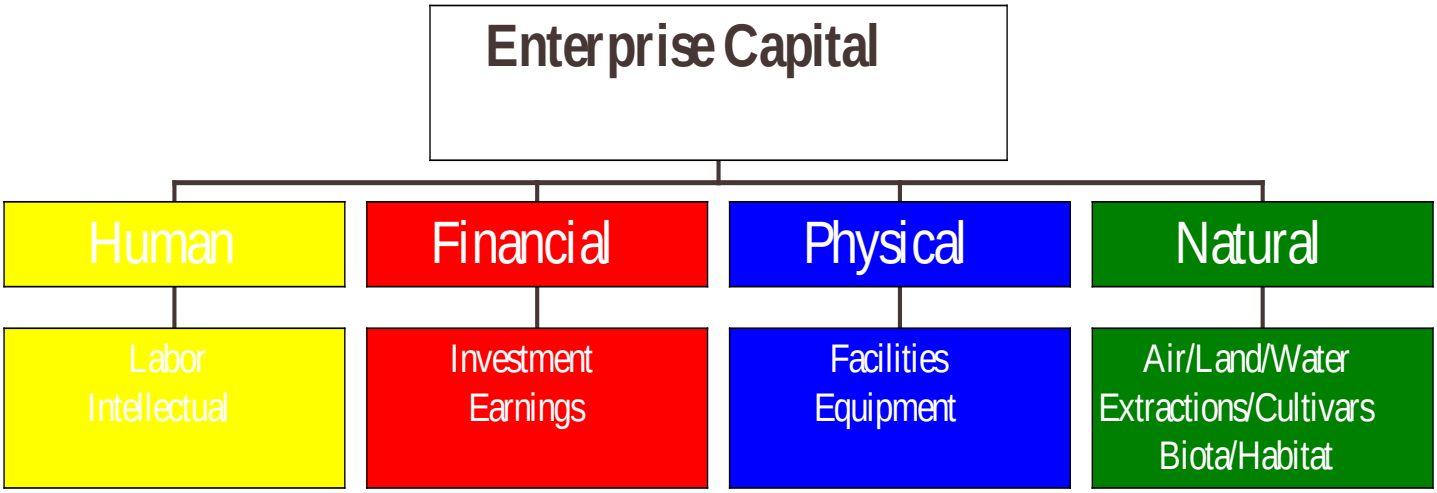


Figure 1: The "Four Capital Elements of Enterprise"™

Source: Koetz and Duncan LLC

Maintenance and revitalization programming for capital "asset" capacity used in mission activities is generally addressed to the physical infrastructure elements such as buildings, pipelines, roads, bridges, and other constructed facilities. However, Department of Energy sites are also comprised of significant stocks of Natural Capital Assets (NCA)[1] both inside site boundaries and within that larger regional ecosystems that, like built capital asset inventories, make up critical design and operability components of every program carried out at SRS.

Land is required for facility and utility emplacement; process or cooling water, and discharge capacity is integrated into operations; critical habitat sustains endangered and other species; airshed absorbs residual emissions from various program activities. These are but a few examples of mission-critical natural capital elements whose capacity and capability must be sustained, and for which excess capacity may be available at SRS. Enterprise systems, private or public, cannot operate without using and recapitalizing some volume or capacity of air, land, water, and their various sub-elements to meet output and performance requirements--SRS is no exception.

Of the four types of capital described in the chart, only Natural Capital is deliberately made scarce as part of legal and economic practices designed to protect its value. This scarcity has evolved over centuries, beginning as early as the 13th century with a ban on coal burning by

[1] Capital itself is generally defined as a stock that yields a flow of valuable goods or services into the future. Natural capital is thus the stock of natural ecosystems and its elements that yield a current and future flow of valuable ecosystem goods or services.

England's Edward I to control air pollution, and expanding significantly to major regulatory systems in the latter 20th century that now, in many cases, define the operating parameters of enterprise activity.

This valuable and irreplaceable, but largely unrecognized and undocumented, natural asset pool requires new accounting paradigms for several reasons: first, regional asset pools are shrinking and stocks available at SRS are taking on greater value; second, restored use value to either infrastructure or ecosystem assets should be recorded to avoid duplicative outlays for residual damage claims; and third, better awareness of available natural capital assets can positively affect mission siting or expansion decisions in overall DOE planning and programming.

THE PARADIGM EVOLUTION: COMPLIANCE TO CAPABILITY

The Compliance Foundation

The current rubric of "Environmental Stewardship" results to a great degree from the role of environmental regulation in driving protection of natural capital assets. For centuries, legal system controls on ownership and access to land, water, and air through deeds and other instruments operated under the principle of Accursius' Maxim: "For whoever owns the soil, it is theirs up to Heaven and down to Hell." Media-based environmental laws successfully revised these ownership-based rule sets to advance the socioeconomic principle of forced internalization of external cost. Restricting the types and volumes of air, land, and water available for use in enterprise processes (not unlike a zoning system) compelled reduction or elimination of leakages, disposals, and outfalls from pipes, stacks, and fills that degraded and undermined natural assets, posed harm to human health from fugitive releases of potentially harmful substances, or both. Statutes like the Clean Air and Clean Water Acts or the Solid Waste Disposal Act succeeded by reducing the volumes and types of air, land, or water assets available to accept discarded byproducts. Hence the premier feature of environmental protection became compliance with these laws and regulations with little managerial focus on the operational effects from the scarcity created.

With compliance, the measure of merit for enterprise operations and activities that use air, land, and water assets has been violation avoidance and mitigation of "Environmental Impacts." The SRS, according to its 2010 Environmental Report, "...maintained its record of environmental excellence in 2010, as its operations continued to result in minimum impact to the public and environment." The report further identifies the SRS Environmental Policy as "a statement of the site's intent to implement sound stewardship practices that protect the air, water, land, and other natural and cultural resources impacted by SRS operations." An Environmental Management System (EMS) is used at SRS to implement this policy by identifying environmental aspects and impacts, which are then validated, addressed through mitigation and corrective action, and

documented. In essence, these programs manage the condition and quality of air, water, land, and other natural assets, and assure compliance with applicable laws and regulations, but fail to address supply.

Such protection-oriented management systems have resulted in tremendous successes at SRS over the years, sustaining its missions through compliance with air, water, and waste disposal permits, fill and dredge regulations, storage, construction, monitoring, and reporting requirements, and a host of regulations associated with the management of radioactive materials. But while compliance activities are a major element of protecting needed natural capital capacity and satisfy important legal requirements, this constrained management paradigm does not provide a value platform for quantifying, documenting, and sustainably re-deploying recapitalized natural asset capacity and capability to as part of planning, programming, and budgeting. Moreover, to the extent EM program activities functionally achieve natural asset revitalization and create asset capability value, no management processes record these assets on behalf of the taxpayers who pay for them.

Hidden Capacity Advantage

Usable volumes of natural capital assets are increasingly shrinking as new laws and regulations continue to restrict supply of, and access to, natural capital available for enterprise processes. At the same time, demand for usable natural capital is increasing due to population expansion and economic growth. While compliance remains vital to maintaining asset condition, access to adequate capacity and supply of natural capital assets is now key to enterprise operability. With growing frequency, the NCA capacity/supply factor directly defines enterprise capability. The International Paper Mill in Augusta, Georgia provides a local example. As part of a revised permit for its paper plant, the company accepted a facility-wide *production* limit to assure it remained below the air emission levels sanctioned in its permit.[2]

Conversely, enterprise can increase or free up natural capital capacity, but lose the value of its use or equity depending on the accounting performed. A recently completed biomass cogeneration facility at SRS replaced an aging coal-fired facility; energy, water, and operations and maintenance savings are estimated at $944 million over a 19-year plant performance agreement. Analysis of the project in its 2008 Environmental Assessment estimated significant reductions in Clean Air Act controlled emissions, including over 700 metric tons of particulate

[2] See PRELIMINARY DETERMINATION SIP Permit Application No. 14747, May 2004, State of Georgia, Department of Natural Resources, Environmental Protection Division, Air Protection Branch. http://www.georgiaair.org/airpermit/downloads/permits/24500006/tv14747/2450006pd.pdf Such a production cap could, in turn, affect the value of the facility, ultimately affecting the value of the enterprise itself.

matter, more than 4500 metric tons of sulfur dioxides, and 2350 metric tons of nitrogen oxides, along with annual carbon emission reductions of 90,000 metric tons and a savings of 5.3 billion liters of water a year. Such "reductions" or "savings" are all examples of additive natural capital asset capacity that could translate to more production or mission capability, or even some form of credit (depending on the supply and demand in the relevant natural capital marketplace). This operational asset capacity is not recorded or appraised in any asset management program at SRS.

Transforming past environmental liabilities into revitalized and repurposed assets for future use is part of the Enterprise SRS strategic direction and EM restoration program goals. Similar to Brownfield concepts being applied in virtually all localities across the domestic economic spectrum, these asset revitalization efforts are generating natural capital capacity in terms of acreage, usable water, and airshed for mission activities like research, training, or industrial emplacement, or rejuvenating assets for future conservation. A stated goal of ARRA funded programs at SRS was reducing the footprint of the site so that secure land could be used for future projects. In August of 2012, SRS contractors reported an 85 percent reduction in footprint, surpassing the goal for that year, but there is no indication that the capacity or value of that land, or associated air and water capacity, suited to future enterprise projects, was inventoried and appraised as available assets or in any way recorded as such.

Of the nearly 81,000 hectares underlying the SRS, approximately 1,780 are developed and used for industrial and other mission activities. The remaining natural capital asset pool includes among its many elements the 4,450 hectare Crackerneck Wildlife Management Area, the DOE Set-Aside Program Area of 5,665 hectares, riparian streams covering about 20% of the site, and several layers of aquifers, providing about 14 billion liters of water per year for domestic and industrial uses. The SRS has long been a significant location for wildlife refugia and habitat, wetlands, regenerative activities such as soil formation, groundwater recharge, and carbon sequestration, as well as being a premier study field for a nationally renowned ecological research laboratory. None of this capacity to provide ecosystem services, reserved natural capital, or knowledge management has been recorded or appraised for asset management or ecosystem service purposes.

Capability Lessons from Built Infrastructure Management

In contrast to compliance-based goals and metrics in natural capital management, SRS manages physical capital assets in the form of built infrastructure using the Facility Information Management System (FIMS). The FIMS database generates quantified capacity, capability, and financial value data regarding built infrastructure assets in the form of calculated dollar amounts and indexed utilization rates that directly relate to capacity for operational activities.

Every facility is identified, inventoried, and appraised, providing management decision-makers key data and information about the facility's capability to support mission activity. Data categories reported by the FIMS include:

- Location Coordinates/ Operational Status
- Utilization Rate/ System Deficiencies
- Acquisition Cost/Total Capital Value
- Plant Replacement Value/Total Portable Value
- Use Density/Vacant Space (subdivided by type)
- Anticipated Maintenance/Recapitalization Costs

Consistent with effective compliance practices, the FIMS also records the existence of SRS permits, compliance activities (such as NEPA analyses) and other use rights (such as easements) when they relate to the facility and its functions. Various qualitative conditions or designations are recorded as "Property Info" in several subcategories using binary "Yes" or "No" indicators as they apply to the facility and its related land, water and air assets. The designations include:

- Environmental/Natural /Cultural
- Development/Deed/Zoning
- Easement/Right-of-Way
- Mineral/Water/Air/Other/Not Applicable

Noting natural capital access as a feature of physical infrastructure rather than as a separate asset is consistent with the temporary nature of many activities requiring permits, such as construction projects, but overlooks long-term value and marketability provided by ongoing use rights such as water discharge or air emission rights and the inherent operational capacity these assets represent. For example, the biomass co-generation emission credits listed as "positive impacts" in its NEPA Analysis or the available land from footprint reduction are not numerically recorded for their capability and financial value in this FIMS format. Looked at from the perspective of the International Paper Mill situation, lack of natural capital acts as a production limit. The converse is increasingly true for SRS: its vast, often underutilized, and largely unrecorded natural asset capacity is a critical component of attracting new enterprise development while keeping existing mission programs. Using binary designations in place of quantified data also masks asset value information usable to counter claims of continuing natural capital damage. However, to serve these purposes also requires natural capital assets to be inventoried, appraised, and communicated as uniquely available capacity and capability in a manner similar to other SRS assets such as facilities.

Emerging Global Concepts in Natural Capital Accounting

The concept of natural capital and its importance to sustainable development has been the subject of growing awareness in the last decade. Global recognition intensified in the last year under the auspices of the United Nations when in June of 2012, banks, investors and insurers joined forces with more than fifty countries including Botswana, the Philippines, South Africa and the United Kingdom, as well as corporations such as Unilever, Puma, Dow Chemical and Mars Incorporated, to make a collective call for natural capital valuation and accounting. In a Natural Capital Declaration published in conjunction with the Rio+20 United Nations Conference on Sustainable Development, signatories recognized that at present many financial institutions do not sufficiently understand, account for and therefore value, the risks and opportunities related to Natural Capital in their financial products and services (loans, investments and insurance products) and in their supply chains. The Declaration affirms that building this knowledge, as well as appropriate valuation and risk management tools, to take Natural Capital into account within financial decision-making, are important early steps to be undertaken by the financial sector.

In September of 2012, KPMG, with co-authors Flora and Fauna International and Association of Certified Chartered Accountants (ACCA) in the United Kingdom, published a report on the materiality of natural capital accounting in corporate financial accounting. Intended to prompt accounting practitioners to respond to what the authors see as an impending crisis from the combined effect of ecological degradation and population growth, the report focuses on the new array of risks to business ranging from increasingly severe competition for resources, tightening regulation, and greater and more costly hurdles to access finance, noting that a trend is emerging that attempts to use accounting practices to give better understanding of the implications of the loss of natural capital for governments and for business.

This emerging understanding, however, is being applied only in a limited manner to natural capital value generated from uses providing what are designated as ecosystem services. In nations such as the United States, where advanced economic and social systems have incorporated air, land, and water elements into its major enterprise systems, and also comprehensively restricted their use and access in a mature legal and market system, natural capital is most effectively accounted for and managed for its distinct but inter-related value to both ecosystem sustainment and enterprise activity. The Natural Capital Asset Management (NCAM)™ Framework developed for SRS can meet these evolving requirements.

MANAGING A NATURAL CAPITAL PORTFOLIO WITH NCAM™

Natural Capital Asset Management (NCAM)™ creates an inventory, utilization, and value management system for natural assets akin to systems currently used for facility assets. By correlating to physical plant, actions to ensure the value and viability of what amounts to natural plant can be structured for optimized recapitalization and utilization, effective rates of return, and financial and managerial accounting of a natural asset's value in overall enterprise and ecosystem management.

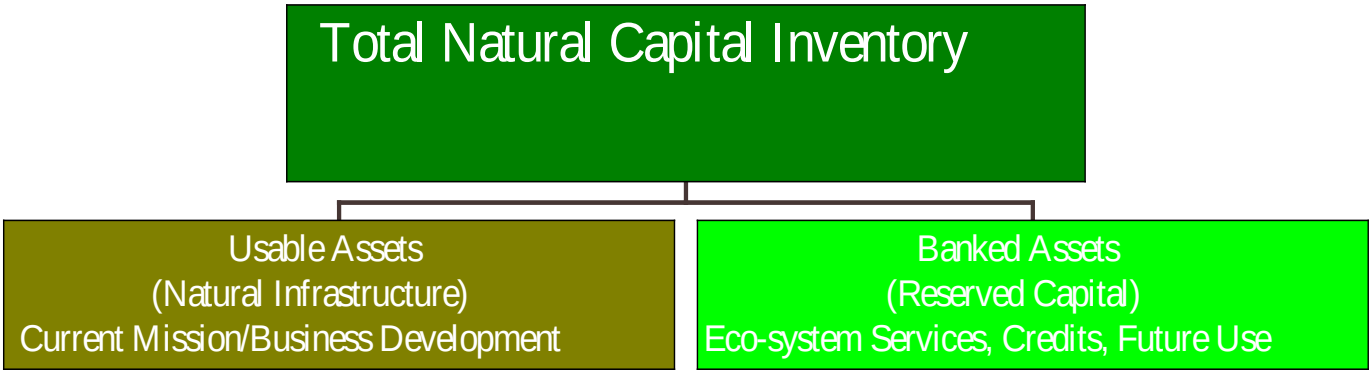
NCAM™ Organizing Principles

Using precepts and governance principles from built infrastructure management such as master planning, recapitalization, and equity management, the following are organizing principles for managing natural capital assets to achieve environmental, economic, and social system sustainability:

- Public and private enterprise systems meeting the needs of today cannot operate without using and recapitalizing some volume or capacity of air, land, water, or their various sub-elements, to maintain operational capability and meet output and performance requirements.
- Ecosystems comprised of these air, land, and water elements are valuable and quantifiable Natural Capital Assets whose use or consumption capacity can be assigned to human economic and social needs only after a sufficient quantity is retained in the system and recapitalized to assure continued system integrity for intergenerational use.
- Media and natural resource regulations are socially approved artificial limits on the supply of natural capital assets made available for human economic and social goals. Quality-based environmental media standards function as allocation and zoning laws that make usable capacity of air, water, or land assets available for permissible economic and social uses as natural infrastructure, while retained or conserved assets are maintained as natural capital reserves to generate ecosystem services and preserve intergeneration availability.
- Goals and metrics for natural capital use extend beyond legal compliance (e.g., annual notices of violation received) to those shared enterprise-wide such as production levels, market share, price validation, cost reduction, social license and acceptance, and equity creation, and can best be met through NCA use optimization indexed against enterprise activity and outcomes.
- Natural Capital Assets require standardized and integrative management practices such as inventory, appraisal, financial and managerial accounting, utilization rates, and recapitalization budgeting in both public and private enterprise to optimize capacity and capability as natural infrastructure, capital reserves, or both.

The NCAM™ System

Key to the design of a NCAM™ system is its unique dual categorization of the air, land, water, and related assets comprising natural capital: Natural Infrastructure is working capital legally sanctioned for use in human economic and social enterprise in either private and public spheres; and Banked or Regenerative Assets is capital conserved to generate ecosystem services, research opportunities, provide credits, or be re-designated for future use where appropriate.



Source: Koetz and Duncan LLC

Figure 2: Natural Capital Categories™

By delineating natural capital in working and reserved functions, a Natural Capital Asset Management™ program adds several dimensions to existing environmental management systems that complement knowledge generation, enhance operational decision-making, and optimize program performance:

- NCAM™ recasts deeds, leases, permits, other environmental access rights, and natural capital features as working capital in the form of infrastructure assets whose capacity translate to mission capability. NCA capability available for mission development and expansion is then visible in an inventory format that supports informed decision-making.
- Recapitalization actions that remediate or restore such assets can be booked as either increased natural infrastructure working capital with market or operational value similar to repairs or restoration of a facility, or as banked asset capacity informing both reuse and loss-mitigation determinations.

- NCAM™ creates quantified data regarding both natural capital use and reduced or avoided capacity consumption that can translate to valuable credits or support environmentally preferable purchasing and other performance goals across the spectrum of sustainability practice.
- NCAM™ provides an asset inventory format for regenerative assets to better depict the quantity and value of ecosystem services and other value creation generated through sustainment practices.

NCAM™ Data Framework and Implementation

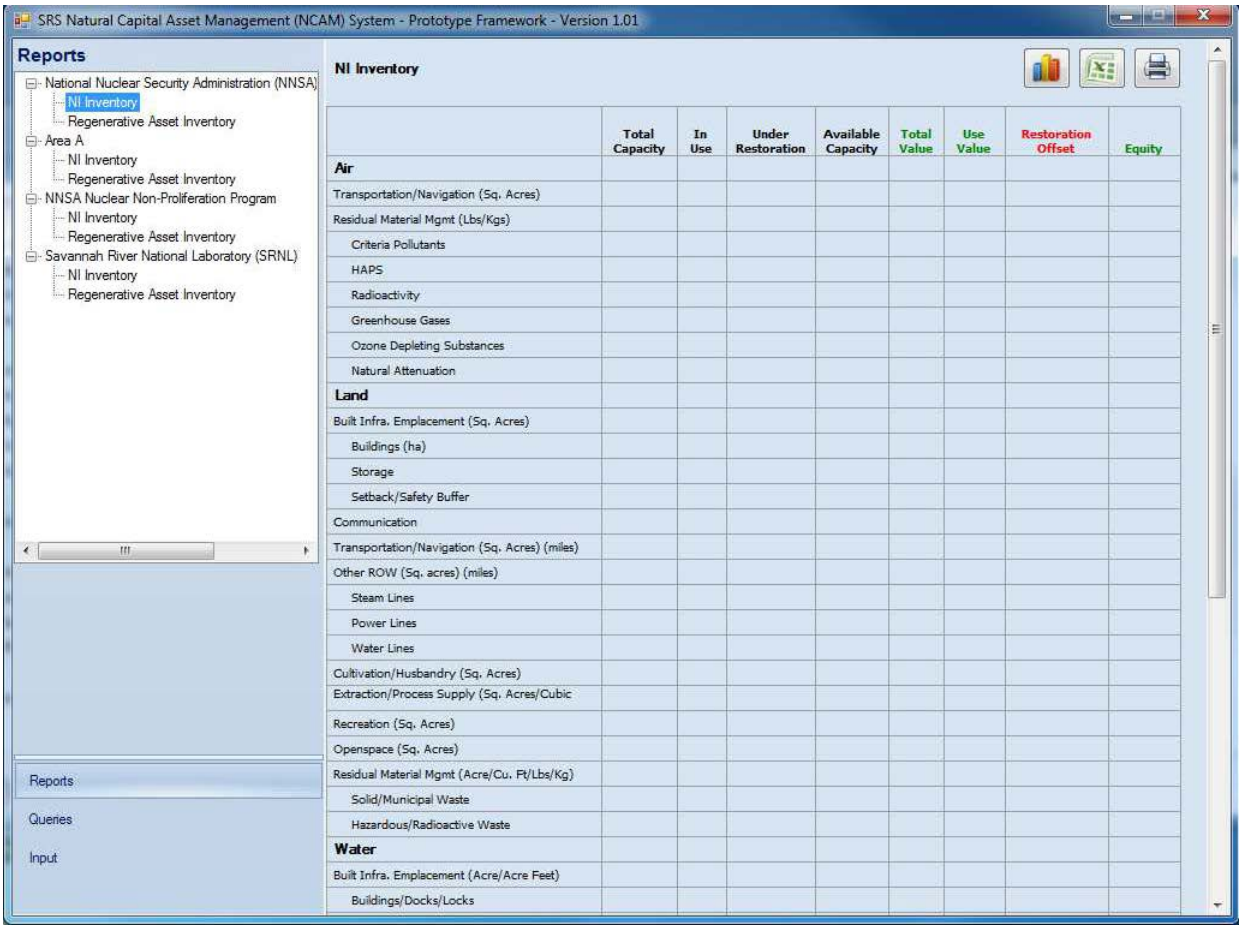
An NCAM™ system is a relational database tool comprised of quantification-based parameters and modalities whose interaction and computation generate capacity, capability, and value analysis for both working and reserved air, land, and water capital asset components in an enterprise portfolio. The resulting information and knowledge further informs enterprise decision-making currently using environmental compliance and facility information management systems.

The two main components of the NCAM™ system are (1) the configuration framework, which structures the database Input, Report, and Query functions using key features and characteristics of the client's enterprise activities and goals, and (2) configuration-controlled data that can be integrated as needed or desired with external databases according to the information and knowledge required.

The actual tool is designed to catalogue, index, review, and assess existing data on Natural Capital Assets, including their condition, configuration, availability, value, and capacity/capability to meets goals and actions of the client missions. The design and development takes into account existing programs and procedures related to Asset Revitalization and looks to complimentary integration with facility management systems. To the extent much of the data regarding Natural Capital Assets is undeveloped, disaggregated, managed in non-quantified formats, or evaluated separately from mission operability and development, the development process includes further data revision or construction.

The data elements are based on algorithmically or arithmetically derived units of affected air, land, and water elements and sub elements thereof or thereupon, that are used or conserved by the client enterprise for economic or social goals both internal and external to its operations. Standard and client-specific configuration protocols are developed and used during later phases to evaluate data source, availability, consistency, time and spatial factors, units of measure, and other data parameters needed for quality control and assurance in both design and operation phases.

Developing an NCAM™ System is a phased process that begins with a Preliminary Design and Architecture Study. This includes initial data gathering regarding natural asset holdings (including deeds, leases, permits, banking programs and other historical records). Next, a client-specific prototype framework is designed. The NCAM™ Framework Template is structured and mapped to key organizing features of the client's enterprise in the main function modalities for Inputs, Reports and Queries. Sample data elements are included to demonstrate the logic and operational flow of the model's ultimate function. Preliminary coding is initially configured in table format, but once fully populated, multiple chart display or histogram options are available for reporting. A sample template used for the SRS prototype is shown in Figure 3.



Source: Koetz and Duncan LLC

Figure 3: NCAM™ Sample Inventory Template

Follow-on development phases include a comprehensive or phased build out, inclusion of appraisal and value data and modalities, reporting program design, and query structuring to allow scenario evaluation for asset uses to include trading, program planning and budgeting, investment analysis, and strategic planning. Clients can perform an integration analysis to determine how best to generate and use NCAM™ data in conjunction with other asset management and planning systems.

As evidenced by the prototype project at SRS, the data to populate the NCAM™ fields is available but embedded in multiple management and reporting systems. Further research, formula development, and configuration protocols with and among the community of natural capital managers and users can guide further build-out and operation of a NCAM™ System in such circumstances. Iterations of the NCAM™ design and data protocols will continue to revise the tool so as to be of value to the most users at SRS or another facility. For SRS, this would include information from FIMS, GIS, EMS, and comprehensive planning programs. In particular, NCAM™ outputs can correlate to, and integrate with, FIMS knowledge management functionality to demonstrate similar utilization rates, capacity, and value for natural assets, particularly where NCA are used in tandem with physical infrastructure for missions and development. Based on the biomass facility and footprint reduction examples at SRS cited, there are likely significant sources of unaccounted natural capital there and at other DOE sites from other program successes in the EM Mission (e.g., groundwater remediation), savings and efficiencies generated in conjunction with other built infrastructure recapitalization, or embedded capital non-use value in other program assets (such as recoverable nuclear fuel) that include undocumented natural capital value.

Comprehensive Use Planning programs used at DOE sites are potentially a key user of information generated in the NCAM™ System development process, as well as “Energy Park” and similar system-designed enterprise structures that optimize natural capital assets available throughout the complex as part of a balanced and interactive development program across larger ecosystems. NCAM™ can be a valuable tool for planned or anticipated future missions such as global applications of nuclear restoration technologies, small-modular reactor, hydrogen, and renewable fuel technology development programs, These advanced, sustainable technologies frequently have higher up-front costs. Quantified documentation of the natural capital savings inherent in advanced technologies throughout their lifecycle adds positive value to return-on-investment calculations that can tip the scales in funding decisions.

CONCLUSION

In parallel to ongoing programs to maintain environmental quality and assure compliance, the laws themselves, coupled with regulations, market forces, evolving intergenerational values, and social license constraints have been steadily reducing the volume and types of air, land, and water assets and sub-elements available to all forms of economic and social enterprise. To the success of compliance programs is being added the larger strategic challenge of sustainability—how to continue to meet today's needs using increasingly limited elements of natural capital available in light of the functional ration system created by regulations.
Stewardship paradigms based on regulatory compliance are necessary but no longer sufficient to assure the capability of Natural Capital Assets to meet current and future mission needs. Nor do compliance-based systems provide accurate capacity indicators for Natural Capital Assets present in a site inventory, or added back through restoration and other recapitalization investment. Significant natural working capital capacity created by new co-generation facilities or EM footprint reduction success is a key component of ongoing and future enterprise in the DOE complex, but only if recorded as such and identified for effective reuse. Evolving operational parameters require evolving management paradigms, hence, the international recognition of natural capital accounting, and the need for Natural Capital Asset Management.™

When used in conjunction with other asset management tools, a Natural Capital Asset Management™ System such as that recently prototyped at the SRS, brings new data, information, and knowledge to decision-making as it:

- Identifies and inventories useable elements of air, land, and water (e.g., deeds, permits, rights) as assets whose capacity translates to mission and development capability
- Informs future use and marketability of NC assets subject to recapitalization under EM program while offsetting potential loss mitigation claims
- Captures previously unrecorded return-on-investment value created by new technology
- Enables positive communication of Investment/Value returns generated by and for mission, joint enterprise, and community stakeholders from Natural Infrastructure and Banked Asset portfolios
- Supports asset banking, credit generation, and data-driven eco-efficiency determinations for upstream and downstream opportunities
- Identifies additional value streams from assets created or managed under enterprise missions

Program successes across the DOE mission spectrum similar to the SRS Biomass Facility are recapitalizing, managing, and saving air, land, and water assets, creating value for taxpayers, regional and local communities, and global users of its research and technology capability.

The result is higher economic production and social benefit as well as ongoing sustainment of critical assets needed by future generations; this value should be accounted for to the highest possible extent. Data, information, and knowledge management systems using paradigms comparable to built infrastructure portfolios can be instituted to for Natural Capital Assets (NCA) to encourage optimized and sustainable NCA reuse and conservation while meeting new and future mission goals.

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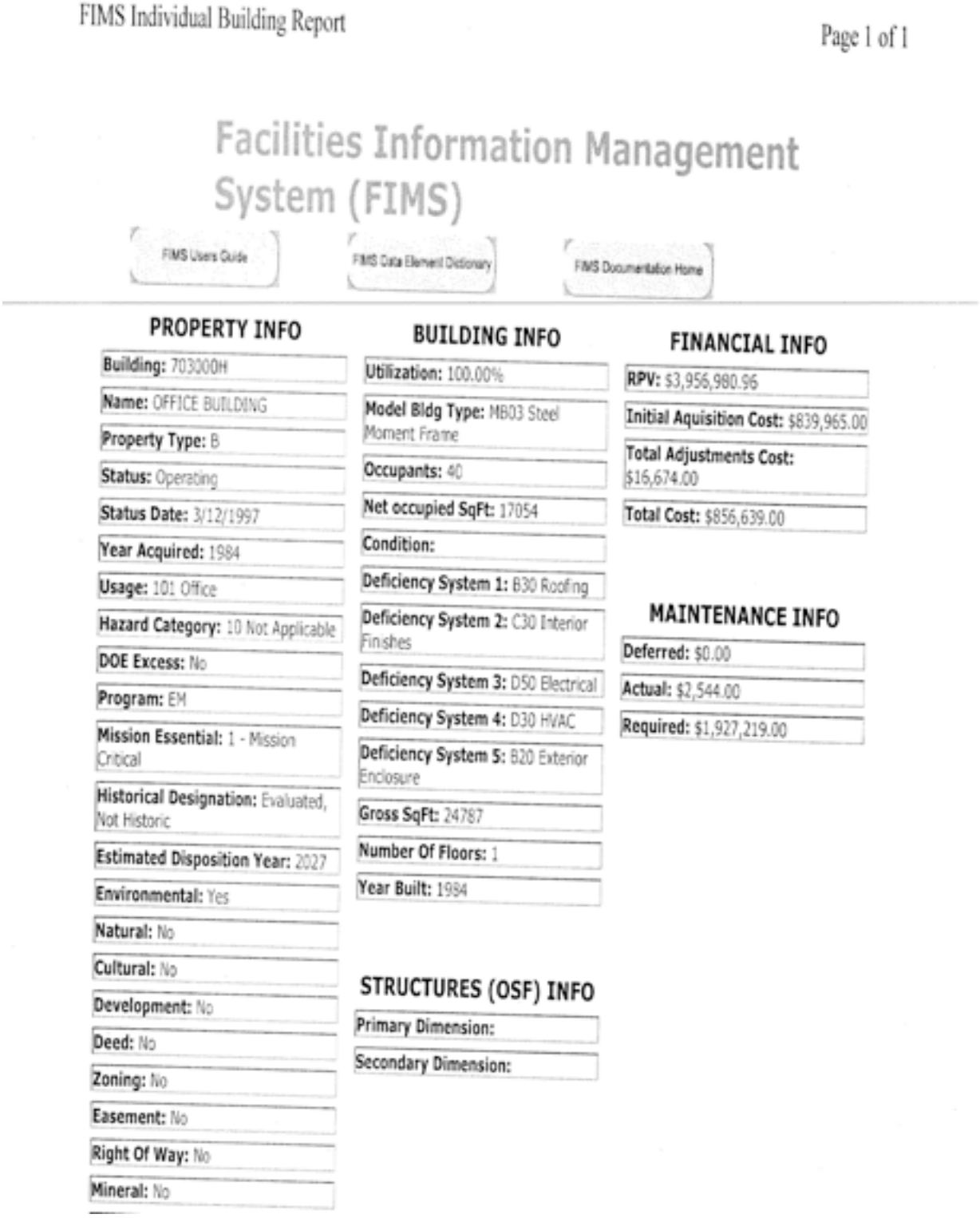
APPENDIX A



FIMS Individual Building Report

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Facilities Information Management System (FIMS)

FIMS Users Guide | FIMS Data Element Dictionary | FIMS Documentation Home

PROPERTY INFO

Building: 703000H
Name: OFFICE BUILDING
Property Type: B
Status: Operating
Status Date: 3/12/1997
Year Acquired: 1984
Usage: 101 Office
Hazard Category: 10 Not Applicable
DOE Excess: No
Program: EM
Mission Essential: 1 - Mission Critical
Historical Designation: Evaluated, Not Historic
Estimated Disposition Year: 2027
Environmental: Yes
Natural: No
Cultural: No
Development: No
Deed: No
Zoning: No
Easement: No
Right Of Way: No
Mineral: No

BUILDING INFO

Utilization: 100.00%
Model Bldg Type: MB03 Steel Moment Frame
Occupants: 40
Net occupied SqFt: 17054
Condition:
Deficiency System 1: B30 Roofing
Deficiency System 2: C30 Interior Finishes
Deficiency System 3: D50 Electrical
Deficiency System 4: D30 HVAC
Deficiency System 5: B20 Exterior Enclosure
Gross SqFt: 24787
Number Of Floors: 1
Year Built: 1984

STRUCTURES (OSF) INFO

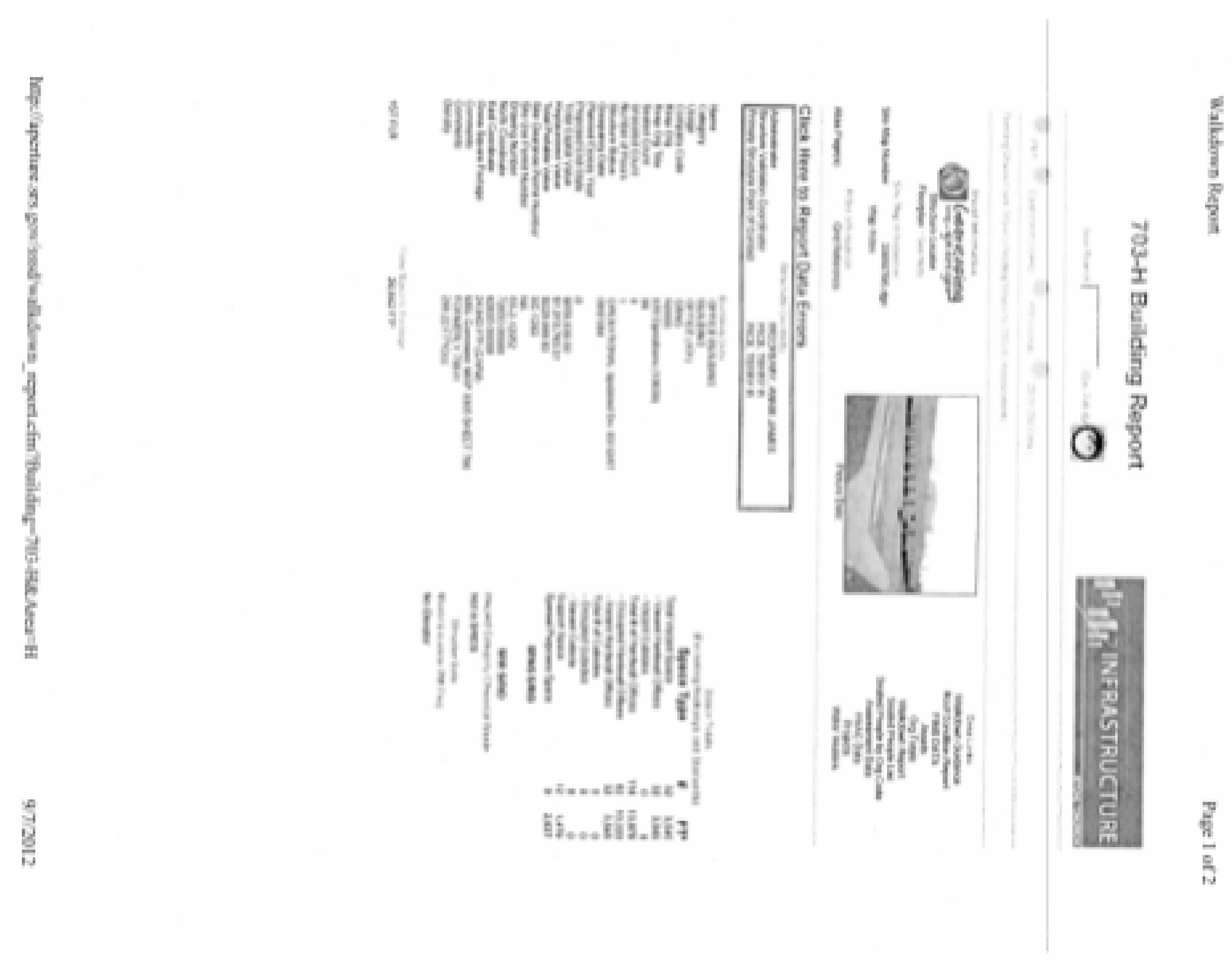
Primary Dimension:
Secondary Dimension:

FINANCIAL INFO

RPV: $3,956,980.96
Initial Aquisition Cost: $839,965.00
Total Adjustments Cost: $16,674.00
Total Cost: $856,639.00

MAINTENANCE INFO

Deferred: $0.00
Actual: $2,544.00
Required: $1,927,219.00



Walkdown Report

Page 1 of 2

703-H Building Report

INFRASTRUCTURE

Click Here to Report Data Errors

9/7/2012