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ChevronTexaco Energy and Greenhouse Gas Inventory: Development of a Corporate-Wide Process for Estimating Emissions

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1

ChevronTexaco Energy and Greenhouse Gas Inventory Project: CEGIS

- **CEGIS Development**

- **Scope**

- **Boundaries/Accuracy**

- **Verifiability**

- **Next Steps**

CEGIS Development

- **ChevronTexaco Project Development and Execution Process (CPDEP)**

  1. **Define the Opportunity**

  2. **Generate and Select Alternative(s)**

  3. **Develop Alternative**

  4. **Execute**

  5. **Operate and Evaluate**

CTPDEP Phase 1: Define Opportunity

- CPDEP Process/Roadmap/Team/DRB
- Hired ADL/PwC/Energetics to help us build a new system
  - Inventory experience
  - Industry/Global politics benchmarking
  - Auditing background
- Workshop in January 2001 to obtain BU input

CPDEP Phase 2-4:

- BU visits
  - Nigeria
  - Richmond
  - Houston
  - Kazakhstan
- Telephone Interviews: Other key/major Business Units

- 'Preferred Alternative' = concepts, boundaries
  - Mgmt. APPROVAL: June 2001

Scope

- **Based on ChevronTexaco organization**

- **Gases Included**
  - **Carbon Dioxide**
  - **Methane**
  - **Nitrous Oxide**

- **Gases Screened**
  - **HFCs**
  - **PFCs**
  - **SF6**

Scope *(Continued)*

- **Emission Sources Included:**
  - **Onsite fuel consumption**
  - **Process emissions**
  - **Flaring**
  - **Venting**
  - **Fugitive Emissions**
  - **Onsite Waste Treatment**

Boundaries

- **All of owned/operated**

- **Joint Ventures: Completeness/Credibility/Influence**
  - **20% threshold**

- **Contractors: Completeness/Credibility/Influence**
  - **Major 'captive' contractors**

Ownership/Responsibilities:
Data Input

Reporting Unit Responsibilities

- **Monthly Inputs**

- **Quarterly Upload to corp database**
  - **Upload parameters specified by Corp**
  - **Upload process straightforward and user-friendly**

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Ownership/Responsibilities: Coordination and Certification

- **Manager of Operations for Reporting Unit certifies data**

- **Reporting unit mgmt designates GHG coordinator**
  - **Analogous to energy coordinator**
  - **Responsible for completing inventory**
  - **Coordinate with Operational Excellence efforts and metrics**
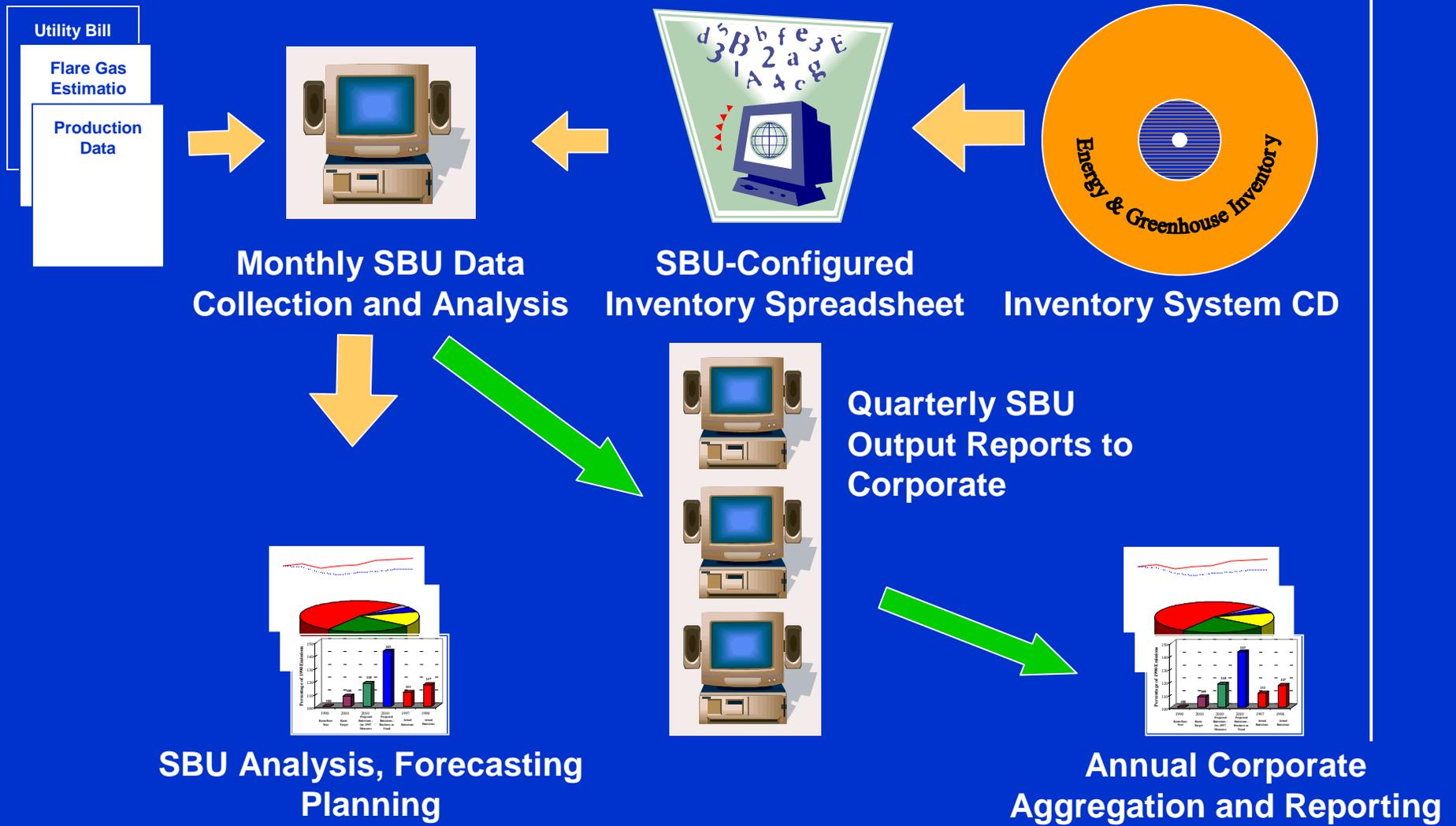
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CPDEP Phase 5:
Operate and Evaluate

- **System Rollout: July 10-11, 2001**

- **Data Input: July-October**

- **First Report Due: October 17, 2001**
  - **January-September, 2001 data**
  - **Monthly Data Input October-December**

- **Year-end 2001 Report Due: January 16, 2002**

- **January 2002+: Monthly data input, quarterly reporting for Energy and GHG**

ChevronTexaco Energy and Greenhouse Gas System (CEGIS)

- **Enables data collection, computation, compilation and reporting**

- **Excel-based, GIL (Global Information Link) compatible**

- **Single system and methodology for all opcos**
  - **User customizes for location**

- **User can choose input and output units (metric, English, mass, volume)**

- **Flexible level of detail/aggregation**
  - **Total refinery fuel gas use OR by source**

- **Includes API 2001 methodologies**

System Architecture

Utility Bill

Flare Gas Estimatio

Production Data

Monthly SBU Data Collection and Analysis

SBU-Configured Inventory Spreadsheet

Inventory System CD

Energy & Greenhouse Inventory

Quarterly SBU Output Reports to Corporate

SBU Analysis, Forecasting Planning

Annual Corporate Aggregation and Reporting

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Report by Equity ☐

Report On Operator Only ☐

Skip Unused Locations ☐

Run Report

Last Report Created: 28-Jun-01

Location	CO_2	CH_4	N_2O	CH_4 (CO_2e)	N_2O (CO_2e)	Total CO_2e	Energy (10^6Btu (LHV))
Field 123 Well 55 Processing	2,266,147	4,128	440.2	86,687	136,461	2,489,295	668,585
Field 123 Well 56 Processing	523,001	43	0.0	895	0	523,895	0
Field 321 Well 77 Processing	414,988	18	0.8	380	238	415,607	728,363
Field 321 Well 66 Processing	80,505	43	0.0	895	0	81,400	0
Total (tonne):	3,284,641	4,231	441.0	88,857	136,699	3,510,197	1,396,948

Module	CO_2	CH_4	N_2O	CH_4 (CO_2e)	N_2O (CO_2e)	CO_2e	Energy (10^6Btu (LHV))
Acid Gas Removal	241,516	128	n/a	2,684	n/a	244,200	n/a
Coke Combustion	1,259,175	n/a	n/a	n/a	n/a	1,259,175	n/a
Cold Vent	11	67	n/a	1,415	n/a	1,425	n/a
Combustion	175,637	21	3.3	435	1,009	177,081	2,956,991
Flare	1,031	6	0.0	127	0	1,158	n/a
Flashing	1,515	6	0.0	121	0	1,636	n/a
Fugitive	n/a	2,621	n/a	55,039	n/a	55,039	n/a
Glycol Dehydrator	n/a	21	n/a	447	n/a	447	n/a
Hydrogen Plant	177,848	n/a	n/a	n/a	n/a	177,848	n/a
Indirect Emission	1,462,820	197	171.3	4,141	53,106	1,520,066	-1,560,043
Crude Oil	n/a	129	n/a	2,702	n/a	2,702	n/a
Miscellaneous	-34,911	1,036	266.4	21,748	82,584	69,420	n/a
Total (tonne):	3,284,641	4,231	441.0	88,857	136,699	3,510,197	1,396,948

CO_2 (by Location & Module)	Acid Gas Removal	Coke Combustion	Cold Vent	Combustion	Flare	Flashing	Fugitive Glyco
Field 123 Well 55 Processing	80,505	408,340	11	132,988	1,031	1,515	n/a
Field 123 Well 56 Processing	80,505	442,495	0	0	0	0	n/a
Field 321 Well 77 Processing	0	408,340	0	42,648	0	0	n/a
Field 321 Well 66 Processing	80,505	0	0	0	0	0	n/a
Total (tonne):	241,516	1,259,175	11	175,637	1,031	1,515	0

CH_4 (by Location & Module)	Acid Gas Removal	Coke Combustion	Cold Vent	Combustion	Flare	Flashing	Fugitive Glyco
Field 123 Well 55 Processing	43	n/a	67	3	6	6	2,621
Field 123 Well 56 Processing	43	n/a	0	0	0	0	0
Field 321 Well 77 Processing	0	n/a	0	18	0	0	0
Field 321 Well 66 Processing	43	n/a	0	0	0	0	0
Total (tonne):	128	0	67	21	6	6	2,621

Setup / Input - Group 1 / Input - Group 2 \ Summary / By Location / By Mc
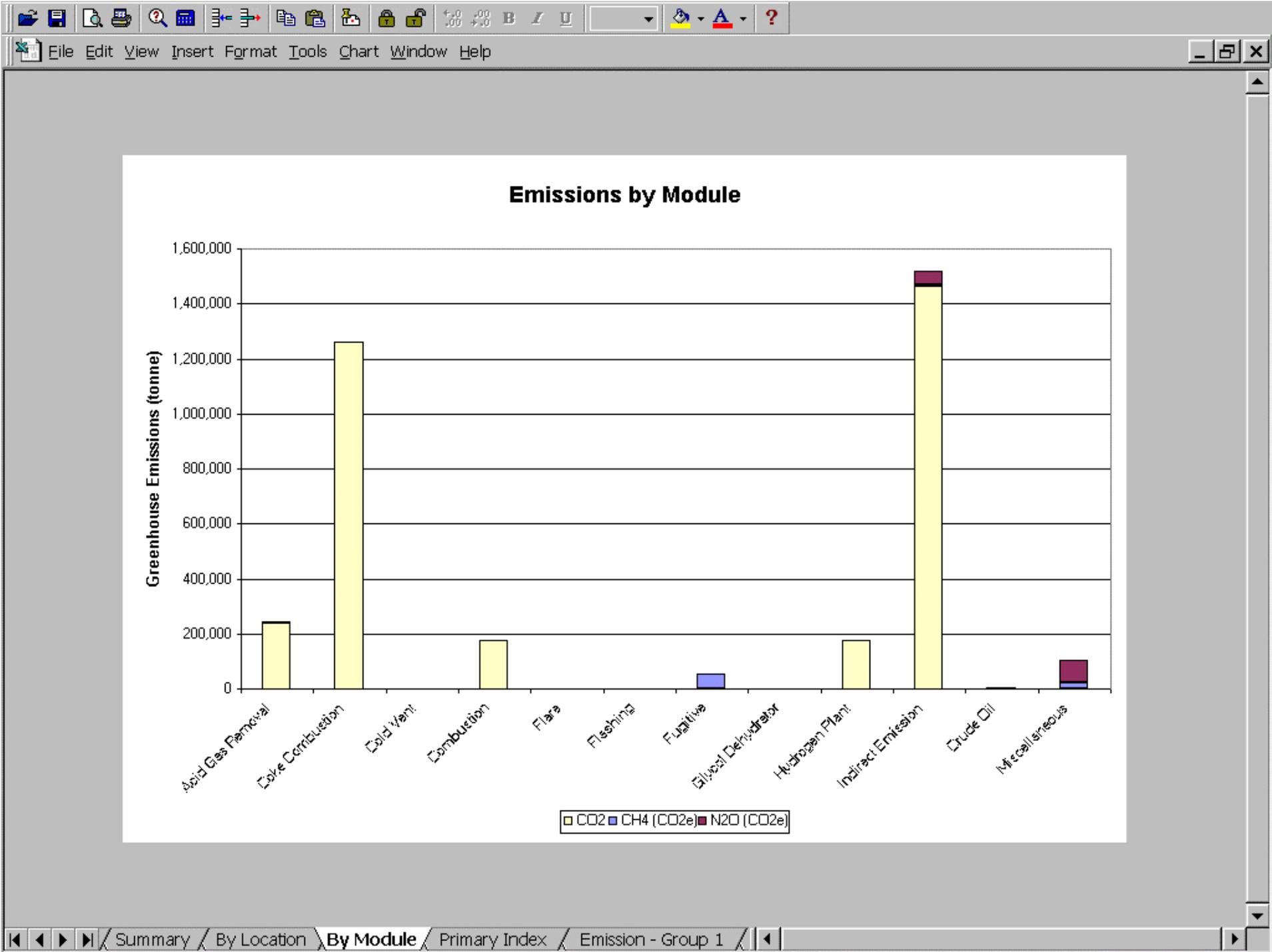
Primary Emission Index

Plot Area

Emission Index (ton (short) / Barrel

30.00
29.50
29.00
28.50
28.00
27.50
27.00

Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec

—— Total Productio
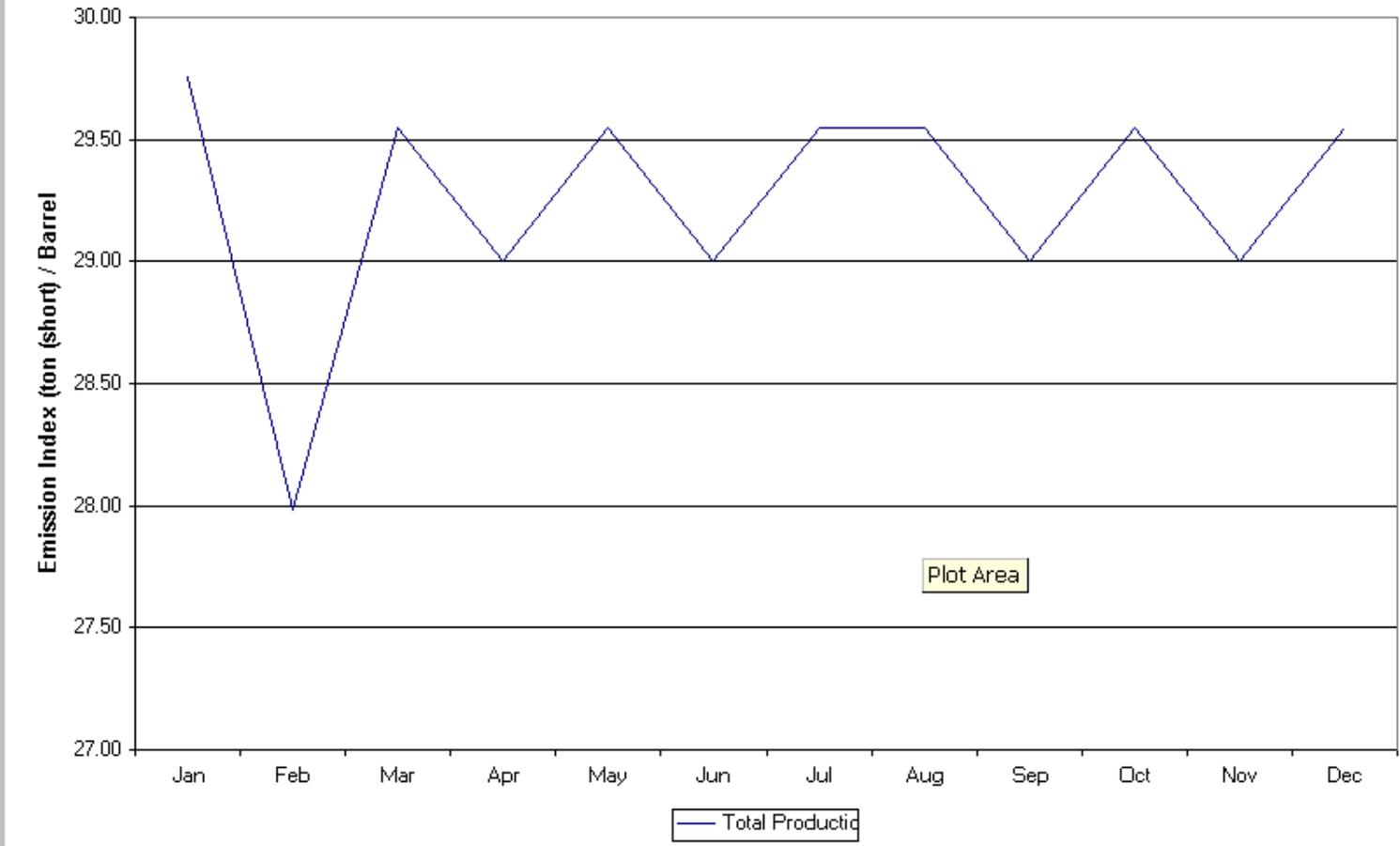
CEGIS Software Control System

- **Checks, reviews, documentation of results**

- **Backup electronic copies of data**

- **Consistent definition of data**

- **Restricted access for editing, report design**

Data Management

- **Corporate**
  - **Oracle Database developed in tandem with CEGIS**
  - **Compatible with CEGIS**
  - **Designed to accommodate future organizational changes**

- **Opcos**
  - **System-generated Excel files or site-specific systems for Opcos**
  - **Details and specifics to be determined as a next step**
    - **Coordinate with Operational Excellence**

What's Next?

- **Add Criteria Pollutants (NOx, SOx, VOCs, CO, PM)**

- **Customization for opco-specific reports**

- **Use CEGIS as a tool to help forecast emissions**

- **Use CEGIS to estimate GHG emissions from new capital projects**

Summary

- **Systematic, 1+-year effort to develop inventory**
  - **Project Manager**
  - **Stakeholder Group**
  - **70+ Users**
  - **Ongoing Help Desk and Upgrades**
- **Off-the-shelf technology not available**
- **ChevronTexaco system unique**
  - **Enterprise-wide deployment**
  - **Verifiable system**
  - **Based on API methodology**